



Diabetic Foot Study Group of the EASD

14th Scientific Meeting

8 - 10 September 2017
Porto · Portugal

Programme and Abstracts



Index

Welcome	3
DFSG Executive Committee	4
General information	5
DFSG membership	8
Overview programme	9
Detailed Programme	
Friday 8 th September	10
Saturday 9 th September	12
Sunday 10 th September	16
Oral abstracts: Prize orals and Paul Brand Award	21
Oral Abstracts	27
Poster Abstracts	67
Sponsor and exhibitor information	170
Author index	174

DFSG Secretariat

Nordre Fasanvej 113, 2nd floor
2000 Frederiksberg C
Denmark

Tel: +45 70 20 03 05
dfsg@dfsg.org
www.dfsg.org

Welcome



Dear participant

It is a great pleasure to welcome you to the 14th meeting of the Diabetic Foot Study Group of the EASD in Porto.

The DFSG is very happy to welcome you all and we are very proud to call the DFSG a true interdisciplinary collaboration between diabetologists, podiatrists, specialist nurses, orthopaedic and vascular surgeons, as well as all other specialists with an interest in diabetic patients with foot problems.

The theme of the meeting is:

Advancement of knowledge on all aspects of diabetic foot care

The three meeting days will offer you a unique opportunity to meet with leading Diabetic foot experts and to be updated on the diabetic foot research happening across Europe.

We look forward to updates on main subjects like Epidemiology, Basic and clinical science, Diagnostics, Classification, Foot clinics, Biomechanics, Osteoarthropathy, Orthopaedic surgery, Infection, Revascularisation, Uraemia and Wound healing/ outcome.

A warm welcome to Porto. Enjoy the conference!
On behalf of the DFSG executive committee

Dr. Klaus Kirketerp-Møller
Chairman

DFSG Executive Committee

Executive Committee 2017



Chairman Klaus Kirketerp-Møller
Denmark



Vice Chairman Nikolaos Papanas
Greece



Scientific Secretary Nikolaos Tentolouris
Greece



Treasurer Nina Petrova
United Kingdom



Maureen Bates
United Kingdom



Anna Katharina Trocha
Germany



José Luis Lázaro Martínez
Spain



Frances L. Game
United Kingdom



Enrico Brocco
Italy

General information

Contact

DFSG Secretariat

Nordre Fasanvej 113, 2nd floor
2000 Frederiksberg C
Denmark
Phone +45 70 20 03 05
Email dfsg@dfsg.org
Web www.dfsg.org

Conference venue

Sheraton Porto Hotel

Rua Tenente Valadim 146
4100-476 Porto
Portugal
www.sheratonporto.com

Disabled access

All areas of the venue allow disabled access.

Conference Secretariat (Registration desk)

The conference secretariat is located in on the 1st floor outside the exhibition and plenary room

Conference Hours

Friday 8th September

12:00 - 19:00	Registration
14:00 - 19:00	Scientific sessions
14:00 - 20:00	Exhibition
19:00 - 20:00	Welcome reception (open to all delegates)

Saturday 9th September

07:00	Podartis Diabetes Run, 5 km
08:00 - 18:00	Registration
09:00 - 17:45	Scientific sessions
09:00 - 17:45	Exhibition
17:45 - 18:30	DFSG Business Meeting (for DFSG members only)
19.30 - 01:00	Conference dinner at Palácio da Bolsa, Porto. Included in the registration fee. Exhibitors can purchase a ticket at the registration desk.

Sunday 10th September

08:00 - 15:00	Registration
09:00 - 16:05	Scientific sessions
09:00 - 14:00	Exhibition
16:10 - 17:00	Closing Words and Farewell in the Lobby of Sheraton

Badges

All participants and exhibitors should wear the name badge in the conference area at all times. The badge must be visible.

Certificates of Attendance

Certificates of attendance will be available from the morning coffee break on Sunday 10 September at the registration desk.

General information

Entitlements

Presenting authors

Accommodation in a single room (in 8 - out 10 September including breakfast), participation in all scientific sessions, programme and book of abstracts, coffee Friday, lunch and coffee Saturday and Sunday, participation in Welcome Reception Friday and Conference Dinner Saturday.

Non-pres. members

Accommodation in a single room (in 8 - out 10 September including breakfast), participation in all scientific sessions, programme and book of abstracts, coffee Friday, lunch and coffee Saturday and Sunday, participation in Welcome Reception Friday and Conference Dinner Saturday.

Non-members

Participation in all scientific sessions, programme and book of abstracts, coffee Friday, lunch and coffee Saturday and Sunday, participation in Welcome Reception Friday and Gala Dinner Saturday.

Accompanying persons

Participation in Welcome reception Friday and Conference Dinner Saturday. Accompanying persons do not have access to the scientific sessions and lunch is not included.

Exhibitors

Coffee Friday, lunch and coffee Saturday and Sunday is included in price. Exhibitors may participate in the social events except for the conference dinner. If an exhibitor wish to join the conference dinner tickets can be purchased by contacting the Secretariat. Exhibitors do not have access to the scientific sessions.

Lunch and coffee

Lunch and coffee is available in the exhibition area. See programme for exact time of breaks.

Wifi

Wifi name: connecting@sheraton
Username: Porto
Password: Porto

Parking

You can park your car on the parking floor of Sheraton Hotel.
Price for parking:
Guests: 9€ / 24 hours / car
External guest: 1.80€ / hour / car
The hotel also offers charging of electric cars.

Speaker Information

Please bring your presentation to the Plenary Session Room before your session starts. We recommend you upload your presentation at least 2 Hours before our session. A technician will be present to assist in the upload if necessary.

Please bring your presentation on a USB. Use of personal laptops is not allowed. Unless otherwise agreed all presentations will be deleted after the conference in order to secure that no copyright issues will arise at the end of the conference.

Mobile phones

All mobile phones must be on silent mode during the sessions.

Language

The language of the DFSG 2017 conference is English.

Lost and Found

Found items should be returned to the registration desk. If you lose something, please report to this desk for assistance.

No smoking policy

Smoking is prohibited in the venue. There are dedicated outdoor smoking areas available.

Posters

Posters can be mounted from Friday 8th September 2017, 12.00 and must be removed after the end of the poster session on Sunday 10th September 2017, 16.10.

The posters will be affixed to the poster boards with tape which will be provided to you by the conference staff.

Prizes and Awards

Oral Abstract Prize

The 3 best oral abstracts will be presented on Saturday 9th September 2017. Participants will have the opportunity to vote for the best presentation after the 3 presentations. 1st prize for the best oral presentation will be announced at the Conference Dinner Saturday evening.

Poster Prize

Poster Prize winners will be chosen from the posters in the session "Top 10 poster abstracts" 1st and 2nd prize for the best posters will be announced at the Gala Conference Saturday evening.

Life Time Achievement Award

The DFSG Life Time Achievement award will be announced at the conference dinner.

The Paul Wilson Brand Repetitive Stress Award

The prize is awarded to a presenter who has submitted an abstract to a regular DFSG meeting, presenting new clinical or experimental data on the effects of repetitive mechanical stress on soft tissues, joints or bones. The winner of the prize will present his/her results in a session on Saturday 9th

September.

First time presenter grant

Winners of the First time presenter grant will be announced at the conference dinner.

Social Events

Welcome reception

The welcome reception takes place on Friday 8th September 19.00-20.00 in the exhibition area. Join your colleagues for snacks and wine/soft drinks. Included in the registration fee. Please note that the reception is not a dinner.

Podartis Diabetes Run

Start the day by running or walking a route of 5 km. We meet in the entrance of Sheraton Hotel 9th September at 7.00. Map and water is provided. The run is sponsored by Podartis

Conference dinner

The Conference dinner takes place at Palácio da Bolsa, Porto Saturday 9th September 19.30 - 01.00. We look forward to seeing you for a great evening with a 3 course dinner, music and the announcement of prize winners. The conference dinner is included in the registration fee for participants. Exhibitors may purchase a ticket by contacting the registration desk.

5 Busses will leave with a 5 min interval from Sheraton Hotel to Palácio da Bolsa from 19.00-19.25. Signs will inform you when the busses will return to Sheraton Hotel.

Closing words and farewell

We close the conference with a snack and drink in the lobby of Sheraton Hotel on Sunday 10th September, 16.10. The event is open to all participants.

DFSG membership

Diabetologists, orthopaedic and vascular surgeons, podiatrists, specialist nurses and other medical specialists with an interest in caring for diabetic patients with foot problems form the main body of Members of the Diabetic Foot Study Group.

How does one become a member?

One must have an abstract accepted for oral or poster presentation at a DFSG Scientific Meeting. One must present this abstract in person, either as first author, or co-author at the same meeting.

Only after successful presentation can one apply to the DFSG secretariat, dfsg@dfsg.org within 2 months after the conference or onsite at the conference to become a member of the DFSG.

- DFSG Members do not pay a yearly membership fee. They can register for DFSG Scientific Meeting at a reduced rate.
- DFSG Members are entitled to participate in the Scientific and Business Meetings of the Group, to vote and to elect the Executive Committee.
- DFSG Members have to attend at least one out of every three Scientific Meetings following each other or else they forfeit their membership.
- Please note that membership of EASD does not mean automatic membership of DFSG.

Overview programme

Friday 8 September 2017

12.00	Registration desk open
14.00 - 14.15	Welcome
14.15 - 15.25	Oral presentations: Miscellaneous I
15.35 - 16.30	Oral Presentations: Diagnostics
16.30 - 17.00	Coffee break
17.00 - 18.00	Woundcare Circle symposium Offloading: Evidence, biomechanics and daily practice: An "Algorithm" from clinical science to patient management
18.00 - 19.00	Oral Presentations: Surgery
19.00 - 20.00	Welcome reception in the exhibition (Included in registration fee. Please note that the event is not a dinner)

Saturday 9 September 2017

07.00	Podartis Diabetes Run/Walk, 5 km, open to all participants
09.00 - 10.30	Oral Presentations: Offloading and Biomechanics
10.30 - 11.15	Coffee break
11.15 - 12.00	Podatis symposium PODIAPP: The App To Simplify The Diabetic Foot Prevention
12.05 - 12.25	Paul Brand Award presentation
12.25 - 13.40	Lunch break
12.45 - 14.15	DFSG Executive Committee Meeting
13.40 - 14.40	Poster discussion I
14.45 - 15.45	Urgo symposium How to Achieve Dynamic healing in the DFU management
15.45 - 16.15	Coffee Break
16.15 - 17.00	Invited talk: Update on the DFSG research grants 2013 and 2014
17.00 - 17.45	Presentation of 3 Top Orals to be judged for prize giving
17.45 - 18.30	Business Meeting and Assembly New DFSG executive members to be elected
18.30 - 19.00	DFSG Executive Committee Meeting including new elected members
19.30 - 01.00	Conference dinner The dinner is included in the registration fee for delegates. Exhibitors can purchase tickets by contacting the DFSG Secretariat.

Sunday 10 September 2017

09.00 - 10.30	Oral Presentations: Charcot and Prevention & Recurrence
10.30 - 11.10	Coffee / Tea Break
11.10 - 11.40	Edixomed symposium DFU Wars: A New Hope?
11.45 - 12.40	Oral Presentations: Podiatry & Vascular assessment and surgery
12.40 - 13.45	Lunch
13.45 - 15.00	Oral Presentations: Miscellaneous II
15.05 - 16.05	Poster discussion II
16.10	Closing words and Farewell in the lobby of Sheraton Hotel: Wine, soft drinks and snacks

Time	Abs.	Title	Speaker	Area
12:00		Registration desk open		
14:00-14:15		Welcome	DFSG Vice-chairman Nikolaos Papanas	Plenary Room
14.15-15.25		Oral presentations: Miscellaneous I Chairs: Nikolaos Papanas, Alberto Piaggese		Plenary Room
	01	Reporting the assessment of new diabetic foot presentations in specialist clinics across Europe: focus on patient perceptions and the possible impact on their management	Raju Ahluwalia, United Kingdom	
	02	Five year mortality following diabetic amputation has not changed over 14 years	Satyan Rajbhandari, United Kingdom	
	03	Comparison of long-term outcomes in diabetic patients with critical limb ischemia treated by autologous cell therapy, percutaneous angioplasty or conservative therapy	Andrea Nemicova, Czech Republic	
	04	Screening MDT, UnderPressure!	Graham Nuttall, United Kingdom	
	05	Negative Pressure Wound Therapy Effect in Diabetic Foot Ulcer May Be Mediated Through Differential Gene Expression	Sebastian Borys, Poland	
15.35-16.30		Oral Presentations: Diagnostics Chairs: Edward Jude, Frances Game		Plenary Room
	06	5-year Follow-up of Patients with Diabetes on Haemodialysis	Paula Gardiner, Ireland	
	07	Diagnostic accuracy of ^{99m} Tc-HMPAO-labeled leucocyte scintigraphy for diabetic foot osteomyelitis in relation to foot part involved and imaging technique	Stamata Georga, Greece	
	08	What is the most reliable and accurate plain X-ray sign in the diagnosis of diabetic foot osteomyelitis?	Francisco Javier Alvaro Afonso, Spain	
	09	The Infected Diabetic Foot: The value of inflammatory biomarkers to diagnose diabetic foot osteomyelitis	Javier La Fontaine, United States	

Time	Abs.	Title	Speaker	Area
16.30-17.00		Coffee break		Exhibition area
17.00-18.00		Woundcare Circle symposium Chair: Alberto Piaggese		Plenary Room
		- The evidence behind modern offloading / Alberto Piaggese - The biomechanics of the offloading devices: one size fits all? / Claudia Giacomozzi - Choosing a modern offloading for diabetic foot ulcer using a practical algorithm: implementing evidence on the daily practice / José Luis Lázaro Martínez		
18.00-19.00		Oral Presentations: Surgery Chairs: José Luis Lázaro Martínez, Enrico Brocco		Plenary Room
	010	Age at amputation is strongly related to mortality during 10 years follow up	Bernard Pac Soo, United Kingdom	
	011	Major lower-extremity amputations in people with and without diabetes in Belgium, 2009-2013	Patrick Lauwers, Belgium	
	012	Diabetic foot surgical treatment in elderly over 75 years	Roberto da Ros, Italy	
	013	The spread of foot infection and its impact on the outcomes of major amputations of lower extremities in diabetic patients	Danguole Vaznaisiene, Lithuania	
19.00-20.00		Welcome reception in the exhibition (Included in registration fee. Please note that the event is not a dinner		Exhibition area

Time	Abs.	Title	Speaker	Area
07.00		Podartis Diabetes Run/Walk, 5 km, open to all participants	 PODARTIS Clinically Tested Footwear	Meet at the entrance to Sheraton Hotel
09:00 – 10:30		Oral Presentations: Offloading and Biomechanics Chairs: Anna Trocha, Sicco Bus		Plenary Room
	014	Declining offloading rate in Belgian Recognized Diabetic Foot Clinics (RDFC): results from an audit-feedback quality improvement initiative.	Isabelle Dumont, Belgium	
	015	Careful selection of insole material stiffness can significantly improve pressure reduction in therapeutic footwear and orthoses	Panagiotis Chatzistergos, United Kingdom	
	016	Clinical efficacy of therapeutic footwear with a rigid rocker sole in the prevention of reulceration in patients with Diabetes mellitus and diabetic polyneuropathy: a prospective and randomized clinical trial	Mateo López Moral, Spain	
	017	Neuromechanical differences between diabetic patients with and without ulcerated feet	Roozbeh Naemi, United Kingdom	
	018	Can people with diabetes reduce the muscular demands of walking through altering the leverage at the ankle?	Milos Petrovic, United Kingdom	
	019	Digital deformities assessment should be consider before a percutaneous flexor tenotomy for management diabetic foot ulcers on the toes	Irene Sanz, Spain	
10.30-11.15		Coffee break		Exhibition area
11.15-12:00		Podartis symposium: PODIAPP: The App To Simplify The Diabetic Foot Prevention Chair: Camillo Buratto	 PODARTIS Clinically Tested Footwear	Plenary Room
		- Diabetic Foot Triage: A Practical Orthotics Guidance for Prevention / Luigi Uccioli - Podiapp: The Project of the Revolutionary App / José Luis Lázaro Martínez - The Screening for the Identification of the Level of Risk /Roberto Da Ros - Recommendations and the Orthotics Prescription according to the Risk Level / Enrico Brocco		
12.05-12.25		Paul Brand Award presentation Chairs: Klaus Kirketerp-Møller, Alberto Piaggese		Plenary Room
		How effectively offload patients with diabetic foot at home?	Jarmila Jirkovska, Czech Republic	Paul Brand Award Oral
12.25-13.40		Lunch break		Exhibition area
12.25-13.40		DFSG Executive Committee Meeting		Challenger
13.40-14.40		Poster discussion I		
		Parallel session A: Top 10 poster abstracts Chair: Nicholas Tentolouris		Ariana 1
	P1	The impact of vascular status on the outcome of patients treated with a minor amputation for their diabetic foot osteomyelitis: a retrospective observational study	Nafeesah Shafiq, United Kingdom	
	P2	Investigation into the relationship between plantar pressure and skin hardness in people with diabetes	David Allan, United Kingdom	
	P3	Smart socks monitoring skin temperature can predict plantar pressure changes	Mamdouh El-nahas, Egypt	
	P4	The effect of shoe outsolestiffness on plantar pressure and patient satisfaction in patients with diabetes at high risk of foot ulceration.	Sicco Bus, Netherlands	
	P5	Efficacy of a pro-active screening for diabetic foot ulceration in the community autonomously performed by nurses	Alberto Piaggese, Italy	

Time	Abs.	Title	Speaker	Area
	P6	Sixty percent reduction of ulcer area at 2 weeks can be a useful predictor of eventually diabetic foot ulcer healing by 12 weeks	Timothy Jemmott, United Kingdom	
	P7	Time sequence of bone marrow edema Resolution in the active diabetic Charcot foot-a retrospective Study	Sofia Antoniou, Germany	
	P8	Microsurgical Diabetic Foot Ulcer Reconstruction: The Most Functional Reconstruction	Donghyuk Shin, Korea, Rep. of South	
	P9	Ischemia as a prognostic factor in the outcome of the patients admitted in a Diabetic Foot Unit.	Jesus Alfayate-Garcia, Spain	
	P10	Comparison of three different isolation methods of cell therapy of critical limb ischemia in diabetic patients	Anna Pyšná, Czech Republic	
Parallel session B: Biomechanics & Microbiology				
Chair: Anna Trocha				Ariana 2
	P11	Effectiveness and cost-effectiveness of orthotic intervention in diabetes: A systematic review	Aoife Healy, United Kingdom	
	P12	Which rocker outsole design is most effective for diabetic patients?	Roosbeh Naemi, United Kingdom	
	P13	Walking poles and upright posture stability in diabetic patients	Piorgiorgio Francia, Italy	
	P14	Colony forming units (CFU) as a marker of effectiveness of VAC with/without ultrasound debridement (USD)	Maksym Gorobeiko, Ukraine	
	P15	A negative bone culture may predict a lower incidence of major amputation in patients with the diabetic foot	Veronika Woskova, Czech Republic	
	P16	Exploration of serial changes in the microbiome of diabetic foot ulcers	Frances Game, United Kingdom	
	P17	The microbiome of the chronic diabetic foot ulcers	Elena Komelyagina, Russian Federation	
	P18	Multidrug resistant bacteria: an increasing complication of diabetic foot	Elisabetta Iacopi, Italy	
	P19	Multiresistant Bacteria: Analysis of Multidisciplinary consultation of the Diabetic Foot Unit	Liliana Fonseca, Portugal	
Parallel session C: Prevention & Varia				
Chair: Maureen Bates				Ariana 3
	P20	Breakthrough in treatment of skin barrier defects in diabetic feet with new foam technology	Maximilian Spraul, Germany	
	P21	Annual diabetic foot risk assessment: is it necessary?	Daniela M. M. Mendes, Portugal	
	P22	The measurement of skin temperature in the examination of the foot within the Diabetic Foot Clinic	Wegin Tang, United Kingdom	
	P23	Effect on HbA1c, diabetes related problems and wellbeing of proactive multidisciplinary care for people with diabetic foot complications and poorly regulated HbA1c	Mette Glindorf, Denmark	
	P24	Diabetic foot in patients after transplantation and it's association with risk factors including education, prevention and physical activity.	Eliška Vrátná, Czech Republic	
	P25	Prognosis of wound healing in diabetic foot patients	Tatiana Zelenina, Russian Federation	
	P26	Is there a relationship between bone quality and fracture risk in patients with type 2 diabetes	Tatiana Gracheva, Russian Federation	

Time	Abs.	Title	Speaker	Area
P27		The role of topical oxygen therapy in the treatment of diabetic foot ulceration	Nia Jones, United Kingdom	
P28		Diabetic foot ulcers caused by rat bite in Tanzania	Zulfiqarali G. Abbas, Tanzania	
P29		Does cognitive function impairment influence the foot protective behavior?	Marina Khlopina, Russian Federation	
Parallel session D: Vascular Surgery /PAD & Offloading Chair: Enrico Brocco				Gemini 1
P30		Reference range for tcpO2 measurement on plantar foot surface: a pilot study	Oleg Udovichenko, Russian Federation	
P31		Botulinum toxin therapy is effective for lower limb spastic of CLI not to undergo revascularization	Yuta Terabe, Japan	
P32		Utilization of criopreserved arterial homografts in the revascularization of the complicated diabetic foot	Laura Carrasco Cortijo, Spain	
P33		Rapid Access to Vascular -A New Local Initiative For Diabetic Foot Patients With Peripheral Vascular Disease	Paula Grannon, United Kingdom	
P34		Pulse wave velocity and peripheral neuropathy in patients with type 2 diabetes mellitus	Anastasios Tentolouris, Greece	
P35		Vascular rehabilitation as part of the therapeutic algorithm of diabetic PAD	Toscanella Fabrizia, Italy	
P36		5-years old results of endovascular treatment in diabetic patients with critical limb ischemia	Zera Abdulvapova, Russian Federation	
P37		What Degree of Blood Supply and Infection Control is Needed to Treat Forefoot Diabetic Critical Ischemia with Foot Osteomyelitis?	Miki Fujii, Japan	
P38		Removable contact splints in patients with diabetic foot under postoperative care	Vladimira Fejfarova, Czech Republic	
P39		Enhanced Offloading for Diabetic Foot Ulcers with Bilateral PulseFlow Technology	Hadi Rahemi, United States	
Parallel session E: Education, Organisation and Guidelines Chair: Nina Petrova				Gemini 2
P40		Current Guidelines on Diabetic Foot Screening: An Evaluation of the Recommendations	Cynthia Formosa, Malta	
P41		SMART-FOOT project: Screening, Measures, Assessment, Reaction and Timely referral of diabetic FOOT problems	Frank Nobels, Belgium	
P42		Diabetic foot care education - developing an innovative way of teaching professionals in Portugal	Sílvia Da Silva, Portugal	
P43		A training video on diabetes foot assessment: an effective and versatile resource for multidisciplinary teams	Francesco Medici, United Kingdom	
P44		Diabetic foot education program (DFEP): Opinion Survey on management of diabetic foot in Indian Clinical Setup	Ashok Das, India	
P45		Care Planning for Diabetic Foot Ulcers - Will it make a difference?	Layth Hendow, United Kingdom	
P46		The Effect of the Multi-Disciplinary Team on Morbidity and Mortality in Patients with Diabetic Foot Disease	Laura Watson, United Kingdom	
P47		Toe-Flow model: 3 years experience of Diabetic Foot Unit	Juan Pedro Sanchez Rios, Spain	

Time	Abs.	Title	Speaker	Area
	P48	Quality and Safety of Podiatric Independent Prescribing: a local retrospective audit within a Diabetic Outpatient Foot Clinic	Jacqueline Mildred, United Kingdom	
	P49	The Impact Of Route Of Admission On Hospital Length Of Stay For Patients With Emergency Diabetes Foot Complications	Jennifer Tremlett, United Kingdom	
14.45-15.45		Urgo symposium: How to Achieve Dynamic healing in the DFU management Chair: K. Van Acker		Plenary Room
		<ul style="list-style-type: none"> - Introduction: What is the battle today in DFU management? / K. Van Acker - How to better diagnose and dialog with Community and non experts? A simple and complete tool / C. Manu - Does local treatment lead to improved patient outcomes? Evidence based medicine review / W. Jeffcoate - Does decreased healing time with UrgoStart lead to higher closure rates? / M. Edmonds - Explorer the ideal RCT? Explorer patient cases Conclusion / K. Van Acker 		
15.45-16.15		Coffee Break		Exhibition area
16:15-17:00		Invited talk: Update on the DFSG research grants 2013 and 2014 Chairs: Kristien van Acker, Nikolaos Papanas		Plenary Room
	020	Analysis of the foot's morpho-functional characteristics that can predispose in the development of a Charcot's Diabetic- Neuropathic-Osteo-Arthropathy (DNOA)	José Luis Lázaro, Spain	
	021	Bone immunohistochemistry and levels of RANKL, osteoprotegerin and inflammatory cytokines in acute charcot foot	Ioanna Eleftheriadou, Greece	
		Information about the Dfoot International	Kristien van Acker, Belgium	
17:00-17:45		Presentation of 3 Top Orals to be judged for prize giving Chairs: Klaus Kirketerp-Møller, Nina Petrova		Plenary Room
	Prize Oral 1	Reducing diabetes related amputations following introduction of validated commissioning criteria in one UK region	Richard Paisey, United Kingdom	
	Prize Oral 2	Impact of below-the-ankle peripheral arterial disease on the outcomes of diabetic patients with ischemic foot ulcers	Marco Meloni, Italy	
	Prize Oral 3	Recurrence of diabetic foot ulcers: 10-year follow-up analysis in Eurodiale subgroup	Michal Dubsy, Czech Republic	
17:45-18:30		Business Meeting and Assembly New DFSG executive members to be elected		Plenary Room
18:30-19:00		DFSG Executive Committee Meeting including new elected members		
19:30-01.00		Conference dinner The dinner is included in the registration fee for delegates. Exhibitors can purchase tickets by contacting the DFSG Secretariat. Palácio da Bolsa, Porto Busses will depart from Sheraton at 19:00,19:05, 19:10, 19:15 and 19:25		

Time	Abs.	Title	Speaker	Area
09:00 – 10:30		Oral Presentations: Charcot and Prevention & Recurrence Chairs: Nikolaos Papanas, Maximillian Spraul		Plenary Room
	022	Foot structural changes after lateral column exostectomy in patients with Charcot foot	Raúl Molines Barroso, Spain	
	023	Temperature difference less than 2 degrees compared with the contralateral foot does not rule active Charcot osteoarthopathy: imaging is mandatory	Jody Lucas, United Kingdom	
	024	Total contact casting is a safe treatment modality for acute Charcot osteoarthopathy and neuropathic ulceration and is not associated with increased incidence of deep vein thrombosis.	Michelle Stafford, United Kingdom	
	025	Adherence to guideline-recommended medical therapies in type 2 diabetic patients with chronic critical limb ischemia	Alberto Coppelli, Italy	
	026	Glycaemic variability as measured by the magnitude of visit to visit HbA1c concentrations over the 5 years prior to presentation is significantly associated with rate of wound healing in the diabetic foot	Ketan Dhatariya, United Kingdom	
	027	Diabetic foot ulcer recurrence prediction:a time-to-event analysis	Matilde Monteiro-Soares, Portugal	
	028	Incidence and predictors of recurrent and new diabetic foot ulcers	Susanne Engberg, Denmark	
10:30 – 11:10		Coffee / Tea Break		Exhibition area
11:10 – 11.40		Edixomed symposium: DFU Wars: A New Hope? - These are not the dressings you are looking for - Nitric Oxide Strikes Back - The Funding Menace	 EDIXOMED natural defence: harnessed	Plenary Room
11:45 - 12:40		Oral Presentations: Podiatry & Vascular assessment and surgery Chairs: Enrico Brocco, Luigi Uccioli		Plenary Room
	029	Does the time interval between podiatric review and intervention influence recurrence of diabetes foot ulcers?	Jo McCardle, United Kingdom	
	030	Infrainguinal revascularization in diabetic patients in hemodialysis. What has changed?	Duarte Rego, Portugal	
	031	Alteration of skin blood flow in response to locally applied pressure in type 2 diabetic patients with foot ulcer	Julien Vouillarmet, France	
	032	Thermographic imaging for detection of peripheral arterial disease: a comparative study	Alfred Gatt, Malta	
12:40 – 13.45		Lunch		Exhibition area
13.45-15.00		Oral Presentations: Miscellaneous II Chairs: Frances Game, José Luis Lázaro Martínez		Plenary Room
	033	Should Calcaneal Ulcers Be Managed In a Class of Their Own?	Dhruvi Hirani, United Kingdom	
	034	Hospitalised individuals with diabetic foot disease have high prevalence of cognitive and psychiatric comorbidities which are associated with poor clinical outcomes	Amanda Jurgensen-Rauch, United Kingdom	
	035	Influence of peripheral nerve system on proliferation and migration of keratinocytes on site of ulceration	Ekaterina Artemova, Russian Federation	

Time	Abs.	Title	Speaker	Area
	O36	The association of Endothelial Progenitor Cells with peripheral neuropathy in patients with type 2 diabetes mellitus	Ioanna Eleftheriadou, Greece	
	O37	The disconnect between the presence or absence of clinical diabetic foot infection and positive bacterial cultures.	Zoe Davies, United Kingdom	
	O38	Evaluation of SPECT/CT in patients with diabetic foot infections - a five year's experience	Aka Freya, Belgium	
15.05-16.05		Poster discussion II		
		Parallel session F: Charcot & Neuropathy Chair: Rui Carvalho		Ariana 1
	P50	Is exostectomy for chronic mid-foot plantar ulcer in Charcot deformity a good choice to prevent future events?	Esther Garcia Morales, Spain	
	P51	Plantar foot pressures, footwear adherence and ulcer recurrence in diabetic patients with Charcot foot deformity	Renske Keukenkamp, Netherlands	
	P52	Epidemiology and early management of acute Charcot foot in a tertiary diabetic foot clinic in Belgium	Severien Meyers, Belgium	
	P53	Charcot Neuroarthropathy (CN):factors characterizing a study population in Tuscany 2008-2015	Roberto Anichini, Italy	
	P54	Long-term effects of a diabetic Charcot foot on the progress of neuropathy	Rasmus Jansen, Denmark	
	P55	Treatment of active Charcot neuropathic osteoarthropathy by multidisciplinary diabetic foot team in hospital: Results of our six year's experience	Johana Venerová, Czech Republic	
	P56	Sudomotor examination should be regularly performed in patients with chronic kidney disease from predialysis stage (CKD4) but also after transplantation to detect nerve regeneration	Dragan Tesic, Serbia	
	P57	Assesment of pain sensitivity and speed of wound healing in rats with streptozotocin-induced diabetes mellitus	Anna Gorbacheva, Russian Federation	
	P58	The portable device for automated sural nerve conduction study: utility for the diagnosis of peripheral neuropathy in patients with type 1 diabetes mellitus	Nikolaos Papanas, Greece	
	P59	Diabetic foot experiences at Augusta Victoria Hospital within the context of low resource countries	Reena abu Sneinah Reena, Palestine	
	P61	Peripheral neuropathy and lumbar spinal stenosis in patients with diabetes	Katia Langton, Canada	
		Parallel session G: Epidemiology, Care and Quality of Life Chair: Alexandra Jirkovská		Ariana 2
	P62	Early prediction of diabetic foot ulcer recurrence at Assiut , Egypt	Walaa Khalifa, Egypt	
	P63	What is different about the diabetic patients with neuropathy compared to their non-neuropathic counterparts: A neuromechanical perspective	Nachiappan Chockalingham, United Kingdom	
	P64	An assessment of diabetes foot risk among T2DM patients in Kenya	James Ngoyo, Kenya	

Time	Abs.	Title	Speaker	Area
P65		Implementation of a joint diabetes renal microbiology multidisciplinary team in patients with diabetic foot disease receiving dialysis	Joanne Casey, United Kingdom	
P66		Longterm follow-up of a cohort with a history of diabetic foot ulcer in Austria	Marlene Pandis, Austria	
P67		Only 23% of diabetic foot infections needing acute hospital admission could be classified as severe based on current guidelines on temperature, pulse, respiration and white blood cell count.	Elizabeth Pendry, United Kingdom	
P68		What is the outcome of newly presenting diabetic ischaemic foot ulcers at 6 months?	Daina Walton, United Kingdom	
P69		Sociodemographic and clinical characteristics of patients attending a first appointment at a Multidisciplinary Diabetic Foot Unit	Teresa Pereira, Portugal	
P70		Predictive parameters for lower limb amputations in a Diabetes Center in Romania	George Nita, Romania	
P71		Screening procedure and stratification of type 2 diabetic patients member of Indonesian diabetes society as a reference for the prevention of diabetic foot complications	Eva Niamuzisilawati, Indonesia	
P72		Analysis of deleterious quality of life on caregivers of patients with diabetic foot ulcers	Yolanda García Alvarez, Spain	
Parallel session H: Infection Chair: Oleg Udovichenko				Ariana 3
P73		Gut is my home.. but I can be in toes too. A case of non healing osteomyelitis	Kaustubh Nisal, United Kingdom	
P74		Inflammatory markers have predictive value on the outcome of Diabetic Foot Osteomyelitis	Aroa Tardáguila García, Spain	
P75		The Total Contact Cast is successful in healing not only non-infected diabetic foot ulcers but also infected ulcers	Nicole Mottolini, United Kingdom	
P76		Challenges faced in managing diabetic foot infection caused by multidrug resistant gram negative organism in outpatient settings	Fadwa Elsanousi, United Kingdom	
P77		Haematological Effects of Linezolid: A Survey of Our Patient Experience	Shailesh Gohil, United Kingdom	
P78		Fungal osteomyelitis in the diabetic foot	Venugopal Vimal, United Kingdom	
P79		Influence of poor metabolic control in worsening presentation of Diabetic Foot Osteomyelitis	Rebeca Alvarez-Madroñal, Spain	
P80		Diabetic foot osteomyelitis: medical versus surgical approach	Ana Amado, Portugal	
P81		Risk factors for amputation in moderate and severe diabetic foot infection	Ana Lopes, Portugal	
P82		Improving home IV antibiotic therapy for diabetic foot patients	Michael Pierides, United Kingdom	
Parallel session I: Research & Outcome Chair: Anne Rasmussen				Gemini 1
P83		Does assessment and management for QTc prolongation on 12-lead ECG in the diabetes foot clinic reduce mortality?	Jonathan Valabhji, United Kingdom	

Time	Abs.	Title	Speaker	Area
	P84	Syme amputation: a limb saving alternative with preservation of mobility in a middle-aged population with limited impaired bloodflow	Pieter-Jan Verfaillie, Belgium	
	P85	Gender difference in Diabetic Foot Ulcer	Cesare Miranda, Italy	
	P86	Neuroischemic diabetic foot and rheopheresis treatment - a pilot study	Pavlina Pithova, Czech Republic	
	P87	Investigation of factors related to Elevated Protease Activity (EPA) in patients with Diabetic Foot Ulcers	Fotini Lakopoulou, Greece	
	P88	The Impact of Topical Phenytoin Loaded Nanostructured Lipid Carriers in Healing of Neuropathic Diabetic Foot Ulceration	Mohamad Motawea, Egypt	
	P89	The use of sodic-salt DNA fragments in the progression of wound healing in diabetic foot. A case-control study	Enrico Brocco, Italy	
	P90	Local application of human mesenchymal stromal cells accelerated wound healing in diabetic porcine model	Robert Bem, Czech Republic	
	P91	Immunological perspectives of LeucoPatch treatment of Diabetic Foot Ulcers	Jonas Damgård Schmidt, Denmark	
	P92	The relation between (day-to-day changes in) left-to-right differences in cumulative plantar tissue stress and plantar foot temperature at high-risk locations in diabetes patients	Wouter aan de Stegge, Netherlands	
	Parallel session J: Surgery Chair: Raju Ahluwalia			Gemini 2
	P93	Tarsal Tunnel Sparing Incision - For the foot salvage surgery in the complicated diabetic foot and ankle infections	Senthil Govindan, India	
	P94	Effects of different types of local treatment of foot ulcers in diabetic patients in comparison to standard management	Gagik Galstyan, Russian Federation	
	P95	Non-suture technique utilizing negative pressure wound therapy for ischemic foot	Shinobu Ayabe, Japan	
	P96	A calcium sulphate / hydroxyapatite bone graft substitute eluting gentamicin in the treatment of diabetic foot osteomyelitis: a mid-term follow-up	Christine Whisstock, Italy	
	P97	Reconstructive Surgery in Patients with Infectious Complications of Neuropathic Diabetic Foot	Vladimir Obolenskiy, Russian Federation	
	P98	Domiciliary delivery of negative pressure wound therapy (NPWT) in diabetic foot patients after surgical procedures compared with in-hospital management: results of one year of follow up.	Chiara Goretti, Italy	
	P99	Sequestrectomy role in diabetic foot treatment	Sokol Hasho, Albania	
	P100	External Fixation Types and Their Suitability for Various Diabetic Foot Reconstruction Operations	Kamil Navratil, Czech Republic	
	P101	Arthroplasty with external fixation as a better option that arthroplasty without fixation to prevent long-term complications in patients affected by osteomyelitis	Ana Pilar Ortiz Fernández , Spain	
	P102	The MDT Approach to the Diabetic Ankle Fracture: The importance of Targeting Glycaemic Control Post Surgery	Raju Ahluwalia, United Kingdom	
16.10	Closing words and Farewell in the lobby of Sheraton Hotel: Wine, soft drinks and snacks			Sheraton Hotel Lobby

15th Scientific Meeting of the

Diabetic Foot Study Group

of the EASD



Berlin · Germany · 28 - 30 September 2018

www.dfsg.org

Conference theme

Advancement of knowledge on all aspects of diabetic foot care

Main subjects during conference

- Epidemiology
- Basic and clinical science
- Diagnostics
- Classification
- Foot clinics
- Biomechanics
- Orthopaedic surgery
- Infection
- Revascularisation
- Uraemia
- Wound healing and outcome

Abstract submission opens

January 2018

Registration opens

February 2018

Abstract submission deadline

1 April 2018

Early registration deadline

6 June 2018





Prize Orals

[Paul Brand Award Oral] HOW TO EFFECTIVELY OFFLOAD PATIENTS WITH DIABETIC FOOT AT HOME?

Jarmila Jirkovska¹, Libuse Fialova¹, Blanka Jirkovska², Johana Venerova¹, Vendula Havrlantova¹, Solar Svatopluk¹, Zavoral Miroslav¹

¹Medical Department of the First Faculty of Medicine and Military University Hospital, Charles University, Prague, Czech Republic

²Czech Technical University in Prague, School of Business and Interdisciplinary Studies, Prague, Czech Republic

Aim: Offloading is one of the very important parts of treatment in diabetic foot management. Noncompliance in offloading leads to prolonged healing and chronicity of the ulceration. Health care professionals are used to educate diabetic patients at foot clinics. Aim of our study was to assess how to effectively offload patients with diabetic foot not only staying outside, but when being at home.

Method: A survey with anonymous questionnaire was performed at our out-patient foot clinic. Altogether 54 consecutive repeatedly educated patients fulfilled the questionnaire in March 2017 [72 % of male, most frequent age group 61-70 years (53.7%), predominantly secondary education (50%), 85.2% of pensioners]. The data were statistically processed.

Results/Discussion: 53.7% of patients had non-healed foot ulcer in the time of fulfilling the questionnaire. 57.4% of patients spend at home more than 10 hours a day, excluding time to sleep. Concerning type of home footwear, 38.9% of subjects are used to wear common slippers, 27.8% wear slippers bought in medical supplies shop, 14.8% wear orthosis and 18.5% are used to walk barefoot/socks only at home. In a subgroup of patients with non-healed ulcer, 44.8% of subjects spend at home less than 10 hours a day (excluding time to sleep). 41.4% of these non-healed patients wear common slippers at home, 24.1% wear slippers bought in medical supplies shop, 20.7% wear orthosis and even 13.8% are used to walk barefoot/socks only. 48.3% of subject use crutches just during outside walking instead of all the time use.

Conclusion: Our survey showed that despite receiving systematic education at foot clinic, diabetic foot patients understand being outside or at home as two different situations. Although they offload outside, patients are often noncompliant with use of the offloading tools at home. Effective re-education in this issue is permanently relevant.

[Prize Oral 1] REDUCING DIABETES RELATED AMPUTATIONS FOLLOWING INTRODUCTION OF VALIDATED COMMISSIONING CRITERIA IN ONE UK REGION

Richard Paisey¹, Angela Abbott², Michelle Roe³, John Moore⁴, Alexandra Harrington⁵, Duncan Browne⁶, Margaret Bamford³

¹Torbay Hospital, NHS England, Newton Abbott, Devon, United Kingdom

²Torbay and South Devon Care Trust, United Kingdom

³NHS England, United Kingdom

⁴NHS Bristol, United Kingdom

⁵Gloucestershire Care Services NHS Trust, United Kingdom

⁶Royal Cornwall Hospital Treliske, United Kingdom

Aim: To ascertain underlying causes of the very high diabetes related major lower limb amputation rates (DRMLEAS) in one region of England (6 million inhabitants, 8% with diabetes, 95% white British ethnicity) and effect improvement.

Method: A process of service review commenced in one provider area (secondary care hospital, community podiatry team and primary care facilities) total population 280,000 in 2007. Shortcomings were identified and addressed. A set of 10 detailed service standards required to minimise avoidable DRMLEAS was developed. These were then assessed in all 14 provider areas in the region and recommendations made to each in 2013 to improve practice. Peer reviews of each provider area were made in 2015 and DRMLEAS in that year compared to a rating out of ten for service provision

Results/Discussion: In the initial provider area DRMLEAS decreased from >3/1000/year before 2008 to <1.0/1000/year from 2009 until the present (P, 0.01). New diabetic foot ulcer rates/1000/year stabilised. There was a strong correlation between service score and DRMLEAS ($r=0.9$, $p<0.001$). In areas where service provision score improved from 3 or less to over 8, DRMLEAS fell within 2 years from >1.5 to <0.8/1000/year (0.8=national average). Where service score remained poor, DRMLEAS remained high. In one provider area (500,000 population) three year total diabetes related amputations varied across primary care facilities from a mean for all 65 practices of 4.7 +/-3.6 (CI 3.8 to 5.6) total amputations per 1000 with diabetes (annualised from 3 year data) to 8.9 (CI 7.5 to 9.9) for the 8 practices with reduced access to podiatry. Pearson's Chi-squared test p -value = 9.372e-10 high amputation rate group vs total mean.

Conclusion: Detailed evaluation of efficacy of diabetes foot care provides a valid tool to commission improvements in service which can if applied result in a rapid reduction in avoidable diabetes related amputations.

[Prize Oral 2] IMPACT OF BELOW-THE-ANKLE PERIPHERAL ARTERIAL DISEASE ON THE OUTCOMES OF DIABETIC PATIENTS WITH ISCHEMIC FOOT ULCERS

Marco Meloni¹, Valentina Izzo¹, Laura Giurato¹, Roberto Gandini¹, Luigi Uccioli¹

¹University of Rome Tor Vergata, Roma, Italy

Aim: To evaluate the role of below-the-ankle peripheral arterial disease (BTA-PAD) in diabetic patients with ischemic foot ulcers.

Method: Consecutive diabetic patients with ischemic foot ulcers who referred to our diabetic foot unit were prospectively considered for revascularization according to a preset limb salvage protocol. All revascularization procedures were performed by percutaneous transluminal angioplasty (PTA). All patients had continuous follow-up until ulcer-healing or death. Patients were divided in two groups: BTA-PAD+ and BTA-PAD- according to the involvement of foot vessels (plantar arteries and/or pedal artery) or not, evaluated blindly by expert interventional radiologists on the basis of the angiographic procedures. After one year of follow-up the following outcomes were evaluated: non-healing, minor amputation (below the ankle), major amputation (above the ankle), revascularization failure (technical recanalization failure of the vessel affected without direct arterial flow to the foot and/or absence of distal run-off), recurrence of critical limb ischemia (CLI) after revascularization (pain relapse, new ulcer or non-healing with TcPO₂ < 30 mmHg).

Results/Discussion: A total of 272 patients were included (age 68,9±9,6 years, males 72,8%, type 2 diabetes 90,4%, diabetes duration 20,7±11,6 years, HbA1c 62±22 mmol/mol): 120 (44,1%) with BTA-PAD and 152 (55,9%) without BTA-PAD. The outcomes for BTA-PAD+ and BTA-PAD- were respectively: non-healing (58,3 vs 26,3% p<0.0001), minor amputation (80,3 vs 20,9% p<0.0001), major amputation (18,3 vs 6,6% p=0.002), PTA failure (38,6 vs 11,1% p<0.0001) and CLI recurrence (33,3 vs 17,1% p=0.002). At the multivariate analysis of all predictors found at univariate analysis, BTA arterial disease resulted an independent predictor of non-healing [HR 2.1 (CI 95% 1.4-3.3) p=0.0001], (minor amputation [HR 3.1 (1.5-5.9) p<0.0001], PTA failure [HR 3.5 (1.9-6.3) p=0.0001] and CLI recurrence [HR 2.8 (1.2-4.1) p=0.0001]. BTA-PAD+ showed lower values of TcPO₂ and ΔTcPO₂ 1 month after revascularization than BTA-PAD- (38±13 vs 47±11 mmHg p<0.0001) and (20±13 vs 25±10 mmHg p=0.0002). Dialysis and age were independently related to BTA-PAD.

Conclusion: BTA-PAD appears to be a specific pattern of PAD in diabetic patients with ischemic foot ulcers. BTA-PAD is related to non-healing, minor amputation, PTA failure and CLI recurrence. Dialysis and age are independent risk factors for BTA-PAD.

[Prize Oral 3] RECURRENCE OF DIABETIC FOOT ULCERS: 10-YEAR FOLLOW-UP ANALYSIS IN EURODIALE SUBGROUP

Michal Dubsky¹, Andrea Němcová¹, Alexandra Jirkovská¹, Robert Bem¹, Vladimíra Fejfarová¹, Anna Pysna¹, Veronika Wosková¹, Kamil Navrátil², Jelena Skibova³

¹Diabetes Centre, Institute for Clinical and Experimental Medicine, Prague, Czech Republic

²Clinic of Transplant Surgery, Institute for Clinical and Experimental Medicine, Czech Republic

³Institute for Clinical and Experimental Medicine, Prague, Czech Republic

Aim: The most of recently published studies are focused on acceleration of diabetic foot ulcers (DFU) healing, data about ulcer recurrence are lacking. The aim of the study was to analyze risk factors for ulcer recurrence in patients with healed foot during the 10-year follow-up in our foot clinic.

Method: Patients with healed study foot after completing Eurodiale study (2003-2005) were included into this follow-up. Out of 93 healed patients during our 10-year follow-up 36 patients died (38.7%) and out of 57 living patients 41 were included into this analysis (drop-out was 16 persons). Potential risk factors for ulcer recurrence were: patient-related factors - age, sex, duration and treatment of diabetes, HbA1c>60 mmol/mol, overweight (BMI>27), end-stage renal disease and other co-morbidities; limb-related factors - peripheral arterial disease (PAD), osteomyelitis, Charcot foot and increased CRP; foot status (ulcer size and depth, ulcer location, previous amputation, local signs of infection) and miscellaneous factors (distance from foot centre, smoking, chronic alcohol use). All risk factors were assessed by the first presentation of foot ulcers during the entry visit of Eurodiale study. Chi-square test and stepwise logistic regression were used for statistical analysis.

Results/Discussion: The ulcer recurrence was observed in 33/41 (80.5%) of patients during 10-year follow-up. Out of those 33 patients 1 recurrence was observed in 10 persons (30.3%), 2 recurrences in 7 patients (21.2%) and 3 or more recurrences in 17 patients (48.5%). Plantar location of the ulcer ($p<0.001$), previous minor amputation ($p=0.031$) and distance from foot centre ($p=0.037$) were significant risk factors for ulcer recurrence in univariate analysis. Stepwise logistic regression revealed that distance from foot centre (OR 5.02, 95% CI 0.92–27) was an independent predictor for recurrence of DFU. Other assessed risk factors were not significant in stepwise logistic regression.

Conclusion: Results of our study proved very high risk of DFU recurrence. Main risk factors for ulcer recurrence were higher distance from foot centre, status after previous minor amputation and plantar location of the ulcer. These results reflect the importance of regular and frequent check-up visits of healed patients especially in local foot clinics.

Supported by MZO00023001.





Oral Abstracts

Information

Programme

Oral Abstracts

Poster Abstracts

Sponsor-Exhibitor

Authors

[O1] REPORTING THE ASSESSMENT OF NEW DIABETIC FOOT PRESENTATIONS IN SPECIALIST CLINICS ACROSS EUROPE: FOCUS ON PATIENT PERCEPTIONS AND THE POSSIBLE IMPACT ON THEIR MANAGEMENT

Raju Ahluwalia¹

¹King's College Hospital, United Kingdom

Introduction: This study aims to assess a patient's perspective of their new diabetic foot problem at the time of 1st presentation in a specialist diabetic foot clinic, to understand their pre-conceptions and thoughts that may impact on their management.

Method: Consecutive patients affected by a new diabetic foot problem were sampled from June to August 2016 and assessed at first presentation in 11 specialist diabetic foot centers across Europe (France, Germany, Italy, Spain and England). A standardized questionnaire was designed and completed by each patient and collated information on patient demographics, their perceptions of the duration and severity of their foot problem, their referral pathway to specialist clinic and patient assessment of characteristics of complaint. Analysis was conducted to correlate perceptions with diabetes type, patient presentation and clinically assessed severity.

Results/Discussion: In total 370 consecutive new patients were recruited. The mean age was 66.9±15.9 years the majority being men (68.9%) and type II Diabetes (87.6%). The main documented foot problem was ulceration (74.1%) and the duration of the foot problem was between 1- 6 months in 46.8%; but in 20.3% the problem had been there greater than 6 months at assessment. Fifty-percent of patients perceived their problem as mild. However, at the time of referral 52.1% had ischemic ulcers, 51.5% had infected ulcers, 30.6% had ischemic-infected ulcers 22.2% had an ulcer classified as IIID according to University of Texas Classification (UTC). Inversely, 30% of the patients with an ulcer classified I UTC considered their problem as severe. In total 27.3% of patients have never checked their feet and 28.9% have never received any warning about the risk of their feet.

Conclusion: A patient's subjective assessment of their foot problem appears to underestimate clinical urgency. Thus the patient's poor perception of the diabetic foot "at risk" may delay clinical assessment and specialist referral, which could negatively impact outcomes. Understanding these results may reclaim a lost opportunity to improve outcomes.

[O2] FIVE YEAR MORTALITY FOLLOWING DIABETIC AMPUTATION HAS NOT CHANGED OVER 14 YEARS

Satyan Rajbhandari¹, Bernard Pac Soo², Ushank Ranashinge², Rochana Jayatilake², Ansy Egun³

¹Lancashire Teaching Hospital, Chorley, United Kingdom

²Chorley & South Ribble Hospital, Chorley, United Kingdom

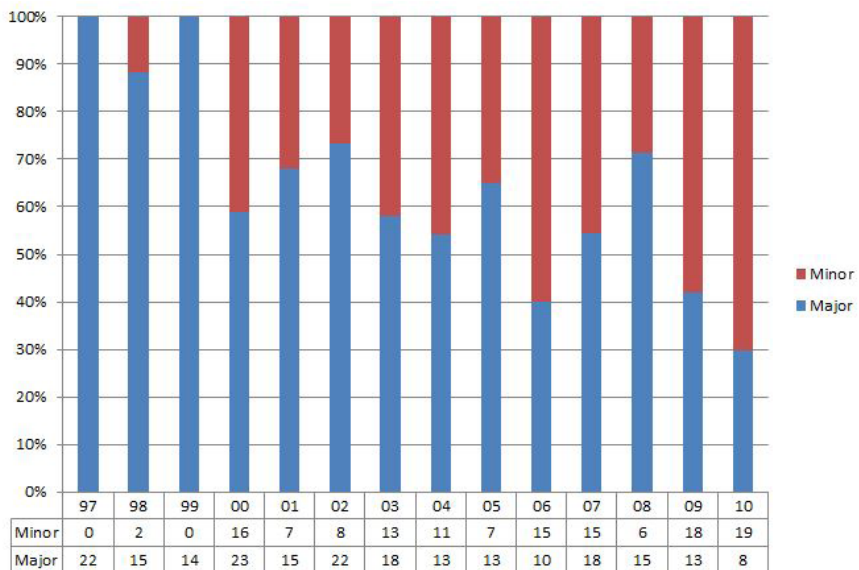
³Lancashire Teaching Hospital, Preston, United Kingdom

Aim: Diabetes is the most common cause of non-traumatic limb amputations. The consequences of undergoing an amputation remain significant. There is an increased risk of mortality compared to non – diabetic patients. Other factors such as the emotional impact and the associated rehabilitation programme also need to be taken into account. There is higher 5- year mortality following diabetes related amputations which is about 70% as per NICE literature review. We wanted to study if this has changed over the last 14 years in our cohort.

Method: This was a retrospective study on 356 patients who underwent amputation between 1997 and 2010. List was obtained from discharge summary and theatre record. Subjects who underwent amputation between 1997 - 2003 were 'Early' cohort and those between 2004 – 2010 were 'Late' cohort. Amputations were grouped at their first surgery into major (above ankle) or minor (below ankle). Electronic database was examined in 2016 to know the date of their death. The cause of death could not be ascertained.

Results/Discussion: There was no difference in the mean number of total amputations performed annually between early and late cohort (25 +/- 8.8 vs 25.9 +/- 4.9; $p > 0.05$), however there was a significant reduction in major amputations performed annually (18.4 +/- 3.9 vs 12.9 +/- 3.2; $p = 0.01$) and a trend for a rise in minor amputations (6.6 +/- 6.3 vs 13.0 +/- 5.1; $p = 0.07$) between these cohorts. 5-year mortality was 59% which was significantly higher in major amputation group than minor (63.9% vs 51.1%; $p = 0.02$). There was no difference between 'Early' and 'Late' cohorts in 5-year total mortality (60.1% vs 57.4%; $p > 0.05$), major amputation mortality (63.2% vs 64.0; $p > 0.05$) or minor amputation mortality (43.9% vs 52.8%; $p > 0.05$).

Oral Abstracts



Conclusion: There has been no change in total mortality with time in subjects with diabetes who needs lower limb amputations. There is significant reduction in major amputation with increase in minor amputation between these cohorts. The change in amputation level started with the introduction of multi-disciplinary diabetic foot clinic in 2001.

[O3] COMPARISON OF LONG-TERM OUTCOMES IN DIABETIC PATIENTS WITH CRITICAL LIMB ISCHEMIA TREATED BY AUTOLOGOUS CELL THERAPY, PERCUTANEOUS ANGIOPLASTY OR CONSERVATIVE THERAPY

Andrea Nemcova¹, Alexandra Jirkovská¹, Michal Dubský¹, Robert Bem¹, Vladimíra Fejfarová¹, Anna Pysna¹, Jelena Skibová¹

¹ Diabetes Centre, Institute for Clinical and Experimental Medicine, Prague, Czech Republic

Aim: Long-term clinical outcomes of revascularization, especially by autologous cell therapy (ACT), in diabetic patients with critical limb ischemia (CLI) remain unclear. The aim of our study was to compare the mortality and amputation rates of patients with diabetic foot (DF) and CLI treated by ACT with patients treated by percutaneous transluminal angioplasty (PTA) and patients treated conservatively.

Method: One-hundred and thirty patients with DF and no-option CLI (defined as transcutaneous oxygen pressure – TcPO₂ ≤ 30 mmHg after unsuccessful standard revascularization) treated in our foot clinic over 5 years were enrolled into the study. Forty-five patients were treated by ACT, 43 patients underwent re-PTA and 42 patients were treated conservatively and formed the control group. Mortality and major amputation rate were assessed over 3 years of follow-up. ANOVA test with Bonferroni correction was used for statistical analysis.

Results/Discussion: Patients in all groups did not differ significantly in basic characteristics. Frequency of comorbidities (hypertension, ischemic heart disease, end stage kidney disease) and immunosuppressive therapy did not differ significantly among the groups. Patients in ACT and control groups had significantly more severe angiographic findings according to Graziani classification than re-PTA group (5.0 ± 0.9 and 5.1 ± 0.8 vs. 3.5 ± 1.1 , $p \leq 0.001$), but there was no significant difference in baseline values of TcPO₂ among all groups. The rate of major amputation after 3 years was significantly lower in ACT and re-PTA groups in comparison with control group (22.2 % and 11.6 % vs. 47.6 %, $p = 0.015$ and 0.003 respectively). There was a trend to lower mortality in ACT group and significantly lower mortality in re-PTA group in comparison with control group (24.4% and 16.3% vs. 42.9%, $p = 0.11$ and 0.009 respectively).

Conclusion: Our study showed significantly lower long-term amputation rate and increased survival in patients treated by ACT and re-PTA in contrast to patients treated conservatively.

Supported by Ministry of Health of the Czech Republic, grant no. 16-27262A, by project for Development of Research Organization 00023001 (IKEM, Prague, Czech Republic) – Institutional support and by Grant Agency of Charles University in Prague, project no. 16415.

[O4] SCREENING MDT, UNDERPRESSURE!

Graham Howard Nuttall¹, Daniel Parker²

¹East Lancashire Teaching Hospital, Blackburn, United Kingdom

²Salford University, Salford, United Kingdom

Aim: Compare screened risk classification to biomechanical risk classification using plantar pressure for the diabetic foot.

Method: Neuropathic diabetic patients were screened in clinic using the SCI-DC foot risk stratification tool and classified as low, moderate or high risk of developing an ulcer. Demographic data was taken and as part of normal treatment all patients received footwear and custom made foot orthotics. In-shoe plantar pressure data was captured using the Pedar system (Novel, Germany) for walking at a self-selected pace in their own footwear with a sham insert (3mm flat Poron) and a custom made foot orthotic. Peak pressure data was determined for the forefoot over the duration of stance. Patients were classified into high or low dynamic biomechanical risk based on the 200kPa pressure threshold outlined by Owings et al. Linear relationships were assessed via Pearson's correlation, paired t-tests were used to assess orthotic effect.

Results/Discussion: 67 patients (58M, 9F). Mean age of 64.2, BMI of 31.1. Based on clinical screening 1% of patients were classified as low, 67% moderate and 32% high risk of ulceration, while 72% were identified as high risk based on biomechanical risk with a weak positive correlation observed between screening methods ($r=0.32$, $p<0.01$). Foot orthotics were effective at reducing biomechanical risk in only 8% of cases, however peak pressure was reduced in the forefoot for 88% of cases demonstrating a clinically relevant effect of foot orthotics. Mean peak pressure for the forefoot was found to be 295.8kPa (± 127.68 kPa) for the in-shoe and 246.06kPa (± 87.95 kPa) with an orthotic, giving a significant difference of 49.74kPa ($t=-4.332$, $p<0.001$) and moderate positive correlation ($r=0.68$, $p<0.01$) suggesting orthotics had greater effect when initial pressures were high.

Conclusion: Classification of ulcer risk based on clinical screening and subsequent management strategies do not capture the biomechanical risk present, but does provide a weak predictor for higher peak pressure in the forefoot. Improved biomechanical risk analysis is required to more accurately predict the peak pressure threshold for ulceration risk across a range of diabetic foot pathologies and to provide a clearer guidance on the effect of orthotic interventions on this risk.

[O5] NEGATIVE PRESSURE WOUND THERAPY EFFECT IN DIABETIC FOOT ULCER MAY BE MEDIATED THROUGH DIFFERENTIAL GENE EXPRESSION

Sebastian Borys¹, Agnieszka Ludwig-Galezowska², Przemyslaw Kapusta³, Michal Seweryn³, Julita Machlowska³, Teresa Koblik³, Jerzy Hohendorff³, Beata Kiec-Wilk³, Paweł Wołkow², Maciej Malecki⁴

¹Katedra I Klinika Chorób Metabolicznych, Krakow, Poland

²Center for Medical Genomics Omicron, Jagiellonian University, Medical College, Krakow, Poland

³Jagiellonian University Medical College, Krakow, Poland

⁴Department of Metabolic Diseases, Jagiellonian University Medical College, Krakow, Poland

Aim: Diabetic foot syndrome (DFS) frequently leads to patient disability due to foot and leg amputations. Negative pressure wound therapy (NPWT) has been successfully used for ulcerations in DFS. However, its mechanisms of action on the molecular level are not fully understood. The aim of this research was to assess the effect of NPWT on the gene expression.

Method: We have included 21 type 2 diabetes (T2DM) patients with foot ulcer treated with NPWT and 8 T2DM patients treated by conventional debridement. Tissue samples were obtained from the bottom of the ulceration at two time points: before the therapy was started and after 8 days of treatment. Total RNA was extracted and gene expression profiling was performed by means of human gene expression arrays*. Differential expression of mRNAs was performed using the standard R Bioconductor pipeline based on 'limma' package.

Results/Discussion: The studied groups were similar in terms of age at the examination 69.0 ± 8.3 vs. 67.5 ± 4.3 years ($p=0.62$), sex: 80,9% vs. 75,0% male ($p=0.72$), T2DM duration: 14.7 ± 7.1 vs. 14.9 ± 6.0 years ($p=0.95$), and other basic clinical characteristics. We identified 6 genes with differential expression ($p<0.05$) between the two time points studied (after the Benjamini-Hochberg correction for multiple testing). Expression of only one of them - RRP7A which is involved in rRNA processing - increased over 2-fold after the treatment ($\log_{2}FC = 0.322$, $p=0.032$), while the remaining 5 genes were downregulated. Two of differentially regulated genes - CYP27A1 ($\log_{2}FC=-0.57$, $p=0.02$) and CLYBL ($\log_{2}FC=-0.08$, $p=0.034$) - associate with mitochondrial function. Two other genes - SRGAP3 ($\log_{2}FC = -0.14$, $p=0.013$) and TRAPPC6A ($\log_{2}FC = -0.12$, $p=0.032$) are associated with endoplasmic reticulum and Golgi apparatus, respectively. Finally, the KIAA1683 gene ($\log_{2}FC = -0.105$, $p=0.035$) encodes a protein interacting with Calmodulin (CaM) messenger protein, which specific function has yet to be determined.

Conclusion: In summary, we found initial evidence that NPWT effect in diabetic foot ulcer may be mediated through differential gene expression. This finding requires further confirmation.

* Illumina

[O6] 5-YEAR FOLLOW-UP OF PATIENTS WITH DIABETES ON HAEMODIALYSIS

Paula Gardiner¹, Antoinette Tuthill²

¹Podiatry Department, Cork University Hospital, Cork, Ireland

²Department of Endocrinology, Cork University Hospital, Cork, Ireland

Aim: End-stage renal disease (ESRD) is an independent risk factor for diabetic foot disease. The aim of this study was to determine outcomes at 5 years of a cohort of patients with diabetes attending a haemodialysis unit.

Method: In 2012 a study was carried out to investigate the podiatric needs of patients with diabetes on renal replacement therapy. This single-centre study involved a convenience sample of 44 patients attending a haemodialysis unit. Using available data this cohort of patients was re-examined on the basis of mortality, prevalence of lower limb pathologies, evidence of peripheral arterial disease (PAD), cardiovascular disease (CVD) and smoking history.

Results/Discussion: The outcome at 5 years indicated a mortality of 70%, which is comparable to published data. Of the remaining 30% (n=12), 4 patients underwent successful renal transplants. With regard to lower limb pathologies 54% had neuropathy, which was of similar incidence in the deceased (58%). However PAD was significantly higher in the deceased group compared to the survivors (85% v 14% respectively). Of the surviving group 23% had a history of Charcot, with two cases occurring during the follow-up period. Foot ulceration occurred in 54% of the surviving group, while 42% of the deceased had active ulceration at time of death. Major amputation was reported in 13% of the deceased patients (one bilateral). One major amputation occurred in the surviving group and this occurred in a patient who declined podiatric care. Smoking prevalence in those who died was almost twice that of the surviving patients (42% v 23%). There was also a higher rate of CVD (52% v 30%) in the deceased group.

Conclusion: This study further highlights the high rate of mortality and podiatric morbidity of this patient population. Mortality appeared to be associated with a higher incidence of PAD, with higher rates of CVD and smoking history also occurring in the deceased group. This may be useful to consider when establishing renal-podiatry programmes. Early identification of risk factors in patients commencing dialysis, implementation of interventions for smoking cessation and aggressive targeting of CVD may be useful in improving outcomes for this group.

[O7] DIAGNOSTIC ACCURACY OF 99MTC-HMPAO-LABELED LEUCOCYTE SCINTIGRAPHY FOR DIABETIC FOOT OSTEOMYELITIS IN RELATION TO FOOT PART INVOLVED AND IMAGING TECHNIQUE

Stamata Georga¹, Christos Manes², Triantafyllos Didangelos³, Georgios Arsos¹

¹3rd Dept of Nuclear Medicine, Aristotle University Medical School, Papageorgiou General Hospital, Thessaloniki, Greece

²Diabetes Center, Papageorgiou General Hospital, Greece

³Diabetes Center, 1st Propedeutic Dept of Internal Medicine, Aristotle University Medical School, Ahepa Hospital, Greece

Aim: Imaging diagnosis of diabetic foot osteomyelitis (DFO) is complex as coexistent soft tissue infection (STI) or Charcot osteoarthropathy (COA), may obscure DFO findings and hamper diagnosis in an anatomy-dependent manner, and imaging technique (planar, tomographic or hybrid) can substantially affect diagnostic accuracy. The study is aiming to evaluate ^{99m}Tc-HMPAO-labeled leucocyte scintigraphy (LS) in DFO diagnosis, in relation to foot part involved and imaging technique.

Method: 168 patients with 207 sites clinically suspect for DFO were investigated by planar LS. Sites were divided into Group-1 (137 forefoot sites, 130 with contiguous ulcer) and Group-2 (70 mid/hind foot sites) further subdivided into subgroups 2a (49 sites with ulcers, 23 with COA) and 2b (21 sites without contiguous ulcer). 80 sites were further investigated by SPECT/CT. Focally increased leucocyte bone uptake was considered positive for DFO. Final diagnosis was based on clinical and radiological follow-up or histopathological findings.

Results/Discussion: Among the 207 sites investigated, final diagnosis was DFO in 74 sites, acute COA in 18, STI in 96 and no infection in 19. In the forefoot sensitivity, specificity, accuracy, positive (PPV) and negative predictive value (NPV) of planar LS for diagnosing DFO were 90.9%, 91.5%, 91.2 %, 87.7% and 93.7% respectively. SPECT/CT addition improved values to 100%, 96.8%, 98.2%, 96.0% and 100%, respectively. In the mid/hindfoot planar LS sensitivity, specificity, accuracy, PPV and NPV were 88.2%, 86.8 %, 87.1%, 68.2% and 95.8% respectively. SPECT/CT addition clearly improved sensitivity to 100%, but only marginally specificity from 86.8% to 90%, due to false positive findings caused by leucocyte accumulation at sites of active bone marrow. Lowest specificity and PPV of 80% and 62.5%, respectively, were observed in subgroup-2b patients with suspected mid/hindfoot DFO without contiguous ulcers and highest acute COA prevalence.

Conclusion: LS is an accurate imaging modality for diagnosing DFO and SPECT/CT can maximize diagnostic performance of planar LS in the forefoot by optimizing discrimination between DFO and STI. Although accuracy of planar LS in the mid/hindfoot is also improved by SPECT/CT, specificity may remain suboptimal by modality-independent false-positives due to active bone marrow foci on sites of acute Charcot arthropathy.

[O8] WHAT IS THE MOST RELIABLE AND ACCURATE PLAIN X-RAY SIGN IN THE DIAGNOSIS OF DIABETIC FOOT OSTEOMYELITIS?

Francisco Javier Alvaro Afonso¹, José Luis Lázaro Martínez², Fernando Sánchez-Lancha López³, Aroa Tardáguila García², Raúl Molines Barroso¹, Ana Pilar Ortiz Fernández²

¹Diabetic Foot Unit, Complutense University Clinic, Instituto de Investigación Sanitaria del Hospital Clínico San Carlos, Madrid, Spain

²Diabetic Foot Unit, Complutense University Madrid, Madrid, Spain

³Diabetic Foot Unit, Complutense University Clinic, Spain

Aim: To analyze the reliability and accuracy of four parameters of plain X-rays in the diagnosis of diabetic foot osteomyelitis (DFO).

Method: A cross-sectional study was conducted. Three clinicians with different levels of experience evaluated 114 x-rays of 107 patients with diabetic foot ulcers with clinical suspicion of osteomyelitis and who underwent surgery between January 2014 and December 2016. Four parameters in the x-rays were analyzed: cortical disruption (loss of cortex with bony erosion), affected bone marrow (ABM), sequestrum (devitalized bone with radiodense appearance that has become separated from normal bone) and active periosteal reaction or elevation (PR). We evaluated the accuracy of x-rays comparing with the histopathology of bone biopsy.

Results/Discussion: The prevalence of osteomyelitis in our patient population was 66.7% (22.4% acute osteomyelitis, 31.6% chronic osteomyelitis and 46% fibrosis). Table depicts the reliability and accuracy of plain X-rays in the diagnosis of DFO.

	Kappa Index	Sensitivity	Especificity
Cortical disruption	$K_{12}=0.40$, $K_{13}=0.40$, $K_{23}=0.48$ ($p<0.001$) moderate	0.76 (0.64-0.84)	0.47 (0.34-0.53)
Affected Bone Marrow	$K_{12}=0.10$ ($p=0.459$), $K_{13}=0.20$ ($p=0.010$), $K_{23}=0.36$ ($p<0.001$) very low	0.66 (0.57-0.78)	0.42 (0.26-0.68)
Sequestrum	$K_{12}=0.16$ ($p=0.055$), $K_{13}=0.10$ ($p=0.209$), $K_{23}=0.20$ ($p=0.003$) very low	0.54 (0.32-0.81)	0.68 (0.29-1)
Periosteal reaction (PR)	$K_{12}=0.50$ ($p<0.001$), $K_{13}=0.36$ ($p<0.001$), $K_{23}=0.26$ ($p=0.004$) moderate and very low.	0.36 (0.25-0.43)	0.75 (0.68-0.79)

Conclusion: The most reliable and accurate X-ray sign in the diagnosis of DFO was the cortical disruption with a moderate agreement among clinicians and a sensitivity of 0.76 (0.64-0.84). The presence of ABM and sequestrum were poor reliable with a very low agreement among clinicians. The less accurate X-ray in the diagnosis of DFO was the presence of PR with a sensitivity of 0.36 (0.25-0.43).

[O9] THE INFECTED DIABETIC FOOT: THE VALUE OF INFLAMMATORY BIOMARKERS TO DIAGNOSE DIABETIC FOOT OSTEOMYELITIS

Javier La Fontaine¹, Junho Ahn², Easton Ryan¹, Dane Wukich², Paul Kim³, Lawrence Lavery¹

¹ Department of Plastic Surgery, University of Texas Southwestern Medical Center, Dallas, United States

² Department of Orthopaedic Surgery, University of Texas Southwestern Medical Center, Dallas, United States

³ Medstar Georgetown University, United States

Aim: To assess the diagnostic value of erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) to diagnoses diabetic foot osteomyelitis (DFO) from soft-tissue infection (STI).

Method: We evaluated 353 patients in a retrospective cohort study of diabetic patients admitted to a tertiary care center with DFO (n=177) and STI (n=176). Patient diagnosis was determined through bone culture or histopathology for DFO, and bone culture, histopathology or imaging (MRI/SPECT CT) for STI.

Results/Discussion: The optimal cutoffs determined by retriever operating characteristic (ROC) analysis for ESR and CRP to predict DFO were 60 mm/h and 8.3 mg/L. The ESR cutoff value demonstrated a sensitivity of 73% and a specificity of 56%, while the values for the CRP cutoff were 50% and 82% respectively. Combined, the sensitivity and specificity for ESR and CRP was 46% and 88%. ESR and CRP values <30 mm/h and <3.0 mg/L demonstrated a negative predictive value of 89% (table).

Parameter	Sen	Sp	PPV	NPV	OR ^a	95% CI
ESR (mm/h)						
> 30	0.97	0.25	0.56	0.88	9.50	(3.39, 23.0)
> 50	0.82	0.43	0.59	0.71	3.58	(2.19, 5.84)
> 60 ^b	0.73	0.56	0.63	0.68	3.56	(2.27, 5.56)
> 70	0.60	0.65	0.63	0.62	2.81	(1.83, 4.34)
CRP (mg/L)						
> 3.0	0.69	0.53	0.60	0.64	2.61	(1.68, 4.06)
> 6.0	0.58	0.68	0.64	0.61	2.84	(1.84, 4.39)
> 8.3 ^b	0.50	0.82	0.74	0.62	4.62	(2.83, 7.54)
> 15.0	0.28	0.91	0.77	0.56	4.23	(2.27, 7.85)
ESR & CRP ^c						
Both	0.46	0.88	0.79	0.62	6.23	(3.63, 10.7)
Either	0.77	0.52	0.62	0.70	3.67	(2.32, 5.81)
Neither	0.49	0.23	0.64	0.39	0.28	(0.18, 0.44)

Conclusion: ESR value of >60 mm/h and a CRP value of >8.3 mg/L should prompt further diagnostic analysis. In such a case, the odds of the patient having DFO is approximately 6-times higher. Furthermore, in the current study, patients with normal range ESR (<30 mm/h) and CRP (<3.0 mg/L) values demonstrated only a 10.8% prevalence of DFO.

[O10] AGE AT AMPUTATION IS STRONGLY RELATED TO MORTALITY DURING 10 YEARS FOLLOW UP

Bernard Pac Soo¹, Ushank Ranashinge¹, Rochana Jayatilake¹, Ansy Egun², Satyan Rajbhandari³

¹Chorley & South Ribble Hospital, Chorley, United Kingdom

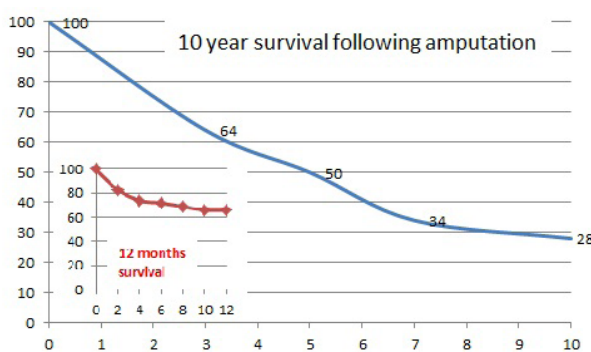
²Lancashire Teaching Hospital, Preston, United Kingdom

³Lancashire Teaching Hospital, Chorley, United Kingdom

Aim: 15% of patients with diabetes develop ulcer in their life time which predisposes them to a high risk of amputations. NICE literature review suggests that in diabetes patients, up to 70% of people die within 5 years of having an amputation. There is no data on long term survival of people who had undergone amputation. We have been following up people for the last 16 years and wanted to study 10 year survival after the first recorded lower limb amputation in our cohort.

Method: This was a retrospective study on 233 patients (159 males) who underwent amputation between 1997 and July 2006. List of patients who had undergone amputation was obtained from discharge summary and theatre record. 63 subjects underwent further amputation but were grouped as their first amputation level into major (above ankle) or minor (below ankle). Electronic database was examined in August 2016 to know the date of their death.

Results/Discussion: The highest mortality was within 4 months of amputations and there was no difference between death following major or minor amputations in our series at this time. During follow up one year survival was 64%, 3 years 50%, 5 years 40%, 7 years 34% and 10 years 28%. People who died by 10 years were older (70.2 +/-11.5 vs 62.4 +/-12.2 years: P <0.0001) and had serum albumin level below normal at presentation (p <0.05). There was no difference in 10 year mortality between gender, presence of anaemia, eGFR, cholesterol level and HbA1c level (p>0.05) at presentation. There was no difference in 10 year mortality with amputation level.



Conclusion: Mortality was highest within 4 months, which could be due to existing co-morbidities. This could explain low albumin in severely ill patients, which was associated with death. Mortality was stable after 5 years. Old age was related to death in our study but the level of amputation was not, which could be due to 63 subjects who underwent further amputation but were grouped as their first recorded amputation.

[O11] MAJOR LOWER-EXTREMITY AMPUTATIONS IN PEOPLE WITH AND WITHOUT DIABETES IN BELGIUM, 2009-2013

Patrick Lauwers¹, Frank Nobels², Claessen Heiner³, Avalosse Hervé⁴, Guillaume Joeri⁵, Isabelle Dumont⁶, Felix Patricia⁷, Boly Jacques⁸, Narres Maria³, Arend Werner³, Stephan Morbach⁹, Andrea Icks¹⁰, Kristien van Acker¹¹

¹Department of Thoracic and Vascular Surgery, Diabetes Liga, Antwerp University Hospital, Edegem, Belgium

² Dept of Endocrinology, Diabetes Liga, Onze-Lieve-Vrouweziekenhuis Aalst, Aalst, Belgium

³Paul Langerhans Group for Health Services Research and Health Economics, German Diabetes Centre, Leibniz Center for Diabetes Research at Heinrich-Heine-University, Institute for Health Services Research and Health Economics, Faculty of Medicine, Heinrich Heine University Düsseldorf, Düsseldorf, Germany

⁴Landsbond der Christelijke Mutualiteiten/Alliances Nationale des Mutualités Chrétienne, Ima/Aim (Intermutualistisch Agentschap/Agence Intermutualiste), Belgium

⁵Ima/Aim (Intermutualistisch Agentschap/Agence Intermutualiste), Nationaal Verbond der Socialistische Mutualiteiten/ Union Nationale des Mutualités Socialistes, Belgium

⁶Foot Centre Ransart, Abd, Association Belge du Diabète, Chu-Brugmann, Bruxelles, Belgium

⁷Clinique du Pied Diabétique, Chr Citadelle, Abd, Association Belge du Diabète, Liège, Belgium

⁸Landsbond der Christelijke Mutualiteiten/Alliances Nationale des Mutualités Chrétienne, Belgium

⁹Internal Medicine, Diabetes and Angiology, Marienkrankenhaus, Soest, Germany

¹⁰ Public Health, Centre for Health and Society, Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany

¹¹Algemeen Ziekenhuis Heilige Familie, Rumst (Reet), Belgium

Aim: Lower-extremity amputations (LEAs), in particular major LEAs, are associated with a high morbidity and mortality rate, reduced quality of life, and high medical costs for the patient, his relatives, and the community. Nationwide data on the incidence of LEA in Belgium are lacking. Therefore, the aim of the present study is to analyze the annual first major LEA rates in patients with and without diabetes in Belgium, and to evaluate the corresponding relative risks as well as the time trends over a five-year period.

Method: Data were provided by the “Intermutualistisch Agentschap – Agence Inter-Mutualiste (IMA-AIM/)”, a non-profit organization that aims to collect and analyze data provided by the Belgian national health insurance funds ; these data cover almost the whole Belgian population. All patients, both with and without diabetes, which underwent a first major LEA during the years 2009 - 2013 were identified. The corresponding age and sex standardized major LEA rates as well the relative risks were calculated. We estimated major LEA rates for each calendar year in the following manner: the number of persons with a major LEA during this year as numerator divided by the number of insured persons in the respective year as denominator. Time trends were analyzed using Poisson regression models.

Results/Discussion: During the study period 5 240 major LEAs were counted. The age–sex standardized annual major LEA rate decreased significantly in the population with diabetes from 42.3 per 100,000 person years in 2009 to 29.9 in 2013. It did not decrease in the population without diabetes (2009: 6.1; 2013: 6.0). As a result we found a strong decrease of the corresponding relative risks from 6.9 in 2009 to 5.0 in 2013. Regarding the time trends, a significant reduction in the major LEA rate was observed among persons with diabetes (8% reduction per year; 95% CI: 7%-9%), but not in the population without diabetes.

Conclusion: We found significantly reduced annual major LEA rates among persons with diabetes, but not among persons without diabetes. Relative risks of major LEA comparing the population with and without diabetes decreased significantly during the study period.

[O12] DIABETIC FOOT SURGICAL TREATMENT IN ELDERLY OVER 75 YEARS

Roberto Da Ros¹, Cesare Miranda², Enrica Barro¹, Barbara Brunato¹, Silvana Carlucci³, Roberta Assaloni¹

¹Diabetes Center, Aas2, Monfalcone, Italy

²Diabetes Center, Aas5, Pordenone, Italy

Aim: Treatment of elderly people represent a challenge in the management of diabetic foot for the presence of multiple comorbidity and frail situation with need of conservative and low impact surgical treatment. Aim of the study: to evaluate diabetic complication, foot outcome and walking ability in old diabetic patients compared to a younger population as control group

Method: Interrogation of surgical database between January 2012 and December 2015, founded 1011 surgical treatment on diabetic foot. 99% of patients have type 2 diabetes, mean age was 72±11 years (mean ± SD), 82% were male, a long history of diabetes 18 ± 11 years was founded. We divided population in two group based on age (< or >75years).

Results/Discussion: 445 (44%) patients were over 75 years. This population presented a mean age of 81.6 (range 75-96). Duration of diabetes was longer in elderly (mean 20.2 vs 16.7 years, p<0.001), while metabolic control was similar (HbA1c 7.7% vs 7.8%, p ns). Compared to population under 75 years, old people presented a similar rate of peripheral neuropathy (95% vs 96%, p ns); peripheral arterial disease was prevalent in older people (84% vs 59%, p<0.001) and need to revascularisation too (64% vs 46%, p<0.001). Diabetic foot presentation with acute infection and need to drainage was similar between the two groups (19% vs 18%, p=ns). Surgical outcome: elderly people experienced a more aggressive conservative treatment with higher prevalence of toes (14% vs 10%, p=0.04) and forefoot amputation (10% vs 5.4%, p<0.01). Major amputations were similar between the two groups (2.5% elderly vs 1.4%, p=ns). Walking ability was loss in 28 (6%) elderly patients and 14 (2%) young patients (p=0.002).

Conclusion: Data from this study confirm that elderly patients presented a complications pattern more complex than younger. This pattern justify surgical outcome that is characterized to higher rate of toes and forefoot amputation. No significant difference was found in rate of major amputation. Walking disability is more frequent in elderly underlining the importance of conservative foot surgical approach to limit risk of walking ability loss and permit conservation of functional autonomy.

[O13] THE SPREAD OF FOOT INFECTION AND ITS IMPACT ON THE OUTCOMES OF MAJOR AMPUTATIONS OF LOWER EXTREMITIES IN DIABETIC PATIENTS

Danguole Vaznaisiene¹, Rita Sulcaite², Astra Vitkauskienė³, Arturas Spucis⁴, Anatolijus Reingardas⁴, Vytautas Kymantas³, Bertrand Eric⁵, Aukse Mickiene¹, Eric Senneville⁶

¹ Infectious Diseases Department, Lithuanian University of Health Sciences, Kaunas Clinical Hospital, Kaunas, Lithuania

² Department of Endocrinology, Lithuanian University of Health, Science, Kaunas, Lithuania

³ Lithuanian University of Health Sciences, Kaunas, Lithuania

⁴ Lithuanian University of Health Sciences, Republican Hospital of Kaunas, Kaunas, Lithuania

⁵ Orthopedic Surgery, Tourcoing Hospital, Tourcoing, France

⁶ Centre Hospitalier Gustave Dron, Service Universitaire des Maladies Infectieuses et du Voyageur, Tourcoing, France

Aim: To assess the spread of foot infection and its impact on the outcomes of major amputations of lower extremities in diabetic patients.

Method: In a multicentre retrospective and prospective cohort study, we included adult diabetic patients (≥ 18 years) who underwent a major amputation of a lower limb in 5 hospitals between 2000 and 2009, 2012 and 2014. A total of 51 patients were included (of which 27 (52.94%) were men and 24 (47.06%) were women) with the mean age of 65.51 years (SD=16.99). Concomitant section's osseous slice biopsy (SOB) and percutaneous bone biopsy of the distal site (BD) were performed during limb amputation. A new surgical set-up and new instruments were used to try and reduce the likelihood of cross-contamination during surgery. A positive culture was defined as the identification of at least 1 species of bacteria not belonging to the skin flora or at least 2 bacteria belonging to the skin flora (CoNS (coagulase negative staphylococci), *Corynebacterium spp*, *Propionibacterium acnes*) with the same antibiotic susceptibility profiles. A doubtful culture was defined as the identification of 1 species of bacteria belonging to the skin flora. The patients were followed-up for 1 year. Stump outcomes were assessed on the delay of complete healing, equipment, need of re-intervention and antibiotics.

Results: In total, 51 SOB were performed during major lower limb amputations (17 above the knee and 34 below the knee) in diabetic patients. Nine (17.65%) bacterial culture results from SOB specimens were positive, 7 (13.73%) doubtful and 35 (68.63%) sterile. Before amputation, 23 patients (45.1%) had not received any antibiotics, including 16 (31.37%) with an antibiotic-free interval of 15 days or more. Microorganisms identified in SOB were also cultured from BD in 33.33% of the cases. Positive SOB was associated with prolonged complete stump healing, re-amputation and the need of antibiotics.

Conclusions: The microorganisms identified from SOB play a role in stump healing in diabetic patients. SOB is useful during major limb amputation due to infectious complications and antibiotic therapy could be corrected on the basis of the SOB culture results.

[O14] DECLINING OFFLOADING RATE IN BELGIAN RECOGNIZED DIABETIC FOOT CLINICS (RDFC): RESULTS FROM AN AUDIT-FEEDBACK QUALITY IMPROVEMENT INITIATIVE.

Isabelle Dumont¹, Deschamps, MSc, Kevin², Vera Eenkhoorn³, Felix Patricia⁴, Sabrina Houthoofd⁵, Lauwers Patrick⁶, Matricali, Giovanni⁷, Randon Caren⁸, Weber Eric⁹, Doggen Kris¹⁰

¹Foot Centre Ransart, Abd, Association Belge du Diabète, Chu-Brugmann, Bruxelles, Belgium

²University of Leuven, Belgium

³Sint-Jozefkliniek, Bornem, Belgium

⁴Clinique du Pied Diabétique, Chr Citadelle, Abd, Association Belge du Diabète, Liège, Belgium

⁵Uz Leuven, Leuven, Belgium

⁶University Hospital Antwerp, Belgium

⁷University Hospitals Leuven, Belgium

⁸University Hospital Ghent, Belgium

⁹Csl Vivalia, Arlon, Belgium

¹⁰Scientific Institute of Public Health, Brussels, Belgium

Aim: To evaluate how DFU (Diabetic Foot Ulcer) are offloaded in RDFC and the evolution over time. RDFC receive their results after each audit for benchmarking (IQED-Foot project).

Method: Comparison of offloading methods used in 2 audits (2011 and 2013/14). Audits characteristics are described in table 1. In each audit, RDFC registered the first 52 diabetic patients over a 1-year period with a “new” foot problem: DFU of Wagner grade 2 or more and/or active Charcot foot (table 2). Off-loading was categorized as follows: 1. **knee-high device**, removable or not (TCC, Diabetic walkers...), 2 ankle-high **shoe** or cast shoe, 3. **other** off-loading techniques around the ulcer (felt, orthoses). 4. **No off-loading**. In case of multiple means of off-loading, the most elaborate one was selected.

Results/Discussion: Population characteristics in 2013/14 are described in table 3. For plantar ulcers, the overall offloading rate diminished significantly between 2011 and 2013/14, from 84.6% to 76.3% (P=0.01). A non-significant decrease was observed in the use of shoes (42.3 and 34.7% in 2011 and 2013/14 respectively, P>0.05), and no decrease in knee-high off-loading (14.8 and 14.7%) and other off-loading techniques (24.8 and 23.4%). The proportion of non offloaded ulcer increased. For dorsal ulcers, the overall off-loading rates were lower and the decline between 2011 and 2013/14 more pronounced (73.1 and 53.7%, P<0.001), affecting both ankle-high off-loading (31.1 and 21.9%, P=0.02) and other off-loading techniques (30.4 and 19.9%, P=0.02), but not knee-high off-loading (7.0 and 8.1%).

Conclusion: Periodical audits in Belgian Recognized Diabetic Foot Clinics have shown a decline in offloading rates. The percentage of patients without any offloading device is increasing. Audit and feedback including non-public anonymous benchmarking has not been able to prevent this decline. Knowing that offloading is the cornerstone of DFU treatment these results are worrying, although overall off-loading rates were comparable to those reported in Eurodiale. Efforts are needed to understand and tackle the barriers towards a correct application of gold standard offloading techniques.

[O15] CAREFUL SELECTION OF INSOLE MATERIAL STIFFNESS CAN SIGNIFICANTLY IMPROVE PRESSURE REDUCTION IN THERAPEUTIC FOOTWEAR AND ORTHOSES

Panagiotis Chatzistergos¹, Roozbeh Naemi¹, Aoife Healy¹, Peter Gerth², Nachiappan Chockalingham¹

¹Staffordshire University, Stoke-on-Trent, United Kingdom

²Magdeburg-Stendal University of Applied Sciences, Magdeburg, Germany

Aim: Cushioning materials in therapeutic footwear and orthoses play an important role in the clinical management of diabetic foot by redistributing plantar loads to reduce plantar pressure. However, no set method exists to help clinicians identify the most appropriate cushioning material on a patient specific basis.

This study aims to investigate the effect of cushioning materials' stiffness on their capacity to reduce plantar pressure and quantitatively assess the importance of carefully selected cushioning materials.

Method: Custom flat insoles were produced from nine bespoke polyurethane cushioning materials with qualitatively similar mechanical behavior but different stiffness (from very soft to very stiff). Plantar pressure distribution was recorded during walking for ten healthy volunteers and peak pressure was measured for all materials for the entire area of the foot (overall peak pressure) and for seven individual foot regions. The capacity of each material to reduce pressure was assessed relatively to a practically rigid material. The overall optimum material (i.e. material achieving maximum overall pressure reduction) and region-specific optimum materials were identified for each participant.

Results/Discussion: One way repeated measures ANOVA indicated that correct selection of cushioning material's stiffness significantly affects pressure reduction (Wilks' Lambda=0.283, F(2,8)= 10.15, p=0.006). The overall optimum material achieved significant reduction in overall pressure (31±13% reduction, p<0.0005) and in region-specific pressure: (a) Heel (26±8% reduction, p<0.0005), (b) Hallux (41±14%, p<0.0005), (c) 1st MetHead (21±23%, p<0.0005), (d) 2nd-3rd MetHead (27±8%, p<0.0005), (e) 4th-5th MetHead (23±14%, p<0.0005). No significant pressure reduction was achieved by the overall optimum material in the regions of midfoot and toes. On average, the materials minimising pressure for the aforementioned regions were 76% and 21% softer than the overall optimum respectively. Pearson correlation analysis indicated that optimum stiffness is correlated to pressure and the participants' body mass and BMI.

Conclusion: Correct selection of cushioning material's stiffness can significantly improve their capacity to reduce plantar pressure. Different materials might be needed to minimize pressure in different regions of the foot. Subject to validation in people with diabetes, these results set the basis for clinically applicable methods to optimize material selection on a patient specific basis.

[O16] CLINICAL EFFICACY OF THERAPEUTIC FOOTWEAR WITH A RIGID ROCKER SOLE IN THE PREVENTION OF REULCERATION IN PATIENTS WITH DIABETES MELLITUS AND DIABETIC POLINEUROPATHY: A PROSPECTIVE AND RANDOMIZED CLINICAL TRIAL

Mateo López Moral¹, José Luis Lázaro Martínez¹, Esther Garcia Morales¹, Irene Sanz², Raúl Molines Barroso², Francisco Javier Alvaro Afonso²

¹Diabetic Foot Unit, Complutense University of Madrid, Madrid, Spain

²Diabetic Foot Unit. Complutense University of Madrid, Instituto de Investigación Sanitaria del Hospital Clínico San Carlos, Madrid, Spain

Aim: To analyze the efficacy of a rigid rocker sole in the reduction of the recurrence rate of plantar ulcers in diabetic foot patients.

Method: Prospective, randomized and controlled clinical trial(NCT02995863) in patients with diabetic neuropathy which were followed-up during a period for at least one month. Twenty-eight patients were randomized either to use a therapeutic footwear with semi rigid sole (control group) or to use a therapeutic footwear with the same characteristics of shoes of the control group in addition of a rigid rocker sole (experimental group). Patients with Diabetes and history of a recently healed ulcer in the plantar aspect of the foot were included. Patients with active ulcer or those with Charcot foot were excluded. Fifteen patients (53,6%) were randomized to the control group and 13(46,4%) to the experimental group. Monthly visits were made to assess the occurrence of diabetic foot ulcers. The main outcome of this study was the recurrence or reulceration in other location in the plantar foot. A multivariate logistic regression was performed and a model was developed to explain the risk of reulceration. $P < 0.05$ was considered to be statistically significant for a confidence interval of 95%.

Results/Discussion: Twenty-seven (96.4%) patients were men, with a mean age of $64,5 \pm 8,56$ years. All patients had type 2 diabetes with a mean evolution of $13 \pm 8,83$ years. Nine patients (28,1%) had retinopathy and 3 (9,4%) nephropathy. The mean of body mass index was $26,87 \pm 4,89$ kg/cm². Twelve patients (42,8%) had previous minor amputation. Ten patients (31,3%) had peripheral arterial disease(PAD). The median follow-up time was 126 days [interquartile range (IQR) 50-206] days. During the follow-up, 8 (28,57%) patients in the control group suffered from recurrence ulcer, and 2 (7,14%) patients in the experimental group. In the logistic regression, we found statistical differences between the use of a rigid rocker sole in the footwear and footwear without a rocker sole at the time of suffering from a reulceration ($p = .010$; OR 0.358; [0.164-.779]).

Conclusion: The therapeutic footwear with a rigid rocker sole is better alternative than therapeutic footwear without rigid rocker sole to reduce the risk of reulceration in diabetic patients with polineuropathy and history of diabetic foot ulcer.

[O17] NEUROMECHANICAL DIFFERENCES BETWEEN DIABETIC PATIENTS WITH AND WITHOUT ULCERATED FEET

Roozbeh Naemi¹, Nachiappan Chockalingham¹, JK Lutale², Zulfiqarali G. Abbas³

¹Staffordshire University, Stoke-on-Trent, United Kingdom

²Muhimbili University of Health and Allied Sciences, Dar Es Salaam, Tanzania

³Dept. of Internal Medicine, Muhas, Amc, Dar-Es-Salaam, Tanzania

Aim: The aim of this study was to investigate the differences in a number of biomechanical, neurological and clinical parameters in patients with and without ulcerated feet along with other demographics and life style profile.

Method: 2406 (M/F: 1379/1027) diabetic patients (184 (M/F: 128/56) with ulcerated vs 2222 (M/F: 1251/971) with non-ulcerated feet who attended the diabetic foot clinic in Tanzania between Jan 2011 and Dec 2015 were recruited and studied.

A combination of categorical and continuous data were collected from the patients during a single visit. A Chi-square test for independence with Yates Continuity Correction was utilized to identify significant ($p < 0.05$) association between categorical parameters and diabetic foot ulceration. Furthermore given the non-normal distribution of the data which was established through the test of normality (Kolmogorov-Smirnov, $p < 0.05$), Mann-Whitney U-Test was utilized to assess the significant ($p < 0.05$) difference between the patients with and without diabetic foot ulceration.

Results/Discussion: The results demonstrate that the ulcerated group showed a significant ($P < 0.05$) association with being male ($\chi^2 = 11.685$), non-active ($\chi^2 = 9.856$), and with current/history of smoking ($\chi^2 = 8.499$), history of alcohol consumption ($\chi^2 = 26.796$), loss of sensation ($\chi^2 = 57.142$), previous ulceration ($\chi^2 = 40.502$), foot deformity ($\chi^2 = 30.108$) and nail ingrowth ($\chi^2 = 10.672$).

Whilst significant ($P < 0.05$) association was found between ulceration and the history of amputation ($\chi^2 = 116.485$) with a medium effect size. Moreover the touch sense sensitivity ($\chi^2 = 164.200$) and swelling ($\chi^2 = 589.781$) both with a large effect size were significantly associated with ulcerated group.

In addition higher VPT ($U = 92344.5$); lower cool sensitivity ($U = 81828.5$); higher heat sensitivity ($U = 103680.5$); lower cold pain threshold ($U = 99477.0$) and higher heat pain threshold ($U = 91143.0$) were the other significant ($P < 0.05$) characteristics of the patients with ulcerated foot when compared to the non-ulcerated group.

Furthermore, the plantar pressure during walking was significantly ($P < 0.05$) higher at the 1st and 5th Metatarsal head, while showed to be lower under the toe regions and the medial and lateral hind foot for patients with ulcerated foot compared to the non-ulcerated group.

Conclusion: The results of this study indicates that the ulcerated group show significant differences in a number of neuromechanical parameters against their non-ulcerated counterparts. These findings can have implications in designing a specific intervention in treating ulcerated patients.

[O18] CAN PEOPLE WITH DIABETES REDUCE THE MUSCULAR DEMANDS OF WALKING THROUGH ALTERING THE LEVERAGE AT THE ANKLE?

Milos Petrovic¹, Steven Brown¹, Frank Bowling², Kevin Deschamps³, Sabine Verschueren³, Constantinos Maganaris⁴, Andrew JM Boulton², Neil Reeves¹

¹Manchester Metropolitan University, Manchester, United Kingdom

²University of Manchester, United Kingdom

³Katholieke Universiteit Leuven, Belgium

⁴Liverpool John Moores University, United Kingdom

Aim: This study aimed to investigate the ratio of the internal compared to the external leverage around the ankle during walking, known as the effective mechanical advantage (EMA) and examine how alterations to the EMA with diabetes and diabetic neuropathy might serve as a mechanism to reduce the workload for the ankle plantarflexor muscles.

Method: Thirty one non-diabetic controls (Ctrl); 22 diabetes patients without peripheral neuropathy (DM) and 14 patients with moderate/severe diabetic peripheral neuropathy (DPN) underwent gait analysis using a motion analysis system and force plates. The internal Achilles tendon moment arm length was determined using magnetic resonance imaging during weight-bearing and external moment arm (ExtMA) was calculated using gait analysis. The EMA around the ankle is given by the ratio of the internal to the ExtMA, with lower values reflecting a relatively greater contribution from the ankle plantarflexor muscles towards the joint moment required to overcome the external resistance during walking.

Results/Discussion: A greater value ($P < 0.01$) for the EMA at the ankle was found in the DPN (0.488) and DM (0.46) groups compared to Ctrl (0.448). The increased EMA was mainly caused by a smaller ExtMA in the DPN (9.63 cm; $P < 0.01$) and DM (10.31 cm) groups compared to Ctrl (10.42 cm). This increased ExtMA may in turn result from the ground reaction force being applied more proximally on the foot, or at an angle directed more towards the ankle. These findings indicate that the ankle plantarflexor muscles would need to generate lower forces to overcome the external resistance during walking compared to controls.

Conclusion: Our findings uncover a new mechanism through which patients with diabetes and particularly those with DPN manage to reduce the joint moment (i.e., strength produced) at the ankle during walking by altering the ratio of the internal to external leverage (the EMA) around the ankle. This strategy allows patients with diabetes and particularly those with DPN to reduce the muscular demands of walking in light of their lower physical capabilities compared to controls.

[O19] DIGITAL DEFORMITIES ASSESSMENT SHOULD BE CONSIDER BEFORE A PERCUTANEOUS FLEXOR TENOTOMY FOR MANAGEMENT DIABETIC FOOT ULCERS ON THE TOES

Irene Sanz¹, José Luis Lázaro Martínez², Aroa Tardáguila García², Yolanda García Álvarez², Francisco Javier Alvaro Afonso¹, Esther García Morales²

¹Diabetic Foot Unit. Complutense University of Madrid, Instituto de Investigación Sanitaria del Hospital Clínico San Carlos, Madrid, Spain

²Diabetic Foot Unit. Complutense University of Madrid, Madrid, Spain

Aim: To evaluate the proportion of digital deformities according to McGlamery's classification in patients with diabetes mellitus.

To assess the relationship between dynamic deformities described by McGlamery and the risk of digital ulcer.

Method: Prospective study was performed in Diabetic Foot Unit between September 2016 and March 2017. Sixty/three consecutive patients with diabetes (126 feet) were evaluated. One clinician performed all the exams of the foot to identify the deformities which were classified in claw or hammer-toe, and in rigid or flexible deformities. Previous ulceration were analyzed and impending ulceration were evaluated by calluses on the tip, over the dorsum of the claw or hammer-toe or nail dystrophy. A film clip in slow motion of the patient's gait was obtained to evaluate the dynamic deformities during the gait and two clinicians categorized independently the deformities described by McGlamery: flexor stabilization, flexor substitution, extensor substitution.

Results: 124 feet (63 patients) were analyzed. 15 feet (12.1%) did not show digital deformities, 2 feet (1.6%) had hammer toe and 107 (86.3%) claw toe. 49 feet (39.5%) suffered rigid deformities, 38 feet (30.6%) had callosity in the tip of the toe, 35 (28.2%) in the dorsum, and 60 (48.4) nail dystrophy. McGlamery classification showed a good intraobserver reliability [0.701 (p<0.001)]. Callus on the tip toe and previous ulceration were associated with flexor stabilization (p=.012; IC[1.237-6.067]; OR 2.7) and with dynamic deformities (p=.024; IC[1.124-8.161]; OR 3.029) respectively. When the flexible deformities were evaluated (n=60 feet), we obtained 16 feet with history of previous ulceration, 8 of them had flexor stabilization, 1 had flexor substitution, and 3 had extensor substitution. Extensor substitution was associated with calluses over the dorsum of the toes (p=.019; IC[1.202-13.875]; OR 4.083), nail dystrophy was associated with dynamic deformities (p=.010; IC[1.322-9.938]; OR 3.625), and flexor stabilization was associated with previous ulcer (p=.041; IC[1.019-10.141]; OR 3.214).

Conclusion: Flexor stabilization was the most dynamic deformity associated with previous ulcer. However, extensor substitution was present in close to 20% of the patients with previous ulcer in whom that flexor tenotomy could aggravate digital deformity. Although there was a high prevalence of flexor mechanism related to ulcers risk, an evaluation of dynamic deformities during the gait should be included as a pre-surgical assessment.

[O20] ANALYSIS OF THE FOOT'S MORPHO-FUNCTIONAL CHARACTERISTICS THAT CAN PREDISPOSE IN THE DEVELOPMENT OF A CHARCOT'S DIABETIC- NEUROPATHIC-OSTEO-ARTHROPATHY (DNOA)

José Luis Lázaro Martínez¹, Irene Sanz², Jose Luis Garcia Klepzig³, Yolanda García Álvarez¹, Esther Garcia Morales¹, Francisco Javier Alvaro Afonso²

¹Diabetic Foot Unit, Complutense University Madrid, Madrid, Spain

²Diabetic Foot Unit, Complutense University of Madrid, Instituto de Investigación Sanitaria del Hospital Clínico San Carlos, Madrid, Spain

³Hospital Clínico San Carlos, Madrid, Spain

Aim: To define the morpho-functional characteristics that influence as risks factors in Charcot's Neuropathic Osteo-Arthropathy patients with Diabetes mellitus (DM).

Method: A prospective study enrolled consecutively patients with diabetes from December 2013 to December 2015. Inclusion criteria were at least three of the following risk factors related Charcot foot (CF): male, duration of DM greater than 10 years, Body mass index (BMI) greater than 30, alcohol abuse, advanced kidney disease, arterial calcification and poor metabolic control. Neurological, vascular and morpho-functional assessment were recorded. X-ray and blood tests were performed at 6, 12 and 24 months. At the end of the study any CF and its relationship with the variables studied was evaluated.

Results/Discussion: 28 patients were included, with a mean age of 60±8.3 years. 26 had DM2 with a mean duration of 14.59 ± 11.93 years. 11 (39.3%) had retinopathy and 4 (14.8%) nephropathy. BMI mean was 29.19 ± 4.5 kg/cm². 32 (57.1%) had pronated or highly pronated foot according to the Foot Posture Index. We found association between pronate foot and the following radiological findings: Lisfranc subluxation (0.000; OR: 17.3[4.4-68]), joint subluxations between 2nd metatarsal and 2nd cuneiform (0.048; OR: 7[0.7-61]), joint subluxation between 2nd metatarsal and 1st cuneiform (0.000; OR:9.5[2.6-34]), bone reabsorption in midfoot (0.04; OR:8.5[0.8-83]), and articular midfoot collapse (0.035; OR:3.3[1-10.7]). Intermetatarsal angle between 1st and 2nd (p=0.002), divergence talus/calcaneus angle (p=0.023) and talus inclination angle (p=0.008) were increased during follow-up. During follow-up: one patient developed a CF, 2 developed a stress fracture in the 4th metatarsal and another one developed bone resorption and periostic reaction in midfoot. Procollagen type 1 n-terminal propeptide (p=0.042) and bone alkaline phosphatase (p=0.05) was increased and had statistically association with the patients with radiographic changes.

Conclusion: Pronate foot is the most prevalent foot type in a cohort of patients with risk factors to develop CF. Pronate foot showed radiological findings similar to those found in chronic CF. The premature alteration in some analytical variables were observed in the patients that showed radiographic changes during the follow-up compatible with CF.

[This study was funded by a DFG Grant. Potsdam. 2012]

[O21] BONE IMMUNOHISTOCHEMISTRY AND LEVELS OF RANKL, OSTEOPROTEGERIN AND INFLAMMATORY CYTOKINES IN ACUTE CHARCOT FOOT

Ioanna Eleftheriadou¹, Iordanis Mourouzis², Edward Jude³, Javier La Fontaine⁴, Eduard Lucian Catrina⁵, Anastasios Tentolouris¹, Chistos Papadimitriou¹, Maria Kemerli⁶, Nicholas Tentolouris⁷

¹First Department of Propaedeutic and Internal Medicine, Medical School, National and Kapodistrian University of Athens, Laiko General Hospital, Athens, Greece

²Department of Pharmacology, Athens University Medical School, Athens, Greece

³Department of Diabetes, Tameside Hospital NHS Foundation Trust, Ashton Under Lyne, United Kingdom

⁴Department of Plastic Surgery, Ut Southwestern Medical Center, Dallas, Texas, United States

⁵Clinica de Chirurgie, Bucharest, Romania

⁶Histopathology Department, Medical School, National and Kapodistrian University of Athens, Athens, Greece

⁷Medical School, National and Kapodistrian University of Athens, Laiko General Hospital, Athens, Greece

Charcot neuroarthropathy (CN) is a progressive condition affecting the bones and joints of the foot and is characterized by pathologic fractures, joint dislocations and debilitating deformities. An exaggerated inflammatory response to a minor trauma is the most current theory regarding the pathophysiology of CN, but the pathogenesis remains unclear. Osteolysis mediated through inflammation and activation of the receptor activator of nuclear factor kappa B ligand (RANKL)-osteoprotegerin (OPG) pathway has been proposed to be the primary event for the initiation and progression of CN.

The aim of this study is to determine the role of the RANKL-OPG pathway, as well as the role of pro-inflammatory cytokines and calcitonin gene-related peptide (CGRP) in bone destruction in acute CN.

A total of 58 subjects have been included in the study, 23 individuals with acute CN, 15 patients with diabetes and peripheral neuropathy, 11 patients with diabetes without peripheral neuropathy and 14 healthy individuals. Eleven participants with acute CN, 10 participants with diabetes and peripheral neuropathy, 8 participants with diabetes without peripheral neuropathy and all healthy individuals have undergone bone biopsies from the foot during elective correcting or other surgery. The excised bone has been fixed in formaldehyde, decalcified in a mixture of formaldehyde and formic acid before routine paraffin-embedded sectioning and staining with hematoxylin and eosin. Immunohistochemistry for the examination of RANKL, OPG, TNF α will be performed at the end of the study. Blood samples have been drawn and determination of RANKL has been performed with ELISA immunoassay, while determination of OPG, TNF α , IL-1b, IL-6, bone specific alkaline phosphatase and CGRP will be performed at the end of the study.

To our knowledge, this is the first study to look for potential differences among expression of RANKL and OPG in bone specimens obtained from the affected sites of patients with acute CN, diabetic patients with and without peripheral neuropathy and healthy individuals. New insights in the pathogenesis of CN could lead to the adoption of new therapies that antagonize the pathologic mechanisms.

[O22] FOOT STRUCTURAL CHANGES AFTER LATERAL COLUMN EXOSTECTOMY IN PATIENTS WITH CHARCOT FOOT

Raúl Molines Barroso¹, José Luis Lázaro Martínez², Francisco Javier Alvaro Afonso¹, Esther García Morales², Yolanda García Álvarez², Mateo López-Moral²

¹Diabetic Foot Unit, Complutense University Clinic, Instituto de Investigación Sanitaria del Hospital Clínico San Carlos, Madrid, Spain

²Diabetic Foot Unit, Complutense University Madrid, Madrid, Spain

Aim: To evaluate the changes in the radiographic alignment after an exostectomy in patients with Charcot foot (rocker bottom) and plantar ulcer located in the lateral column.

Method: A retrospective study between January and February 2017, evaluated 9 patients with diabetes underwent exostectomy for treating a non-healing plantar ulcer located in the lateral aspect of the foot. Foot alignment was assessed by following angles in weight-bearing lateral radiographic view: calcaneal pitch angle; talus inclination angle; first metatarsal inclination angle, Meary's angle; calcaneal-first metatarsal angle; and talus-calcaneal angle. These angles were calculated in both preoperative and postoperative radiographic view to assess changes in the foot alignment after exostectomy. Two different clinicians were blinded to calculate the angles in preoperative and postoperative radiographic views. The reliability in the angles was assessed using intraclass correlation coefficients (ICCs) and the differences between preoperative and postoperative measurements were calculated by paired sample t-student. $P < 0.05$ was considered to be statistically significant for a confidence interval of 95%.

Results/Discussion: Evaluated angles demonstrated excellent inter-rater reliability with ICCs ranging from 0.91 to 0.99. Greater inclination in the talus and calcaneal were observed after exostectomy (table 1). Furthermore, those patients ($n=7$) which cuboid bone or calcaneal-cuboid joint were involved in the exostectomy showed greater changes in the calcaneal pitch angle ($p=.020$ [3.055-24.831]).

N=9	Pre-operative		Postoperative		P-value CI [95%]
	ICC [95%CI]	Mean ±SD	ICC [95%CI]	Mean ±SD	
Calcaneal pitch angle	.975* [.870-.994]	2.20°±9.81	.992* [.963-.998]	-8.64°±10.31	.026* [1.694-19.995]
Talus inclination angle	.958* [.816-.991]	39.53°±7.51	.974* [.884-.994]	46.24°±9.07	.032* [-12.661--761]
First metatarsal inclination angle.	.917* [.633-.981]	16.49°±6.52	.994* [.974-.999]	16.82°±9.36	.864 [-4.529-3.884]
Meary's angle	.959* [.810-.991]	156.86°±11.14	.964* [.841-.992]	150.87°±8.64	.028* [.840-11.127]
Calcaneal-first metatarsal angle	.946* [.755-.988]	164.56°±11.75	.995* [.977-.999]	170.02°±13.26	.130 [-12.927-1.993]
Talus-calcaneal angle	.983* [.930-.996]	36.96°±10.19	.984* [.931-.996]	37.03°±9.75	.971 [-4.134-4.001]

Conclusion: Lateral column exostectomy cause worsening of the arch collapse in patients with Charcot foot. Misalignment in talus and calcaneal bones was commonly associated after an exostectomy in patients with Charcot foot and plantar ulcer located in the lateral column. The risk to develop foot unstable was increased in those exostectomies that involve calcaneal-cuboid joint.

[O23] TEMPERATURE DIFFERENCE LESS THAN 2 DEGREES COMPARED WITH THE CONTRALATERAL FOOT DOES NOT RULE ACTIVE CHARCOT OSTEOARTHROPATHY: IMAGING IS MANDATORY

Jody Lucas¹, Maureen Bates², Timothy Jemmott², Wegin Tang², Daina Walton², Michelle Stafford², Nicole Mottolini², Prash Vas², Chris Manu², Michael Edmonds², Nina Petrova²

¹Kings College Hospital, London, United Kingdom

²Diabetic Foot Clinic, King's College Hospital NHS Foundation Trust, London, United Kingdom

Aim: The active Charcot foot is diagnosed when it is at least 2°C warmer compared with the contralateral foot. However, we report that only 28% of patients diagnosed with Charcot osteoarthropathy by X-ray or magnetic resonance imaging (MRI) present with skin foot temperature difference 2°C or greater compared with the contralateral foot.

Method: We studied 36 patients (20 males and 16 females) who presented with intact hot swollen unilateral foot and clinical suspicion of active Charcot foot in our Diabetic foot Clinic over an 18-month period. Skin foot temperatures were measured with infrared thermometer at corresponding sites of the right foot and left foot. These included metatarso-phalangeal joints, tarso-metatarsal joints, medial and lateral malleoli. Patients underwent weight-bearing foot and ankle radiographs and in cases of normal x-rays, magnetic resonance imaging (MRI) or single-photon emission computer tomography (SPECT/CT) was performed.

Results/Discussion: In 21 patients the diagnosis of Charcot osteoarthropathy was made by the presence of typical radiological changes on weight-bearing foot and ankle radiographs (stage 1 Charcot foot). Fifteen patients presented normal X-rays (stage 0 Charcot foot) but 12 patients had abnormal MRI scans and 3 patients had abnormal SPECT CT scans.

The maximum skin foot temperature difference between feet was above 2°C only in 2/15 patients with stage 0 Charcot foot and in 8/21 patients with stage 1 Charcot foot. The median temperature difference was 0.9°C [0.6-1.7°C] in stage 0 Charcot foot and 1.9°C [0.7-2.4°C] in stage 1 Charcot foot. There was no correlation between the maximum temperature difference between feet and the presence of radiological changes ($r=0.277$, $p=0.102$).

Conclusion: This study reports that only 13% of patients diagnosed with a stage 0 Charcot foot (x-ray negative stage, MRI positive) and 38% of patients diagnosed with a stage 1 Charcot foot (X-ray positive) have a temperature difference 2°C or greater compared with the contralateral foot. We recommend that in a patient with a clinically suspected Charcot foot, it is imperative to carry out imaging studies to identify early bone damage even in cases presenting with a temperature difference below 2°C.

[O24] TOTAL CONTACT CASTING IS A SAFE TREATMENT MODALITY FOR ACUTE CHARCOT OSTEOARTHROPATHY AND NEUROPATHIC ULCERATION AND IS NOT ASSOCIATED WITH INCREASED INCIDENCE OF DEEP VEIN THROMBOSIS

Michelle Stafford¹, Maureen Bates¹, Tim Jemmott¹, Wegin Tang¹, Jody Lucas¹, Daina Walton¹, Nicole Mottolini¹, Nina Petrova¹, Chris Manu¹, Prash Vas¹, Michael Edmonds¹

¹Diabetic Foot Clinic, King's College Hospital NHS Foundation Trust, London, United Kingdom

Aim: Total contact casting is an established 'gold standard' treatment for managing acute Charcot osteoarthropathy and offloading neuropathic ulceration. There are currently no definite guidelines for using anticoagulation therapy with a cast.

The aim of this study was to analyse the incidence of deep vein thrombosis (DVT) in patients treated with total contact casting in our Diabetic Foot Clinic, where it is not a standard practice for patients to receive prophylactic anticoagulation therapy.

We report that out of 879 casting episodes, over a 12 month period, and with an 18-month follow up there were no cases of DVT.

Method: We analysed a total of 879 episodes of cast treatment in 184 patients (43 female, 141 male). These patients presented to our Diabetic Foot Clinic with neuropathic foot ulceration or Charcot osteoarthropathy over a 12 month period. The casting episodes which were analysed included only treatment with a non-removable total contact cast.

Results/Discussion: All patients were treated with standard casting therapy and did not receive prophylactic anticoagulation therapy for total contact casting. At each visit the patients were routinely assessed for any clinical signs of DVT. Of the 184 patients, 26 required DVT scans but no patients were diagnosed with a DVT during the study.

Conclusion: This study has shown that total contact casting is a safe treatment for Charcot osteoarthropathy and neuropathic ulcers. This therapy was not complicated by DVT in 100% of patients.

[O25] ADHERENCE TO GUIDELINE-RECOMMENDED MEDICAL THERAPIES IN TYPE 2 DIABETIC PATIENTS WITH CHRONIC CRITICAL LIMB ISCHEMIA

Alberto Coppelli¹, Elisabetta Iacopi¹, Chiara Goretti¹, Tatiana Violi¹, Alberto Piaggese¹

¹Diabetic Foot Section, Medicine Department, Pisa University Hospital, Pisa, Italy

Aim: The aim of this study was to evaluate the adherence to guideline-recommended medical therapies in type 2 diabetic patients managed by a third-level Center for chronic critical limb ischemia from January 2011 to December 2015.

Methods: We analyzed the database of 603 type 2 diabetic patients (M/F: 430/173; age: 72±9 yrs; diabetes duration: 20±12 yrs; BMI: 27.6±4.9 Kg/m²; HbA1c 7.9±1.6%), focusing on the use of statin, anti-hypertensive and antiplatelet drugs, and smoke habits at the admission.

Results: In total, 63.7% of patients were on statin therapy; 82.6 % on anti-hypertensive treatment and 70.7% on antiplatelet drugs. Concerning smoke habits, 19% of patients were no-smokers; 41% former smokers and 40% active smokers. Among all patients, 32% were prescribed all the four guideline-recommended therapies. We observed no differences in total (138.8±42.2 vs 138.2±42.5 p=NS) and LDL cholesterol levels (75.0±35.4 vs 76.6±28.7 p=NS) in patients on Statin therapy when compared with patients without hypolipidemic drugs. In patients treated with anti-hypertensive drugs we observed higher levels of systolic pressure (138.0±29.5 vs 107.7±36.6 p<0.02) while no differences were observed in diastolic pressure levels.

Conclusion: In conclusion, in diabetic patients with a severe limb and life threatening clinical condition, we observed a weak application of international guideline-recommended medical therapies. In fact, not only just one out of three patients were on recommended medical treatment, but also these patients did not reach the standard targets requested to prevent cardiovascular disease.

[O26] GLYCAEMIC VARIABILITY AS MEASURED BY THE MAGNITUDE OF VISIT TO VISIT HBA1C CONCENTRATIONS OVER THE 5 YEARS PRIOR TO PRESENTATION IS SIGNIFICANTLY ASSOCIATED WITH RATE OF WOUND HEALING IN THE DIABETIC FOOT

Ketan Dhatariya¹, Edwin Li Ping Wah-Pun Sin², Joyce Cheng², Francesca Li², Anson Yue², Ian Nunney², Catherine Gooday¹

¹Diabetic Foot Clinic, Elsie Bertram Diabetes Centre, Norfolk and Norwich University Hospitals NHS Foundation Trust, Norwich, United Kingdom

²Norwich Medical School, University of East Anglia, Norwich, United Kingdom

Aim: Recent work has suggested that glycaemic variability – the visit-to-visit variation in HbA1c – plays a role in the development of micro and macrovascular disease in patients with diabetes. However, whether glycaemic variability is a factor determining wound healing in diabetes related foot ulcers remains unknown. We aimed to see whether this was the case.

Method: A retrospective analysis of patients attending our specialist multidisciplinary diabetes foot clinic between July 2013 and March 2015. Patients were only included if they had at least 3 HbA1c measurements 5 years prior first presentation with a foot ulcer and who had more than 2 follow-up appointments up to 1 year of first presentation. HbA1c variation was measured by the magnitude of Standard Deviation (SD) of HbA1c.

Results/Discussion: 629 foot ulcers were referred to the clinic between July 2013 and March 2015. 328 cases were excluded. Of the remaining 302, 181 patients had their number of days to healing recorded. The overall geometric mean days to heal was 91.1 days (SD 80.8 to 102.7). In the low HbA1c variability group the geometric mean days to heal was 72.1 days (58.3 to 89.1) and in the high HbA1c variability group the geometric mean days to heal was 106.5 days (89.4 to 126.9), ($p < 0.05$).

In addition, ulcer healing was significantly associated with duration of DM ($p = 0.0278$). The odds of healing for DM duration of 8-15 years was 2.56 (95 CI 1.25 to 5.139) compared with having DM < 8 years. Ulcer grade [Texas] ($p < 0.0001$), number of pulses ($p < 0.0001$), ABPI ($p = 0.0208$) and past foot problems ($p = 0.0453$) were also statistically significantly associated with ulcer healing. Type 2 patients on tablet or insulin odds of healing 2.6 (95% CI: 1.37 to 4.94) times that of patients with Type 1 DM or diet controlled T2DM.

Conclusion: Our novel data has shown that wound healing of a foot ulcer is significantly associated with HbA1c variability, with lower variability associated with shorter time to heal. These data confirm the importance of maintaining steady glycaemic control, but also emphasise that large variations in HbA1c over time lead to longer healing times.

[O27] DIABETIC FOOT ULCER RECURRENCE PREDICTION: A TIME-TO-EVENT ANALYSIS

Matilde Monteiro-Soares¹, Paula Marques Ferreira², Joana Rigor², Sara Pinto², CHVNG/E Diabetic Foot Clinic Team³, Daniela M. M. Mendes²

¹Cides Department, Oporto Faculty of Medicine, Porto, Portugal

²Internal Medicine Dept., Centro Hospitalar Vila Nova Gaia/Espinho, Epe, Portugal

³Centro Hospitalar Vila Nova Gaia/Espinho, Epe, Portugal

Aim: The focus of preventive measures should be, firstly, high risk patients. However, there is an insufficient number of studies addressing the diabetic foot ulcer (DFU) recurrence (R) risk and how to predict its occurrence. So, we aim to identify the variables linked with DFU-R.

Method: We consecutively included all subjects with an active DFU treated in our Hospital Diabetic Foot Clinic, from 01/2011 to 03/2013, which healed. At baseline, demographic and clinical information was collected. After complete healing or lower extremity amputation (LEA), patients were followed for 3 years, until DFU-R or death by consulting the clinical files and National Data Platform. A model was derived to predict DFU recurrence by using first a univariate and then a multivariate Cox regression analysis, considering time to event. Hazard ratios (HR) and respective 95% confidence intervals (CI) were calculated.

Results/Discussion: The sample (n=172) mean age was 68 (± 11) years and of Diabetes (DM) duration 19 (± 11) years; 64% were male, all had type 2 DM, 63% had physical impairment and DM related complications prevalence ranged from 15% (coronary heart disease) to 54% (retinopathy). With a median follow-up of 24 (0-36) months, 42% had DFU-R (from which 74% were digital and 19% required a LEA) and 23% died before DFU-R. Median time to DFU-R was 12 months. In our univariate analysis, subjects with coronary heart disease (CHD), end-stage renal disease, in whom the previous DFU was located at the forefoot, affected the bone and had longer duration (in months) had a DFU-R more rapidly. In the multivariate analysis only CHD (adjusted HR 3.16, 95% CI 1.21-8.25), previous DFU located at the forefoot (adjusted HR 3.69, 95% CI 1.05-12.98) and previous DFU duration (adjusted HR 1.13, 95% CI 1.03-1.24) maintained statistical significance.

Conclusion: Our data points out that special attention and foot care should be given to subjects with CHD in whom their previous DFU occurred in the forefoot and had longer duration. On the other hand, it also indicates that prevention of digital DFU-R is of fundamental importance.

[O28] INCIDENCE AND PREDICTORS OF RECURRENT AND NEW DIABETIC FOOT ULCERS

Susanne Engberg¹, Henrik Ullits Andersen¹, Klaus Kirketerp-Møller¹, Anne Rasmussen¹

¹Steno Diabetes Center Copenhagen, Gentofte, Denmark

Aim: 1) among patients with a healed DFU to estimate the progression rate to recurrent/new diabetic DFU, 2) to compare the progression rates depending on whether the healed ulcer was neuropathic, neuro-ischemic or ischemic, and 3) to study selected risk factors rate ratios (RR) for progression to recurrent/new DFU.

Method: A retrospective cohort study including all patients with a healed diabetic foot ulcer at our centre from 2010 to 2016. Patients were followed to an outcome (a recurrent/new DFU), to end of contacts with our centre, to death or to study end. Poisson regression analyses were made.

Results/Discussion: Among 780 patients with a healed DFU, (489 (63%) neuropathic, 202 (26%) neuro-ischemic and 89 (11%) ischemic), 53% (33%/person year) progressed to a recurrent/new DFU during follow-up. The patients were followed for 1249 years in total (median 1.04 (Q1= 0.38 – Q3=2.46) years pr. patient).

When adjusted for age and gender, the RR for neuro-ischemic vs. neuropathic was 1.29 (95% confidence interval (CI) 1.03-1.61) and ischemic vs. neuropathic was 1.42 (95% CI 1.04-1.95). A quarter of the patients (26%) died during follow-up. A majority of the DFU seen during follow-up were new (88 %).

Men – RR 1.26 (95% CI 1.01-1.56), patients with lost sense of vibration (> 50 Volt) – RR 1.31 (95% CI 1.08-1.59), patients with Charcot feet – RR 1.66 (95% CI 1.20-2.28) and patients with foot deformities – RR 1.26 (95% CI 1.00-1.59) had higher progression rates to recurrent/new DFU compared to patients without these risk factors. Patients with type 1 diabetes – RR 0.81 (95% CI 1.01-1.56), non-smokers – RR 0.76 (95% CI 0.63-0.93) and patients with a creatinine level < 90 µmol/l – RR 0.76 (95% CI 0.63-0.93) had lower risk of progression to a recurrent/new DFU compared to patients without these characteristics.

Conclusion: Per year one third of the patients progressed to a recurrent/new DFU which is comparable to other studies. Patients with a neuro-ischemic or ischemic DFU progressed to recurrent/new DFU at a higher rate than patients with neuropathic DFUs. Male gender, type 2 diabetes, smoking, lost sense of vibration, Charcot feet and foot deformities were risk factors for recurrent/new DFU.

[O29] DOES THE TIME INTERVAL BETWEEN PODIATRIC REVIEW AND INTERVENTION INFLUENCE RECURRENCE OF DIABETES FOOT ULCERS?

Jo McCardle¹, Matthew Young², Graham Leese³

¹Salford Royal Hospital NHS Foundation Trust, NHS Lothian, Salford, United Kingdom

²Royal Infirmary Hospital, Diabetes Foot Clinic, Edinburgh, United Kingdom

³Newells Hospital and Medical School, Dundee, United Kingdom

Aim: Primary aim: Determine whether or not the frequency of podiatric interventions prevents the recurrence of diabetic foot ulceration (DFU).

Secondary aim: If re-ulceration did occur was time to re-ulceration affected by the time review frequency.

Method: A randomised control trial of parallel design with three treatment interval groups was conducted. Patients with a healed ulcer of ≤ 2 weeks were allocated to one of three groups (Two, four or eight weeks). Participation was for one year unless another episode of re-ulceration occurred and they were withdrawn. There were also health quality of life questionnaires (EQ-5D 3l) completed at point of entry and those at re-ulceration. All participants with Diabetes Type 1 and 2 were considered for inclusion.

Results/Discussion: Primary results: Frequency of podiatric care did not prevent recurrent of DFU. Out of 103 participants, 71 (70%) re-ulcerated. There were no statistical differences between the three groups ($p=0.41$). Over the study period, 16 remained ulcer free ($p=0.33$) and 15 (14%) voluntarily withdrew/left the study.

The median days to re-ulceration were; Group 1-two week treatment interval-65.5 days, Group 2- four week treatment interval-71.5 days, Group 3- eight week treatment interval- 84 days. This was not statistically significant ($p=0.22$).

Using the EQ-5D 3l 'Visual Analogue Scales', the participants that re-ulcerated also showed a significant reduction in overall health rating than those that remained intact (65 ± 19.0 pre-study and 58.9 ± 19.7 after re-ulceration).

Conclusion: The purpose of this study was not test podiatry intervention as this has been well documented. A history of DFU is recognised as the highest risk factor for ulceration and podiatry care is essential in preventing recurrence. However, this is the first study conducted that measures the impact of frequency of appointment interval. The results are clear that recurrence is extremely high in this group and the frequency between appointments does not influence rates or time to re-ulceration. This indicates that frequency of appointments may be safely extended. However, the numerical difference in 'time to re-ulceration' in the eight week group was numerically longer and this highlights that timely access to podiatrists is essential.

[O30] INFRAINGUINAL REVASCLARIZATION IN DIABETIC PATIENTS IN HEMODIALYSIS. WHAT HAS CHANGED?

Duarte Rego¹, Clara Nogueira², André Carvalho¹, Joana Martins¹, Luis Loureiro¹, Cláudia Freitas¹, Cláudia Amaral¹, Paulo Almeida¹, Sara Pinto¹, Rui Carvalho¹, Rui Almeida¹

¹Centro Hospitalar Do Porto, Portugal

²Centro Hospitalar de Vila Nova de Gaia, Portugal

Aim: The treatment of critical limb ischaemia (CLI) in diabetic patients represents one of the most challenging goals to Vascular Surgeons. In diabetics with **chronicle** kidney disease in hemodialysis (stage5 CKD), the **atherosclerotic** process is associated with even more severe and **diffuse** arterial calcification, **which** leads to a worse prognosis. We describe our **institution** results in the treatment of CLI in **these patients**.

Method: It was done a **retrospective** analysis of all the diabetic patients with stage 5 CKD, revascularized between 2009 and 2014. The primary outcome was the limb salvage rate. Secondary outcomes were the freedom from target lesion revascularization (TLR) and the patency in the patients **submitted** to revascularization by **conventional** surgery. A comparative analysis between our results and the results published by our institution in a previous period (2006 to 2008) was done.

Results: A total of 45 limbs of diabetics in stage 5 CKD were revascularized in the **analysis** period. The studied sample was similar to the previous study. The 12 **month** survival was 68,2%. The limb salvage rate at 6m and 12m were 83.5% and **74.4%**; superior, but without statistical significance ($p=0747$), to the previous study (63.3% at 12m). The TLR at 6m was 64,1%, inferior to the previous study (86.6%). In the group of patients submitted to **conventional** surgery, the patencys at 3,6 and 12 **months** were 71.4%, 64.9% and 51.9%. It was verified between the periods of analysis an increase of the number of treated limbs/year, of the revascularizations or TLR/year (12.2 vs 6.33) and of the revascularizations or TLR for each treated limb (1.55 vs 1.19). There was an increased number of endovascular **interventions**/year (6.5 vs 3.33) but also of conventional surgery (4.67 vs 2.67).

Conclusion: The mortality and major amputation rate remain high in diabetics with stage 5 CKD. In our **institution**, between the studied periods, was verified an increase of the rate of revascularized limbs and interventions of revascularization. This was due to the increase of the endovascular **procedures**, **but** also of the **conventional** surgery that **maintains** an **essential** role in this **patients** with extensive calcified and arterial occlusions.

[O31] ALTERATION OF SKIN BLOOD FLOW IN RESPONSE TO LOCALLY APPLIED PRESSURE IN TYPE 2 DIABETIC PATIENTS WITH FOOT ULCER

Julien Vouillarmet¹, Michon Paul¹, Josset-Lamaugarny Audrey², Sigaudou-Roussel Dominique²

¹Centre Hospitalier Lyon Sud, France

²Université Lyon 1, France

Aim: We previously described a specific cutaneous skin blood flow in response to an increase non-noxious progressive local pressure. This neurovascular reactivity permits an increase local blood flow that contribute to limit skin ischemia and by the way ulceration. This neurovascular response is impaired in patients with type 1 and type 2 diabetes but no data were available in patients with diabetic foot ulcer (DFU). We analysed, in this study, skin blood flow response of locally applied pressure in patients with DFU and in patients without DFU.

Method: Patients were recruited in a single diabetic centre. All patients had a complete record of diabetes history and foot problem. Neuropathy was assessed using the neuropathy sensitivity score (NSS), the neuropathy disability score (NDS) and by sensory tests. Basal blood flow, endothelium-dependent and endothelium-independent vasodilatations, maximal vasodilatation capacity by local heating to 44°C and skin blood flow in response to locally applied pressure were measured. All measurement were realised on the same tibia. Vasodilatory responses were expressed as the maximal percent increase in cutaneous blood flow from the baseline.

Results/Discussion: A total of 59 patients with type 2 diabetes were included; 29 without DFU and 30 with DFU. Patients were predominantly men (78%) with a mean age of 65 ± 11 years. Patients with DFU have a significant higher NDS score (6.0 ± 0.5 vs 2.8 ± 0.6 , $p < 0,05$) than those without DFU. There is a significant lower increased skin blood flow in response to locally applied pressure in the group with DFU than in the group without DFU ($36\% \pm 8$ vs $81\% \pm 28$, $p < 0,05$). There is no difference between the two groups in term of age, NSS, warm perception threshold, cutaneous pressure perception threshold, endothelium-dependent and endothelium-independent vasodilatation and skin blood flow in response to local heating.

Conclusion: This study revealed that increase blood flow in response to non-oxious pressure locally applied is significantly more impaired in patients with DFU than in those without DFU underlining a reduce ability of the skin to be protected against local pressure and ischemia.

[O32] THERMOGRAPHIC IMAGING FOR DETECTION OF PERIPHERAL ARTERIAL DISEASE: A COMPARATIVE STUDY

Alfred Gatt¹, Kevin Cassar¹, Owen Falzon¹, Stephen Mizzi¹, Anabelle Mizzi¹, Kenneth Camilleri¹, Jean Gauci¹, Nachiappan Chockalingham², Christian Ellul¹, Cassandra Sturgeon¹, Cynthia Formosa¹

¹University of Malta, Msida, Malta

²Staffordshire University, Stoke-on-Trent, United Kingdom

Aim: To investigate whether participants living with peripheral arterial disease (PAD) would exhibit a significant difference in thermal image characteristics when compared to subjects living with diabetes mellitus (DM) without complications.

Method: Participants living with type 2 diabetes underwent thermographic imaging in a room at 23°C, whilst lying in a supine position and with a thermal camera* placed 1.5m away from the feet. Once acclimatized to room temperature, thermal images of the palms and feet were taken. Thereafter, subjects were categorized into two groups. Those subjects who had triphasic waveforms and an ABPI >0.9–1.2 were classified in the DM group, whilst those with an ABPI <0.6 and monophasic waveforms were categorized in the PAD group. Automatic segmentation of the toes, medial, central and lateral forefoot and palms was performed using custom software, which extracted mean, maximum and minimum temperatures.

Results/Discussion: Out of 223 participants (430 limbs) who were initially tested and imaged, 62 limbs (from 11 females, mean age 64.5 yrs; 51 males, mean age 72.2yrs) were categorized as PAD and 22 limbs (from 9 females (mean age 59.8, 13 males, mean age 65.8yrs) as subjects with DM. Independent sample T-Test demonstrated a significant difference between all the toes of the two groups ($p=0.005$, $p=0.033$, $p=0.015$, $p=0.038$ and $p=0.02$ for toes 1-5 respectively). A Palmar/Plantar Thermographic Index composed of the mean_{Max} PalmTemp/mean_{Min} ForefootTemp also revealed significant difference between the two groups ($p=.016$). Mean Forefoot Temperature in PAD vs Subjects with DM was also significant ($p=.019$), however with the PAD group having a higher mean temperature (28.3°C) when compared to the subjects in the DM Group (26.2°C).

Conclusion: Thermography may have potential as a method of detecting peripheral arterial disease in the feet. The unexpected higher mean temperatures in participants with PAD when compared to the DM participants could be attributed to alternate collateral route taken by the circulating blood due to occluded arteries which may be closer to the periphery, thus increasing heat emissivity. Nonetheless, the application of thermography is still unclear and further research in this field is warranted.

* FLIR Model SC 7000

[O33] SHOULD CALCANEAL ULCERS BE MANAGED IN A CLASS OF THEIR OWN?

Dhruvi Hirani¹, Linda Bloomfield², Jonathan Valabhji², Victoria Salem², Vassiliki Bravis²

¹Department of Diabetes & Endocrinology, St Mary's Hospital, Imperial College Healthcare NHS Trust, Division of Diabetes, Endocrinology and Metabolism, Imperial College, London, Barts and The London School of Medicine and Dentistry, United Kingdom

²Department of Diabetes & Endocrinology, St Mary's Hospital, Imperial College Healthcare NHS Trust, United Kingdom

Aim: Calcaneal diabetic foot ulcers are experientially the most challenging to manage. The aim of this enquiry is to interrogate the specific clinical features of diabetic calcaneal ulceration and spark debate as to whether it should be managed differently from the outset.

Method: Clinical, laboratory and radiological data were collected for 34 calcaneal ulcers cases in our diabetic foot service (March 2010 to November 2016). Outcomes of interest included mortality rates, average healing time, and major limb amputation. Data collection for an age-matched control group with non-calcaneal foot disease is in progress.

Results/Discussion: The average age of our calcaneal cohort was 65 years and the mean diabetes mellitus duration was 25 years (which does not differ significantly from our overall diabetic foot disease population). The mortality rate in the calcaneal cohort was strikingly high at 43% (12/28) compared with 11% in previously published data for all patients with diabetic foot ulcers in our unit over the same 6-year time period. In 6 of the patients who died, the calcaneal ulcer was still an active problem at the time of death, with a mean preceding duration of 30 months.

Only 1 calcaneal ulcer healed by 24 weeks. 10 ulcer episodes took longer than 24 weeks, with an average healing time of 15 months. By comparison, National Foot Audit data reports that 49% of all diabetic foot ulcers can be expected to heal by 12 weeks. A below knee amputation (BKA) was required in 21% (7/34) of calcaneal ulcer episodes. 2 episodes requiring BKA were due to chronic ulceration lasting a mean duration of 51 months. Compared with our non-calcaneal ulcer population, heel ulcers are more significantly associated with PVD ($P < 0.01$).

Conclusion: Diabetic calcaneal ulcers are associated with poor healing rates, higher rates of amputation, and a 5-year mortality rate of close to 50%. We plan to interrogate predictors of healing in calcaneal diabetic foot disease. The diabetes foot community should consider revising current treatment guidelines for calcaneal disease, considering earlier, more aggressive interventions to prevent chronic and potentially life threatening longer-term sequelae.

[O34] HOSPITALISED INDIVIDUALS WITH DIABETIC FOOT DISEASE HAVE HIGH PREVALENCE OF COGNITIVE AND PSYCHIATRIC COMORBIDITIES WHICH ARE ASSOCIATED WITH POOR CLINICAL OUTCOMES

Amanda Jurgensen-Rauch¹, Sobia Arshad¹, Chris Manu¹, Michael Edmonds², Khalida Ismail¹, Prash Vas²

¹Kings College Hospital, London, United Kingdom

²Diabetic Foot Clinic, King's College Hospital, London, United Kingdom

Aim: The high prevalence and adverse clinical outcomes of depression in diabetic foot disease (DFD) are well recognised. However, the prevalence and impact of significant cognitive and non-depressive psychiatric comorbidities (C/NDPC) in DFD has not been well documented. We aimed to explore this in a specific cohort of those admitted to hospital for the management of DFD.

Method: Analysis of 135 individuals, prospectively collated over 11 months, hospitalised with DFD at a single centre. C/NDPC was considered present if there was a pre-existing of a cognitive or an ICD-10 Classification of Mental and Behavioural Disorder/s apart from depression (F32-38), or if a new diagnosis was made during the admission. Differences in characteristics between participants were tested using unpaired t-test and odds ratio calculated where necessary.

Results/Discussion: The group was predominately male (76%), with an average age of 62±13years and HbA1c of 8.8±3.4% and 55% had evidence of significant peripheral vascular disease. Overall, 38 % (48/136) had C/NDPC of which 29% (14/48) had dementia. Schizophrenia (23%), Anxiety disorder (20%), personality disorder (10%), bipolar disorder (8%) were other important psychiatric comorbidities. Those with C/NDPC were younger (59±11 years v 62±16 years (p=0.08)), had higher HbA1C 9.3% v 8.2% (p=0.03) and showed a trend towards presenting more often through the emergency department (54% v 40%, p=0.12). There were 4 major amputations in the C/NDPC group, while there were none in those without. Not unsurprisingly, those with C/NDPC had a longer length of hospital stay (48±59 v 33±12 days, p=0.02, 1 outlier excluded), required greater physiotherapy and occupational therapy input (178 minutes/week v 110 minutes/week, p<0.05) and were twice as likely (odds ratio 1.98) to have housing/placement/financial issues.

Conclusion: We establish a high prevalence (more than 1 in 3) of C/NDPC amongst those hospitalised with DFD. These patients presented significant challenges, demonstrated inferior outcomes and longer bed occupancy. This underscores the need for continued multidisciplinary involvement including strong psychosocial support. Further studies exploring the relationship of major cognitive and psychiatric illness with diabetic foot outcomes in well characterised cohorts are urgently required.

[O35] INFLUENCE OF PERIPHERAL NERVE SYSTEM ON PROLIFERATION AND MIGRATION OF KERATINOCYTES ON SITE OF ULCERATION

Ekaterina Artemova¹, Zera Abdulvapova², Gagik Galstyan¹, Alla Tokmakova², Anna Gorbacheva³, Alexander Berdalin³, Maria Morozova³, Svetlana Gavrilova³

¹Endocrinology Research Center, Moscow, Russian Federation

²Endocrinology Research Centre, Diabetic Foot Department, Moscow, Russian Federation

³Lomonosov Moscow State University, Faculty of Fundamental Medicine, Moscow, Russian Federation

Diabetic neuropathy is one of the most common late complication of diabetes, as well as the main risk factor of DFU. Damage to the integrity of the skin leads to activation of keratinocytes, triggers a cascade of reactions that contribute to changes in the phenotype of the epidermal cells lead to their migration and proliferation.

Aim: To assessment of proliferation and migration of keratinocytes at the nonhealing edges of neuropathic wounds.

Materials and methods: 16 patients with DF neuropathic ulcers (ulcer group) and 9 diabetic patients without ulcers (control group) were included. There were DM2 – 14 (87,5%), male-10 (62,5%), mean disease duration – years 17 [13-20], ulcer duration was about 12 months.

DF patients were underwent to standard treatment including debridement, atraumatic dressing, offloading with removable total contact cast, antibacterial therapy if it needs.

Measurement of ulcer size and punch ulcer biopsy samples were done for Hematoxylin/Eosin and immunohistochemical analysis on 0 and 10 days of treatment. All patients underwent an evaluation of neurologic signs and symptoms according to the NDS, CCM for estimation of corneal nerve fibre density (CNFD) and fibre length (CNFL).

Results: All patients have severe neuropathy according to NDS(>8). CCM in group with ulcers showed a significant reduction in CNFD ($20,1 \pm 7.4$ v 36.1 ± 4.1 no/mm², $p < 0.0001$). The average size of DF ulcers before and on 10th day of treatment was of 5.56 cm² and 4,29 cm², respectively ($p < 0,004$).

Neuropathic ulcers were characterized by hyperproliferative epidermis. Mitotically active keratinocytes reside throughout the suprabasal layers. Corneocyte cells comprising the top layer of the epidermis express primarily $\alpha 7nAChR$. Immature (basal) keratinocytes located within the base layer of the epidermis express primarily $\alpha 3\beta 2$. All keratinocyte cells appear to express $\alpha 9nAChR$.

Conclusions: Peripheral nervous system plays an important role in keratinocytes cycle and tissue repair. Identifying common signaling pathways that contribute to cutaneous inflammation and immune function. It will facilitate better understanding the therapeutic strategies in patients with DFU.

Supported by grant of Russian Science Foundation №16-15-10365

[O36] THE ASSOCIATION OF ENDOTHELIAL PROGENITOR CELLS WITH PERIPHERAL NEUROPATHY IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

Ioanna Eleftheriadou¹, Natalia Dimitrakopoulou¹, Nikolitsa Kafasi², Aglaia Dimitrakopoulou², Edward Jude³, Nikolaos Tentolouris¹

¹First Department of Propaedeutic and Internal Medicine, Medical School, National and Kapodistrian University of Athens, Laiko General Hospital, Athens, Greece

²Department of Immunology & Histocompatibility, Laiko General Hospital, Athens, Greece

³Tameside General Hospital, Ashton-Under-Lyne, Lancashire, United Kingdom

Aim: Endothelial progenitor cells (EPCs) are a population of adult stem cells with the ability to differentiate into epithelial cells and to promote endothelial regeneration and neo-vascularization in response to tissue ischemia. Several studies have reported an association between EPCs dysfunction and diabetic macrovascular complications. Although peripheral neuropathy (PN) has been associated with changes in the microcirculation and reduced endothelial-dependent and -independent vasodilation, regardless of the presence of macrovascular disease, data about its association with EPCs are scarce. The aim of the present study is to evaluate the relationship between PN and EPCs in patients with type 2 diabetes mellitus (DM).

Method: A total of 59 patients with DM (29 without PN and 30 with PN) and 20 healthy controls were recruited. Participants were non-smokers and had no clinical macrovascular disease. After venipuncture peripheral blood mononuclear cells (PBMCs) were obtained and stained with monoclonal antibodies against CD45, CD34, CD309 and CD133. A hierarchical gating strategy was employed to count low expressing CD45 cells and 1×10^6 events per subject was acquired and analyzed using the 6-color flowcytometer*. EPCs were defined as cells expressing the CD45^{dim}/CD34⁺/CD309⁺/CD133⁺ phenotype.

Results/Discussion: The number of EPCs differed significantly between the 3 groups of participants ($p=0.015$). The sub-analysis showed that patients with PN had significantly higher number of EPCs when compared with patients without PN [39 (28, 59) vs. 23 (13, 35), $p=0.020$] and participants without DM [39 (28, 59) vs. 18 (12, 38), $p=0.012$]. No significant difference was observed in the EPCs number between patients without PN and participants without DM ($p=0.476$).

Conclusion: The number of EPCs was significantly higher in patients with PN in comparison with patients without PN and participants without DM. This finding may imply that there is an effort for restoration of the damaged peripheral nerves and more research is warranted to clarify the role of EPCs in diabetic PN.

*BD FACSCanto

[O37] THE DISCONNECT BETWEEN THE PRESENCE OR ABSENCE OF CLINICAL DIABETIC FOOT INFECTION AND POSITIVE BACTERIAL CULTURES

Zoe Davies¹, Chris Manu², Prash Vas¹, Surabhi Taori³, Maureen Bates¹, Daina Walton¹, Michael Edmonds¹

¹Diabetic Foot Unit, Kings College Hospital, London, United Kingdom

²King's College Hospital, London, United Kingdom

³Viapath Microbiology, Kings College Hospital NHS Foundation Trust, London, United Kingdom

Aim: The diagnosis of infection in the diabetic foot can be challenging, as the microbiology and the pathology is complex. The working consensus is to take tissue samples when there are signs of infection. The aim of this study was to investigate the microbiological growth of pathogenic organisms from samples taken from clinically non-infected and infected wounds.

Method: Retrospective analysis of microbiology results from consecutive new patients on their first visit to the Diabetic Foot Clinic, between May to October 2016. We excluded patients with necrosis and non-salvageable limbs, and new patients who attended clinic after discharge from the ward. We compared the type of microbiology samples, and pathogenic organisms (*Staphylococcus aureus*, *Pseudomonas aeruginosa*, Beta-haemolytic *Streptococcus*) between patients with clinical signs of infection versus patients without clinical signs of infection.

Results/Discussion: A total of 80 patients were sampled. Mean age 65±14yrs, 56% males. 63% of the patients did not have clinical signs of infection and 37% had clinical signs of infection. 16% of samples were surface swabs, 63% were from deep swabs, 16% were from deep tissue and 5% were from bone samples. Of the surface swabs 31% were positive with no significant difference between clinically infected and non-infected ulcers, 33% vs 29% [p=0.881], Of the deep swabs 64% were positive with no significant difference between the two groups 61% vs 71% [p=0.513]. Of the deep tissue samples 85% were positive with no significant difference between the two groups 86% vs 83% [p=0.886]. There was no significant difference in pathogenic organisms between the two groups 54% vs 47% [p=0.547]. There was no significant difference in the proportion of positive results between swabs (surface and deep) and tissue (deep tissue and bone) 57% vs 82% [p=0.061].

Conclusion: The absence or presence of clinical signs of infection does not fully correlate with the microbiology yield, regardless of whether the samples are taken from surface swabs, deep swabs or deep tissue. Our data therefore supports the use of other means of identification of virulence of organisms, such as genotyping, as reliance on clinical signs of infection can be deceptive.

[O38] EVALUATION OF SPECT/CT IN PATIENTS WITH DIABETIC FOOT INFECTIONS - A FIVE YEAR'S EXPERIENCE

Aka Freya¹, Van Hattem Jessica², Eveline Dirinck², Patrick Lauwers³, Huyghe Ivan⁴, Van Bouwel Saskia⁵, Longueville Lynn², Stokman Liesbeth², Stroobants Sigrid⁴, Somville Johan⁵, Hendriks Jeroen⁶, Van Schil Paul⁶, Luc Van Gaal²

¹Department of Thoracic and Vascular Surgery, University of Antwerp, Antwerpen, Belgium

²Department of Endocrinology, Antwerp University Hospital, Edegem, Belgium

³Department of Thoracic and Vascular Surgery, Diabetes Liga, Antwerp University Hospital, Edegem, Belgium

⁴Department of Nuclear Medicine, Antwerp University Hospital, Edegem, Belgium

⁵Department of Orthopedic Surgery, Antwerp University Hospital, Edegem, Belgium

⁶Department of Thoracic and Vascular Surgery, Antwerp University Hospital, Edegem, Belgium

Aim: Correct diagnosis and treatment of osteomyelitis is a challenge in patients with a diabetic foot ulcer. Actually, osteomyelitis is diagnosed on clinical grounds, after bone biopsy, or during imaging (X-ray, bone scintigraphy, or magnetic resonance imaging - MRI). The aim of this study is to present our experience with SPECT/CT.

Method: All patients with a new diabetic foot ulcer, presenting from January 1st, 2012 until December 31st, 2016 at the Diabetic Foot Clinic from the Antwerp University Hospital were evaluated for inclusion. All patients where presence of an osteomyelitis was considered, were included. The SPECT-CT used was the GE Discovery Tandem NM/CT 670, which is a combination of a dual head gamma camera and a 16 slice helical CT.

Results/Discussion: Three hundred sixteen ulcers (234 patients, 158 males/76 females, mean age 67 years) were evaluated. The majority of patients suffered from neuropathy (64%), nephropathy (56%), and peripheral arterial disease (67%). Sixty patients had more than one SPECT-CT performed, because of a second ulcer, or a change in clinical presentation during the study period. Distribution of the lesions was: toe (168), metatarsophalangeal joint (79), ankle (20), heel (30), and other (19). Clinical suspicion of osteomyelitis (positive probe-to-bone test or sausage toe) was present in 50 cases.

Based on the findings of SPECT-CT, osteitis or osteomyelitis was suspected in 201/316 ulcers (64%). When relating these results to the findings of bone biopsy (available in 36 cases after toe amputation), MRI (50 cases), and clinical degree of suspicion for osteomyelitis (positive probe to bone test or sausage toe, 50 cases), we could calculate a sensitivity of respectively 96%, 90% and 82%; the specificity was 18%, 75% and 40%.

Conclusion: Diagnosis of osteomyelitis remains difficult, due to a lack in golden standard. In this retrospective five-year evaluation, SPECT/CT offers a good sensitivity but a low specificity for diagnosis of osteomyelitis. SPECT/CT can be used to differentiate between osteitis/osteomyelitis and other pathologies of the diabetic foot.



Poster Abstracts

Information

Programme

Oral Abstracts

Poster Abstracts

Sponsor-Exhibitor

Authors

[P1] THE IMPACT OF VASCULAR STATUS ON THE OUTCOME OF PATIENTS TREATED WITH A MINOR AMPUTATION FOR THEIR DIABETIC FOOT OSTEOMYELITIS: A RETROSPECTIVE OBSERVATIONAL STUDY

Nafeesah Shafiq¹, Rhonda Iskander¹, Natasha Patel²

¹St Thomas' Hospital, London, United Kingdom

²Guy's and St Thomas' Hospital, London, United Kingdom

Aim: This study's primary aim was to determine whether vascular status influences the outcome of patients treated with a minor amputation for their diabetic foot osteomyelitis. The secondary aim studied the impact of patient demographics and diabetic comorbidities on the same outcome.

Method: A retrospective analysis of all diabetic foot osteomyelitis patients admitted in 2015 treated with minor amputation. A total of 61 patients were followed up and 26 (43%) had a positive outcome. The clinical diagnosis of osteomyelitis was based on radiographic evidence and/or bone culture results. Data collection from patients' records allowed the following variables to be studied: patient demographics (age, gender, ethnicity), diabetic comorbidities (smoking status, glycaemic control, obesity, previous foot amputation, CKD stage) and diabetic vascular disease status (microvascular and macrovascular disease, hypertension, limb revascularisation). The follow-up period for outcome was 12 months from the date of minor amputation, with the outcome measure defined as 'positive' if there was complete healing of the surgical wound and/or ulcer, or 'negative' if the patient was admitted for further medical/surgical intervention, if reinfection occurred or if the patient died.

Results/Discussion: Revascularisation was necessary in 30% of patients alongside the minor amputation, and was associated with a nonsignificant increased risk of negative outcome. Univariate analysis revealed chronic kidney disease stage as having an influence on the outcome ($p=0.005$). The independent risk factor predictive of a negative outcome following multivariate analysis was presence of coronary artery disease (OR = 9.69, 95% CI 1.07-87.47, P value = 0.043). Presence of any macrovascular disease and HbA1c level were trending towards statistical significance. The remaining patient characteristics including demographics, comorbidities and microvascular disease status had no effect on the outcome.

Conclusion: This study's findings conclude that the success of minor amputation as primary treatment is independent of patient characteristics. Presence of coronary artery disease was the only vascular factor predisposing a diabetic osteomyelitis patient to a poor prognosis following minor amputation. By evaluating patients for its presence prior to surgical intervention, patients at risk of requiring further intervention can be recognised and appropriate tailored treatment decisions can be made by the MDFT.

[P2] INVESTIGATION INTO THE RELATIONSHIP BETWEEN PLANTAR PRESSURE AND SKIN HARDNESS IN PEOPLE WITH DIABETES

David Allan¹, Shriraan Mahadevan², Panagiotis Chatzistergos¹, Aoife Healy¹, Lakshmi Sundar³, Ambady Ramachandra³, Suresh Kannan², Alan Punnoose², Nachiappan Chockalingham¹, Roorzbeh Naemi¹

¹Staffordshire University, Stoke-on-Trent, United Kingdom

²Sri Ramachandra University, Chennai, India

³India Diabetes Research Foundation, Chennai, India

Aim: Changes in the mechanical properties of plantar soft tissue could affect the tissues' ability to uniformly distribute plantar loads and therefore increase ulceration risk in people with diabetic foot disease. Despite evidence that plantar soft tissue mechanical properties change during the course of diabetes the exact implications of these changes on the tissues' mechanical viability is not yet fully understood.

Therefore, this study is to investigate if there is a relationship between plantar pressure and plantar skin hardness.

Method: Plantar pressure, Vibration Perception Threshold (VPT) and skin hardness were recorded from 40 (M/F 23/17) participants with diabetes age 63 ±8.61 years from two diabetic foot clinics in Chennai, India.

Plantar pressure distribution was recorded using two-step protocol and a 0.5m x 0.5m pressure mat*. Three individual foot strikes were recorded for each foot and individual templates applied to divide the foot into regions (Hallux, 1st, 3rd, 5th Metatarsal heads, Midfoot and Heel).

Peripheral Neuropathy score and skin hardness was measured at these regions using a handheld instrument designed to measure the threshold of appreciation of vibration in human subjects** and a Shore-00 durometer, respectively. Spearman's correlation test was used for both left and right feet separately to investigate the association between skin hardness, peak pressure, maximum and mean contact area, maximum and mean force and neuropathy.

Results/Discussion: Skin hardness was positively correlated to peak pressure in the region of 1st metatarsal head ($r=0.374$, $n=40$, $p=0.018$) and negatively correlated to peak pressure in the region of Hallux ($r=-0.316$, $n=40$, $p=0.047$). Skin hardness was positively correlated to maximum ($r=0.355$, $n=40$, $p=0.025$) and mean ($r=0.315$, $n=40$, $p=0.048$) contact area and maximum ($r=0.371$, $n=40$, $p=0.0018$) and mean ($r=0.416$, $n=40$, $p=0.008$) force in the 3rd metatarsal head region. On the other hand, skin hardness was negatively correlated to maximum ($r=-0.363$, $n=40$, $p=0.021$) and mean ($r=-0.357$, $n=40$, $p=0.024$) contact area in the 5th Metatarsal head region and mean force in the heel region ($r=-0.337$, $n=40$, $p=0.033$)

Conclusion: The results of the correlation test have revealed a significant yet weak association between plantar skin hardness and peak plantar loading. Further investigations are needed to understand if altered skin hardness is also associated with increased ulceration risk.

*MatScan, Tekscan

** Biothesiometer

[P3] SMART SOCKS MONITORING SKIN TEMPERATURE CAN PREDICT PLANTAR PRESSURE CHANGES

Mamdouh El-nahas¹, Shaimaa El-Shazly², Fayrouz El-gamel³, Mohamed Motawea⁴, Fady Kyrillos⁴, Hatem Idrees²

¹Internal Medicine Departement, Port-Said University, Port-Said, Egypt

²Ready Made Garments Department, Faculty of Applied Arts, Damietta University, Egypt

³Textile Department, Faculty of Applied Arts, Damietta University, Egypt

⁴Diabetes and Endocrinology Unit, Mansoura University, Mansoura, Egypt

Aim: To test the ability of smart socks measuring temperature changes beneath the plantar aspect of the foot to predict plantar pressure changes.

Method: The study included 25 healthy volunteers (11 males and 14 females, the mean age 41.1± 17.6 years, BMI 29.4 ±6.95). The study was explained and written consent was taken. Smart socks had been designed, the socks were made of 62% cotton and 38% Acrylic. The thickness of the sock was 5.4 mm. 7 thermal sensors* ((negative temperature coefficient sensor)) were woven into the fabric of the sock at specific foot regions. The sensors are connected to a central unit made of an electronic circuit** through which changes in the sensor resistance is converted into temperature changes. Plantar pressure was measured by a pressure mat***. Automated masking divided the foot into 12 anatomically referenced regions: medial heel (MH), lateral heel (LH), mid-foot (MF), five metatarsal head regions (MTH1–5) and four toe regions (T1–4).

Results/Discussion: Pressure time integrals (PTI) were MH: 74.5±26.2, LH: 75.6±30.3, MF: 47.1±17.8, MTH 1: 62.3±25.2, MTH 2: 63.5±25.5, MTH 3: 69.7±34.5, MTH 4: 57.5± 28.7, MTH 5: 57.2± 24.2, T1: 50.5±25.7, T2: 43.9±18.3, T3: 45.8±24.9, T4,5: 44.9± 34.2 KPa/sec. Temperature changes at sensor 5 significantly correlated with PTI at MTH2 (r 0.519, P 0.008), MTH3 (r 0.435, P 0.03), MTH4 (r 0.452, P 0.023). Temperature changes at sensor 6 significantly correlated with PTI at MTH1 (r 0.560, P 0.004). Temperature changes at S6 were significantly correlated with temp changes at S1 (r 0.524, P 0.007), S2 (r 0.704, P 0.000), S3 (r 0.487, P 0.013), S4 (r 0.515, P 0.008), S5 (r 0.601, P 0.001) and S7 (r 0.619, P 0.001). Temperature changes at sensor 5 significantly correlated with BMI (r 0.427, P 0.033).

Conclusion: Smart socks monitoring skin temperature can predict plantar pressure changes. Only two sensors at positons 5 and 6 could be sufficient to predict plantar pressure changes. We recommend the use of new technologies especially if cheap to increase patient awareness and consequently early detection of any foot pathology.

*Thermistor 10K NTC

**Arduino Mega

***MatScan (Tekscan Inc.)

[P4] THE EFFECT OF SHOE OUTSOLE STIFFNESS ON PLANTAR PRESSURE AND PATIENT SATISFACTION IN PATIENTS WITH DIABETES AT HIGH RISK OF FOOT ULCERATION

Jennefer Zwaferink¹, Heleen Berendsen², Wim Custers³, Irma Paardekooper³, Sicco Bus⁴

¹Academic Medical Center, University of Amsterdam, Amsterdam, Netherlands

²Reinier de Graaf Gasthuis, Delft, Netherlands

³Penders Voetzorg, Delft, Netherlands

⁴Dept. of Rehabilitation, Academic Medical Center, Amsterdam, Netherlands

Aim: To evaluate the effect of shoe outsole stiffness as part of diabetic footwear design on dynamic forefoot plantar pressures and patient satisfaction in diabetic patients at high risk of foot ulceration.

Method: Twenty-four diabetic patients (16 male, mean age 67 years) with neuropathy and high ulcer risk were tested in an extra-depth diabetes shoe with a tough 1.8cm thick rubber outsole with 18 degrees rocker configuration (tough outsole) or the same diabetes shoe with a 3mm carbon full shoe length reinforcement of the outsole (stiff outsole). The same custom-made insole was worn in both shoes. Shoe conditions were tested in randomized order. In-shoe pressures were measured during walking at a comfortable speed, standardized between conditions. Patient satisfaction was assessed using a Visual Analogue Scale (score 0-10).

Results/Discussion: Significantly lower metatarsal head peak pressures were found with the stiff outsole compared to the tough outsole (mean±SD: MTH1 146±52 vs. 163±59, MTH2-3 158±44 vs. 180±4, MTH4-5 107±36 vs. 117±38, p<.001). In >83% of cases with the stiff outsole and in >71% with the tough outsole, metatarsal head pressures were <200 kPa, an indicative level for protection against foot ulceration. No significant effect of outsole stiffness was found in the hallux region (164±37 vs. 171±48, p=.141). Patient satisfaction showed slightly better but non-significant (0.069<p<0.871) satisfaction scores for the tough compared to the stiff outsole on walking comfort (mean score 5.9 vs. 5.8), shoe fit (mean score 6.1 vs. 5.7), shoe weight (mean score 7.8 vs. 7.3), and shoe appearance (mean score 5.1 vs. 4.7).

Conclusion: A 3mm carbon reinforcement creating a stiff outsole led to significantly lower peak pressures at the metatarsal heads than a tough outsole, but appears to have no effect on hallux peak pressure or patient satisfaction outcomes relevant for high-risk diabetic patients. Based on these results, a carbon reinforced outsole is recommended to relieve forefoot peak pressures in high risk patients. Further investigation into the effect of a range of outsole stiffnesses on plantar peak pressures and walking comfort is needed to assist in defining the most optimal outsole stiffness for shoes for high-risk diabetic patients.

[P5] EFFICACY OF A PRO-ACTIVE SCREENING FOR DIABETIC FOOT ULCERATION IN THE COMMUNITY AUTONOMOUSLY PERFORMED BY NURSES

Alberto Piaggese¹, Chiara Goretti¹, Elisabetta Iacopi¹, Mariagrazia Buccarello¹, Ludovica Tamburini¹, Nicola Riitano¹, Antonella Ghio¹, Antonella Tomei¹, Alberto Coppelli¹

¹ Diabetic Foot Section, Medicine Department, Pisa University Hospital, Pisa, Italy

Aim: the late diagnosis and referral of Diabetic Foot Ulceration (DFU) to specialist care is one of the most important determinant for the progression of the disease towards late stages and amputation. We tested the efficacy of a pro-active screening strategy in a community setting autonomously managed by nurses in detecting patient at high risk of DFU.

Method: in a community in north-west Tuscany, where 421,382 people live in a mixed urban/rural area, we trained 16 nurses according to the International Working Group on Diabetic Foot (IWGDF) guidelines for the screening of DFU. The nurses were committed to screen yearly DFU in the population of known diabetic patients, which were referred to them by their GPs. Patients at high risk or with active DFU, when detected, were promptly referred to a specialized DF clinic; all patients screened received education on how to prevent DFU. The results of the screening were retrospectively collected and analyzed for the years 2014-2016. Results are reported in the Table.

Results:

Year	N. Diabetic Patients (%)	N. Screening (%)	N. High Risk (%)	N. DFU (%)
2014	6767 (1.6%)	2442 (36.1%)	21 (0.8%)	5 (0.2%)
2015	7016 (1.7%)	3856 (54.9%)	52 (1.3%)	8 (0.3%)
2016	9435 (2.2%)	6817 (72.2%)	144 (2.1%)	31 (0.5%)

Conclusion: Our data, although possibly biased by an underestimation of the actual prevalence of diabetes in the population, show how increasing the rate of subject actively screened in the population of known diabetic patients, the rates of high risk patients detected increases in parallel, as well as the rate of active DFUs, making it possible to early detect them and to intervene promptly, interrupting the progression of the disease.

[P6] SIXTY PERCENT REDUCTION OF ULCER AREA AT 2 WEEKS CAN BE A USEFUL PREDICTOR OF EVENTUALLY DIABETIC FOOT ULCER HEALING BY 12 WEEKS

Timothy Jemmott¹, Maureen Bates¹, Jody Lucas², Wegin Tang¹, Chris Manu², Michael Edmonds¹

¹Diabetic Foot Clinic, King's College Hospital, London, United Kingdom

²Kings College Hospital, London, United Kingdom

Aim: Percentage area reduction by 4 weeks can be used to assess the likelihood of an ulcer eventually healing with standard clinical care. Using a 3D wound imaging system to assess ulcer area the aim was to determine if it is possible predict ulcer eventual healing from reduction in ulcer area over an earlier time period.

Method: We conducted retrospective analysis of consecutive new patients attending the diabetic foot clinic. Ulcer areas were assessed at two weekly intervals, with comparison of percentage area reduction from baseline. The healing rates of ulcers which eventually closed were then compared with ulcers which did not heal. Fisher's Exact Test was used to determine which percentage reduction and at which time point was the most predictive of eventual ulcer healing.

Results/Discussion: Over a one year period, 149 new patients (February 2015 to February 2016) were studied. Mean age was 65±13 years, (Mean±SD); 74% were male and 86% had type 2 diabetes. Healing was achieved by 12 weeks in 44% of patients. At 2 weeks follow-up, after initial presentation, the average area reduction of patients who went on to heal was 48±42%, (Median 61%) vs 19±39%, (Median 21%) in the patients who did not heal. On further analysis, 60% area reduction at 2 weeks was a significant predictor of subsequent healing. (Fisher's Exact Test, p=0.0409), whereas the use of 50% or less reduction of area at two weeks was not a significant predictor of healing. (p=0.1693). At 4 weeks follow-up, those that eventually healed had an average area reduction of 22±66%, (Median 34%) vs 16±65%, (Median 24%) in the non-healers. On further evaluation, 35% area reduction at 4 weeks was not a significant predictor of subsequent healing. (Fisher's Exact Test, p=1.000). At 6 weeks follow-up, there was no statistical difference in the percentage area of reduction between the healers and non-healers.

Conclusion: The use of 60% or greater percentage reduction in ulcer area at two weeks is a robust predictor of eventual ulcer healing by 12 weeks

[P7] TIME SEQUENCE OF BONE MARROW EDEMA RESOLUTION IN THE ACTIVE DIABETIC CHARCOT FOOT-A RETROSPECTIVE STUDY

Sofia Antoniou¹, Ernst Chantelau², Michael Roden³

¹Klinik für Endokrinologie und Diabetologie, Heinrich Heine Universität Düsseldorf, University Hospital of Ioannina, Düsseldorf, Germany

²C/O Dr.Pd Med.R.Kimmerle, Practice of Endocrinology and Diabetology, Düsseldorf, Germany

³Dept. of Endocrinology & Diabetology, Institute for Clinical Diabetology, German Center for Diabetes Research, Düsseldorf, Germany

Aim: Fractures present with bone marrow edema (BME) on magnetic resonance imaging (MRI). BME in initial stage may represent inflammation or reparative fibrovascular tissue (callus formation). Spongiosa microfractures (i.e. active Charcot foot Grade 0) heal directly or by secondary fracture healing with callus formation, whereas corticalis macrofractures (i.e. active Charcot foot Grade 1) heal almost always with callus formation, when treated conservatively with immobilisation and weight bearing. Data regarding BME follow-up patterns in patients have not yet been published

Method: We retrospectively analyzed data from 27 patients undergoing 27 baseline and 54 follow up-MRIs for qualitative BME increase (+) or decrease (-) during the healing process. Inclusion criterion was clinical improvement under standard treatment with walking casts.

Results/Discussion: In 14 Grade 0 cases, baseline MRIs after a median time of 4 weeks (range 1-52) after trauma as well as 23 follow-up MRIs were analyzed. Thirteen Grade 1 cases, were evaluated with baseline MRIs 12 weeks after trauma (range 4-36) and 31 follow-up MRIs. In the first 16 weeks after treatment initiation, a transient BME increase was found in 4/11 and 5/13 of the follow-up MRIs in patients with Grade 0 or 1 respectively. Clinical improvement with decrease of local swelling and hyperthermia was also observed.

Weeks after baseline MRI (Begin of treatment)	0-8	8-16	16-24	>24
(n=27)				
Follow-up MRI (n)	6	18	12	18
BME +/- (n)	4/2	5/13	1/11	0/18

Conclusion: In the long run, BME decreased in all cases. However, in the first 16 weeks after treatment initiation, a transient BME increase was observed in approximately 37% of the follow-up MRIs. This finding could indicate a prolonged physiological callus formation

[P8] MICROSURGICAL DIABETIC FOOT ULCER RECONSTRUCTION: THE MOST FUNCTIONAL RECONSTRUCTION

Donghyuk Shin¹, Yoonhye Lee¹

¹Department of Plastic Surgery, Konkuk University Medical Center, Korea, Rep. of South

Aim: The reconstruction of diabetic foot ulcer (DFU) has been quite challenging. Especially, because majority of DFU patients have occlusive peripheral arterial disease, many microsurgeons hesitate performing the free flap for DFU reconstruction. Nowadays, the application of free flap for DFU is increased and high success rate as much as in non-diabetes has been reported, however, it has not been universal. We would like to report our results and discuss the role and worth of the free flap in the DFU reconstruction.

Method: From September 2010 to October 2016, 167 free flap operations were performed for 159 patients. All ulcers were bigger than 5x5 cm in area and invaded into bony level through fascia and tendon. The preoperative PTA was done if indicated and every patient were fully evaluated for medical and anesthesiologic problem.

Results/Discussion: Preoperative PTA procedures were done in 114 patients (68%). 139 flaps of 167 flaps showed complete flap survival (82%) and 10 flaps were partially necrotized. Overall flap survival rate was 89%. Among 18 total flap necrosis, 10 flaps were replaced with skin graft, four were healed with dressing, and four were treated with below knee amputation. There were 18 patients with renal failure, however 16 flaps were survived completely. The patients with flap survival could walk and there was no recurrence.

Conclusion: Currently, the success rate of free flap is mentioned as more than 95%. Similar rate could not be expected in DFU, however, our results showed that the success rate is not too low to look away free flap in DFU. Because most of DFU occur on the plantar where has a role for weight bearing, free flap is more superior to other reconstruction method like skin graft. According to my results and experiences, I would like to highly recommend free flap for DFU reconstruction.

[P9] ISCHEMIA AS A PROGNOSTIC FACTOR IN THE OUTCOME OF THE PATIENTS ADMITTED IN A DIABETIC FOOT UNIT

Jesus Alfayate-Garcia¹, Juan Pedro Sánchez Ríos¹, Fernando Criado-Galan¹, Susana Cancer-Perez¹, Miguel Gutiérrez-Baz¹, Miryam Perera Sabio¹, Luis De Benito-Fernandez¹

¹Hospital Universitario Fundación Alcorcón, Alcorcón, Spain

Aim: To show the different performances of the diabetic patients during follow-up according to the presence of severe peripheral arterial disease (PAD) and revascularization.

Method: Between November 2009 and September 2012, 288 consecutive diabetic patients with foot ulcer were enrolled. Patients were treated according to multidisciplinary care protocol based on international guidelines. Patients were divided into three groups according to the presence of ischemia: Group A (non-ischemic); B (ischemic without revascularization) and C (ischemic with revascularization). Comorbidities, type of revascularization, ulcer healing rate, re-ulceration rate during follow-up, limb salvage, and survival were evaluated. Statistical analysis: Chi-squared test for categorical variables adjusted by the Bonferroni method. ANOVA for continuous variables adjusted by the Bonferroni method or Kruskal-Wallis test. SPSS V.22 for Windows was used.

Results/Discussion: 559 limbs (288 patients) were included. 172 limbs (31%) were classified as non-ischemic limbs (Group A), 290 (52%) ischemic limbs (Group B) and 97 (17%) revascularized limbs (Group C). Hypertension, previous cardiovascular events, retinopathy and sedentarism were lower in the non-ischemic group. Non ischemic patients were also younger, with shorter exposure time to diabetes and higher level of educational attainment. During follow-up the healing rate is nearly 80% for the non-ischemic group (A) and nearly 60% for the ischemic limbs (B and C groups) ($p < 0.01$). 18 patients (6%) needed a major amputation. The re-ulceration rate in groups A and B were 27% and 26.6% respectively, being significantly higher in group C (37.6% $p < 0.001$). The overall death rate was 5.9% (17). The cumulative healing rate at 6 months was 60% for group A and 40% for groups B and C. After two-year follow-up, the healing rate for all lesions was 85%, 65% and 72% for the A, B and C groups respectively.

Conclusion: Ischemia is a negative prognostic factor in the diabetic foot, it is associated with lower healing rate and higher re-ulceration and amputation rates. A more aggressive policy of revascularization could improve the healing rate in those complex patients.

[P10] COMPARISON OF THREE DIFFERENT ISOLATION METHODS OF CELL THERAPY OF CRITICAL LIMB ISCHEMIA IN DIABETIC PATIENTS

Anna Pyšná¹, Robert Bem², Alexandra Jirkovska², Andrea Nemcova¹, Vladimíra Fejfarová¹, Veronika Woskova¹, Kamil Navratil², Jelena Skibova², Michal Dubsky¹

¹Diabetes Centre, Institute for Clinical and Experimental Medicine, Prague, Czech Republic

²Institute for Clinical and Experimental Medicine, Prague, Czech Republic

Aim: Autologous cell therapy has emerged as a perspective treatment of no-option critical limb ischemia (NOCLI) in diabetic patients. The aim of our study was to assess three different cell therapy product (CTP) isolation methods, quantify cell populations involved and correlate their numbers with transcutaneous oxygen pressure (TcPO₂).

Method: Since the cell therapy program was launched in our podiatric clinic in 2008 90 applications have been executed. Autologous CTPs were separated either from peripheral blood (n=11) after precedent stimulation by granulocyte colony-stimulating factor or harvested from bone marrow processed by a Multicellular Processing System* (n=50) alternatively sedimentated using succinate gelatin (Plasma Volume Replacement**; n=29). CTPs obtained by these three isolation methods were analyzed to quantify CD34⁺ cells, white blood cells (WBC), neutrophils, lymphocytes, monocytes and platelets. Subsequently cell yields in each population were statistically correlated with TcPO₂ before and in regular intervals up to one year after cell therapy administration.

Results/Discussion: All three isolation methods resulted in significant increase in TcPO₂ after 1, 3, 6 and 12 months in comparison with baseline values (p < 0.01); however there was no significant difference among these groups. Surprisingly whereas increase in TcPO₂ did not correlate with amount of injected CD34⁺, there was a significant correlation of TcPO₂ one month after cell therapy administration with WBC (r = 0.29, p = 0.0034), monocytes (r = 0.27, p < 0.001) and neutrophils (r = 0.32, p = 0.073) injected. Despite each isolation method generated different volumes of CTP, there was no significant difference in overall amount of CD34⁺ administered. We observed significantly higher WBC gains in CTP separated from stimulated peripheral blood (125.6 ± 70.5 x 10⁹/l) compared to bone marrow harvesting by the use of the Plasma Volume Replacement** (50.6 ± 40.7 x 10⁹/l, p = 0.013) and the Multicellular Processing System* (54.5 ± 23.9 x 10⁹/l, p = 0.016).

Conclusion: Our study showed that cell therapy of diabetic patients with NOCLI resulted in significant increase in TcPO₂ irrespective of isolation method. TcPO₂ increase one month after cell therapy administration significantly correlated with the number of WBC, monocytes and neutrophils in contrast to no association with CD34⁺.

*Smart PreP2 (Harvest Technologies Corporation)

**Gelofusine

[P11] EFFECTIVENESS AND COST-EFFECTIVENESS OF ORTHOTIC INTERVENTION IN DIABETES: A SYSTEMATIC REVIEW

Aoife Healy¹, Sybil Farmer¹, Nicola Eddison², Anand Pandyan³, Nachiappan Chockalingham¹

¹Staffordshire University, Stoke-on-Trent, United Kingdom

²Royal Wolverhampton NHS Trust, Wolverhampton, United Kingdom

³Keele University, Staffordshire University, Staffordshire, United Kingdom

Aim: The aim of this review is to establish the effectiveness and cost effectiveness of orthotic interventions in diabetes.

Method: 14 databases were searched using MeSH headings and free text terms for to capture all research in the area. The search was limited to the last 20 years. Two reviewers independently screened the titles and abstracts of these studies for full text review. The extracted characteristics from each study included the type of orthotic intervention, the comparator/s and the outcome measures used. Extracted data were used to calculate effect sizes and odds ratios, where possible, for outcome measures of each study separately.

Results/Discussion: 15 Randomised Controlled Trials (RCTs) were identified which examined the effect of orthotics (foot orthoses and/or footwear) on the prevention or treatment of diabetic foot ulcers. None of these 15 studies examined the cost effectiveness of the interventions. Four studies compared ulcer incidence or relapse in a control group to a group provided with footwear and/or insoles or digital padding. Seven studies compared the effect of different orthotic interventions (footwear, foot orthotics, removable cast walkers, and half shoes) on prevention or treatment of ulceration and four studies compared an orthotic intervention to a total contact cast for ulcer healing. Reported outcome measures included ulcer incidence/relapse, ulcer free time, ulcer area, Bristol foot score, Foot Health Status Questionnaire, SF-36 and plantar pressure measurement. Results from three of the four studies which compared an orthotic intervention to a control group supported the use of an orthotic intervention.

Conclusion: Research in this area is limited with only 15 randomised controlled trials completed in the last 20 years and none of these studies examined cost effectiveness. In relation to ulcer healing, total contact casts are considered the gold standard, in terms of orthotic interventions removable cast walkers are more effective than half shoes or custom footwear. Research to date has identified orthotic interventions which are found to be effective in ulcer prevention and treatment. However, there are some conflicting findings in the research and further large scale RCTs are required.

[P12] WHICH ROCKER OUTSOLE DESIGN IS MOST EFFECTIVE FOR DIABETIC PATIENTS?

Banafshe Ghomian¹, Roozbeh Naemi², Sina Mehdizadeh³, Rokhsareh Aghili⁴, Hassan Saeedi¹

¹Iran University of Medical Sciences, Tehran, Iran

²Staffordshire University, Stoke-on-Trent, United Kingdom

³National Sports Institute, Kuala Lumpur, Malaysia

⁴Firouzgar Institute of Endocrinology and Metabolism, Tehran, Iran

Aim: Plantar foot ulceration and gait abnormality are two serious complications of diabetes. While rocker outsoles are the most common shoe modification for offloading diabetic foot, there is a paucity of research about their most effective design. Thus, we aimed to investigate the effects of three designs of rocker outsoles on several gait characteristics.

Method: Ten females with diabetes aged 55.6 ± 5.25 years, with no history of previous ulceration were recruited after obtaining an ethical approval. Three designs of rocker outsole (with 10°, 15° and 20° rocker angle) which were previously shown to be most effective in plantar pressure reduction were used. Kinetic and kinematic data were collected while subjects walked either barefoot or with rocker outsole shoes at a self-selected speed. Spatiotemporal parameters and the ground-reaction forces (GRF) were measured. Repeated-measures ANOVA followed by Bonferroni Post-Hoc statistical analysis was performed.

Results/Discussion: There was no significant difference among test conditions for first GRF peak ($p > 0.05$). Although second GRF peak was decreased by increasing rocker angle respectively, this decrease was only significant for 20° compared to both barefoot ($p = 0.003$, $Eta^2 = 0.45$) and 10° ($p = 0.007$, $Eta^2 = 0.41$); with no significant difference between 20° and 15°. There was an increase in mean step-width from barefoot to 20°, but it was significant only between barefoot and 20° ($p = 0.0$, $Eta^2 = 0.58$). Mean step-length was significantly increased with all three rocker outsoles compared to barefoot ($p < 0.05$, $Eta^2 > 0.8$). Although, mean cadence was increased by increasing rocker angle, this increase was only significant for 15° ($p = 0.02$, $Eta^2 = 0.37$) and 20° ($p = 0.0$, $Eta^2 = 0.58$) compared to barefoot. All rocker outsoles significantly increased mean step-length which is related to their specific anterior-posterior geometry facilitating propulsion. The 20° rocker outsole was the most effective design to facilitate forefoot rocker by decreasing second GRF peak and increasing the cadence. However, the significant increase of mean step-width with 20° rocker outsole might indicate a postural control adjustment for preserving balance by providing a wider base of support.

Conclusion: Although 20° rocker outsole was the most effective design to facilitate forefoot rocker, it imposed more changes on gait in diabetic patients which might concern their postural balance.

[P13] WALKING POLES AND UPRIGHT POSTURE STABILITY IN DIABETIC PATIENTS

Piergiorgio Francia¹, Alessandra De Bellis², Massimo Gulisano¹, Giuseppe Seghieri³, Elisabetta Salutini², Anna Tedeschi², Roberto Anichini²

¹School of Human Health Sciences, University of Florence, Florence, Italy

²Diabetes Unit and Diabetic Foot Unit, San Jacopo Hospital, Pistoia, Italy

³Ars Tuscany, Pistoia, Italy

Aim: It is known that patients with diabetes can show postural instability and functional impairments increasing the risk of falls and foot ulcers. Aim of this study was to evaluate the effect of walking poles on balance and forces distribution on the foot plantar surface of diabetic patients in standing position.

Method: In 10 subjects with diabetes (males/females: 7/3; type 1/2: 4/6), mean age 59,1±16,3 yrs, duration of diabetes 18,6±12,6 yrs, mean HbA1c 7,5±1,0 %, body mass index (BMI) 26,8±5,0 kg/m², were evaluated: muscle strength*, ankle range of motion (inclinometer), orthostatic plantar pressure distribution and postural control with and without trekking poles**, posture on the sagittal plane (images of patients in quiet standing). A paired Student t-test was used to determine the difference in the means calculated with or without the use of trekking poles.

Results/Discussion: The patients showed a reduction of joint mobility greater than the group of 30 healthy controls matched for age (58.4±6,0 yrs) and BMI (26.3±3.4 kg/m²): 133.7±18.4° vs 98,1±35.1°; p <0.05. In standing, patients with diabetes showed a lower load on the right foot (dx 46,0±2,9 %) while the load on the forefoot was about 56,0±5,0 %. The use of trekking poles resulted in a not significant variation of load on the right foot (dx 48,3±3,5 %), forefoot (56,5±4,7 %), and mean velocity reduction of the center of pressure (2.5±1,3 vs 1.9±0,8 mm/sec).

Conclusion: The preliminary results of this pilot study showed that the use of trekking poles in orthostatic condition do not worsen the plantar pressure distribution between the two limbs, the forefoot and the rearfoot. The use of walking poles could then have possible positive effects on the orthostatic posture and risk of falls.

*Jamar hand grip

**P-walk baropodometric and stabilometric analysis, BTS, Italy

[P14] COLONY FORMING UNITS (CFU) AS A MARKER OF EFFECTIVENESS OF NEGATIVE PRESSURE WOUND THERAPY* WITH/WITHOUT ULTRASOUND DEBRIDEMENT (USD)

Maksym Gorobeiko¹, Oleksandr Iarin¹, Svyrydov Mykola¹, Zoya Krushinska¹, Maksym Prystupiuk²

¹Ukrainian Centre for Endocrine Surgery of Ministry of Health of Ukraine, Kyiv, Ukraine

²Kyiv Clinical Hospital #4, Kyiv, Ukraine

Aim: Diabetic foot wounds secondary to amputation, are very complex and difficult to treat. We investigated whether Negative Pressure Wound Therapy* with/without USD improves the wound healing after partial foot amputation in patients with diabetes using as a marker CFU

Method: Diabetic foot wounds secondary to amputation, are very complex and difficult to treat. We investigated whether Negative Pressure Wound Therapy* with/without USD improves the wound healing after partial foot amputation in patients with diabetes using as a marker CFU

Results/Discussion: The obtained data are shown in Table 1

Table 1. The level of CFU during treatment, depending on its type

	before	After debridement			4 th day			12 th day		
		mediana	1 st qrt	3 rd qrt	mediana	1 st qrt	3 rd qrt	mediana	1 st qrt	3 rd qrt
Negative Pressure Wound Therapy*	83.01±17.28	43	13	56	18	10	71	10	0	23
Negative Pressure Wound Therapy*+USD	79.5±16.26	18	8	22	0	0	10	0	0	0
Control	65.13±12.55	41	10	61	54.5	42	64	29.5	16	43

Before the start of treatment, the level in all groups did not differ statistically ($p = 0.0552$ and 0.379). After the debridement in the Negative Pressure Wound Therapy* + USD group, he became statistically different ($p = 0.007$ and $p = 0.0059$) from the Negative Pressure Wound Therapy* group and the control group. Between themselves, the last did not differ ($p = 0.15$). After 4 days of treatment in the Negative Pressure Wound Therapy* + USD group, the CFU was statistically different ($p < 0.001$ and $p = 0.0128$) from the control group and Negative Pressure Wound Therapy* group. Between the Negative Pressure Wound Therapy* group and the control group, the difference is significant ($p = 0.0287$) as well. After 12 days of treatment, there is a reliable difference between all groups. It is also a significant difference between the beginning and the 12 day treatment in all groups

Conclusion: Combination of the Negative Pressure Wound Therapy* and US debridement seems to be a safe and effective treatment for complex diabetic foot wounds, and could lead to a higher proportion of healed wounds, faster healing rates, and potentially fewer re-amputations than standard care or single Negative Pressure Wound Therapy*.

*VAC therapy

[P15] A NEGATIVE BONE CULTURE MAY PREDICT A LOWER INCIDENCE OF MAJOR AMPUTATION IN PATIENTS WITH THE DIABETIC FOOT

Veronika Woskova¹, Alexandra Jirkovska¹, Robert Bem¹, Michal Dubsky¹, Vladimíra Fejfarová¹, Kamil Navratil², Andrea Nemcova¹

¹Diabetes Centre, Institute for Clinical and Experimental Medicine, Prague, Czech Republic

²Transplant Surgery Department, Institut for Clinical and Experimental Medicine, Prague, Czech Republic

Background and aim: Diabetic foot osteomyelitis (OM) is associated with impaired healing, recurrent ulcer infection, and enhanced risk of major amputation. The standard diagnostic test for OM is isolation of bacteria from a bone sample. The impact of OM defined as a positive bone culture on long-term outcomes in diabetic foot ulcer (DFU) patients is unclear. The aim of our study was to evaluate one-year outcomes in patients with DFU and suspected OM with respect to bone culture results.

Method: A total of 86 DFU patients (mean age 61±13 years, 70 male, 63 with Type-2 DM) who underwent bone sampling for culture during foot surgery or by indirect bone biopsy between Jan-Dec 2015 were included in the study. Indications for bone sampling were deep chronic ulcers with the underlying bone, often with cellulitis, and highly suspected bone involvement. Patients were divided into two groups according to bone microbiology results and followed up for one year in terms of mortality, major amputation, new ulcer appearance, hospital admission, and need for additional surgery.

Results: Negative microbiology results of bone samples were observed in 26 (30.2%) patients, with bone microbiology positive in 60 (69.8%) patients. At one-year follow-up, 4 (15.4%) bone culture-negative patients vs. 4 (6.7%) bone culture-positive patients had died (NS). All bone culture-negative patients remained major amputation-free after 1 year, while 9 (15%) bone culture-positive patients underwent major amputation ($p = 0.05$). A generally high rate of hospital admissions for any reason was observed in both groups with no significant difference (46.2% vs 50.0%, NS). During one-year follow-up, no significant differences between bone culture-positive and negative patients in terms of additional foot surgery procedures (42.3% vs. 56.7%) and presence of a new ulcer (38.5 vs. 35.0%) were observed.

Conclusion: Our study demonstrated an association of a negative bone culture with a better one-year outcome in terms of major amputation, while mortality, hospital admission, additional surgery, and presence of a new ulcer were not associated with bone culture results. Based on our results, it seems that a negative bone culture in DFU patients may predict a lower risk of major amputation.

[P16] EXPLORATION OF SERIAL CHANGES IN THE MICROBIOME OF DIABETIC FOOT ULCERS

Sloan Tim¹, Turton Jim¹, Mat Diggle¹, Bonnie Hurwitz², Frances Game³, William Jeffcoate⁴

¹Department of Microbiology, Nottingham University Hospitals Trust, Nottingham, United Kingdom

²Agricultural and Biosystems Engineering, University of Arizona, Tucson, United States

³Derby Teaching Hospitals, NHS Foundation Trust, Derby, United Kingdom

⁴Nottingham City Hospital, Foot Ulcer Trials Unit, Diabetes and Endocrinology, Nottingham, United Kingdom

Aim: Characterisation of the microbiota by identification of the bacterial DNA associated with chronic foot ulcers overcomes many of the limitations of conventional microbiology. And while identification using 16S ribosomal RNA gene sequencing is now employed in a number of fields, research has been hitherto relatively restricted in chronic ulcers. Such work has the capacity to explore the more complex relationships which might exist between different bacterial groups as well as between bacteria and their hosts. We have used these techniques to study the bacterial profiles in samples from 28 individuals with heel ulcers complicating diabetes and have sought to determine how these profiles change with repeated sampling.

Method: Participants in a parent study evaluating an off-loading device consented to have surface swabs taken using the Levine method each two weeks for 24 weeks (or until healing or withdrawal from the study). Material was frozen at -80C prior to extraction, 16S rRNA amplification, sequencing and bioinformatic analysis. Detailed data on treatments and the status of the wound were available from the parent trial.

Results/Discussion: Ulcer samples could be grouped into six clusters reflecting dominant taxa: *Corynebacterium*, *Staphylococcus*, *Enterobacteriaceae*, *Pseudomonas*, *Micrococcaceae* or mixed anaerobes. Ulcers consistently colonised by *Enterobacteriaceae* and anaerobes were less likely to heal, while a trend towards *Corynebacterium* and *Staphylococci* was observed in healing ulcers. Falling microbial diversity was observed preceding clinical infection in certain cases

Conclusion: These early data confirm the considerable possibilities afforded by this approach and the potential for gaining further insight into the way in which the clinical status and prognosis of the wound are associated with the dominance of certain bacterial communities and the changes which may occur within them. When refined and combined with clinical findings, this approach may prove invaluable in the routine assessment and monitoring of chronic ulcers.

[P17] THE MICROBIOME OF THE CHRONIC DIABETIC FOOT ULCERS

Elena Komelyagina¹, Mikhail Antsiferov¹, Olga Uvarova², V.M. Popova³, E.L. Zhilenkov³, V.V. Yuskevich³

¹Moscow State Out-Patient Endocrine Center, Moscow, Russian Federation

²High School of Economy, Moscow, Russian Federation

³Scientific and Practical Center "Micromir", Russian Federation

Aim: To evaluate and compare the microbiome of chronic neuropathic diabetic foot ulcers (nDFU) using conventional culture techniques (CCT) and mass-spectrometry approach of microbial markers (MSMM).

Method: The samples from 18 nDFU without signs of infection were sent to Microbiology laboratory in order to obtain the presence of microorganisms using CCT and to chemical laboratory for performing MSMM simultaneously.

Results/Discussion: The CCT revealed no growth in 2 specimens (4%), presence of gram-positive cocci in 5 cases (21%) including MRSA, gram-negative bacilli in 2 samples (4%), polymicrobial infection in 5 cases (21%). Anaerobes were not obtained. Obtained number of microorganisms did not exceed 10^{*6} KOE/ml. Mixed genera were identified in all samples using MSMM approach. The most commonly detected bacteria were *St. aureus* (76%); facultative anaerobes: *Streptococcus mutants* (52%), *Nocardia spp* (24%), *Streptomyces* (24%); obligate anaerobes: *Eggerthella lenta* (67%), *Clostridium spp.* (48%), *Clostridium ramosum* (14%).

Conclusion: Mass-spectrometry of microbial markers technique revealed new information about diversity of bacteria in chronic not infected neuropathic diabetic foot ulcers. Anaerobic and fastidious microorganisms may play a significant role in delayed healing process. Further investigations are needed to study the importance of mixed genera in the development of a microbial biofilm and to use obtained data in clinical practice.

[P18] MULTIDRUG RESISTANT BACTERIA: AN INCREASING COMPLICATION OF DIABETIC FOOT

Elisabetta Iacopi¹, Alberto Coppelli¹, Chiara Goretti¹, Elisa Leporati¹, Enrico Tagliaferri², Carlo Tascini², Francesco Menichetti², Alberto Piaggese¹

¹Diabetic Foot Section, Medicine Department, Pisa University Hospital, Pisa, Italy

²Infectious Disease Unit, Pisa University Hospital, Pisa, Italy

Aim: Multidrug resistant (MDR) infections complicate diabetic foot ulcers (DFU) severely worsening their prognosis. The aim of this study was to assess the prevalence of MDR phenotypes of different bacterial strains in diabetic patients followed by our diabetic foot clinic from January 2001 until December 2014.

Method: We retrospectively analysed 7.826 culture results from deep wound specimens in diabetic patients (M/F: 6.065/1.761. Age: 63.2±11.7 yrs) followed by our outpatient Clinic for DFU. From all bacterial strains we selected those more prevalent and we analysed antimicrobial sensitivity pattern in relation to the more widespread antibiotic resistance phenotypes. In particular, we evaluated the prevalence of *Staphylococcus aureus* (SA), *Pseudomonas aeruginosa* (PA) and Enterobacteriae (EB), sorting out Methicillin-Resistant SA (MRSA), PA resistant to Ciprofloxacin (CiproRPA) and Carbapenem (CRPA), EB resistant to Ciprofloxacin (CiproRE) or Extended Spectrum Beta Lactamase producers (ESBL). To test if the MDR pattern changed overtime, we divided the obtained results in two groups: the first (Group A) included those from 2001 until 2007 while the second (Group B) from 2008 until 2014.

Results/Discussion: SA was detected in 2.483 specimens in Group A and in 2.131 in Group B (NS), the presence of MRSA was 58.7% in Group A and 51.2% in Group B (NS). PA was observed in 1.428 specimens in Group A and 1.783 in Group B (p<0.03): in particular, CiproRPA was detected in 45.1% of cultures in Group A and 64.1% in Group B (p< 0.04) while CRPA in 32.7% in Group A and 34.2% in Group B (ns). The presence of EB was detected in 1.516 specimens in Group A and 2.032 in Group B (p<0.001); CiproRE prevalence was 28.0% in Group A and 47.7% in Group B (p< 0.02) while ESBL prevalence was 23.0% in Group A and 39.7% in Group B (p< 0.05).

Conclusion: In conclusion, our data confirmed the high prevalence of MDR bacteria infections in DFU and their increasing overtime, stressing the importance of a close monitoring of antimicrobial drugs susceptibility.

[P19] MULTIRESTANT BACTERIA: ANALYSIS OF MULTIDISCIPLINARY CONSULTATION OF THE DIABETIC FOOT UNIT

Liliana Fonseca¹, Ana Amado², Teresa Pereira², Ana Martins², Sofia Teixeira², André Carvalho², Cláudia Amaral², Helena Neto², Cláudia Freitas², Joana Martins², Luís Loureiro², Luís Costa², André Gomes², Isabel Gonçalves², Sara Pinto², Rosa Guimarães², Joel Pereira², Rui Carvalho²

¹Endocrinology Department, Centro Hospitalar Universitário Do Porto, Porto, Portugal

²Centro Hospital e Universitário Do Porto, Porto

Aim: To characterize the pathogens of infected Diabetic Foot Ulcers (DFU), microbiological foot infections, and analyze the association of amputation rates with multiresistant bacteria.

Method: Observational, analytical and retrospective studies were performed on 74 patients with microbiological data populations, evaluated in the Multidisciplinary Consultation of the Diabetic Foot Unit – Hospital Santo António- Oporto, from January to December of 2014. Data were analyzed using chi – square and binary logistic regression tests of SPSS 21®.

Results/Discussion: Among the 74 bacterial foot infections evaluated, 47 (63.5%) had more than one bacterial agent isolated and 13% (n=17) of it were multiresistant agents: Methicillin-Resistant *Staphylococcus aureus* (MRSA) (n=8); quinolone resistant *Pseudomonas aeruginosa* (n=6); *Escherichia coli* producers of extended spectrum betalactamase (ESBL) (n= 2) and *Acinetobacter baumannii* (n=1). Among non-multiresistant agents the more frequent were: methicillin- sensitive *Staphylococcus aureus* (MSSA) (n=20); *Proteus Mirabilis* (n=10); multisensitive *Escherichia coli* (n=9); *Morganella morganii* (n=8); *Enterobacter cloacae* (n=5), *Serratia marcescens* (n=5), *Pseudomonas aeruginosa* MS (n=5), *Corynebacterium* spp (n=5).

All patients with MRSA, *Pseudomonas aeruginosa* quinolone resistant, *Escherichia coli* ESBL and *Acinetobacter baumannii* were hospitalized for therapy optimization except one patient that had vancomycin therapy in hemodialysis. In our study 5 of the patients infected with MRSA and 3 with *Pseudomonas aeruginosa* quinolone resistant had a score 3 in PEDIS scale, at the first assessment.

A total of 32 (43.2%) patients suffer amputation being major in four of them (at the leg or thigh level). From the 8 patients infected with MRSA six had an amputation and 4 of the patients infected with *Pseudomonas aeruginosa* quinolone resistant were also amputated.

MRSA foot infection was associated with an increased risk of amputation compared to non-multiresistant agents (OR = 5.850; 95% IC = 1.082 – 31.661; p=0.04).

Conclusion: Diabetic foot infections are frequently classified as moderate or severe and are associated with more than one microbiological agent. In the present study MRSA infection was related to a higher amputation risk, although this result should be confirmed in the future using larger study samples.

[P20] BREAKTHROUGH IN TREATMENT OF SKIN BARRIER DEFECTS IN DIABETIC FEET WITH NEW FOAM TECHNOLOGY

Maximilian Spraul¹, Schulte-Walter Judith², Dähnhardt Dorothee³, Wigger-Alberti Walter⁴, Neubourg Thomas², Hanisch Eckhard²

¹Mathias-Spital, Rheine, Germany

²Neubourg Skin Care GmbH & Co.Kg, Greven, Germany

³Microscopy Services Dähnhardt GmbH, Flintbek, Germany

⁴Bioskin GmbH, Hamburg, Germany

Aim: Dry to cracked foot skin in diabetics presents an entry point for bacteria and fungi. The present studies were performed to investigate the repairing and rehydrating effects of two different foam creams on the skin barrier. Furthermore, the bacterial growth in the interdigital spaces of the feet was analysed.

Method: Two separate studies were performed both as prospective, double-blind, randomised, placebo-controlled, intraindividual single center study. Study participants applied verum and placebo foam cream to their feet twice daily for 4 weeks. Study 1: Integrity of the skin barrier was measured by morphometric analysis of the quantity of intercellular lipid lamellae (ICLL) after transmission electron microscopy (TEM). High-performance thin-layer chromatography (HPTLC) was applied to analyze the Stratum Corneum lipids. Study 2: For analysis of bacterial growth swabs were taken from the interdigital spaces. Biophysical measurements including transepidermal water loss (TEWL) and skin hydration were examined in both studies.

Results: After 4 weeks of treatment the amount of ICLL as well as the content of ceramide NP is significantly increased for verum treated skin compared to baseline and placebo. The amount of ICLL for the feet treated with verum is comparable to values of healthy skin after 4 weeks of treatment. No changes in bacterial count were detected for both foam creams.

Conclusion: After 4 weeks of treatment using verum foam cream the length of the lipid lamellae equaled that of healthy skin, thus a completely repair of the skin barrier is achieved. The data show that a high-quality repair and regeneration of the skin barrier is achieved, which includes filling the gaps in the skin barrier lipid film as well as regeneration of the skin barrier to the status of healthy skin. In addition, it has been shown that verum and placebo foam cream can be applied also to the interdigital spaces, without increasing the risk of bacterial infection. The potential of the verum foam cream examined here goes far beyond the simple moisturizing effect of other skin care products. It is an approach of skin care that is tailored to the particular needs of diabetes related skin problems.

[P21] ANNUAL DIABETIC FOOT RISK ASSESSMENT: IS IT NECESSARY?

Daniela M. M. Mendes¹, CHVNG/E Diabetic Foot Clinic Team², Matilde Monteiro-Soares³

¹Centro Hospitalar Vila Nova Gaia/Espinho, Epe, Internal Medicine Dept., Faculty of Medicine of Porto University, Biochemistry Dept., I3s - Instituto de Investigação e Inovação Em Saúde of Porto University, Espinho, Portugal

²Centro Hospitalar Vila Nova Gaia/Espinho, Epe, Portugal

³Cides Department, Oporto Faculty of Medicine, Porto, Portugal

Aim: International guidelines recommend annual diabetic foot risk assessment. However, it is unlikely that, once established, risk variables can regress. We aim to study the real change in these variables after 1 year and risk progression using the International Working Group on Diabetic Foot (IWGDF) classification.

Method: A prospective cohort study including subjects with Diabetes (DM) without active diabetic foot ulcer (DFU) that underwent foot screening in our Diabetic Foot Clinic, from 01/2010 to 12/2011 was conducted. At baseline, demographic, clinical and foot risk characterization variables were collected. After 1 year follow-up, foot risk characterization was re-performed. IWGDF classification was applied at both time points. Peripheral arterial disease (PAD) was diagnosed by foot pulses palpation and diabetic peripheral neuropathy (DPN) using the 10g Semmes-Weinstein monofilament and 128 Hz tuning fork. Subjects dead or lost to follow up before 1 year were excluded (n=30).

Results/Discussion: We included 175 subjects, with mean age of 65 (± 9) years, DM duration 16 (± 11) years, HbA1c 8.0 (± 1.6) %. All had type 2 DM, the majority were male, with hypertension. DM related complication prevalence ranged from 16% (nephropathy) to 41% (retinopathy). At baseline, 52% of participants were classified as risk group 0, 3% as 1, 20% as 2 and 25% as 3; 48% had DPN, 79% foot deformity, 17% PAD, 33% previous DFU and 9% previous lower extremity amputation (LEA). After 1 year, 50% of individuals were in risk group 0, 2% in 1, 21% in 2 and 26% in 3; 50% had DPN, 84% foot deformity, 17% PAD, 35% previous DFU and 9% previous LEA. This means that an additional 2% developed DPN, 5% foot deformity and 2% a DFU, resulting in a reduction of 1.7% and 0.6% subjects classified as group 0 and 1, respectively and an increase of 1.1% and 1.2% as group 2 and 3, correspondingly.

Conclusion: Although annual risk re-assessment is considered mandatory in diabetic foot care, we consider that with such slow progression this periodicity might be enlarged. So, never undervaluing the importance of diabetic foot direct observation, time could be spared and invested in other preventive measures.

[P22] THE MEASUREMENT OF SKIN TEMPERATURE IN THE EXAMINATION OF THE FOOT WITHIN THE DIABETIC FOOT CLINIC

Wegin Tang¹, Aaron Whittam², Rob Simpson², Audrey MacDonald³, Claire Lomas⁴, Suhail Ainkar⁵, John Bevans⁵, John Allen³, Leon Rogers², Ben Kluwe⁶, Francis Ring⁶, Peter Plassmann⁷, Graham Machin², Nina Petrova¹, Michael Edmonds¹

¹Diabetic Foot Clinic, King's College Hospital NHS Foundation Trust, London, United Kingdom

²Temperature and Humidity, National Physical Laboratory, London, United Kingdom

³Microvascular Diagnostics, Newcastle Upon Tyne Hospitals Trust, Newcastle, United Kingdom

⁴Podiatry Department, Diabetes Centre, Newcastle Upon Tyne Hospitals Trust, Newcastle, United Kingdom

⁵Community Podiatry Department, Penine Acute Hospitals Trust, Manchester, United Kingdom

⁶Department of Computing, University of South Wales, Pontypridd, United Kingdom

⁷Photometrix Imaging Ltd, Pontypridd, United Kingdom

Aim: Skin foot temperatures are frequently measured in diabetic foot patients, although no measurement algorithms have been established. We report that plantar temperatures between the right foot (RF) and left foot (LF) are similar in both healthy volunteers and diabetic foot patients. Moreover, these temperatures are comparable whether measured after 10 or 20 minutes resting with a longitudinal temperature reduction of less than 1.5%.

Method: We studied 104 healthy volunteers and 110 diabetic patients with intact feet and past history of foot ulceration. Subjects were asked to rest barefoot on a podiatry chair with legs extended and supported. They underwent assessment with novel thermal imaging device designed by Photometrix Imaging Ltd. A plantar imaging sequence (PIS) of RF and LF was captured after 10 (PIS1) and 20 minutes (PIS2). The images were analysed by an independent scientist and the mean RF and LF temperatures were calculated. The percentage temperature change (%Tchange) of the RF and LF for patients and controls was also calculated (% T change= (PIS2-PIS1)*100/PIS1).

Results/Discussion: There was no significant difference between the mean RF and LF skin temperatures whether measured after 10 or 20 minutes resting in healthy volunteers (PIS1: 26.9±2.3 vs 26.8±2.3, p=0.839; PIS2: 26.5±2.3 vs 26.4±2.4, p=0.653) and in diabetic foot patients (PIS1: 25.7±2.5 vs 25.7±2.5, p=0.955; PIS2: 25.5±2.4 vs 25.4±2.4, p=0.879). Although the mean RF and LF temperatures significantly decreased from 10 minutes of resting to 20 minutes of resting in both controls and diabetic foot patients (p<0.05 for all comparisons), the %Tchange was less than 1.5 % for both groups: (healthy volunteers: %Tchange RF=(-1.2±2.7%) and %Tchange LF=(-1.5±2.5%); diabetic foot patients: % T change RF=(-1.0±2.0%) and %Tchange LF=(-1.2±2.1%).

Conclusion: Plantar thermal imaging indicated that the mean RF temperature is similar to the mean LF temperature in both healthy volunteers and diabetic foot patients. The observed %Tchange between 10 and 20 minutes of resting was statistically significant although a reduction in temperature of less than 1.5% has negligible clinical importance. We conclude that 10 minutes barefoot resting is sufficient for acclimatisation to enable skin foot temperature assessment in diabetic patients and healthy volunteers.

[P23] EFFECT ON HbA1c, DIABETES RELATED PROBLEMS AND WELLBEING OF PROACTIVE MULTIDISCIPLINARY CARE FOR PEOPLE WITH DIABETIC FOOT COMPLICATIONS AND POORLY REGULATED HbA1c

Mette Glindorf¹, Karen Rytter¹, Anne Rasmussen¹, Volkert Siersma², Ulla Bjerre-Christensen¹

¹Steno Diabetes Center Copenhagen, Gentofte, Denmark

²Research Unit for General Practice, Copenhagen, Denmark

Aim: The aim was to investigate if HbA1c improves when poorly regulated people presenting with diabetic foot complications (DFC) are proactively offered person-centered support by a diabetes specialist nurse (DSN). Additional aim was to explore if diabetes related problems and wellbeing improves concurrent to treatment.

Method: A prospective intervention study with follow-up after one year. Patients referred to orthopedic surgeon in the foot clinic were consecutively recruited by systematic audit by podiatrist and DSN. During nine months, consultations and education were given and monitored by DSN. Medical treatment was supervised and delegated by **endocrinologist**. HbA1c was measured before and after the intervention with follow-up after one year. Psychosocial aspects were monitored with PAID and WHO-5 wellbeing index, supported by five individual interviews.

Results/Discussion: Forty-nine patients were included aged 56 ± 22 years, male 69.3%, HbA1c 88 (75-125) mmol/mol, type 1 diabetes 55%, disease duration 25.1 (2-67) years, multiple complication 85.4%. HbA1c 77.9 (40-135) mmol/mol after intervention $p=0,0001$, HbA1c 79.7 (53-114) mmol/mol at one year follow up $p=0,0008$. Forty-three 43 (87%) patients answered PAID and WHO-5. 37% had a PAID sum-score >33 indicating serious diabetes related problems. PAID improved significantly $p=0,004$ after nine month, and results were sustained at one year follow up $p=0,0126$. 35% had a WHO-5 score <50 indicating poor well-being with a significant correlation to a PAID score >33 (Spearman's rho 0.47, $P=0,01$). No significant change in WHO-5 scores was seen. Interviews revealed that living with a foot complication has an impact on all aspects of life including feeling alone with the disease, loss of socioeconomic status, feeling insecure with your body and sleep disturbances. It reveals satisfaction with better HbA1c, and effort to self-care with support from familiar Health Care Professionals (HCP). Ethical considerations for the participants made a control group impossible.

Conclusion: When people presenting with DFC are proactively offered person-centered support and care by DSN, a significant and sustained reduction in HbA1c and diabetes related problems is seen. The effort does not seem to change well-being in general. Interviews reveal efforts to self-care and the need of assistance from HCP.

[P24] DIABETIC FOOT IN PATIENTS AFTER TRANSPLANTATION AND IT'S ASSOCIATION WITH RISK FACTORS INCLUDING EDUCATION, PREVENTION AND PHYSICAL ACTIVITY

Eliška Vrátná¹, Anna Pyšná², Robert Bém², Michal Dubský², Andrea Němcová², Veronika Wosková², Alexandra Jirkovská², Tomáš Neškudla², Peter Girman², Radomíra Kožnarová², Věra Lánská², Vladimíra Fejfarová²

¹Faculty of Physical Education and Sport, Prague, Czech Republic

²Diabetes Centre, Institute for Clinical and Experimental Medicine, Prague, Czech Republic

Aim: Diabetic foot(DF) that may occur due to a lack of education and prevention could lead to increased morbidity and mortality in diabetic patients after organ transplantation. The aim of our study was to assess the occurrence of DF in transplant patients and risk potentially affecting its appearance.

Methods: We included into our study 57 diabetic patients (mean age 46±10.5 years, diabetes duration 28.6±10.2 years) who underwent organ transplantation (01/2013-12/2015) and were followed for at least 12 months in the transplant clinic. The occurrence of DF and risk factors potentially contributing to its development such as the function of transplant organs, the presence of late complications (93%of patients had severe neuropathy, 66.7% proliferative retinopathy or amaurosis) and PAD and level of physical activity (detected by Godin Leisure-Time Exercise Questionnaire indicated Weekly leisure activity score - WLAS and the level of strenuous, moderate and light exercise), intensity of education and prevention of DF were determined.

Results: DF developed in 31.6%(18/57) of patients after organ transplantation within 11 months on average after surgery. Only HbA1c (p=0.018), PAD (p=0.0001), TcPO2 (p=0.0003), deformities (p=0.0017) and moderate intensity of exercise (p=0.049) significantly correlated with the development of DF. Other factors such as age, diabetes duration, BMI, duration of posttransplant period, severe forms of retinopathy, renal functions after transplantation were not associated with the occurrence of DF. The intensity of physical activity remained unchanged (WLAS 31.7±24.8 in pre-transplant vs. 28.8±24.9 in post-transplant period;NS), but there was a trend to the reduction of its duration (150±94 vs. 329±153 minutes/week;p=0.12).Education was performed periodically (2.6±2.5 times on average), 94.7% of patients checked their feet 4.5±2.9 times/week, however appropriate preventive shoes worn only 26.3% of transplant patients.

Conclusion: The occurrence of DF was much higher in such risk group of patients compared to general diabetic population. Risk factors included worse diabetes control before transplantation, the presence of PAD and foot deformities. Therefore, more detailed vascular and physical examinations and more intensive education should be performed in diabetic patients before transplantation. Education should also be focused on an increase of physical activity leading to higher physical fitness under the circumstances of appropriate preventive footwear usage.

Supported by project GAUK 546417, SVV260345,00023001

[P25] PROGNOSIS OF WOUND HEALING IN DIABETIC FOOT PATIENTS

Tatiana Zelenina¹, Aleksandr Zemlianoi², Natalia Vorokchobina¹, Natalia Gabaraeva¹

¹Federal State Budget Institution of Higher Education North-Western State Medical University Named after I. I. Mechnikov the Ministry of Public Health of the Russian Federation, St. Petersburg, Russian Federation

²Institute of Medical and Social Technologies, Moscow, Russian Federation

Aim: More than 60% of diabetic foot patients require surgery operations and foot amputations. Prolonged spontaneous wounds healing associates with risk of reinfection and new operations. We estimated risk factors of healing delay and created prognosis model.

Method: We examined 108 diabetic outpatients after surgery and partial foot amputations. All of them had open wound and were treated at the Center and received standardized therapy. We excluded patients with critical limb ischemia (ABPI < 0.5). We suggested that wound healed at 12 weeks would be a good result, at 24 weeks - satisfactory result and more when 24 weeks - failure of healing. Some factors involved in wound healing were found and significances of them were assessed. Data were presented as means \pm SEM. Classification trees multivariate exploratory techniques were used.

Results/Discussion: The mean age of patients was 60.0 ± 1.3 yrs, mean duration of diabetes was 12.9 ± 1.5 yrs. HbA1c level was $9.10 \pm 0.47\%$. The mean time of wound healing was 12.7 ± 1.55 weeks. The presence of infection and osteomyelitis were detected in 57 (55.9%) and 19 (18.1%) cases respectively. The mean size of wounds was 17.0 ± 2.82 cm², and mean time of wounds presence before appeal to the Center was 13.0 ± 2.8 weeks. We found that local parameters were major factors for delay of neuropathic wound healing. The osteomyelitis was the most impotence parameter. The second one was infection. The presence of osteomyelitis and MRSA-infection was associated with delay of wound healing in 100% of cases. The combination Size (more than 10 sm²), location of the wound (forefoot or plantar face) and time before referral to the Center (more than 9 weeks) were also great determinants. There weren't associations of age, gender, duration of diabetes, HbA1c% with time of completed healing. Severe diabetic neuropathy was also significant but not great predictor of delay healing.

Conclusion: Prognosis of wound healing in diabetic patients first of all depended on local wound parameters such as depth of damage, infection, size and forefoot localization. Diabetic neuropathy were involved in the process of wound healing along with local factors.

[P26] IS THERE A RELATIONSHIP BETWEEN BONE QUALITY AND FRACTURE RISK IN PATIENTS WITH TYPE 2 DIABETES

Tatiana Gracheva¹

¹Regional Hospital#1, Ekaterinburg, Russian Federation

Aim: To examine the risk factors (including bone quality) for fractures in women with diabetes mellitus type 2 in menopause.

Method: In a cross – sectional study included 75 female with diabetes mellitus type 2 (T2DM) during 13.07±6.65 years, age of patients made up 61.83±6.89 years, duration of menopause of 11.96±7.29 years, who were hospitalized in Department of endocrinology of our hospital from 01 January 2015 to 01 December 2016. 67 (89.33%) patients received insulin therapy in a combination therapy or monotherapy with insulin. The level of HbA1C was 9.45±1.61%, the mean weight was 82.2±11.54 kg, height 162.0±5.7 cm, body mass index of 31.44±4.36 kg/cm². During the dual –energy x-ray absorptiometry studied the mineral bone density (BMD) at the femoral neck, lumbar spine, as well as the study of trabecular bone index (TBS), that reflect the quality of bone. Estimated TBS carried out taking into account the recommendations of the European group of users of TBS, where the TBS is less than 1.2 corresponds to the destruction of micro architecture, TBS less than 1.35, but over 1.2 – partial destruction of the micro architecture, more than 1.35 – normal structure of bones.

Results/Discussion: In 88 % of patients (n=66) revealed a reduction in index TBS. In 38 patients (50.6%) TBS was less than 1.2, which corresponds to the destruction micro architectonics. In 21(28%) patients were fractures of various localization, in 15 (20%) - low-energy fractures. Fractures of the spine had 4 (5,33%) patient. In patients with fractures significantly reduced the BMD of the femoral neck (0,77±0,12 vs 0,86±0,13, p=0.003) and lumbar spine (0,95±0,15 vs 1,02±0,13, p=0.03). Significantly lower TBS was found in the group of patients undergoing vertebral fractures (1.002±0.08, p=0,013), while in group with osteoporotic low-energy fractures the declining of TBS was not statistically significant (1.11±0.16 vs of 1.16±0.12, p=0,11).

Conclusion: BMD measurement in femoral neck and lumbar spine works in fracture risk assessment. To evaluate role of TBS in patients with DM2 we need the prospective study. Further study is needed to estimate the role of low TBS for non-vertebral fracture risk and arthropathy Charco.

[P27] THE ROLE OF TOPICAL OXYGEN THERAPY IN THE TREATMENT OF DIABETIC FOOT ULCERATION

Nia Jones¹, Gail Curran², Nicola Ivins¹, Keith Harding¹, Paul Hayes²

¹Welsh Wound Innovation Centre, Wales, United Kingdom

²Addenbrooke Hospital, Cambridge, United Kingdom

Aim: Oxygen is a prerequisite in wound healing. It supports several pathophysiological processes such as cell proliferation, bacterial defence, angiogenesis and collagen synthesis. Even though the role of topical oxygen therapy in wound healing is not completely understood, many experimental and clinical observations have shown that defective wound healing is associated with localised tissue hypoxia. The diabetic foot is particularly susceptible to the adverse effects of tissue hypoxia due to complications arising from autonomic neuropathy which can preclude the systemic delivery of oxygen to the wound bed. The class II medical device* delivers pure humidified oxygen directly to the wound to optimise healing potential.

Method: 35 patients presenting with non-healing diabetic foot ulcers (≥ 6 months) were recruited from 14 specialist foot clinics in the United Kingdom. Data on 28 patients was included in this interim analysis as recruitment was ongoing. A comprehensive diabetic foot assessment was performed on the sample and in contrast to many other diabetic foot related studies, no lower limit on foot perfusion was specified within the exclusion criteria. Reviews were undertaken once a week and data on quality of life and pain was recorded once a month over the 24-week study period. Standardised digital images were taken once a week to assess the change in wound surface area.

Results/Discussion: Median age of the sample recruited into the study was 65 (*Md*). Over the 24-week study period the wound surface area had decreased from 1.75cm² (*Md*) to 0.1cm² (*Md*) at study endpoint. After 8 weeks of continuous therapy* the median wound surface area had decreased (48%) and at study endpoint 45% (10/22) of patients had healed. A further 15% of patients had achieved wound re-epithelialisation of greater than 80% over the 24-week duration. Six patients (6/28) from the total sample included in this interim analysis failed to complete the study.

Conclusion: The findings suggest that the application of continuous ambulatory topical oxygen therapy using the device* had a significant beneficial effect on wound healing in this hard-to-heal patient sample. Analysis on the economic significance of these findings are ongoing.

*Natrox™

[P28] DIABETIC FOOT ULCERS CAUSED BY RAT BITE IN TANZANIA

Zulfiqarali G. Abbas¹, Janet Lutale², Nadina Lincoln³, William Jeffcoate³

¹Dept. of Internal Medicine, Muhas, Amc, Dar-Es-Salaam, Tanzania

²Muhas, Dar-Es-Salaam, Tanzania

³Nottingham University, Nottingham, United Kingdom

Aim: To characterize foot injuries caused by rat bites in patients presenting to a diabetes clinic in Tanzania.

Method: The records of all diabetic foot ulcers (DFUs) attending between January 1999 and December 2016 were examined. People who had both rat-bite and non-rat bite DFUs were not included in the comparator group. The first presentation only of each group member was used. Differences between groups were compared using appropriate parametric and non-parametric methods.

Results/Discussion: There were a total of 426 DFUs resulting from rat bites in 179 individuals, and 9343 other DFUs in 4232 individuals. The rat bite population was significantly younger (mean 55.9 versus 57.5 years, $p=0.037$) and had a lower BMI (26.5 vs 27.93, $p=0.008$) but there was no difference in sex, race, diabetes type, diabetes duration, the number who smoked or drank alcohol. There was similarly no difference in the prevalence of either retinopathy or peripheral artery disease (30.7% vs 27.2 %, $p=0.179$) but peripheral neuropathy was more common in those with rat bites (90.9% vs 84.7%, $p=0.012$). Rat bite ulcers were seen significantly sooner after onset than other types of DFU (7.8 vs 18.2 days, $p<0.001$) and the overall incidence of healing was higher (85.8% vs 55.5%, $p<0.001$). There was no difference between groups in the incidence of either minor (4.5% vs 3.0%) or major (2.8% vs 1.9%) amputation but the mortality of people with ulcers from rat bite was higher (overall: 11.9% vs 7.3%, $p= 0.021$; death from infection: 9.1% vs 5.3%, $p=0.032$) despite no difference in mean duration of recorded follow-up (132.2 vs 142.0 days).

Conclusion: Rat bite is a cause of DFU in developing countries, and is associated with increased mortality. All rat bites occurred when the person was in bed. Appropriate protective measures should be considered for people with known neuropathy.

[P29] DOES COGNITIVE FUNCTION IMPAIRMENT INFLUENCE THE FOOT PROTECTIVE BEHAVIOR?

Marina Khlopina¹, Oleg Udovichenko²

¹Clinical Hospital#15, Moscow, Russian Federation

²Central Clinical Hospital of the Presidential Affairs Department, Moscow, Russian Federation

Aim: Previously high prevalence of cognitive disorders among diabetic foot patients was found by Suermann A. et al, 2014. The aim of our study was to investigate its possible effect on the foot protective behavior.

Method: 65 consecutive high foot risk diabetic patients of a hospital surgical department (in stable health condition) were included into the study. 82% of them were admitted due to foot ulcer/wound lesion, others had history of foot ulcer or high risk foot or leg ulcer. Median age was 60 (36-87) years, male:female ratio – 63:37%, diabetes duration: 10 (0,5-37) yrs, type 1:2 ratio – 8:92%. 46% had history of foot ulcer, 20% - of an amputation, and only 9% underwent structured group education for patients with diabetes. We elaborated and used 10-point questionnaires to assess patient's knowledge about foot protection rules and real behavior in this field. Cognitive function was assessed by the Clock Drawing Test (CDT) interpreted according to the ADCSS algorithm.

Results/Discussion: Median number of correct answers about foot protection rules was 7.5 of 10 (0-10); self-reported practicing of these rules – 6.3 (3-10) of 10. Correlation of knowledge and practicing was moderate ($r=0.05$, $p<0.001$). Nevertheless 11% were practicing cutting off callus, 30% used chemical substances to remove callus, 55% had experience of skin injuries while cutting nails. In CDT only 37% had normal results (4/5 or 5/5). Surprisingly we found no correlation between cognitive function and knowledge or behavior concerning foot protection ($r=0.1$ for both). These results were not changed after adjustments: exclusion of 8 patients with newly diagnosed diabetes, or of those who are younger than 60 y.o.

Conclusion: We found no influence of cognitive function on self-reported foot protection knowledge or behavior – perhaps due to relative simplicity of these protection rules and forming of some hygienic behaviors early in patient's life. Nevertheless high prevalence of cognitive impairment should be taken into account during education of patients for more complicated activities – such as insulin dose adjustment or carbohydrate count.

References: Suermann A., Engels A., Meier A. et al. // Materials of the DFSG Meeting (Bratislava, Slovakia), 2014. P43.

[P30] REFERENCE RANGE FOR TCPO₂ MEASUREMENT ON PLANTAR FOOT SURFACE: A PILOT STUDY

Oleg Udovichenko¹, Ekaterina G. Chernova¹, Larisa V. Dadova¹, Anna V. Belyaeva¹, Ekaterina M. Nosenko¹, Darya O. Ladygina¹, Mikhail N. Alekhin¹

¹Central Clinical Hospital of the Presidential Affairs Department, Moscow, Russian Federation

Aim: Dorsal foot is a gold standard for tcpO₂ measurements with validated reference range. Nevertheless, it reflects arterial blood flow in only one of the foot angiosomes. So plantar tcpO₂ measurement is an attractive idea but its implementation was limited by lack of established reference range and some technical problems of the probe attachment. We elaborated a technique for the probe fixation and conducted a study aimed to establish the reference range for plantar tcpO₂.

Method: 30 consecutive diabetic patients (60 legs) from a hospital endocrinology department in stable health condition were included. 7% had type 1 and 93% - type 2 DM; male:female ratio was 43:57%. Median age was 67 (49-85) years, DM duration – 14 (1-31) years. We conducted duplex ultrasound scan (DUS) to confirm vascular status, and dorsal and plantar tcpO₂ measurements on both feet as well as in subclavian region (as a reference). We also semi-quantitatively assessed dryness of plantar skin as it can possibly affect the measurement results.

Results/Discussion: DUS revealed significant (70% or more) stenoses or occlusions, mainly asymptomatic, in 18 legs which were excluded from further reference range assessment. In legs with good blood flow median plantar pO₂ was significantly higher than dorsal one (69 (43-86) vs. 45 (30-107) mmHg, p<0,001). Nevertheless, reference range for plantar pO₂ calculated as M+/-2SD equaled 44-91 mmHg. Median subclavian region value in these patients was 53 (34-95) mmHg. Plantar and dorsal pO₂ values constituted 131(63-206)% and 90(42-162)% of the subclavian one, respectively (p<0,001).

Only 2 feet (3%, not enough for statistical analysis) had severe skin dryness; we found no significant difference in pO₂ value between those with mild (36%) or no dryness (58%).

Conclusion: This pilot study demonstrated that reference range for plantar pO₂ measurement may be different from the dorsal foot one. Further studies should assess cut-off points, i.e. prognostic value of several degrees of plantar pO₂ reduction in critical limb ischemia. Patients with severe skin dryness may need elaboration of special fixation rings.

[P31] BOTULINUM TOXIN THERAPY IS EFFECTIVE FOR LOWER LIMB SPASTIC OF CLI NOT TO UNDERGO REVASCULARIZATION

Yuta Terabe¹

¹Plastic and Reconstructive Surgery, International Medical Center, Saitama Medical University, Hidaka, Japan

Aim: Revascularization is necessary for treating chronic lower extremities ulcer with peripheral arterial disease. Sometimes it doesn't undergo for many reasons. In this time, critical limb ischemia patients have limit of hip joint and knee joint movement due to cerebral and vertebrae disorder. So they don't take revascularization because limit of range of movement. We treat their improvement of range of movement by botulinum toxin therapy (BTX) and they take revascularization.

Method: 6 CLI patients hospitalized at Department of cardiology, Kasukabe chuo general hospital weren't able to take revascularization, because they have limit of hip joint and knee joint movement due to lower limb spasticity. 2 males and 4 females, total 6 patients(72.5±1 2.8 years) was enrolled, 1 with only limit of hip joint movement, 5 with limit of hip joint and knee joint movement. We use 200 - 300-units of Botox*.

Results/Discussion: All patients improve range of movement by BTX and take revascularization. There were no complications from injection. Extension movements of hip joint from -30°(-15°~-40°) to -23.75°(-10°~-40°) and extension movements of knee joint from -28.75°(-15°~-45°) to -18.75°(-5°~-35°) after BTX.

Conclusion: CLI is one of polyvascular disease, so some CLI patients have CVA and lower limb spasticity. Hard spasticity often causes them not to undergo revascularization. BTX is very effective therapy in this case.

*GlaxoSmithKline, Japan

[P32] UTILIZATION OF CRIOPRESERVED ARTERIAL HOMOGRAPHS IN THE REVASCULARIZATION OF THE COMPLICATED DIABETIC FOOT

Laura Carrasco Cortijo¹, Alejandro Ponton Cortina², José Aurelio Sarralde Aguayo², David Alonso Peña³, Jose Manuel Villaescusa Catalan², Carlos Juarez Crespo²

¹Responsible for the Diabetic Foot Unit, Podiatry. University Hospital Marqués DE Valdecilla, Santander, Spain

²Cardiovascular Surgeon, University Hospital Marqués DE Valdecilla, Santander, Spain

³Plastic Surgeon, University Hospital "Rio Hortega", Valladolid, Spain

Aim: Arterial ischemia is associated with infection as the main predisposing factor for major amputation in complicated diabetic foot. Patients with complicated diabetic foot should be screened for arteriopathy. If revascularization is required, the options are to perform angioplasty using endovascular techniques or to perform shunts in cases of longer and more complex obstructions. In the case of derivations to infrapopliteal arterial trunks the use of saphenous vein as graft is essential since the permeability of the synthetic grafts at that level is very reduced and in the cases of patients with active ulcers the risk of infection of the prosthesis is high.

Method: We present our experience in 2016 in the HUMV in the use of cryopreserved arterial homografts in the revascularization of patients with complicated diabetic foot and risk of limb loss in which endovascular treatment is not possible or has failed and has no saphenous vein available.

During the year 2016, 5 distal revascularizations were performed in diabetic patients by means of cryosurgery-assisted arterial homografts. The mean age of the patients was 62 years (42-78). All patients presented critical ischemia two patients had ischemic pain at rest and three patients had ulcers and necrosis.

No autologous saphenous graft was available.

Except in one case that was the first revascularization intervention in the rest, it was reoperations in all cases proximal anastomosis was performed in a common femoral.

Results: The early primary permeability was 100%. In one patient it was necessary to perform a thrombectomy at 3 months and recover in graft.

The limb salvage rate has been 100%. In both patients with pain at rest, the clinic has disappeared, remaining asymptomatic. In two patients with necrotic ulcers, a minor amputation with complete healing has been performed and in one case a cutaneous graft with good evolution and closure of the ulcer has been performed. Despite treating patients with infective active ulcers, no infectious complications have occurred.

Conclusions: The use of cryopreserved arterial homografts in distal revascularizations in diabetic patients is a useful tool, both for its permeability rate and for its resistance to infection.

[P33] RAPID ACCESS TO VASCULAR - A NEW LOCAL INITIATIVE FOR DIABETIC FOOT PATIENTS WITH PERIPHERAL VASCULAR DISEASE

Paula Grannon¹

¹Diabetes Centre, Kettering General Hospital, Kettering, United Kingdom

Aim: A new initiative was set up in Northamptonshire to provide a Rapid Vascular Access Clinic. The primary aim was to identify diabetic patients with PVD and non-healing diabetic foot ulcers and expedite their access to a Vascular Surgeon working in partnership with a Diabetes Specialist Podiatrist. Historically the vascular service has run as a central access hub based at another hospital with an on-call rota of Consultant Vascular Surgeons with initial access to clinics for diabetics involving a 2-6 week wait.

Method: A retrospective review was undertaken to compare the Rapid Access Vascular Clinic versus the conventional referral route with outcomes for the patient at 3, 6 and 12 months.

Results/Discussion: Early data from this new initiative is encouraging, at the same time highlights a complex case load of high risk factors and co-morbidities to clinically navigate and explore. 50% of patients assessed converted to a vascular surgical intervention, 42% managed conservatively due to various comorbidity and frailty risks. 5% were considered palliative and 3% have active current follow up. Access to Vascular Surgeon is now on average 5 days compared to previous 2-6 week wait. Vascular intervention unless emergency is now on average 5 week compared to previous 14 weeks. Initial outcome data of patients receiving early vascular interventions is indicating 88% of patient with diabetic foot ulcers at 3 month review have demonstrated progressive healing with 12% completely healed. Patients previously reporting ischaemic pain have noted a marked improvement in their symptoms.

Conclusion: The preliminary data from this new initiative suggests an improvement in healing rates, reduction in ischaemic pain and possible decline in patients that may have faced major amputation. Also, it has improved patient experience and has at least sustained their existing quality of life and in fact has improved it in a significant proportion of the caseload.

The further benefit is that it has eradicated the challenge of patients "lost to the system" whose outcomes are traditionally worse. Improved direct communication, continuity and effective partnership with Vascular Surgeon has had a positive benefit on the patient's clinical management.

[P34] PULSE WAVE VELOCITY AND PERIPHERAL NEUROPATHY IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

Anastasios Tentolouris¹, Ioanna Eleftheriadou¹, Pinelopi Grigoropoulou¹, Alexander Kokkinos¹, Evangelia Siami¹, Maria Nikoloudi¹, Nikolaos Katsilambros¹, Nikolaos Tentolouris¹

¹1st Department of Propaedeutic and Internal Medicine, Medical School, National and Kapodistrian University of Athens, Laiko General Hospital, Athens, Greece

Aim: Diabetic peripheral neuropathy (DPN) is the most common diabetic complication. Increased aortic stiffness, measured with the carotid-femoral pulse wave velocity (PWV), has been associated with incident of cardiovascular disease independently of traditional risk factors. Previous studies have reported associations between risk factors for macroangiopathy with DPN in diabetes. However, the association between PWV and DPN is unknown. The aim of this study was to examine the association between PWV and presence as well as severity of DPN in patients with T2DM.

Method: A total of 381 patients with T2DM were recruited. PWV was measured at the carotid-femoral segment using applanation tonometry. DPN was assessed by measuring the vibration perception threshold (VPT), the Neuropathy Symptom Score and the Neuropathy Disability Score (NDS).

Results/Discussion: Participants were classified as having DPN (107) and not having DPN (274). Patients with DPN were more often male and older ($p < 0.05$), had longer diabetes duration, higher height, larger waist circumference, higher arterial blood pressure and higher PWV (all $p < 0.001$). Univariate logistic regression analysis demonstrated that there was significant association between the presence of DPN and age, gender, diabetes duration, height, waist circumference, peripheral and central SBP, PWV, dyslipidemia, HbA1c, retinopathy and nephropathy. Multivariate logistic regression analysis, after adjustment for age, gender, waist circumference, peripheral and central arterial blood pressure and nephropathy, demonstrated that the odds [OR (95% confidence intervals)] of peripheral neuropathy were significantly and independently associated only with height [1.070 (1.038-1.103), $p < 0.001$], diabetes duration [1.051 (1.017-1.087), $p = 0.003$], HbA1c [1.579 (1.261-1.978), $p < 0.001$], PWV [1.202 (1.081-1.337), $p < 0.001$], dyslipidemia [2.425 (1.311-4.488), $p = 0.005$] and retinopathy [4.589 (2.361-8.918), $p < 0.001$]. In addition, multivariate linear regression analysis, after controlling for age, gender, arterial blood pressure and nephropathy, demonstrated that increased NDS score was significantly and independently associated with height [standardized regression coefficient (β)=0.247, $p < 0.001$], diabetes duration (β)=0.118, $p = 0.042$], HbA1c (β)=0.112, $p = 0.038$], PWV (β)=0.232, $p < 0.001$) and retinopathy (β)=0.286, $p < 0.001$).

Conclusion: Our study implies that in patients with T2DM increased PWV is associated with DPN beyond the known risk factors. More importantly, increased PWV is associated not only with the presence but also with the severity of DPN.

[P35] VASCULAR REHABILITATION AS PART OF THE THERAPEUTIC ALGORITHM OF DIABETIC PAD

Toscanello Fabrizio¹, Maria Concetta Gugliotta¹, Antonio Mander², Isac Flaishman¹

¹Villa Tiberia Clinic, Rome, Italy

²Vaclav Vojta Centre of Vascular and Oncologic Rehabilitation, Italy

Aim: Diabetic Patients suffering from arterial disease undergo a severe functional limitation related to the reduction of power reserve or to major and minor amputations. According to our experience the vascular rehabilitation plays a role in stabilization/improvement of vascular disease as well as a metabolic functional improvement and quality of life.

Method: 105 PAD patients with and without neuropathy were selected from revascularized (70) and unfit to revascularization (35) patients. Over 70% in secondary prevention. An individual rehabilitation project (IRP) together with therapeutic education intervention was formulated: postural re-education, stimulation of proprioception, respiratory gymnastics, activities to treadmill. Also SF 36 on the perception of their health was tested. All patients (estimated for suitable footwear and insole) performed 60 minutes cycles three times/week for two months. Incoming and outgoing, basal blood glucose test, BORG for fatigue and dyspnea, perimeter of the treadmill, blood pressure and heart rate were evaluated.

Results/Discussion: No cardiovascular complications during treatment, only two patients discontinued for issues not related to vascular or diabetic disease, bone and joint complications. In all patients there was at least one walk distance range increasing of 100%, the SF has documented an improvement in the perception of health status, together with a better control of blood pressure and blood glucose values and heart rate. No significant changes observed between the two groups: those revascularized in which was recovered a good distal perfusion, generally have a higher performance than non-vascularized, but the increase was still present in both groups. No recurrent ulceration or prelesions during the rehabilitation treatment wearing the adequate shoes. The immediate results of the treatment are both objectively and subjectively very good acting on the multiplicity of factors present in the diabetic pathology, not last at the patient's awareness of their disease and the ability to handle it.

Conclusion: In conclusion, the vascular rehabilitation treatment (performed with the right footwear and insole above all in secondary prevention) represents an important therapeutic aid in the treatment of arteriopathic diabetic patients with and without peripheral neuropathy and must be included in the algorithm of the diabetic foot therapy.

[P36] 5-YEARS OLD RESULTS OF ENDOVASCULAR TREATMENT IN DIABETIC PATIENTS WITH CRITICAL LIMB ISCHEMIA

Zera Abdulvapova¹, Anna Gorbacheva², Olga Bondarenko³, Gagik Galstyan³

¹Endocrinology Research Centre, Diabetic Foot Department, Moscow, Russian Federation

²Lomonosov Moscow State University, Faculty of Fundamental Medicine, Moscow, Russian Federation

³Endocrinology Research Centre, Moscow, Russian Federation

Background: Critical limb ischemia (CLI) in diabetic patients is a risk factor of limb amputation and mortality. Timely done complex treatment of CLI in diabetic patients reduce the amount of amputation and improve life prognosis. However, there is little evidence of long-term results of CLI treatment in diabetic patients.

Aim: To evaluate the long-term results after percutaneous balloon angioplasty (PTA) in diabetic patients with CLI.

Materials and methods: In 2010-2012 were recruited 85 diabetic patients with CLI. Diagnosis and treatment of CLI were based on recommendation of TASC II. There were 54(63%) men, with mean age 64,1[54-68] years, diabetes type 1/2 - 8/73 (9,4/90,6%), mean duration of diabetes 16,5[0,8-43] years, mean HbA1c 7,9±1,4%. Myocardial infarction (MI) and stroke in anamnesis were in 25(15%) and 15(9%) patients, respectively. Minor amputations in anamnesis – 17 (20%) patients. GFR<60ml/min - 29 (34%). Peripheral arterial disease (PAD) 4-6 classes according Graziani classification were in 69 (93%) limbs; Rutherford classification: IV category-15 (15%), V-51(53%), and VI in 30 (31%) patients. All patients were undergoing to PTA in 96 limbs with technical success in 96%. Patients with foot ulcer and gangrene were underwent to treatment including debridement, atraumatic dressing, minor amputations in 15 (17%) cases, antibacterial therapy if it needs. The primary outcome was common survival, secondary outcome were cases of repeat PTA, and major amputations.

Results: During 5 years there were 28(29%) cases of repeat PTA due to CLI recurrence. There were major amputations in 6 (7%) patients; common survival - 66 (77%). Death's reasons were: MI- 6 (7%), stroke – 1(1,2%), 4 (4,7%), sepsis – 1 (1,2%), unknown reasons – 7 (8,2%).

Conclusions: Diabetic patients with CLI have severe morphological lesions of lower limb arteries and foot ulcers and gangrene in most cases. Complex successful CLI treatment including PTA decrease the risk of major amputations. Timely reintervention in diabetic patients with recurrent CLI promotes better limb salvage and common survival. Potentially active follow up in diabetic patients with CLI and severe comorbidities will improve common survival.

[P37] WHAT DEGREE OF BLOOD SUPPLY AND INFECTION CONTROL IS NEEDED TO TREAT FOREFOOT DIABETIC CRITICAL ISCHEMIA WITH FOOT OSTEOMYELITIS?

Miki Fujii¹, Hiroto Terashi², Koichi Yokono³, David G Armstrong⁴

¹Department of Plastic and Reconstructive Surgery, Critical Limb Ischemia Center, Kitaharima Medical Center, Ono, Japan

²Department of Plastic and Reconstructive Surgery, Kobe University Hospital, Kobe, Japan

³Department of General Medicine, Kitaharima Medical Center, Ono, Japan

⁴Southern Arizona Limb Salvage Alliance, University of Arizona College of Medicine, Tucson, Az, United States

Aim: Diabetic foot ulcer with ischemia and infection can be difficult to treat. No studies have investigated the levels of blood supply and infection control required to treat such ulcers. We previously proposed a surgical treatment strategy for diabetic forefoot osteomyelitis (DFO) based on magnetic resonance imaging (MRI) and histopathology¹⁻³. In this study, we demonstrate a specific method to control infection and ischemia to increase the likelihood of limb salvage.

Method: We retrospectively studied the records of 30 critical limb ischemia (CLI) patients (26 men, 4 women; mean age 68.4±11 years, range 40-89 years) treated for forefoot DFO at our institutions from 2009 to 2016. After a total of 44 surgeries based on our previous methods, we investigated patient background (age, sex, hemodialysis), infection status (pre-, post-, 1-week, 2-week postoperative C-reactive protein [CRP] level (mg/l)), vascular supply (skin perfusion pressure [SPP] (mmHg)), ulcer size (Rutherford 5 or 6), and surgical bone margin (with or without osteomyelitis) between the healing group and the non-healing group.

Results/Discussion: After a total 44 surgeries, 28 ulcers healed and 16 did not. Pre-operative CRP (15±17 vs. 43±32; p<0.05), SPP level (54.2±14.1mmHg vs. 36.4±14.8mmHg; p<0.05), and the number of Rutherford 6 ulcers (p<0.05) differed significantly between the groups.

Conclusion: To treat diabetic CLI with foot osteomyelitis, osteomyelitis should be resected completely, and if the preoperative CRP is greater than 4, debridement should be performed first to control infection. An SSP value of at least 40mmHg is needed to heal any wound. However, our results indicate that an SPP of 40mmHg is insufficient for the treatment of infected diabetic CLI, and 55mmHg is the median value needed for success even after complete resection of osteomyelitis.

1. Fujii M, et al. J Am Podiatr Med Assoc. 104:24-29,2014
2. Fujii M, et al. J Foot Ankle Surg. 52:717-723,2013
3. Fujii M et al. Wound Repair Regen. 24 447-453, 2016

[P38] REMOVABLE CONTACT SPLINTS IN PATIENTS WITH DIABETIC FOOT UNDER POST-OPERATIVE CARE

Vladimira Fejfarova¹, Jaroslav Pavlů¹, Robert Bem¹, Veronika Wosková¹, Michal Dubský¹, Andrea Němcová¹, A. Jirkovská¹, Kamil Navrátil², Bedrich Sixta², Marta Křížová¹, Jitka Niklová¹, Anna Pyšná¹, Eliška Vrátná¹, Vera Lánská¹

¹Diabetes Centre, Institute for Clinical and Experimental Medicine, Prague, Czech Republic

²Clinic of Transplant Surgery, Institute for Clinical and Experimental Medicine, Czech Republic

Aim: The aim of our study was to assess the effect of removable contact splints (RCS) for healing of DF and postoperative complications in patients with DF after surgical procedures.

Methods: We enrolled 137 patients with DF in our observational study, whose underwent foot surgery and were treated using one type of off-loading device only. Patients were followed until DF healed or for at least 3 months up to a maximum of 12 months. Based on the type of off-loading used, patients were divided into 2 groups and compared in terms of patient characteristics and therapy outcomes (f.e.percentage of healed patients and their healing time, duration of antibiotic therapy, number of re-amputations).

Results: 21.2% of patients were treated using a combination of wheelchairs and RCS (group WR), 78.8% were treated using other off-loading devices (group O). Surgical procedures were performed in 65.7% of patients on the forefoot, in 26.3% on the midfoot and in 8% on the hindfoot. In addition to age ($p=0.003$) and peripheral arterial disease ($p=0.02$), the study groups did not differ significantly with regard to basic characteristics, including the presence of osteomyelitis and mean values of TcPO₂. We found there was significantly better healing of DF (totally 75.9%vs.63.9% of healed patients, NS; healing in the hindfoot was 75% vs.14.3% of patients; $p=0.088$), shorter healing time (totally 14.2 ± 8.6 vs. 17.6 ± 11 weeks,NS; healing time for midfoot-operation patients was 10.7 ± 6.4 vs. 21.1 ± 8.6 weeks; $p=0.008$), shorter antibiotic therapy (totally 11.9 ± 11 vs. 14.3 ± 11.3 weeks,NS; in midfoot-operated patients 11.2 ± 12.9 vs. 15.6 ± 10.3 days; $p=0.048$) and lower numbers of re-amputations (0.17 ± 0.4 vs. $0.56\pm 1/1$ patient; $p=0.078$) in the WR group compared to group O. Lower numbers of re-hospitalisations (0.34 ± 0.9 vs. $0.69\pm 1/1$ patient; $p=0.0032$), which were of shorter duration (3 ± 7.7 vs. 8.5 ± 14.3 days on average; $p=0.02$), were recorded for the WR group in contrast to group O.

Conclusions: RCS combined with the use of wheelchair seems to be a more effective off-loading device than other off-loading methods. RCSs accelerated healing processes after surgical procedures especially in the hindfoot, reduced healing time and antibiotic usage and, moreover, decreased postoperative complications, e.g. the number of re-amputations by up to 70% and the number and duration of re-hospitalisations by up to 50% and 65%, respectively.

Supported by 00023001

[P39] ENHANCED OFFLOADING FOR DIABETIC FOOT ULCERS WITH BILATERAL PULSE-FLOW TECHNOLOGY

Hadi Rahemi¹, He Zhou¹, Ana Enriquez¹, Brian Lepow¹, Miguel Montero¹, Joseph Mills¹, Bijan Najafi¹

¹Baylor College of Medicine, Houston, United States

Aim: This study evaluated a new offloading device* which may potentially help treat diabetic foot ulcers (DFU) and accelerate wound healing by providing a better blood flow to the foot and ankle via a pneumatic pump to compress the plantar arch. The new offloading device* has been designed to look like a normal foot device and may provide better balance and walking quality compared to other standard devices. The device is also able to monitor wear-time for the patients.

Method: Three ambulatory subjects with unilateral diabetic foot ulcers (Age=53.6±1.4 years, BMI=30.3±2.1 kg/m²) have been enrolled in this study. Each subject performed two 15-free walking tasks by wearing standard offloading boot or the new offloading boots* while having wearable sensors to measure their gait parameters. Fore-foot plantar pressures for both the offloaded and the contralateral foot as well as limping (estimated by the difference in stance % between right and left side) were estimated. Participants were given the new offloading boots* and were re-visited in 1 week and 4 week follow ups. Wound size and skin perfusion pressure (SPP) were measured at follow up visits.

Results/Discussion: The fore-foot peak pressure in the new offloading boots* trials, when compared with the standard offloading boot trial, decreased by 13% and 79% for the offloaded and the contralateral foot respectively. Limping decreased by 32% when wearing the new offloading boots*, showing a more symmetric gait.

Between week 1 and week 4 follow-ups, the SPP values for the ulcerated feet and contralateral increased by 195% and 75%, the average daily wear-time increased from 3 hrs to 5.8 hrs (96% increase), and the area of the ulcers reduced by 52%.

Conclusion: The use of bilateral boot* improves offloading, balance and gait which may enhance the adherence to the treatment by the patients. A larger sample size is needed to confirm the observed trends.

*PulseFlowDF™

[P40] CURRENT GUIDELINES ON DIABETIC FOOT SCREENING: AN EVALUATION OF THE RECOMMENDATIONS

Cynthia Formosa¹, Alfred Gatt¹, Nachiappan Chockalingam²

¹University of Malta, Msida, Malta

²Staffordshire University, United Kingdom

Aim: The aim of this investigation is to critically evaluate the current diabetes foot screening guidelines with a view to examine the relevance of the recommendations relating to advancement in clinical practice, improvement in technology, and change in socio-cultural structure to provide ways of improving existing screening methods which could save limbs. The evidence leading to these recommendations were evaluated to check the quality and compared against each other.

Method: A literature search was conducted within standard scientific and clinical databases namely; Pubmed/Medline, SCOPUS, CINAHL, Google Scholar and Cochrane Register of Controlled Trials between January 2011 and January 2015 using the keywords '(Diabetes) AND (Foot Screening) AND (Guidelines)'.

Results/Discussion: Ten complete diabetes foot screening guidelines were identified and selected for analysis. Six included the full-process guidelines recommended by the International Diabetes Federation. Evaluation of existing diabetes foot screening guidelines showed substantial variability in terms of different evidence-based methods and grading systems to achieve targets, making it difficult to compare the guidelines. Some guidelines were unclear how the authors have derived the recommendations. We recommend that detailed information regarding the sources of the evidence used in each guideline should be clearly reported. This will enable new guideline developers to refer to the work performed and published by others as 'source' guidelines, and to optimize and standardize diabetes foot screening guidelines in their country. Furthermore, evidence needs to be reviewed on a regular basis as new research emerges. Although there are updates to the guidelines they don't seem to encourage new research and innovation which can then be translated into clinical practice to reduce diabetic foot complications. Limitations of currently available guidelines and lack of evidence, on which, the guidelines are based are responsible for the current gaps between guidelines, standard clinical practice, and development of complications. Large-scale, randomized trials are needed to demonstrate the benefit of various foot screening recommendations and improve outcomes.

Conclusion: A paradigm shift on how to screen for risk factors in the high-risk population using high-quality evidence is urgently needed should the risks of foot ulceration and its devastating consequences be reduced.

[P41] SMART-FOOT PROJECT: SCREENING, MEASURES, ASSESSMENT, REACTION AND TIMELY REFERRAL OF DIABETIC FOOT PROBLEMS

Frank Nobels¹, Jan Rumbaut², Wahid Rezaie³, Caren Randon⁴

¹ Dept of Endocrinology, Diabetes Liga, Onze-Lieve-Vrouwiekenhuis Aalst, Aalst, Belgium

²Olv Ziekenhuis Aalst Belgium, Denderhoutem, Belgium

³Foot-Ankle Surgery, Olv Ziekenhuis Aalst, Aalst, Belgium

⁴Vascular Surgery, Gent University Hospital, Gent, Belgium

Aim: Inadequate risk assessment and treatment of diabetic foot problems (DFP) in primary care and late referral to diabetic foot clinics (DFC) lead to loss of foot tissue or amputation. The SMART-FOOT project is designed to increase knowledge and skills for the prevention and approach of DFP in primary care and to improve the collaboration between GP's and DFC's.

Method: Development of an innovative hands-on teaching module where logical thinking about diabetic foot, reflection on the organization of care and teaching practical skills are key subjects. Care was taken to create constructive interaction allowing GP's to discover themselves the challenges in a non-accusing way. The first version of the teaching module was developed by an experienced DFC in collaboration with local GP's. Several test-runs were used to optimize the teaching techniques in collaboration with the diabetic foot working group of the Belgian Diabetes Liga, leading to the development of a quality improvement teaching package for GP's.

Results/Discussion: An interactive lesson of 1.5h was created. The teachers are local DFC teams and the target audience GP's and other caregivers of primary care. The topics covered are **S**creening (inspection, pulses, monofilament and/or touch test), which **M**easures when screening is abnormal, how to **A**ssess the severity of a diabetic foot ulcer, how to **R**eact (first aid in primary care) and how to refer **T**imely (with **FOOT** attack and the use of the **SMART** phone for sending a photo for urgent teleconsultation). Several teaching techniques are used: roleplays, use of fake ulcers (with inbuilt metal to practice probe to bone), evaluating footwear, application of safe bandages, etc. Teach the teacher sessions are organised to instruct Belgian DFC's to approach their GP's and use this interactive module. The success of the project will be monitored on the basis of the number of DFC's that participate, the number of GP's reached and on the basis of evaluation forms.

Conclusion: It is feasible to develop an interactive hands-on teaching module on the practical approach of diabetic foot in primary care. A national program is launched to spread the use of this module in Belgium.

[P42] DIABETIC FOOT CARE EDUCATION - DEVELOPING AN INNOVATIVE WAY OF TEACHING PROFESSIONALS IN PORTUGAL

Sílvia Da Silva¹, Vítor Neves Lopes¹, M. Jesus Dantas²

¹Centro Hospitalar Do Tâmega e Sousa, Penafiel, Portugal

² Multidisciplinary Diabetic Foot Clinic, Centro Hospitalar Do Tâmega e Sousa, Penafiel, Portugal

Aim: Endowed with the indomitable will to stop *the silent drama within the shoes*, and awareness of limitations presented by non-specialized health professionals who deal with diabetic foot problems on a daily-basis, the desire to organise a practical training arose. We aim to evaluate the results and degree of satisfaction of the trainees after one year of experience.

Method: We designed a course starting with theoretical background communications followed by practice sessions, including hands-on modules and clinical cases with real patients. We applied an anonymous questionnaire retrieving aspects of the course, with grade classifications NS- "not satisfied", PS- "poorly satisfied", I- "indifferent"; S- "satisfied"; VS- "very satisfied"; DK/NR- "don't know/respond". We revised trainees' answers.

Results/Discussion: To date, we have completed 4 courses encompassing general practitioners, nurses and podiatrists, within a total of 105 trainees. To all questions, the most prevalent answer was VS.

Regarding the evaluation of the theoretical module, the question about the *relevance of the contents* showed that 92.4% of the trainees were VS, with 90,5% of them being VS about the *quality of the lectures*. The overall evaluation of the practical benches was VS in 82.5%, meeting "VS" in 89.5% of answers about the *quality of the training material*, and 80% regarding the *possibility of interaction with these same materials*. From the general evaluation of the course, we scored 87.6% VS to the question about the *relevance of the course to the daily professional activity*, with 78.1% of trainees being VS with the *acquisition of skills in the evaluation of patients with diabetic foot*.

100% of participants said they would *recommend this course to co-workers*.

Conclusion: The success in the treatment of diabetic foot arises from the commitment between the health professional and the patient. Only trained professionals, alert to their individualities, will achieve the best results. According to the evaluation of the trainees, this sharing of experiences, methodologies and simple ways of being with the patient proved to be very satisfactory, motivating us to continue this exchange of knowledge, believing that it's possible to keep our patients walking on both feet throughout their life.

[P43] A TRAINING VIDEO ON DIABETES FOOT ASSESSMENT: AN EFFECTIVE AND VERSATILE RESOURCE FOR MULTIDISCIPLINARY TEAM

Francesco Medici¹, Mohamed Soliman¹

¹Homerton University Hospital, London, United Kingdom

Aim: The need for screening large number of individuals for diabetes foot problems poses challenges of manpower and training. Screening needs to be performed by a variety of healthcare professionals. Face-to-face training is important but further educational adjuncts may be helpful. In our institution the screening is performed by a multidisciplinary team. All undergo training using traditional methods. However, an audit using UK National Diabetes Inpatients Audit (NaDIA) templates in 2014 showed inadequate rate of inpatients' assessments. Feedback from the team highlighted the need for targeted training. Our aims were to: establish the need for a resource on diabetic foot examination, produce a training video, ensure access, assess its impact on training and inpatients screening rates and guarantee wider dissemination.

Method: Production of a video on diabetic foot examination meeting the national standards (Diabetes UK 2011, TRIEPodD-UK 2012, FRAME) as an adjunct to our training programme. Staff questionnaires to evaluate the initiative and national diabetes inpatients audit to assess its impact on clinical practice, dissemination using IT platforms.

Results/Discussion: The video was made available on our hospital intranet and its youtube channel. Evaluation questionnaires were completed by 16 healthcare professionals before and after its introduction. These showed an improvement in skills in 50% and in confidence in 56% ($P < 0.05$). 93.7% graded the video as very helpful. The NaDIA data showed an improvement in the inpatients screening from 32.7% to 80% ($P < 0.05$) between 2015 and 2016. The internet link has also been shared with a number of other organisations including our local district clinical care commissioning organisation, the regional postgraduate specialist training provider, the London School of General Practice and the Health Education England communication network.

Conclusion: This is the first training video widely available in the UK, meeting defined standards and specifically designed for health care professionals. The introduction of our video training in our unit was highly successful. This resource is a versatile, inexpensive and long-term adjunct to face-to-face training. The video is freely available for viewing on the Homerton University Hospital youtube channel by direct link* or by searching for 'diabetes foot assessment homerton'.

*(<https://www.youtube.com/watch?v=XU2XdBnPuYA>)

[P44] DIABETIC FOOT EDUCATION PROGRAM (DFEP): OPINION SURVEY ON MANAGEMENT OF DIABETIC FOOT IN INDIAN CLINICAL SETUP

Ashok Das¹, Sharad Pendsey², Mahesh Abhyankar³, Sharon Lobo³

¹Pondicherry Institute of Medical Sciences, Pondicherry, India

²Dream Trust, Nagpur, India

³Usv Private Limited, Mumbai, India

Aim: The opinion survey was conducted to gather insights from doctors after participation in Diabetic foot education program (DFEP) India.

Method: A national level survey was conducted among 377 doctors across India from November 2016 to January 2017 based on a structured questionnaire and the responses were analyzed descriptively.

Results/Discussion: A total of 377 doctors participated in the DFEP program opinion survey. Two hundred and sixty one doctors responded that they are running an independent diabetic foot clinic.

The 44.4% of doctors reported that they see < 5 diabetic foot patients in a week, 42.8% of doctors reported that they see 5-10 diabetic foot patients in a week; whereas 8.9% and 4% of doctors reported that they see 10-25 and >25 diabetic foot cases in a week, respectively. Most of the diabetic foot cases were non-ischemic cases followed by ischemic foot cases and Charcot foot.

25.7% of doctors in the survey reported that they use comprehensive clinical examination, optimal preventive and therapeutic care, callous removal and dressings in the treatment of diabetic foot. 23.4% of doctors stated that they use the tuning fork and monofilament, and 17.7% of doctors responded that they use the tuning fork, monofilament and biothesiometer as basic instruments for managing diabetic foot. Regarding referral practice, 87.8% of doctors reported that they refer up to 5 diabetic foot ulcer patients to specialists/super specialists per week. 23.8% of doctors reported that they refer diabetic foot cases to surgeons and 13.3% of doctors reported that they refer diabetic foot cases to surgeons and vascular surgeons. The commonest co-morbidities associated with diabetic foot include neuropathy > peripheral vascular disease > renal disease > diabetic retinopathy.

For carrying out diabetic foot education, 15.9% of doctors reported that they use pamphlets, videos, diabetic foot apps and posters.

Conclusion: DFEP allowed doctors to start their own diabetic foot clinic successfully. Clinicians are effectively using diagnostic tools for assessing nature and severity of diabetic foot. There is still need to create awareness of diabetic foot problems so as to ensure effectiveness in the management of diabetic foot in the patient population.

[P45] CARE PLANNING FOR DIABETIC FOOT ULCERS - WILL IT MAKE A DIFFERENCE?

Layth Hendow¹, Christian Pankhurst¹, Elizabeth Camfield², Natasha Patel²

¹Kings College London, London, United Kingdom

²Guy's and St Thomas' Hospital, London, United Kingdom

Aim: Diabetic Foot Ulcers (DFU's) are a major complication of Diabetes Mellitus, with 1 in 10 patients being affected. With an increase risk of depression, and a 50% 5-year mortality rate, DFU's pose as a significant prognostic factor for patients. Despite this, only 85% of patients receive an annual foot assessment, and only 49.2% of ulcers heal within the NICE recommended 12-week period. Care Planning could be an effective way of managing DFU's, as well as engaging patients and improving their quality of life (QoL). The aim of this study is evaluate the effectiveness of Care Planning on the QoL of patients with Diabetic Foot Ulcers.

Method: A unique Diabetic Foot Care Plan (DFCP) was created using the Year of Care framework. To assess its effectiveness, changes in QoL using the 'Wound Quality of Life' questionnaire between patients receiving standard care and patients receiving the DFCP was compared. The effectiveness of the DFCP was also assessed through patient and staff feedback. 40 patients were recruited to control (20) and intervention (20), and changes in Wound QoL were assessed over a 4-6 week period.

Results/Discussion: Qualitative analysis showed the DFCP to be user friendly and engaging for patients. It allowed them to discuss the key issues relating to their care, as well as creating personalized goals around them. Furthermore, 35% of patients were screened positive for low mood with the PHQ-2, and hence appropriate assessment and referrals were made for them.

Conclusion: Care Planning has been shown to be a holistic method of managing DFU's that engages patients and integrates them into decisions regarding their own care, as well as improving depression diagnosis. Further research is required to assess the benefits with other outcomes such as wound healing and ulcer prevention. Future development of the DFCP will include updates on assessments of cognitive function and self-management education. Once updated, it will be integrated into the IMPARTS system at Guy's & St Thomas' Hospitals. This will improve the screening pathways and referrals, and provide a more efficient way of delivering the DFCP. This in turn will improve the management of DFU's.

[P46] THE EFFECT OF THE MULTI-DISCIPLINARY TEAM ON MORBIDITY AND MORTALITY IN PATIENTS WITH DIABETIC FOOT DISEASE

Laura Watson¹, Vaishali Desai², N. H. Patel²

¹Kings College London Faculty of Life Sciences and Medicine, London, United Kingdom

²St Thomas' Hospital, London, United Kingdom

Aim: To determine whether the initiation of the diabetic foot MDT reduces patient mortality and morbidity.

Method: 100 patients presenting to podiatry services (prior to MDT initiation) were compared to 100 patients presenting to an established MDT. Baseline data included: cardiovascular history, renal failure, hypercholesterolemia, smoking status, prior foot complications/amputations, HbA1c, CRP, and WCC. Patients were followed up for 12 months. Primary outcomes were: death, major amputation, sepsis induced AKI/MI, antibiotic complications (*C Diff.* infection, vancomycin induced AKI, anaphylaxis). Sub-analysis was conducted on patients new to foot services, having never received foot/vascular intervention in the past.

Results/Discussion: 14 amputations occurred in both groups (p1.00), suggesting patients are being referred too late for limb salvage. 17 deaths occurred in MDT vs 31 in non-MDT groups (p 0.02), highlighting the MDT's role in reducing mortality. Sepsis outcomes: 11 in MDT vs 6 in non-MDT groups (p 0.205), and antibiotic side effects: 5 in both cohorts (p1.00), suggesting that the MDT does not affect these factors or that more rigorous MDT assessment is picking up these outcomes. Kaplan-Meier analysis showed no difference in time to amputation, but demonstrated improved long-term survival, suggesting relatively rapid benefits of medical management in improving survival. Sub-analysis of 51 new patients found that this statistical significance was lost, with 0 vs 3 amputations (p 0.920), and 2 vs 6 deaths (p 0.173) in MDT and non-MDT groups, suggesting positive outcomes may be influenced by prior foot interventions and not the MDT itself. However, patients in the sub-analysis may have poorer foot health as they have never attended specialist foot services before, potentially explaining the increase in negative outcomes. This study should be repeated in the future, as the MDT was newly established in this study and may not yet be working at full efficiency, which could confound results.

Conclusion: The MDT does not reduce amputation rates, but may reduce mortality. However, when examining new referrals only, no significant difference in mortality can be seen. This may suggest that apparent improvements in mortality with MDT management may be confounded by prior medical/surgical intervention and not the MDT itself.

[P47] TOE-FLOW MODEL: 3 YEARS EXPERIENCE OF DIABETIC FOOT UNIT

Juan Pedro Sanchez Rios¹, Jesús Alfayate García², Fernando Criado Galán², Susana Cancer Pérez², Miguel Gutiérrez Baz², Miriam Perera Sabio², Luis de Benito Fernández²

¹Hospital Universitario Fundación Alcorcón, Spain

²University Fundación Alcorcón Hospital, Spain

Aim: Report our data follow-up, about diabetic foot unit based on Toe-Flow model.

Method: All diabetic foot patients from November 2009 to July 2012 were enrolled. History of patient, neuropathic and vascular screening, ulcer classification and surgical interventions were evaluated. On follow-up, endpoint as wound closure, reulceration, major or minor amputations, exitus and type of revascularization and survival were evaluated.

Statistical analysis: Chi-squared test and ANOVA, adjusting in both cases by the Bonferroni method were included. SPSS 17.0 for Windows was used.

Results/Discussion: 288 diabetic patients were consecutively included. Mean age was 68.0+/-12.4, 73.5% were male. Mean diabetes duration was 16.6+/-12.1 years, and HbA1c was 7.5%+/-1.5%.

Total DFUs was 404 (p<0.05 digital Vs midfoot). Previous our first visit, 26.2% had an evolution longer than 6 weeks. Of this 404 DFUs, 154 had re-ulceration (38.1%) (p<0.001 digital, metatarsal and midfoot Vs heel). Ischemia was presented on 70.2% of DFUs. 77.2% of 558 DFUs (404 + 154 reulcerations), were healing during follow-up. Mean of days until healing were 84.6±97.5 days (p<0.05 digital Vs heel location, NS between the others locations).

According to University of Texas Wound Classification System: group A: 18.2%; B 9.7%; C: 52.2% and D: 20%. Grade III were more common with a concomitant infection (50% group B; 61.3% group D vs 5% group A and 6.6% Group C). Without infection, superficial DFUs are similar on patients with or without ischemia (NS: 72.1% vs 77.2%). Location of DFUs according depth were similar on group A and C; and group B and D (NS).

Revascularizations were performed in 124 subjects: 23.4% open, 71.8% endovascular and 4.8 % hybrid. 18 major amputations were performed (6.3%) and 157 minor amputations to 104 patients (36.1%). There were 17 exitus during follow-up.

Conclusion: These results obtained, maybe improvable, are comparable to that described in the literature, especially if we consider the high number of ischemic patients and their high comorbidity. These results justify the creation of units based on Toe-Flow model.

[P48] QUALITY AND SAFETY OF PODIATRIC INDEPENDENT PRESCRIBING: A LOCAL RETROSPECTIVE AUDIT WITHIN A DIABETIC OUTPATIENT FOOT CLINIC

Jacqueline Mildred¹

¹Northamptonshire Healthcare Foundation Trust, Podiatry, St Marys Hospital, Kettering, Northampton, United Kingdom

Aim: Medicine legislation changed in August 2013 permitting Podiatrists to become Independent Prescribers (IP). Northamptonshire Healthcare Foundation Trust (NHFT) High Risk and Diabetic Foot Service successfully has 2 Diabetes Specialist Podiatrists (DSP) qualify as IP. The aim of the audit was to evaluate the safety, effectiveness and timely outcomes if integrating IP into an outpatient Diabetic Foot Service.

Method: Over a 6 month period from October 2016-March 2017 the DSP prescribing was reviewed. The cohort included all diabetic adults with mild or moderate foot infection, which were treated with oral antibiotics. Measurement included the number of prescriptions issued, the range of medicines, medicine management, scope of practise, errors, adverse drug reaction (ADR) and in line with trust guidelines.

Results: Over the 6 month period 93 prescriptions had been written for 57 diabetic foot ulcer (DFU) patients. Antibiotics were the most common drugs prescribed involving 8 different drugs. No prescribing errors, no incorrect drug, dose or miscalculations noted. Patient satisfaction improved due to a seamless process for prescribed medicine. IP significantly showed less interrupted courses for long term antibiotics treated for osteomyelitis and therefore reducing the risk of antimicrobial resistance and also in relapse of infection. The efficiency increases to immediate with IP rather than the patient having to wait to receive a prescription, via the GP. A delay in receiving antibiotics created a higher risk of a deteriorating DFI with risk of patient admission, amputation and limb loss. Of the 93 prescriptions written there were no ADR reported.

Conclusion: This audit suggests NHFT DSP shows easier and improved timely access for patients to get the required medicines, improving patient care without compromising patient safety. IP is able to deliver care closer to home, supporting patients to remain in work, providing patient satisfaction. Improvement of treatment results with safe and effective integration of IP into the Diabetes Team, contribute to a flexible team across the health service. This short audit demonstrates that we as independent prescriber are working within out scope of practise and acted in line with the HCPC and the Society of Chiroprapist and Podiatrist guidelines.

[P49] THE IMPACT OF ROUTE OF ADMISSION ON HOSPITAL LENGTH OF STAY FOR PATIENTS WITH EMERGENCY DIABETES FOOT COMPLICATIONS

Jennifer Tremlett¹, Elizabeth Pendry¹, Marcus Simmgen¹, Chris Manu², Michael Edmonds¹

¹King's College Hospital, Diabetic Foot Clinic, London, United Kingdom

²King's College Hospital, London

Aim: Patients admitted to hospital with emergency diabetes foot complications can have a long length of stay (LOS). The unique role of the in-patient Diabetic Foot Practitioner (DFP) has been implemented to improve patient LOS. The aim of this study was to compare LOS of patients admitted with emergency diabetic foot complication from Accident and Emergency (A&E) with those admitted from the Diabetic Foot Clinic (DFC) and possible impact of the DFP.

Method: A retrospective review of patients admitted to hospital via A&E and DFC over a four month period (April-June 2016) with a with an emergency diabetic foot complication who were referred to DFP. We compared patient demographics, LOS, patient parameters (C-Reactive Protein (CRP), White Cell Count (WCC), and Estimated-Glomerular Filtration Rate (eGFR)), and duration of referral time to DFP between the two groups.

Results/Discussion: We included 53 patients with a total of 59 admission episodes over the four-month period. There were 42/53 males (79%) and 43/53 (81%) with type 2 diabetes; 33/59 (56%) were admitted from DFC and 26/59 (44%) from A&E. The patients admitted via A&E had a significantly longer LOS, 35±33 days (Mean SD) (Median 20days) vs 21±18days (Median 15days) for those admitted via DFC [p=0.042]. The CRP was significantly higher in the A&E cohort 147±105mg/L (Median 116mg/L) vs 73±68mg/L (Median 57mg/L) in the DFC cohort [p=0.002]. The WCC was significantly higher in the A&E cohort, 12±4 10⁹/L vs 9±4 10⁹/L [p=0.006]. The eGFR was significantly lower in those admitted from A&E, 48±30mg (Median 42mL/min) vs 64±27mL/min (Median 69mL/min) [p=0.036]. Of those referred to the DFP, they were referred within a similar time interval, 84% of each group was referred within 24hrs of admission, 27/32 for DFC and 21/25 for A&E. Indicating a similar involvement of the DFP in both groups.

Conclusion: Those patients referred to DFP from A&E had significantly longer LOS, increased CRP and WCC, and lower eGFR compared to those referred from DFC. Patients with diabetic foot complications require universal, rapid, open access to Diabetic Foot Clinics. This should prevent presentation with advanced pathologies at A&E which result in longer LOS.

[P50] IS EXOSTECTOMY FOR CHRONIC MID-FOOT PLANTAR ULCER IN CHARCOT DEFORMITY A GOOD CHOICE TO PREVENT FUTURE EVENTS?

Esther Garcia Morales¹, José Luis Lázaro Martínez¹, Raúl Molines Barroso², Jose Luis Garcia Klepzig³, Mateo López-Moral¹, Irene Sanz²

¹Diabetic Foot Unit, Complutense University of Madrid, Madrid, Spain

²Diabetic Foot Unit, Complutense University Clinic, Instituto de Investigación Sanitaria del Hospital Clínico San Carlos, Madrid, Spain

³Hospital Clínico San Carlos, Madrid, Spain

Aim: To analyse the outcomes in patients with chronic mid-foot plantar ulcer in Charcot foot who underwent a plantar exostectomies.

Method: A retrospective study involving 15 patients with a mean age of 59.50 ± 17.13 years. 9 patients (60 %) were male and 6 (40 %) female. DM duration median was 16.50 ± 10.63 years. Body mass index (BMI) median was 28 ± 4.60 Kg/m² and average of Hb1Ac was 7.81 ± 2.32 %. All the patients had Charcot foot pattern III. 8 (53.3%) had nephropathy and 8 (53.3 %) retinopathy. An exostectomy was performed when conservative care failed or when the deformity was unable to be offloading. In 11 patients (73.3%) the exostectomy was performed in the lateral column and in 4 patients (26.7%) in the medial one. After completed healing patients were treated with customized insoles and therapeutic footwear with rigid rocker sole. Recurrence of mid-foot plantar ulcer, Charcot reacute process, minor and major amputation, and exitus were recorded in all patients.

Results/Discussion: 13 patients (86.6%) healed in a mean time of 24.5 ± 12.87 weeks. The median follow-up of the patients was 48.21 months [IR 12.35-73.75]. 4 patients (30.7%) suffered a recurrence of mid-foot plantar ulcer in a mean time of 10.5 ± 5.80 months, all of them located in lateral column. There was not an acute Charcot foot process during the follow-up period, neither minor amputation. 2 (15.4%) major amputation were suffered, due an acute ischemia process 12 months later, and due a necrotizing soft tissue 42 months later. These complications of the adverse event had no relation with surgical procedure. 1 (15.4%) of them died 24 months later. Other patient died 40 months later of healing ulcer due to ischemic stroke. Thus, 6 patients (40 %) did no suffer any event after exostectomy.

Conclusion: Reulceration rates in patients who underwent plantar exostectomy are lower compared to patients undergoing other surgical procedures. The most severe complications, major amputation and died, occur later and are not related to the surgical process. Plantar exostectomy is a safe and effective technique for the treatment of recurrent Charcot foot ulcers.

[P51] PLANTAR FOOT PRESSURES, FOOTWEAR ADHERENCE AND ULCER RECURRENCE IN DIABETIC PATIENTS WITH CHARCOT FOOT DEFORMITY

Renske Keukenkamp¹, Ruth Barn², Heleen van der Wielen¹, Tessa Busch-Westbroek¹, Jim Woodburn², Sacco Bus¹

¹Academic Medical Center, Amsterdam, Netherlands

²Institute for Applied Health Research, Glasgow, United Kingdom

Aim: Charcot foot deformity is a severe complication of diabetes and a significant risk factor for ulceration, but minimal data on footwear efficacy and ulcer recurrence is available. The aim was to analyze plantar foot pressures, footwear adherence and ulcer recurrence in diabetic patients with a Charcot foot deformity.

Method: Data from a previous footwear trial was used to compare 21 diabetic patients with a midfoot Charcot foot deformity and ulcer history, to 150 diabetic non-Charcot patients with ulcer history. Barefoot and in-shoe plantar pressures were measured at trial entry and footwear adherence was measured over 7 days as percentage of steps that prescription footwear was worn. Ulcer recurrence was assessed at 18 months.

Results/Discussion: The Charcot group showed significantly higher median [1st QR, 3rd QR] barefoot and in-shoe peak pressures in the midfoot region (756 [234, 1274] and 149 [115, 200] kPa) compared to the non-Charcot group (137 [93, 197] kPa and 120 [95, 143] kPa, respectively). Other foot regions showed significantly lower plantar pressures in the Charcot group. The Charcot patients were significantly more adherent (95 [82, 98]% vs. 78 [55,92]%), especially when being at home (94 [86, 95]% vs. 68 [27,89]%). No significant differences were found in ulcer recurrence between groups: 42.9% in Charcot vs. 41.3% in non-Charcot, but relatively more midfoot recurrences were found in the Charcot group.

Conclusion: Although Charcot patients wear their prescribed shoes and generally show low in-shoe peak pressures, ulcer recurrence is not lower than in non-Charcot patients. A higher midfoot plantar pressure in the Charcot group may explain the higher rate of midfoot ulcer recurrence. Further optimization of custom-made footwear seems indicated, in particular in the midfoot region.

[P52] EPIDEMIOLOGY AND EARLY MANAGEMENT OF ACUTE CHARCOT FOOT IN A TERTIARY DIABETIC FOOT CLINIC IN BELGIUM

Severien Meyers¹, Sabrina Houthoofd², Sander Wuite², Giovanni Matricali³

¹Ku Leuven, Leuven, Belgium

²Uz Leuven, Leuven, Belgium

³Uz Leuven, KU Leuven, Leuven, Belgium

Aim: Charcot foot is a rare complication of diabetes mellitus, associated with nonspecific inflammatory symptoms and progressive fragmentation of bones and joints. Diagnosis and management is often challenging, resulting in delayed treatment and devastating deformation. This retrospective study aimed to determine how acute Charcot foot occurs and is managed in our diabetic foot clinic.

Method: From 2004 until 2016, our centre registered 53 Charcot foot attacks using the IQED-foot registration procedure. Diagnosis and other variables were cross-checked using the electronic medical files. Data on initial occurrence and treatment were investigated, during an average follow-up period of 13.5±7.6 months. Of these 53 cases, 6 were still under follow-up, 6 were lost to follow-up and 7 consulted once for a second-opinion. For statistical analysis, missing values were excluded.

Results/Discussion: Peripheral neuropathy was present in all patients with an electromyography (n=26). Monofilament testing revealed that 42(91.3%) patients had loss of protective sensation. Although no peripheral arterial disease(PAD) was detected, mild arterial obstruction was observed in 2 cases after 7 months of first consult. Additionally, 3 patients were revascularised before the attack. 15(29.4%) subjects underwent surgery (n=19) on the affected foot during the 12-month period before diagnosis, mainly being minor amputation (n=10) and surgical debridement (n=5). Deformation was already present at first visit in 41(78.8%) cases and 23(56.1%) of these had the typical Rocker bottom foot deformity. Presence of this deformity was associated with a significant longer existence of Charcot related symptoms compared to absence of deformity (median 9 vs. 3 weeks, p<0.05). Regarding treatment, immobilisation by total contact casting (n=40) for a duration of 11.9±4.9 weeks is the standard of care. Subsequently, 25(55.5%) patients were treated with a below-knee orthosis, resulting in a total immobilisation period of 28.9±17.3 weeks.

As confirmed by literature, peripheral neuropathy and absence of PAD are well-known predisposing factors. Furthermore, previous surgery plays a possible role in its pathogenesis, since approximately 1/3 underwent foot surgery.

Conclusion: Charcot foot patients often present with gross deformation. Early treatment remains challenging. Introducing an educational program could be a future plan to raise awareness among patients, first-line and second-line care providers.

[P53] CHARCOT NEUROARTHROPATHY (CN): FACTORS CHARACTERIZING A STUDY POPULATION IN TUSCANY 2008-2015

Roberto Anichini¹, Anna Tedeschi¹, Giuseppe Seghieri², Secondina Viti¹, Elisabetta Salutini³, Laura Policardo², Piergiorgio Francia⁴, Marco Perini¹, Arianna Bernini¹, Alessandra De Bellis³

¹Diabetes Unit and Diabetic Foot Unit, Pistoia, Italy

²Ars Tuscany, Pistoia, Italy

³Diabetes Unit and Diabetic Foot Unit, San Jacopo Hospital, Pistoia, Italy

⁴Facoltà Scienze Motorie, Università DI Firenze, Firenze, Italy

Aim: To provide data on hospitalization, incidence rates of Charcot neuroarthropathy (CN) and its relation to lower limbs' amputations/revascularizations in population with diabetes in Tuscany.

Method: Hospitalizations with CN diagnosis (codes ICD-9-CM: 7130, 7135, 7138) have been recorded in people with diabetes 2008-2015 in Tuscany. Amputations, peripheral vascular disease, revascularizations and infections were likewise evaluated.

Results/Discussion: In these years CN hospitalizations were very infrequent: they were in 2008 14.1 x100,000 patients with diabetes, 22x100,000 in 2012 and in 2015 reduced to 7x100,000 patients (p=NS). Yearly CN incidence declining in Tuscany to a minimum of 3.4x100,000 diabetic patients in 2015 (p=0.047). CN patients were younger and with longer length of hospital stay than those with non-Charcot diabetic foot (p<0.05). Amputation and infection rates were higher in CN patients than in those with non-Charcot diabetic foot, while the revascularization rate was similar in both.

Conclusion: Over last decade, in Tuscany yearly CN incidence and hospitalization rates concerned only a small percentage of patients, remaining very infrequent and declining in Tuscany in the last couple of years. CN was significantly associated to younger age, longer hospital stay and greater risk of amputations and infections, while the need of revascularization was similar to that ulcers of non-Charcot diabetic foot.

[P54] LONG-TERM EFFECTS OF A DIABETIC CHARCOT FOOT ON THE PROGRESS OF NEUROPATHY

Rasmus Jansen¹, Tomas Møller Christensen¹, Jens Bülow², Lene Rørdam², Per Holstein³, Ole Lander Svendsen¹

¹Dept. of Endocrinology, Bispebjerg Hospital, University of Copenhagen, Copenhagen NV, Denmark

²Dept. of Clinical Physiology and Imaging, University of Copenhagen, Copenhagen NV, Denmark

³Copenhagen Diabetes Foot Center, Bispebjerg Hospital, University of Copenhagen, Copenhagen NV, Denmark

Aim: Charcot foot is a severe complication to diabetes mellitus and is associated with diabetic neuropathy. However, any possible long-term effects of a Charcot foot on the progress of neuropathy are still largely unexplored. Our objective was to investigate whether a previous Charcot foot had any long-term effects on somatosensory or autonomic neuropathy.

Method: An 8.5-year follow-up case-control study of 49 individuals with diabetes mellitus, 24 of whom also had Charcot foot at baseline visit in 2005-2007. Neuropathy was assessed with biothesiometry, heart rate variability and venous occlusion plethysmography.

Results/Discussion: Of the 49 participants, 22 were able to participate in the follow-up, while 12 had passed away in the meantime. Of the 22, 11 had previously had a Charcot foot, while another 11 were from the control group with diabetes without Charcot foot. The participants at follow-up was on average 69 years old, diabetes duration was 27 years with a HbA1c of 59 mmol/mol. There were 7 with type 1 diabetes and 17 with type 2 diabetes.

Somato-sensory neuropathy was measured by biothesiometry and showed no difference between baseline (39.1 Hz) and follow-up in the Charcot group (38.5 Hz)($p=0.946$), while there was a significantly worsened sensitivity in the control group (from 25.1 to 38.9 Hz)($p=0.002$).

Heart rate variability was unchanged in both groups; from 9.7 beats/min to 7.2 beats/min ($p=0.053$) in the Charcot group, and 14.3 beats/min to 12.6 beats/min ($p=0.762$) in the control group. In the Charcot group there was an expected decrease in blood-flow in the Charcot foot from baseline to follow-up ($p=0.003$), while in the control group there was no difference between the visits ($p=0.272$).

Conclusion: While baseline measurements showed a difference in both somatic sensitivity and blood-flow, we found that any differences in somatic or cardiac autonomic neuropathy present at baseline had disappeared at follow-up.

Regarding blood-flow, this normalisation seems to be due to a complete normalisation of blood-flow to the previously acute Charcot foot. Regarding somato-sensory and cardiac autonomic neuropathy, it seems to be due to the control group becoming more affected by neuropathy, and not the Charcot group recovering any sensitivity.

[P55] TREATMENT OF ACTIVE CHARCOT NEUROPATHIC OSTEOARTROPATHY BY MULTI-DISCIPLINARY DIABETIC FOOT TEAM IN HOSPITAL: RESULTS OF OUR SIX YEAR'S EXPERIENCE

Johana Venerová¹, Jarmila Jirkovská¹, Vendula Havrlantová¹, Libuše Fialová¹, Marek Malý², Svatopluk Solař¹, Miroslav Zavoral¹

¹Medical Department of the First Faculty of Medicine and Military University Hospital, Diabetes Center, Prague, Czech Republic

²The National Institute of Public Health, Prague, Czech Republic

Aim: Our study focused on evaluating the outcome of one year treatment (OYT) in patients with active Charcot neuropathic osteoarthropathy (ACN).

Method: Retrospective survey included 32 patients (mean age 61 ± 10 ys, 87% males, 90% T2DM, DM duration 13 ± 8 ys) with ACN examined at our foot clinic in 2010-2016. According to severity of clinical condition of foot at first presentation we divided the patients into 3 risk categories: 1. no deformity with or without ulcer, 2. deformity without ulcer, 3. deformity with ulcer. We evaluated OYT according to whether the illness developed from active to non-active stage, NACN (defined as absence of edema and redness, decrease of temperature difference below 2°C , bone healing in X-ray), or whether the activity persists, or if occurred complications requiring surgical treatment. We evaluated relation between OYT and demographic and clinical parameters (risk category of foot, adherence to offloading, time between first symptoms and examination, osteomyelitis).

Results: We confirmed statistically relevant relation and tendency between risk category of foot at first presentation and OYT (the higher category, the higher risk of complications, $p=0.039$). An important predictor of persisting CN activity or surgical treatment is osteomyelitis ($p<0.001$), while we did not prove a significant relation between clinical parameters (age, duration and type of DM, HbA1C) and OYT. Many patients treated by off-loading showed no progression ($p<0.001$). After one year of conservative treatment the disease turned into NACN in 25/32 (78%) patients. The ACN persisted, or complications requiring surgical treatment occurred in 7/32 (22%) patients. The average duration of ACN symptoms until the first presentation at the foot clinic was 3.6 months. The average period to decrease the skin temperature was 19.6 weeks. In 7/32 (22%) patients, development of ACN was preceded by overloading the limb in course of DFU treatment of the contralateral limb.

Conclusion: Predictors of ACN persisting one year and complications requiring a surgery were a deformity and foot ulcer at the first presentation and osteomyelitis. To prevent destruction of foot due to ANC necessitates regular education of high-risk diabetic patients and reliable interdisciplinary collaboration of specialists in the field.

[P56] SUDOMOTOR EXAMINATION SHOULD BE REGULARLY PERFORMED IN PATIENTS WITH CHRONIC KIDNEY DISEASE FROM PREDIALYSIS STAGE (CKD4) BUT ALSO AFTER TRANSPLANTATION TO DETECT NERVE REGENERATION

Dragan Tesic¹, Nicolaos Papanas²

¹Novi Sad - Klinicki Centar Vojvodine, Novi Sad, Serbia

²Diabetic Foot Clinic-Diabetes Centre, Democritus University of Thrace, Alexandroupolis, Greece

Aim: The aim of this prospective 5-year study was to examine the incidence of foot morbidity among diabetic and non-diabetic patients in different stages of chronic kidney disease (CKD).

Method: During the preceding 5 years were enrolled: 108 diabetic patients [(18 with type 1DM); 25 with GFR 30-59 mL/min/1.73 m² (G1); 27 on HD (G2b); 56 with GFR \geq 90 mL/min/1.73m² (G3b)], 35 with nephroangi-sclerosis on HD (G2a); 30 with other causes HD (G2c); and 26 transplant recipients (G3a). Before 5 years, we performed: Neuropathy Disability Score (NDS) plus a diagnostic Test for Sudomotor Dysfunction and Early De-tection of Diabetic Foot Syndrome, Diabetic Neuropathy* (evaluated as time to total colour change), colour doppler and detection of ulcer and/or amputation. Of the entire 199 patient population, 79 had meanwhile died.

Results/Discussion: Five-year mortality rates were: 68% in G1; 57.1% in G2a; 70.4% in G2b; 36.7% in G2c; 3.84% in G3a; 19.6% in G3b ($p < 0.01$). Patients in G1 were older (71.12 \pm 7.8 years) compared with G2b (60.3 \pm 13.1 years) and G3b (59.9 \pm 7.75yrs) ($p < 0.01$). Comparing G2a vs. G2b among those who had died, male sex was more prevalent among diabetic patients, (45.7 vs. 70.4%, $p < 0.05$); duration of HD was shorter in diabetic patients (5.2 \pm 2.5 vs. 4.6 \pm 2.5 years, $p = 0.03$). Prevalence of arterial hypertension in G1 vs. G2b vs. G3b was: 13(52%) vs. 26(96.3%) vs. 9(16.1%) ($p < 0.01$) and duration of diabetes was 17.9 \pm 6.2 vs. 23 \pm 10 vs. 15.9 \pm 7.8 years ($p < 0.01$). Among those who had died, abnormal NDS was without significant differences. However, the time until colour change for the diagnostic test for Sudomotor Dysfunction and Early De-tection of Diabetic Foot Syndrome, Diabetic Neuropathy* was: G1 8.9 \pm 5.8 min., G2a-c 26.8 \pm 8.2min., G3a 9.1 \pm 7.6min., G3b 11.3 \pm 7.4min. ($p < 0.01$). Peripheral arterial disease among dead patients was: G1 8(47.1%), G2b 15(78.9%), G3b 7(63.6%). Ulcerations and/or minor amputations were present in G2b 5(18.5%) and G3b 13(23.2%). Major amputations were: 1 in G1, 1 in G3b and 6 in G2b(HD+DM) ($p = 0.003$).

Conclusion: Category 3 diabetic foot (IWGDF) is exclusively seen in diabetic patients, on HD or not. Categories 1 and 2 may be present even in non-diabetic patients. We recommend prospective monitoring of sudomotor dysfunction from CKD stage 4 onwards. This dysfunction is strongly associated with end-stage diabetic foot pathology but also with end-stage renal insufficiency, regardless of the presence of diabetes.

*Neuropad

[P57] ASSESSMENT OF PAIN SENSITIVITY AND SPEED OF WOUND HEALING IN RATS WITH STREPTOZOTOCIN-INDUCED DIABETES MELLITUS

Anna Gorbacheva¹, Alexander Berdalin¹, Maria Morozova¹, Zera Abdulvapova², Ekaterina Artemova³, Ekaterina Klochikchina¹, Gagik Galstyan³, Alla Tokmakova², Svetlana Gavrilo¹, Vladimir Koshelev¹

¹Faculty of Fundamental Medicine, Lomonosov Moscow State University, Moscow, Russian Federation

²Diabetic Foot Department, Endocrinology Research Centre, Moscow, Russian Federation

³Endocrinology Research Center, Moscow, Russian Federation

Aim: To assess the relationship between the development of peripheral neuropathy and wound healing rate in rats with streptozotocin-induced DM.

Method: The study was performed in rats, diabetes was induced by an injection of streptozotocin in 0.1 M citrate buffer in a dose of 65 mcg/kg. In control group an injection of 0.1 M CB was performed. 42 days later, the wound on the rats' back was inflicted. The observation of wounds lasted for 8, 16 or 24 days. DM rat group received therapy with insulin detemir 1 IU/kg/day. The development of neuropathy was assessed by the pain test every 7th day. The wound's area was measured every 3rd day. Skin samples were taken at 0, 8, 16 and 24 days of wound healing. The samples were stained with hematoxylin and immunohistochemical staining on $\beta 2$ – adrenergic receptors ($\beta 2$ -AR) and Ki67 was conducted.

Results/Discussion: To 42 day of DM the time of withdrawal of the tail in rats with diabetes has almost doubled in comparison with the group of CB ($p < 0.05$), which allows to establish the presence of sensory neuropathy. At the same time, a significant gap in the rate of wound healing in the group of rats with DM was noticed. According to the results of histological staining it was found that the intact skin was the same in all groups. On 8 day after modeling of the wound in the region of the edges of the wound, the expression of Ki67 was significantly less than in intact areas ($p = 0.004$). On the 16th day, the expression of Ki67 in the area of the wound increased and did not differ from the remote areas of the skin. On the 24th day, Ki67 staining was again significantly weaker in the edges. The density of $\beta 2$ -AR in diabetic group at the wound edge was lower than in intact areas.

Conclusion: STZ-induced DM in rats is accompanied by development of peripheral neuropathy and a decrease in the rate of wound healing. According to immunohistochemical analysis, time and zone factors were significant for Ki67 expression, and only time factor was significant for $\beta 2$ -AR expression.

The research was supported by Russian Science Foundation (project № 16-15-13065).

[P58] THE PORTABLE DEVICE FOR AUTOMATED SURAL NERVE CONDUCTION STUDY: UTILITY FOR THE DIAGNOSIS OF PERIPHERAL NEUROPATHY IN PATIENTS WITH TYPE 1 DIABETES MELLITUS

Nikolaos Papanas¹, Kalliopi Pafili¹, Maria Demetriou¹, Georgia Chatzikosma¹, Konstantinos Vadikolias², Dimitrios Papazoglou¹, Efstratios Maltezos¹

¹Diabetes Centre-Diabetic Foot Clinic, Second Department of Internal Medicine, Democritus University of Thrace, Alexandroupolis, Greece

²Department of Neurology, Democritus University of Thrace, Alexandroupolis, Greece

Aim: The diagnostic utility of the portable device for automated nerve conduction study (NCS) of the sural nerve has been mainly evaluated in patients with type 2 diabetes mellitus (T2DM). Therefore, the aim of the present study was to examine the performance of this device in the diagnosis of peripheral neuropathy among patients with type 1 diabetes mellitus (T1DM).

Method: We included 46 T1DM patients (26 men) with mean age 36.8 years and mean T1DM duration 14.5 years. Exclusion criteria were B₁₂ depletion, alcohol abuse and other causes of peripheral neuropathy. The reference method was the Neuropathy Disability Score (NDS) with a threshold NDS \geq 3. Sural nerve automated NCS was carried out with the portable device*. Nerve conduction velocity and sensory nerve action potential amplitude were measured bilaterally. Automated NCS was dichotomously considered as normal or abnormal: abnormality was present when \geq 1 of the two aforementioned neurophysiological parameters were outside normal range in at least one leg.

Results/Discussion: Examination with the portable device* yielded 95% sensitivity, 92.3% specificity, 86.4% positive predictive value (PPV) and 96% negative predictive value (NPV). Positive Likelihood Ratio (+LR) was 12.3 and negative Likelihood Ratio (-LR) was 0.05. Youden's J index was 0.873.

Conclusion: Sural nerve automated NCS with the portable device* exhibits high sensitivity and specificity for the diagnosis of peripheral neuropathy in T1DM, similar to its performance in T2DM.

*NC-stat[®] DPNChech[™] device (Neurometrix, Inc., Waltham, MA, USA)

[P59] DIABETIC FOOT EXPERIENCES AT AUGUSTA VICTORIA HOSPITAL WITHIN THE CONTEXT OF LOW RESOURCE COUNTRIES

Reena Abu Sneinah Reena¹

¹Augusta Victoria Hospital, Jerusalem, Palestine

Aim: Before 2005, there were no foot clinics and no education for podiatrists in Palestine. More than 20% of Palestinians were diabetics. To start up a diabetic foot clinic was great desire in this region because of the severe late complications. However, there were no resources nor knowledge how start-up. 2005 the Danish Church Aid and especially World Diabetes Foundation started a 5-year program. 2 Danes did the set up for this: Mrs. Kirsten Larsen and Dr. Torsten Deckert.

Method: The head of the Diabetic Foot Clinic contacted all health Care Centers in the West Bank and made agreements for calling patients and cooperators. Denmark sent a team of podiatrists' volunteers to Augusta Victoria Hospital. Only a clinic of 10 square meter with nurse, Dietician, Laboratory Technician and a leader of the diabetic Clinic. They treated patients from West Bank and Gaza. The team went to villages and did home visits all over the West Bank. In 2014, mobile clinic was established for screening and treatments. This mobile clinic include eye-clinic and minor possibilities for making insoles etc.

Results/Discussion: 2016 the Diabetic Foot Clinic has grown to separate building with 290 square meters. It contain 11 rooms, toilettes and reception. The staff are 14 persons. They do Screening the Palestinian population, diagnoses, making gait analyses, treatment of big ulcers, measuring toe blood pressure, make bracelets for in-growing toenails, making insoles, making individually therapeutically shoes. Teaching patients concerning self-care and dressing for families. Established specialized foot care services in the Palestinian health care system. There are Training programs for nurses from the West Bank areas as well as from Gaza.

The team goes to Marathons with the mobile clinic to be an emergency-clinic. The diabetic foot clinic cooperate with education-organizations*. Statistics will be shown in the lecture.

Conclusion: The clinic has grown from level zero to a very highly specialized center for knowledge and experience center in the region. Training of Palestinian professionals on foot care and support the Palestinian health care system in providing high standard level of diabetic foot care.

*like University of Copenhagen and Novo Nordic Denmark.

[P61] PERIPHERAL NEUROPATHY AND LUMBAR SPINAL STENOSIS IN PATIENTS WITH DIABETES

Katia Langton¹, Edward Jude²

¹Island Podorthic Footcare, Nanaimo, Canada

²Tameside Hospital, United Kingdom

Aim: Diabetic neuropathic patients present with loss of sensation, burning or numbness in the feet with weakness in the lower limb. With an aging population lumbar spinal stenosis (LSS) is seen frequently in this age group and the signs and symptoms can mimic neuropathy and Health Care Practitioners need to differentiate patients presenting with Neurogenic Intermittent Claudication and Diabetic Peripheral Neuropathy (DPN).

Method: Patients referred to a Diabetic Foot Clinic for a comprehensive Diabetic foot assessment and risk categorized for DPN between Risk Category 0 to 3. The patient files were randomly pulled out from May 2015 to March 2017. Patients that presented with chief complaint of DPN, patients diagnosed with LSS and patients that were diagnosed with both

Results/Discussion: 84 patient's files surveyed (Mean age 68.6 (range 37-91 years; 60 males). 49 were diagnosed with DPN only on examination (67.6±13.4 years; 37 males) and 29 (34.5%) had both LSS and DPN (70.9±9.3 years; 23 males) (p=NS). There was no difference in risk categories between groups.

Conclusion: LSS is very common occurrence in patients with diabetes and neuropathy and may be a confounding factor in the diagnosis and management of these patients especially as LSS can mimic DPN; although the severity of presentation is similar for both groups. Currently there is no treatment available for DPN but patients with LSS can benefit from appropriate physiotherapy and surgery and patients. Therefore patients with DPN and LSS will have a better quality of life if timely diagnosis is made.

[P62] EARLY PREDICTION OF DIABETIC FOOT ULCER RECURRENCE AT ASSIUT, EGYPT

Walaa Khalifa¹

¹Assiut University Hospital, Assiut, Egypt

Aim: To estimate the percentage of foot ulcer recurrence among diabetic patients attending Assiut diabetic foot care clinic and identify early predictors for its occurrence to establish targets for the prevention of reulceration.

Method: It was a prospective study, in which patients attending Assiut diabetic foot care clinic which was established in 2010 after participating in step by step project, and now receive many cases with different foot lesions and treat all levels of foot care. Presented with primary healed ulcer were followed until ulcer recurred maximally for 2 years, then they were divided into 2 groups: group with recurrent ulcers and group with non-recurrent ulcers to evaluate potential predictors of reulceration between May 2013 to July 2016. Multiple logistic regression analysis was used to identify independent predictors.

Results: The study included 93 patients out of 121 (23 patients lost in the follow up period and 5 patients died), all included patients were with type 2 diabetes. 49 (52.7%) were females, mean age was 51.73 ± 14.45 years. 57/93 (61.2%) patients had recurrent ulceration, of which 43(75.4%) occurred in the first year. Characteristics of recurrent ulcers were 38/57 (66.6%) in the same foot, 19 /57 (33.3%) were in the fore-foot, 16(28.1%) were infected, 39 were neuropathic, 11 neuroischemic and 7 ischemic ulcers. Predictors of ulcer recurrence were heavy smoking (p value 0.007), longer duration of diabetes (p value 0.005), presence of large fiber neuropathy and lost ankle reflex (p value 0.001, 0.0001 respectively), limb ischemia (p value 0.0001), HbA1c ≥ 10 and LDLc ≥ 110 (p value 0.009, 0.02 respectively).

Conclusion: Despite arising number of diabetic foot ulcers healed conservatively, the rates of ulcer recurrence are very high. Lost ankle reflex and limb ischemia were considered as independent predictors of ulcer recurrence. Another important issue is the lack of therapeutic footwear and proper foot care in our locality.

[P63] WHAT IS DIFFERENT ABOUT THE DIABETIC PATIENTS WITH NEUROPATHY COMPARED TO THEIR NON-NEUROPATHIC COUNTERPARTS: A NEUROMECHANICAL PERSPECTIVE

Nachiappan Chockalingham¹, Roozbeh Naemi¹, JK Lutale², Zulfiqarali G. Abbas³

¹Staffordshire University, Stoke-on-Trent, United Kingdom

²Muhimbili University of Health and Allied Sciences, Dar Es Salaam, Tanzania, Tanzania

³Dept. of Internal Medicine, Muhimbili University of Health and Allied Sciences, Avc, Dar-Es-Salaam, Tanzania

Aim: The main purpose of this study was to examine if there are differences within the commonly reported neurological and biomechanical parameters along with patient demographics, their life style profile and other clinical assessment in patients with and without neuropathy.

Method: 2371 (M/F: 1351/1020) diabetic patients; of whom 1255(M/F: 698/227) with neuropathy and 1116 (M/F: 653/463) without neuropathy who attended the diabetic foot clinic in Tanzania between Jan 2011 and Dec 2015 were recruited to participate in this study.

A combination of categorical and continuous data were collected from the patients during a single visit. A Chi-square test for independence with Yates Continuity Correction was utilized to identify significant ($p < 0.05$) association between categorical parameters and diabetic foot neuropathy. Given that the data was not normally distributed (Kolmogorov-Smirnov, $p < 0.05$), Mann-Whitney U Test was utilized to assess the significant ($p < 0.05$) differences between the patients with and without diabetic neuropathy.

Results/Discussion: The results show that the diabetic neuropathy group showed a significant ($p < 0.05$) association with the following: assistive devices ($\chi^2 = 5.368$), history of smoking ($\chi^2 = 6.211$), history of alcohol consumption ($\chi^2 = 28.656$), history of previous ulceration ($\chi^2 = 7.804$), presence of callus ($\chi^2 = 8.158$), active ulcer ($\chi^2 = 41.411$), and ulcer location ($\chi^2 = 43.764$), touch sense sensitivity ($\chi^2 = 612.489$), abnormal MTP Joint range of motion ($\chi^2 = 26.316$); abnormal ankle range of motion ($\chi^2 = 25.543$); skin fissures ($\chi^2 = 10.129$); mycosis ($\chi^2 = 14.099$); nail ingrowth ($\chi^2 = 4.824$); swelling ($\chi^2 = 20.994$), future ulceration ($\chi^2 = 16.152$).

Mann-Whitney U test revealed significantly ($p < 0.05$): lower Ankle Brachial Index ($U = 627867.0$) with small effect size, higher Vibration Perception Threshold ($U = 304013.0$), lower cool sensitivity ($U = 301069.0$); higher heat sensitivity ($U = 295984.0$); lower cold pain threshold ($U = 295172.5$) and higher heat pain threshold ($U = 290947.5$) all with a large effect size. Further the regional plantar pressure at different sites were significantly higher during walking for the patients without neuropathy when compared to their neuropathic counterparts.

Conclusion: The results of this study indicates that the neuropathic group show significant differences in the foot related characteristics against their non-neuropathic counterparts. This can have implications in designing a group-specific protocol that can best accommodate the needs of patients.

[P64] AN ASSESSMENT OF DIABETES FOOT RISK AMONG T2DM PATIENTS IN KENYA

Samuel Gatimu¹, James Ngoyo²

¹ University of Nairobi, Nairobi, Kenya

² Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya

Aim: Approximately 1.9% of the Kenya population lives with diabetes with about 1 case in every 4 newly diagnosed cases being undiagnosed. Foot care remains a neglected area in provision of quality diabetes care during routine annual check-up. Thus, we sought to assess the risk of diabetes foot complications among type 2 diabetes patients in Kenya to highlight the need for improved foot care.

Method: A descriptive cross sectional study design was adopted. A total of 149 diabetes patients were screened for their risk of foot complications using the New Zealand Foot Stratification criteria. A systematic random sampling was used to select the participants. The study was conducted in Mathari National Hospital, Kenya. The study was approved by the Ethics and Research Committee of the Kenyatta National Hospital and University of Nairobi.

Results/Discussion: Out of 149 participants, 19.48% had good glycaemic control < 7% with (48.8%, 40.2-56.4) having active risk, 24.2% (17.2-31.1%) had high risk, 26.2% (19.0-33.3%) had moderate risk and 1.3% (-0.5-3.2%) had low risk. There was no significant association between glycaemic control and the risk of foot complications. Among those with active, high and moderate risk of foot complications, 77.8%, 75% and 89.7% had poor glycaemic control respectively. Majority of the women had active (50.5%) and high (24.3%) risk of foot complications while most of the male participants had high proportion of active (43.5) and moderate (28.3%) risk of foot complications. More than half (53.6%) of the older population had a high proportion of active risk of foot complication while 50.9% of the active risk was among the 45-54 years' age group. 85% of the participants have never been screened for feet complications.

Conclusion: The foot risk classification has been fronted as an effective tool to prevent lower-extremity complications of diabetes. The practice of screening of foot is poor in Kenya and efforts should be put in place to routinely screen patients for diabetes foot complications. Health care professional and patients should also be sensitized on the importance of foot screening to prevent lower-extremity complications. Moreover, HCPs should work with patients to promote good glycaemic control.

[P65] IMPLEMENTATION OF A JOINT DIABETES RENAL MICROBIOLOGY MULTIDISCIPLINARY TEAM IN PATIENTS WITH DIABETIC FOOT DISEASE RECEIVING DIALYSIS

Joanne Casey¹, Jennifer Tremlett¹, Jody Lucas², Alexandra Rankin², Surabhi Taori³, Chris Manu², Michael Edmonds¹, Prash Vas¹

¹ Diabetic Foot Clinic, London, Kings College Hospital, United Kingdom

² Kings College Hospital, London, United Kingdom

³ Viapath Microbiology, Kings College Hospital NHS Foundation Trust, London, United Kingdom

Aim: Diabetic foot disease (DFD) and lower extremity amputation are considered to be 10 times higher in diabetic individuals receiving dialysis. Furthermore, they have disproportionately high rates of foot-related hospital admissions. Those on dialysis often lose contact with care outside the dialysis units and access to foot care is limited in dialysis units. Thus, interventions and strategies aimed at reduction of DFD burden in dialysis patients are important. We report on our joint diabetes-renal-microbiology multidisciplinary team (JDRMDT), set up to address the challenge and facilitate cross specialty care.

Method: Retrospective analysis of all the patients discussed at the JDRMDT meetings over a 24 month period. Patients were reviewed by the acute foot team while undergoing dialysis with liaison and referral to the hospital multidisciplinary foot unit when required. A summative team discussion was held at the end of each week comprising of a podiatrist, diabetologist, nephrologist and microbiologist to update and address any concerns. The analysis was limited only to those with active DFD mandating closer surveillance.

Results/Discussion: We discussed 37 patients with an average age 65 ± 12 years (mean \pm SD), males 51%, with active DFD. Duration since dialysis start was 3.5 ± 3.1 years. In 24/37 (67%) patients there was evidence of significant peripheral vascular disease; they underwent 2.3 ± 2.1 revascularisation procedures. There were 14 (38%) minor amputations (13/14 had CLI) and 4 (11%) major amputations (all had CLI). Microbiology was predominantly polymicrobial (44%) with gram-negative organisms predominating although pure MSSA (17%), MRSA (21%) VRE (10%) were also noted. Overall, 8/37 (22%) died during this period with a higher (50%) mortality observed among those with major amputations. While emergency hospital admissions were 6.0 ± 5.1 episodes/patient; only 1 ± 1.25 episodes/patient were foot-related.

Conclusion: We found that the JDRMDT was an effective way of bridging the care gap in diabetic foot patients receiving dialysis. It allowed for complex diabetic foot care within the dialysis unit mitigating the need for multiple outpatient visits and demonstrated encouragingly low foot-related hospital admissions. In addition, our observed major amputation rate was lower than reported in literature. Such an initiative may represent major quality of care and cost benefits.

[P66] LONGTERM FOLLOW-UP OF A COHORT WITH A HISTORY OF DIABETIC FOOT ULCER IN AUSTRIA

Marlene Pandis¹, Julia Mader¹, Waltraud Haas², Beate Boulgaropoulos³, Petra Baumann³, Karl Horvath¹, Thomas Pieber¹, Harald Sourij⁴, Johannes Plank⁵, Gerd Koehler⁴

¹Division of Endocrinology and Diabetology, Department of Internal Medicine, Medical University of Graz, Graz, Austria

²Division of Endocrinology and Diabetology, Department of Internal Medicine, University Hospital Graz, Graz, Austria

³Health-Institute for Biomedicine and Health Science Joanneum Research, Austria

⁴Dept. of Internal Medicine, Medical University Graz, Graz, Austria

⁵Division of Gastroenterology and Hepatology, Department of Internal Medicine, Medical University of Graz, Graz, Austria

Aim: Patients with a history of diabetic foot ulcer have a higher risk for re-ulceration, amputation or re-amputation and a significantly decreased quality of life and increased mortality. We aimed to investigate the rate of foot related complications and mortality in a high-risk population of patients with diabetic foot syndrome.

Method: 91 patients with recently healed foot ulcers (age: 65 ± 11 years, gender: 44 women and 47 men, 6 with diabetes type 1, 85 with diabetes type 2, mean BMI 28.5 ± 4.4 kg/m² and HbA1c $8.4 \pm 1.6\%$ (68.1 ± 17.3 mmol/mol) were included. 91 patients had clinical signs of neuropathy, 42 had clinical signs of peripheral artery disease (PAD), 25 a history of minor amputation, 5 had a major amputation, 40 had clinical signs of nephropathy, and 53 of retinopathy.

Results/Discussion: 33 patients completed the observation time of 11.0 ± 0.6 years and 58 patients died during this follow-up period. Causes of death were cardiovascular events in 62.1%, infections in 20.7%, cancer in 6.9%, renal causes in 1.7% and 1 patient committed suicide. In 6.9% the cause of death was unknown. 71 of the initial 91 patients showed re-ulceration, mean time of first ulcer recurrence was 1.8 ± 2.4 years, 21 patients had an amputation, which included 19 minor and 2 major amputations and mean time to amputations was 3.6 ± 1.9 years. In patients with an initial minor amputation, 3 major amputations were required over the follow up time. PAD was significantly predictive for a composite of amputation or death ($p < 0.01$).

Conclusion: Resulting data highlights the high recurrence rate of ulcerations and increased mortality in patients with diabetic foot syndrome and identified PAD as major predictive risk factor for amputation or death. Cardiovascular risk factors should be addressed in this high-risk population.

[P67] ONLY 23% OF DIABETIC FOOT INFECTIONS NEEDING ACUTE HOSPITAL ADMISSION COULD BE CLASSIFIED AS SEVERE BASED ON CURRENT GUIDELINES ON TEMPERATURE, PULSE, RESPIRATION AND WHITE BLOOD CELL COUNT

Elizabeth Pendry¹, Nina Petrova¹, Christopher Manu¹, Prash Vas¹, Michael Edmonds¹

¹Diabetic Foot Clinic, King's College Hospital NHS Foundation Trust, London, United Kingdom

Only 23% of diabetic foot infections needing acute hospital admission could be classified as severe based on current guidelines on temperature, pulse, respiration and white blood cell count.

Aim: International guidelines indicate that that diabetic foot infection can only be classified as severe when patients present with a systemic inflammatory response syndrome (SIRS) as manifested by 2 or more of the following features: Temperature >38°C or <36°C, Heart rate >90 beats/minute, Respiratory rate >20 breaths/minute, White blood cell (WBC) count >12.0 10⁹L or <4.0 10⁹L. This study reports that only 23% of diabetic foot infections needing admission to hospital could be classified as severe if current guidelines on temperature, pulse, respiration rate and WBC count are followed.

Method: We studied 30 patients who needed admission to hospital for treatment of diabetic foot infection. Clinical parameters (body temperature, pulse rate and respiratory rate) were recorded on the day of admission. Blood samples were also collected on admission and inflammatory markers were measured. Data are median (25th–75th percentile) values.

Results/Discussion: The median plasma C-reactive protein on admission was considerably raised at 160 (72-287) mg/l, reference range (rr) below 5mg/l. However, the median body temperature was only 37.2 (36.8 - 38.1)°C. The median pulse rate was 85 (80-95) beats/min and the median respiratory rate was 17 (17-18) breaths/min. The median WBC count was 12.4 (9.4-17.2) 10⁹L, rr 4.0 to 11.0 10⁹L and the median neutrophil count was 10.3 (6.7-14.5) 10⁹ L, rr 2.2-6.3 10⁹L).

With reference to guideline criteria, only 6/30 patients had a body temperature >38°C and 0/30 patients had a body temperature <36°C; 7/30 patients had a pulse rate >90 beats/min and 0/30 patients had a respiratory rate >20 breaths /min; 13/30 patients had WBC >12.0 10⁹L and 0/30 had WBC<4.0 10⁹L. Overall, only 7/30 patients fulfilled the current definition of severe foot infection.

Conclusion: There is concern that diabetic foot infections which are serious enough to require hospital admission may not be classified as severe according to present guidelines and may not receive the urgency which they deserve. Guidelines on diabetic foot infection should be revisited.

[P68] WHAT IS THE OUTCOME OF NEWLY PRESENTING DIABETIC ISCHAEMIC FOOT ULCERS AT 6 MONTHS?

Daina Walton¹, Maureen Bates¹, Ben Freedman¹, Hani Slim¹, Hisham Rashid¹, Prashanth Vas¹, Michael Edmonds¹, Chris Manu¹

¹Diabetic Foot Clinic, King's College Hospital, London, United Kingdom

Aim: The ischaemic diabetic foot is difficult to treat and the role of revascularization is not fully established. Our aim was to document the progress of diabetic patients who present with a foot ulcer and non-palpable pedal pulses over 6 months.

Method: We conducted retrospective analysis of consecutive new patients with ulceration and absent foot pulses. All patients had Doppler waveform assessment at common femoral, popliteal, anterior tibial, posterior tibial and dorsalis pedis arteries. All patients had multidisciplinary conservative treatment in the Diabetic Foot Clinic and outcomes of ulcer healing, major amputation, mortality and frequency of revascularization were recorded at 24 weeks (6 months).

Results: The patients were divided into four groups according to Doppler findings. Group 1 (n=8) had normal waveforms in the feet, 5 had infection and 3 were hindfoot ulcers: 3 healed, 4 unhealed (one was lost to follow up). Group 2 (n=11) had normal femoral waveforms but diminished popliteal and foot artery waveforms, 9 had infection and 4 were hindfoot ulcers: 6 healed, 5 unhealed, one had a femoral-posterior tibial artery bypass, one had popliteal-lateral plantar bypass, 2 patients had superficial femoral artery (SFA) angioplasty, 2 patients had tibial artery angioplasty and one patient had SFA and tibial-peroneal trunk angioplasty. Group 3 (n=5) had normal femoral and popliteal waveforms but reduced foot artery waveforms, 3 were infected and 2 were hindfoot ulcers: 3 healed, one unhealed (one lost to follow up). There was one angioplasty of anterior tibial artery. Group four (n=2) had abnormal femoral, popliteal and foot artery waveforms, one had infection and one was a hindfoot ulcer: both were unhealed and one had iliac angioplasty. Overall, 12/24 patients were alive and ulcer free at 24 weeks (6 months). Nine patients underwent revascularization, 7 receiving angioplasty and 2 bypasses. However, 10/12 patients healed their ulcers without revascularization. There were no major amputations or deaths.

Conclusion: Our patients underwent multidisciplinary management leading to 50% ulcer healing at 24 weeks (6 months). Although revascularization was performed in 38% of patients, it is important to note that 10/12 patients healed with conservative treatment alone.

[P69] SOCIODEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF PATIENTS ATTENDING A FIRST APPOINTMENT AT A MULTIDISCIPLINARY DIABETIC FOOT UNIT

Teresa Pereira¹, Liliana Fonseca¹, Ana Amado¹, Ana Martins², Sofia Teixeira¹, André Carvalho¹, Cláudia Amaral¹, Helena Rei Neto¹, Cláudia Freitas¹, Joana Martins¹, Luís Loureiro¹, Luís Costa¹, André Gomes¹, Isabel Gonçalves¹, Sara Pinto¹, Rosa Guimarães¹, Joel Pereira¹, Rui Carvalho¹

¹Diabetic Foot Unit, Hospital de Santo António - Oporto, Porto, Portugal

²Endocrinology Department, Centro Hospitalar de Lisboa Norte, Portugal

Aim: The aim of this study was to characterize the patients that attended a first appointment at the multidisciplinary outpatient Diabetic Foot Unit of our institution during one year.

Method: A retrospective observational study was performed. Patients who were observed

for the first time in our multidisciplinary outpatient Diabetic Foot Unit between January and

December 2014 were reviewed (n=541). Patients with diabetic foot ulcer (DFU) and available data were included. We have analysed: demographic data, educational level, duration of diabetes, HbA1c, presence of neuropathy and peripheral artery disease, previous ulcers and amputations, clinical characteristics and management of DFU

Results/Discussion: A total count of 305 patients was included. There was a slight predominance of men (56.7%), with a median age of 69.5 years old (32 - 93). They had been diagnosed with diabetes for a median of 15 years (0.5 - 55). The median of HbA1c was 7.7% (4.9-14%).

The majority of patients were under insulin treatment (54.8%). 78.9% of the patients had an education level equal or below the fourth year. 38.6% had had a previous diabetic foot ulcer and 24.4% had had a previous amputation. The presence of peripheral artery disease was 64.3%.

The majority of patients had a forefoot wound (70.3%), while hindfoot and midfoot ulcers had the same prevalence (12.3%). Probable osteomyelitis was present at least in 31.8%.

87 (28.5%) of these patients were hospitalized to receive intravenous antibiotics and/or surgical treatment of the wound. Only 36% of patients with peripheral artery disease underwent a revascularization procedure. 42 patients (13.8%) underwent amputation and 9 of these were major.

Conclusion: Diabetic foot ulcers were more common in older men and in individuals with low educational level. The majority of ulcers occurred in patients with neuroischemic foot and forefoot ulcers were predominant. Near one third of the patients had probable osteomyelitis.

[P70] PREDICTIVE PARAMETERS FOR LOWER LIMB AMPUTATIONS IN A DIABETES CENTER IN ROMANIA

George Nita¹, Ciprian Petrisor Vasiluta², Lidia Iuliana Arhire¹, Laura Mihalache¹, Andreea Gherasim¹, Otilia Nita³

¹Grigore T. Popa University of Medicine and Pharmacy, Iasi, Romania

²Sf. Spiridon Clinical Emergency Hospital, Iasi, Romania

³Grigore T. Popa University of Medicine and Pharmacy, Department of Diabetes, Nutrition and Metabolic Diseases, St. Spiridon Clinical Emergency Hospital, Iasi, Romania

Aim: Diabetes represents the leading cause in approximately 60% of non-traumatic lower limb amputations, which, together with renal failure and blindness, is one of the most feared consequences of diabetes. The aim of the study was to find predictive parameters for lower limb amputations among the diabetic foot cases admitted to a Diabetes Clinic during 1 year.

Method: We conducted a retrospective study on a group of 151 patients admitted to the Clinic of Diabetes, Nutrition and Metabolic Diseases, during 1 year. We considered all cases with diagnoses related to “diabetic foot”, noting that, in patients with multiple admissions during the duration of the study, we collected data for the first admission. Data collected included socio-demographic factors, anthropometric parameters, data on diabetes, biological tests, descriptive elements of the lesion, osteolysis, cellulitis, duration of hospitalization and transfer into a surgical clinic for amputation.

Results/Discussion: A percentage of 54.3 of cases had cellulitis. Approximately one third of patients had osteolysis and a percentage of 34.4% of cases had a history of amputation. 35.8% of patients were transferred to a surgical clinic for amputation. The median duration of hospitalization was 14.28 days, with a maximum of 59 days. There were no statistically significant differences between men and women, with respect to the location of the lesion ($p = .621$), osteolysis ($p = .746$), history of amputation ($p = .963$) and transfer into a surgical clinic ($p = .075$), except for the presence of cellulite ($p = .008$). By using ROC curves and calculation of the area under the curve with a 95% confidence interval several parameters were tested in order to evaluate the predictive value for transfer in a surgical clinic to be amputated. Statistical significance was obtained for: CRP ($p = .001$), ESR ($p = .000$), fibrinogen ($p = .000$), white blood cells ($p = .000$), neutrophils ($p = .000$), osteolysis ($p = .000$), cellulitis ($p = .025$).

Conclusion: Among all cases of diabetic foot registered in our clinic during one year, the ones which necessitated amputation were those with higher inflammatory tests, with osteolysis and perilesional cellulitis.

[P71] SCREENING PROCEDURE AND STRATIFICATION OF TYPE 2 DIABETIC PATIENTS MEMBER OF INDONESIAN DIABETES SOCIETY AS A REFERENCE FOR THE PREVENTION OF DIABETIC FOOT COMPLICATIONS

Eva Niamuzisilawati¹

¹Division Endocrinology Metabolic and Diabetes of Internal Medicine Department , Dr. Moewardi Hospital, Medical Faculty of Sebelas Maret University, Surakarta, Indonesia

Aim: The global rise in diabetes prevalence is associated with an increase in diabetes-related complications. Indonesia is in fifth position worldwide for cases of diabetes. Most diabetic foot amputations are caused by ulcers. Early identification at high risk patient for diabetic foot ulcers (DFU) was a top priority due to the clinical and economic burden of diabetic foot complications. Indonesian Diabetic Society (PERSADIA) performs routine activities such as diabetes and leg exercises, health education, doctor's consultation, training, and gathering. The activities are expected to support the achievement to control diabetes and prevent diabetic complications such as diabetic foot ulcers (DFU). This study aims to determine the stratification of risk factors for ulcers in patients with type 2 diabetes member of PERSADIA.

Method: This cross-sectional study was conducted on 150 participants PERSADIA Surakarta branch. There are 74 samples that met the inclusion criteria. Inclusion criteria: Patients with type 2 diabetes members of PERSADIA, at least one weekly doing foot and diabetic exercise. Exclusion criteria: patients with non-DM, psychosomatic disorders. Sample is screened foot with model of care for the diabetic foot National Diabetes program, Clinical Strategy and Programs Directorate, 2011, consists of a history of diabetes related foot complications, medical history and assessment of peripheral sensation*, the assessment of vascular, Ankle Brachial Index (ABI) and toe abnormalities.

Results/Discussion: There were 21 men and 53 women. 27 samples aged 40-60 year, there are 47 samples aged over 60 years. 5-10 years suffering from diabetes 40 sample. Users of oral anti-diabetic (OAD) 53 samples, Insulin 14, the combination of insulin and OAD only 7 samples, neuropathy found in 56 samples. 10 sample with ABI <0.9. 10 sample with a history of ulcers and amputations. The stratification result of risk factors: high (10 samples), moderate (37 samples) and low (26 samples).

Conclusion: Screening procedures and stratification in diabetic patients member of PERSADIA can be used as a reference for the prevention, consultation and prompt treatment of the complications of diabetes, including leg ulcers.

*Semmes Weinstein Monofilament 10 g

[P72] ANALYSIS OF DELETERIOUS QUALITY OF LIFE ON CAREGIVERS OF PATIENTS WITH DIABETIC FOOT ULCERS

Yolanda García Álvarez¹, José Luis Lázaro Martínez¹, Esther Garcia Morales¹, Ana Pilar Ortiz Fernández¹, Aroa Tardáguila García¹, Raúl Molines Barroso²

¹Diabetic Foot Unit, Complutense University of Madrid, Madrid, Spain

²Diabetic Foot Unit, Complutense University Clinic, Instituto de Investigación Sanitaria del Hospital Clínico San Carlos, Madrid, Spain

Aim: To identify variables affecting the quality of life of the caregivers of patients with DFU according to dependency level.

Method: Observational study, conducted at a Diabetic Foot Unit, which included 39 caregivers of patients with DFU. Barthel Index (1955) was used to assess the level of dependency in basic patient daily activities and the questionnaire* to identify the cares that the caregivers give to its relative patient and consequences that this caring activity have in his quality of life (conceptual framework of Virginia Henderson).

Results/Discussion: Average age of the caregivers was 58,87±14,63 years and 69,2% (n=27) were woman. Average time caregivers have spent with their relatives was 86,32±105,29 months, 76,9% (n=30) lived together with the patients and 41% (n=16) worked outside home. Average patient level of dependency was moderated [(Barthel: 70,33±22,27)]. Following table shows the distribution of the impact in the basic necessities of the caregivers and the carer characteristics that have impact on the carer life quality, depending of the level of dependency:

Impacted necessities according to the carer perception	n	%	Carer Variables associated to the basic necessities impacts			
			Total dependency (1 patient/2,6%)	Severe dependency (10 patients/25,6%)	Moderate dependency (22 patients/56,4%)	Low dependency (6 patients/15,4%)
Oxygenation	7	17,95	None	None	Illiteracy (p=0.05)	None
Nutrition	20	51,28	None	Female (p=0.011) Illiteracy (p=0.05)	Work outside home (p=0.030)	Work partially outside home (p=0.013)
Elimination	10	25,64	None	Work partially outside home (p=0.035)	None	College degree (p=0.014) Work partially outside home (p=0.014)
Movement	27	69,23	None	Female (p=0.038)	None	None
Rest and sleep	27	69,23	None	None	None	None
Get dressed and undressed	3	7,69	None	None	Work outside home (p=0.035) Living with the patient (p=0.015)	Age (p=0.001) Living with the patient (p=0.005)
Hygiene and protection skin	12	30,77	None	None	Higher education (p=0.047)	College degree (p=0.044)
Avoid dangers	11	28,21	None	None	Living with the patient (p=0.013)	Life together with the patient (p=0.003)
Communication	20	51,28	None	None	None	College degree (p=0.014) Work partially outside home (p=0.014)
Work and personal fulfillment	24	61,54	None	None	Higher education (p=0.007) Primary studies (p=0.041)	None
Recreation	34	87,18	None	None	Work outside home (p=0.034)	None
Learning	9	23,08	None	Living with patient (p=0.035)	None	None

Conclusion: The impact on quality of life of caregivers of patients with DFU is highly altered. Caregivers of patients with DFU and severe dependency have alteration focused in physical health (nutrition/elimination/movement) and everyday life (learning). With moderate dependency in physical health (oxygenation/nutrition) psychological health (get dressed and undressed/hygiene and skin protection), everyday life (avoid dangers/recreation) and professional life (work and personal fulfillment). And with de low dependency in physical health (nutrition/elimination) psychological health (get dressed and undressed/hygiene and skin protection) and everyday life (avoid dangers/communication).

*Questionnaire ICUB97©

[P73] GUT IS MY HOME. BUT I CAN BE IN TOES TOO. A CASE OF NON HEALING OSTEO-MYELITIS

Kaustubh Nisal¹, Kamal Chokkalingam¹, Lisa Metcalf², Jaclyn Glazebrook³, Ravikanth Gouni¹, Carolyn Chee¹

¹Nottingham University Hospital NHS Trust, Nottingham, United Kingdom

²Dundee House, Nuh City Hospital, Nottingham, United Kingdom

³Podiatry Department, Dundee House, Nottingham University Hospitals - City Hospital Campus, Nottingham, United Kingdom

An 85 year old lady with end stage renal disease requiring haemodialysis and T2DM was initially referred to our multidisciplinary diabetic foot ulcer clinic with left hallux ulceration and abscess. X-ray confirmed distal phalanx osteomyelitis. The patient was treated with a six week course of oral antibiotics as per the local protocol. By 4 weeks the ulcer had resolved. She was discharged from the clinic with appropriate footwear and follow up care with the community podiatrist. 10 weeks later the patient was again referred to the clinic. She had developed a sharply punched, deep probing ulcer with purulent discharge at the same site. The X-ray showed further destruction of the terminal phalanx of the hallux. The purulent discharge didn't grow any organisms. Skin swab grew *candida albicans*. It was thought to be a contaminant. She received a further course of oral antibiotics. Differential diagnosis of calciphylaxis, and uremic arthropathy were considered. The ulcer again healed completely 4 weeks into a 6 week course of oral Clindamycin but recurred at the end of antibiotics course. The repeat X-ray showed progressive destruction of left hallux distal phalanx. The patient was not keen for partial amputation of left hallux. Hence, she had a surgical debridement. Bone biopsy demonstrated an acute on chronic osteomyelitis. Microbiology cultures grew *candida albicans* from the infected bone as well as from the biopsy of the proximal phalanx. She was given 12 week course of oral fluconazole. The ulcer rapidly responded to oral fluconazole and healed. She was discharged from the foot ulcer clinic with no evidence of recurrence to date.

Discussion: *Candida albicans* osteomyelitis has been reported in immunocompromised patients including transplant patients. *Candida* species can be isolated from skins of normal healthy individuals and it is also known to colonise chronic wounds. Our patient had paronychia prior to ulceration and had *Candida* isolated from her hallux but it was thought to be a commensal. She had recurrent ulceration and progressive destructive osteomyelitis unresponsive to standard antibiotics. This case highlights the importance of consideration of mycotic infections in protracted diabetic foot ulcers.

[P74] INFLAMMATORY MARKERS HAVE PREDICTIVE VALUE ON THE OUTCOME OF DIABETIC FOOT OSTEOMYELITIS

Aroa Tardáguila García¹, José Luis Lázaro Martínez¹, Jose Luis Garcia Klepzig², Raúl Molines Barroso³, Yolanda García Álvarez¹, Fernando Sánchez-Lancha López¹

¹Diabetic Foot Unit, Complutense University of Madrid, Madrid, Spain

²Hospital Clínico San Carlos, Madrid, Spain

³Diabetic Foot Unit, Complutense University Clinic, Instituto de Investigación Sanitaria del Hospital Clínico San Carlos, Madrid, Spain

Aim: To analyze the utility of inflammatory markers on the outcome of diabetic foot osteomyelitis (DFO).

Method: A prospective observational study was performed in patients with clinically suspected DFO. The patients received surgical or medical treatment. Erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) and white blood cells (WBC) were analyzed from the blood of 74 patients at DFO diagnosis, at ulcer healing and after 1 month from healing. As a follow-up study, patients were screened for DFO recurrence and ulcer recurrence for a month after ulcer healing.

Results/Discussion: Median time from ulcer was 13.1±21.7 weeks. The data of the inflammatory markers are showed in table 1.

	At DFO diagnosis	At ulcer healing	After 1 month
	Mean±SD N=74	Mean±SD N=74	Mean±SD N=74
Surgical management n=64	ESR 32.5±26.6mm/h	ESR 23.1±21.5mm/h	ESR 22.3±19.3mm/h
	CRP 13.9±32.1mg/L	CRP 5.0±6.0mg/L	CRP 7.8±19.2mg/L
	WBC 8.7±2.6x10 ³ /μL	WBC 8.3±2.6x10 ³ /μL	WBC 8.6±2.4x10 ³ /μL
Medical therapy n=10	ESR 27.2±32.6mm/h	ESR 23.1±17.2mm/h	ESR 28.8±19.5mm/h
	CRP 27.1±72.1mg/L	CRP 4.1±5.1mg/L	CRP 3.3±3.8mg/L
	WBC 7.6±1.4x10 ³ /μL	WBC 7.8±2.0x10 ³ /μL	WBC 7.4±2.0x10 ³ /μL

Table 1.

Significant differences were observed between the value of ESR (p=0.002) and CRP (p=0.024) at the beginning and when the ulcer was healed but no significant differences were found respect to WBC value (p=0.161). Two (2.7%) patients suffered DFO recurrence with elevated values of ESR (66mm/h and 74mm/h) and 1 with elevated value of CRP (13.9mg/L). Two (2.7%) patients suffered ulcer recurrence with normalized values of ESR and CRP.

Conclusion: Normalized inflammatory markers (ESR and CRP) are useful tools to predict absences of adverse events related to bone infection after short-term follow-up in patients who suffered DFO, after the ulcer healed regardless of the treatment administered.

[P75] THE TOTAL CONTACT CAST IS SUCCESSFUL IN HEALING NOT ONLY NON-INFECTED DIABETIC FOOT ULCERS BUT ALSO INFECTED ULCERS

Nicole Mottolini¹, Maureen Bates², Timothy Jemmott², Chris Manu¹, Daina Walton², Jody Lucas¹, Michael Edmonds²

¹King's College Hospital NHS Foundation Trust, London, United Kingdom

²Diabetic Foot Clinic, King's College Hospital, London, United Kingdom

Aim: The Total Contact Cast (TCC) has been described as the gold standard for off-loading ulcers but its usefulness in healing complex non-infected and infected diabetic foot ulcers has not been well established. The aim of this study was to demonstrate the value of TCC in healing not only non-infected diabetic foot ulcers but also clinically infected ulcers.

Method: The study was a retrospective review of consecutive patients, who were treated with non-removable TCC treatment for foot ulceration within our diabetic foot clinic over a 3 month period (June to August 2015). We excluded patients treated with complex casts (scotch cast boots, removable casts and windowed casts). We compared patients with infected ulcers to those with non-infected ulcers. Patient demographics, duration of ulceration before start of TCC, duration of TCC treatment and healing outcomes were compared between the two groups.

Results/Discussion: A total of 56 patients were included over the 3month period. The mean age was 59±12years; 80% were male. On initiation, 44/56 (79%) had non-infected ulcers and 12/56 (21%) had clinically infected ulcers. Mean duration of ulceration before the start of TCC was 15±7 weeks (Mean±SD) (Median 16 weeks) in the non-infected group vs 18±2 weeks (Median 13 weeks) in the infected group [p=0.327]. The duration of TCC was 26±23 weeks (Median 22 weeks) in the non-infected group vs 19±18 weeks (median 13 weeks) in the infected group [p=0.352]. Time taken to heal from the start of TCC was 17±15weeks (median 13 weeks) in non-infected group vs 26±7 weeks (median 28 weeks) in the infected group. The time taken to healing from the start of ulceration was significantly reduced in the non-infected group at 20±15 weeks (median 18 weeks) vs 32±8 weeks (median 36 weeks) in the infected group [p=0.049]. There was no statistical difference in the percentage of ulcers healed between the two groups; 33/44 (75%) of patients in the non-infected group healed vs 7/12 (58%) of those in the infected group [p=0.253].

Conclusion: TCC can be successfully used to heal both infected as well as non-infected diabetic foot ulcers. The technique ought to be offered to more patients including those with clinical signs of infection.

[P76] CHALLENGES FACED IN MANAGING DIABETIC FOOT INFECTION CAUSED BY MULTIDRUG RESISTANT GRAM NEGATIVE ORGANISM IN OUTPATIENT SETTINGS

Fadwa Elsanousi¹, Marie France Kong², Rachel Berrington², Deborah Modha²

¹Department of Microbiology, University Hospitals of Leicester NHS Trust, Leicester, United Kingdom

²Department of Diabetes, University Hospitals of Leicester NHS Trust, Leicester, United Kingdom

Aim:

- To explore the antimicrobial resistance pattern of gram negative bacteria in diabetic foot infections (DFIs) in our diabetic foot service.
- To discuss the challenges in managing DFIs with multi drug resistant gram negative organisms (MDRGNO) in diabetic foot clinic.

Method: Laboratory and clinical data between 2010 and 2017 were reviewed retrospectively for MDRGNO from patients with DFIs.

Results/Discussion: In the last 7 years, 30 MDRGNO were identified from diabetic foot patients. 27 of these were Extended-spectrum β -lactamase (ESBL) organisms and 3 Carbapenem resistant organisms (CRO). The majority of isolates showed resistance to three or more antimicrobial classes including Beta-lactams (all Penicillins and Cephalosporins), Fluoroquinolones and aminoglycosides. These were resistant to all oral agents.

Bacterial resistance is a rising concern that is becoming increasingly common in healthcare settings. This increase raises serious concerns because multi drug resistant infections limit the choice of antibiotic therapy leading to the use of more IV agents, longer hospital admission and the potential for failure of empirical therapy.

The out-patient setting makes it very difficult to implement the same infection prevention measures as inpatient hospital settings. Management of diabetic foot infections includes not only antimicrobial therapy but also wound care, mechanical support and offloading. This represents a challenge in preventing the transmission of antibiotic-resistant bacteria between patients in a busy clinic. The CRO require rigorous infection prevention interventions including enhanced cleaning (including hydrogen peroxide vaper), use of more specialised personal protective equipment (PPEs) and issues using radiology and casting facilities.

Conclusion: 30 cases of MDRGNO in 7 years is a small numbers but the complications and the challenges they raise are complex. There may be a need to adjust the empirical choice of antibiotics and more complex infection prevention interventions to deal with these cases in outpatient settings. This will be discussed in relation to specific cases which highlight these points.

[P77] HAEMATOLOGICAL EFFECTS OF LINEZOLID: A SURVEY OF OUR PATIENT EXPERIENCE

Shailesh Gohil¹, Rachel Berrington¹, Deborah Modha¹, Marie France Kong¹

¹Department of Diabetes, University Hospitals of Leicester NHS Trust, Leicester, United Kingdom

Aim: Linezolid is an oxazolidinone antibiotic, active against Gram positive bacteria, and is very useful in the treatment of diabetic foot infections (DFI). It has the advantage of having excellent oral bioavailability and therefore parenteral antibiotic therapy can potentially be avoided in patients with resistant infections. However, amongst other side effects, Linezolid can cause reversible myelosuppression. The manufacturer's datasheet recommends weekly full blood count (FBC) monitoring and a maximum treatment duration of 28 days. We aimed to see what effect Linezolid had on the FBC in our cohort of patients who were prescribed Linezolid for their DFI.

Method: We searched our electronic database for all patients who were prescribed Linezolid for their DFI from 1st January 2016 to 1st January 2017. Data was collected on duration of treatment, reason for stopping treatment and FBC monitoring whilst on treatment. We looked at the change in haemoglobin, white cell count, platelets and neutrophils week by week for each patient whilst on treatment.

Results/Discussion: Over the 1 year period, 41 courses of Linezolid were prescribed to 35 patients. 94% (33/35) were male and 94% (33/35) had type 2 diabetes mellitus. Indication for Linezolid was an infected foot ulcer in 93% (38/41) of cases, 1 case of paronychia and 2 cases of gangrenous toes. Mean treatment duration was 18.2±7.5 days. Linezolid was stopped in 1 patient due to falling platelets (252x10⁹/L to 131x10⁹/L). 3 patients stopped due to falls in both their haemoglobin and platelets. Most patients had a drop in platelets. Mean drop throughout treatment for all patients was 91x10⁹/L. After 3 weeks of treatment, the mean drop in platelets was 120x10⁹/L±83 x10⁹/L. 15% (6/41) developed thrombocytopenia (platelets < 150x10⁹/L). In patients who had 4 weeks of treatment haemoglobin fell by mean of 9.5g/L.

Conclusion: In our patients, after Linezolid treatment, a drop in platelets is observed more than other FBC parameters, similarly observed by others. Longer duration of treatment is also associated with greater severity of myelosuppression. It is therefore vital that patients are adequately monitored whilst on Linezolid and that results are acted upon in a timely manner.

[P78] FUNGAL OSTEOMYELITIS IN THE DIABETIC FOOT

Venugopal Vimal¹, Marie France Kong¹, Rachel Berrington¹, Rajesh Jogia¹, Deborah Modha¹

¹Department of Diabetes, University Hospitals of Leicester NHS Trust, Leicester, United Kingdom

Aim: To identify cases of fungal osteomyelitis in patients attending our multidisciplinary diabetes foot clinic over a 2 year period and to review the causative organisms and the required treatment. We also wanted to look at the degree of morbidity due to fungal osteomyelitis in regards to amputations and death.

Method: All patients seen in our multidisciplinary diabetes foot clinic have documentation entered with their consent into our local electronic database. We used the database to identify our cohort. We included patients with a diagnosis of diabetes mellitus and an episode of fungal osteomyelitis between January 2015 and December 2016. Osteomyelitis was diagnosed either clinically or radiologically. Fungal involvement was determined by either direct bone culture of fungal organisms or tissue culture of fungal organisms and specialist microbiologist input diagnosing fungal osteomyelitis. We also looked at gender, ethnicity, HbA1c, fungal organism, co-existing bacterial infection and need for amputation.

Results/Discussion: 18 patients with fungal infection were identified but only 8 had the specified above criteria. All the patients were male, 7/8 had type 2 diabetes mellitus and the other patient had type 1 DM. 7 patients were Caucasian and 1 patient was of Indian origin. Average HbA1c was 84.4mmol/mol (46-110). 7 patients had co-existing bacterial infection and only 1 patient had isolated fungal growth. All patients with bacterial co-infection went on to have an amputation, whereas the patient with isolated fungal culture did not require amputation. All fungal species grown belonged to *Candida* genus with three individual species identified – *C. Albicans*, *C. Tropicalis* and *C. Parapsilosis*. All were sensitive to fluconazole which was used as the treatment of choice – 100 mg twice a day for the first day then 100 mg daily for 6 weeks.

Conclusion: Fungal infection often co-exist alongside bacterial infection in patients with diabetic foot ulcers. It is evident that fungi can also infiltrate bone and cause osteomyelitis. Patients with osteomyelitis treated with antibiotic therapy as per bone culture sensitivity who are not improving may have fungal involvement which requires antifungal treatment. Thus bone samples obtained from these patients should be sent for fungal culture.

[P79] INFLUENCE OF POOR METABOLIC CONTROL IN WORSEING PRESENTATION OF DIABETIC FOOT OSTEOMYELITIS

Rebeca Alvarez-Madroñal¹, José Luis Lazaro Martinez², Aroa Tardáguila García¹, Esther García Morales¹, Yolanda García Álvarez¹, Raúl Molines Barroso³

¹Diabetic Foot Unit, Complutense University of Madrid, Madrid, Spain

²Diabetic Foot Unit, Unidad Pie Diabético, Clínica Universitaria de Podología, Universidad Complutense, Madrid, Spain

³Diabetic Foot Unit, Complutense University Clinic, Instituto de Investigación Sanitaria del Hospital Clínico San Carlos, Madrid, Spain

Aim: To analyze if metabolic control of diabetes mellitus is associated with presence of inflammatory markers in diabetic foot osteomyelitis (DFO).

Method: A prospective study was performed in 23 patients with Diabetes between October 2015 to October 2016. Patients with diabetic foot ulcer complicated with osteomyelitis confirmed by histopathology and underwent conservative surgery were included. Blood samples were taken prior to surgery. Mean age of patients was 41 years \pm 10.50. 19 patients were male (68%). 3 patients (14%) had DM type 1 and 20 patients (85%) DM type 2. Diabetes duration was 19 \pm 12.53 years. Mean body mass index (BMI) was 27 \pm 6.09 kg/m² and mean of HbA1c was 7.5 \pm 1,5%. Diabetic foot ulcers suffering time was 15.71 \pm 23,42 weeks. ESR, CRP and leukocytosis were analyzed. Correlation of variables were analyzed using chi-2 test for qualitative variables and Spearman correlation for quantitative one. SPSS V.21.0 for Windows was used for statistical analysis.

Results/Discussion: Patients with longer duration of Diabetes had higher leukocytosis values (8,81[7,2-9,7] p=0,001). Higher ESR (26,5[21,35-37,75]) values were associated with patients who had a higher value of HbA1c (p= 0,042). We found statistically association between patients with elevated CRP (1,3[0,6-8,7]) and leukocytosis (p=0,027). No association was found between inflammatory markers and ulcer healing time.

Conclusion: Abnormal inflammatory markers values in patients with DFO were associated with poor metabolic control. Poor metabolic control could be related with worse infection presentations of DFO. However, healing time were not associated abnormal inflammatory markers. Probably surgery homogenizes short term outcomes in these kinds of patients.

[P80] DIABETIC FOOT OSTEOMYELITIS: MEDICAL VERSUS SURGICAL APPROACH

Ana Amado¹, Teresa Pereira², Liliana Fonseca¹, Ana Martins¹, Cláudia Freitas¹, Cláudia Amaral¹, André Carvalho¹, Helena Neto¹, Sofia Teixeira¹, Joana Martins³, Luís Loureiro⁴, Luís Costa⁴, André Gomes⁴, Isabel Gonçalves⁴, Sara Pinto¹, Rosa Guimarães¹, Joel Pereira¹, Rui Carvalho¹

¹Endocrinology Department, Centro Hospitalar Universitário Do Porto, Porto, Portugal

²Diabetic Foot Unit - Hospital de Santo António - Oporto, Porto, Portugal

³Vascular Surgery Department, Centro Hospitalar Universitário Do Porto, Porto, Portugal

⁴Orthopaedic Surgery Department, Centro Hospitalar Universitário Do Porto, Porto, Portugal

Aim: The purpose of this study was to evaluate the characteristics and clinical course of patients with diabetic foot osteomyelitis.

Method: A retrospective observational study was performed. Patients reviewed were observed for the first time in a multidisciplinary outpatient diabetic foot clinic between January and December 2014. We included those with probable osteomyelitis (obtained from clinical and radiological criteria). The following data were obtained: gender, age, diabetes duration, presence of arterial disease, microbiological isolations and use of antibiotics. Adverse outcome was defined as death or amputation.

Results/Discussion: We included 56 patients; the majority of them were male (67.9%). Median age was 64 years (min. 32, max. 93) and mean duration of diabetes was 18.1 years (+- 10.0). Peripheral artery disease was present in 71.4% (n=40). In 67.9% (n=38) of the patients cure was achieved with medical treatment only; of these, more than one antibiotic course was necessary in 57.9% (n=22). Amputation was performed in 30.4% (n=17) of the patients [28.6% (n=16) were submitted to minor amputation and 1.8% (n=1) to major amputation]. One patient died during hospital admission from diabetic foot infection. No correlation was found between the adverse outcome and peripheral artery disease. Nine patients (16%) had infection with multi-resistant bacteria (methicilin-resistant *Staphylococcus aureus* or quinolone-resistant *Pseudomonas aeruginosa*); no extended-spectrum beta-lactamase-producing bacteria were isolated.

Conclusion: Although a considerable percentage of patients need amputation in the course of diabetic foot osteomyelitis, medical treatment, which sometimes requires more than one antibiotic course, was effective in treating 67.9% of patients. In our series, the presence of peripheral artery disease was not correlated with the outcome. More studies are needed to define which factors can be predictive of amputation.

[P81] RISK FACTORS FOR AMPUTATION IN MODERATE AND SEVERE DIABETIC FOOT INFECTION

Ana Lopes¹, André Carvalho¹, Cláudia Amaral¹, Cláudia Freitas¹, Helena Neto¹, Rui Carvalho¹, Sofia Teixeira¹, Susana Garrido¹, Teresa Pereira¹, André Gomes¹, Isabel Gonçalves¹, Luis Costa¹, Joana Martins¹, Luis Loureiro¹, Pedro Cantista¹, Sara Pinto¹, Joel Pereira¹, Rosa Guimarães¹

¹Diabetic Foot Unit - Centro Hospitalar Do Porto, Porto, Portugal

Aim: To evaluate lower limb amputation rate and to establish predictors of amputation in moderate and severe diabetic foot infection (DFI).

Method: A prospective study of patients with moderate and severe DFI episodes seen in a tertiary referral center was performed between October 2012 and June 2014. Demographic and clinical data related to each episode were evaluated. Univariate descriptive analysis was performed and a logistic regression model was created to predict lower limb amputation.

Results/Discussion: A total of 151 episodes of moderate and severe DFI were recorded, corresponding to 118 patients. Amputation (minor and major) occurred in 52 episodes, representing a total amputation rate of 34.4% episodes. Major amputation occurred in 6.6% of all episodes. Patients were 63.9±12.3 years old; 72.8% were male; 86.8% had type 2 diabetes. Infection was severe in 18.5% of the episodes; osteomyelitis was present in 71.5%; there was a previous lower limb amputation in 37.1%; and peripheral arterial disease (PAD) was present in 56.3%. Presence of PAD [OR 5.69 (95% CI 2.47-13.12; p<0.001)] and previous lower limb amputation [OR 2.37 (95% CI 1.12-5.01; p=0.024)] were identified as risk factors for amputation. There was no significant association between amputation and osteomyelitis or severity of infection (moderate vs. severe).

Conclusion: In this sample of episodes of moderate and severe DFI, amputation occurred in 34.4% of the episodes (93.4% minor amputation). In moderate and severe DFI, risk of amputation increases six-fold in the presence of PAD and two-fold if there was previous lower limb amputation.

[P82] IMPROVING HOME IV ANTIBIOTIC THERAPY FOR DIABETIC FOOT PATIENTS

Michael Pierides¹

¹Kettering General Hospital, Kettering, United Kingdom

Aim: Diabetic foot ulcers with osteomyelitis can require long term IV antibiotics. Infections caused by pseudomonas or multi-resistant coliforms are prescribed thrice daily piperacillin/tazobactam. There are limited IV/oral options for these patients due to antibiotic resistance, bone penetration of antibiotic and high *C. difficile* risk. The thrice daily administration usually results in a hospital admission. Continuous infusion of piperacillin/tazobactam over 24 hours via an infusion pump enables patients to have it at home as it is once daily. The advantages are: more patients can be treated at home, capacity for home IV treatment is maximised and less risk of breaking aseptic technique and line infection/thrombosis/tissuing of cannula (continuous infusion). Furthermore as penicillins show time dependent bactericidal effects, pharmacokinetic studies show as good or better outcomes with 24 hour continuous infusions and improved antimicrobial stewardship (avoid unnecessary carbapenem use).

Method: We introduced piperacillin/tazobactam over 24hours as a pilot to enable early discharge or admission avoidance for diabetic foot patients. Patients were selected based on ulcer microbiology results and suitability for home IV therapy. Doses were 9g or 13.5g/24 hours based on renal function.

Results/Discussion: The pilot ran for 2 months and 9 patients were referred, however only 7 were treated. 265 days of therapy were administered via 24 hour infusion in total, in theory saving 265 bed days or 530 visits for IV doses in the community. All patients had a similar outcome as predicted from thrice daily administration. Patient satisfaction and experience were improved as the treatment regime was less obtrusive to daily life. The cost of each 24 hour infusion bag 13.5g was £55+VAT whereas the cost per day of three times a day piperacillin/tazobactam is £2.73 +VAT, an increase of £52.27 per day but this cost difference is mitigated by savings in bed days or home IV slots. There were no significant patient adverse effects.

Conclusion: The use of 24 hour infusion devices enables patients to have more convenient IV therapy at home which is highly cost effective in the context of savings in bed days and home IV slots.

[P83] DOES ASSESSMENT AND MANAGEMENT FOR QTc PROLONGATION ON 12-LEAD ECG IN THE DIABETES FOOT CLINIC REDUCE MORTALITY?

Jonathan Valabhji¹, Nicholas Collins², Robert J. Young³, Rahul Nayar⁴, Satyan Rajbhandari⁵, David Coppini⁶, Chris Manu⁷, Ketan Dhatariya⁸, Catherine Gooday⁸, Marie France Kong⁹, Simon Ashwell¹⁰, Ananth Nayak¹¹, Adam Robinson¹², Huon Gray¹³, Naomi Holman¹⁴, Michael Edmonds¹⁵

¹Dept. of Diabetes & Endocrinology, Imperial College Healthcare, London, United Kingdom

²NHS England, United Kingdom

³Dept. Diabetes & Endocrinology, Salford Royal Hospital, Salford, United Kingdom

⁴City Hospitals Sunderland NHS Foundation Trust, United Kingdom

⁵Lancashire Teaching Hospital, Chorley, United Kingdom

⁶Poole Hospital, Dept of Diabetes, Poole, United Kingdom

⁷King's College Hospital, London, United Kingdom

⁸Diabetic Foot Clinic, Elsie Bertram Diabetes Centre, Norfolk and Norwich University Hospitals NHS Foundation Trust, Norwich, United Kingdom

⁹Department of Diabetes, University Hospitals of Leicester NHS Trust, Leicester, United Kingdom

¹⁰James Cook University Hospital, Diabetes Care Center, Middlesbrough, United Kingdom

¹¹University Hospitals of North Midlands NHS Trust, United Kingdom

¹²Salford Royal Hospital, Salford, United Kingdom

¹³University Hospital Southampton NHS Foundation Trust, Southampton, United Kingdom

¹⁴Glasgow University, Otley, United Kingdom

¹⁵King's College Hospital, Diabetic Foot Clinic, London, United Kingdom

Aim: To evaluate whether the introduction of a 12-lead ECG to assess for QTc prolongation as part of routine care for those with diabetes presenting with foot ulceration in England, and whether appropriate clinical action based on the ECG, is associated with reduced mortality. This is an interim report.

Method: New patients with diabetes and foot ulceration at 10 multidisciplinary foot services in England, undergo 12-lead ECG to assess for QTc prolongation. Males and females with QTc 431-450 and 451-470 milliseconds respectively undergo foot clinic review of medications and loosening of glycaemic control where indicated, in addition to standard foot care; those with QTc > 450 and > 470 milliseconds respectively undergo direct referral to cardiologists.

The service improvement, initiated in July 2014, interfaces with the National Diabetes Footcare Audit in England. Audit participation requires informed consent for linkage of data with primary care, hospital and Office for National Statistics datasets. Audit participants cared for in non-ECG centres, so without routine ECG, act as the control population – control numbers are approximately 5 times greater. For 80% power at $p < 0.05$, 4115 audit participants with ECGs at ECG centres are required to demonstrate reduction in 2 year mortality from 31.5% to 26.9%.

Results/Discussion: By December 2016, 1400 subjects had had ECGs at ECG centres. Prevalence of QTc prolongation was 23%, and 25% had had additional management as a result of the ECG. To increase recruitment rate, from April 2017, further centres will join. Recruitment will continue until December 2018, and mortality will be assessed in December 2020 in audit participants who have had an ECG at an ECG centre vs. those cared for at a non-ECG centre. Clinicians report that it is challenging within the foot clinic environment to both collect data for the Audit and interpret and act on the ECG. Nevertheless, all ECG centres that initiated have continued.

Conclusion: The evaluation will complete in 2021, and is adequately powered to demonstrate whether incorporation of a 12-lead ECG to assess for QTc prolongation as part of routine care within the diabetic foot clinic beneficially affects mortality in this population.

[P84] SYME AMPUTATION: A LIMB SAVING ALTERNATIVE WITH PRESERVATION OF MOBILITY IN A MIDDLE-AGED POPULATION WITH LIMITED IMPAIRED BLOODFLOW

Pieter-Jan Verfaillie¹, Sander Wuite², Sabrina Houthoofd², Giovanni Matricali³

¹Ku Leuven, Leuven, Belgium

²Uz Leuven, Leuven, Belgium

³Uz Leuven, Ku Leuven, Leuven, Belgium

Aim: Amputation is one of the severest complications in the diabetic foot, having a major impact on quality of life. In a specific group of patients, Syme amputation can be a limb saving alternative. In this study, we want to determine the outcome of the stump and the fate of the contralateral limb (CL) and identify parameters that can be predictive for the outcome of this amputation.

Method: 17 diabetic patients (age 62.47±6.50 years) that underwent a Syme amputation in the University Hospitals Leuven between 1998 and 2008 were retrospectively investigated. Clinical data, laboratory and vascular testing results and operation reports were analyzed. A successful Syme amputation was defined by a healed stump and functional usage of a prosthesis for at least 3 months.

Results/Discussion: In 8/17 patients, a successful result was achieved with a stump healing period of 53(IQR:35.50-139.50) days and a period of 80(IQR:43.00-198.00) days before measurement of prosthesis. From the other 9 patients, 8 required a secondary amputation. The other patient suffered from recurrent fistulas. For all failures, infection was a contributing factor. In the group receiving a 2-stage procedure, 5/6 required a secondary amputation within a year after Syme. Analysis revealed that the median TcpO₂-value and the presence of peripheral pulsations differ in the group with a successful procedure compared to the group without success (TcpO₂:22 vs.9.5mmHg, p=0.045 and pulsations: p=0.048). Eight patients developed wounds on the CL after amputation (3 successful Syme's). In 5 patients, this resulted in an amputation: 2 minor and 3 major amputations.

The low success rate can be partially attributed to the elderly population and impaired peripheral blood flow. The high failure rate for the 2-stage procedure can be possibly attributed to the short period between stages combined with the presence of peripheral arterial disease.

Conclusion: In half of our population, the Syme amputation was a limb saving alternative with preservation of an acceptable level of mobility. Infection and impaired peripheral blood flow appeared to be predictive for the outcome. As to be expected the CL is at risk, but only 8/17 patients developed wounds with 2 resulting in a major amputation.

[P85] GENDER DIFFERENCE IN DIABETIC FOOT ULCER

Cesare Miranda¹, Matteo Cassin¹, Riccardo Neri¹, Umberto Grandis¹, Roberto Da Ros², Giorgio Zanette¹

¹Clinic of Cardiology, Pordenone Hospital, Pordenone, Italy

²Clinic of Diabetology, Monfalcone Hospital, Monfalcone, Italy

Aim: Diabetic foot ulcer is a major cause of morbidity and mortality in the world, with much of the economic and social costs related to hospitalization and to lower extremity amputations. While racial/ethnic differences in diabetes are well documented, less attention has been given to differences in diabetic foot ulcer by gender. Aim of the study to evaluate differences between genders in diabetic foot ulcer.

Method: We have retrospectively evaluated 172 subjects with diabetic foot ulcer between January 2016 and December 2016. 99% of patients have type 2 diabetes, mean age was 73.4 ± 10.8 years (mean \pm SD), 80 (46.5%) patients were over 75 years and a long history of diabetes 18.6 ± 10.3 years was founded. We divided population in two group based on gender.

Results/Discussion: 117 (68%) patients were men. The average age was longer in women (78.1 ± 9.55 years vs 71.1 ± 10.7 years, $p < 0.001$) and 34 (61.8%) women were over 75 years. Women and men had similar diabetes duration (17.7 ± 8.0 vs. 19.0 ± 11.2 years) while women had worse metabolic control (HbA1c $7.94\% \pm 2.0$ vs $7.67\% \pm 1.4$) and higher prevalence of chronic kidney disease (47.2% vs 34.1%). Men had higher prevalence of retinopathy (41% vs 29%) and ischemic heart disease (31.6% vs 20%). No gender-difference were found in prevalence of hypertension, dyslipidemia, atrial fibrillation and BMI. Both groups presented a similar rate of peripheral neuropathy, while peripheral arterial disease was prevalent in women and need to revascularisation too (23% vs 18% , $p < 0.001$). Amputations were more common in men (20.5% vs 10.9% , $p < 0.001$).

Conclusion: Data from this study show that women with diabetic foot ulcer are more older, have a higher prevalence of peripheral arterial disease and need to revascularisation too, while confirm that risk of amputation is higher in men.

[P86] NEUROISCHEMIC DIABETIC FOOT AND RHEOPHERESIS TREATMENT - A PILOT STUDY

Pavlina Pithova¹, Lenka Vitova², Jan Pitha²

¹2nd Faculty of Medicine, Teaching Hospital Motol, Charles University, Praha 5, Czech Republic

²Clinic of Internal Medicine, Faculty Hospital Motol, Praha 5, Czech Republic

Aim: Diabetic foot syndrome is a debilitating condition that increases risk of leg amputation. In case of non-optional ischemia, we tend to find another method how to help to improve tissue viability and heal the ulceration. Rheopheresis means double plasma filtration, the high-molecular-weight particles as fibrinogen, LDL cholesterol, alpha 2 macroglobulin and IgM are removed. Improving the blood viscosity is followed by improvement of the endothelial function and better microcirculation. Unfortunately we have only low evidence about efficacy of this treatment in diabetic neuroischemic ulcerations.

Method: Three Type 2 diabetic patients (2 men 72 and 59 years old and 1 woman 48 years old), with persistent low peripheral blood pressures and tcpO₂ (even after a couple of revascularization procedures) had 7 non-healing neuroischemic ulcerations. All those patients underwent rheopheresis treatment (3 or 4 procedures according to the fibrinogen level decrease). We measured high-molecular-weight particles concentrations in plasma, ankle brachial and toe brachial indexes and tcpO₂, size of the ulceration and we also checked the level of calf muscles metabolism via ³¹MRI examination*. The measurement was provided before the treatment, 1 week and 1, 2 and 3 months after rheopheresis treatment.

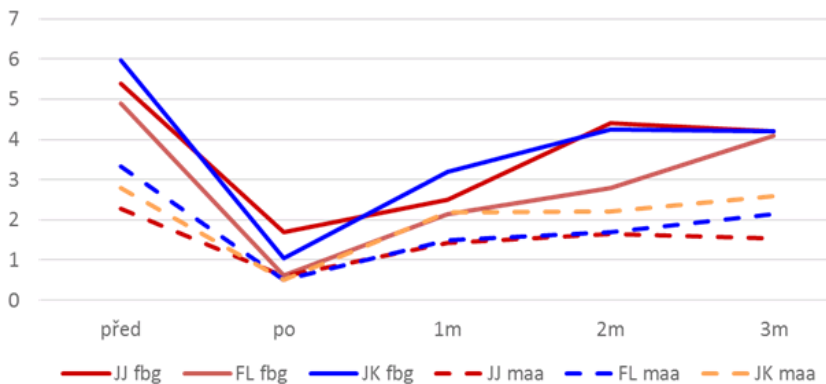
Results/Discussion: After series of rheopheresis treatment we observed significant decrease in plasmatic concentrations of LDL and HDL cholesterol particles, fibrinogen, IgM, alfa-2-macroglobulin, lipoprotein(a) and fibrinogen. Concentrations of these particles reached their pre-treatment level after 2 months. We observed significant increase of toe brachial pressures and tcpO₂ levels in 1 week, 1 month and 2 months after treatment. The metabolism of calf muscles was slightly better immediately after the rheopheresis treatment. The most important observation was the reduction in size of long-lasting non-healing ulcerations. The sum of ulcer area in all patients decreased about 80% (from 0.63 to 0.12 cm², from 1.15 to 0.33 cm² and from 2.48 to 0.52 cm²).

Conclusion: The rheopheresis treatment could be very helpful in supporting microcirculation in patients with non-optional ischemia and helps to heal previously non-healing diabetic ulcerations.

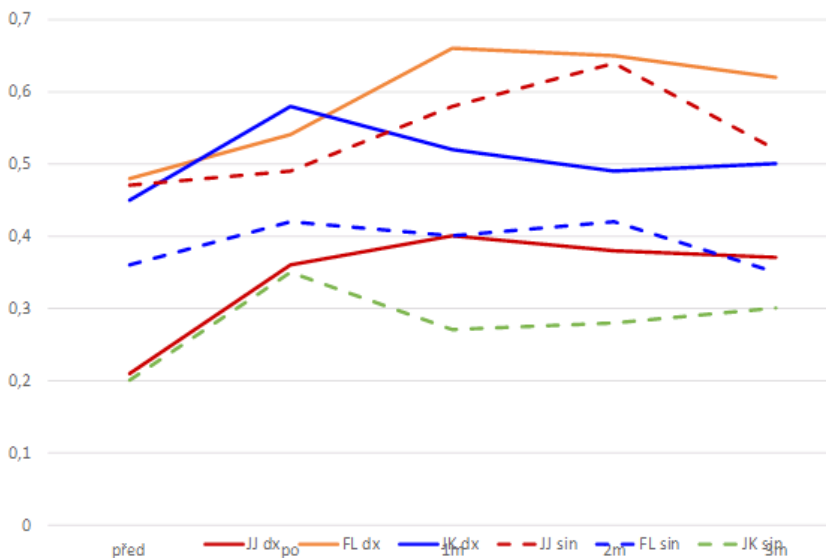
We continue, new patients entered the study recently, so we expect increase in data at the time of DFSG meeting.

*FID technic

Fibrinogen (fbg) and alfa2 macroglubulin(maa) level JJ, FL and JK are patients initials



Toe - brachial index



[P87] INVESTIGATION OF FACTORS RELATED TO ELEVATED PROTEASE ACTIVITY (EPA) IN PATIENTS WITH DIABETIC FOOT ULCERS

Fotini Lakopoulou¹, Maria Charcharidou², Georgios Vasipoulos³, Maria Kalafati⁴, Ioannis Kalemi-kerakis⁵, Eleftherios Voyatzoglou⁶, Adriana Donou⁶, Chariclia Loupa⁷

¹General Hospital of Athens "G. Gennimatas", Athens, Greece, Demetrios Voyatzoglou Diabetic Foot Clinic, A. Fleming General Hospital, Athens, Greece, Athens, Greece

²General Hospital of Athens "G. Gennimatas", Athens, Greece

³Technological Educational Institute of Athens, Greece Hellenic Wound Healing Society, Athens, Greece

⁴Nursing Department, National and Kapodistrian University of Athens, Greece, Athens, Greece

⁵Nursing Department, Technological Educational Institute of Athens, Greece, Athens, Greece

⁶Demetrios Voyatzoglou Diabetic Foot Clinic, A. Fleming General Hospital, Athens, Greece

⁷A. Fleming General Hospital, Halandri, Athens, Greece

Aim: The investigation of patients' factors which are associated with elevated protease levels in diabetic foot ulcers.

Method: Descriptive correlation approach was used in this study and the convenience sample consisted of 15 patients with diabetic foot ulcers. Data collection was conducted in two phases, upon the entry to the study and after four weeks. A database was created for the needs of the study, in which all data relating to the general condition of patients, the diabetic foot ulcer and the protease activity measurement with a specific clinical tool*, were recorded. For the statistical analyses the SPSS 22.0 program was used.

Results/Discussion: In the study population, 8 patients (53.3%) were male, and the mean age of the sample was 64.13 years ($SD \pm 12,79$). In the second study phase, the ulcer area seemed to be decreased (mean = 1,1, $SD \pm 1,83$) in comparison to the first phase. In the first study phase, the elevated Proteases activity (EPA) test showed that 6 (40%) patients had elevated protease levels, while in the second phase this number fell to 4 (26.7%). The patients' factors positively associated with elevated protease levels were female gender ($p = 0,015$), higher value in co morbidity index ($p = 0,018$), peripheral neuropathy ($p = 0,018$) and ischemia ($p = 0,022$). In the literature, the percentage of chronic diabetic ulcers with EPA was found 33-60% (Chadwick & Haycocks, 2013 and Anichini et al, 2013 respectively).

Conclusion: In our study, the protease activity measurement in patients with chronic diabetic foot ulcers, was correlated with high co morbidity index, neuropathy and ischemia. This findings may be useful, in order to choose the appropriate patients who will be benefit of the protease level test. Nevertheless, further studies involving larger patient samples are needed, in order to confirm these findings.

*WOUNDCHek™ Protease Status test

[P88] THE IMPACT OF TOPICAL PHENYTOIN LOADED NANOSTRUCTURED LIPID CARRIERS IN HEALING OF NEUROPATHIC DIABETIC FOOT ULCERATION

Mohamad Motawea¹, Amira Motawea², Abd El-Gawad Abd El-Gawad², Thanaa Borg², Manal Tarshoby¹

¹Departement of Diabetes and Endocrinology, Faculty of Medicine, Mansoura University, Mansoura, Egypt

²Department of Pharmaceutics, Faculty of Pharmacy, Mansoura University, Mansoura, Egypt

Aim: Study the impact of topical phenytoin loaded nanostructured lipid carrier (PHT-NLC) in improving wound healing in patients with neuropathic diabetic foot ulceration (NDFU).

Method: Twelve patients with NDFU under the metatarsal-heads were enrolled in this study. Patients were comparable regarding ulcer size, grade and control of diabetes with no major deformity. All patients were managed by weekly sharp debridement if indicated and offloading with cast shoes done by the same hands. They were divided into three groups: PHT-NLC-hydrogel (0.5%w/v), phenytoin (PHT) hydrogel (0.5%w/v) and blank-hydrogel groups. Wound area was assessed after 1, 4 and 8 weeks. Also, we investigated the in-vitro release of PHT and PHT-NLC-hydrogels by modified Franz diffusion cell at pH 7.4 up to 48h.

Results/Discussion: Ulcers treated with PHT-NLC-hydrogel showed complete healing in two cases and smaller wound area compared to the control groups ($p \leq 0.05$). Baseline wound area of PHT-NLC, PHT and blank-hydrogels were 3.42 ± 1.77 , 3.62 ± 1.98 and $3.87 \pm 2.39 \text{ cm}^2$, respectively. The average wound area changed to 3.19 ± 1.98 , 3.51 ± 1.75 and $3.60 \pm 1.63 \text{ cm}^2$ respectively after the first week; 0.86 ± 0.40 , 2.62 ± 1.40 and $4.07 \pm 1.65 \text{ cm}^2$ after the fourth week; 0.10 ± 0.15 , 1.69 ± 0.78 and $4.06 \pm 1.93 \text{ cm}^2$ after the eighth week respectively. Overall reduction in ulcer size was $97.48 \pm 2.61\%$ for PHT-NLC-hydrogel, in comparison to $52.29 \pm 9.18\%$ and $-9.58 \pm 14.85\%$ for PHT-hydrogel and blank-hydrogel groups respectively ($p < 0.001$) (fig 1,2,3). This may be attributed to small particle sizes of the NLC-hydrogel with subsequent large surface area, its lipoid nature (acts as a reservoir), in addition to solubility and penetration enhancement that increase the skin delivery. Also, the in-vitro release study clarified that, drug release from the NLC-hydrogel displayed a biphasic release pattern with initial burst followed by sustained release. On the contrary, in PHT-hydrogel drug release was very rapid and completed within 48h.

Conclusion: PHT-NLC-dressing is more effective than PHT-hydrogel at the same concentration in healing of NDFU. This effect may be assigned to its small particle sizes with consequent increase in its solubility, in addition to their biphasic release pattern that is recommended for topical products. These promising results encourage large scale trials for use of PHT-NLC in treatment of diabetic ulcers and other chronic wounds.

Pictures are available on poster

[P89] THE USE OF SODIC-SALT DNA FRAGMENTS IN THE PROGRESSION OF WOUND HEALING IN DIABETIC FOOT. A CASE-CONTROL STUDY

Mariagrazia Marin¹, Sasa Ninkovic¹, Christine Whisstock¹, Marino Bruseghin¹, Giovanni Boschetti¹, Marco Manzi², Mariano Palena², Michela Pinfi¹, Deborah Silvestri¹, Valentina La Rocca¹, Beatrice Macchi¹, Antonio Volpe³, Enrico Brocco⁴

¹Diabetic Foot Unit, Policlinico Abano Terme, Abano Terme, Italy

²Interventional Radiology Unit, Policlinico Abano Terme, Abano Terme, Italy

³Orthopedic Unit, Policlinico Abano Terme, Abano Terme, Italy

⁴Policlinico Abano Terme, Abano Terme, Italy

Aim: Diabetic foot syndrome is a multifactorial condition often requiring surgical intervention to heal. In this way we are able to keep the foot as longer as possible. In order to reconstruct tissues we can use various devices, such as NPWT, engineered tissues, dermal substitutes (DS). Recently a new sodic-salt DNA fragments (SSDF) preparation became available to use with the aim to exert tissues reconstructive action through cytokines production and nucleotide synthesis. In this study we aimed to evaluate the usefulness of SSDF in accelerating the healing rate of diabetic foot residual lesions.

Methods: Between January 2016 and December 2016, we enrolled 60 consecutive patients which underwent to open transmetatarsal amputation (40 pts TMA) or open rays amputation (20 pts RA). All patients underwent to the application DS. When DS was completely integrated to patient's tissues, every patient of each group (TMA and RA) was alternatively allocated or to the treatment group (Group S: 20 TMA, 10 RA) or to the control one (Group C: 20 TMA, 10 RA). S treatment implied disinfection with antiseptic solution and the application of SSDF cream three times a week and sterile gauzes dressing for 4 weeks. C treatment was the same, apart from SSDF cream. All patients wore medical shoes. We evaluated the effects of SSDF application on lesions' healing rate and healing time and 1 (T1) and 4 (T4) weeks reduction rate of the lesions' area (cm²).

Results: 3/30 (10%) of the S and 7/30 (23,3%) of the C did not heal. The healing time (wks) was significantly lower in S than in C (5,74±1,16vs8,22±2,92; Mann-Whitney, p=0,001). T0 areas were not different between the 2 groups (S23,59±5,03vsC22,50±4,94). T1 areas were not different between the 2 groups vs T0 (S 15,82±4,06vsC 15,39 ±5,40; t-paired test NS). T4 areas were statistically significantly different between the 2 groups S4,06±2,62vsC5,67±3,50; t-paired test p<0,005).

Conclusions: This study highlighted a significantly lower healing time in patients treated with SSDF and a lower residual lesions'area after 4 weeks-treatment respect to the controls. SSDF could be considered a new adjuvant-therapy in the treatment of diabetic foot lesions.

[P90] LOCAL APPLICATION OF HUMAN MESENCHYMAL STROMAL CELLS ACCELERATED WOUND HEALING IN DIABETIC PORCINE MODEL

Robert Bem¹, Michal Dubsky¹, Zuzana Kočíř², Andrea Němcová¹, Vladimíra Fejfarová¹, Anna Pysna¹, Zuzana Simunkova³, Iveta Mrazova³, Šárka Kubínová³

¹Diabetes Centre, Institute for Clinical and Experimental Medicine, Prague, Czech Republic

²Department of Biomaterials and Biophysical Methods, Institute of Experimental Medicine, Academy of Science, Department of Neuroscience, 2nd Faculty of Medicine, Charles University, Prague, Czech Republic

³Centre of Experimental Medicine, Institute for Clinical and Experimental Medicine, Prague, Czech Republic

Aim: Unfavourable healing of diabetic foot ulcers could be improved by local application of cell therapy, but the hope has not been fulfilled yet. The aim of our study was to compare the process of wound healing in diabetic porcine model treated with local application of human mesenchymal stromal cells derived from bone marrow or adipose tissue.

Method: Diabetes in six pigs was induced by a single intravenous injection of streptozotocin 150 mg/kg bw and confirmed by a blood glucose level higher than 15 mmol/l. Each animal was wounded by 21 full-thickness skin excisions in the back area one month after the induction of diabetes. Immediately after wounding, the suspension of human cells as injected in triplets into the base of the wounds. There were seven therapeutic eventualities: 4 ml of bone marrow mononuclear cells; 4 million of bone marrow mesenchymal stromal cells or 4 million of adipose tissue mesenchymal stromal cells; each time from diabetic and nondiabetic donors. The seventh triplet of wounds has been assessed as controls. Wounds were covered by silicone dressing and all animals were treated by insulin and immunosuppression. Photographs and measurements of the wound has been taken for the assessment of the effect of cell therapy on wound healing after 7, 14, 21 and 28 days of the appropriate therapy.

Results/Discussion: The sizes of the wounds before treatment were comparable in all groups. After 7, 14, 21 and 28 days, there was a significant reduction of wound size in all groups, including controls ($p < 0.01$). After 14 days, a significant acceleration of healing in all cells groups in comparison with the controls was seen (all $p < 0.05$); there was no significant difference between individual cell groups. Only 50 % of control wounds were healed after 28 days, in contrast to cell treated wounds, where 75- 87.5 % of wounds were healed.

Conclusion: In our experiment, the local application of human multipotent cells derived from bone marrow and adipose tissue accelerated wound healing in diabetic porcine model. Topical cell therapy could be a promising treatment for non-healing wounds in patients with diabetic foot ulcers.

[P91] IMMUNOLOGICAL PERSPECTIVES OF LEUCOPATCH TREATMENT OF DIABETIC FOOT ULCERS

Rasmus Lundquist¹, Jonas Damgård Schmidt¹

¹Reaplix Aps, Birkerød, Denmark

Aim: Diabetic foot ulcers (DFU) remain a challenging task in the clinic. These chronic wounds often have high bacterial load but conversely leukocyte recruitment is impaired. Recent data demonstrates that induction of acute wound healing through interleukin-1 beta (IL-1 β) signalling restores chemotaxis and engage wounds onto the trajectory of healing.

To investigate the mode-of-action of an autologous blood-derived platelet- and leukocyte rich fibrin-patch*, used and tested for DFU, the present study investigates its immunological response to stimuli relevant for its clinical use.

Method: The company** has devised a medical device that provide the means of preparing an autologous blood-derived platelet- and leukocyte rich fibrin-patch*. The leukocyte rich fibrin-patch* is created without additives by drawing peripheral blood into a vacuum containing device at the patient bedside.

The leukocyte rich fibrin-patch* was formed from 3 donors by the 20 min centrifugation, coagulation and compaction process***, ****. The resulting three-layered patch containing fibrin, platelets and living leukocytes, was cultivated *in-vitro* over the course of 48 hours in RPMI-1640 medium or treated with; LPS (10 ng/ml), IL-4 (40 ng/ml) and IL-13 (20 ng/ml) or Chronic Wound Fluid (CWF 2%). Culture supernatants were analysed for 1000 soluble analytes using kiloplex array*****. Dehydrated human amnion/chorion membrane (dHACM)***** was included as a control wound care product.

Results: 818 analytes were detected in the leukocyte rich fibrin-patch* while 335 were detected in dHACM. Further analysis found that the leukocyte rich fibrin-patch* produced 659 analytes (>2-fold threshold) over dHACM. Evaluating these cytokines using the Gene Ontology (GO) consortium we found acute inflammatory response, regulation of cell proliferation and positive regulation of cell communication to be overrepresented. Whereas dHACM released 58 analytes >2-fold over the leukocyte rich fibrin-patch* associated with multicellular organismal process, extracellular structure organization and regulation of locomotion.

Furthermore, we find that CWF induce production of 129 analytes with *STAT3 signalling* and *T cell co-stimulation* induced when compared to the untreated leukocyte rich fibrin-patch* control.

Conclusion: Results suggest that the leukocyte rich fibrin-patch*, beside cells and growth factors, provide immunological signals involved in acute wound healing and that the leukocyte rich fibrin-patch* adapts to its environment. Interestingly STAT3 signalling may provide the transition from pro-inflammatory responses to the anti-inflammatory wound healing status.

*LeucoPatch

**Reaplix

***3CP

****as described by Reaplix

*****RaybioTech

*****Epifix

[P92] THE RELATION BETWEEN (DAY-TO-DAY CHANGES IN) LEFT-TO-RIGHT DIFFERENCES IN CUMULATIVE PLANTAR TISSUE STRESS AND PLANTAR FOOT TEMPERATURE AT HIGH-RISK LOCATIONS IN DIABETES PATIENTS

Wouter aan de Stegge¹

¹Academical Medical Center, Department of Rehabilitation, University of Amsterdam, Amsterdam, The Netherlands

Background: Home-monitoring of skin temperature can be used to detect early signs of inflammation, that acts as a precursor to ulceration, and supposedly occurs as a result of repetitive stress on the foot while ambulant. However, the evidence to support this biomechanical mechanism of temperature increase and inflammation is meagre.

Aim: To investigate the association between (day-to-day changes in) left-to-right differences in cumulative plantar tissue stress and plantar foot temperature at high-risk locations in diabetes patients.

Method: Thirteen patients with recent ulcer history participating in a trial on efficacy of home-monitoring of plantar foot temperature had their barefoot and in-shoe plantar pressures measured. Daily walking activity and footwear adherence were measured over 7 consecutive days, while on the same days, the patient measured skin temperature at the hallux, first, third, and fifth metatarsal head of both feet in the early morning with an infrared thermometer. The difference in cumulative plantar tissue stress (CPTS = (in-shoe PTI x adherence)+(barefoot PTI x (1-adherence)) x stride count) between left and right foot was calculated per region. Per patient and region, correlation coefficients for left-to-right difference in CPTS (dCPTS) and difference in skin temperature (dT) were calculated.

Results: Correlation coefficients between dCPTS and dT varied from -0.850 to 0.689 across regions and patients, with an overall correlation of -0.005. From the total 52 calculated coefficients, only 3 were >0.6, and none were significant. The correlation between mean dCPTS and mean dT for the hallux was 0.617 ($p=0.033$), and varied from -0.450 to 0.233 for the other regions. In only 2 patients a dT of 2.2°C was measured on 2 consecutive days.

Conclusion: Based on the results of this explorative analysis, that included a comprehensive biomechanical method to determine the total load on the foot, the data seem to suggest that left-to-right difference in cumulative plantar tissue stress, and changes thereof over time, are mimicked by left-to-right differences in plantar foot temperature and changes thereof over time. Several methodological limitations prevented us from drawing strong conclusions on this matter, and more detailed studies with longer follow-up and multiple temperature assessments per day are therefore needed.

[P93] TARSALE TUNNEL SPARING INCISION - FOR THE FOOT SALVAGE SURGERY IN THE COMPLICATED DIABETIC FOOT AND ANKLE INFECTIONS

Senthil Govindan¹, Vijay Viswanathan¹, Anitha Rani¹

¹M V Hospital for Diabetes, Chennai, India

Aim: The aim of this study was to prevent the below knee amputation by using 'Tarsal tunnel sparing incision' in the complicated diabetic foot and ankle infections and also to reduce the risk of posterior tibial vessels/nerve injury and the ankle joint exposure caused by the conventional incisions.

Method: A total of 25 Type 2 diabetes patients with foot and ankle infection visiting the tertiary care unit (Podiatry Department) were recruited in the study. Patients with diabetic foot and ankle infection of moderate to severe category according to International Working Group on Diabetic Foot (IWGDF) were included in the study. Likewise patients with mild to moderate category and limited to the foot were excluded from the study.

Results/Discussion: 'Tarsal tunnel sparing incision' technique stops the plantar incision distal to heel and continues behind the medial malleolus above the ankle, sparing the tarsal tunnel. Removal of the pus and retrieval of the infected tendons were effectively achieved using this technique. All the patients underwent this procedure were recovered from the infection within a week and the mean healing duration was 6.5 ± 0.5 weeks. This incision gives an adequate exposure for the removal of the pus and infected FHL /FDL tendons which act as 'pus highways' spreading infection from the foot to the ankle and the leg. In some complicated diabetic foot and ankle infections, 'Loeffler Ballard incision' and its modifications incision pose the risk of posterior tibial vessels/nerve injury and also the possible exposure of the ankle joint and instability. There is a paucity of literature stating the complications due to conventional incision technique, which lacks the comparison with the current technique. However Tarsal tunnel sparing incision avoids the meticulous dissection at the ankle region where the tibial vessels and nerve were tightly packed at the tarsal tunnel.

Conclusion: The Tarsal tunnel sparing incision technique prevents the progression of infection and major amputation among Type 2 diabetes subjects with complicated foot and ankle infections.

[P94] EFFECTS OF DIFFERENT TYPES OF LOCAL TREATMENT OF FOOT ULCERS IN DIBETIC PATIENTS IN COMPARISON TO STANDARD MANAGEMENT

Ekaterina Zaitseva¹, Alla Tokmakova¹, Ludmila Doronina¹, Gagik Galstyan²

¹Diabetic Foot Department, Endocrinology Research Centre, Moscow, Russian Federation

²Endocrinology Research Centre, Moscow, Russian Federation

Aim: To estimate clinical effects of NPWT and collagen dressings in comparison to standard management of diabetic foot ulcers (DFUs).

Method: Clinical examination, tcpO₂ before and after local treatment.

Results/Discussion: 63 patients were enrolled (42men; 21women) with DFUs after surgical debridement and divided into 3 groups. Group 1 (n=21) was treated with NPWT (-90-120mmHg), group 2 (n=21) we used collagen dressings and group 3 (n=21) was treated with atraumatic dressings for 9±2days. Group 1 and group 2 were not compared due to different mechanisms of treatment.

The groups matched by DM type, age (group 1 60[52;64], group 2 55[50;66] group 3 60[57;72] years), HbA1c in group1-8.8[7.4;10.6]%, in group 2 -8.3[7.8;9.5]%, in group 3-8.8[7.6;9.7]%, severity of microvascular complications, form of diabetic foot (neuropathic-33,neuroischemic-30(after revascularization)), wound size (group1-25,0[16,2;44,5]cm², group2- 18.6[15.3;22.8]cm², group 3 - 23.5[12.3;55.3]cm²), wound depth (group1-3,3[1,5;6,5]cm, group2- 2.8[2.2;3.2]cm, group 3 - 3.2[2.4;5.2]cm), tcpO₂(group1 - 46[38;52]mmHg; group2- 47[41;51]mmHg, group 3 - 43[38;47]mmHg), p>0.05.

In follow-up period wound size decreased more in group 2 – in 26,4 (p<0.05); in 19,8% in group 1 (p>0.05) , in 17,0% in group 3 (p>0.05) .

The depth decreased more significantly in group 1 - in 42,8% (p<0.05), in group2 – in 30,4% (p>0.05), in group 3 – in 16,6%(p>0.05).

TcpO₂ increased more significantly in group 1 52[48;58] mmHg(p<0.05), in group 2 48[45;53] mmHg (p<0.05), in group 3 - 39[32;47] mmHg (p<0.05) after treatment.

Conclusion: According to results NPWT more effectively decreases wound depth and increases tcpO₂ and collagen dressings more effectively decrease wound size in comparison to standard care in DFUs treatment.

[P95] NON-SUTURE TECHNIQUE UTILIZING NEGATIVE PRESSURE WOUND THERAPY FOR ISCHEMIC FOOT

Shinobu Ayabe¹

¹Yao Tokushukai General Hospital Wound Care Center, Osaka, Japan

Aim: In minor amputation surgery, stumps are usually closed with sutures such as vertical mattress. In the ischemic foot, however, wound dehiscence and necrosis of wound edges are sometimes observed. This can be caused by poor blood flow due to tension of suturing. Therefore, a bony stump has to be sufficiently shortened for tension free suturing. It results in a decreased weight-bearing area and leads to gait instability. To avoid this undesirable result, we performed non-suture technique utilizing negative pressure wound therapy (NPWT) for the ischemic foot.

Method: The incision planning for debridement was designed based on the assumption that the defect would be closed by fillet flaps. The bony stump was resected to allow adequate soft tissue closure. The wounds were left open and alginate dressings were applied for hemostasis. On post-operative day one, the wounds were treated with NPWT. Fillet flaps were gradually advanced by NPWT, and complete wound closure was achieved.

Results/Discussion: 20 patients underwent this non-suture technique for wound closure. All wounds healed successfully without utilizing skin grafts and there were no complications.

Conclusion: Minor amputation wound closure is generally achieved using sutures. In order to avoid wound dehiscence or necrosis of wound edges in the ischemic foot, bony stumps must be sufficiently shortened for tension free suturing. To completely reapproximate wounds with suture technique the residual foot length may be compromised. This may lead to gait instability. On the other hand, skin grafting is usually performed after NPWT, but skin grafts tend to be weaker in resisting friction and load in comparison to skin flaps. Non-suture technique utilizing NPWT is considered a practical and appropriate measure. In comparison to direct closure, the non-suture technique maximizes the weight-bearing area and maintains the foot length more. This technique also creates a more resistant amputation site than the skin graft technique making it more advantageous in gait stability. This technique was found to be convenient and safe, but a prospective comparative study is needed to confirm the usefulness in ischemic foot.

[P96] A CALCIUM SULPHATE/HYDROXYAPATITE BONE GRAFT SUBSTITUTE ELUTING GENTAMICIN IN THE TREATMENT OF DIABETIC FOOT OSTEOMYELITIS: A MID-TERM FOLLOW-UP

Christine Whisstock¹, Mariagrazia Marin¹, Marino Bruseghin¹, Sasa Ninkovic¹, Giovanni Boschetti¹, Antonio Volpe², Enrico Brocco¹

¹Diabetic Foot Unit, Policlinico Abano Terme, Abano Terme, Italy

²Foot and Ankle Clinic, Policlinico Abano Terme, Italy

Aim: Since July 2013 our group has been using an antibiotic bone substitute, composed of calcium sulphate, hydroxyapatite and gentamicin sulphate (CSH + HA + GS), in the treatment of osteomyelitis (OM) in diabetic foot. The aim of this work was to evaluate the mid-term efficacy of this treatment regime on outcomes. A favorable outcome in diabetic foot includes no recurrence of OM, healed soft tissues and the ability to weight-bear.

Method: In this study we reviewed patients treated from July 2013 to December 2016, in which we used CSH + HA + GS to treat OM of the forefoot, midfoot and hindfoot, and evaluated how many patients are able to walk and fully weight-bear at present. We identified 11 pts treated during this time period; 1 with bilateral 1st metatarsal-head OM due to plantar ulcers, 5 with midfoot OM secondary to Charcot deformities and ulcers, 5 with hindfoot OM due to pressure ulcers or Charcot deformity. We continuously monitored the patients for recurrence of OM, ulcers and soft tissue inflammation in our outpatient department.

Results/Discussion: Of the 11 patients, two died during follow up (both patients had calcaneal ulcers; one died in the 1st month and one in the 2nd month after treatment, both due to cardiovascular disease). For the remaining nine patients, we had an average of 25 (17–33) months follow-up. One patient did not heal, presenting with a persistent mid-foot lesion in a Charcot foot. Another patient with bilateral forefoot ulcers had a plantar ulcer recurrence under the left 1st metatarsal foot, 19 months after bone substitute application and primary healing. This patient is still weight-bearing on the right foot, as are the remaining 7 patients. In 8 patients (1 with bilateral forefoot, 4 with mid-foot and 3 with hindfoot OM) no recurrence of OM or ulcers was observed.

Conclusion: This study suggests that a CSH + HA + GS bone substitute can be used to treat diabetic foot OM. Our mid-term results show good clinical outcomes in terms of ulcer healing, no recurrence of OM and weight-bearing.

[P97] RECONSTRUCTIVE SURGERY IN PATIENTS WITH INFECTIOUS COMPLICATIONS OF NEUROPATHIC DIABETIC FOOT

Vladimir Obolenskiy¹

¹City Hospital #13, Rnrmu, Moscow, Russian Federation

Aim: To improve the quality of life of patients with infectious complications of diabetic foot syndrome.

Method: 104 patients with infectious complications of neuropathic diabetic foot (2012-2015) with follow-up > 1 year.

1) When treating neuropathic ulcers caused by deformation of the forefoot (10 patients), we used extrafocal corrective mini-osteotomy (ECM) of the metatarsal bones ± finger flexor tenotomy against the backdrop of the one-off antimicrobial therapy (AMT).

2) Where the metatarsal bones and metatarsophalangeal joints break down (37 patients) we combined the one-off AMT with resection of the affected bones and subsequently filled the defect with antibiotic impregnated collagen sponge (AICS).

In case of Charcot foot after resection of the affected bones and excision of the infected soft tissues against the backdrop of AICS therapy:

3) forefoot – the limb was immobilized with appropriate dressings (14 patients); 7 days AMT;

4) midfoot – foot stabilized with compression screws (37 patients); 7 days AMT;

5) hindfoot – extrafocal corrective osteosynthesis using Ilizarov technique (6 patients); 21 days AMT.

Results/Discussion: The observation period ranged 15-58 months. In groups 1-3 there were no complications and recurrences. Five patients in group 4 had septic instability of the screws in terms 1-5 months - the screws were removed without loss of the foot correction. Only one patient in connection with the complications produced by amputation at the Shin level. The remaining 103 patients had no amputations, even at the level of the toe.

Conclusion: The presence of infectious complications of the diabetic foot syndrome is not a contraindication for carrying out reconstructive plastic surgery, including a fusion.

[P98] DOMICILIARY DELIVERY OF NEGATIVE PRESSURE WOUND THERAPY (NPWT) IN DIABETIC FOOT PATIENTS AFTER SURGICAL PROCEDURES COMPARED WITH IN-HOSPITAL MANAGEMENT: RESULTS OF ONE YEAR OF FOLLOW UP

Chiara Goretti¹, Alberto Coppelli¹, Laura Marinsalda¹, Riccardo Mazzanti¹, Marilena Petitto¹, Elena Ciampa¹, Lorenza Abbruzzese¹, Elisabetta Iacopi¹, Alberto Piaggese¹

¹Diabetic Foot Section, Medicine Department, Pisa University Hospital, Pisa, Italy

Aim: To evaluate costs and resource utilization of a domiciliary service of NPWT placement for diabetic foot ulcers (DFU) managed by visiting nurses (VN) of National Health Service.

Method: We retrospectively analyzed the databases of a local Health Authority Service and of the University Hospital in which all the DFU cases of the area are admitted for surgical procedures, for the year 2015. All the patients to which NPWT was prescribed during admission and to which it was then applied and managed by VNs at their home were traced and healing rates (HR) and times (HT), number of days of NPWT, costs and days of in-hospital stay were sorted out and compared to those of 2012, when the service was not active.

Results: 52 DFUs patients among those admitted in 2015 were managed for NPWT by VNs. Their HR (87.5%) and HT (143.6 ± 38.2 days) didn't significantly differ from controls, while the length of NPWT was considerably shorter (14.1 ± 5.4 vs 20.7 ± 11.3 days, $p < 0.01$). The costs, calculated as number of days of therapy and days of in-hospital stay were significantly decreased in 2015, when normalized for the number of patients and days of NPWT (31.2 € vs 450 € per day of therapy, respectively, $p < 0.001$).

Conclusion: The implementation of a domiciliary service for the delivering of NPWT to DFU patients after surgical intervention proved not only to be as safe and effective than the in-hospital management, but also was associated to a significant reduction of costs and resource utilization.

[P99] SEQUESTRECTOMY ROLE IN DIABETIC FOOT TREATMENT

Sokol Hasho¹, Eni Celo²

¹Shefqet Ndroqi University Hospital, Tirana, Albania

² Endocrinology, Mother Theresa University Hospital, Tirana, Albania

Aim: To evaluate the role of sequestrectomy as a better solution compared to long term conservative treatment in diabetic patients.

Method: We performed 52 consecutive sequestrectomies in 51 diabetic patients with bone involvement demonstrate by a positive probe to bone and a positive rx. For each patient the part of bone resected resulted with abnormal consistence and was collected in a sample. In our study there were 80% males and 20% females. Mean age was 70 ± 10 years old. Mean HbA1c values $8.2 \pm 2.4\%$.

Results/Discussion: In our study 37 patients (72%) resulted with peripheral vascular disease, while 15 patients (28%) had no arterial problems. In the hystological examination 48/52 patients (92%) resulted positive for osteomyelitis (presented acute inflammation, micro-abscesses, necrosis of trabecolae). In 4/52 patients (8%) resulted absence of osteomyelitis (presence of fibro productive process without infection). There were isolated a total of 54 strains. Among them 10 alert pathogens were identified (1 MRSA, 2 MRSCN, 1 *Escherichia coli* ESBL, 1 *Klebsiella pneumoniae* ESBL, 1 *Pseudomonas aeruginosa* ESBL, 2 VRE, 1 *Acinetobacter lwofii* MDR and 1 *Acinetobacter calcoaceticus-baumannii complex* MDR). Twenty-two patients presented complete healing of the wound with a mean healing time of 85 ± 48 days. Antibiotic therapy was given orally for a mean duration of 22 ± 9 days. No relapse of wounds or osteomyelitis was observed at the site of previous lesions in the follow up of 6 months.

Conclusion: Limited removal of infected bone is associated with a high percentage of success in healing osteomielitis with a very low relapse rate.

[P100] EXTERNAL FIXATION TYPES AND THEIR SUITABILITY FOR VARIOUS DIABETIC FOOT RECONSTRUCTION OPERATIONS

Kamil Navratil¹, Michal Dubsky², Veronika Woskova², Robert Bem²

¹Transplant Surgery Clinic, Institute for Clinical and Experimental Medicine, Prague, Czech Republic

²Diabetes Centre, Institute for Clinical and Experimental Medicine, Prague, Czech Republic

Aim: To find useful modifications of “Δ-frame” external fixator (EF) used for stabilization and surgical offloading after reconstructive surgery for diabetic foot (DF) and Charcot neuroosteoarthropathy (CN) suitable in case of partial foot ischemia or major patient discomfort.

Method: A tube-to-bar EF* was used in three variants: standard Δ-frame (Bonell pins with a central thread were passed through the metatarsal heads, then into the calcaneus and tibia and stabilized by double framed rods), hybrid frame (the same placement in tibia and calcaneus, but one or two semicircles with crossed tarso-metatarsal K-wire fixation), used in case of partial ischemia and unilateral frame (Schantz half-pins used instead of full-pins, with lateral rods) in cases of discomfort from metallic-part traumatization. Sixteen diabetic patients (11 men, 5 women), mean age 58 (40-76) years were included into the study and observed prospectively within years 2014-2016 (follow-up 2-36 months). Twelve patients were diagnosed by CN, other types of DF in 4 cases. Δ-frame was used in 6, hybrid EF in 7 and unilateral EF in 3 cases. Repeated hospitalisations, major complications – pin-tract infection (PTI), osteomyelitis recurrence (OM), non-union rate, hardware failures and EF adjustment episodes were tracked in all EF groups.

Results/Discussion: No major amputation was performed, we observed only one re-hospitalisation for severe osteomyelitis without need to disassemble EF. Overall PTI rate was 44% (80% around crural pins), in one case (hybrid group) a premature EF removal was needed. Two non-union cases underwent further fixation (1 from Δ-frame and 1 from hybrid group). No serious hardware failure occurred, 8 patients needed outpatient EF adjustments.

Conclusion: Despite the size of the group our results showed that there are no differences in complications between EF types, so all of them might be safely used. Hybrid EF lowers the risk of blood vessels traumatization due to thinner diameter of the pins. The main advantage of unilateral EF is decreased traumatization of the surrounding skin by sharp edges, but this technique does not tolerate higher loads because of high risk of pin breaking, therefore it should not be applied in patients with higher BMI.

*ProSpon, Medin, CZ

[P101] ARTHROPLASTY WITH EXTERNAL FIXATION AS A BETTER OPTION THAN ARTHROPLASTY WITHOUT FIXATION TO PREVENT LONG-TERM COMPLICATIONS IN PATIENTS AFFECTED BY OSTEOMYELITIS

Ana Pilar Ortiz Fernández¹, José Luis Lázaro Martínez², Yolanda García Álvarez², Irene Sanz³, Fernando Sánchez-Lancha López¹, Francisco Javier Alvaro Afonso³

¹Diabetic Foot Unit, Complutense University Clinic, Madrid, Spain

²Diabetic Foot Unit, Complutense University Madrid, Madrid, Spain

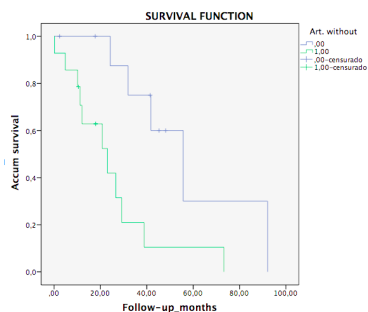
³Diabetic Foot Unit, Complutense University of Madrid, Instituto de Investigación Sanitaria del Hospital Clínico San Carlos, Madrid, Spain

Aim: To analyse long-term complications in patients with Diabetic Foot Osteomyelitis (DFO) who underwent first metatarsal joint arthroplasty with and without external fixation.

Method: This is a retrospective observational study included 14 patients suffering DFO located beneath the first metatarsal head who met surgical indication for the treatment of bone infection. Patients who are not healed after surgical procedure were excluded for the follow-up. The patients were selected consecutively to the analysis and divided in two groups according to the surgical technique. Group A: patients underwent arthroplasty with external fixation (K-wire), and Group B: patients underwent arthroplasty without any fixation.

We follow up patients after wounds complete healing and we recorded any new ulcer in the same location of primary lesion (recurrence) or an ulcer in any other location on the feet (reulceration). Statistical analysis was conducted using SPSS for Macintosh, version 20.0*. Survival analysis was done by Kaplan-Meier's test between both surgical techniques. *P value* < 0.05 was accepted as statistically significance with IC of 95%.

Results/Discussion: Ten patients (41.7%) were included in group A, and 14 patients (58.3%) in group B. Mean time follow-up was 23,6 months (Interquartile Range:11.4-41.7). Patients group A developed 1 (10%) recurrence and 6 (60%) reulceration and 5 (33.7%) recurrence 6 (42.6%) in group B. Patients in Group B had higher risk of complication in the long-term outcomes (*p* 0.012), IC [0.067-0.712] (figure 1) than patients in Group A. Furthermore, Group B patients needed undergoing higher number of revision surgeries as a consequence of the complications of surgical procedure (*p* 0.031) IC [0.112-0.991].



Conclusion: First metatarsal joint arthroplasty with external fixation showed lower number of complications in a long-term follow up than arthroplasty without fixation in patients with DFO beneath first metatarsal head.

*SPSS, Inc. Chicago, IL

[P102] THE MDT APPROACH TO THE DIABETIC ANKLE FRACTURE: THE IMPORTANCE OF TARGETING GLYCAEMIC CONTROL POST SURGERY

Firas Raheman¹, Raju Ahluwalia¹, Alex Vris¹, Venu Kavarthapu²

¹ Department of Trauma and Orthopaedics, Kings College Hospital NHS Foundation Trust, London, United Kingdom

² King's College Hospital, London Bridge Hospital, London, United Kingdom

Aim: Prospective study comparing the complication rates for acutely ankle fractures in diabetics with non-diabetic patients treated by all surgeons in our unit and assessing factors for success.

Method: Patient data was cross-referenced with theatre and departmental databases. Prevalence of diabetic foot ankle fractures was 12.5%. Fractures classified into unimalleolar, bi malleolar and trimalleolar and fixation assessed into standard or long segment/multi-column fixation. The HB1Ac assessed diabetic control.

Patients underwent surgical management were subjected to a retrospective review and assessment of their follow up for minimum 6 months. Radiographs were assessed of the ankle before, during, and at completion of treatment were reviewed independently.

Relative Risk was calculated between normal, diabetic sensate and non-sensate populations and whom underwent standard or long segment/multi-column fixation.

Results/Discussion: Between Jan 2014 to Dec 2016 147 patients identified; 33 patients had operative treatment. 6-tri-malleolar-fracture, 20-bi-malleolar fractures and 7-unimalleolar fractures with the average length of stay as 13 days (13-86), average age of 61 (13- 86). Average HBA1c was 7.64; rose to 8.07 at 6 months post index injury. If neuropathy found at presentation HB1ac was 8.48.

Raised HBA1c was associated with 61.5% of all complications, 77.8% non-unions, 100% wound complications and all those whom developed charcot neuroarthropathy. Hb1Ac was highest in patients with wound breakdown (9.81); non-union (8.34) and development of CN.

Complication rate in non-diabetic patients was 12.5% compared to 39.4% in diabetics. Relative Risk of a complication was 3.15 (P<0.03), risk increased with neuropathy (RR 5.8; p<0.003), and HBA1c>7 4.6 (p<0.0004). Combination of neuropathy and raised HBA1c increased relative risk to 6.22 (P<0.0003)

Individual analysis of 13 patients who underwent Rigid Multicolumn stabilisation with immobilization sand cautious bracing up to 6-months reduced the relative risk of complications to 0.65 or by 160%.

Conclusion: We believe that one of the most significant factors in predicting a complication after operative fixation of ankle fractures is the HBA1C, and/or the presence of neuropathy. Thus tight glucose control as part of the multi-disciplinary management could improve outcomes, as does the shift to long segment/multi-column fixation.

Sponsor and exhibitor information



Sorbact® Right from the Start - Prevents and Treats wound infections.
Visit ABIGO Medical - booth 13!

ABIGO Medical AB

Mr Björn Larsson
Tel.: +46 31 748 49 50
info@abigo.com
www.abigo.com



an Essily company

THERAPIES. HAND IN HAND.

BSN Medical GmbH

Olaf Wohlberedt-Menzel
Tel.: +49 40 4909 4617
Olaf.Wohlberedt-Menzel@bsnmedical.com
www.bsnmedical.com

BSN medical is a global leader in the worldwide healthcare market specialising in the areas of Compression Therapy, Wound Care and Orthopaedics. We are focused on the development of world-class branded products that offer high quality solutions for our caregivers and patients.

BSN medical connects its broad portfolio with strong technological competencies to meet the market's need for reduced complexity and more efficient treatments. With integrated therapy solutions, eg. for Venous Leg Ulcers or Diabetic Foot Ulcers, BSN medical consistently supports a continuum of care. Welcome to Therapies. Hand in Hand. Welcome to Integrated Therapy Solutions.



DARCO (Europe) GmbH

Tel.: +49 887 922 80
www.darco.de
info@darco.de

DARCO is dedicated to being one of the leading providers of post op, trauma and wound care solutions to the global foot and ankle community.



DEKA

Mauro Galli
Tel.: +39 055 8826807
info@dekalaser.com
www.dekalaser.com

A spin-off of the El.En. Group, DEKA is a world leader in the design and manufacture of lasers and light sources for medical applications in more than 80 countries. Excellence is the hallmark of the DEKA's experience and recognition garnered in the sphere of R&D in over 30 years of activity. Quality, innovation and technological excellence place DEKA and its products in a unique and distinguished position in the global arena.



DM Systems' Heelift

Tel.: +1 847 328 9540
info@dmsystems.com
www.heelift.com

Avoid amputation, heal chronic wounds & prevent heel pressure ulcers. See published clinical evidence, request a sample. The Heelift® Suspension Boot.



Edixomed Limited

Martine Morris – Business Manager
Tel. +44 (0) 20 7493 4546
martinemorris@edixomed.com
www.edixomed.com

At Edixomed, we aim to provide patients and healthcare professionals with a revolutionary nitric oxide (NO) generating treatment, that improves clinical outcomes, prevents infection and reduces the economic burden on healthcare resources. Our NO technology delivers exogenous NO, harnessing the body's antimicrobial, healing and inflammatory mechanisms, mimicking the body's natural physiological processes. This has many beneficial applications in wound care, dermatology, critical care, respiratory and transdermal drug delivery. Our first randomised controlled study, in 148 diabetic foot ulcers with infection allowed at baseline, has demonstrated the improved clinical efficacy of our NO technology compared to standard of care wound dressings.



Humana Medical

Binotto Radames
Tel. +39 328 2364233
info@humanamedical.it
www.humanamedical.it

Humana Medical srl is a start up Italian company, with the cooperation from University and Italian company we have develop a products named Sanaryn in Spray and Cream version. The Kproducts are to be considered unique since their formulation is protected by exclusive patent. The aforementioned products are made with micro-fractions based on high purity DNA-NA; have a regenerative action on all tissues since it acts positively by re-balancing and regulating the growth of the granulation tissue, increasing the production of collagen and fibronectin, generating tissue scarring physiologically, thus preventing chelloids. Sanaryn is indicated for diabetic lesions burns, radiotherapy injuries and traumatic, ulcerative lesions



ISDF 2019

Natasja van Schaik
Tel.: +31 (0)88 089 81 01
diabeticfoot@congressbydesign.com
www.congressbydesign.com

8th International Symposium on the Diabetic Foot | 22-25 May, 2019 | World Forum, The Hague, The Netherlands
The Diabetic Foot Symposium, held once every four years, is the largest and most prestigious meeting devoted to lower extremity problems in diabetes. It has accomplished this unique position by bringing together delegates from many specialties and the leading experts in various fields, both from all over the world. Participating in this event will give you the unique opportunity to communicate with the experts-in-the field.



Klaveness Footwear

Tony Norrby
Tel.: +46 72 741 48 81
tony.norrby@klaveness.se
www.klaveness.se

Klaveness Footwear was founded in 1957 by Dagfinn Klaveness. Klaveness Footwear produces and sells a wide variety of footwear. Our product categories are as follows:
Casual footwear · Medical footwear/rehab footwear · Individual footwear made to measure · Customized orthotics



LEA Medizintechnik GmbH

Thomas Derfuss
Tel.: +49 (0)641 96988 0
derfuss@LEA.de
www.lea.de

LEA Medizintechnik is a German company, located in Giessen. We develop and produce our medical diagnostic devices, which are based on non-invasive optical technology. The LEA devices family called O2C (oxygen to see) is established in the fields of angiology, vascular surgery, plastic surgery and transplant surgery as reliable diagnostic system. Especially for patient with diabetic foot syndrome O2C can help them to salvage their foot. In vascular surgery the critical limb ischemia, the wound healing and the amputation level can be determined. The continuous post-operative monitoring of micro-vascular flaps is a standard task of O2C in the plastic- and maxillofacial surgery departments.

Sponsor and exhibitor information



Medicap Homecare GmbH

Mr Damir Danic
Tel.: +49 151/528 796 35
ddanic@medicap.de

Medicap was founded in 1981 in Ulrichstein/Germany. Medicap's product portfolio today consists of certified medical devices like oxygen concentrators, oxygen conserving devices, IPPB devices and optical transcutaneous oximetry devices/tcpO2 for the field of vascular medicine, Diabetology, angiology and wound therapy.



Mölnlycke Healthcare

Anna Bertilsson
Tel.: + 46 317 223 414
anna.bertilsson@molnlycke.com
www.molnlycke.com

Mölnlycke is a world leading medical solutions company. Our purpose is to advance performance in healthcare across the world. That is why we aspire to equip everybody in healthcare with solutions to achieve the best outcomes. We develop and bring to market innovative wound care and surgical solutions along the entire continuum of care – from prevention to post-acute settings. Our solutions provide value for money, supported by clinical and health economic evidence. Mölnlycke was founded in 1849. Nowadays, our solutions are available in around 100 countries; we are the number one global provider of advanced wound care and single-use surgical products; and we are Europe's largest provider of customized trays. Our headquarters are in Gothenburg, Sweden and we have about 7,500 employees around the world.



Perimed AB

Eva Weber Andersson
Tel.: +46 8 580 119 90
mail@perimed-instruments.com
www.perimed-instruments.com

PERIMED is a global provider of diagnostic solutions for patients with peripheral vascular diseases and complex diabetic foot ulcers. Our new PeriFlux 6000 offers a unique combination of tests: ABI, toe pressure and transcutaneous oximetry (tcpO2).



Podartis Srl

Eleonora
Tel.: +39 0423 2931
centro.ricerca@podartis.it
www.podartis.it

Podartis is specialized in the production of shoes, orthotics and walkers for the prevention and the treatment of the major gait diseases. Source of pride for the Company are the cutting edge solutions designed for the diabetic foot, that are all strictly clinically tested to ensure maximum benefit and comfort. The continuous product innovation through a strong and ongoing commitment in research, the medical and scientific collaborations with the most authoritative experts, and the several patents that characterize Podartis footwear, are the direct evidence of the mission of the company: to help people walk well, in order to better live.



Salvatelli S.r.L.

Tel.: +39 733 801 060
info@molliter.com
www.molliter.com

Salvatelli S.r.L. is a company that produces orthopaedic shoes (Molliter) and dynamic Walkers for the management of the Diabetic foot ulceration or post-surgery/trauma (Optima).



Smith & Nephew Advanced Wound Management

Maricel Pamely, Exhibitions and Events Manager
Tel.: +44 1482 673632
maricel.pamely@smith-nephew.com
www.smith-nephew.com

Smith & Nephew supports healthcare professionals in more than 100 countries in their daily efforts to improve the lives of their patients.

We do this by taking a pioneering approach to the design of our advanced medical products and services, by securing wider access to our diverse technologies for more customers globally, and by enabling better outcomes for patients and healthcare systems



Söring GmbH

Ms. Ines Faber
Tel.: +49 (4106) 6100-0
ines.faber@soering.com
www.soering.com

Söring has experience in developing high performing ultrasonic-assisted surgical systems for over 30 years. Based in Quickborn, Germany, everything comes from one source: as a family owned company we develop, produce and distribute our entire range of products for liver, spine and neurosurgery as well as for wound debridement. Our worldwide customers appreciate the high quality of our reliable medical products and benefit from a straightforward assurance concept. By continuously challenging our expertise and performance we focus on trendsetting solutions – for the best support of the medical team and especially for the patient's well-being.



Urgo Medical

Catherine Barrault
Tel.: +33 3 80 54 50 00
C.barrault@fr.urgo.com
www.urgomedical.com

Urgo Medical's mission is to be the Healing Company, helping to relieve the burden of wounds for patients and healthcare professionals through innovative products and added value services.



Woundcare-Circle

Tel.: +49 880 792 280
www.woundcare-circle.com
info@woundcare-circle.com

The 3 Woundcare-Circle founders, OPTIMA, Heelift and DARCO are international market leaders providing innovative product solutions. The group permanently supports

Authors

Name	Abstract	Bold = Presenting author
Aan de Stegge, Wouter	P92	
Abbas, Zulfiqarali G.	P63, 017, P28	
Abbott, Angela	Prize Oral 1	
Abbruzzese, Lorenza	P98	
Abd El-Gawad , Abd El-Gawad	P88	
Abdulvapova, Zera	P57, P36 , 035	
Abhyankar, Mahesh	P44	
Abu Sneinah, Reena	P59	
Aghili, Rokhsareh	P12	
Ahluwalia, Raju	01, P102	
Ahn, Junho	09	
Ainarkar, Suhail	P22	
Alekhin, Mikhail N.	P30	
Alfayate García, Jesús	P9 , P47	
Allan, David	P2	
Allen, John	P22	
Almeida, Paulo	030	
Almeida, Rui	030	
Alonso Peña, David	P32	
Alvarez-Madroñal, Rebeca	P79	
Alvaro Afonso, Francisco Javier	020, P101, 08 , 022, 016, 019	
Amado, Ana	P19, P69, P80	
Amaral, Cláudia	030, P19, P69, P80, P81	
Andersen, Henrik Ullits	028	
Anichini, Roberto	P13, P53	
Antoniou, Sofia	P7	
Antsiferov, Mikhail	P17	
Arhire, Lidia Iuliana	P70	
Armstrong, David G.	P37	
Arshad, Sobia	034	
Arsos, Georgios	07	
Artemova, Ekaterina	P57, 035	
Ashwell, Simon	P83	
Assaloni, Roberta	012	
Audrey, Josset-Lamaugarny	031	
Ayabe, Shinobu	P95	
Bamford, Margaret	Prize Oral 1	

Name	Abstract	Bold = Presenting author
Barn, Ruth	P51	
Barro, Enrica	O12	
Bates, Maureen	O23, O24, O37, P6, P68, P75	
Baumann, Petra	P66	
Belyaeva, Anna V.	P30	
Bem, Robert	Prize Oral 3, O3, P10, P15, P24, P38, P90 , P100	
Berdalin, Alexander	P57, O35	
Berendsen, Heleen	P4	
Bernini, Arianna	P53	
Berrington, Rachel	P76, P77, P78	
Bevans, John	P22	
Bjerre-Christensen, Ulla	P23	
Bloomfield, Linda	O33	
Bondarenko, Olga	P36	
Borg, Thanaa	P88	
Borys, Sebastian	O5	
Boschetti, Giovanni	P89, P96	
Boulgaropoulos, Beate	P66	
Boulton, Andrew JM	O18	
Bowling, Frank	O18	
Bravis, Vassiliki	O33	
Brocco, Enrico	P89 , P96	
Brown, Steven	O18	
Browne, Duncan	Prize Oral 1	
Brunato, Barbara	O12	
Bruseghin, Marino	P89, P96	
Buccarello, Mariagrazia	P5	
Bülow, Jens	P54	
Bus, Sicco	P4 , P51	
Busch-Westbroek, Tessa	P51	
Camfield, Elizabeth	P45	
Camilleri, Kenneth	O32	
Cancer-Perez, Susana	P9, P47	
Cantista, Pedro	P81	
Caren, Randon	O14	
Carlucci, Silvana	O12	
Carrasco Cortijo, Laura	P32	
Carvalho, André	O30, P19, P69, P80, P81	
Carvalho, Rui	O30, P19, P69, P80, P81	
Casey, Joanne	P65	

Name	Abstract	Bold = Presenting author
Cassar, Kevin	032	
Cassin, Matteo	P85	
Catrina, Eduard Lucian	021	
Celo, Eni	P99	
Chantelau, Ernst	P7	
Charcharidou, Maria	P87	
Chatzikosma, Georgia	P58	
Chatzistergos, Panagiotis	015 , P2	
Chee, Carolyn	P73	
Cheng, Joyce	026	
Chernova, Ekaterina G.	P30	
Chockalingham, Nachiappan	015, 017, 032, P2, P11, P40, P63	
Chokkalingam, Kamal	P73	
Ciampa, Elena	P98	
Collins, Nicholas	P83	
Coppelli, Alberto	025 , P5, P18, P98	
Coppini, David	P83	
Costa, Luis	P19, P69, P80, P81	
Criado Galán, Fernando	P9, P47	
Curran, Gail	P27	
Custers, Wim	P4	
Da Ros, Roberto	012 , P85	
Da Silva, Sílvia	P42	
Dadova, Larisa V.	P30	
Dantas, M. Jesus	P42	
Das, Ashok	P44	
Davies, Zoe	037	
De Bellis, Alessandra	P53, P13	
de Benito Fernández, Luis	P9, P47	
Demetriou, Maria	P58	
Desai, Vaishali	P46	
Deschamps, Kevin	018	
Dhatariya, Ketan	026 , P83	
Didangelos, Triantafyllos	07	
Diggle, Mat	P16	
Dimitrakopoulou, Aglaia	036	
Dimitrakopoulou, Natalia	036	
Dirinck, Eveline	038	
Dominique, Sigauco-Roussel	031	
Donou, Adriana	P87	

Name	Abstract	Bold = Presenting author
Doronina, Ludmila	P94	
Dorothee, Dähnhardt	P20	
Dubsky, Michal	Prize Oral 3 , 03, P10, P15, P24, P38, P90, P100	
Dumont, Isabelle	014 , 011	
Eckhard, Hanisch	P20	
Eddison, Nicola	P11	
Edmonds, Michael	023, 024, 034, 037, P6, P22, P49, P65, P67, P68, P75, P83	
Eenkhoorn, Vera	014	
Egun, Ansy	02, 010	
Eleftheriadou, Ioanna	036, 021 , P34	
El-gamel, Fayrouz	P3	
Ellul, Christian	032	
El-nahas, Mamdouh	P3	
Elsanousi, Fadwa	P76	
El-Shazly, Shaimaa	P3	
Engberg, Susanne	028	
Enriquez, Ana	P39	
Eric, Beltrand	013	
Eric, Weber	014	
Fabrizia, Toscanella	P35	
Falzon, Owen	032	
Farmer, Sybil	P11	
Fejfarová, Vladimíra	Prize Oral 3, 03, P10, P15, P24, P38 , P90	
Fialová, Libuše	Paul Brand Award, P55	
Flaishman, Isac	P35	
Fonseca, Liliana	P19 , P69, P80	
Formosa, Cynthia	P40 , 032	
Francia, Piergiorgio	P13 , P53	
Freedman, Ben	P68	
Freitas, Cláudia	030, P19, P69, P80, P81	
Freya, Aka	038	
Fujii, Miki	P37	
Gabaraeva, Natalia	P25	
Galstyan, Gagik	035, P36, P57, P94	
Game, Frances	P16	
Gandini, Roberto	Prize Oral 2	
García Álvarez, Yolanda	019, 020, 022, P72 , P74, P79, P101	
Garcia Klepzig, Jose Luis	020, P50, P74	
Gardiner, Paula	06	

Name	Abstract	Bold = Presenting author
Garrido, Susana	P81	
Gatimu, samuel	P64	
Gatt, Alfred	032 , P40	
Gauci, Jean	032	
Gavrilova, Svetlana	035, P57	
Georga, Stamata	07	
Gerth, Peter	015	
Gherasim, Andreea	P70	
Ghio, Antonella	P5	
Ghomian, Banafshe	P12	
Girman, Peter	P24	
Giurato, Laura	Prize Oral 2	
Glazebrook, Jaclyn	P73	
Glindorf, Mette	P23	
Gohil, Shailesh	P77	
Gomes, André	P19, P69, P80, P81	
Gonçalves, Isabel	P19, P69, P80, P81	
Gooday, Catherine	026, P83	
Gorbacheva, Anna	P57 , P36, 035	
Goretti, Chiara	025, P5, P18, P98	
Gorobeiko, Maksym	P14	
Gouni, Ravikanth	P73	
Govindan, Senthil	P93	
Gracheva, Tatiana	P26	
Grandis, Umberto	P85	
Grannon, Paula	P33	
Gray, Huon	P83	
Grigoropoulou, Pinelopi	P34	
Gugliotta, Maria Concetta	P35	
Guimarães, Rosa	P19, P69, P80, P81	
Gulisano, Massimo	P13	
Gutiérrez-Baz, Miguel	P9, P47	
Haas, Waltraud	P66	
Harding, Keith	P27	
Harrington, Alexandra	Prize Oral 1	
Hasho, Sokol	P99	
Havrlantova, Vendula	Paul Brand Award Oral	
Havrlantová, Vendula	P55	
Hayes, Paul	P27	
Healy, Aoife	015, P2, P11	

Name	Abstract	Bold = Presenting author
Heiner, Claessen	011	
Hendow, Layth	P45	
Hervé, Avalosse	011	
Hirani, Dhruti	033	
Hohendorff, Jerzy	05	
Holman, Naomi	P83	
Holstein, Per	P54	
Horvath, Karl	P66	
Houthoofd, Sabrina	014, P52, P84,	
Hurwitz, Bonnie	P16	
Iacopi, Elisabetta	025, P5, P18 , P98	
Icks, Andrea	011	
Idrees, Hatem	P3	
Iskander, Rhonda	P1	
Ismail, Khalida	034	
Ivan, Huyghe	038	
Ivins, Nicola	P27	
Izzo, Valentina	Prize Oral 2	
Jacques, Boly	011	
Jansen, Rasmus	P54	
Jayatilake, Rochana	02, 010	
Jeffcoate, William	P16, P28	
Jemmott, Timothy	023, 024, P6 , P75	
Jeroen, Hendriks	038	
Jessica, Van Hattem	038	
Jim, Turton	P16	
Jirkovská, Alexandra	Prize Oral 3, 03, P10, P15, P24, P38	
Jirkovska, Blanka	Paul Brand Award Oral	
Jirkovská, Jarmila	Paul Brand Award Oral , P55	
Joeri, Guillaume	011	
Jogia, Rajesh	P78	
Johan, Somville	038	
Jones, Nia	P27	
Juarez Crespo, Carlos	P32	
Jude, Edward	021, 036, P61	
Judith, Schulte-Walter	P20	
Jurgensen-Rauch, Amanda	034	
Kafasi, Nikolitsa	036	
Kalafati, Maria	P87	
Kalemikerakis, Ioannis	P87	

Name	Abstract	Bold = Presenting author
Kannan, Suresh	P2	
Kapusta, Przemyslaw	05	
Katsilambros, Nikolaos	P34	
Kavarthapu, Venu	P102	
Kemerli, Maria	021	
Keukenkamp, Renske	P51	
Kevin, Deschamp	014	
Khalifa, Walaa	P62	
Khlopina, Marina	P29	
Kiec-Wilk, Beata	05	
Kim, Paul	09	
Kirketerp-Møller, Klaus	028	
Klochikchina, Ekaterina	P57	
Kluwe, Ben	P22	
Koblik, Teresa	05	
Kočí, Zuzana	P90	
Koehler, Gerd	P66	
Kokkinos, Alexander	P34	
Komelyagina, Elena	P17	
Kong, Marie France	P76, P77, P78, P83	
Koshelev, Vladimir	P57	
Kožnarová, Radomíra	P24	
Kris, Doggen	014	
Křížová, Marta	P38	
Krushinska, Zoya	P14	
Kubínová, Šárka	P90	
Kymantas, Vytautas	013	
Kyryllos, Fady	P3	
La Fontaine, Javier	09, 021	
La Rocca, Valentina	P89	
Ladygina, Darya O.	P30	
Lakopoulou, Fotini	P87	
Lander Svendsen, Ole	P54	
Langton, Katia	P61	
Lánská, Věra	P24, P38	
Iarin, Oleksandr	P14	
Lauwers, Patrick	038, 011	
Lavery, Lawrence	09	
Lee, Yoonhye	P8	
Leese, Graham	029	

Name	Abstract	Bold = Presenting author
Leporati, Elisa	P18	
Lepow, Brian	P39	
Li, Francesca	026	
Li Ping Wah-Pun Sin, Edwin	026	
Liesbeth, Stokman	038	
Lincoln, Nadina	P28	
Lobo, Dr Sharon	P44	
Lomas, Claire	P22	
Lopes, Ana	P81	
López-Moral, Mateo	016 , 022, P50	
Loupa, Chariclia	P87	
Loureiro, Luis	030, P19, P69, P80, P81	
Lucas, Jody	023 , 024, P6, P65, P75	
Ludwig-Galezowska, Agnieszka	05	
Lundquist, Rasmus	P91	
Lutale, Janet	017, P28, P63	
Lynn, Longueville	038	
Macchi, Beatrice	P89	
MacDonald, Audrey	P22	
Machin, Graham	P22	
Machlowska, Julita	05	
Mader, Julia	P66	
Maganaris, Constantinos	018	
Mahadevan, Shriiraan	P2	
Malecki, Maciej	05	
Maltezos, Efstratios	P58	
Malý, Marek	P55	
Mander, Antonio	P35	
Manes, Christos	07	
Manu, Chris	023, 024, 034, 037, P6, P49, P65, P67, P68, P75, P83	
Manzi, Marco	P89	
Maria, Narres	011	
Marin, Mariagrazia	P89, P96	
Marinsalda, Laura	P98	
Marques Ferreira, Paula	027	
Martínez, José Luis Lázaro	08, 020 , 016, 019, 022, P50, P72, P74, P79, P101	
Martins, Ana	P19, P69, P80	
Martins, Joana	030, P19, P69, P80, P81	
Matricali, Giovanni	014, P52, P84	
Mazzanti, Riccardo	P98	

Name	Abstract	Bold = Presenting author
McCardle, Jo	029	
Medici, Francesco	P43	
Mehdizadeh, Sina	P12	
Meloni, Marco	Prize Oral 2	
Mendes, Daniela M. M.	P21 , 027	
Menichetti, Francesco	P18	
Metcalf, Lisa	P73	
Meyers, Severien	P52	
Mickiene, Aukse	013	
Mlhalache, Laura	P70	
Mildred, Jacqueline	P48	
Mills, Joseph	P39	
Miranda, Cesare	012, P85	
Miroslav, Zavoral	Paul Brand Award Oral	
Mizzi, Anabelle	032	
Mizzi, Stephen	032	
Modha, Deborah	P76, P77, P78	
Molines Barroso, Raúl	08, 016, 022 , P50, P72, P74, P79	
Møller Christensen, Tomas	P54	
Monteiro-Soares, Matilde	P21, 027	
Montero, Miguel	P39	
Moore, John	Prize Oral 1	
Morales, Esther Garcia	016, 019, 020, 022, P50 , P72, P79	
Morbach, Stephan	011	
Morozova, Maria	P57, 035	
Motawea, Amira	P88	
Motawea, Mohamad	P3, P88	
Mottolini, Nicole	023, 024, P75	
Mourouzis, Iordanis	021	
Mrazova, Iveta	P90	
Mykola, Svyrydov	P14	
Naemi, Roozbeh	015, 017 , P2, P12, P63	
Najafi, Bijan	P39	
Navrátil, Kamil	Prize Oral 3, P10, P15, P38, P100	
Nayak, Ananth	P83	
Nayar, Rahul	P83	
Němcová, Andrea	03 , Prize Oral 3, P10, P15, P24, P38, P90	
Neri, Riccardo	P85	
Neškudla, Tomáš	P24	
Neto, Helena	P19, P80, P81	

Name	Abstract	Bold = Presenting author
Neves Lopes, Vítor	P42	
Ngoyo, James	P64	
Niamuzisilawati, Eva	P71	
Niklová, Jitka	P38	
Nikoloudi, Maria	P34	
Ninkovic, Sasa	P89, P96	
Nisal, Kaustubh	P73	
Nita, George	P70	
Nita, Otilia	P70	
Nobels, Frank	011, P41	
Nogueira, Clara	030	
Nosenko, Ekaterina M.	P30	
Nunney, Ian	026	
Nuttall, Graham Howard	04	
Obolenskiy, Vladimir	P97	
Ortiz Fernández , Ana Pilar	08, P72, P101	
Paardekooper , Irma	P4	
Pac Soo, Bernard	02, 010	
Pafili, Kalliopi	P58	
Paisey, Richard	Prize Oral 1	
Palena, Mariano	P89	
Pandis, Marlene	P66	
Pandyan, Anand	P11	
Pankhurst, Christian	P45	
Papadimitriou, Chistos	021	
Papanas, Nikolaos	P56, P58	
Papazoglou, Dimitrios	P58	
Parker, Daniel	04	
Patel, Natasha	P1, P45, P46	
Patricia, Felix	014, 011	
Patrick, Lauwers	014	
Paul, Michon	031	
Pavů, Jaroslav	P38	
Pendry, Elizabeth	P49, P67	
Pendsey, Sharad	P44	
Pereira, Joel	P19, P69, P80, P81	
Pereira, Teresa	P19, P69 , P80, P81	
Perera Sabio, Miriam	P9, P47	
Perini, Marco	P53	
Petitto, Marilena	P98	

Name	Abstract	Bold = Presenting author
Petrova, Nina	023, 024, P22, P67	
Petrovic, Milos	018	
Piaggese, Alberto	025, P5 , P18, P98	
Pieber, Thomas	P66	
Pierides, Michael	P82	
Pinfi, Michela	P89	
Pinto, Sara	027, 030, P19, P69, P80, P81	
Pitha, Jan	P86	
Pithova, Pavlina	P86	
Plank, Johannes	P66	
Plassmann, Peter	P22	
Policardo, Laura	P53	
Ponton Cortina, Alejandro	P32	
Popova, V.M.	P17	
Prystupiuk, Maksym	P14	
Punnoose, Alan	P2	
Pyšná, Anna	03, Prize Oral 3, P10 , P24, P38, P90	
Raheman, Firas	P102	
Rahemi, Hadi	P39	
Rajbhandari, Satyan	02 , 010, P83	
Ramachandra, Ambady	P2	
Ranashinge, Ushank	02, 010	
Randon, Caren	P41	
Rani, Anitha	P93	
Rankin, Alexandra	P65	
Rashid, Hisham	P68	
Rasmussen, Anne	028, P23	
Reeves, Neil	018	
Rego, Duarte	030	
Rei Neto, Helena	P69	
Reingardas, Anatolijus	013	
Rezaie, Wahid	P41	
Rigor, Joana	027	
Riitano, Nicola	P5	
Ring, Francis	P22	
Robinson, Adam	P83	
Roden, Michael	P7	
Roe, Michelle	Prize Oral 1	
Rogers, Leon	P22	
Rumbaut, Jan	P41	

Name	Abstract	Bold = Presenting author
Ryan, Easton	09	
Rytter, Karen	P23	
Rørdam, Lene	P54	
Saeedi, Hassan	P12	
Salem, Victoria	033	
Salutini, Elisabetta	P13, P53	
Sánchez Ríos, Juan Pedro	P9, P47	
Sánchez-Lancha López, Fernando	08, P74, P101	
Sanz, Irene	016, 019 , 020, P50, P101	
Sarralde Aguayo, José Aurelio	P32	
Saskia, Van Bouwel	038	
Schmidt, Jonas Damgård	P91	
Seghieri, Giuseppe	P13, P53	
Senneville, Eric	013	
Seweryn, Michal	05	
Shafiq, Nafeesah	P1	
Shin, Donghyuk	P8	
Siami, Evangelia	P34	
Siersma, Volkert	P23	
Silvestri, Deborah	P89	
Simmgen, Marcus	P49	
Simpson, Rob	P22	
Simunkova, Zuzana	P90	
Sixta, Bedrich	P38	
Skibova, Jelena	Prize Oral 3, P10	
Skibová, Jelena	03	
Slim, Hani	P68	
Solař, Svatopluk	P55	
Soliman, Mohamed	P43	
Sourij, Harald	P66	
Spraul, Maximilian	P20	
Spucis, Arturas	013	
Stafford, Michelle	023	
Stafford, Michelle	024	
Stroobants, Sigrid	038	
Sturgeon, Cassandra	032	
Sulcaite, Rita	013	
Sundar , Lakshmi	P2	
Svatopluk, Solar	Paul Brand Award	
Tagliaferri, Enrico	P18	

Name	Abstract	Bold = Presenting author
Tamburini, Ludovica	P5	
Tang, Wegin	023, 024, P6, P22	
Taori, Surabhi	037, P65	
Tardáguila García, Aroa	08, 019, P72, P74 , P79	
Tarshoby, Manal	P88	
Tascini, Carlo	P18	
Team, CHVNG/E Diabetic Foot Clinic	P21, 027	
Tedeschi, Anna	P13, P53	
Teixeira, Sofia	P19, P69, P80, P81	
Tentolouris, Anastasios	021, P34	
Tentolouris, Nicholas	021, 036, P34	
Terabe, Yuta	P31	
Terashi, Hiroto	P37	
Tesic, Dragan	P56	
Thomas, Neubourg	P20	
Tim, Sloan	P16	
Tokmakova, Alla	035, P57, P94	
Tomei, Antonella	P5	
Tremlett, Jennifer	P49 , P65	
Tuthill, Antoinette	06	
Uccioli , Luigi	Prize Oral 2	
Udovichenko, Oleg	P29, P30	
Uvarova, Olga	P17	
Vadikolias, Konstantinos	P58	
Valabhji, Jonathan	033, P83	
van Acker, Kristien	011	
van der Wielen, Heleen	P51	
Van Gaal, Luc	038	
Van Schil, Paul	038	
Vas, Prashanth	023, 024, 034, 037, P65, P67, P68	
Vasiluta, Ciprian Petrisor	P70	
Vasipoulos, Georgios	P87	
Vaznaisiene, Danguole	013	
Venerová, Johana	Paul Brand Award Oral , P55	
Verfaillie, Pieter-Jan	P84	
Verschueren, Sabine	018	
Villaescusa Catalan, Jose Manuel	P32	
Vimal, Venugopal	P78	
Violi, Tatiana	025	
Viswanathan, Vijay	P93	

Name	Abstract	Bold = Presenting author
Viti, Secondina	P53	
Vitkauskiene, Astra	O13	
Vitova, Lenka	P86	
Volpe, Antonio	P89, P96	
Vorokchobina, Natalia	P25	
Vouillarmet, Julien	O31	
Voyatzoglou, Eleftherios	P87	
Vrátná, Eliška	P24 , P38	
Vris, Alex	P102	
Walter, Wigger-Alberti	P20	
Walton, Daina	O23, O24, O37, P68 , P75	
Watson, Laura	P46	
Werner, Arend	O11	
Whisstock, Christine	P89, P96	
Whittam, Aaron	P22	
Wołkow, Paweł	O5	
Woodburn, Jim	P51	
Woskova, Veronika	Prize Oral 3, P10, P15 , P24, P38, P100	
Wuite, Sander	P84, P52	
Wukich, Dane	O9	
Yokono, Koichi	P37	
Young, Matthew	O29	
Young, Robert J.	P83	
Yue, Anson	O26	
Yuskevich, V.V.	P17	
Zaitseva, Ekaterina	P94	
Zanette, Giorgio	P85	
Zavoral, Miroslav	P55	
Zelenina, Tatiana	P25	
Zemlianoi, Aleksandr	P25	
Zhilenkov, E.L.	P17	
Zhou, He	P39	
Zwaferink, Jennefer	P4	

The 14th meeting of the DFSG is organised with the highly appreciated support of:

Gold sponsors



Silver sponsors



Bronze sponsors



Exhibitors

