ABSTRACTS

Diabetic Foot Study Group

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DIABETIC FOOT STUDY GROUP

[OP01] THE EFFECTIVENESS OF ADJUVANT THERAPY OF DIABETIC FOOT ULCERS USING RECOMBINANT HUMAN EPIDERMAL GROWTH FACTOR COMPARED TO STANDARD TREATMENT

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Aim: to study the effectiveness of recombinant human epidermal growth factor (rhEGF) compared to standard therapy in the treatment of diabetic foot ulcers (DFUs).

Method: general clinical, assessment of the area and depth of wounds by planimetric method

Results / Discussion: The study included 61 patients (study group (1) – 40 patients, control group (2) – 21 patients) with neuropathic and neuroischemic (without critical ischemia) DFUs after surgical debridement. In the study group, in addition to the standard treatment (offloading, antibiotics according to indications, atraumatic dressings), rhEGF was used, in the control group – only standard therapy. The groups were comparable by age, gender, duration and control of diabetes, however, they differed in the size of wounds at the time of inclusion in the study: the wound area in group 1 was 8,275 [6.05; 16.45] cm2, in group 2 - 23.5 [12.3; 55.3] cm2, the wound depth in group 1 - 1.6 [1.05; 2.45] cm, in group 2 - 3.2 [2.4; 5.2] cm. In group 1, in addition to standard therapy, 7±2 injections of rhEGF were performed. After 14±3 days, the groups significantly differed in the dynamics of wound size reduction: the difference in wound area in group 1 was -39.5% [-52.85; -26.45], in group 2 - 19,0% [-28,6; -13,6], the difference in the depth of wounds in the group 1 - -53,1% [-70,0; 45,5], in group 2 -14.8% [-24.3; -12.5] ($p<0.001$).

Conclusion: Adjuvant therapy with rhEGF has an effective impact on reducing the area and depth of wounds and shortens their healing time.

[OP02] The Role of CO_2 Therapy in Reversing Loss of Protective Sensation and Accelerating Wound Healing

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Aim:

Distal symmetrical polyneuropathy (DSPN) is a common complication of diabetes mellitus, significantly increasing the risk for diabetic foot ulcers (DFUs). Transcutaneous carbon dioxide (CO_2) therapy has demonstrated potential in improving microcirculation and neuroprotection in patients with chronic wounds.

The aim of the study was to evaluate the efficacy and safety of non-invasive transcutaneous CO_2 therapy in improving DSPN symptoms in diabetic patients with and without DFUs.

Method:

This prospective cohort study included 120 patients with DSPN across two centers in Slovenia and Croatia. Patients were allocated into three groups: DSPN without DFU treated with CO_2 (Group A, n=40), DSPN with DFU treated with CO_2 (Group B, n=40), and untreated DSPN without DFU (Group C, n=40). CO_2 therapy was administered in 20 sessions over 4 weeks. Primary outcomes included Semmes-Weinstein monofilament test, vibration sensation, and hallux temperature. Wound healing outcomes and adverse effects were also recorded.

Results / Discussion:

Significant improvements were observed in both CO_2-treated groups. Protective sensation improved by 53% in Group A and 34% in Group B ($p=0.002$); vibration sensation improved by 30% and 23%, respectively. Hallux temperature increased by 5.10°C (Group A) and 3.89°C (Group B). Improvement in monofilament test was observed across all ankle-brachial index (ABI) categories, with the best outcomes in patients with borderline ABI. DFUs healed completely in 67.5% of patients in Group B, with a mean wound size reduction of 92%. No adverse effects were reported.

Conclusion:

Transcutaneous CO_2 therapy significantly alleviates DSPN symptoms and improves wound healing, regardless of DFU presence or ABI status. The treatment was well-tolerated, suggesting it may represent an effective non-invasive option for managing DSPN and enhancing microcirculation.

[OP03] Enhanced Healing Outcomes in Diabetic Foot Ulcers: A Retrospective Analysis of an Advanced Treatment Protocol

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Aim: Diabetic foot ulcers (DFUs) remain a major global health burden, contributing prolonged hospital stays, high amputation rates, and increased mortality. Despite advancements in DFU management, healing outcomes remain suboptimal in many healthcare settings. This study evaluates the effectiveness of a multidisciplinary, evidence-based treatment protocol in achieving superior healing outcomes and reduced amputation rates.

Method: A retrospective analysis was conducted on 1057 DFU patients treated at a specialized diabetic care hospital in Kerala. Patient demographics, ulcer characteristics, comorbidities, and treatment strategies were assessed. Healing rates, amputation rates, and predictors of delayed healing were analyzed using multivariate logistic regression.

Results / Discussion: Among the study population, 75% of ulcers achieved complete healing, significantly higher than the 30–50% reported in previous studies, while the major amputation rate was only 2.6%, markedly lower than prior reports (10–20%). Poor healing was significantly associated with coronary artery disease (OR: 2.42, p = 0.007) and past ulcer history (OR: 2.36, p = 0.008), whereas strict glycemic control (HbA1c < 7%) reduced the risk of poor healing by 75% (OR: 0.25, p = 0.002). Additionally, absence of prior antibiotic therapy (OR: 2.27, p < 0.01) and chronic kidney disease (OR: 2.22, p < 0.01) were major contributors to delayed healing exceeding five months.

Conclusion: This study demonstrates that a comprehensive DFU treatment protocol, integrating strict glycemic control, aggressive infection management, offloading, and advanced wound care, significantly improves healing outcomes and minimizes amputations. These findings highlight the need for wider adoption of standardized, multidisciplinary care models to enhance DFU management globally.

[OP04] Metabolic decompensation parameters as predictors of mortality in diabetic foot patients

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Aim: To evaluate the role of new metabolic decompensation indexes and anemia as predictors of mortality in a cohort of severely complicated diabetic foot (DF) inpatients.

Method: We retrospectively analyzed data of all patients admitted in our department for DF in 2021. We collected data regarding demographic and clinical characteristics, blood parameters, procedures and clinical outcomes, such as healing. At the end of 2024 all patients were contacted to investigate vital status and, in case of death, its date. Patients were divided into two groups according to whether they were alive (Group A) or dead (Group B). We compared groups for clinical characteristics, blood analysis and parameters of metabolic severity [Fibrosis 4 (FIB4) index, triglyceride/glucose ratio (TyG)]. We then compared those parameters with mortality rate.

Results/Discussion: We admitted in the study period 280 patients: 31 of them were not contactable during follow-up and were therefore excluded from this analysis. Of the remaining 249: 160 in Group A [64.3%, mean age 73.9±9.2 yrs, male/female 74.4/25.6, DM1/2 7.5/92.5%; BMI 29.0±5.1 kg/m2; Hba1c 61.9±18.7 mmol/mol; diabetes duration (DD) 20.2±11.9 years] and 89 in Group B [35.7%, mean age 67.8±11.2 yrs, male/female 66.2/33.8, DM1/2 8.9/91.1%; BMI 27.4±7.7 kg/m2; Hba1c 60.1±15.3 mmol/mol; DD 21.4±13.9 years]. Group B were older ($p<0.05$), had a longer ($p<0.001$) DD, a higher prevalence of ischemic cardiopathy ($p<0.05$) and chronic kidney disease ($p<0.05$). No differences in total haemoglobin while Group B had higher FIB4 ($p<0.05$), TYG ($p<0.05$) and creatininemia ($p<0.05$). In Cox logistic regression FIB 4 (HR 1.34, $p=0.027$), TyG (HR 1.78, $p=0.032$), ischemic cardiopathy (HR 1.23, $p=0.034$) and chronic kidney disease (HR 1.33, $p=0.028$) positively correlated with death. Multivariate regression confirmed only FIB4 (HR 1.87, $p<0.02$) and TYG (HR 1.34, $p<0.001$) as predictor of mortality.

Conclusion: Our data demonstrated how metabolic decompensation indexes may predict mortality in DF patients.

[OP05] Use of a oleic matrix releasing Reactive Oxygen Species (ROS) impregnated gauze in tunneled post-surgical neuroischemic diabetic foot patients

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Aim: Postoperative wounds may arise from several etiologies including open partial pedal amputation, postoperative infection, and dehiscence of surgical sites from wound failure or patient compliance issues. If negative pressure wound therapy is the gold standard, its application in the toes area could be challenging as a consequence standard care is most likely used. Reactive oxygen species are a key part of the normal wound-healing process and we evaluate the use of a new oxygen-enriched oil-based product (gROS) in this kind of ulcers.

Method: A total of 22 diabetic patients with tunnelling post-surgical dehiscence of the foot (TUC IIA or IIIA) comprised the study population. Patients were randomised in two groups as follows: group 1 patients were treated with (gROS) and group 2 patients were treated with standard therapy. Primary outcome is healing rate. Secondary outcomes are new infections and side effects.

Results / Discussion: After 16 weeks wound closure occurred in 9 patients (75%) in group 1 and 4 (33%) in group 2 (p=0,04). New infections affected 2 patients (17%) in group 1 and 7 patients (58%) in group 2 (p=0,05) and, of these, six patients (50%) needed a new surgical debridement. No severe side effects were reported in group 1 and only in 1 patient (8%) perilesional maceration was observed. In standard therapy frequency of dressing was twice a week and in gROS once a week, reducing costs related to nursing time and hospital visits, responsible of 80-85% of the total cost.

Conclusion: Oleic matrix – based gel releasing Reactive Oxygen Species promising to be effective, safe and efficient in tunnelling post-surgical dehiscence in diabetic foot.

[OP06] Outcome of the EXPLORER RCT based on current wound classification of SINBAD and WIfI: demonstrate better healing in severe ulcers upon treatment with nano-oligosaccharide factor (TLC-NOSF)

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Aim: Current international guidelines recommend the use of SINBAD and WIfI classification for DFU assessments. The double blinded EXPLORER RCT demonstrated an 18 points difference between the treatment group TLC-NOSF vs control group; inclusion eligibility and results were based on the Texas Classification. The aim was to assess the wound outcomes within EXPLORER based on a reclassification with SINBAD and WIfI.

Method: A retrospective reclassification and post-Hoc analysis of wounds treated within EXPLORER. Wound healing were compared between the TLC-NOSF and control groups for severe ulcers (SINBAD ≥3) and less severe ulcers, as well as reclassification for the levels of WIFI scores. Then evaluated to ascertain if the results would be comparable if the latter two classification systems are utilised.

Results : All 240 patients could be reclassified with SINBAD score: 52.5% of the 240 had severe ulcers. But 57.9% in the NOSF group had severe ulcers compared to 46.5% in the control group. The proportion of ulcer healing of severe ulcers were better within the NOSF group compared to the control group (43.8% vs 24.5% respectively). Reclassification into WIfI score was possible for 237 participants, 126 in the NOSF group and 111 in the control group. Total of 26.2% of the 237 wounds had a Low or Moderate WIfI score risk of amputation, but 8.7% of the NOSF group had a moderate risk of amputation compared to 4.5% within the control group. The 20-week ulcer healing was 63.6% in the NOSF group with Moderate WIfI score compared to 20% healing in the control group.

Conclusion: The use of SINBAD or WIFI still supports treatment with TLC-NOSF for better ulcer healing rate, despite having a higher proportion of more severe ulcer compared to the control group. Thus, the need for a better uptake of TLC-NOSF treatment in this cohort.

[OP07] Novel proteomic markers associated with diabetic foot ulcer healing time

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Aim: Diabetic foot ulcers (DFU) are a common complication that precede 80% of lower extremity amputations in people with diabetes worldwide. Prolonged DFU healing time is liked to an increased risk of foot amputations which occur 10 to 20 times more frequently in individuals with diabetes than in those without. Biomarkers of DFU healing are needed. Our aim is to map foot ulcer swab proteins associated with DFU healing time and compare two bioinformatic workflows.

Method: Explorative proteomics profiling was performed on DFU surface swabs from 112 individuals with newly diagnosed DFU (type 1 and type 2 diabetes). Participants were monitored until healing or for six months at the diabetes outpatient (foot) clinic. Proteomics analysis used Liquid Chromatography-Mass Spectrometry (LC-MS) with MaxQuant for quantification, and Perseus software for annotation. Two data processing workflows (WF1 and WF2) were compared, WF1 imputed missing values after filtering 30% non-missing data, while WF2 applied compositionality-based Bayesian multiplicative replacement. Longitudinal analysis using Cox proportional hazards regression adjusting for covariates (age, gender, BMI, diabetes type and duration, HbA1c, and triglyceride levels), with a false discovery rate (FDR) threshold of PFDR < 0.1 was performed, in R studio. A lower hazards ratio indicated longer healing time.

Results / Discussion: Study participants had a mean (± SD) age 50.7 (11.9), and diabetes duration 26.9 (14.6) years, HbA1c 64.8 (15.3) mmol/mol, BMI 29.9 (5.5) kg/m2, Toe brachial index, TBI 0.48 (0.22), 83.9% had neuropathy and 62.5% had type 2 diabetes. Of the 256 (WF1) and 1092 (WF2) unique proteins remaining after preprocessing, 6 and 46 proteins were significantly associated (PFDR<0.1) with ulcer healing time. Both WFs were highly correlated (R=0.7).

Conclusion: We identify tissue proteomic signatures for DFU wound healing time particularly proteins indicating increased inflammation and granulocyte infiltration in DFU wound bed and poor healing.

[OP08] Pedal acceleration time is a suitable test to detect peripheral circulatory disorders in diabetic patients

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Aim: Peripheral circulatory disorders of lower extremities detection is an important part of examination in diabetic patients. In addition to duplex sonography of peripheral arteries (DUS), ankle brachial index (ABI), toe brachial index (TBI) and transcutaneous oxygen pressure (tcpO2) measurements are available. Due to presence of mediocalcinosis, ABI examination is not reliable and TBI and tcPO2 measurements are not widely available. Therefore, other methods suitable for detecting peripheral circulatory disorders that are more accessible are being sought. Method tested in this way is the evaluation of pedal acceleration times (PAT) on plantar arteries using DUS. Our aim was to compare ABI and TBI values with PAT examination in type 1 (T1DM) and type 2 (T2DM) diabetic patients.

Method: 113 patients (29 T1DM patients, 67 men), mean age 64.5 ± 13.1 years, mean diabetes duration 20.7 ± 13.3 years, were examined. Diabetic ulceration was present in 49 % of patients. We examined 221 limbs (5 patients were after major amputation), 39 limbs had been revascularized in the past. We determined ABI and TBI values using a photoplethysmographic device. We determined pedal acceleration time in both plantar arteries using duplex ultrasound.

Results / Discussion: PAT values were significantly negatively correlated with TBI (r= -0.82, p=0.001), but not with ABI (r= -0.18, p=0.928) regardless of diabetes type. PAT values changed unfavourably with age and duration of diabetes, identically to changes in TBI values, but only in type 2 diabetics. In limbs underwent revascularization procedures, PAT values were significantly higher and TBI significantly lower than in limbs without a history of revascularization.

Conclusion: Examination of pedal acceleration times made by duplex ultrasound at plantar arteries may be an easily available alternative method to determine circulatory disorders in the lower limbs in diabetic patients, and it is completely comparable to measurement of toe brachial indexes.

[OP09] Development and Validation of the Toe Ankle Index and Gradient for the Early Detection of Below the Ankle Disease PAD: Derivation of Normative Values

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Aim: There is an increasing appreciation and innovative ways to intervene on below-the-ankle PAD, but late diagnosis remains a challenge. The aim was to derive and validate normative values for the Toe-Ankle Index (TAI) and Ankle-Toe Gradient (ATG)

Method: Consecutive healthy volunteers, without a diagnosis of diabetes, nor PAD and non-smokers were invited for a series of non-invasive parameters of perfusion, including brachial systolic blood-pressure (BP), Ankle-Pressure (AP) and Toe-Pressure (TP). Note was made of participants' baseline demographics and subsequent derivation of their ABI, TBI and a new derivation of TAI defined as TP/AP and ATG defined by AP–minus-TP. Analysis was made for distribution and differences between sex and age.

Results / Discussion: There were a total of 23 participants, mean age 32±13yrs, BMI 24±3 kg/cm2, and 39% male. The overall average brachial BP was 102±14mmHg. Of the 46 lower limbs assessed, mean AP and TP were 133±22mmHg and 104±20mmHg, with a mean TAI of 0.77±0.11 with an ATG of 29±17mmHg. There were no statistical differences between the parameters of below the ankle perfusion in males compared to females. TAI was 0.78±0.08 vs 79±0.13 (p=0.137), and ATG was 30±10mmHg vs 29±21mmHg (p=0.089). Of the participants, 17(74%) were below the age of 40yrs and the remainder 6(26%) were 40yrs or older. The mean Brachial BP and Ankle-Pressure were significantly lower in the younger cohort compared to those above 40yrs; Brachial BP 97±7mmHg vs 120±16mmHg (p=0.011) and Ankle-Pressure 125±16mmHg vs 157±23mmHg (p=0.037). However, there were no significant differences in the two age groups with the derivation of the TAI and ATG.

Conclusion: The derivation of the Toe-Pressure as an index of the Ankle-Pressure (TAI) or a measure of the relative drop in pressure between the Ankle and toe (ATG), could be a more robust assessment to identify disease below the ankle.

[OP10] Artificial intelligence for diabetic foot osteomyelitis: Validation of a deep learning model for plain radiograph interpretation

Francisco Javier Álvaro Afonso[1], Aroa Tardáguila García[1], Mateo López Moral[1], Sebastián Flores Escobar[1], Irene Sanz-Corbalán[1], José Luis Lázaro-Martínez[1]

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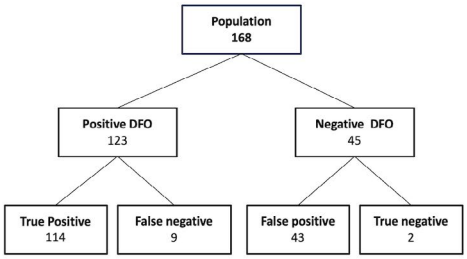
Aim: To develop and validate a ResNet-50-based deep learning model for the automatic detection of osteomyelitis (DFO) in plain radiographs of patients with diabetic foot ulcers (DFU).

Method: We carried out a retrospective study that included 168 patients with Type 1 and Type 2 diabetes and a clinical suspicion of DFO. These patients underwent surgical bone biopsies for histopathological confirmation. Both an experienced clinician and a pretrained ResNet-50 model independently interpreted the radiographs. The model was developed and fine-tuned using Python-based frameworks, receiving assistance from ChatGPT for code implementation and debugging. We assessed the diagnostic performance of both methods against histopathological findings. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and likelihood ratios were all calculated. Using Cohen's kappa coefficient, we evaluated the agreement between the artificial intelligence (AI) model and the clinician.

Results / Discussion: The AI model showed a high sensitivity (92.8%) and PPV (0.97), but a low specificity (4.4%) (Figure 1). The clinician had a sensitivity of 90.2% and a specificity of 37.8% (Figure 2). The Cohen's kappa coefficient between the AI model and the clinician was -0.105 (p = 0.117), indicating a weak agreement. Both methods manifested a tendency to classify a large number of cases as DFO-positive, with an 81.5% agreement in positive cases.

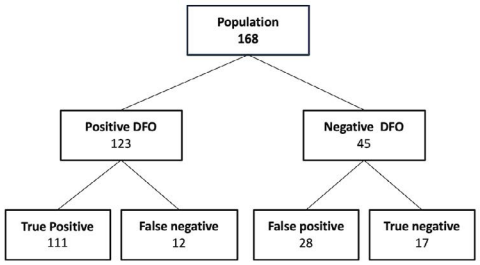
ARTIFICIAL INTELLIGENCE MODEL

	Value	95% CI
Sensitivity	92.68%	86.56-96.60%
Specificity	4.44%	0.54%-15.15%
Positive Likelihood Ratio	0.97	0.90-1.05
Negative Likelihood Ratio	1.65	0.37-7.33
Disease prevalence	73.21%	65.85-79.74%
Positive Predictive Value	72.61%	70.99 -74.18%
Negative Predictive Value	18.18%	4.75-49.74%



EXPERIENCED CLINICIAN

	Value	95% CI
Sensitivity	90.24%	83.58- 94.86%
Specificity	37.78%	23.77-53.46%
Positive Likelihood Ratio	1.45	1.15-1.83
Negative Likelihood Ratio	0.26	0.13-0.50
Disease prevalence	73.21%	65.85-79.74%
Positive Predictive Value	79.86%	75.81-83.37%
Negative Predictive Value	58.62%	42.38-73.18%



Conclusion: The AI model surpassed the experienced clinician in terms of sensitivity for DFO detection using plain radiographs. However, its lower specificity underlines the necessity for additional model optimization. AI-assisted radiographic interpretation might enhance the early detection of DFO, especially in settings where the disease is prevalent, but it necessitates further validation to improve its specificity and evaluate its utility in primary care. Implementing AI tools in regular clinical practice may assist clinicians in achieving earlier and more precise DFO diagnoses, diminishing lower limb amputations and associated mortality rates.

[OP11] The Evolving Field of Mobile Applications: A Smarter Approach to Diabetic Foot Ulcer Management

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Aim: This study evaluates the inter-rater reliability of diabetic foot ulcer (DFU) measurement using the traditional paper-ruler method versus the Imito Wound Application. Given the clinical importance of accurate and reproducible ulcer measurement, the research aims to determine whether a smartphone-based application offers a more reliable alternative to standard care, thereby improving DFU prognosis and management.

Method: A comparative observational study was conducted involving clinicians measuring DFUs using both the paper-ruler method and the Imito Wound App. A total of **67** DFUs were assessed, with each ulcer measured independently by three raters using both methods. The inter-rater reliability was analyzed using **intraclass correlation coefficients (ICC),** and statistical assessments were performed using SPSS software. Additional analyses considered the impact of ulcer shape and location on measurement reliability.

Results / Discussion: The results have highlighted that measurements performed using the ruler method had a difference of 1.43 times across all raters when compared to the Imito Application results. The ICC of both measurements was very good, with Imito App having a slightly better interrater reliability -ICC- 0.975 vs ICC- 0.970 - for the Ruler measurements. Ulcer shape and location influenced reliability, with irregularly-shaped DFUs exhibiting greater measurement discrepancies when using the ruler method. The findings underscore the limitations of the paper-ruler method and support the use of smartphone-based wound measurement tools for DFU assessment.

Conclusion: The Imito Wound App significantly enhances measurement reliability, reducing inconsistencies that could impact treatment decisions with the introduction of a more objective tool. Integrating digital wound measurement into clinical practice could improve DFU monitoring, ultimately reducing the risk of complications and lower limb amputations.

[OP12] A pilot investigation of Intelligent Foot Offloading Orthoses Technology (iFOOT) effectiveness to offload the high risk foot

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Aim: To determine whether innovative smart insoles can autonomously and effectively offload areas of peak pressure in forefoot regions

Method: Participants wore the smart insole in diabetic footwear. They walked along a 10m corridor whilst pressure was recorded. Following the identification of the highest pressure region within the forefoot, the shape of the smart insole was altered autonomously via a mobile app according to a pre-determined strategy, to offload that particular region. The participant then walked again at the same speed, to record the new pressures. This was repeated 3 times for both pre- and post-intervention and a mean value recorded for both conditions. Pressures under the 1st Metatarsophalangeal joint (MPJ), 2-4th MPJ and 5th MPJ were recorded in all captures.

Results / Discussion: 10 participants (8 male, 2 female; mean age 44.8years, SD 12.7; mean weight 77.4kg, SD6.4) were recruited. Dependent sample t-test revealed a significant reduction in pressure in all 3 pressure areas, p=0.0025.

Conclusion: This initial laboratory investigation demonstrates that innovative smart insole technology could provide a way forward to offload regions on the plantar aspect of the foot. This could be the first step to applying intelligent technology to prevent ulceration. Whilst this technology is still in its infancy, with the insole being controlled via a mobile application, in the near future these smart insoles could be controlled by Artificial Intelligence. This would bypass the need for the diabetic patient to wait for long periods of time until custom offloading insoles are manufactured, thus possibly reducing the rate of ulceration and eventually even amputation.

[OP13] Clinical efficacy of rearfoot elements in custom-made insoles for the prevention of recurrent plantar diabetes foot ulcers. A pilot randomized and controlled clinical trial

Cristina Villalta Alarcón[1], Mateo López Moral[1], Raul Molines Barroso[1], Francisco Javier Álvaro Afonso[1], Irene Sanz Corbalan[1], José Luis Lázaro-Martínez[1]

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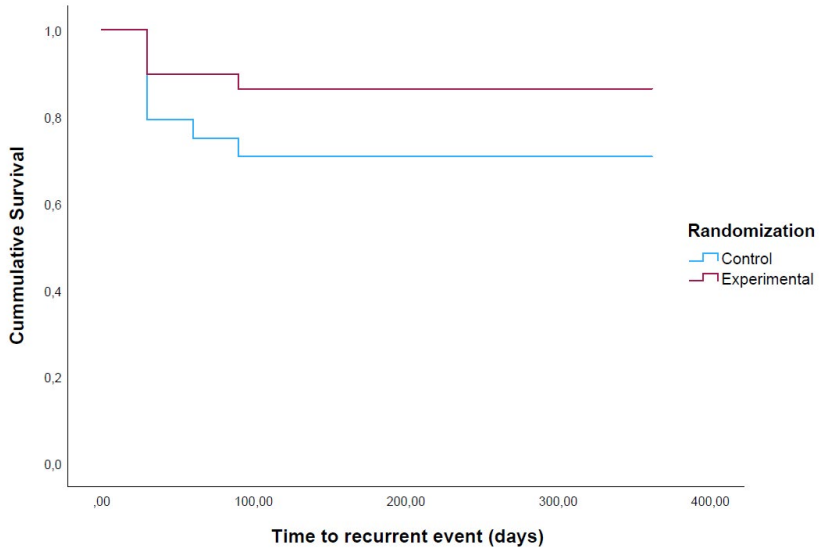
Aim: International Working Group Diabetic Foot (IWGDF) recommends the use of custom-made insoles in a person with diabetes who is at risk of foot ulceration. The aim of the present study is to evaluate the clinical efficacy of different rearfoot elements in custom-made insoles in the reduction in the prevention of plantar diabetes related foot ulcers (DFU).

Method: between January 2023 and February 2025 we conducted a randomized controlled parallel (1:1) clinical trial on 53 consecutive participants with diabetes and a previous plantar DFU. Participants were randomly assigned to group 1, those who were assigned plantar orthoses without a medial nor lateral heel wedge; and group 2 patients who were assigned insoles with medial or lateral heel wedge. The prescription of a rearfoot wedge was based on the foot position via the use of foot posture index. Primary outcome measures included recurrence rate and free survival time to recurrence. Secondary outcome measures included minor amputation. All the participants were followed up for 1 year one a month until they developed a recurrence event.

Results / Discussion: During the 1-year follow-up period 11 participants (20.8%) resulted in a recurrent foot ulcer, 7 (29.2%) in the control group and 4 (13.8%) in the experimental group, p=.170. Participants prescribed with a rearfoot wedge in their custom-made insole resulted in longer time to recurrence compared with control group, the difference between groups was not significant (p=.171) (figure 1). During the follow-up period we did not observe any minor amputation.

Conclusion: clinicians should consider the use of rearfoot wedges when prescribing custom-made insoles. Further research with bigger sample size is needed to better understand the nature of heel wedge in the clinical efficacy of participants in remission.

Figure 1.



[OP14] Footwear effects on biomechanical and user-related outcomes in individuals with diabetes at moderate-to-high risk of foot ulceration: a systematic review

Isabella Gigante[1 2], Jaap van Netten[1 2], Kamran Shakir[3 4], Sicco Bus[1 2]

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Aim: We aimed to systematically review biomechanical and user-related effects of footwear in people with diabetes at moderate-to-high ulceration risk (i.e. target population) and other populations.

Method: We conducted a PRISMA-guided systematic review in PubMed and Embase. Included studies were categorized by population, footwear type and components, and outcomes: pressure, shear stress, stability, adherence, usability, and quality of life. Studies involving the target population were classified as 'direct evidence', others as 'indirect evidence.' Risk of bias was assessed using the Critical Appraisal Skills Programme.

Results / Discussion: Of 5813 screened studies, 269 were included (10 qualitative, 176 cross-sectional, 35 cohort, 48 RCTs), with 32 providing direct evidence. As summarized in Table 1, rocker soles reduce forefoot pressure by 17–53% and increase midfoot/heel pressures. Larger rocker angles cause more discomfort. Insoles show variable balance effects, metatarsal pads reduce forefoot pressure up to 57%, and medial arch supports shift pressure to the midfoot. Evidence for the effect of shoe upper components is limited. Among the full-footwear interventions (being solely indirect evidence), custom-made and off-the shelf footwear show the largest pressure reductions, while pre-fabricated medical grade footwear improve balance. Footwear adherence being influenced by comfort, shoe weight, and aesthetics. All 32 direct evidence studies described footwear components. Shear stress was assessed once.

Conclusion: This review provides a comprehensive overview of how footwear (components) influences biomechanical and user-related outcomes in populations with and without moderate-to-high ulceration risk. Rocker outsoles effectively reduce forefoot pressure but may compromise stability. Insoles, the most studied component, show positive effects on pressure redistribution and comfort. User-related outcomes, shoe uppers, and shear stress are underexplored despite their clinical relevance. Overall, study quality was moderate. The outcomes of this systematic review guide clinicians and technicians in selecting appropriate footwear (features) for the target population.

Table 1: Table of results

Component	Biomechanical-related effects	User-related effects	Risk of bias
Rocker sole (47 studies)	• ↓ Forefoot pressure (-17 to 53%, -38 to 126.6 kPa p<0.01) • ↑ Midfoot/heel pressure (+1.6 to 32%, p<0.05) • Center of pressure shifts and ↑ postural sway (p<0.05)	• Discomfort/instability with high rocker angles (p<0.05)	High (1), Moderate (38), Low (8)
Midsole (9 studies)	• Thinner midsoles ↓ balance failures (p = 0.0003) • Harder midsoles ↓ balance failures vs. softer (p ≤ 0.003) • Peak pressures ↑ with sole hardness (up to +23%, p < 0.001)	• Thick, soft midsoles rated most comfortable (76–88%), but also comfort not different across sole hardness (p = 0.223) • No pain difference between shoe types (p = 0.60)	High (1), Moderate (5), Low (3)
Insoles (143 studies)	• Metatarsal pads/bars ↓ forefoot pressure (-11 to 57%, p<0.0001), best effect at 10.6 mm proximal to MTH2 • Heel/forefoot wedges altered center of pressure • Medial arch supports ↑ midfoot pressure (p<0.001), ↓ forefoot (p<0.001) & hindfoot pressure (p=0.014), ↑ balance, ↑ stability • Adding MTH pads to insoles further ↓ pressure with -15 to -20% (p< 0.05)	• All insoles ↑ comfort (p<0.05) • Cover materials ↑ comfort and stability (p<0.05)	High (15), Moderate (87), Low (41)
Shaft & upper (6 studies)	• Stiff shafts ↑ metatarsal pressure (p=0.016) • High collar shoes ↑ balance (p<0.001) • ↑ Ankle pressure and ↓ stability (p=0.018)	• Most preferred: flexible shaft + stiff sole boot (p=0.008) • Breathable materials ↑ comfort (p<0.05)	Moderate (4), Low (2)
Full-footwear interventions (45 studies)	• Pressure ↓ in several studies (e.g., up to −36% in forefoot with running footwear and up to −33% with custom insoles, p < 0.001) • Custom-made footwear showed greater pressure reduction than off-the-shelf in some studies (p < 0.05) • Off-the-shelf footwear linked to increased sway or instability in multiple studies (p < 0.05)	• Adherence influenced by comfort, weight & aesthetics (p<0.05) • Few studies compared footwear modifications • Heavier shoes lead to ↓ daily use	High (7), Moderate (40), Low (18)

[OP15] The Long-term Effects of a Personalized Multimodal Intervention on Plantar Pressure, Physical Activity, and Footwear Adherence in People with Diabetes at High Ulcer Risk: a preliminary analysis

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Aim: In people with diabetes, mechanical loading of the foot contributes to ulcer development and recurrence. The factors contributing to mechanical loading (plantar pressure, physical activity and footwear adherence) are mostly assessed at one moment in time, but if and how they change over time remains poorly understood. This study aims to assess these factors between two care models using data from a subsample of a multicenter randomized controlled trial.

Method: A subset of 23 participants (usual care: n=12, age: 72.1±5.2 years, BMI: 27.6±3.7; intervention: n=11, age: 71.9±7.0 years, BMI: 28.2±6.1) were included. The intervention group received enhanced care, i.e. pressure-optimized footwear, custom-made indoor shoes, temperature monitoring, and tailored education. In-shoe plantar pressure, daily steps, and footwear adherence were measured at baseline and 12 months with pressure-sensing insole, tri-axial accelerometer, and shoe temperature sensor. Paired t-tests and effect sizes (Cohen's d) were used for within-group comparisons, while independent t-tests assessed between-group differences.

Results/Discussion: The results are displayed in Tab. 1. At 12 months, no statistically significant differences were found between care groups for any of the measured outcomes. In-shoe PMax remained stable in both groups: from 247.4±56.7 kPa to 243.7±85.9 kPa for usual care (p=0.804, d=–0.07), and from 253.7±79.9 kPa to 238.6±66.5 kPa for the intervention (p=0.307, d =–0.36). While not significantly different, footwear adherence, wearing time, and step count remained more stable in the intervention group. These trends may indicate a potential benefit of the intervention, but should be interpreted with caution given the limited sample.

Conclusion: This preliminary analysis of the RCT found no significant differences in factors determining mechanical loading between usual and enhanced care groups after 12 months and between baseline and 12 months in either group. These exploratory findings support further evaluation of the intervention's effects over time in the full RCT cohort.

		Personalized				Standard				Group comparison at 12 months
Variable (Unit)		Baseline	Final Visit (12 months)	p	d	Baseline	Final Visit (12 months)	p	d	p
PTI	(kPa·s)	109.3 ± 25.7	120 ± 19.8	0.079	0.67	121.2 ± 20.3	116 ± 26	0.134	-0.47	0.079
Pmax	(kPa)	253 ± 79	238 ± 66	0.307	-0.36	247 ± 56	243 ± 85	0.804	-0.07	0.307
Adherence	(%)	65.7 ± 26.4	59.4 ± 22.6	0.576	-0.17	67 ± 30	51 ± 33	0.08	-0.56	0.576
Steps	(per day)	5484 ± 3195	5702 ± 3225	0.599	0.16	4121 ± 2024	3707 ± 2419	0.438	-0.23	0.599
Wearing Time	(hours/day)	7.7 ± 4.5	9.3 ± 4.7	0.321	0.31	8 ± 3.9	7.3 ± 4.9	0.418	-0.24	0.321

Tab. 1: Comparison between baseline and final visit results for personalized multimodal intervention (red) and standard care (blue). Values are presented as means ± std. dev.

[OP16] BAROPODOMETRICAL AND KINEMATIC ASSESSMENT IN TYPE 1 DIABETIC PATIENTS

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Aim: Constant physical activity has a protective effect against diabetic neuropathy and a positive effect on metabolic control, and can also increase walking performance in diabetic subjects. The objective of the investigation is to observe and quantify the biomechanical parameters that describe the dynamic behavior of the foot in type 1 diabetics who perform regular physical activity compared to sedentary patients.

Method: 21 patients were evaluated, 10 active (A) and 11 sedentary (S) in good metabolic control. The kinematic and pressure data collection were carried out using a baropodometric insole system (Pedar-Novel) to obtain the plantar pressure data and a Gait Analysis system (Technobody) to collect the kinematic and inertial data.

Results / Discussion: As regards the Gait Analysis, significant differences were observed for stride length; A=69 cm vs S=51 cm ($p<0.05$). Vertical oscillation significantly lower in sedentary people; A= 2.3 mm vs S= 1.4 mm ($p<0.05$).

The baropodometric analysis revealed pressure peaks in forefoot support that were significantly greater in the active population; A= 1450 kPa vs S= 1260 kPa ($p<0.05$). The support area significantly greater A= 133 cm\q vs S= 103 cm\q with ($p<0.05$).

Conclusion: The kinematic and baropodometric data of this study show significant differences in terms of mobility and foot support between sedentary vs active patients, with improvements in gait propulsion performance.

[OP17] Results of Treatment with the Novel, Non-Removable and Mobility-Promoting Offloading Device FiFI-Sole: A Retrospective Cohort Analysis

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Aim:

We developed and standardized a non-removable offloading device that is fabricated at the patient's bedside by medical professionals that had accomplished an 8-hours training course. The device consists of a rigid fiberglass base combined with a structured application of up to seven layers of felt and is fixed to the foot (non-removable). Patients are encouraged to maintain their activity levels and by that their quality of life and cardiovascular fitness. This retrospective analysis evaluates the treatment characteristics and results and compares them to treatments documented in the DFS-Register.

Method:

We searched the electronic patient records at our centre for the term "Fifi" between January 1, 2021, and December 31, 2023. The 1st ulcer in a person was evaluated as index ulcer to find out treatment characteristics. The DFS-Register was searched for all patients with treatments starting in the same period, observation ending in both cases 31.3.2025.

Results / Discussion:

A total of 199 patients were treated with the non-removable offloading device. In the DFS-register, treatments of 6402 patients were found.

	FiFi			**Register**		
	Avg	Median		Avg	Median	
Age	68,8	69		70,5	72	
Gender male			80,6%			68,4%
Gender female			19,4%			31,6%
DM Typ 1			4,6%			8,2%
DM Typ 2			93,5%			89,8%
Diabetes Duration	15,2	16,0		17,4	16	
Wight	96,2	93,0		92,2	91	
PVD			37,1%			35,7%
Infection			23,1%			35,0%
Bone Involvement			10,2%			9,0%
Duration	173,9	117		194,7	112	
Major Amputation			0,9%			0,67%
Minor Amputation			2,8%			5,61%
verstorben			9,26%			6,44%

Conclusion:

This retrospective analysis shows comparable severity and outcomes in patients treated with the mobility-focused approach and those in the general DFS register. The devices, being non-removable, incorporating all established offloading techniques, and allowing timely preparation, made it unnecessary to ask patients to reduce walking.

[OP18] A Mobility-Focused Offloading Approach Using a Novel Non-Removable Custom-made Device to Protect Diabetic Foot Ulcers: A Retrospective Safety Analysis in a Real-World Cohort

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Aim:

We developed and standardized a non-removable offloading device, fabricated directly at the patient's bedside by medical professionals who completed an 8-hour training course. The device features a rigid fiberglass base combined with a structured application of up to seven layers of felt and is fixed to the foot. Patients are encouraged to maintain their pre-DFU activity levels to help preserve quality of life and cardiovascular fitness. This retrospective analysis evaluates the safety of this mobility-focused treatment approach.

Method:

We searched the electronic patient records at our centre between January 1, 2021, and December 31, 2024. All ulcer episodes when the sole was used were observed until maximum 31.3.2025.

Results / Discussion:

A total of 273 patients was treated with the device on 502 plantar wounds. 34.7 % of index ulcers had PVD. The mean duration until wound closure was 116.5 days, 108.6 of them with the use of the sole. 39,218 days of use could be observed.

In 73.8% of cases, only minor adjustments to the sole were required, and no adverse events occurred. In one case, a new ulcer developed due to a flaw in the sole. The device had to be replaced in 10.7% of treatments. In 5.1%, incorrect application revealed insufficient training. In 1.1%, the sole was removed after becoming wet from rain or showers. Hospitalization was required in 11.2% of cases—mostly planned due to necessary revascularization—and 6.7% of patients died before wound closure; neither was related to the sole.

Conclusion:

Treatment with the non-removable Fifi offloading device, combined with encouraging unrestricted walking, appears to be a safe therapeutic option. To ensure optimal use, written instructions should be provided not only at the start but also throughout the treatment period.

[OP19] Environmental impact of offloading modalities for people with diabetes-related foot ulcers: a life-cycle assessment

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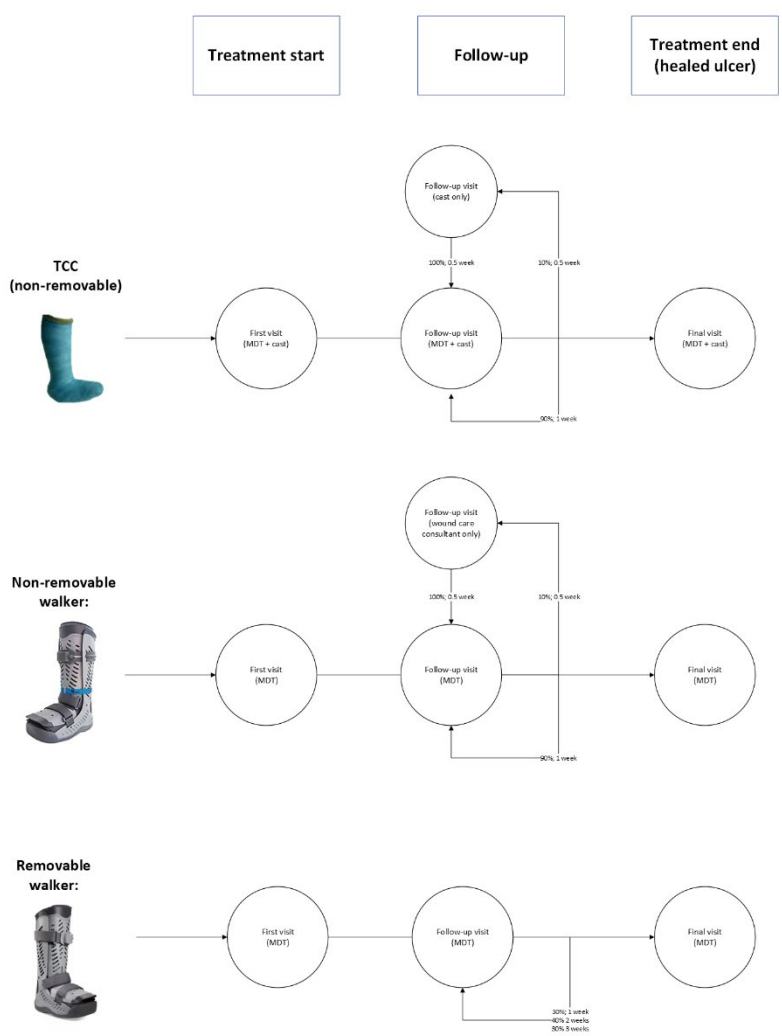
Aim: Climate change is a global issue, presenting significant threats to ecosystems, humanity and health. Healthcare is both impacted by and contributing to climate change. Insights into the environmental impact of diabetic foot disease treatments is absent. Besides clinical effects and patient preferences determining treatment, decision-making can also be based on other factors. We aimed to compare the environmental impact of three offloading modalities for people with a plantar foot ulcer, to incorporate sustainability into clinical decision-making.

Method: We followed the sustainable care pathways methodology. We defined three clinical pathways (Total Contac Cast (TCC)/non-removable walker/removable walker), including frequency of renewing TCC/walker, energy use and patient/clinician transport, based on scientific literature and input from experts (Fig.1). We measured materials used for a single TCC-application in 34 participants, and for one standard walker (Rebound Diabetic Walker, size L; Össur). We performed a lifecycle assessment using the ReCiPe-2016 method, employing SimaPro and Ecoinvent3.10. We calculated total CO_2-equivalents for each pathway in a Markov-model with 1,000,000 patients.

Results / Discussion: Mean environmental impact of producing and disposing a single TCC or walker was 8.7 and 11.8kg CO_2-eq respectively. Impact of one visit was 5.7kg CO_2-eq. Total impact of the entire offloading treatment of one ulcer (from first visit to healing) was on average 88.2kg (SD:56) CO_2-eq for a TCC, 60.4kg (SD:32) CO_2-eq for a non-removable walker, and 49.2kg (SD:22) CO_2-eq for a removable walker ($p<.001$).

Conclusion: Treating a plantar diabetes-related foot ulcer with a walker has significantly smaller environmental impact compared to treatment with a TCC. This resulted from the need to change TCCs weekly, whereas a single walker can be used (much) longer. Environmental impact from a removable walker was smaller compared to a non-removable walker, due to lower visit frequency, despite longer time to healing. Future analyses will investigate additional environmental parameters.

Figure 1: The three clinical pathways and their assumptions for the Markov-modeling



Assumptions and probabilities

MDT = multidisciplinary team visit
MDT consists of 4 professionals (2 medical specialists, 1 podiatrist, 1 wound care consultant).
MDT consists of 1 room of (on average) 15m2.
An MDT can see on average 24 patients/day.

Cast = casting technician visit
Casting technician is 1 professional.
Cast visit is in the casting room, which is 15m2.
A casting technician can apply on average 12 TCCs/day.

Probabilities
Probability of ulcer healing:
- mean time to healing = 6 weeks
- SD time to healing = 3 weeks
- minimum = 3 weeks
- maximum = 24 weeks
- % healed >12 weeks = 16%

Probability of follow-up visit:
Follow-up visit (MDT + casting technician): 90%; always 1 week
Follow-up visit casting technician only: 10%; 0.5 week. Then 100% to follow-up visit MDT+casting technician, after 0.5 week.

Probability of new TCC provided after follow-up visit: 100%
Probability of new TCC provided after final visit: 0%

MDT = multidisciplinary team visit
MDT consists of 4 professionals (2 medical specialists, 1 podiatrist, 1 wound care consultant).
MDT consists of 1 room of (on average) 15m2.
An MDT can see on average 24 patients/day.

Probabilities
Probability of ulcer healing:
- mean time to healing = 6 weeks
- SD time to healing = 3 weeks
- minimum = 3 weeks
- maximum = 24 weeks
- % healed >12 weeks = 17%

Probability of new walker provided:
First visit: 100%
Follow-up visit: 0%, unless it is the first follow-up >12 weeks after treatment start, then 100%.
Final visit: 0%.

Probability of follow-up visit:
Follow-up visit (MDT): 90%; always 1 week
Follow-up visit wound care consultant only: 10%; 0.5 week. Then 100% to follow-up visit MDT, after 0.5 week.

MDT = multidisciplinary team visit
MDT consists of 4 professionals (2 medical specialists, 1 podiatrist, 1 wound care consultant).
MDT consists of 1 room of (on average) 15m2.
An MDT can see on average 24 patients/day.

Probabilities
Probability of ulcer healing:
- mean time to healing = 10 weeks
- SD time to healing = 5 weeks
- minimum = 3 weeks
- maximum = 24 weeks
- % healed >12 weeks = 42%

Probability of new walker provided:
First visit: 100%
Follow-up visit: 0%, unless it is the first follow-up >12 weeks after treatment start, then 100%.
Final visit: 0%.

Probability of time to next MDT visit:
- 1 week = 30%
- 2 weeks = 40%
- 3 weeks = 30%

[OP20] CHARCOT NEURO-OSTEOARTHROPATHY: A NEW RISK CLASS IS NEEDED?

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Aim: Charcot Neuro-Osteoarthropathy (CNO) epidemiological data are few, with no shared national or international registry. The IWGDF 2023 Risk Stratification System and its corresponding foot examination does not currently include CNO due to insufficient medical evidence. This study, conducted at the Italian Diabetic Foot Clinic of Pistoia, Tuscany, Italy, aimed to propose the inclusion of a new risk classification (risk class 4) in the IWGDF Risk Stratification System, specifically for patients diagnosed with CNO. The objective was to assess the impact of more frequent podiatrist monitoring on key clinical outcomes such as re-ulceration, amputation, and revascularization rates.

Method: We evaluated 211 patients over two years: 184 high-risk (HR) patients (risk class 3) without CNO and 27 patients with previously diagnosed CNO. The study was divided into two phases:

1. Year 1: Comparison of epidemiological data, peripheral vascular disease, revascularizations, re-ulcerations, and re-amputation rates between the two groups, with follow-ups every 1-3 months.

2. Year 2: Only CNO patients were included, reducing follow-up intervals to a maximum of 30 days, and comparing the data with the previous year.

Results / Discussion: In the first year, CNO patients had a significantly higher risk of re-ulceration (70.4%) compared to HR patients (33.1%), increased amputation rates (18.5% vs. 7.6%), and a higher rate of revascularization in patients with peripheral artery disease (21% vs. 8%). In the second year, with more frequent follow-ups, re-ulceration rates decreased to 18.5%, while new amputation and revascularization rates dropped respectively to 3.7% and 7,14%.

Conclusion: CNO was strongly associated with higher recurrence risks (ulcerations, amputations, etc.), emphasizing the need for appropriate screening and treatment frequency. Although based on limited data, this study provides an epidemiological foundation for including CNO in the IWGDF risk stratification guidelines as a new risk class, recommending at least monthly treatment to reduce complications.

[OP21] MAC score does not discriminate Charcot from non-Charcot neuropathic patients but predicts chronic diabetes-related complications.

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Aim: To test if MAC score could identify an association in patients with diabetes (DM) between vascular calcification and Charcot Neuro-osteoartreopathy (CNO) and identify potential predictors of CNO presence and evolution.

Method: We prospectively enrolled all patients presenting at our Diabetic Foot (DF) clinic in 2024 with DM, duration of disease (DD) over 5 years and no history of ulceration, surgical foot procedures or revascularization. We divided patients into three Groups: Group A, affected by CNO, Group B, with peripheral neuropathy without CNO and Group C, non-neuropathic. We compared them for clinical history, DM complications, vascular calcification by means of MAC score, and Vibration Perception Threshold (VPT).

Results / Discussion: We enrolled 64 patients: 21 (32.8%) in Group A (mean age 66.9±7.9 yrs, M/F % 33.3/66.7, DM 1/2 % 42.9/57.1, DD 26.9±15.4 yrs), 22 (34.4%) in Group B (mean age 67.2±10.1 yrs, M/F % 86.4/13.6, DM 1/2 % 18.1/81.9, DD 24.6±14.8 yrs), and 21 (32.8%) in Group C (mean age 65.3±10.9 yrs, M/F % 47.7/52.3, DM 1/2 % 23.8/76.2, DD 19.9±14.2 yrs). Number of complications was higher in Group A and B versus C ($p=0.004$). Age/gender-corrected VPT, both at first toe and at malleolus, was highest in Group B, intermediate in A ($p<0.05$ vs B) and lower in C ($p<0.001$ vs A and B). Similarly, mean MAC score was higher in Group B, intermediate in A and lower in C ($p=0.034$). Correlation analysis showed a direct association of MAC score with both VPT values ($p<0.001$ for first toe and $p<0.001$ for malleolus) and number of chronic complications ($p<0.001$). No correlation between MAC score and presence and activity of CNO.

Conclusion: MAC score does not discriminate about presence of CNO but is associated to number of chronic complications, thus suggesting a possible role as an index of complexity of DM overall.

[OP22] Learning from the clinic and artificial intelligence: a possible predictive model for clinical suspicion of Charcot neuro-osteoarthropathy in the acute phase.

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Aim: after retrospective analysis of our Charcot neuro-osteoarthropathy (CNO) patients, we found a discrepancy between clinical suspicion and imaging confirmation of activity through magnetic resonance (MRI). We then speculated if an artificial intelligence(AI)-generated prediction model could help in diagnostic workup.

Method: We retrospectively collected clinical and MRI data of all patients with clinical suspicion of active CNO in 2024. We searched for previous episode of active CNO, oedema, erythema, pain and temperature difference in the plantar or dorsal region greater than 1°C (Celsius). We divided patients according to MRI confirmation of activity through detection of bone marrow oedema (Group A) or not (Group B). We created a decision model applying the AI-technique of Random forest in regression modality with growing method Exhaustive CHAID (CHi-square Automatic Interaction Detection) organizing probabilities in a tree-like hierarchical model.

Results/Discussion: We studied 40 patients: 15 in Group A (37.5%, mean age 66.1±9.6, male/female 46.7/53.3%) and 25 in Group B (62.5%, mean age 70.2±8.0, male/female 64.0/36.0%). CNO history was present in 44% in Group A and 60% in B, pain in 44% in Group A and 53.3% in B, oedema in 44% in Group A and 80% in B, erythema in 16% in Group A and 46.7% in B. Plantar temperature was higher than 1°C in 72% of Group A and 86.7% of B while dorsally the difference was higher than 1°C in 56% in Group A and 73.3% in B. Only erythema (p=0.004) differed significantly. The diagnostic model included, in hierarchical order: oedema (p=0.026), erythema (p=0.026), history of CNO (p=0.049) and plantar temperature difference greater than 1°C (p=0.003).

Conclusion: According to exhaustive CHAID method, presence of oedema, erythema, history of CNO and plantar temperature difference greater than 1°C in this hierarchical order, represent the clinical cluster of diagnostic signs more reliable in detecting active CNO.

[OP23] Can novel bioceramics withstand osteoclastic resorption or act as a vehicle to deliver local therapies for treatment of fractures and limit bone destruction of the active Charcot foot in diabetes?

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Aim: The active Charcot foot in diabetes is characterised with excessive osteoclastic activity and reduced osteoblastic repair. Despite prolonged immobilisation, fracture non-union is common. We hypothesise that targeted therapy with suitable synthetic bone substitutes could augment bone healing and lessen deformity. The aim was to investigate how newly formed osteoclasts generated from monocytes from people with active Charcot foot degrade different types of bioceramics and compare it with bone resorption in the presence /absence of activators and inhibitors. Next, we assessed the chemical composition of resorbed surfaces before and after the addition of the cathepsin K inhibitor, Odanacatib (ODN).

Method: Osteoclast precursors from people with active Charcot foot were cultured in the presence of macrophage-colony stimulating factor (M-CSF) and receptor activator of nuclear factor-κβ ligand (RANKL) on β-tri-calcium phosphate, hydroxyapatite and bovine bone discs. Osteoclast formation and resorption were assessed after 21 days in vitro with confocal image analysis, contact and optical surface analysis methods. The compositional variation of randomly selected resorbed areas was examined with Raman spectroscopy.

Results / Discussion: We observed that osteoclast biodegradation of β-TCP discs resembled resorption of bovine bone discs, whereas osteoclast biodegradation of HA-discs included intracellular digestion of the material (endocytosis). Initial assessment with contact surface profilometry indicated differences between resorption depth of bone discs vs resorption depth of biomaterials. Optical profilometry showed differences between bone resorption (organic and inorganic) and dissolution of biomaterials (inorganic). Pilot experiments with the resorption inhibitor ODN, added in vitro reversed the deep trenches (bulldozer type of resorption) to a less aggressive resorption of pits (drilling resorption). Raman spectroscopy showed differences in organic and inorganic dissolution.

Conclusion: These observations have translational potential as they may inform novel therapies with bioceramics coated with an osteoclast inhibitor as targeted therapy to modulate bone destruction of the active Charcot foot.

[OP24] From pixels to patterns: Charactering Charcot Deformity progression for surgery

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Aim: Charcot foot is a severe, progressive, and debilitating complication of peripheral neuropathy. It is characterised by progressive bone and joint destruction. Understanding deformity progression is key to preventing ulceration and potential amputation. Artificial intelligence (AI) using radiographs was used to predict Charcot evolution and identify key time points for deformity progression.

Method: We found 263 patients diagnosed with Charcot, with radiographs of the foot, ankle, and calcaneus. Inclusion criteria included; a complete set of radiographs from stage 0 to fulminant CN deformity changes even with total contact casting and a documented diagnosis of Charcot. We characterised deformity patterns into ankle, Chopart, TMTJ and forefoot. The images were transferred into an AI program to create animations of deformity progression and assess speed of progression and deformity sequence in Charcot neuroarthropathy.

Results / Discussion: In total 42 patients meet the criteria. 12 Had Type 1 diabetes, 26 had type 2 diabetes and 4 had no diabetes. There were 18 Ankle, 36 Chopart, 32 TMTJ affected by the CN process. In 11 patients all three locations were affected, 4 were bilateral. 21 were Right-sided and 21 Left-sided. In total 532 radiographic images were used: 380 foot x-rays, 143 ankle x-rays, and 9 calcaneus x-rays.

Modelling with AI was used to map deformity progression. This included bone fragmentation, bone loss, joint subluxation and CN collapse. Three models of deformity development were mapped and animated. Standard angles from radiographs were used to assess progression; (calcaneal pitch, meary's, talo-calcaneal angles on AP/Lateral). Each specific pattern deformity had a different speed of progression and sequence. Hind-foot followed by TMTJ patterns had the greatest speed of deformation.

Conclusion: AI can be used to define radiographic trends in Charcot foot. The model's characteristic patterns of CN deformity, and support monitoring outcomes, for training and possible early surgical intervention.

[OP25] Efficacy of ancient and innovative techniques for treatment of osteomyelitis in the diabetic foot

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Aim: Osteomyelitis is one of the most common manifestations of diabetic foot infection, it is present in approximately 10-15% of moderate infectious processes and in 50% of severe ones, associated with a high risk of major amputation. Surgical treatment has been the milestone for treatment of osteomyelitis, but is associated with dead spaces and biomechanical alterations of the foot. Conservative surgery aims to limit morbidity by trying to reconstitute a valid support for walking, limiting major amputations.

Method: The study was conducted from January 2021 to January 2024 on 83 patients with diabetic foot syndrome complicated by ulceration and osteomyelitis (Texas University 3B and 3D), localized to the forefoot, midfoot, hindfoot and ankle. All patients underwent conservative surgery combined with adjuvant antibiotic therapy. Resection of bone infections were associated with complex techniques such as bone substitute implantation, Masquelet technique and distraction osteogenesis according to the Ilizarov method for ankle localizations.

Results / Discussion: Healing of the lesion was achieved in 76 cases (91.6%), with an average healing time of 74.5 days. In 45.8% of cases at least one reoperation was necessary during the first year. Persistence of osteomyelitis was observed in 2.4% for which a surgical revision was necessary within the first 6 months. Residual bone stump modeling interventions for ulcerative recurrence, biomechanical osteotomic corrections, tendon rebalancing procedures or fascio-cutaneous flaps were necessary in cases of ulcerative recurrence (3.6%) and load transfer ulcer (18.1%). In the first year, only one death occurred, while two cases were lost to follow-up.

Conclusion: Osteomyelitis should not be considered a "unique" disease, but the association with soft tissue infection, ischemia, different locations and host characteristics influence the outcome, regardless of treatment options. Combining ancient and innovative techniques can improve outcomes and quality of life, avoiding major surgery.

[OP26] Correlation between Carotid Artery Disease and Peripheral Arterial Disease in patients with diabetic foot ulcers

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[1]University Hospital "Tor Vergata", Rome, Italy; [2]Centro Traumatologico Ortopedico "A. Alesini", Rome, Italy

Aim: The aim of this study was to evaluate if there is a correlation between Carotid Artery Disease (CAD) and Peripheral Arterial Disease (PAD) in patients with diabetic foot ulcers (DFUs).

Method: This is a retrospective observational study conducted in a specialized diabetic foot service, including a population of admitted patients with neuro-ischemic DFUs who underwent lower limb revascularization. Clinical, metabolic, and cardiovascular characteristics were assessed such as the prevalence of significant CAD, defined as the presence of a carotid plaque exceeding 70% stenosis and requiring revascularization (endovascular or surgical). A comparative analysis was performed between patients with significant CAD (CAD+) and those without (CAD-), investigating factors influencing its development and its correlation with the severity of PAD.

Results / Discussion: Overall, 75 patients were included, among them 8 (10.7%) had CAD, while 67 (89.3%) not. CAD+ in comparison to CAD- were older (80.1±5.4vs69.1±11.5,p=0.009), had a longer diabetes duration (30±15.1vs21.7±13 years) and lower HbA1c levels (61±22 and 64±20 mmol/mol, p=0.6). In addition, patients with CAD had a lower prevalence of dyslipidemia (87.5%vs100%,p=0.03), and more frequently exhibited mixed-type carotid plaques with calcium and lipids (75%vs25%,p=0.02). The study did not reveal any significant correlations between the characteristics, the type kind and the severity of PAD and the severity of CAD. At the multivariate analysis, among the factors influencing the presence of significant CAD, only the age (per 10 year increase) emerged as an independent factor associated with the severity of carotid atherosclerosis [OR 3.6 CI95% (1.5-7.1)].

Conclusion: These findings suggest that in patients with ischaemic DFUs the carotid vascular bed may be less sensitive to traditional cardiovascular risk factors than the lower limb vascular bed. Instead, carotid plaque formation appears to be more closely associated with the age.

[OP27] Comparison of morphological features of the plantar soft tissues between previously ulcerated and non-ulcerated sites in people with diabetes

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Aim: To examine the thickness, stiffness and ultrasound features of the plantar soft tissues (PST) in people with diabetes, with a focus on comparing between recently healed (or previously ulcerated) and non-ulcerated sites.

Method: The thickness, stiffness (sonoelastography) and other sonographic features of the PST were examined bilaterally using a GE Logiq S8 ultrasound machine and 8-15-MHz linear array transducer (ML6-15). Plantar tissue thickness was measured as the maximum vertical distance between skin and bone. Three sonoelastography measurement techniques were used to measure plantar tissue stiffness, namely, colour scoring, strain index and strain ratio. Additionally, the presence of a mass/bursa, alterations in echotexture, bone or tendon pathology, calcifications and a positive Power doppler signal was further documented. These variables were examined at seven plantar sites known to be at the highest risk of ulceration on each foot.

Results / Discussion: 20 people with a recently healed DFU were recruited from outpatient podiatry clinics in Scotland. The mean age of participants was 64.3 (SD 12.4) years, and their mean BMI was 30.0 (SD 4.9) kg/m^2. 85% of participants were male, 75% had type 2 diabetes and 85% had diabetic peripheral neuropathy. Thickness and stiffness differences between ulcerated and non-ulcerated PST sites appear broadly modest. However, all ulcerated sites presented with at least one sonographic abnormality. Notably, they were more likely to present with ≥3 sonographic changes (13/20, 65%). By contrast, no pathological ultrasound features were observed in almost half of non-ulcerated sites (115/253, 45%).

Conclusion: This study highlights that differentiating sonographic features may exist between ulcerated and non-ulcerated PST sites. However, thickness and stiffness features were varied across the PST sites studied and further work is required in a larger sample.

[OP28 -Top 5 Oral] Short-term efficacy of a multimodal intervention program to improve custom-made footwear use in people at high risk of diabetes-related foot ulceration

Jaap van Netten[1], Lisa Vossen[1], Faye Driebergen[1], Danne Wolthuis[1], Maarten Merkx[1], Sicco Bus[1]

[1]*Amsterdam UMC, Amsterdam, Netherlands*

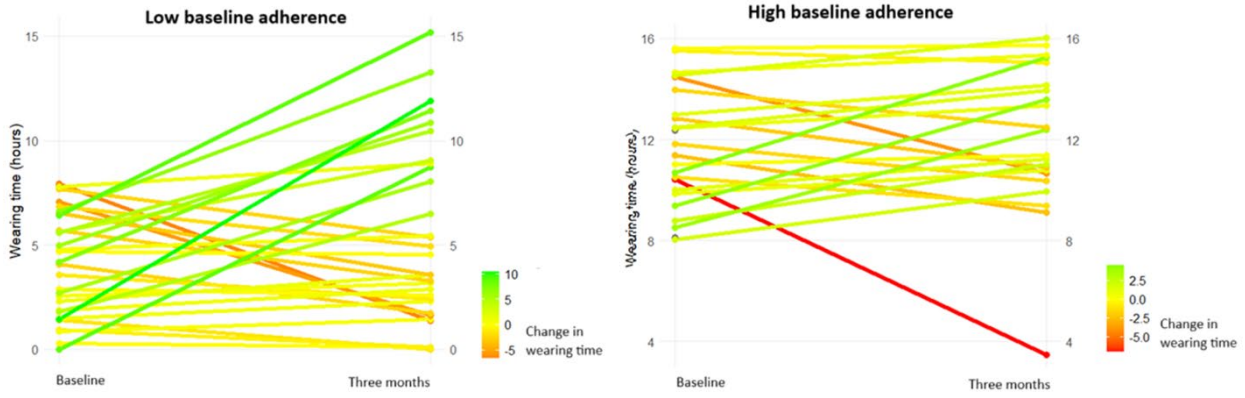
Aim: Wearing custom-made footwear is key in diabetes-related foot ulcer prevention. However, adhering to wearing footwear is challenging, in particular at home. Evidence-based interventions with proven effect are needed, but scarce. We developed a multimodal intervention to improve custom-made footwear use, and investigated short-term efficacy.

Method: We used a multidisciplinary multiphase approach to develop a three-modality intervention: structured education, motivational interviewing, and custom-made indoor footwear. To assess efficacy, we measured mean 2-week wearing time of custom-made footwear with a validated sensor, at baseline and after three months (primary outcome), and in the two weeks directly before and after each modality was administered (secondary outcomes). We assessed differences between timepoints using within-subjects T-tests.

Results / Discussion: 53 participants were included (30 with low [<8hours/day] baseline adherence): 17% females, mean age 66 (SD:10) years, all with peripheral neuropathy and a recent foot ulcer (mean time since healing: 6 (SD:9) months). Wearing time increased non-significantly from 4.0 (SD2.5) at baseline to 5.5 (SD4.3) after three months in the low adherence group (p=0.068, Fig1.); this was 11.9 (2.3) to 12.0 (2.8) in the high adherence group (p=0.898). Following provision of indoor footwear, wearing time increased significantly for low baseline adherence (Δ2.7 hours/day (95%CI:1.0-4.4; p=.004) and high baseline adherence (Δ2.0 hours/day (95%CI:0.5-3.4; p=.010). Following structured education, wearing time increased non-significantly in those with low baseline adherence (Δ1.0 hours/day (95%CI:0-0.2-2.2; p=.098). Following motivational interviewing, wearing time remained similar in both groups.

Conclusion: The multimodal intervention program combining structured education, motivational interviewing and custom-made indoor footwear did not result in a statistically significant improvement of wearing time of custom-made footwear after three months. However, significant improvements followed the provision of indoor footwear, and clinically relevant improvements followed structured education in people with low adherence, providing avenues for implementation and research.

Figure 1: Changes in daily wearing time of custom-made footwear for each of the 53 participants, divided in low (left) and high (right) baseline adherence.



[OP29 -Top 5 Oral] Comparison of four, eight and twelve weeks-based screening for the prevention of recurrent diabetes-related foot ulcers: A randomized clinical trial.

Mateo López Moral[1], Marta García-Madrid[1], Raul Molines Barroso[1], Irene Sanz-Corbalán[1], Aroa Tardáguila García[1], José Luis Lázaro-Martínez[1]

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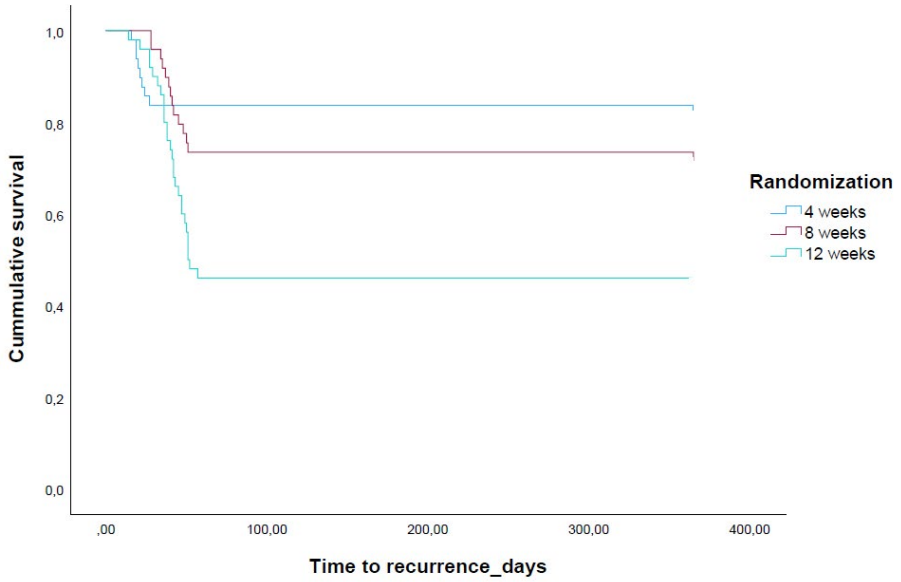
Aim: International Working Group Diabetic Foot (IWGDF) recommends to screen patients at high-risk (risk-3) of a foot ulcer once every 1 – 3 months. The aim of the present study is to evaluate the clinical efficacy of different screening times in participants with plantar diabetes-related foot ulcers (DFU) in remission.

Method: between October 2023 and January 2024 we conducted a randomized controlled parallel (1:1:1) clinical trial on 148 consecutive participants with diabetes and a previous plantar DFU. ClinicalTrial.gov (Reg. no.: NCT06143215). Participants were randomly assigned to group 1, participants screened every 4 weeks; group 2, participants screened every 8 weeks; and group 3, participants screened every 12 weeks. Primary outcome measures included recurrence rate and free survival time to recurrence. Secondary outcome measures included minor lesions, minor and major amputation, and death. All the participants were followed up for 1 year or until they developed a recurrence event. At every visit, the principal investigator performed debridement of high-risk points, such as minor lesions or hyperkeratosis following the IWGDF guidance.

Results / Discussion: during the 1-year follow-up period 50 participants (32%) resulted in a recurrent event, 9 (18.4%) in group 1, 14 (28.6%) in group 2 and 27 (54%) in group 3 (p<.001). In the multivariate analysis group 1 resulted in longer free-recurrence survival time compared to group 2 and 3, (P=0.001; 95% CI, 233.5 – 283.6; hazard ratio 13.5) (fig 1). Additionally, a trend was observed related to a higher rate of minor lesions in group 2 participants (n=10) compared to group 1 (n=2) and group 3 (n=5), (p=.037). Minor and major amputation and death did not show any difference between study groups.

Conclusion: diabetes related foot ulcers patients in remission must be screened on a 4-weeks basis to prevent ulcer recurrence.

Figure 1.



[OP30 -Top 5 Oral] Effectiveness of the DIASSIST Optimization Method to Reduce Plantar Pressure in Custom-Made Footwear in People with Diabetes at High Ulcer Risk: a Randomized Controlled Trial

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Aim: Custom-made footwear for people with diabetes aims to prevent foot ulcer recurrence by redistributing plantar pressure, with guidelines recommending peak pressures below 200kPa. Implementation of this recommendation and the potential for further improvement remains unclear. We investigated the effectiveness of the DIASSIST optimization method to further improve plantar pressure distribution of custom-made footwear in people with diabetes at high ulcer risk compared to usual care.

Method: This study evaluates the footwear part of a multicenter RCT on ulcer prevention, where 126 people with diabetes, neuropathy, a recently healed foot ulcer, and custom-made footwear were assigned to the intervention (n=62) or control (n=64) group. We assessed all footwear on design features and measured in-shoe plantar pressure during walking. The DIASSIST optimization method entailed evaluating and modifying footwear based on scientific evidence, footwear design, peak pressure and clinical expertise, until no further benefits were to be expected. Peak pressure parameters were compared between groups using t-tests and statistical parametric mapping. In footwear with peak pressures already <200kPa before optimization, we assessed pressure improvement beyond guideline recommendations.

Results / Discussion: Maximum peak pressure was significantly lower for the intervention versus control: mean 195 (SD:54) vs 223 (SD:72) kPa (p<0.0001), as were other scalar pressure parameters (Table 1). Multidimensional analysis showed significantly reduced forefoot pressures, increased midfoot pressures, and lower pressure during 70–80% of the stance phase for the intervention versus control (Figure 1). Statistically significant improvements were reached in the 39% of footwear with peak pressures already <200kPa (Table 1).

Conclusion: The DIASSIST optimization method significantly improved pressure distribution in custom-made footwear compared to usual care, even when peak pressures were <200kPa before modifications. Thus, footwear in clinical practice can be further improved. Clinical outcomes of the RCT will determine the effect of this method on ulcer recurrence.

Table 1: Scalar peak plantar pressure parameters for the primary and secondary analysis. Primary analysis: the control vs intervention group, secondary analysis: a subgroup analysis of the shoes <200kPa pre-modifications in the intervention group. Data are presented as mean (SD), n equals the number of included shoes.

	Maximum peak pressure (kPa)	Pressure time integral (kPa.s)	Pressure gradient (kPa/mm)
Primary analysis: Control vs Intervention group			
Control group (n=210)	223 (72)	98 (26)	14 (6)
Intervention group (n=167)	195 (54)	93 (25)	12 (5)
Significance	**P<0.0001**	P=0.09	**P<0.0001**
Secondary analysis: Pre- vs Post-modifications (<200kPa)			
Pre-modifications (n=42)	171 (24)	88 (18)	11 (3)
Post-modifications (n=42)	163 (21)	83 (17)	10 (3)
Significance	**P<0.05**	**P<0.05**	**P<0.05**

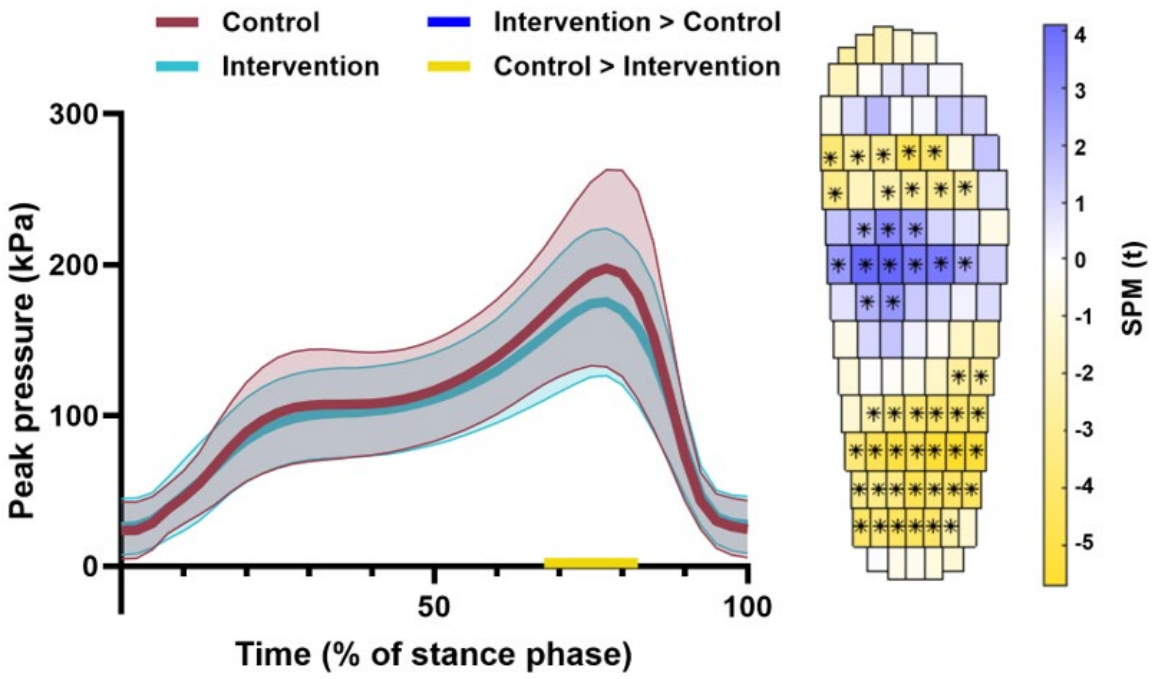

Figure 1: Peak plantar pressure in temporal (left) and spatial (right) parameters for the primary analysis: control vs intervention group. Spatial results are shown as the statistical differences, with significant differences indicated with an asterisk. Blue indicates higher pressure post-intervention, yellow indicates higher pressure for the control group.

[OP31-Top 5 Oral] Introducing the concept of Minimal Invasive Novel Open Revascularization (MINOR) approach and its Impact on infra brachial and infra inguinal limb bypasses.

Hani Slim[1], Yasmeen Gouda[1], Shailendra Singh[1], Yanxue Li[1], Catia Agostinhodossantos[1]

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Aim:

The challenges in traditional major open bypass revascularisation, particularly in the diabetic population remain the high perioperative complications including large wounds, extensive dissections, poor mobility, major blood loss, infection, post-operative complications

Aim, to Introducing the Minimal Invasive Novel Open Revascularization (MINOR) approach. Utilizing minimal incisions and dissections for bypass to minimize the peri and post-operative complications. MINOR has 4 criteria

- Shorts Vein bypass revascularization
- Endoscopic vein harvesting (EVH)
- Least amount of tissue damage
- Faster recover with the minimal perioperative morbidities.

Method:

All patients undergoing upper or lower limb bypass surgery were recruited into the MINOR approach arm without any case selection bias. All cases were performed by a single vascular surgeon. Primary outcomes were technical success, wound site complications. Secondary outcomes were: 30-day mortality, major amputations, graft patency and Amputation free survival rates

Results / Discussion:

A total 81 infra- brachial and infra-inguinal bypasses revascularization surgery using MINOR approach technique. The majority 63% were diabetic. 91% of the bypasses were for CLTI. The outflow arteries included popliteal bypasses in 19(23%), distal bypasses in 32(40%) and ultra distal bypasses in 30(37%).
Endoscopic Vein Harvesting (EVH) was used in all conduits. Technical success was 100 % with zero conversion rate. Wound and EVH tunnel site complications including mild haematomas were observed in 15%. These were all managed conservatively and made full recovery.
The One-year mortality rate was 2.5%. The Major amputation rate was 2.5 %, both patients with patent grafts.
The primary and secondary patency rates at 1 year were 72% and 90 % respectively and amputation free survival rate at 18 months was 89 %

Conclusion:

The MINOR approach technique in open limb bypasses is an efficient and safe procedure with no major adverse effects and excellent, mortality, graft patency and Amputation free survival rates.

[OP32 -Top 5 Oral] Disease Burden of Charcot Neuro-Osteoarthropathy in a Population-Based Diabetes Registry

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[1]Amsterdam UMC location University of Amsterdam, Department of Rehabilitation Medicine, Amsterdam, Netherlands; [2]Amsterdam Movement Sciences, Rehabilitation and Development, Amsterdam, Netherlands; [3]Glasgow Caledonian University, School Health and Life Sciences, Glasgow, United Kingdom; [4]Glasgow Caledonian University, School of Computing, Engineering and Built Environment, Glasgow, United Kingdom; [5]University of Galway, School of Health Sciences, Galway, Ireland; [6]Steno Diabetes Center Copenhagen, Herlev, Denmark; [7]The Bioinformatics Center, Department of Biology, University of Copenhagen, Copenhagen, Denmark; [8]King's College Hospital NHS Foundation Trust, Diabetic Foot Clinic, London, United Kingdom

Aim: Charcot Neuro-Osteoarthropathy (CNO) is a rare complication of diabetes, with limited population-based data describing associated health outcomes. We aimed to quantify disease burden by examining time from first CNO diagnosis to emergency admission, major or minor lower extremity amputation (LEA), or death.

Method: This prospective cohort study utilised linked health data from the Scottish Care Information–Diabetes (SCI-Diabetes) registry for NHS Greater Glasgow and Clyde region. Between 2015–2024, 127,513 people with diabetes were identified in a regional population of 1.3 million, of whom 140 had a first diagnosis of CNO, defined by earliest recorded diagnostic code. Demographics and clinical characteristics were summarised. Time to emergency admission, LEA, and death was analysed using Kaplan-Meier curves. Group differences were assessed using log-rank tests. Median survival times and survival probabilities were reported.

Results/Discussion: Mean age at first CNO diagnosis was 59(±14) years and 67% were male. Common comorbidities and foot risk markers included HbA1c 72(±23) mmol/mol, eGFR 52(±15) ml/min, and BMI 31(±7) kg/m². Neuropathy was present in 64%, PAD in 28%, and 40% were classified as high/active foot risk based on assessments closest to diagnosis. Median time to emergency admission was 40 days, with one-year admission probability of 67%. At five years, the overall survival probability was 67%, and the probability of remaining free from LEA was also 67%. Amputation-free survival (AFS) probability (alive and no amputation) was 44%, with a median time to event of 4.04 years. AFS probability was significantly lower in those with CKD stages 4-5 (16%, $p<0.0001$) and high/active foot risk (32%, $p=0.003$).

Conclusion: This registry data showed increased morbidity and mortality following CNO diagnosis in people with diabetes. The high rate of emergency admission within 1.5 months, along with poor five-year outcomes, suggests potential delays in diagnosis or gaps in care that require urgent attention.

[OP33] AfroDiale – A multi-centre observational study of diabetic foot ulcers in 10 different countries across Africa. PART 1- Ulcer characteristics at baseline.

Roozbeh Naemi[1], Ketan Dhatariya[2 3], Zulfiqarali G. Abbas[4 5 6]

[1]School of Health and Society, University of Salford, Manchester, United Kingdom; [2]Norfolk & Norwich University Hospitals NHS Foundation Trust, Norwich, United Kingdom; [3]Norwich Medical School, University of East Anglia, Norwich, United Kingdom; [4]Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania; [5]Abbas Medical Centre, Dar es Salaam, Tanzania; [6]School of Health, Education, Policing and Sciences, Stoke on Trent, United Kingdom

Aim:

The aim of the study is to investigate the demographics and characteristics of patients with active Diabetic Foot Ulcer (DFU) who attended 10 foot clinics across Africa.

Method:

During the 6 months study period-October 2023 to March 2024 -data from 762 (F/M:297/465) consecutive patients with active DFU who attended the diabetes services across the 10 African countries were accessed. The data included demographics, diabetes status, details of ulcer, amputation history, peripheral neuropathy, peripheral arterial diseases (PAD), ulcer classification as well as the lifestyle and comorbidities. Descriptive statistics was used to describe the characteristics of patients at baseline.

Results / Discussion:

The distribution of ulcers across SINBAD classifications were: SINBAD-1: 5.4%, SINBAD-2: 7.5%, SINBAD-3: 14.2%, SINBAD-4: 34%, SINMBAD-5: 27.2% and SINBAD-6: 10.2%. There were 5.1% of patients with Charcot foot, and 3.4% had an active ulceration on the Charcot foot. Blisters was the most prevalent aetiology (32.2% of all wounds) followed by trauma (19.4%). 20.5 % of patients had history of amputation (3.1% major amputations, 17.6% minor amputations and 0.2% both minor and major amputations) while 47.8% had a previously healed ulcer. 88% of patients had peripheral neuropathy while 33.6% had peripheral arterial disease (PAD). 78.5% had a palpable pulse in either feet and 30.4% had neuro-ischemic ulcers.

Conclusion:

In this Pan African study, we have shown that almost 9 in 10 DFU were neuropathic with half of patients having a history of ulceration. 1 in 3 patients had PAD with a similar ratio having neuro-ischaemic ulcers. 70% of all ulcers had SINBAD classification scores 4 or higher.

Our results show that neuropathy is still the commonest cause of DFU. The prevalence of peripheral arterial disease is also high. The knowledge of patient and ulcer characteristics at baseline can be useful in developing strategies to improve resource allocations across Africa.

[OP34] Diabetic Foot patients aging and survival over 20 years of activity of a third-level specialized unit.

Elisabetta Iacopi[1], Francesco Giangreco[1], Chiara Goretti[1], Letizia Pieruzzi[1], Alberto Piaggesi[1]

[1]*Diabetic Foot Section, Department of Endocrino-Metabolic and Transplantation Medicine, University of Pisa., Pisa, Italy*

Aim: The aim of our study was to assess whether over the years patients attending our Diabetic foot (DF) centre has changed demographically and if this affected long-term survival

Method: We evaluated patients who have made their first access to our DF centre in 2004 (Group A), 2014 (Group B) and 2024 (Group C). We compared Groups for age at first admission, reason for accessing such as prevention, acute DF and presence of infection, ischemia or neuro-arthropathy. We evaluated for all patients death and date thereof. We analyzed through regression predictive power of parameters for mortality rate and time.

Results / Discussion: We derived data from 1341 patients: 165 in Group A (12.3%), 716 in Group B (53.4%) and 460 in Group C (34.3%). Age was increasing from Group A (mean 66.3±11.6, median 67.0 yrs) to B (mean 69.4±13.0, median 70.5 yrs) and to C (mean 70.9±12.6, median 72.0 – $p<0.001$). In Group A almost all patients accessed for ulcers versus about half in others (93.9% in Group A, 47.1% in B, 52.0% in C, $p<0.001$). Only 3% of patient in Group A was in primary prevention versus 46.5% in B and 40.4% in C ($p<0.001$). Mortality within ten years from first access was significantly higher in Group A versus B (53.3% vs 44.1% $p<0.001$) and age of death significantly increased: 74.9±10.1 yrs in Group A, 79.1±12.9 in B and 83.2±8.9 in C ($p<0.001$). Logistic regression pointed out a predictive role for death of male sex (OR 1.551, $p<0.001$), ischemia (OR 2.296, $p<0.001$) and infection (OR 1.970 $p<0.001$). Multivariate Cox regression analysis inversely correlated infection with survival (HR 1.27 – 95%, $p=0.04$).

Conclusion: Over the years, DF patients have become older, while a decrease in mortality was observed. Infection and ischemia appear to be predictors of mortality while infection conditions survival.

[OP35] The association between serum albumin and amputation and mortality risk in a Danish nationwide cohort of patients admitted to hospital with diabetic foot ulcers

Josefine Darket[1], Julie Winckler[1], Puriya Yazdanfard[1], Mikkel Porsborg Andersen[1], Jonas Askø Andersen[1]

[1]*North Zealand Hospital, Hilleroed, Denmark*

Aim:

This study aimed to investigate the association of serum albumin in patients with diabetic foot ulcers by evaluating the risk of amputation and mortality.

Method:

This Danish national register-based cohort study included adult patients admitted to hospital between 2013 and 2022 with diabetic foot ulcers and a serum albumin sample available within 48 hours of admission. The population was followed until 2023 and were divided into two groups by the median serum albumin level. Probability of 2, and 5-year survival within each group was calculated by Kaplan-Meier estimates and the absolute amputation risk was calculated with death as a competing risk using Aalen-Johansen estimates. A Cox proportional hazards model adjusting for social factors, comorbidities and C-reactive protein was used to evaluate the association between serum albumin and 2-year and 5-year survival, respectively.

Results / Discussion:

In total 3,914 patients were included for analysis, of which 2,119 patients had serum albumin levels equal to or lower than 31 g/L and 1,795 patients with higher values. We found a significantly reduced mortality risk in patients with higher albumin levels with 2-year, and 5-year survival probability of 55% and 38%, respectively. Cox 2-year and 5-year survival showed hazard ratios of 0.56 (95% CI 0.51:0.63) and 0.63 (95% CI 0.57-0.68) for patients with high albumin levels compared to low level patients, respectively. The risk of amputation or death a year after admission was around 75% and 50% for patients with low and high albumin, respectively.

Conclusion:

Clinicians should be aware of low serum albumin levels in patients admitted with diabetic foot ulcers as we established an association between low serum albumin and an increased risk of amputation and mortality within this population.

[OP36] SIX-MONTH OUTCOMES OF PATIENTS ADMITTED FOR DIABETIC FOOT ATTACK

Federico Rolando Bonanni[1 2], Martina Salvi[1 2], Ermanno Bellizzi[1 2], Aurora Buccolini[1], Luigi Uccioli[1 3], Valeria Ruotolo[2], Alfonso Bellia[1 2], Davide Lauro[1 2], Marco Meloni

[1]Department of Systems Medicine, University of Rome Tor Vergata, Rome, Italy; [2]Division of Endocrinology and Diabetology, Department of Medical Sciences, Fondazione Policlinico Tor Vergata, Rome, Italy; [3]Division of Endocrinology and Diabetes, Department of Systems Medicine, CTO Andrea Alesini Hospital, Rome, Italy

Aim: To evaluate the mid-term outcomes of patients admitted for a diabetic foot attack (DFA).

Method: This retrospective observational study included a population of patients admitted for diabetic foot ulcers (DFU) in a specialized multidisciplinary diabetic foot service. Based on the type of hospital admission (emergency or elective), patients were divided into two groups: those with DFA and those without DFA (chronic diabetic foot, CDF). The DFA was considered in case of ischemia (acute or chronic), infection and Charcot foot requiring urgent hospitalization. The following six-month outcomes were evaluated: healing, major amputation, mortality, hospital readmission, and major adverse limb and cardiovascular events (MALCE) including nonfatal myocardial infarction, nonfatal stroke, cardiovascular death, and critical limb ischemia requiring revascularization.

Results / Discussion: Overall, 150 patients were included. The mean age was 70±12 years, most patients were male (76.7%) and had type 2 diabetes (93.3%) with a mean duration of 22±13 years; 88 (58.7%) patients presented DFA while 62 (41.3%) presented CDF. The DFA group reported a greater rate of foot infection (81.8 vs 50.0%, p=0.0002), higher HbA1c values (67±22 vs 56±14 mmol/mol, p=0.0008) and more cases of first assessment for DFUs (59.4 vs 13.7%, p<0.0001) when compared with the CDF group. The six-month follow-up outcomes for DFA and CDF were: healing (68.8 vs 61.0%, p=0.3), major amputation (5.2 vs 1.7%, p=0.2), mortality (8.6 vs 11.7%, p=0.5), hospital readmission (30.9 vs 29.6%, p=0.8), MALCE (11.7 vs 22.6%, p=0.1).

Conclusion: Foot infection and poor metabolic control resulted more frequent in patients with DFA. Six-month outcomes did not show significant differences in terms of healing, major amputation, mortality, readmission and MALCE between the DFA and CDF groups. Prompt and multidisciplinary management of DFA seems to ensure favourable mid-term outcomes, even if compared to patients with CDF.

[OP37] Mental Health and Social Deprivation Continue to Impact Hospital Length of Stay despite Input from Inpatient Diabetic Foot Practitioner

Patricia Lee[1], Sandra Woolcock[1], Wegin Tang[1], Erika Vainieri[1], Nina Petrova[1], Michael Edmonds[1], Chris Manu[1]

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Aim: The inpatient diabetic foot practitioner coordinates MDfT care and facilitates timely discharge. However, some patients continue to have prolonged hospital length of stay (LOS). The aim was to investigate the impact of depression, anxiety and social deprivation on LOS in patients with foot disease.

Method: This was a retrospective review of consecutive patients referred to the MDfT over a six-month period. Notes were reviewed for diagnosis of depression and/or anxiety, and determination of socioeconomic status using the Index of Multiple Deprivation (IMD). The total LOS and delayed discharge (defined as days between medically fit for discharge and actual discharge) were calculated.

Results / Discussion: There were 111 patients, mean age 66yrs, 73% male. Seventy-five(68%) were discharged from a specialist foot ward and 36(32%) from general wards. The overall median LOS was 15days (range 2–96days), with 22days (range 2-70days) in general wards and 14days (range 3-96days) in specialist wards ($p>0.05$). Among patients with delayed discharge, the median delay was 6days and 4days for specialist and general wards, respectively ($p>0.05$). A total of 63(57%) patients had a diagnosis of depression and/or anxiety. In specialist ward, those with depression and/or anxiety had significantly longer LOS ($p = 0.039$). There was significant correlation between the IMD decile and delayed discharge ($r=0.21$, $p=0.027$). Of those living in the most deprived 25th percentile, the delayed discharge was10days in general wards vs 6days in specialist wards ($p = 0.075$). Those with depression and/or anxiety in most deprived 25th percentile had significantly longer delayed discharge compared to those in least deprived 75th percentile (4 vs 0 days, $p <0.001$).

Conclusion: Social deprivation is associated with delayed discharge. Additionally, depression and/or anxiety contribute to prolonged LOS particularly among socioeconomically disadvantaged patients. Thus, early screening for depression and/or anxiety and social determinants of health might facilitate timely discharge.

[OP38] Assessing the effectiveness of 8% capsaicin (Qutenza) patch in Painful Diabetic Peripheral Neuropathy- A UK district general hospital experience

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Aim:

To evaluate the effect of 8% capsaicin patch in Painful Diabetic Peripheral Neuropathy (PDPN) patients by measuring changes in pain rating scales at 6 and 12 weeks.

Method:

This retrospective observational study from a UK hospital diabetes foot clinic incorporated baseline demographic data (age, gender, diabetes type, and pain duration). At visit 0, the first 8% capsaicin patch was applied. The patch's effectiveness was assessed using clinical outcome measures: Numerical Rating Scale (NRS), Disease Activity Score 21 (DAS 21), Norfolk Quality of Life Questionnaire (Norfolk QOL), Leeds Assessment of Neuropathic Symptoms and Signs (SLANSS) at week 6 and before the second patch application at week 12. Paired t-tests and Wilcoxon signed-rank tests assessed differences in pre- and post-treatment outcomes. Linear regression identified factors associated with pain reduction.

Results / Discussion:

Fifty-one people with PDPN were included (mean age 61.2±9.8 years, 53% female). 86.3% with Type 2 Diabetes Mellitus and 13.7% with Type 1 Diabetes Mellitus. Median pain duration was 4 (2-9) years. NRS scores at 0, 6, and 12 weeks were 6.78±1.69, 4.76±2.19, and 6.2±2.0 ($p<0.001$), respectively. Mean scores for DAS 21, LANSS, and median Norfolk QOL at 0 and 12 weeks were: 31.2(17.9) vs. 27.4(19.3), p=0.65; 19(12-24) vs. 19(13-24), p=0.11; and 78(68-95) vs. 70(57-81), p=1.00. Linear regression analysis revealed male patients were significantly associated with pain reduction ($\beta = 0.93$, constant = 7.2, $R^2 = 0.08$, $p = 0.04$).

Conclusion:

This first-of-its-kind data from a UK diabetes foot clinic demonstrates that NRS scores significantly decreased at 6 and 12 weeks following a single 8% capsaicin patch application. However, no significant changes were observed in DAS 21, LANSS, or Norfolk QOL measurements. The observed NRS score rebound at 12 weeks suggests potential need for reapplication, consistent with previous clinical trial observations.

[OP39] Poor compliance with the Federation of Surgical Specialty Associations targets on emergency surgical prioritisation in diabetic foot patients compared to non-diabetic patients

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Aim:

The Federation of Surgical Specialty Associations (FSSA) categorisation of surgical priority optimises the allocation of surgical resources and facilitates the timely delivery of surgical care. We aim to evaluate the hospital's compliance with FSSA guidelines for surgical prioritisation in diabetic foot patients compared with non-diabetic foot patients and identify areas for improvement in performance.

Method:

Retrospective data was collected from February 2024 to February 2025 on all consecutive foot and/or ankle surgical procedures in main operating theatres. The data was reviewed for timing of surgical decision, the assigned priority levels, be it: priority 1a (P1a): procedures to be performed in <24 hours, priority 1b (P1b): for within <72 hours and priority 2 (P2): for procedures to be performed in <1 months. We then assessed whether surgery was performed within the designated priority timeframe.

Results / Discussion:

There were 61 surgical procedures identified through automated extraction from electronic patient records, with an additional 29 cases identified via manual search. Of the 90 procedures, 52 (58%) were male and 38 (32%) were female. Among these, 58 (64%) of cases involved diabetic foot patients, while 32 (36%) cases were classified as non-diabetic foot patients. All cases had been assigned an FSSA priority classification. Only 18% of the patients with diabetes classified as P1a had their surgery within the timeframe of <24hrs compared to 67% in the non-diabetic patients ($p=0.0251$). The proportions meeting P1b and P2 were similar between the two groups; 68% vs 62% for P1b and 60% in both groups had their allocated P2 surgery done within the timeframe.

Conclusion:

Our data shows a disparity or delay to emergency P1a procedures for diabetic foot patients within 24hrs compared to non-diabetic patients. This highlights the need to address the imbalance in patient identification and extent of severity in the diabetic foot patient.

[OP41] Heel Diabetic Foot Osteomyelitis: a current challenge in the clinical practice

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Aim: To evaluate the long-term outcomes of heel diabetic foot osteomyelitis (DFO) managed in a specialised diabetic foot service

Method: The current study is a retrospective observational study including a population of patients with diabetic foot ulcers (DFUs) complicated by DFO, managed between 2019 and 2022 in a tertiary level diabetic foot service. All patients have been managed by a local protocol in the respect of international guidelines. DFO was treated by antibiotic therapy and surgically if required, based on each specific clinical framework. According to the location of bone infection, patients were divided into two groups: those with heel DFO and those with forefoot/midfoot DFO. After one year of follow-up, the following outcomes were evaluated and compared between groups: healing, wound healing time, and the rate of major amputation.

Results / Discussion: Overall, 114 patients were included. The mean age was 67.9 ± 12, most of them were male (72.8%) and had type 2 diabetes (91.2%); 84 (73.6%) of patients reported forefoot/midfoot DFO, while 30 (26.3%) reported heel DFO. Patients with heel DFO showed greater rate of soft tissue infection (80 vs 68.7%, p= 0.04), ulcer size >5cm (93.3 vs 34.3%, p= <0.0001), gangrene (63.3 vs 22.9%, p= <0.0001), higher C-reactive protein values (67.6 ± 25 vs 24 ± 16 mg/dl, p= 0.0002) and concomitant peripheral ischemia (83.3 vs 52.4%, p= 0.0002). Outcomes for heel DFO and forefoot/midfoot DFO were: wound healing (66.7 vs 97%, p= <0.0001), healing time (14 ±6 vs 6.8 ±5 weeks, p=<0.0001), and major amputation (10% vs 0%, p= 0.0002) respectively.

Conclusion: Heel DFO resulted associated with a higher risk of major amputation, reduced chance of healing, and longer healing time.

[OP42] Phage therapy with BX211 demonstrates positive efficacy results in Staphylococcus aureus diabetic foot osteomyelitis: Phase 2 randomized, double-blind, placebo-controlled clinical trial

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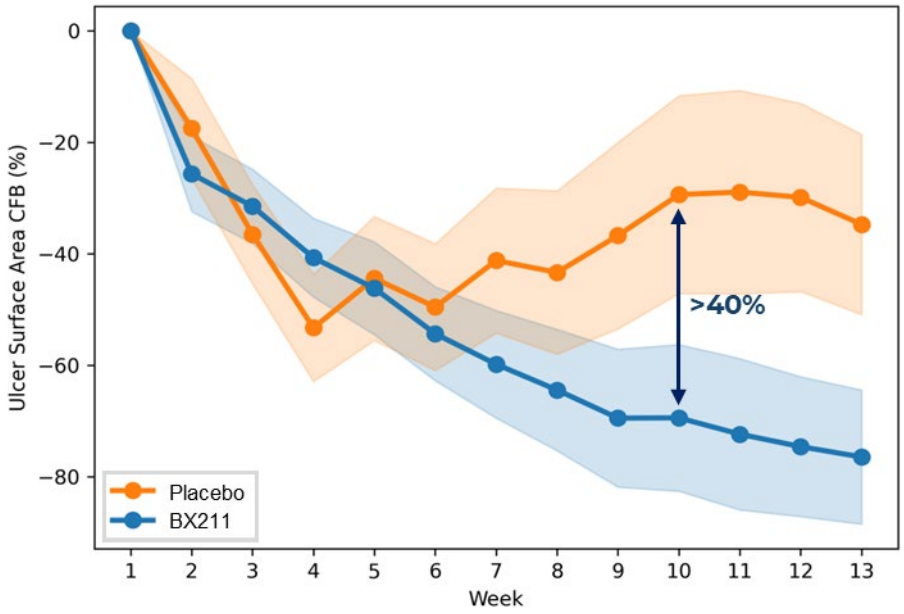
Background: *Staphylococcus aureus* (StA) is the most prevalent causative pathogen in diabetic foot osteomyelitis (DFO). Bacteriophage (phage) therapy offers a novel alternative or adjunct therapy to antibiotics, with potential to improve the frequently unsatisfactory outcomes of current standard of care. This study's objectives were to assess the safety and efficacy of phage (BX211) in subjects with DFO colonized with StA.

Methods: This phase 2, multicenter, randomized, double-blind, placebo-controlled trial investigated BX211 in 41 DFO patients with StA isolated from bone biopsy. BX211 is a phage therapy where phages from a pre-established "phage-bank" are individually matched to each patient's StA strain. Subjects were assigned (2:1) to an initial intravenous dose, followed by weekly topical doses of BX211 or placebo for 12 weeks, in addition to standard of care (including systemic antibiotic therapy). Primary outcome was measured at week 13.

Results: 26 patients were randomized to BX211, 15 to placebo. BX211 demonstrated sustained and statistically significant[1] greater Percent Area Reduction (PAR) of ulcer size (p = 0.046 at wk12 and 0.052 at wk13); separation from placebo started at week 7 and difference was ≥ 40% by week 10 (Figure 1). Compared to placebo, BX211 also demonstrated statistically significant[1] improvements in both ulcer depth at week 13 (in patients with ulcer depth defined as bone at baseline, ulcer depth was classified according to deepest tissue involved as measured by swab) (p=0.048) and in limiting the expansion of ulcer area (p=0.017). BX211 showed favorable safety and tolerability.

Conclusions: BX211 therapy demonstrated sustained and statistically significant percent area reduction of ulcer size, compared to placebo, supported by additional improved clinical responses, and an overall positive safety profile. These favorable results warrant further studies of this promising therapy.

Figure 1: Percent area reduction from baseline of ulcer surface area



This work was supported by Naval Medical Research Command (NMRC)-Naval Advanced Medical Development (NAMD) thru Medical Technology Enterprise Consortium (MTEC) by using an Other Transaction Authority (OTA).

1. p-values are non-adjusted

[OP43] THE ASSOCIATION OF MACRO- AND MICROCIRCULATION WITH THE EFFICACY OF ATB THERAPY IN PATIENTS WITH INFECTED DIABETIC FOOT ULCERS – DFIATIM STUDY

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The infection spreading in patients with infected diabetic foot ulcers (iDFU) is preventable by the induction of sufficient serum and peripheral tissue concentrations of applied antibiotics (ATBs).The impact of peripheral arterial disease on ATB levels in people with iDFU is still unclear.The aim of the DFIATIM trial was to determine the possible impact of circulation parameters on achieved peripheral tissue levels of time-dependent ATBs.

Method: We have enrolled 60 patients (mean age 65±9 years, BMI 32.7±5.1 kg.m-2, HbA1c 63±7 mmol/mol),who were treated by intravenous ATBs - ceftazidime (CTZ) or amoxicillin/clavulanate acid (AMC) for iDFU. These study subjects were divided into 4 groups based on the type of ATB administration – bolus (CTZbolus, AMCbolus) or continual (CTZcont, AMCcont). Macrocirculation status was determined by ankle-, toe-brachial indexes (ABI, TBI) and occlusive plethysmography (arterial flow, inter-arm distance). Microcirculation was assessed by transcutaneous oxygen pressure (TcPO2). Peripheral tissue ATB levels were assessed via microdialysis and their efficacy by pharmacokinetic/pharmacodynamics determinants.

Results: No significant differences as in parameters of macro- as of microcirculation were detected among study groups (mean ABI 1.15-1.2±0.15-0.36; TBI 0.66±0.26; inter-arm distance 25±3.5 mm; increase of arterial flow 43-76±17.5-29.5 mL.min-1;TcPO2 46±14 mmHg in all study groups). Only slightly positive correlation of increase arterial flow with ATB concentrations in peripheral tissue has been found in patients from CTZcont group (p=0.079). Patients treated with AMC, especially study subjects from AMCbolus group, had positive correlations of tissue ATB concentrations with ABI (p=0.017) and increase of arterial flow (p=0.012), in AMCcont group with TBI only (p=0.033). Microcirculation did not influence significantly the peripheral tissue ATB levels.

Conclusion: DFIATIM trial has shown that in contrast to microcirculation only parameters of macrocirculation, predominantly amount of arterial flow to lower limbs, significantly influenced the achieved ATB concentrations in peripheral tissue and therefore their efficacy in patients with iDFU. Supported by NW24-09-00184, LX22NPO5104

[OP44] One Year, 121 Major Amputations: Applying Inversion-Thinking to Limb Loss in Diabetes

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Aim:

Major lower limb amputation in individuals with diabetes reflects a complex interplay between arterial disease, co-morbid burden, and access to limb salvage pathways. We applied an inversion-thinking methodology to retrospectively analyse all major amputations performed over 12 months at a high-volume vascular hub, aiming to identify potential preventable cases and inform contemporary service design.

Method:

We retrospectively reviewed 121 consecutive major amputations performed in patients with diabetes between January and December 2024 at a tertiary vascular centre. Data included patient demographics, referral pathway, and timing of vascular assessment and imaging, evaluated against national guidance. Where applicable, revascularisation strategy and timing was recorded. Arterial disease distribution was characterised using the Global Limb Anatomic Staging System (GLASS). Each case was assessed against predefined criteria to determine potential preventability, incorporating severity of ischaemia and infection, revascularisation options, and suitability for intervention. Cases were stratified as preventable, potentially preventable, or non-preventable based on structured multidisciplinary review.

Results / Discussion:

Mean age was 67.1 years, with 72% of patients being male. Amputation was performed at the trans-tibial level in 75% of cases, with a 30-day mortality rate of 4%. Severe foot infection was the primary indication in 23 cases, including 9 emergency procedures for life-threatening sepsis. Of the remaining 98 amputations attributed to chronic limb-threatening ischaemia (CLTI), nearly all patients underwent an attempted revascularisation in the context of high anatomical disease complexity. In 48% of CLTI cases, disease was confined to the infra-popliteal segment. Based on predefined criteria, 19% of amputations were classified as preventable or potentially preventable, most commonly due to delays in arterial imaging and revascularisation.

Conclusion:

This analysis highlights modern contributors to limb loss in diabetes, with delays in ischaemia recognition and intervention emerging as key modifiable factors in potentially preventable amputations among patients with advanced arterial disease and co-morbidity.

[OP45] The impact of pedal arch quality in ultradistal revascularization in patients with advanced critical limb ischemia

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Aim: Critical limb-threatening ischemia (CLTI) is a severe condition with a high risk of major amputation and death. Endovascular ultradistal revascularization has become a key treatment for CLTI. However, the significance of the pedal arch remains debated.This study aimed to assess the impact of pedal arch status on survival, limb salvage, and freedom from reintervention in patients with below-the-knee CLTI and foot ulcers undergoing endovascular revascularization.

Method: Between 2020 and 2022, all patients with CLTI (Rutherford V-VI) undergoing below-the-knee revascularization were enrolled. The study population was divided into three groups based on pedal arch quality on pre- and post-procedural angiography: complete pedal arch (CPA), incomplete pedal arch (IPA), and absent pedal arch (APA). Overall survival, limb salvage, and freedom from reintervention were evaluated using Kaplan-Meier analysis and compared between the groups using the log-rank test.

Results / Discussion: A total of 131 patients, predominantly male, were included. The average age was 81.1±9.6 years, and 51.2% had diabetes mellitus. Post-procedural angiographies showed CPA in 38 patients (vs 21 pre-procedural), IPA in 73 patients (vs 62 pre-procedural), and APA in 20 patients (vs 48 pre-procedural). At a median follow-up of 25.1±14.6 months, 57 deaths, 4 major amputations, and 37 reinterventions occurred. No significant differences were found among the groups for survival (p=0.5) and limb salvage (p=0.8). The APA group showed a statistically worse trend for freedom from reinterventions (p=0.01). 54% of reinterventions occurred in diabetic patients. Multivariate analysis identified several independent risk factors for the outcomes.

Conclusion: Pedal arch quality appears associated with a higher risk of reintervention in below-the-knee CLTI patients undergoing endovascular revascularization. The presence of significant comorbidities seems to have a stronger association with worse clinical outcomes with respect to pedal arch status alone.

[OP46] DELPHY CONSENSUS TO IMPROVE THE MANAGEMENT OF ISCHEMIC DIABETIC FOOT PATIENTS. THE IMPROVEMENT GROUP ON THE CRITICALLY ISCHEMIC DF (CIDF) OF DIABETIC FOOT VALLEY TUSCANY PROJECT

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Aim: In the context of the Diabetic Foot Valley Tuscany (DFVT) initiative, the amelioration project on the Critically Ischemic DF (CIDF) aimed to reach a consensus between diabetologists and vascular specialists on the revascularization pathways of CIDF, which a previous survey demonstrated criticity implementing guidelines' indications

Method: A Delphi consensus meeting between diabetologists and vascular specialists from the Tuscany public centers was asked to express their agreement on 10 statements about dispersion of cases, disparity of access to the procedures, revascularizations delay, differences in the procedural outcomes, inadequacy of the procedures respect to the pathology and inadequacy of medical therapy compared to the best medical practice.

Results/Discussion: The participants agreed in changing the organizational model extending the possibility for the patients to timely access the treatments, the identifications of multidisciplinary dedicated teams and settings to address the pathology at the increasing level of complexity, to limit the delay of revascularization procedures within 1 week for inpatients and 2 weeks for outpatients, to identify centers able to deliver distal effective procedures and to convey there the most critical patients, to grant to no-option patients the alternative therapies before give indications for major amputations, to take adequately care of comorbidities, to stop considering the number of major amputation per se, not associated to more descriptive parameters, as a marker of quality of care for DF, to introduce as a process indicator the delay between indication to revascularization and its effective actuation.

Conclusion: the Delphi consensus meeting inside the DFVT identified the components of the amelioration program for CIDF management to be realized in the next phases of the project.

Paper poster abstracts

[PP01 - Top 12 poster] Prevalence of foot pathology among the patients of Ljubljana Out-patient diabetes clinic between 1996 and 2024

Vilma Urbancic-Rovan[1], Maja Garbas[2], Mira Slak[3], Mojca Lunder[4], Miodrag Janić[2]

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Aim: Mandatory foot screening was introduced at the Diabetes Outpatient Clinic in Ljubljana in 1996. The test was performed on all patients registered at the clinic before 1996, and thereafter on all newly diagnosed type 2 patients at the time of diagnosis and on all newly diagnosed type 1 patients 5 years after diagnosis. The data are stored in a computerized database.

Method: The screening protocol corresponds to the protocol recommended by the International Working Group on the Diabetic Foot. It includes medical history, physical examination (foot deformity, loss of protective sensation (LOPS, 10-g monofilament), peripheral arterial disease (PAD, palpation of foot pulses)) and assignment to risk status (0 – very low: no LOPS, no PAD; 1 – low: LOPS or PAD; 2 – moderate: LOPS and PAD, LOPS and foot deformity, PAD and foot deformity; 3 – high: LOPS or PAD and one or more of the following: History of foot ulcer, lower limb amputation, end-stage renal disease).

Results / Discussion: Between January 1996 and December 2024, 17,672 patients (mean age 60.6 ± 14.0 years, 43.2% women) were examined. 415 patients (2.3%) had a previous amputation and 1,786 (10.1%) a previous foot ulceration. 7.488 (42.4%) reported various neuropathic symptoms. Claw/hammer toes were noted in 3,855 (21.8%), fat pad atrophy in 944 (5.4%), abundant callus in 3,412 (19.3%) and dry skin in 6,340 (35.9%). LOPS was noted in 2,930 patients (16.6%) and PAD (at least one foot pulse not palpable) in 1,567 (8.9%), all four in 856 (4.8%). An open ulcer was detected in 1,125 (6.3%). Risk status: 0: 13,809 patients (78.1%), 1: 628 (3,.6%), 2: 2,027 (11.5%), 3: 1,208 (6.8%).

Conclusion: An extensive database on foot pathology has been collected over 28 years. Data analysis provides good estimates of the prevalence of neuropathy and peripheral arterial disease and is important for resource planning.

[PP02 - Top 12 poster] The benefit of therapeutic footwear for people living with diabetes. Umbrella review of meta-analyses

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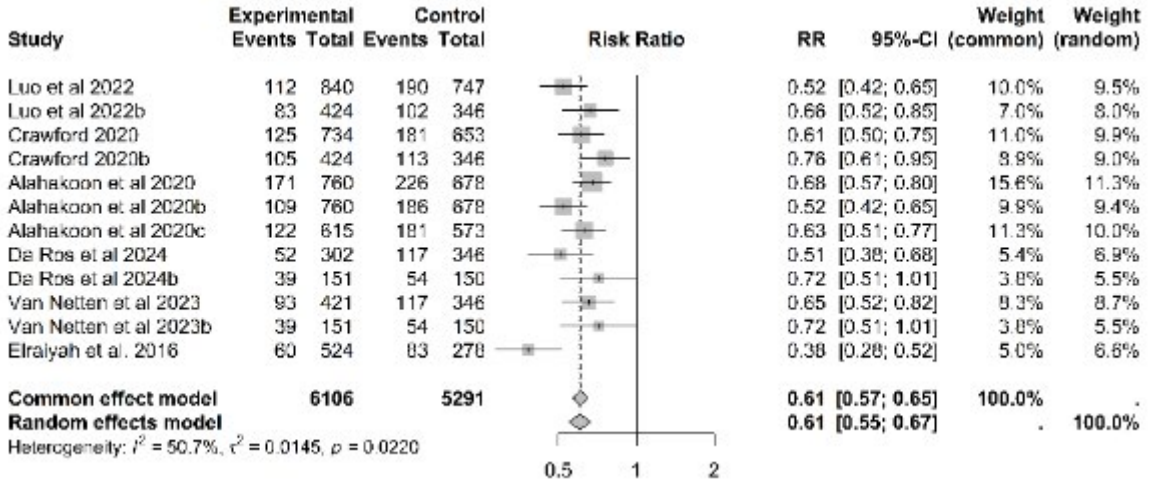
Aim: This umbrella review seeks to consolidate the meta-analysis findings on therapeutic footwear and summarise their clinical implications.

Diabetic foot ulcers (DFUs) pose a serious health risk for individuals with diabetes, often resulting in significant health issues and financial burdens. To help mitigate the risk of DFUs, clinical guidelines recommend customised and therapeutic footwear for those at high risk.

Method: A comprehensive literature search with PICO (**P**eople at High Risk of diabetic foot -IWGDF3, **I**ntervention: Therapeutic footwear, **C**omparator= Standard footwear, **O**utcome=quantified effect on Risk of diabetic foot ulceration) was conducted to identify systematic reviews with meta-analyses relevant to the prevention of diabetic foot ulcers (DFUs), using PubMed, Scopus, Google Scholar and Web of Science databases. Eligibility criteria included meta-analysis that contained reviews with >12 months of follow-up. Project reviewers assessed the quality of review papers using AMSTAR-2.

Results / Discussion: Broad search of 445 records was filtered to six systematic reviews containing twelve meta-analyses (maximum Eight studies, 1587 participants in a meta-analysis). The quality assessment (AMSTAR-2) found systematic reviews to be of Low-Moderate quality, for lack of reporting on critical items. The pooled data of metanalysis using the Random Effect Model, indicate a reduced risk of DFU (RR: 0.61, Confidence Interval (CI): 0.55 to 0.67). However, there was moderate heterogeneity (I^2: 50.7%, tau^2: 0.0145). Quantified data on footwear prescription adherence are inadequate.

Conclusion: Synthesis of data indicates that people at high risk of foot ulceration may be able to reduce the risk of diabetic foot ulcers by approximately 39% compared to those using standard footwear for over >12 months. The reduction seems statistically significant. The moderate heterogeneity indicates that while there is some variability among the studies, the overall effect is consistent. However, this clinical benefit cannot be fully relied upon because the quality of evidence is lacking.



[PP03 - Top 12 poster] Application of Machine Learning for the Prediction of Diabetic Foot Ulceration in Individuals at High Risk of Foot Ulceration

Touria Ahaouari Lemrabet[1 2 3], Brenda Berendsen[1], Chantal Hulshof[4], Nicolaas C. Schaper[2 3], Hans Savelberg[1], Sicco Bus[5 6], Jaap van Netten[5 6]

[1]Nutrition and Translational Research in Metabolism (NUTRIM), Maastricht University, Department of Nutrition and Movement Sciences, Maastricht University, Maastricht, Netherlands; [2]Care and Public Health Research Institute (CAPHRI), Maastricht University, Maastricht, Netherlands; [3]Cardiovascular Research Institute Maastricht (CARIM), Maastricht University, Maastricht, Netherlands; [4]Department of General Practice, Erasmus MC, University Medical Center Rotterdam, Rotterdam, Netherlands; [5]Department of Rehabilitation Medicine, Amsterdam UMC, University of Amsterdam, Amsterdam, Netherlands; [6]Amsterdam Movement Sciences, Program Rehabilitation & Development, Amsterdam, Netherlands

Aim:

Several factors have been identified as predictors for diabetic foot ulceration (DFU), but most current models have relatively poor performance. Traditionally, statistical regression techniques have been used to study predictors for DFU. However, these methods may miss to capture complex nonlinear relationships and interdependence among predictors. To address this, we selected features from a broad range of potential predictors, including biomechanical, clinical and behavioral variables and we implemented machine learning (ML) for the prediction of DFU, focusing on tree-ensemble models.

Method:

A total of 58 participants (age 65 ± 9, 48 males and 10 females) with diabetes and at high DFU risk were followed for one year; 22 participants developed a DFU. The dataset was split, with 60% allocated for feature selection and training, and 40% for testing. Lasso feature selection was used for identifying relevant features. We trained and tested tree-ensemble models using the Scikit-learn library from Python, including Decision Tree, Random Forest, and XGBoost. Model performance was evaluated through accuracy, sensitivity and specificity.

Results / Discussion:

The feature selection phase resulted in 22 features selected as relevant. The best performing algorithm was Random Forest with an accuracy of 79% (sensitivity 67% and specificity 87%). Among the selected features, the top-5 most relevant features used by the Random Forest are: social functioning (36-Item Short Form Survey, SF-36), date of previous ulcer occurrence, emotional well-being (SF-36), duration of healing of the previous ulcer and in-shoe peak pressure.

Conclusion:

We were able to predict diabetic foot ulceration with 79% accuracy in a relatively small dataset of individuals at high risk of DFU. Our predictive model could assist clinicians in identifying individuals at high risk of DFU, that may require additional care next to the usual care for the prevention of DFU but further validation in different datasets is needed.

[PP04 - Top 12 poster] Accuracy of clinical diagnosis of osteomyelitis in patients with active diabetic foot ulcer (DFU)

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[1]Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania, Dar es Salaam, Tanzania; [2]Abbas Medical Centre, Dar es Salaam, Tanzania; [3]School of Health, Education, Policing and Sciences, University of Staffordshire Science Centre, Stoke on Trent, United Kingdom; [4]School of Health and Society, University of Salford, Manchester, United Kingdom

Aim: Diabetic foot ulcer (DFU) is common in Sub-Saharan Africa. Osteomyelitis is a life-threatening infection with high morbidity and mortality rates. While X-ray is commonly used for diagnosing osteomyelitis, in low resource settings the cost is a hurdle. Hence, we aimed to assess the accuracy of clinical diagnosis in identifying patients with osteomyelitis.

Method: During December 2021 to January 2025, 166 (F/M:69/97) patients with deep ulcer were recruited after informed consent. Aggregated data included basic epidemiological data, risk factors, details of DFU history, clinical assessment and examination of ulcer at base line. Wound classifications, and outcome were also collected. All patients underwent X-ray assessment.

Results / Discussion: Clinical diagnosis indicated that 117 (out of 166) patients had osteomyelitis. X-ray indicated 96 (out of 117) patients had osteomyelitis (True Positive = 96). This indicated that 21 patients with clinically diagnosed osteomyelitis did not have osteomyelitis (False Positive = 21). X-ray results for all 49 patients who were clinically diagnosed as not having osteomyelitis were negative (True Negative = 49) indicting that there was no patient with osteomyelitis missed using clinical diagnosis (False Negative = 0). Based on these figures, sensitivity was 100%, and specificity was 70%, while the overall diagnosis accuracy was 87.3%. While sensitivity stayed at 100% across ulcer classifications, specificity significantly ($p<0.05$) increased from 63.8% for SINBAD-4 to 77.8% for SINBAD-5. This also increased the overall accuracy from 86.1% for SINBAD-4 to 89.7% for SINBAD-5.

Conclusion: Clinical diagnosis appears to accurately diagnose patients with suspected osteomyelitis with 100% sensitivity, indicating that all patients with the condition correctly diagnosed. However, the specificity was 70% indicating that the clinical judgement diagnosed 3 (in 10) patients that did not have osteomyelitis, having the condition. The specificity of the test was higher for higher ulcer classification categories, which require further investigations.

[PP05 - Top 12 poster] Controlled slow release of vascular endothelial growth factor (VEGF) in alginate and hyaluronic acid bead system to promote wound healing in punch-induced wound rat model

Hwanjun Choi[1]

[1]*Soonchunhyang University Cheonan Hospital, Cheonan, Korea, Rep. of South*

Aim:

Wounds with compromised vascularity and hypoxia may be healed with the additional growth factor to promote vascularity. Among the different angiogenic growth factors, vascular endothelial growth factor (VEGF) is a crucial and important candidate.

Method:

To address this issue, a combination of two different polymers, alginate (ALG) and hyaluronic acid (HA) in 80:20 ratio composition is used to optimize the bead system along with the 5 IU heparin (Hep) by crosslinking into calcium chloride ($CaCl_2$). Encapsulation of Vascular endothelial growth factor (VEGF) in the bead system shows delayed cumulative release in phosphate buffer saline (PBS).

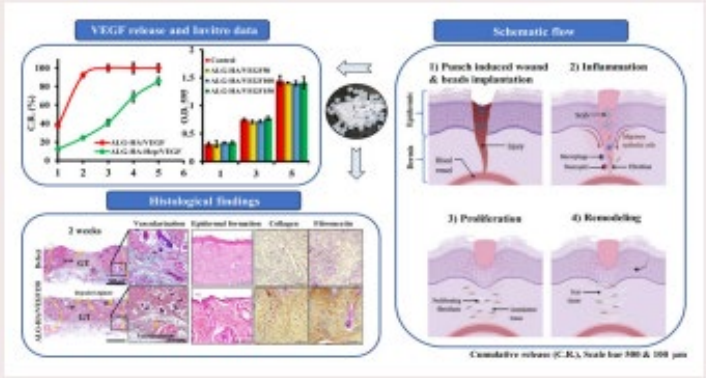
Results / Discussion:

For in vitro studies, ALG–HA/VEGF150 improves endothelial Vascular cell adhesion protein 1 (VCAM1) and endothelial nitric oxide synthase (eNOS) expression markers in CPAE cells. In vivo evaluation of the bead system shows around 68 % of wound closure 2 weeks post-implantation in 8 mm punch wound models. The treatment group shows decreased epithelial gap between the ends of the wound and neo-epidermal regeneration.

Conclusion:

The objective of our study is to fabricate a dual polymer bead system for wound dressing that can be degraded in 5 to 6 days; the beads could be slowly releasing VEGF growth factor and to investigate the effect of VEGF incorporation into the bead system to improve wound healing. From clinical aspects, our bead system might be reducing pain and lowering dressing cost for the patient and convenience for the healthcare provider in future.

GRAPHICAL ABSTRACT



Schematic workflow diagram including *in vitro* and *in vivo* results. ALG-HA/VEGF150 implanted in the punch-induced wound rat model for 1 and 2 weeks (figure created with Biorender).

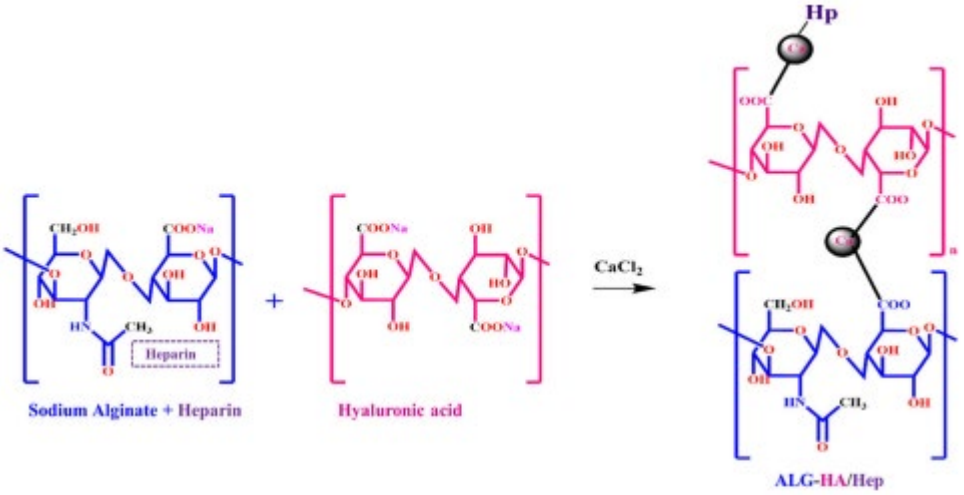


Figure 1. Chemical composition of the ALG-HA/heparin bead. Sodium alginate along with the heparin crosslinked with the hyaluronic acid.

Table 1. Differing compositions of the ALG–HA beads.

2% alginate (w/v)	2% hyaluronic acid (w/v)
90	10
80	20
60	40
40	60
20	80

[PP06 - Top 12 poster] Psychological and emotional aspects in people with diabetic foot disease: A systematic scoping review

Alice Cardon[1 2], Tue Helms Andersen[3], Abhilasha Akerkar[4 5], Mette Due-Christensen[1], Olivia Braad Honoré[1], Anne Rasmussen[6], Peter Rossing[2 4], Bryan Cleal[1]

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Aim: Several psychological and emotional aspects have been identified in people with diabetic foot disease (DFD). Currently, the scope of evidence on the topic is unclear, and there is a need to explore how research has been conducted in this population. The aim of this scoping review is to identify and map the literature on psychological and emotional aspects of DFD.

Method: A systematic search was conducted on the 6th of May 2024, in MEDLINE, Embase, CINAHL and PsycInfo using broad terms to capture the diversity of existing research. Search results were screened independently by two people based on predefined eligibility criteria. Data charting followed predefined data extraction sheets, tailored to the study type (quantitative or qualitative).

Results / Discussion: From a total of 1,838 unique records identified in the database search and 1,819 unique records identified from backwards citation search, 118 studies were deemed eligible for inclusion. Twenty-two studies employed a qualitative design, two were mixed methods, and 94 were quantitative. Five categories of foot outcomes were identified: diabetic foot ulcer, history of diabetic foot ulcer, amputation, Charcot neuroarthropathy, and diabetic foot disease. Qualitative studies revealed psychological and emotional impacts, with data collected mostly through individual interviews, using various methods of analysis. Quantitative studies reported 25 different psychological and emotional concepts, utilizing 53 distinct data collection tools. Most common concepts were depression, anxiety, and illness perception.

Conclusion: Existing research on psychological and emotional aspects of DFD is diverse, using a wide variety of study designs, concepts, and tools. Most studies are quantitative and focus on psychological factors such as depression and anxiety. This highlights the need for further exploration of other relevant concepts to improve understanding of the psychological and emotional characteristics, along with their potential impact on this population. This would help healthcare professionals to enhance patient support.

[PP07 - Top 12 poster] Effectiveness of Dehydrated Human Amnion/Chorion Membrane for Hard-to-Heal Foot Ulcers in Japan: A Case Series

Yuta Terabe[1]

[1]*Kasukabe Chuo General Hospital, Kasukabe, Japan*

Aim: The dehydrated human amnion/chorion membrane (dHACM) allograft received regulatory approval from the medical insurance system in 2021 for the treatment of hard-to-heal ulcers, including diabetic foot ulcers (DFUs) and venous leg ulcers. This present study is the first step to investigating the efficacy of dHACM allograft for DFUs in our country.

Method: A total of 55 patients were treated with dHACM allograft after undergoing debridement. The evaluation criteria included treatment duration and wound outcomes. Treatment was considered complete when the wound achieved wound closure (through reconstruction or epithelialization) or when adverse events (such as wound infection, death, or other complications) occurred. Wound outcomes were classified as either healed or non-healed.

Results / Discussion: Wound healing was observed in 43 patients. A comparison between healed and non-healed wounds revealed a significant difference in the presence of chronic kidney disease (G5d), coronary artery disease, laboratory data (albumin, C-reactive protein, white blood cell count, and hemoglobin) ($P < 0.05$). The treatment duration did not significantly differ between the healed and non-healed group (24.39 vs. 24.83 days, $P = 0.14$)

Among patients who achieved wound healing, not only wound bed preparation but also improved general health condition was necessary. Since dHACM allograft promoted wound healing, careful patient selection is essential to maximize its effectiveness.

Conclusion: It is highly likely that dHACM allograft can be effectively used to treat hard-to-heal foot ulcers under our country medical insurance system.

[PP08 - Top 12 poster] Identification of the most common barriers in diabetic foot clinics in Belgium

Margot Buyle[1], Kalina Todorova[1], An-Sofie Vanherwegen[1], Frank Nobels[2], Patrick Lauwers[3], Marcelle Rorive[4], Sabine De Bruyne[5], Eveline Dirinck[3], Caren Randon[6]

[1]Sciensano, Brussels, Belgium; [2]AZORG, Aalst, Belgium; [3]Antwerp University Hospital, Edegem, Belgium; [4]CHU Liège, Liège, Belgium; [5]AZ Sint-Lucas, Ghent, Belgium; [6]Ghent University Hospital, Ghent, Belgium

on behalf of the IQED-Foot Group of Experts

Aim: Belgium's national Initiative for Quality improvement and Epidemiology in multidisciplinary Diabetic Foot clinics (IQED-Foot, since 2005, including approximately 2000 patients), reveals large variations in diabetic foot care between different multidisciplinary diabetic foot clinics (MDFC). To better understand these, a survey was launched in 2024 aiming to identify the most common barriers to proper diabetic foot care in MDFC in Belgium.

Method: Variations were assessed for specific indicators: offloading, revascularisation, and secondary prevention. MDFC were divided into higher- and lower-scoring compared to their median score for the given indicator. The survey included open-ended questions to explore possible explanations for varying scores. Responses were sorted into reasons for higher and lower scores according to three categories, namely healthcare provider factors, patient factors, and healthcare system factors.

Results: All 37 Belgian recognised MDFC participated in the barrier survey. Higher-scoring MDFC for offloading reported effective patient education, intensive multidisciplinary collaboration (orthopaedist, podiatrist, shoe technician) and easier access to resources, unlike lower-scoring MDFC reporting limited personnel, patient refusal and reimbursement issues. Similarly, higher-scoring MDFC for revascularisation demonstrated expertise, strong commitment from the vascular department, and adequate resources, while lower-scoring MDFC addressed limited trained personnel, patient characteristics (i.e., fragile, ill), and low collaboration. Finally, it was again highlighted that patient education and strong commitment from the orthopaedics department, resulted in a high score regarding secondary prevention. Limited trained personnel, patient characteristics and low collaboration were additionally reported for lower-scoring MDFC in terms of secondary prevention.

Conclusion: Patient education and intensive multidisciplinary collaboration were mostly emphasised in higher-scoring MDFC, while limited suitable personnel, less collaboration and patient characteristics were mainly addressed in the lower-scoring MDFC. A next step is to explore ways to overcome the identified barriers, and to ultimately reduce the variation between different MDFC in Belgium.

[PP09 - Top 12 poster] Effects of Electrical Muscle Stimulation on Hemodynamic Performance and Muscle Strength in Diabetic Patients with Lower Extremity Arterial Disease

Shinobu Ayabe[1]

[1]*Yao Tokushukai General Hospital, Osaka, Japan*

Aim:

Patients with lower extremity arterial disease (LEAD) often have muscle weakness due to disuse. Exercise therapy is recommended, but intermittent claudication and pain due to ischemia make loading difficult, and muscle weakness often occurs due to disuse. Electrical muscle stimulation (EMS) can directly stimulate muscles without loading or walking. The aim of this study was to measure the effects of EMS on muscle strength and blood flow in patients with LEAD.

Method:

An EMS device (SIXPAD Foot fit, MTG Co., Ltd., Nagoya, Japan) was used to apply EMS to the foot sole to stimulate the contraction of muscles in the entire lower limb. Patients underwent bilateral EMS for 23 min once per day, three days per week, for 8 weeks for six patients. Hemodynamic measurements of peak venous velocity (PV) (cm/s), the time average mean velocity (TAMEAN) (cm/s), flow volume (FV) (ml/min), skin perfusion pressure (SPP) (mmHg), dorsiflexion strength, plantarflexion strength, toegrasping strength, and soleus muscle thickness were recorded.

Results / Discussion:

For TAMEAN and FV results, EMS consistently exhibited significantly higher values compared to rest and voluntary contraction across all time points (pre, 4 weeks, and 8 weeks). Compared to pre (49.0 ± 4.4), SPP_dorsal showed a significant increase at 4 weeks (56.0 ± 7.9, $p = 0.036$) and 8 weeks (55.6 ± 9.5, $p = 0.049$). Plantarflexion strength at 8 weeks showed a significant increase compared to pre (8 weeks: 15.4 ± 2.1 vs. pre: 13.0 ± 3.0, $p < 0.001$).

Conclusion:

MS improved lower extremity arterial and venous hemodynamics and increased plantar flexion muscle strength in LEAD patients. Greater use of EMS devices could be considered in the treatment of conditions related to chronic arterial and venous insufficiency but requires further research.

[PP10 - Top 12 poster] Therapeutic Benefits of Glucagon-Like Peptide-1 in Managing Oxidative Stress and Promoting Wound Healing

Ioanna Anastasiou[1], Anastasios Tentolouris[1], Panagiotis Sarantis[2], Ioanna Eleftheriadou[1], Nikolaos Tentolouris[1]

[1]1st Department of Propaedeutic Internal Medicine, Medical School, National and Kapodistrian University of Athens, 'Laiko' General Hospital,, Department of Pharmacology, Medical School, National and Kapodistrian University of, Athens, Greece; [2]Molecular Oncology Unit, Department of Biological Chemistry, Medical School, National and Kapodistrian University of, Athens, Greece

Aim: Synthetic GLP-1 analogs are utilized as GLP-1 receptor agonists (GLP-1RAs) for the pharmacological management of diabetes mellitus. In recent years, emerging evidence has indicated that GLP-1RAs exhibit anti-inflammatory and antioxidant properties.

The aim of this study is to evaluate the effects of GLP-1RAs on oxidative stress in human fibroblasts and to investigate its potential implications for wound healing.

Method:

Human dermal fibroblasts (NHDF-Ad, CC-2511; Lonza) were cultured and exposed to semaglutide (0-45 pg/ml) for 48 hours. Hydrogen peroxide (H_2O_2) was utilized as an oxidative stressor. Cell viability and proliferation were assessed using appropriate assays, while apoptosis levels were determined by immunohistochemistry and flow cytometry. Mitochondrial superoxide production was visualized using confocal microscopy under oxidative stress and post-treatment with GLP-1RAs. A scratch assay assessed the efficacy of GLP-1RAs in promoting wound closure, and the expression levels of genes related to oxidative response and wound healing were analyzed.

Results/Discussion:

Exposure of NHDF to GLP-1RAs under conditions of oxidative stress was associated with a significant increase in cell viability and ATP levels compared to the control group ($p<0.001$). Additionally, a marked reduction in apoptosis and mitochondrial superoxide levels was observed following treatment with GLP-1RAs ($p<0.001$). Notably, treatment with GLP-1RAs resulted in a reduction of wound area by over 30%, thereby facilitating wound closure.

Gene expression analysis indicated that antioxidant genes were upregulated following GLP-1RA treatment. Furthermore, in wounds subjected to oxidative stress, GLP-1RAs treatment led to the downregulation of proinflammatory cytokines and metalloproteinases, while transcription factors and extracellular matrix genes were upregulated by 40% relative to the control group ($p<0.001$).

Conclusion:

These findings indicate that significant in vitro antioxidant activity is exhibited by GLP-1RAs on NHDF, providing new insights into its potential beneficial role in the management of diabetic ulcers.

[PP11 - Top 12 poster] Lower Limb Amputation Outcomes: An Analysis of Two Consecutive Years from a UK Tertiary Hospital

Sheena Thayyil[1], Rachel Berrington[1], Marie France Kong[1]

[1]*University Hospitals of Leicester NHS Trust UK, Leicester, United Kingdom*

Aim:

Lower limb amputations remain a significant healthcare burden, necessitating consistent evaluation of clinical practices and patient outcomes. We compared amputation data in 2022-23 and 2023-24 at a single institution, identifying trends in clinical variables and highlighting opportunities for improvement in care pathways.

Method:

Retrospective analysis of amputation cases in 2022-23 (n=184) and 2023-24 (n=216), examining patient demographics, diabetes prevalence, admission type, length of stay (LOS), procedure level, mortality, and multi-disciplinary foot team (MDFT) involvement.

Results / Discussion:

Year	2022-23	2023-24
Total amputations	184	216
Average Age (years)	63	65
Major/minor amputations	72 (39%)/112	76 (35%)/140
Diabetes/no diabetes	145 (79%)/39	162 (75%)/54
Admission type (Emergency/Inpatient/Day case)	163 (88.6%)/18/ 3	190 (88%)/22/4
Major/minor/total amputations Under MDFT	20/42/62 (33.7%)	17/54/71 (32.9%)
LOS (Days)	18	14
Death in the whole group	57/184 (31%)	35/216 (16.2%)
Death in MDFT attended	17/62 (27.4%)	11/71 (15.5%)

75-79% of the amputations were in patients with diabetes. Major amputations accounted for 35% of cases, showing a declining trend. Around 88% of the amputations were emergency admissions and only 33% of the patients were under the MDFT clinic in both years. 31% of patients who had amputations in 2022-23 were dead after 2 years.

Conclusion:

The mortality of 1, 2 years (16.2% and 31%) after an amputation is comparable to other studies. High rates of emergency admissions and the fact that two-thirds of patients who underwent amputations were not previously known to the MDFT clinic underscore the need for significant improvements. These findings highlight the importance of community-based preventive care and strengthened MDFT involvement to enhance outcomes in high-risk cases. Strengthening early referral pathways to MDFT clinic can improve the outcomes and features the need to shift from reactive amputation strategies to proactive limb preservation, aligning with NICE (National Institute for Health and Care Excellence) return of investment principles.

[PP12 - Top 12 poster] Title: Percutaneous needle flexor tenotomies for the treatment and prevention of apical diabetic foot ulcers, 12 month outcomes of a consecutive series

Amy Sherratt[1], Nick Duncan[2], Frances Game[1]

[1]University Hospitals of Derby and Burton, Derbyshire Community Health Services, Derby, United Kingdom; [2]University Hospitals of Derby and Burton, Derby, United Kingdom

Aim: Foot ulceration is a common occurrence in high-risk diabetic feet. Apical toe ulcers are a common area of breakdown when toe deformity combines with high external pressures associated with neuropathy. Percutaneous flexor tenotomies (PFT) have been suggested as a less invasive method of providing permanent correction and aiding ulcer healing compared to other surgical interventions.

To undertake a retrospective audit of consecutive patients who underwent PFT in a single centre. Data were collected on ulceration duration, healing times, recurrence rates and transfer ulcerations for 12 months following the procedure.

Method: Retrospective case notes review of patients, attending a Multidisciplinary Foot Clinic who underwent outpatient PFT between April 2018 and September 2022 for the treatment of an apical diabetic foot ulcer.

Results / Discussion: 49 patients (mean age 67 years, 92% Type 2 diabetes, mean HbA1c 66mmol/mol), were included. 7 had PFT on a hallux and 42 on lesser toe(s). 6/29 had multiple ipsilateral toe ulcers. Median days from presentation to PFT was 147.5 (range 0-314) days. Median time to healing post PFT (n=48, 1 lost to Follow-up) was 24 (range 7-191) days. By 12 months recurrences occurred in 5/42 participants ,15/42 had new apical ulcers at other sites, 6 of which were on the contralateral foot. Of the 6 hallux PFTs (1 lost to F/U) median time to healing 25 (range 7-115) days. No major or minor amputations were done within 12 months.

Conclusion: Outpatient PFTs are effective in healing apical ulcers even when performed on the hallux. Transfer ulcers are common as is new ulceration on the contralateral foot.

[PP13] A Novel Topical Desiccation Agent for Management of Complex Diabetic Foot Ulcers Resistant to Sharp Debridement: A Prospective Analysis

Alpa Lakhani[1], Caoimhe Joyce-Hearne[2], Prash Vas[2]

[1]Guy's and St Thomas' Hospitals, King's College London, London, United Kingdom; [2]Guy's and St Thomas' Hospitals, King's College Hospital, King's College London, London, United Kingdom

Aim: Debridement is essential for managing diabetic foot ulceration (DFU); however, the gold standard, sharp debridement, may not always yield the desired outcomes. A novel topical desiccation agent (TDA) containing methane sulfonic acid may offer an alternative means of achieving adequate wound control to promote granulation and enhance the potential for wound healing. We evaluated the effectiveness of TDA in complex DFU with refractory necrotic tissue and biofilm expression resistant to sharp debridement.

Method: Prospective analysis of 10 patients with hard-to-heal ulcers, of which 80% had peripheral arterial disease (PAD). All DFU were TEXAS 2 B/D or 3B/D, IDSA2 were present for at least 2 weeks and received a minimum of four rounds of sharp debridement. A single application of TDA was undertaken. Over a six-week period, outcomes evaluated were the development of new granulation, the proportion achieving a 50% percentage area reduction of (50%PAR), patient-reported pain reduction using the numeric rating scale (NRS), and the use of systemic antibiotics for new infection.

Results / Discussion: TDA application facilitated new granulation tissue formation in 80% of cases, with 70% of patients achieving measurable wound size and/or depth reduction. A 50%PAR was observed in 50% of patients within six weeks. Patient-reported pain improved in 30% of cases. Importantly, no new systemic antibiotics were started on 80% of patients post-TDA application. No adverse effects (burns, infections, or peri-wound maceration) were reported.

Conclusion: Our experience indicates a significant potential for the novel TDA in enhancing the debridement process for wounds refractory to standard sharp debridement with improvements in key wound healing indicators. The lack of adverse events emphasises its safety profile. These findings imply that TDA may be a valuable adjunct in managing complex wounds resistant to conventional debridement methods. Further studies are necessary to validate these outcomes in larger cohorts.

[PP14] Clinical effects of weekly and biweekly low-frequency ultrasound debridement versus standard of wound care in patients with diabetic foot ulcers: A pilot randomized clinical trial

Sebastián Flores Escobar[1], Yolanda García Álvarez[1], Francisco Javier Álvaro Afonso[1], Mateo López Moral[1], Marta García-Madrid[1], José Luis Lázaro-Martínez[1]

[1]*Diabetic Foot Unit. Universidad Complutense de Madrid, Madrid, Spain*

Aim: To evaluate clinical effects of weekly (UD/week) and biweekly (UD/2-weeks) low-frequency ultrasound debridement (UD) on wound healing, healing time, wound area and granulation tissue in patients with diabetic foot ulcers (DFUs), compared to the standard of care (SoC).

Method: A pilot randomized clinical trial was conducted involving 30 patients with DFUs receiving UD/week (n=10), UD/2-weeks (n=11), or SoC (n=9) every week over a 12-week treatment period. Outcome measures included healing rate, healing time, wound area reduction and granulation tissue, assessed using Wollina wound score. Survival analysis was performed to examine the time required for DFUs to heal during the follow-up period. Differences in survival between treatment groups were assessed using the log-rank test and demonstrated by Kaplan-Meier curves.

Results / Discussion: Healing rates at 6 months were 70% (UD/week), 54.4% (UD/2-weeks), and 33.3% (SoC) (p = 0.27). Healing times were 11 (IQR 7–19) weeks for UD/week, 18 (IQR 15–36) weeks for the SoC, and 24.5 (IQR 16–30) weeks for the UD/2-weeks group (p = 0.036). Wound area was reduced by 87.5±18.5% in the UD/week, 68.6±26.2% in the UD/2-weeks, and 38.9 ± 16.6% in the SoC (p = 0.014). Wollina wound scores were 7 (IQR 6–7) for UD/week, 7 (IQR 6.5–7) for UD/2-weeks, and 4 (IQR 3–6) for SoC (p = 0.002).

Conclusion: UD/week showed not significantly higher healing rates than the UD/2-weeks and SoC, but experienced significantly shorter healing time, a greater percentage of wound area reduction and higher Wollina wound score. These findings suggest that UD/week could be a valuable therapeutic option in clinical practice, especially for patients in whom sharp debridement is not a viable option or who require an alternative approach to promote wound healing.

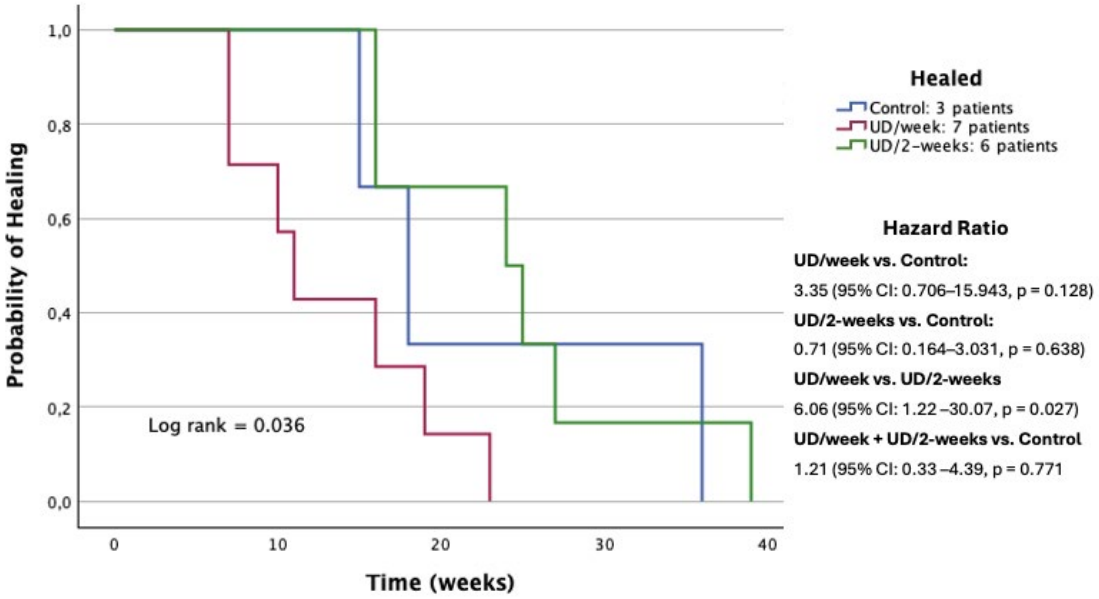

Figure 1. *Kaplan-Meier survival curves. Time to the healing of DFUs by study group*

[PP15] Effectiveness of a Bimodal Debridement Strategy in Patients with Peripheral Arterial Disease and Diabetes at a Large Vascular Centre

Caoimhe Joyce-Hearne[1], Alpa Lakhani[1], Vaishali Desai[1], Amina Ceesay-Jaiteh[1], Prash Vas[2], Tejal Patel[1]

[1]Guy's and St Thomas' Hospitals, King's College London, London, United Kingdom; [2]Guy's and St Thomas' Hospitals, King's College Hospital, King's College London, London, United Kingdom

Aim: Sharp debridement, the practice standard, may be difficult for certain individuals with diabetic foot ulcers (DFU). Ongoing ischaemia or pain may make regular sharp debridement challenging, risking further wound-related complications, including infection and amputation. A bimodal debridement strategy (BMDS) may overcome such limitations by combining sharp debridement with interval larval-assisted debridement. We evaluated the effectiveness of this approach in a cohort of individuals with severe peripheral arterial disease (PAD) and DFU.

Method: A retrospective analysis was conducted on 20 individuals with confirmed PAD who had undergone revascularisation. The DFU were W2-3, I2-3 and fI1-2 on the WifI classification. DFU were considered acute (present<4 weeks, 45%, mainly post-surgical DFU) or chronic (>4 weeks, 55%).

Results / Discussion: The initiation of BMDS was indicated for pain during debridement (70%) and/or persistent slough despite sharp-only debridement (45%). The larval applications varied from one (65%) to two (25%) and three (10%). At six weeks, 90% showed increased granulation tissue and reduced slough post-treatment. Following BMDS, wound support included negative pressure wound therapy (standard VAC, 40%; PICO, 10%), dry dressings (45%), and antibiotic-loaded calcium-sulphate (5%). Among 18 patients with complete follow-up, 61% experienced a 50% percentage-area reduction within 12 weeks, and 39% achieved complete healing with median time 26.0 (IQR 16.5) weeks. Two reported adverse effects (bleeding, skin maceration).

Conclusion: The BMDS appears to be an effective approach to managing complex foot ulcers in complex DFUs that are intolerant of the practice standard. The high rates of granulation tissue formation, slough reduction and promising healing outcomes suggest its potential as a valuable strategy in wound care. Further studies are warranted to confirm these findings.

[PP16] Adipose Grafting in Diabetic Foot Ulcers: Outcomes and Safety Analysis

Roberto Da Ros[1], Roberta Assaloni[1], Andrea Michelli[1], Enrica Barro[1], Barbara Brunato[1], Giacomo Colombin[1], Elisabetta Belardinelli[1], Cesare Miranda[2]

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Aim: Adipose tissue grafting, also known as adipose-derived stem cell therapy, is a regenerative medicine approach showing potential for the treatment of diabetic foot lesions. In diabetic patients, impaired wound healing, peripheral neuropathy, and vascular insufficiency contribute to the development of chronic ulcers and osteomyelitis, complicating traditional treatment strategies.

Method: We conducted a retrospective analysis of our center's database, including all patients treated for chronic diabetic foot lesions who underwent adipose grafting with a follow-up of at least six months.

Results / Discussion: We identified 38 patients, with a mean age of 69±10 years, a mean diabetes duration of 18±7 years, a mean creatinine level of 1±0.34 mg/dL, a mean HbA1c of 7.4±1.8%, peripheral neuropathy in 36 patients (95%), peripheral vascular disease in 24 (63%), and osteomyelitis in 27 (71%). Lesion locations were: 10 forefoot, 5 midfoot, 22 heel, and 1 ankle. Lesion classification was: 22 Texas 3D, 5 Texas 3B, 2 Texas 2C, and 9 Texas 2A. The median duration of the lesions was 5 months (Q1: 1, Q3: 12). No patients experienced severe complications; 4 patients (10%) developed a hematoma at the adipose tissue harvesting site, which resolved spontaneously. At a mean follow-up of 12±4 months, 24 (63%) patients achieved healing with a mean healing time of 206±79 days, without requiring further surgical interventions. Comparison between healed and non-healed patients revealed significantly higher creatinine levels in the non-healed group (1.2±0.4 vs. 0.9±0.3 mg/dL) and a greater prevalence of heel lesions (79% vs. 46%). Among the non-healed patients, two underwent Syme amputations during follow-up.

Conclusion: In conclusion, adipose grafting is a safe and minimally invasive procedure with no major adverse events. Our data demonstrate its efficacy in promoting healing, even in chronic lesions with osteomyelitis and those located on the heel.

[PP17] Effectiveness of Oxygen Multimodality Therapy in the Treatment of Diabetic Foot Ulcers

Bernd Gächter[1 2]

[1]Ospedale Regionale di Locarno, La Carità, EOC,, Locarno, Switzerland; [2]Spital Oberengadin Samedan,, Samedan, Switzerland

Aim:

Older patients with multiple comorbidities are known to have impaired wound healing. With an aging population and increasing multi-morbidity, many patients are no longer eligible for interventions under anesthesia. In addition to the advanced age of the patient population, the geographic setting-characterized by mountainous terrain and long travel distances-limits the frequency with which patients can attend follow-up visits and receive treatment at the wound center. Therefore, alternative treatment options are needed.

Method:

Fourteen patients with diabetes mellitus and chronic wounds were enrolled in the study. All patients presented with osteomyelitis; 13 had concomitant peripheral arterial disease, 4 were receiving dialysis. The mean age was 70 years. Critical limb ischemia was excluded in all cases. In the presence of clinical signs of infection, wound swabs were obtained and systemic antibiotic therapy was initiated for 10 days, guided by antibiogram results. Patients underwent oxygen multi-modality therapy three to five times per week over a period of three months.

Results / Discussion:

After three months of treatment, complete wound closure was achieved in 10 cases. Two additional wounds reached full epithelialization after nine months. One wound showed 50% healing after three months. One patient discontinued therapy prematurely and subsequently underwent surgical intervention.

Conclusion:

It is essential to follow the standards of chronic wound care, including the exclusion of critical ischemia and infection, appropriate wound bed preparation, and offloading.

Oxygen multi-modality therapy has shown good results in patients with diabetic foot, peripheral arterial disease and chronic wounds without critical ischemia.

For patients with limited treatment options due to age or comorbidities, it represents a valuable alternative. Since the therapy can also be performed at home, transport to therapy centers is not necessary. It can be administered without removing the wound dressing, which may also help reduce care costs.

[PP19] TLC-NOSF DRESSINGS AS FIRST-LINE TREATMENT IN DIABETIC FOOT ULCERS: A SYSTEMATIC REVIEW OF CLINICAL EVIDENCES

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Aim: TLC-NOSF (Technology Lipidocolloid-Nano Oligosaccharide Factor) dressings are recommended by numerous national and international guidelines in diabetic foot ulcers (DFUs) management but are still often used as a second-line treatment, which may result in lost opportunity for patients and increased costs for payers. This work aimed to explore the wound healing outcomes and related costs of TLC-NOSF dressings used as first-line treatment in patients with DFUs.

Method: We conducted a systematic review (four databases (MEDLINE, Embase, Emcare, and Google Scholar), up to February 2024, following PRISMA principles. Studies were eligible if the evaluated dressings had been used as an integral part of standard of care at patient's first presentation and/or in recent wounds (≤ 2-months). Main evaluation criteria included wound healing rate, time-to-heal, associated costs and change in patients' quality of life (WoundQuol 17, EuroQuol 5D-5L). The evidence quality was appraised using well-recognized risk-of-bias tools.

Results / Discussion: Fourteen studies, at relatively low risk of bias, assessed the use of TLC-NOSF dressings as a first-line treatment in DFUs (1,174 patients). Evidence shows that using these dressings consistently results in significantly higher healing rates (adjusted odds ratio: 2.60; p=0.002), shorter healing times (two months sooner; p=0·029), and cost savings (10 to 48% less expensive) compared with standard dressings used under similar conditions. Real-life evidence supported the results obtained in clinical trials and economic models, within similar ranges, regardless of the settings involved or of the patients and wounds' characteristics (wound healing rate: 74% by week 20/24, time-to-heal: 7-12 weeks). Furthermore, dressings have been shown to improve patient**s'** quality of life and are well tolerated and accepted, supporting a wide adoption approach.

Conclusion: These results reinforce the current guidelines recommending TLC-NOSF dressings in the treatment DFU**s** and support their wider implementation as a first-line treatment, being part of standard of care.

[PP20] Clinical outcomes of skin micro-fragment therapy in managing hard-to-heal diabetic foot ulcers

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Aim: To evaluate the clinical outcomes Skin Micro-Fragments therapy (Hy-tissue micrograft (HT-MG)) in managing hard-to-heal diabetic foot ulcers (DFUs.)

Method: A prospective case series was conducted involving a total of 13 patients with hard-to-heal DFUs treated with HT-MG from October 2021 to December 2024. The inclusion criteria included having a confirmed diagnosis of type 1 or type 2 DM, being over 18 years of age, presenting with a non-infected, neuropathic or neuroischemic chronic DFU classified as Texas grade IA, IC- IIIA, or IIIC, that has not responded to conventional or advanced treatments, and has had at least 4 weeks of evolution. The exclusion criteria included infection as defined by the Infectious Diseases Society of America criteria, untreated osteomyelitis, and critical limb ischemia. The primary outcome was the wound healing rate at 12 weeks. Secondary outcomes comprised the time to complete epithelialization, wound area reduction (WAR) at 4 and 12 weeks, and the incidence of adverse events.

Results: 13 patients were included (12 (92.3%) male) with a mean age of 60.92±4.95 years old, with Diabetes Type 2. After treatment with HT-MG, 7 (53.8%) of patients achieved complete wound closure within 12 weeks. The mean healing time was 7.8 ±3.5 weeks. The mean WAR at 4 and 12 weeks was 60.5%±31.5% and 86.2%±22.9% respectively. The procedure was well tolerated with no complications observed in the donor site such as pain or infection. No adverse effects related to the infiltration procedure at wound site were recorded with a promising wound healing rate during the follow-up period.

Conclusion: Autologous micro-fragmented skin grafts have shown promising clinical outcomes in healing hard-to-treat DFUs. This approach could be considered a promising therapeutic alternative, and future studies should focus on increasing the evidence level of this innovative strategy.

[PP21] HARD TO SEAL-HARD TO HEAL: A NEW APPROACH TO ENHANCE HEALING IN DIABETIC FOOT ULCERS. A PROSPECTIVE CASE SERIES

Juan Pedro Sanchez Rios[1], Irene Valero Luján[1], Miguel Ignacio Herrero Marco[1], Ignacio Querol Cisneros[1], Blanca Expósito Camacho[1], Sandra Vicente Jiménez[1], Jesús Manuel Alfayate García[1], Luis de Benito Fernández[1]

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Aim:

To evaluate the clinical outcome using a novel negative pressure wound therapy (nNPWT) with an smart easy-dress system to use on hard to seal diabetic foot ulcers (DFU) with moderate/severe infection.

Method:

Four diabetic patients with neuropathic or neuroischemic foot ulcer and moderate/severe infection, who required a large debridement and drainage, were included from November 2024 to January 2025.

Patients were recruited after surgical drainage and revascularization if needed. After debridement, nNPWT with easy-dress system for atypical amputation was used. The primary outcome was wound healing at 12 weeks, or, wound area reduction (WAR) at 8 weeks. Secondary outcomes comprised the time to complete epithelialization, and the incidence of adverse events.

Results / Discussion:

All patients were men with type 2 ***Diabetes Mellitus*** (100%), with a mean age of 68±4.74 years

old, and 2 of them (50%) have previous ulcers and revascularization. 3 patients (75%) had abscense of pedal pulses, ABI was not compressible in 3 patients and 1 patient had ABI >1.

On admission 3 patients (75%) had severe infection according to IDSA (Infectious Diseases Society of America). 3 patients (75%) required revascularization: 2 open surgery and 1 endovascular.

The average wound size was 24±16.92 cm2. nNWPT was used after atypical total or parcial Trans-Metatarsal Amputation (TMA) in 4 patients (100%). Complete healing at 12 weeks was achieved in 75% cases, with a mean time of 11.33±0.47 weeks. The fourth patient, had a WAR of 62,9% at 8 weeks. No complications were recorded.

Conclusion:

nNWPT after surgical debridement is recommended by International Guidelines and has demonstrated to be an ambulatory, effective and safe technique to reduce healing time. In our experience, this smart easy-dress system, enhances outcome on DFU with irregular edges, damaged perilesional skin and previous moderate/severe infections, classically hard to seal.

[PP22] Successful Management of Diabetic Foot Ulcer Complicated by Osteomyelitis with Conservative Curative Surgery: A Case Report

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Aim: Diabetic foot ulcers (DFUs) complicated by osteomyelitis pose a significant challenge in preventing limb amputation. This case describes the successful combination of surgery to treat a diabetic foot ulcer with osteomyelitis (IDSA/IWGDF 3O), and prophylactic flexor tenotomy to reduce biomechanical ulceration risk.

A 69-year-old male with type 2 diabetes (HbA1c 7.7%), diagnosed four years prior, with microvascular (neuropathy) and macrovascular (HTN, PAD) complications, a prior distal amputation of the second digit of the left foot, and an IDSA/IWGDF 3O ulcer on the left hallux. The chronic wound, persisting for six months, exhibited a descending fistulous tract, bone exposure, and local infection signs. Radiological findings confirmed cortical discontinuity of the first metatarsal head and osteolysis of the distal phalanx. Vascular assessment indicated compromised but preserved distal perfusion (ABI 0.75, TBI 0.6, TPS 80 mmHg).

Method: Treatment involved conservative surgery, including ostectomy of the distal aspect of the proximal phalanx, distal phalangectomy, and sharp debridement of the medial aspect of the hallux. Postoperative care included targeted three-week antibiotic regimen (for the cortical erosion of the first metatarsal head), dressing protocols, and offloading methods (felted foam dressing and post-op shoes). Prophylactic flexor tenotomies were performed on the second and third digits bilaterally to correct claw toe deformities.

Results / Discussion: At 20 weeks post-surgery, the ulcer healed with no residual osteomyelitis. The patient exhibited improved foot biomechanics without new lesions. Monthly follow-ups included medical and podiatric consultations, tertiary prevention with silicone orthoses, and permanent offloading via therapeutic footwear with adapted insoles, adjusted to ulceration risk.

Conclusion: This case highlights the effectiveness of conservative curative surgery as an alternative to hallux amputation in DFUs complicated by osteomyelitis. Additionally, prophylactic surgery helped offload plantar pressure and prevent ulceration. This combined approach addresses infectious and biomechanical factors, providing a strategy for limb preservation.

Figure 1 - Evolution of a diabetic foot ulcer complicated by osteomyelitis, from initial presentation to complete healing after conservative curative and prophylactic surgery.

[PP24] Efficacy of transcutaneous CO_2 therapy in the treatment of diabetic foot

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Aim: Presentation of the effectiveness of transcutaneous CO2 application in the treatment of diabetic foot

Method: Microcirculation is the most extensive segment of the vascular system, where the transfer of oxygen and nutrients actually takes place, which allows tissue survival. Its dysfunction plays an important role in many diseases, including diabetes. Diabetic foot is the most common microvascular complication of diabetes. Transcutaneous CO_2 therapy is a novelty in the health of microvascular diseases and their consequences. The effectiveness of transcutaneous CO_2 therapy in gaseous form has been shown to significantly improve microvascular function, which is reflected in clinical efficacy in significantly shorter wound healing time and reduced pain.

Results / Discussion: The paper presents the efficacy of transcutaneous CO2 therapy, which has been confirmed by two RCTs, which found an up to six-fold increase in blood flow at the microcirculation level. The efficacy is demonstrated through two cases of diabetics with chronic wounds, where microcirculation during CO2 therapy was regularly monitored by spectroscopy.

Conclusion: Microvascular complications in the development of diabetes are thus important risk factors for their health and survival and thus a key factor that slows down wound healing.

The use of transcutaneous CO_2 therapy significantly improves sensory functions, reduces neuropathic pain and accelerates wound healing, and consequently reduces the number of major or minor amputations.

Despite great progress in understanding its significance, MVD still represents a diagnostic and therapeutic challenge. In parallel with the development of new diagnostic and therapeutic approaches, including endovascular techniques, pharmacological interventions and effective therapeutic procedures, such as transcutaneous CO_2 therapy, better patient outcomes and chronic wounds, MVD and PAOB are becoming increasingly accessible.

[PP26] Impact of malnutrition on survival and amputation risk in patients hospitalized for diabetic foot ulcers: a retrospective single-center cohort study

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Aim: Diabetic foot ulcers (DFUs) significantly increase morbidity and mortality among patients with diabetes. Malnutrition is highly prevalent in this population, but its impact on survival and amputation rates remains understudied. This study aimed to assess the effect of malnutrition, defined by the Global Leadership Initiative on Malnutrition (GLIM) criteria, on survival and amputation risk in patients hospitalized for DFUs.

Method: Clinical records from patients admitted to the University Hospital Antwerp (Belgium) for DFU complications between June 2016 and June 2024 were retrospectively analyzed (follow-up until December 2024). Malnutrition was assessed upon admission using the GLIM criteria. Survival differences were analyzed using Kaplan–Meier curves, as well as Cox proportional hazards model adjusting for age, DFU severity and comorbidities. Similarly, a Fine-Gray model was analyzed for competing risks of amputation and survival.

Results / Discussion: Of the 222 included patients (mean age 69±12 years, 79% male), 35% were malnourished. Overall survival probability after 5 years was 62%. Survival distributions did not significantly differ between the malnourished and non-malnourished group (p=.607). Time to amputation (any level) and time to major amputation also did not significantly differ between both groups (p=.95 and p=.78 respectively).

Conclusion: Our study found no significant impact of malnutrition on survival or amputation risk, suggesting that other factors, such as cardiovascular disease, may play a more dominant role in determining these outcomes. All patients received nutritional support as part of standard care, which may have mitigated negative effects of malnutrition and influenced our results. Further research is needed to explore the role of malnutrition in DFU healing and long-term outcomes.

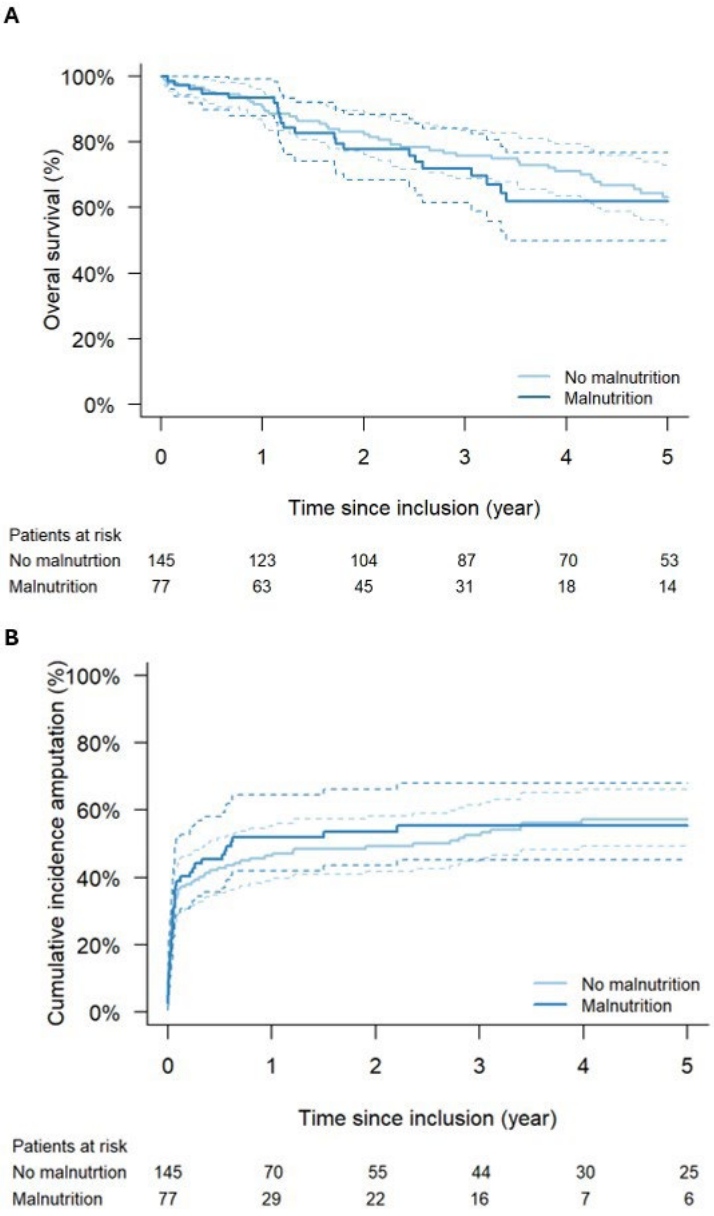

Figure: Bold lines show Kaplan-Meier curves for overall survival (A) and cumulative incidence functions of amputation adjusting for death as competing risk (B) for both malnourished and non-malnourished patients. Dashed lines show corresponding confidence intervals.

[PP27] Wound healing and health-related quality of life in patients with DFU treated with TLC-NOSF dressings: A French prospective multicentre observational study in 144 patients

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[1]Laboratoires Urgo, Chenove, France; [2]Laboratoires Urgo, Paris, France; [3]CHU Lapeyronie, Montpellier, France

Aim: This study aimed to evaluate the performance of TLC-NOSF dressings in managing chronic wounds in patient population under real-life conditions in France, focusing on diabetic foot ulcers (DFUs).

Method: A French prospective, multicentric, observational study was conducted across 28 centers, using three different TLC-NOSF dressings (UrgoStart Plus Pad, UrgoStart Plus Border, and UrgoStart Contact). Patients with DFUs were followed for up to 12 weeks. The primary endpoint was complete wound healing. Secondary endpoints included subgroup analysis by wound duration, wound progression, local tolerance, and dressing acceptability. Changes in quality of life were assessed using the validated EuroQol-5D-5L questionnaire. The study was registered under NCT06135987.

Results / Discussion: Between June 2022 and July 2024, 144 DFU patients were treated for an average duration of 63 ± 27 days. By the final visit, 41% of ulcers were fully healed. Healing was optimal for recent ulcers (<3 months), with 51% healing compared to 27% for ulcers >6 months. Patients reported quality-of-life improvement, with 87.0% rating the dressings as “extremely useful/useful” and 97.7% as “very well/well accepted.”

Conclusion: These findings confirm the effectiveness and tolerance of TLC-NOSF dressings in DFU management under daily practice conditions. Aligned with a recent systematic review*, the study supports their use as first-line treatment until wound closure, integrated within an appropriate care protocol.

*Reference: Meloni M et al. TLC-NOSF dressings as a first-line local treatment of chronic wounds: a systematic review of clinical evidence. J Wound Care. 2024

[PP28] Inside the Shoe: Novel Thermal Patterns of the Plantar Foot Across Non-Ambulatory States

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Aim
Foot thermoregulation reflects underlying vascular and neurological function, but most studies focus on barefoot measurements using thermal cameras in ambient environments. This study presents a novel analysis of in-shoe plantar temperature patterns in healthy individuals during three non-ambulatory postures—lying, sitting, and standing—using sensor-embedded smart insoles. The aim was to establish normative baseline data for comparison with individuals with impaired peripheral perfusion.

Methods
Twenty healthy adults with confirmed vascular and neurological integrity participated. Each wore smart insoles containing 21 embedded temperature sensors distributed across key plantar regions. Data were recorded at 10-second intervals during three consecutive 10-minute phases: lying down, sitting, and standing.

Discussion
Posture-specific thermoregulatory patterns were observed. The lying phase showed a progressive and uniform temperature rise across all foot regions, likely reflecting enhanced circulation due to reduced gravitational effects. Sitting and standing phases exhibited more stabilised and regionally varied temperature responses. The arch consistently recorded the highest temperatures, while the toes remained cooler across all postures. These gradients were consistent across participants and postures, indicating a reliable baseline thermal signature in healthy individuals.

Conclusion
This study provides the first high-resolution, in-shoe plantar temperature data during static phases in a healthy population. Findings demonstrate consistent spatial gradients and posture-related thermal variation under enclosed footwear conditions. Notably, the in-shoe environment introduced distinct thermal behavior not observed in barefoot studies. These normative patterns—especially the arch-to-toe gradient—offer valuable reference data for future comparisons in populations with circulatory or neurological dysfunction. The results highlight the importance of considering footwear in both clinical thermographic assessments and wearable health-monitoring technologies

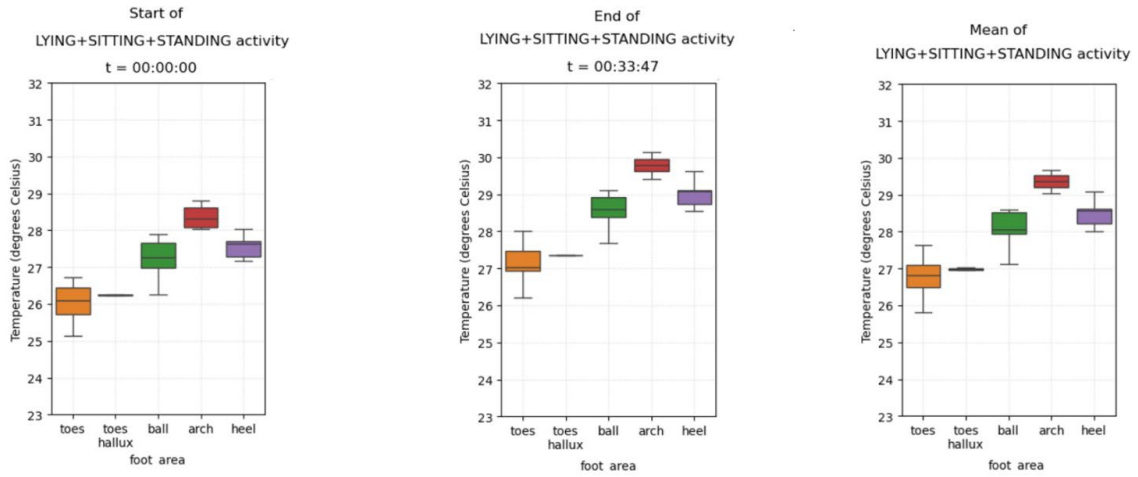

Figure 1: Boxplots showing foot temperatures by region at the start, end, and as the mean across all static phases

[PP29] Key Determinants of Healing Time Following Day Case Diabetic Foot Surgery: A Retrospective Cohort Analysis from a Single Centre

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Aim

Diabetic foot disease affects up to one-third of patients, with nearly 20% requiring amputation (1). Locally implanted calcium sulphate beads with vancomycin and gentamicin have demonstrated good outcomes by delivering antibiotics and supporting tissue regeneration (2,3). This study assessed factors influencing healing time in diabetic foot amputations performed as day cases by a single podiatric surgeon.

Method

A retrospective cohort study was conducted at a tertiary centre, analysing patients who underwent amputations for diabetic foot ulcers between January 2024 and January 2025. Data included demographics, HbA1c, smoking, peripheral vascular disease (PVD), revascularisation, and antibiotic use. The primary outcome was time to complete wound healing. Univariate and multivariate analyses were performed.

Results / Discussion

Sixty amputaYons in 55 paYents (mean age 65 years) were analysed. All received calcium sulphate anYbioYc beads. Mean healing Yme was 75 days (range 10–357). PVD was significantly associated with prolonged healing (median 152.5 vs 51.5 days, p<0.05).

Variable	Category (n)	Percentage (%)
Gender	Female (6)	10
	Male (54)	90
Smoking	Yes (17)	28.3
	No (18)	30
	Ex (25)	41.7
Revascularisation	Yes (14)	23.3
	No (46)	76.7
PVD	Yes (16)	26.7
	No (44)	73.3
HbA1c >7%	Yes (46)	76.7
	No (14)	23.3
Post-op antibiotics	Yes (16)	26.7
	No (44)	73.3

Table – 1: Pre operative characteristics

PVD: Peripheral Vascular Disease

Conclusion:

HbA1c showed a nonlinear, non-significant associaYon (p=0.46), indicaYng glycaemic control was not predicYve in this cohort. Healing Yme was longer with PVD and prior revascularisaYon (121.5 vs 40.5 days, p=0.002).

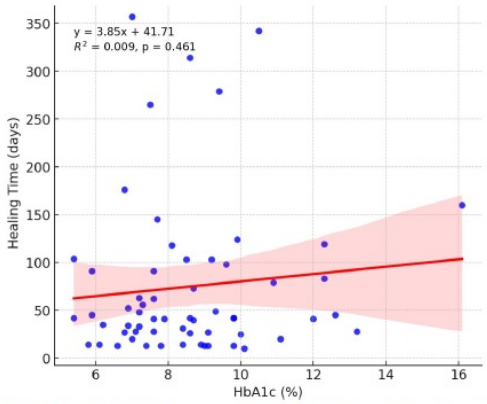

Figure – 1: Relationship between HbA1c (%) and healing time (days)

Active smoking prevalence was 28.3%, higher than the UK average of 11.9% (4), but its effect on healing was not significant. Gender and post-operative antibiotics showed no significant effect (p=0.42 and 0.07).

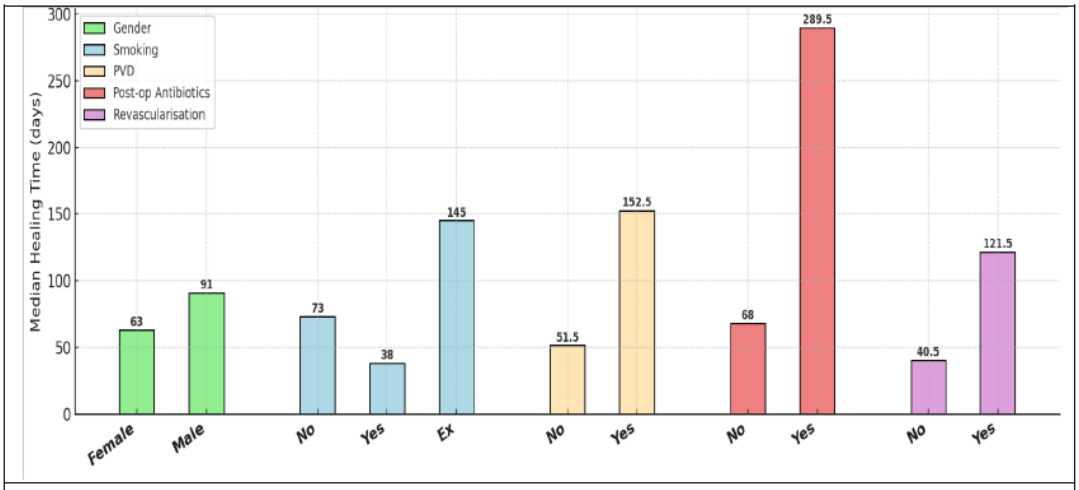

Figure – 2: Univariate analysis of median healing time by variables

Multivariate analysis identified PVD as the strongest independent predictor of delayed healing (+187.7 days, p=0.0007), while revascularisation trended toward faster recovery (−105.4 days, p=0.059).

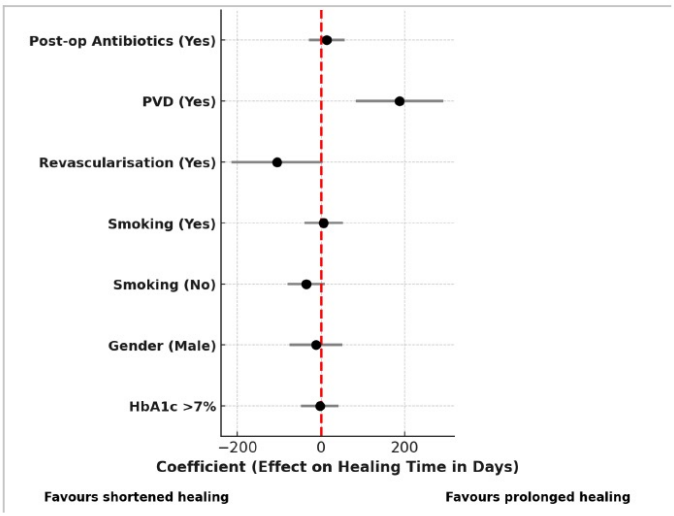

Figure – 3: Multivariate analysis of factors affecting healing time

Conclusion

Calcium sulphate beads are effective in promoting healing after diabetic foot amputation. PVD significantly delays recovery, while revascularisation may shorten healing. HbA1c, smoking, gender, and antibiotic use were not independent predictors. Early identification and treatment of PVD may improve outcomes.

References

1. Edmonds M, et al. J Clin Orthop Trauma. 2021;17:88–93. https://www.journal-cot.com/article/S0976-5662(21)00083-7/abstract
2. Crowther GS, et al. Antimicrob Agents Chemother. 2021;65(6): https://journals.asm.org/doi/10.1128/aac.02012-20
3. Dales J, et al. Br J Diabetes. 2022;22(2):125–126. https://bjdabcd.com/index.php/bjd/article/view/1007/1235
4. ONS. Adult smoking habits in Great Britain: 2023. https://www.ons.gov.uk/releases/adultsmokinghabitsingreatbritain2023

[PP30] The impact of limb offloading on the skeleton condition in men with type 1 and 2 diabetes during diabetic food syndrome therapy

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Aim: To examine the impact of limb offloading on BMD in patients with DFU.

Method: The study involved 43 men T1DM, n = 6; T2DM, n = 37) with DFU (n = 41) or Charcot neuroarthropathy (n = 2) and 30 men as control. The mean age (median [Q1–Q3]) of patients with DFU 64.5 [56.5–69.0], in the control group 60.5 [53.0–66.0] years; p = 0.213; the BMI: 29.2 [25.4–33.1] and 28.4 [25.5–33.3], respectively; p = 0.943. The diabetes duration in the DFU 15 years (10–20) 10 years (6–15) in the control group; p = 0.042. DXA of the lumbar spine and the proximal ends of femurs were performed at baseline and after 6.3 (5.8–6.9) months. The median duration of ulceration at the initiation was 6 months (range, 3–16 months). The methods of offloading 15 (34.9%) wheelchair, 25 (58.1%) an offloading shoe, 3 (7.0%) crutches.

Results / Discussion: At the study baseline, no differences were found in BMD in the proximal femur and lumbar spine between the groups. BMD values expressed as SD, were within the normal range. At the baseline, there were no differences in BMD between the limbs. In the follow-up analysis comparing changes in BMD in L1–L4, total hip and femoral neck, no differences were found between the groups. There were no differences in BMD of the lumbar spine, total hip and femoral neck between the first and second measurements regardless. In the DFU group, concentration of vitamin D3 17.9 [12.1–26.1] ng/ml vs 26.6 [22.3–35.9] ng/ml; p < 0.001 concentration of alkaline phosphatase: 92.0 [76.0–106.0] U/l vs 67.0 [53.0–77.0] U/l; p < 0.001.

Conclusion: Limb offloading used in the treatment of DFS does not affect the BMD at a median follow-up of 6.3 months.

[PP31] Documentation of Skin Scale in High-Risk Diabetic Foot Patients: A Retrospective Review

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Aim: Documentation of Skin Scale in High-Risk Diabetic Foot Patients: A Retrospective Review

Background: Diabetic foot ulcers (DFUs) significantly contribute to morbidity and healthcare burden. Identifying high-risk patients through proper documentation, including skin scale scoring (which assesses foot skin dryness during annual foot checks), is crucial for prevention e.g diabetic pre-ulcerative callus resulting in DFUs. This study evaluates skin scale documentation in patients with a history of DFUs.

Method: A retrospective review was conducted at a single primary care practice with 2,822 registered diabetics using SystmOne. Clinical codes searched included various DFU classifications. The patient population was predominantly (78%) South Asian/Indian. Data collected included the most recent HbA1c (within 12 months), ulcer status (healed or active), use of SGLT-2 inhibitors, and foot skin scale documentation.

Results / Discussion:

HbA1c & DFU Status: 15 of 41 patients had HbA1c >7.5% with an active or healed ulcer; 4 were on SGLT-2 inhibitors.

Demographics: Ages ranged from 47–90 years; 11 were female, 30 male.

Amputation History: Three patients with healed ulcers had prior minor amputations; two had HbA1c >7.5%. One patient with an active ulcer and amputation history had an HbA1c of 5.9% (diabetes remission).

Skin Scale Documentation: Only 14 patients (34%) had a recorded foot skin scale, all within primary care.

Conclusion: Limited skin scale documentation may hinder early identification of high-risk patients (scale 3–4) and impact prevention. Strengthening foot risk assessments across care settings is essential. Secondary care prioritises active ulcer management, but integrating skin scale documentation into primary care could aid DFU prevention. Despite high diabetes prevalence, ulcer coding rates were low, aligning with lower DFU incidence in South India, possibly due to ethnic/genetic factors. The study lacks diverse ethnic representation, does not consider confounders (e.g., lifestyle, socioeconomic status), and has a small sample size, limiting generalisability.

[PP32] A case of lymphoma in a non-healing vascular foot ulcer

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Diabetic and vascular foot ulcers are common, affecting 6% of diabetic patients. Primary extranodal anaplastic large cell lymphoma (ALCL) of the bone, though rare (5% of primary bone tumours), can mimic an ulcer, hindering timely diagnosis and treatment.

We present the case of a 62-year-old man who attended the Diabetic Foot Clinic of our hospital in 2015. He presented with a few months' history of a poorly healing right foot ulcer with calcaneus involvement. His medical history included peripheral arterial disease, hypertension, and hyperlipidaemia. Initially, the vascular team performed a right femoral-popliteal bypass to aid healing, but the ulcer failed to improve. A biopsy of the ulcer revealed ALCL (stage 1e), and the patient was referred to the haematology team for chemotherapy with CHOP (cyclophosphamide, doxorubicin, vincristine, prednisolone). Despite this, the disease was refractory to chemotherapy.

Subsequently, the patient received IVE (ifosfamide, epirubicin, etoposide) chemotherapy, followed by an autologous stem cell transplant (ASCT) with LEAM (lomustine, cytarabine, etoposide, melphalan) conditioning in October 2015. In 2023, a CT angiogram revealed long segmental occlusion of the superficial femoral and popliteal arteries, requiring a re-do femoral-popliteal bypass surgery. Five weeks post-bypass, the patient was readmitted due to a ruptured pseudoaneurysm of the femoral artery and graft occlusion, requiring emergency surgery. At present, the patient is in remission, although the ulcer has evolved into a large, depressed cavity.

This case underscores the importance of considering malignant processes in non-healing ulcers with unusual features when standard treatment fails. Histopathology should be employed early to aid in diagnosis. In addition, lymphoma, although rare, can masquerade as a vascular foot ulcer.

[PP33] Enhancing Diabetic Foot Care with Continuous Glucose Monitoring (CGM)

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Aim: Diabetic foot ulcers (DFUs) significantly contribute to patient morbidity, increased healthcare costs, and a heightened risk of amputation. Poor glycaemic control hinders wound healing, leading to complications and prolonged hospital stays. Continuous Glucose Monitoring (CGM) provides real-time glucose data, offering potential for improved glycaemic management and reduced complication rates. This study aims to investigate the impact of CGM impact on DFU healing, hospitalisation duration, complications, and healthcare costs.

Method: A prospective cohort study is underway at our multidisciplinary diabetic foot clinic, involving 40 patients with DFUs on insulin therapy and multiple comorbidities. Participants will have CGM for 6 months, with baseline evaluations including HbA1c, wound characteristics, complication rates, cardiovascular health, renal function, and prior hospitalisations. Patients receive comprehensive training on CGM with regular support, with real-time glucose data correlated with wound healing and complication trends. Regular follow-ups will monitor glycaemic control, hospital length of stay (if admitted), and cost-effectiveness. Comparative analysis will evaluate pre- and post-CGM intervention metrics, supported by statistical assessments of CGM's benefits.

Results / Discussion:

CGM is expected to improve glycaemic control, yielding the following benefits:

- Accelerated wound healing and reduced ulcer-related complications.
- Shorter hospital stays and reduced readmission rates.
- Improved cardiovascular health metrics.
- Substantial reductions in healthcare costs associated with DFU management.

Conclusion: The integration of CGM into diabetic foot care has the potential to significantly enhance clinical outcomes, reduce complications, and improve cost-effectiveness. This study aims to provide robust, real-world evidence supporting CGM's role in DFU management. We hope to offer evidence-based recommendations for incorporating CGM into standard multidisciplinary diabetic foot care pathways.

[PP34] Dignity First: Advanced Care Planning in Diabetes Foot Clinics for Frail Patients

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Aim:

Frail patients with severe diabetic foot infections present unique and complex challenges, particularly when active surgical interventions are contraindicated due to significant comorbidities and advanced frailty. Our case series aim to highlight the need for advanced care planning in frail patients with severe diabetic foot infections, advocating strategies that uphold dignity, reduce suffering, and align with patient values.

Method:

This case series explores three complex cases from a diabetes foot clinic, highlighting the need for thoughtful personalised care plans that address medical needs while preserving dignity. The first, a 65-year-old female with dry gangrene affecting the first four toes of her right foot, is a current smoker with type 2 diabetes, hypertension, stroke, chronic obstructive pulmonary disease (COPD), heart failure, pulmonary embolism, and deep vein thrombosis. The second, an 80-year-old female with multiple infected right foot ulcers and wet gangrene of the right hallux, has a background of type 2 diabetes, hypertension, critical limb ischaemia, and advanced COPD. The third, a 94-year-old male with severe diabetic foot infection, has type 2 diabetes, heart failure, atrial fibrillation (AF), and advanced dementia.

Discussion:

In all cases, the absence of advanced care plans posed significant dilemmas for patients, families, and healthcare professionals regarding the escalation of care during acute deterioration. Decisions regarding hospital admission, invasive interventions, and end-of-life care were further complicated by the need to balance aggressive medical management with the goal of minimising suffering and maintaining dignity and respect. Key considerations include preventing unnecessary hospitalisations, optimising symptom management, and respecting the dignity and medical needs of the patients.

Conclusion:

This case review highlights the role of proactive multidisciplinary collaboration in developing advanced care plans for frail, high-risk diabetic foot clinic patients to optimise care and uphold patient dignity.

[PP35] High Five-Year Mortality and Mental Health Burden in Patients Hospitalised for Diabetic Foot Attack

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Aim:

The diabetic foot attack (DFA) is one of the most severe forms of diabetic foot infection, characterised by rapidly progressive tissue necrosis and high risk of limb loss and mortality. The aim of this study was to evaluate the 5-year mortality rate and assess the prevalence of mental health disorders in a cohort of patients hospitalised for DFA.

Method:

We re-evaluated a cohort of 106 consecutive patients hospitalised between 2016 and 2017 for DFA, defined as TEXAS Grade 3B or 3D and IDSA Class 4 infection. The primary outcome was all cause mortality at 5 years from the first hospitalisation. In addition, we evaluated the prevalence of mental health disorders among the cohort.

Results / Discussion:

Of the 106, 27 patients were lost to follow-up at 5 years. Patients were mainly male (70%), had type 2 diabetes (78 %), mean age of 63± 13 years and a mean HbA1c of 9 ± 2.2 % at the time of the admission. 58 out of the remaining 79 patients (73.4%) had died. Among those who died within the 5-year follow-up, 22 patients (37.9%) had a documented mental health disorder at the time of the first hospitalization. The mortality rate remained markedly high, with the majority of deaths occurring after hospital discharge. In this extended follow-up, we specifically assessed the association between mental health disorders and mortality, observing a high prevalence of mental health disorders among the deceased patients.

Conclusion:

In this unique cohort of patients admitted with DFA, we observed a concerning 5-year mortality rate exceeding 70%, with a high prevalence of mental health disorders among deceased patients. These findings highlight the severe long-term prognosis associated with DFA and underscore the importance of integrated care models addressing both physical and mental health needs.

[PP36] Shared Decision Making for Patients with Diabetic Foot Ulcers: A Decision Need Assessment

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Aim: Shared decision making (SDM) is redefining traditional medical paradigms, transforming relationships and roles between clinicians and patients. SDM has not been widely explored for the care of people with diabetes who have a diabetic foot ulcer (DFU). We conducted a decision need assessment to identify the key decisions concerning DFUs.

Method: A qualitative evaluation was carried out using the Ottawa Shared Decision-Making Framework in Canada. A total of 24 participants (12 patients with DFUs and 12 clinicians involved in the continuum of care for DFUs) were recruited for semi-structured interviews with Zoom. A deductive process supported the thematic analysis of the data. Decision characteristics of this population were defined and compared between patients and clinicians.

Results / Discussion: The results demonstrated that patients want to be involved in healthcare decisions. There was a considerable need for decision support for offloading interventions. Other areas of the SDM were revascularization, taking antibiotics for osteomyelitis and all decisions regarding overall diabetes management (e.g., medications, lifestyle). All treatment options are not often presented to patients when clinicians promote their clinical plan. The clinicians stated that they practise SDM, but the patients shared a different point of view. Offloading is one of the most mandatory interventions in DFUs' care. Patient decision aids (ptDAs) are not currently available to support SDM and this project is the basis for the development and integration of ptDAs. They represent a relevant lever for improving the quality of care and informed consent for patients with DFUs. ptDAs are knowledge mobilization tools that can improve patient-centred care and reduce health iniquities

Conclusion: This was the first step to support SDM for this population. People with diabetes-related foot complications or at-risk can benefit from informed choices about what is important to them, to support empowerment in their journey to remission.

[PP37] Comfort, Appearance and Cost' Shape Diabetic Footwear Adherence

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Aim: To explore the reasons behind footwear choices of UK residents from a South Asian or low socioeconomic background, living with diabetes.

Appropriate footwear must be worn to protect against diabetic foot ulceration. Patients find the recommendation to wear appropriate footwear all day difficult to follow. Personal values and preferences influence footwear choice and vary with culture and class.

Method: Semi structured interviews were audio-recorded and transcribed. Data was analysed using inductive thematic analysis, charted and interpreted using a framework approach using the COM-B model: capability, opportunity, and motivation.

Results / Discussion: Individuals (7/11:Male) with diabetes and neuropathy, from a South Asian or low socioeconomic background, with and without therapeutic footwear, were purposively sampled until data saturation.

Capability: Foot problems, balance issues, and difficulty putting shoes on were challenges faced by participants when trying recommended shoes. Participants found the concept of 'diabetic footwear' confusing. Recall of the advice given was poor. Participants were unable to articulate features of a good shoe, instead describing how the shoe felt; 'comfortable' and 'secure.'

Opportunity: Participants balanced affordability with comfort and durability. Many recalled difficulties with finding a good fit, accepting the need to 'break-in' new shoes. Most considered footwear a priority expenditure, bought to last. The perception that therapeutic shoes signaled their diabetes to others, prompted a preference for regular shoes.

Motivation: Participants continued with old habits, wearing familiar or comfortable shoes, unconvinced that changing to therapeutic shoes would reduce ulcer risk. Removing shoes whilst indoors was customary. Wearing outdoor shoes indoors was considered unclean

Conclusion: This study gives a voice to underrepresented individuals from South Asian and low socioeconomic communities. Individuals placed trust in shoe comfort and familiarity. Forgettable, unconvincing footwear advice and a lack of confidence that footwear choice could reduce the chance of ulceration were barriers to changing footwear choice.

[PP38] The chemical and antimicrobial activity within a nitric oxide-generating wound dressing

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Aim: To demonstrate the novel chemical properties (water activity, osmolarity, and pH), and antimicrobial activity from the supplemental generation of nitric oxide (NO), within a novel NO-generating dressing (NOGD).

Method: Water activity of the entire dressing, and for each of the two dressing layers, was measured using a tuneable diode laser water activity meter. Osmolarity was calculated from solute concentrations in NOGD components. Dressing pH was measured using a pH surface probe by challenging dressings with a pH 7.4 buffered solution at 0.4 mL/hour over 48 hours. The antimicrobial activity of the dressing over 48 hours was measured using a direct inoculation method, including a 48-hour preconditioning period, with six bacteria, one yeast, and one mould.

Results / Discussion: NODG had a water activity of 0.71 ± 0.014, with 90% of the water activity attributable to the upper absorbent layer. Osmolarity of NOGD was over 20-times higher than that of wound fluids. NOGD buffered the alkaline challenge solution immediately and then consistently to pH 5-6 over 48 hours. All challenge microorganisms were rapidly killed by >4 $\log_{10}$ within NOGD. The water activity of NOGD provides high fluid absorption and is inhospitable to absorbed microorganisms, while high osmolarity creates fluid flux from the wound. NOGD immediately buffered the alkaline solution back to acidic pH, creating an acidic state inhibitory towards microorganisms and conducive to wound healing. This acidic pH also activates the production of NO within the dressing. NO provides additional antimicrobial activity over a minimum of 48 hours, as shown by the eradication of 8 challenge microorganisms.

Conclusion: The chemical and antimicrobial activity of the NOGD provides a potent antimicrobial environment and one which is also supportive of wound healing.

[PP39] Utilising nitric oxide as an antimicrobial and antibiofilm agent within a wound dressing is unlikely to face the antimicrobial resistance and tolerance challenges associated with antibiotics and standard antimicrobial dressings

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Aim: To outline the key features of nitric oxide (NO) as an antimicrobial agent in wound care, and compare it to established antibiotics and antiseptics utilised in dressings.

Method: A narrative review.

Results / Discussion: NO is a natural molecule of our innate immune system. It is an uncharged, gaseous, diatomic free radical, with a half-life of a few seconds in biological systems. NO has numerous functions as a regulator molecule in mammalian biology, and so we have evolved mechanisms to avoid its deleterious effects. NO can pass freely across microbial cell walls and membranes, to target membrane proteins, intracellular DNA, and metabolic enzymes. These myriad antimicrobial targets of NO make resistance highly unlikely, compared to antibiotics which usually have single microbial targets. Since NO passes through mammalian tissues as a signalling molecule, it also passes freely through biofilm. NO targets structural biofilm components as well as triggering biofilm dispersal and blocking microbial communication. These multiple targets make biofilm tolerance highly unlikely, compared to antiseptics such as iodine, silver and polyhexanide, which have to be combined with physical or chemical antibiofilm mechanisms to disrupt biofilm structure. The unhindered passage of NO into microbial cells and biofilm mean it is faster-acting than charged antiseptic molecules, which must build up at cell walls and membranes, overcoming unwanted interactions, before diffusing into cells, while they fail to efficiently penetrate complex, charged biofilm matrices. NO can be further differentiated from antibiotics and antiseptics in dressings due to the requirement for it to be generated ***in situ***, by donors or via chemical reaction, so it can be formulated to be continually generated and longer lasting

Conclusion: NO is emerging as a novel antimicrobial and antibiofilm molecule with encouraging bench and clinical data to support its use in a wound dressing format.

[PP40] Salmonella in Diabetic Foot Ulcer: A Rare Pathogen Linked to Prior Gastroenteritis

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Aim:

We present a case of a 62-year-old male with a diabetic foot ulcer (DFU) infected with ***Salmonella enterica*** subspecies ***enteritidis***, confirmed through wound culture. Salmonella infections in DFUs are exceptionally rare.

Method:

The patient had a prior episode of ***Salmonella enteritidis*** gastroenteritis six months earlier, treated with intravenous antibiotics. This case raises important questions about the mechanisms of Salmonella persistence or reinfection in DFUs and the challenges in managing such infections in immunocompromised hosts.

The patient had a background of poorly controlled type 2 diabetes (HbA1c 13.8%), peripheral arterial disease, cardiovascular disease, chronic kidney disease (stage 2), and mixed anxiety and depressive disorder. He was referred with gangrene of the left second toe with ulceration, swelling, and sloughing. Wound culture identified ***Salmonella enteritidis*** (confirmed by genomic sequencing to be the same species as previous gastroenteritis episode). He was prescribed ciprofloxacin and amoxicillin for two weeks based on culture and sensitivity results. He is now awaiting vascular assessment for possible amputation.

Results / Discussion:

Potential mechanisms for ***Salmonella*** infection in DFU include hematogenous seeding from prior bacteraemia, biofilm formation leading to persistent colonization or incomplete eradication of the initial infection and carrier state. Poor glycaemic control and vascular insufficiency likely impaired the immune response and antibiotic penetration, contributing to infection persistence. Antibiotic resistance may have been promoted by prior treatment with co-amoxiclav and ceftriaxone.

Management included targeted antibiotic therapy along with vascular assessment for possible surgical intervention. While ***Salmonella*** has been documented in osteomyelitis, brain abscesses, and soft tissue abscesses, it is unusual in DFUs.

Conclusion:

This rare case highlights the significance of wound cultures in detecting uncommon pathogens, the necessity of optimizing glycaemic control to reduce recurrent infections, and the potential benefits of biofilm-targeting strategies in treatment.

[PP41] Clinical and Economic Benefits of Antimicrobial Stewardship: A Retrospective Review of continuing Co-trimoxazole with Sodium zirconium cyclosilicate (Lokelma)

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Aim: Co-trimoxazole, a broad-spectrum antibiotic; is widely used to treat Diabetic Foot Infections (DFIs). However, co-trimoxazole induced hyperkalaemia can represent a clinical challenge when maintaining uninterrupted antimicrobial management in certain scenarios. Thus, there was a need to review the use of adjunctive therapies that can address co-trimoxazole induced hyperkalaemia.

Method: We retrospectively analysed all patients (n=18) treated with oral Co-trimoxazole for DFIs between October 2021 to September 2023. The selected patients prescribed Lokelma had a DFI and previously had a history of co-trimoxazole induced hyperkalaemia. The data was used to undertake an economic evaluation of patients continuing oral co-trimoxazole and avoiding parenteral antibiotics through either hospital admission or OPAT (Outpatient Antibiotic Therapy), which can represents a higher cost per QALY.

Results / Discussion: We reviewed 17 males and 1 female with ages ranging from 34 – 81 years (mean = 64 years)(median= 64.5). The therapy duration ranged from 3 to 70 days (mean = 33.9) (Median = 31.5). The review demonstrated potential savings of £1, 781, 333 and £718, 145 through avoiding; inpatient admissions saving 252 bed days and OPAT referrals over 14 days/episodes of care respectively.

Three patients (16.7%) suffered from adverse drug reactions. 2 patients experienced a decline in renal function (Normokalaemia) and 1 patient suffered from Acute Kidney Injury (AKI). All resolved after stopping co-trimoxazole.

During this review, we observed no significant changes in full blood count and no patients reported any pathological dermopathy.

Conclusion: Despite its small sample size, this review does suggest oral co-trimoxazole with concurrent Lokelma can be a safe treatment option. The use of Lokelma in mitigating hyperkalaemia risk in this cohort has the potential to improve clinical outcomes which include; safe continuation of oral therapy in primary care, improving antibiotic stewardship and facilitating secondary care resource management in the provision of parenteral antibiotics.

[PP42] Impact of Locally Applied Antibiotic-Loaded Calcium Sulphate on Systemic Antibiotic Use and Wound Healing in Difficult-to-Heal Infected Neuroischaemic Diabetic Foot Ulcers Managed at a Vascular Hub

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Aim: Difficult-to-heal diabetic foot ulcers (DFUs) often exhibit chronic infection, necessitating multiple or prolonged systemic antibiotic courses. Local delivery of antibiotics with biodegradable carriers can minimise systemic exposure and promote wound healing by targeting infections with concentrated antimicrobial activity. We evaluated the effectiveness of antibiotic-loaded calcium-sulphate (ALCS) on key outcomes in DFUs complicated by infection.

Method: A prospective data collection approach involving 45 consecutive individuals over 2-months (Oct 23-Oct 24). All included DFUs were classified as TEXAS2B/D or 3B/D. Key parameters evaluated included the proportion of individuals achieving a percentage area reduction (PAR) of ≥50% at 12 and 24 weeks, complete wound healing, and the impact of concurrent systemic antibiotic use.

Results / Discussion: Overall, 84% of individuals had peripheral arterial disease (PAD), and 45% had CKD3-5. DFU were located on the forefoot/digits(75%), heel(20%), and midfoot(5%). Vancomycin (76%), Gentamicin (82%), and Amikacin (5%) were used for antibiotic-loading. By 12 weeks, 62% achieved a PAR≥50%, with the average time to achieve this being 45(SD ±20.0) days. Complete healing was observed in 13.9% by 12 weeks and increased to 39.6% by 24 weeks, with 44.4% achieving complete healing by the end of follow-up. Mean time-to-heal was 113(SD 49.0) days, ranging from 35 to 224 days. Concurrent systemic antibiotics were prescribed to 62% of individuals, with a median duration of 17.5 days (IQR 30.0), and 38% received no antibiotics. Healed individuals showed no difference whether they received systemic antibiotics or not (55% vs. 55%,p>0.05)

Conclusion: The use of ALCS in difficult-to-heal DFUs with low-grade persistent infection demonstrated promising outcomes, including substantially reducing dependence on systemic antibiotics. Furthermore, improvements in parameters related to wound healing were observed. These findings underscore the potential role of ALCS in managing complex DFUs and call for further investigation into their optimal deployment in clinical settings.

[PP43] RETROSPECTIVE SINGLE-CENTER EXPERIENCE IN THE MANAGEMENT OF DIABETIC FOOT ATTACK: ANALYSIS OF PROGNOSTIC FACTORS IN LIMB SALVAGE

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Aim: Diabetic Foot Attack (DFA) is a severe complication of diabetic foot syndrome that requires prompt and aggressive management. The aim of this study was to identify prognostic factors associated with limb salvage in patients affected by DFA

Method: We conduced a retrospective analysis of all patients admitted to the Vascular Surgery Department at the University of Siena with diagnosis of infected and/or ischemic diabetic foot between January 2018 and December 2024. The primary outcome was limb salvage. Evaluated factors included time from admission to surgery and the presence of mono- or polymicrobial infections

Results / Discussion: A total of 46 patients were included (mean age 77.4 ± 10.8 years; 82.6% male), with 16 elective and 30 emergency admissions. Among elective patients, 13 (81%) underwent surgery within 72 hours, while 3 (19%) were treated after 72 hours. In the emergency group, 9 patients (30%) received surgery within 24 hours, 5 (16.7%) within 72 hours, and 16 (53.3%) beyond 72 hours. 40 patient undergoing endovascular revascularization. Notably, among patients treated within 24 hours, there was only one case of major amputation. In contrast, patients who underwent surgery after 72 hours had a significantly higher rate of major amputation (53%) ($p = 0.017$). Infection analysis revealed 28 polymicrobial infections. Polymicrobial infections were associated with a higher risk of major amputation (11 out of 28 cases) respect to monomicrobical, although this association did not reach statistical significance ($p = 0.5685$)

Conclusion: This study underscores the critical importance of early surgical intervention in DFA, with procedures performed within 24 to 72 hours significantly reducing the risk of major amputation. While polymicrobial infections appear to be linked to a higher amputation risk, the association was not statistically significant. These findings highlight the need for timely treatment and a multidisciplinary approach in the management of DFA.

[PP44] Diabetic foot infection may present with normal or even low body temperature, often a normal White Blood Cell Count and in over 50% of cases, a normal National Early Warning Score.

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Aim: The aim was twofold: firstly, to evaluate the reliability of body temperature and white blood cell count (WBC) in the diagnosis of diabetic foot infection (DFI), and secondly, to consider the usefulness of the National Early Warning Score (NEWS2) in assessing the severity of DFI.

The NEWS2 is a national scoring system used to assess severity of illness. It records physiological measurements of temperature, blood pressure, pulse, respiratory rate, oxygenation and consciousness level. The score is 0 if all parameters are within normal range or ≥1, depending on how far the parameters deviate from normal.

Method: This study reviewed the electronic medical records of randomly selected patients presenting to a diabetic foot clinic with a new diagnosis of DFI, which was determined by the presence of two or more of the following: erythema, swelling, warmth, pain, purulent discharge, according to IWGDF/IDSA guidelines. C-reactive protein (CRP), WBC, tympanic body temperature and NEWS2 scores were recorded.

Results / Discussion: A total of twenty-four patients with DFI were included. Mean CRP was 32.3 mg/L (reference range <5mg/L). Mean body temperature was 36.3°C (range: 35.6–37.2°C). Only 1/24 had a temperature above 37.0°C. Mean WBC was 8.4 x10^9/L (range: 5.3-12.3 x10^9/L). Only 2/24 had an elevated WBC.

Regarding NEWS2 scores, 14/24 patients had normal physiological parameters, thus scoring 0. Only 10/24 registered a score on NEWS2: 9/10 had a NEWS2 score of 1, surprisingly due to an abnormally low body temperature (<36°C), and one patient scored 2 due to both a low body temperature and high pulse rate.

Conclusion: This study demonstrated that diabetic foot infection can present in an atypical manner. Body temperature was either normal or low and mean WBC was within the normal range. The NEWS2 score was not reliable in assessing the severity of infection.

[PP46] Clinical Study of Silver-Copper Wound Dressing in Patients with Diabetic Foot Ulcer Infection

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Aim: Diabetic foot ulcers (DFUs) remain a serious clinical burden worldwide due to their high susceptibility to infection and the associated risk of lower limb amputation. Despite international guidelines, effective treatment options—especially for infected DFUs—remain limited, and the clinical utility of wound dressings in managing infection is not clearly defined. This clinical trial aimed to evaluate the safety and efficacy of a novel, first-in-class wound dressing containing synergistic copper and silver nanoparticles (CuAgWD) in patients with infected DFUs.

Method: A randomized, single-center, parallel-group clinical trial was conducted with 30 patients diagnosed with grade 2 infected DFUs, according to IWGDF criteria. Patients were randomized 1:1 to receive either the investigational CuAgWD or a commercially available gelling fiber dressing containing silver ions (AgWD). The intervention lasted one week, followed by two weeks of treatment with a standard, non-antibacterial dressing in both groups. The primary endpoint was to assess and compare the safety and efficacy of CuAgWD versus AgWD. Secondary outcomes included wound appearance, selected laboratory markers, microbiological swab results, and patient-reported quality of life.

Results / Discussion: Patients treated with CuAgWD demonstrated significant difference in reduction of wound area size (WAS) compared to those treated with AgWD during active treatment period. Extrapolation using a generalized linear mixed model showed a significantly shorter time to 50% WAS reduction in the CuAgWD group (approx. 21 days) versus the AgWD group (approx. 37 days). While bacterial load remained stable in the CuAgWD group, the AgWD group exhibited increased variability. Additionally, CuAgWD was more effective in managing exudate and was associated with fewer adverse events. No serious or severe adverse events were observed in the CuAgWD group.

Conclusion: CuAgWD was well tolerated and demonstrated superior safety and efficacy over a standard silver-based dressing, supporting its potential as a new treatment option for infected DFUs.

[PP48] Identifying Tophaceous Gout in Foot Ulcers Using Ulcer Debris Microscopy in Patients with type 2 Diabetes

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Aim:

Gout is often underdiagnosed in patients with type 2 diabetes, especially in elderly individuals with comorbidities like neuropathy, vascular disease, and infection. This chronic disease, marked by urate deposition, can lead to tophi formation in the feet, which may ulcerate. The gold standard for gout diagnosis—urate crystal identification—is rarely performed in routine clinical practice. Radiography is limited to detecting late-stage disease, and advanced imaging techniques like ultrasound or dual-energy computed tomography may not be readily available.

This explorative study evaluated the feasibility of sampling foot ulcer debris during routine debridement for polarized light microscopy to detect birefringent urate crystals and identify gout in patients with diabetes.

Method:

Among 35 foot ulcer debris samples from patients with type 2 diabetes, urate crystals were identified in 5 cases (14%), strongly suggesting previously unrecognized gout and ulcerating tophi. Radiographic findings further supported tophaceous gout as the primary cause of these ulcers.

Results / Discussion:

Several samples were too contaminated to definitively rule out urate crystals, highlighting a significant limitation of the current sampling method. Further refinement of sampling and examination techniques is necessary to improve detection accuracy and ensure that negative findings truly reflect the absence of gout. Selection bias may have led to an overestimation of prevalence, while insufficient or contaminated samples may have resulted in an underestimation.

Conclusion:

- Unrecognized, ulcerating tophaceous gout may be relatively common among patients with type 2 diabetes and foot ulcers.
- Microscopic examination of ulcer debris may represent a new and feasible way of diagnosing the disease in a substantial number of patients seen in routine outpatient foot ulcer care.
- For patients with positive findings of urate crystals in ulcer samples, effective urate-lowering treatment for gout can be initiated.
- Ideally, these techniques should be supplemented by advanced imaging methods to enhance diagnostic accuracy.

[PP49] Epigenetic Insights in Diabetic Foot Ulcers: The Role of Lifestyle Medicine

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Aim:

This presentation explores the role of lifestyle interventions in modulating epigenetic mechanisms that influence diabetic foot ulcer (DFU) progression and healing. It examines how lifestyle factors impact gene expression related to inflammation, immune response, and tissue repair, with a focus on their clinical implications.

Method:

A comprehensive review of emerging evidence was conducted to evaluate the impact of lifestyle pillars—including whole food plant-based nutrition, physical activity, stress management, restorative sleep, social connectedness, and avoidance of harmful substances—on epigenetic pathways relevant to DFU healing. Key mechanisms such as DNA methylation, histone modification, and non-coding RNA activity were analyzed to understand their role in regulating inflammation, vascular health, and cellular repair.

Results / Discussion:

Findings suggest that positive lifestyle behaviors can induce beneficial epigenetic changes that suppress pro-inflammatory gene expression, enhance immune function, and promote tissue regeneration. Conversely, factors such as poor diet, physical inactivity, chronic stress, insufficient sleep, and substance use have been shown to trigger adverse epigenetic modifications that impair glucose regulation, increase oxidative stress, and disrupt wound healing. While clinical studies examining lifestyle interventions in DFU management are limited, existing research is highly suggestive of their efficacy. Implementing lifestyle modifications in clinical practice may improve wound healing rates, reduce infection risks, and lower recurrence rates.

Conclusion:

Integrating lifestyle medicine into DFU management offers a promising adjunctive approach to conventional therapies. By addressing modifiable risk factors and leveraging epigenetic mechanisms, healthcare providers can adopt a comprehensive, whole-person strategy that optimizes clinical outcomes and enhances long-term patient well-being. Further research is warranted to establish standardized protocols and evaluate the long-term impact of lifestyle interventions on DFU healing.

[PP50] Gout: An Overlooked Disease in Patients With Diabetes? A Danish Prospective Cohort Study With Four Years of Follow-Up

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Aim: Diabetes affects approximately 6% of the world population, with 20% developing foot ulcers. Gout affects about 3% of the population, yet fewer than 40% receive sufficient urate-lowering therapy to prevent or dissolve urate crystal (tophi) deposition in the feet. One study reported a 22% prevalence of gout in patients with type 2 diabetes. Our study aimed to assess adherence to recommended gout treatment in patients with diabetes.

Method: From a prospective cohort of patients with gout established based on microscopy-confirmed urate crystals in joint fluid or tophaceous material we identified all patients with concomitant diabetes. Patients were treated across various healthcare settings, including general practice, nephrology and diabetes outpatient clinics, orthopedic surgery, and nurse-led gout clinics. S-urate levels after 4 years of follow-up were retrieved through the hospital's biochemical database. The primary outcome was achieving target s-urate levels four years after diagnosis: <0.36 mmol/L (<6 mg/dL) for general gout management and <0.30 mmol/L (<5 mg/dL) for patients with tophi.

Results / Discussion: Our cohort included 85 (30%) patients with diabetes and gout out of 286 patients with gout. The median age was 71 years, and 76% were male. Comorbidities were common. Ten percent had no urate level monitoring for more than two years. Among those monitored, 58% maintained urate levels sufficient to prevent new tophi. However, 45% had tophi at diagnosis, and only 46% of these achieved urate levels low enough to dissolve tophi.

Conclusion: The study indicates that gout in patients with diabetes often was inadequately managed, potentially leading to the persistence of tophi, which may ulcerate and contribute to foot ulcers. We find it likely that our findings reflect everyday treatment in most settings.

Affordable and effective gout treatment could prevent tophi formation and improve patient outcomes.

Gout screening should be included in current diabetes management guidelines.

[PP51] A Triple-Blind Randomised Clinical Trial on the Effectiveness of CBD for Neuropathic Pain in Diabetic Foot Neuropathy

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Aim: To evaluate the efficacy of cannabidiol (CBD) in relieving neuropathic pain in patients with Diabetic Foot Syndrome (DFS).

Method: A randomised, triple-blind, controlled clinical trial was conducted on patients diagnosed with DFS in a specialised Diabetic Foot Unit. Participants were assigned to two groups: the treatment group received a cream containing CBD, menthol, arnica, and 10% urea, while the placebo group received a base cream without active ingredients. Each participant received a 100 ml bottle of the assigned cream, packaged in identical containers with a 2 ml dispenser for daily application on the dorsum and plantar surface of the foot over 30 days. The foot with the highest neuropathic pain level was selected for evaluation. Pain was assessed using the Neuropathic Pain Scale (NPS) at baseline and after 30 days. Adherence was monitored by collecting used cream bottles at the end of the study.

Results / Discussion: A total of 22 patients were included, 9 (40.9%) men and 13 (59.1%) women with a mean age of 73.3±10.9 years. After randomisation, 13 patients (59.1%) were assigned to the treatment group and 9 (40.9%) to the placebo group. The treatment group showed a significant reduction in global pain intensity (pre-treatment range 4.42 vs post-treatment range 1.5, p=0.034, Z=-2.120) and in neuropathic pain relief (pre-treatment range 5.0 vs post-treatment range 1.0, p=0.016, Z=-2.413). No significant differences were observed in the placebo group for pain intensity (pre-treatment range: 2.25, post-treatment range: 1.5, p=0.414, Z=-0.816) or for neuropathic pain relief (pre-treatment range: 2.5, post-treatment range: 1.75, p=0.785, Z=-0.272).

Conclusion: The findings suggest that topical CBD may be an effective and well-tolerated option for neuropathic pain in DFS patients. Further randomised large-scale studies are needed to confirm these results and evaluate long-term benefits.

[PP52] New prognostic markers of painful and painless neuropathy in patients with diabetes

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Aim: Among those with distal symmetric polyneuropathy, about 15% experience painful diabetic neuropathy (DPN), characterized by chronic pain that significantly impairs quality of life. The aim of our study was to analyze biomarker difference between diabetic patients with DPN, painless neuropathy and without neuropathy.

Method: In our study, we have investigated three diabetic patient cohorts: without neuropathy (D, n=20), with painless neuropathy (DN, n=20), and with painful neuropathy (DPN, n=20). Each cohort included 10 males and 10 females. The symptoms of DPN were assessed by Visual Analogue Scale, Wong-Baker Scale and by special DPN questionnaires (DN4, PainDETECT and S-LANSS). The study focused on metabolomic and lipidomic markers in plasma and plasma exosomes fraction.

Results/Discussion: There were no differences in baseline parameters between DN and DPN patients, whereas people in D group were younger (65.5 vs 51.2 years; $p<0.01$) with shorter diabetes duration (29 vs 20.1 years; $p=0.022$). Results of the lipidomic and metabolomic analysis showed significant differences in expression of different molecules between the patient cohorts and also differences between the male and female patients. Most significant difference between DPN and DN were observed in N-acetylneuraminate (NANA; $p<0.01$) and citric acid ($p=0.014$). Metabolites and lipids were also differentially expressed in the exosome fraction samples from different cohorts and the expression pattern was distinctive from plasma samples (most significant difference in stachydrine and malic acid; both $p<0.01$); the most robust differences were between the D and DPN cohorts.

Conclusion: Our data strongly support the hypothesis of substantial differences in the metabolomic and lipidomic profiles of plasma samples and the exosomal fraction between the diabetic patient cohorts and possibly also between male and female patients. These results suggest that certain plasmatic markers such as NANA may serve as prognostic markers for detecting DPN in early stages.

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[PP53] Impact of carotid artery disease on the hospital outcomes of patients admitted for diabetic foot ulcer

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Aim: The aim of the study was to evaluate the impact of carotid artery disease (CAD) on the hospital outcomes of patients admitted for diabetic foot ulcers (DFUs).

Method: This is a retrospective observational study conducted in a specialized diabetic foot service, including patients admitted for neuro-ischaemic DFUs requiring lower limb revascularization. According to the presence of CAD or not, defined by the presence of an atherosclerotic plaque larger than 70% and requiring carotid revascularization, patients were divided into two groups: those with significant CAD (CAD+) and those without (CAD-). The following in-hospital outcomes were assessed and compared: in-hospital clinical complications, length of stay, major amputation and major adverse cardiovascular events (MACE). The potential correlation of CAD and the above-mentioned outcomes of interest was evaluated.

Results / Discussion: Seventy-four patients were included. Among the whole population, 8 (10.8%) had significant CAD and 66 not (89.2%). The mean age was 70.3±11.5 years, most of them were male (71.6%), all of them had DM2 with a mean duration of 22.3±13.3 years and a mean HbA1c of 64±21 mmol/mol. Comparing the two groups, it was observed that CAD+ were older (80.1±5.4vs69.1±11.5 years, p=0.09), had longer diabetes duration (30±15.1vs21.4±12.9 years, p=0.08), a higher rate of below-the-ankle arterial disease (100%vs89.4%, p=0.2) and small artery disease (57.1%vs43.3%, p=0.4) in comparison to CAD-, even if the last three variables were not statistically significant. The outcomes for CAD+ compared to CAD- were: in-hospital complications (12.5%vs19.7%, p=0.6) and length of stay (18.9±9.2vs15.3±5.8 days, p=0.1) respectively, while no major amputation and MACE were recorded in both groups. At the univariate analysis there was no correlation between the presence of CAD and the outcomes of interest.

Conclusion: The presence of significant CAD did not influence the outcome of admitted patients for DFUs.

[PP55] Success Factors for amputation rate reduction in a tertiary care diabetic foot unit

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Diabetic foot is a serious, resource-consuming, complication of diabetes. The factors of success/failure of its treatment can be divided into 2 groups: patient / disease related and treatment related

Aim: to analyze these factors in a tertiary care setting patients cohort

Method: we analyzed retrospectively medical records of 90 patients treated for a diabetic foot ulcer / wound in our center from May to December 2023. Of them, 35 received only outpatient care. 10 patients admitted with gangrene in the same period were not included. Median age was 65 (37-90) years, 96% had type 2 DM

Results / Discussion: The patients were accepted by our team with median wound duration of 29 (1 – 1461) days. Previous treatment was made by GP in 30%, local wound clinic – 7%, other medical specialists – 27%, by the patient/relatives – in 29%

Off-loading device / method was prescribed at this stage only in 37% cases; referral to vascular surgeon was made in 35% (where it was necessary and relevant).

Limb ischemia presented in 44 (49%) patients. Of them, in 16 intervention was made

With median follow-up time of 6.3 months, 48% patients healed (at 3 mo – 24%). Minor and major amputations were made in 4% and 5% respectively; 6% died of concomitant diseases, 29% stayed unhealed, 8% - lost to follow-up.

Type 1 DM, insulin treatment, ethnic group, hindfoot ulcer, limb ischemia, lack of revascularization, previous amputations, WBC and CRP were associated with non-healing / amputation

Conclusion:

1). Treatment results in this In/Outpatient cohort were relatively good.

2). To prevent diabetes-related amputations in our region it is mandatory to:

* Implement International Guidelines at the primary and secondary levels of DF care
* Facilitate prompt acceptance of patients by specialized wound clinics.
* Increase capacity of secondary wound clinics
* Increase availability of revascularization.

[PP56] Diabetic foot ulcers treated with a nitric oxide-generating wound dressing segmented by patients receiving antibiotics: post-hoc analysis

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Aim: Nitric oxide (NO) within a wound dressing represents a promising agent for use in diabetic foot ulcer (DFU) treatments due to its antimicrobial and antibiofilm properties. The purpose of this analysis was to evaluate the impact of a NO-generating dressing (NOGD), compared to standard of care (SoC) in a randomised controlled trial (RCT), on DFU healing in patients receiving antibiotics.

Method: A post-hoc analysis of the ProNOx1 RCT[1] was performed to determine the impact of NOGD on DFU healing in patients receiving antibiotics at commencement and/or during the RCT. The primary endpoint was DFU percent area reduction (PAR) at 12 weeks. A secondary endpoint was number of DFUs healed at 12 weeks.

Results/Discussion: Of the 124 patients that were treated per protocol, 63 (33 in the SoC population; 30 in the NOGD population) were treated with antibiotics. At 12 weeks, mean PAR was 13.6% and median PAR was 44.3% in the SoC population, compared to mean PAR of 61.5% and median PAR of 87.1% in the NOGD population. 27% of DFUs increased in area in the SOC population, compared to 13% in the NOGD population. At 12 weeks, the number of healed DFUs was 5/33 (15%) in the SoC population and 11/30 (37%) in the NOGD population.

Conclusion: This post-hoc analysis of DFUs in patients receiving antibiotics, which can be assumed to be infected or at-risk of infection, demonstrates the ability of NOGD to improve DFU healing outcomes compared to SoC.

1. Edmonds ME, et al. ***Wound Repair Regen***. 2018;26:228–237.

[PP57] Early Hospital Discharge and Coordinated Aftercare with NPWT in Patients with Diabetic Foot Lesions

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Aim: Post-hospital wound care represents a critical phase in the healing process, especially for diabetic vascular patients with complex wound conditions. Negative pressure wound therapy (NPWT) is an established method that is increasingly being used on an outpatient basis as a bridging therapy. The aim of this study was to evaluate the effectiveness and wound healing outcomes of outpatient NPWT within the framework of coordinated collaboration between a hospital and a medical care center.

Method: In 2024, 27 patients with an average age, 67 years (63% male) received NPWT in an outpatient setting following inpatient surgical treatment. Wound locations included the foot (78%), lower leg (16%). 78% had peripheral arterial disease. For 33%, this was their first NPWT treatment, while 67% had already received NPWT during their hospital stay. NPWT was initiated on the day of discharge in 68% of the patients, and within the first week after discharge in another 30%. The outpatient therapy lasted an average of 4–6 weeks, with weekly dressing changes performed.

Results / Discussion: After 6 weeks of NPWT, 22% of patients achieved complete wound closure, while 73% showed a significant reduction in wound size. 52% of patients were able to be readmitted for final wound care—either secondary closure or skin grafting—within six weeks.

Conclusion: Outpatient NPWT allows for early discharge from the inpatient setting while maintaining a patient-centered and efficient therapy. Readmission occurs only after stabilization and conditioning of the wound, enabling secondary closure or skin grafting. This facilitates better organization of the overall treatment process and allows for seamless, uncomplicated readmission.

The transition to outpatient care provides multiple benefits: For the hospital, it relieves inpatient capacity, while the outpatient sector benefits from quality care. Patients benefit from more flexible follow-up care in their familiar environment, increases treatment acceptance and satisfaction

[PP58] Identification of Emergency Department foot presentations in those living with Diabetes Mellitus using clinician allocated SNOMED CT codes

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Aim: To investigate the immediate destinations and outcomes of people presenting to an Emergency Department (ED) with diabetes mellitus (DM) and a foot complaint.

Method: A retrospective, single-centre, consecutive service evaluation from October 2023 to March 2024. A Structured Query Language search of SNOMED CT codes was undertaken to extract episode of care (EoC) data. Electronic patient record systems were accessed to complete patient characteristics and one year outcome data.

Results: 277 EoC were coded as foot related presentations. SNOMED CT codes did not report the presence of DM. A manual search of electronic patient records for the presence of DM excluded 240 EoC. A total of 36 EoC were eligible for inclusion for 33 patients. Of the 36 EoC included: 78% were male, age 63±14 years (mean±SD), 81% had T2DM (haemoglobin A1c 67±28 mmol/mol; duration16±11 years).

Reasons for presentation were diabetes foot ulcer (DFU, 67%, n=24) and musculoskeletal (MSK) injury (33%, n=12). Admitted patients with DFU (n=16) had significantly higher median CRP (44.0 vs 5.3) and mean SINBAD score (3.6 vs 2.5). Median length-of-stay was 12.5 days (range 1-40 days) and 87.5% (n=14) received specialist input within 1.5 days of admission (range 1-8 days). Of the 33% (n=8) DFUs not admitted, 50% (n=4) were referred for outpatient MDFT follow up. Clinical outcomes at one year were: major amputation (n=2); lost to follow up (n=5); DFU healed (n=6); minor amputation (n=6); deceased (n=7).

Of the 33% MSK injuries, 67% (n=8) were foot fractures and 33% (n=4) ligament sprains. Orthopaedic involvement was recorded for six cases and no onward referral to a MDFT or community podiatry was recorded. Further analysis, including more EoC data is currently underway.

Conclusion: Of the DFUs presenting to ED, 75% were referred onward to specialist care however high incidence of amputation and mortality were observed.

[PP59] An improvement in patient care through a novel national virtual orthopaedic diabetic foot multidisciplinary (MDT) meeting

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Aim: To introduce the structure, organisation, and delivery, of a novel national virtual orthopaedic diabetic foot multidisciplinary team (MDT) meeting, and look at early outcomes.

Method: We have devised a weekly national virtual orthopaedic diabetic foot MDT meeting on Microsoft Teams, attended by orthopaedic surgeons, diabetologists, diabetic foot practitioners, and podiatrists. The MDT advises not only on the care of local patients, but also accepts referrals from around the UK, for advice on patient care or referral. Patients are referred via email, with relevant investigations and images, and the referring team presents the patient. The outcome is either to provide advice on local management, or the patient is reviewed in our orthopaedic diabetic foot MDT clinic as a one-stop visit.

Results / Discussion: From October 2022 to September 2023, there were 243 referrals to this MDT meeting. Of these, 86 patients were from 37 external sources (range 1-9 each), the rest were internal referrals. The outcomes of the meeting were that 136 were given advice on local management avoiding unnecessary clinic attendance. Six were asked to provide more information and re-discuss the case at a later date, 90 were invited to attend the clinic for assessment, and for 10 the referring team did not attend the meeting and so the case was not discussed.

Conclusion: There is clear need for a national virtual orthopaedic diabetic foot MDT meeting, to ensure these patients and treating clinicians, have access to specialist diabetic foot MDT care, regardless of where they are based in the UK.

[PP61] This review investigates whether Achilles Tendon Lengthening (TAL) improves outcomes in the management of Acute Charcot Neuropathy (ANC)

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Aim: This review investigates whether Achilles Tendon Lengthening (TAL) improves outcomes in the management of Acute Charcot Neuropathy (ANC).

Method: A comprehensive search of PubMed & Embase databases were conducted for publications referencing "Acute Charcot Neuropathy" and/or "tendon release", this allowed the widest relevant search parameters. A steering group was identified, classified achilles tightness and provided a definition for CAN. We assessed the same population of CN presentations for the incidence of Achilles tightness, and its impact on outcomes such as ulceration, deformities, need for further surgery, and compared casting times to the referenced controls without Achilles releasing. These results were then referenced with established data of patients who had not undergone TAL, and a determination was made as to whether TAL in the setting of stage 0 Charcot resulted in significantly better outcomes compared to patients who had only undergone the current standard management of total contact casting (TCC) alone.

Results / Discussion: Initial findings suggest there is potential benefits of TAL when combined with early diagnosis and offloading in the prevention of deformities, however at this stage, larger studies with well-defined staging criteria of CN are needed to fully understand the effect of TAL in the setting of acute CN.

Conclusion: Early intervention diagnosis and intervention with TCC or appropriate off-loading does seem to be beneficial in the prevention of unnecessary deformity. CAN and muscular imbalance leads to deformity and increasing equinus pressure, but low incidence of deformity progression with TTC alone does not necessarily support TAL in acute Charcot without radiological evidence of a midfoot break. Due to the limited evidence of low strength and high risk of bias as small case series mean larger studies are required with definitive staging of CN process to understand TAL effect.

[PP63] Walking the Line: Are Custom-Made Shoes the Best Fit?

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Aim:

This study aims to explore the challenges in prescribing and providing custom-made footwear for persons with diabetes, focusing on the discrepancies between expectations and realities.

Method:

Data was retrospectively collected from persons with diabetes seen in the foot clinic between November 1st, 2023, until January 1st, 2025. All had prescribed custom-made footwear reimbursed by the municipality. Data was extracted from the electronic health records.

Results:

A total of 99 persons were included in the study. Of these 68 (68.7%) had T2D, 71 (71.7%) were male, with a mean age 64 ± 12 years. The average duration of diabetes was 22 ± 14 years, BMI was 28.2 kg/m ± 5, and the mean Hba1c was 59.4 mmol/mol ± 13. The majority had peripheral neuropathy, with a vibration sensation > 25 volts. All participants had foot deformities, and 78 (78.8%) had palpable foot pulses. Additionally, 60 (60.6%) had toe blood pressure > 40 mmHg and 69 (69.7%) have had a previous foot ulcer. Forty-six had a prescription for semi-orthopedic footwear, and 53 for handmade footwear.

Footwear was evaluated in the clinic for 48 patients, with a delay of 30 weeks (range: 14-47 weeks) from prescription to follow-up for the group of handmade shoes and 25 weeks (range 6-48 weeks) for semi-orthopedic shoes. Fifty-one (51%) persons did not receive footwear during the study period, primarily due to patient delays (23%), shoemaker challenges (3%), municipality delays (2%), or unclear reasons (23%). Thirty-two patients underwent peak pressure measurement to assess the fit of their footwear. Some required adjustments by the shoemaker.

Conclusion:

This study highlights the complexities and delays in prescribing and delivering custom-made footwear for individuals with diabetes. The findings emphasize the need for improvements in communication, joint decision-making, coordination, and timely follow-up to ensure better access to and fit of footwear.

[PP64] Does treatment with a Total Contact Cast for an active diabetic foot disease have an impact on mental health?

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Aim: Although the efficacy of total contact casting (TCC) for the management of diabetic foot ulceration (DFU) and active Charcot foot is well recognised, it is not always appreciated by the person living with diabetes, as this therapy interferes with many aspects of life. The aim of this study was to identify the impact of TCC on mental health.

Method: A self-reported patient survey was distributed among persons with diabetes undergoing treatment with a TCC for an active foot problem (DFU or Charcot foot) who attended the Diabetic Foot Clinic over 5 days.

Results/Discussion: A total of 38 individuals were invited and they all agreed to participate. Of these, 42.1% were between 51-65 years old, 31.6% were 65 years or older, and the remainder (26.3%) were between 18 and 50 years old. Out of 38 participants, 24 (63.2%) indicated that living with an active foot problem had a significant impact on their mental health. Almost 40% of the participants indicated that treatment with a TCC has made their mental health worse. Regarding talking to others about mental health, the majority of participants (81.6%) felt comfortable about openly discussing it. Among all participants, 26.3% indicated that they were having mental health support while undergoing TCC treatment.

Conclusion: The results of this survey indicate an association between TCC and mental health in persons living with diabetes mellitus. This suggests that mental health support might improve patient's adherence to TCC therapy.

[PP66] Analysis of clinical outcomes and plantar pressure patterns after the application of an adjuvant antibiotic loaded injectable Bio-Composite in patients treated by forefoot surgery secondary to diabetic foot osteomyelitis.

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Aim: Metatarsal head resection (MHR) has demonstrated to be effective in treating diabetic foot osteomyelitis (DFO), despite this, it has shown high rates of transfer lesions and reulcerations. The aim of the present study is to evaluate clinical outcomes and plantar pressure patterns of patients subjected to their first MHR procedure with the application of injectable bio-composite

Method: Between May 2023 and December 2024 we conducted a prospective case series in 11 patients with DFO suspicion operated for their first MHR and application of injectable bio-composite. Patients were screened for barefoot peak plantar pressure (PPP – N/cm2) before and after the surgical procedure in the metatarsal heads (MH) area. Primary outcome measures included recurrence, transfer lesions and PPP in the metatarsal area. Patients were screened before the surgery and after completely healing to evaluate changes in PPP. All the patients were followed up for 6 months or until they developed a recurrence event.

Results / Discussion: all the patients (N=11) included in the research healed within a median time of 6 IQR [4 – 12] weeks. During the follow – up period, no patients experienced a recurrent event neither a transfer lesion in an adjacent metatarsal head. Peak pressures in the operated MH decreased after the MHR procedure and the application of an injectable bio-composite [(22.4 IQR [19.2 – 26.1 N/cm^2]) vs. (7.4 IQR [3.3 – 9.1 N/cm^2]); p<.001). The application of an injectable bio-composite was a protective factor against the increase of PPP in the adjacent MH after the resection of the affected metatarsal head, without any statistical increase in PPP (Table 1).

Conclusion: The application of an adjuvant antibiotic loaded injectable Bio-Composite in patients treated by MHR secondary to diabetic foot osteomyelitis can prevent further complications such us recurrence and transfer lesions, additionally, it decrease peak pressures in the at risk-operated area.

[PP67] Percutaneous tenotomy (PT) of the toe flexors performed by a podiatrist in patients with diabetic foot

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Aim: Peripheral neuropathy and foot deformities are major risk factors for diabetic defects. Toe deformities (hammer, claw, and mallet toes) are common in diabetics due to intrinsic foot muscle atrophy and tendon imbalance. In patients with peripheral neuropathy, these deformities increase plantar pressures during walking, leading to callus and defects on the distal phalanx.

The primary treatment for plantar defects in deformed toes is debridement and offloading. However, conservative treatment often fails due to poor patient adherence. If unsuccessful, percutaneous tenotomy (PT) of the flexor tendon is indicated for diabetic patients with distal toe defects. A possible complication is a transfer defect on an adjacent toe. PT is recommended for non-healing neuropathic defects without severe ischemia or osteomyelitis.

Method: Patient provides informed consent. The procedure is performed in a podiatric outpatient clinic. Under aseptic conditions, an 18G needle is inserted subcutaneously from the plantar side, and its distal tip is used to sever the flexor tendon. The toe is then maximally straightened. The puncture wound and defect are treated with local therapy. After the procedure, the patient leaves in regular footwear and takes prophylactic antibiotics for five days.

Results / Discussion: All patients experienced complete defect healing within two weeks without complications. In one case, two adjacent toes were treated sequentially.

Conclusion: Percutaneous flexor tenotomy (PT) is an effective and safe outpatient treatment for diabetic neuropathic defects of the distal toe phalanx. Further research is needed to determine whether multiple tenotomies should be performed simultaneously or progressively.

[PP68] Development of a Modular Footwear Setup to test the effect of midsole geometry and material on comfort and lower limb biomechanics

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Aim:

Design and preliminary validation of a Modular Footwear Setup (MFS) to test the effect of midsole geometry and material on comfort and lower-limb biomechanics.

Method:

The MFS consists of an upper from a standard diabetic shoe featuring a flexible inner-insole and a fixation layer attached to the bottom of the shoe-upper, enabling easy and robust fixation of midsole/outsole components of varying properties. Different fixation methods have been tested, and analysis of the strength and ease of each fixation method is undergoing.

Results/Discussion:

According to the preliminary results, the MFS allows reliable testing of midsole/outsole components while maintaining upper-to-midsole continuity, structural integrity, and minimal stiffness changes. The ongoing validation will assess mechanical stability, ease of attachment/detachment of midsole components, and repeatability of biomechanical measurements such as in-shoe plantar pressure.

Offloading pressure in at-risk foot areas is crucial for individuals with diabetes, as recommended by IWGDF guidelines (1). Diabetic shoes typically feature a rigid or semi-rigid midsole with a longitudinal rocker, defined by parameters like apex position, rocker angle, and material stiffness. However, no systematic assessment of midsole geometrical features and mechanical properties on in-shoe pressure and lower limb kinematics via a validated and reliable tool has thus far been performed.

The MFS aims to fill this gap by allowing the swapping of midsole/outsoles without the need to remove or displace pressure and kinematic sensors during tests. Furthermore, this method enables lower manufacturing costs and shorter testing durations.

Conclusion:

The MFS has the potential to enhance footwear research by enabling consistent and cost-effective testing of midsole/outsole designs while reducing measurement variability. Moreover, this approach may improve efficiency and sustainability in foot biomechanics research, particularly for diabetic footwear.

References:

1. Bus et al., Guidelines on the prevention of foot ulcers in persons with diabetes (IWGDF 2023 update). Diabetes Metab Res Rev. 2024;

[PP69] Effectiveness and Safety of Technical Sports Footwear for Secondary Prevention of Diabetic Foot Ulcers

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Aim: Diabetic foot ulcers (DFUs) have a 40% of recurrence rate within one year after wound healing. Healthcare professionals play a crucial role in minimizing DFU risk and recurrence while enabling patients to maintain a normal social life and safely engage in physical activity. This study aimed to evaluate the safety and effectiveness of technical sports footwear designed for physical activity as a secondary prevention strategy to reduce DFU recurrence.

Method: This retrospective, single-center observational study included patients classified as risk level 3 according to the International Working Group on the Diabetic Foot (IWGDF) guidelines, eligible for mild to moderate physical activity. All participants received technical sports footwear with a semi-rigid biomechanical rocker sole and a customized insole, designed to reduce pressure on the metatarsal heads, minimize shear stress, and provide propulsive support for walking. Patients were evaluated every three months as part of a structured prevention program, which included reinforced education and regular foot inspections. After one year of follow-up, we recorded DFU recurrence, minor and major amputations, and hospitalizations due to foot problems.

Results / Discussion: A total of 53 patients were included (mean age: 71±9 years; 71% male; 90% with type 2 diabetes for an average duration of 21±11 years). Additionally, 88% had neuropathy, 40% had peripheral arterial disease, and 86% had foot deformities. After one year, 5 patients (9.4%) had DFU recurrence, 1 patient (1.9%) underwent a minor amputation, and 3 patients (5.7%) were hospitalized for foot-related complications. No major amputations were recorded.

Conclusion: Technical sports footwear specifically designed for diabetic patients appears to be an effective tool in reducing DFU recurrence and preventing complications in individuals engaging in mild to moderate physical activity. The 1-year recurrence rate was lower than previously data reported in the literature.

[PP70] Hyperspectral imaging as assessment tool in at high-risk plantar areas of foot ulceration

Raul Molines Barroso[1], Mateo López Moral[1], Yolanda García Álvarez[1], Esther Alicia Garcia Morales[1], Francisco Javier Álvaro Afonso[1], José Luis Lázaro-Martínez[1]

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Aim: We hypothesized that plantar tissues at high-risk of ulceration have different microperfusion and water content in comparison with plantar tissues at non-high-risk of ulceration in patients with previous diabetes-related plantar ulcer.

Method: In this cross-sectional study we included 40 patients (N= 40 feet) with diabetes at high-risk of ulceration (IWGDF risk 2-3) between December 2024 and March 2025. Patients were imaged in the supine position and were allowed to rest for 10 minutes to minimize systemic vascular effects. We selected two plantar areas of interest (AOI) where the following physiological parameters were recorded: StO_2 (relative oxygen saturation in superficial tissue layers), tissue hemoglobin index THI (index value of the relative quantity of hemoglobin), near infrared perfusion index NIR (index value of the relative oxygen saturation in deep tissue layers), and tissue water index TWI (index value of the relative quantity of water in the tissue). The selected AOI were metatarsal head at high-risk of ulceration (deformity or previous ulcer) and other metatarsal head as control area (without deformity or previous ulcer). All of the values were extracted manually from these areas avoiding scars or callus. The main outcome was the differences in physiological parameters between high-risk and low-risk areas.

Results / Discussion: AOI showed differences in StO_2 (non-risk area 63.8% vs high-risk area 72.5%; p-value < 0.001), THI (28.5% vs 33.5%; p-value= 0.019 and NIR (58.2% vs high-risk area 62.0%; p-value =0.001). Twenty-five neuroischemic patients showed higher values in StO_2 (non-risk area 65.6% vs high-risk area 74.3%; p-value < 0.001), and NIR (non-risk area 58.7% vs high-risk area 63.7%; p-value < 0.001).

Conclusion: HSI is a quick and noninvasive assessment of perfusion parameters which have shown differences in microperfusion at high-risk plantar areas. Further studies could find the useful in preventive strategies.

[PP71] BAROPODOMETRICAL AND KINEMATIC ASSESSMENT IN TYPE 1 DIABETIC PATIENTS

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Aim: Constant physical activity has a protective effect against diabetic neuropathy and a positive effect on metabolic control, and can also increase walking performance in diabetic subjects. The objective of the investigation is to observe and quantify the biomechanical parameters that describe the dynamic behavior of the foot in type 1 diabetics who perform regular physical activity compared to sedentary patients.

Method: 21 patients were evaluated, 10 active (A) and 11 sedentary (S) in good metabolic control. The kinematic and pressure data collection were carried out using a baropodometric insole system (Pedar-Novel) to obtain the plantar pressure data and a Gait Analysis system (Technobody) to collect the kinematic and inertial data.

Results / Discussion: As regards the Gait Analysis, significant differences were observed for stride length; A=69 cm vs S=51 cm ($p<0.05$). Vertical oscillation significantly lower in sedentary people; A= 2.3 mm vs S= 1.4 mm ($p<0.05$).

The baropodometric analysis revealed pressure peaks in forefoot support that were significantly greater in the active population; A= 1450 kPa vs S= 1260 kPa ($p<0.05$). The support area significantly greater A= 133 cm\q vs S= 103 cm\q with ($p<0.05$).

Conclusion: The kinematic and baropodometric data of this study show significant differences in terms of mobility and foot support between sedentary vs active patients, with improvements in gait propulsion performance.

[PP72] Perceptions of the 'in-remission' risk status in diabetes related foot disease

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Aim:

This study aims to explore patient and clinician perspectives of the term in-remission in the context of diabetes foot disease.

Method:

Semi-structured interviews and focus groups were conducted to understand the perceptions of the term 'in-remission'. Participants included individuals classified as 'in-remission' and podiatrists who regularly treat people with diabetes. University ethical approval was obtained and social media, posters, and snowball sampling were used for recruitment. All sessions were recorded and transcribed verbatim, with data analyzed thematically.

Results / Discussion:

The study involved 9 people with diabetes and 12 podiatrists. An online focus group was conducted with 5 podiatrists, while the remaining 7 podiatrists and all 9 patients participated in individual interviews. Three major themes emerged for each group (Table 1), each with several sub-themes. Podiatrists generally avoided using the term 'in-remission' directly with patients, focusing instead on education, and had mixed views on its impact. Patients were mainly unaware of their 'in-remission' risk status, with varying interpretations of the term and its potential effect on foot care.

Conclusion:

There is inconsistency in the awareness and use of the term 'in-remission' within podiatric practice. While the term was intended to enhance patient awareness and access to services, its perceived applicability and clarity were limited, leading to its avoidance by clinicians and confusion among patients. These findings highlight the need for further research into the adoption and communication of this terminology.

Table 1: Themes from people with diabetes and podiatrists

People classes as 'in -remission' themes	Podiatrist themes
Lack of awareness of the 'in-remission' risk category	Clinician understanding and implementation of the category is inconsistent
Varied perceptions of the meaning of 'in remission'	Perceptions of the impact on people with diabetes are mixed
Impact of being classed 'in-remission' highly variable	Risk stratification system facilitates patient education but could be improved

[PP73] Association between microbiological culture results and histopathology of the bone biopsy in diabetic foot osteomyelitis

Irene Sanz-Corbalán[1], Aroa Tardáguila García[1], Raul Molines Barroso[1], Yolanda García Álvarez[1], Esther Alicia Garcia Morales[1], José Luis Lázaro-Martínez[1]

[1]*Diabetic Foot Unit. Complutense University of Madrid, Madrid, Spain*

Aim: To analyze the relationship between microbiological bone culture results and the type of diabetic foot osteomyelitis (DFO) based on bone biopsy histopathology.

Method: A retrospective observational study was conducted, including 52 patients diagnosed with DFO by probe-to-bone test and radiological signs. All underwent bone culture and microbiological analysis, with DFO confirmed by bone biopsy. A 48-hour antibiotic washout was implemented. Patients with critical limb ischemia or Charcot foot were excluded.

Results / Discussion: Forty-two (80.8%) patients were male, with a mean age of 64.27 years. Positive bone cultures were found in 36 (69.2%) patients: 28 (53.8%) monomicrobial and 8 (15.4%) polymicrobial. Gram-positive bacteria were identified in 26 (50%) cases and Gram-negative in 9 (17.3%). ***Staphylococcus aureus*** (17.3%) was the most frequent pathogen, followed by ***Pseudomonas aeruginosa*** (11.5%).

Bone biopsy histopathology confirmed osteomyelitis in 47 (90.4%) cases: 12 (25.5%) acute and 35 (74.4%) chronic. Five (9.6%) had negative histopathology biopsy results. Positive bone cultures were associated with acute osteomyelitis (p=0.031), but no significant association was found between Gram-positive or Gram-negative cultures and histopathology biopsy results. No correlation was observed between isolated microorganisms and osteomyelitis type.

DFO is a multifactorial condition influenced by bacterial load, microorganism virulence, immune status, and inflammatory response. Sample collection may be affected by prior antibiotics, infection heterogeneity, and challenges in obtaining representative bone samples.

Conclusion: Positive bone cultures were associated with acute osteomyelitis. However, no relationship was found between isolated bacteria and osteomyelitis type, suggesting these factors are independent. These findings highlight the need for a comprehensive clinical diagnosis integrating microbiological, imaging, and histopathological data.

[PP74] An Experimental and Clinical Study of Flap Monitoring with an Analysis of the Clinical Course of the Flap Using an Infrared Thermal Camera

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Aim:

Flap surgery is a common method used to cover defects following tumor ablation, trauma, or infection. However, insufficient vascularity in the transferred flap can lead to flap necrosis and failure. Proper postoperative monitoring is essential to prevent these complications. Recently, research has explored the use of infrared thermal imaging in plastic surgery, leading to its clinical application.

Method:

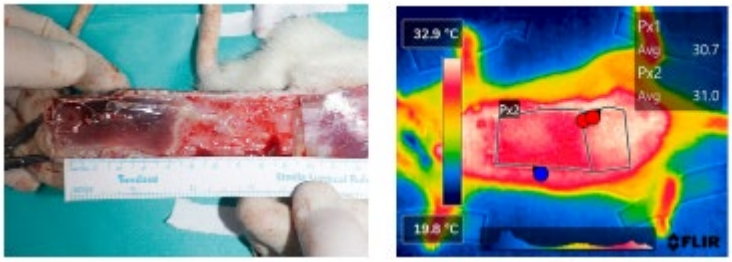
This study comprises two separate parts: an in vivo experimental study and a clinical study. In this study, 28 rats underwent reverse McFarlane flap surgery, and their flaps were analyzed using a FLIR thermal imaging camera seven days post-surgery. Additionally, thermal images of flaps were taken on postoperative days 0, 1, 2, 3, and 7 in 22 patients. This study focused on temperature differences between normal skin and the perforator compared to the average flap temperature.

Results / Discussion:

Results showed that the temperature difference was higher in the necrosis group and increased over time in cases of total necrosis. A lower perforator temperature compared to the flap's average indicated vascular compromise, potentially leading to flap failure.

Conclusion:

The FLIR camera, being contact-free and convenient, shows promise for understanding and inferring the clinical progression of flaps in postoperative monitoring.



(a) (b)

Figure 4. Analysis of flap necrosis in rat models. (**a**) After euthanization of the rats, the total flap and necrotic areas were measured with distinguishment of flap viability. (**b**) The thermal images were captured by FLIR camera, indicating the necrosis area (colored red), which shows a drop in temperature compared to the viable area (colored white). The temperature difference between the total flap area and necrotic area was calculated by using infrared thermal software.

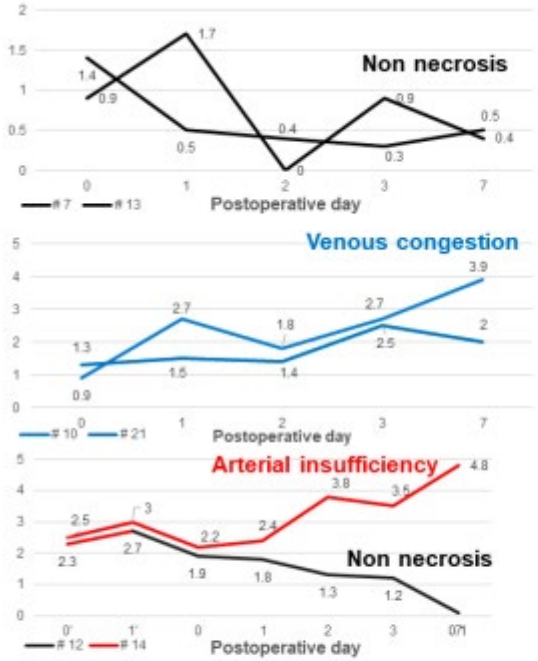


Figure 9. The graph of the temperature difference between normal skin and perforator according to clinical course of the flaps. The black graph, which represents the non-necrosis group, shows a downward trend in values over time. The red graph represents the group with arterial insufficiency, and the blue graph represents the group with venous congestion. Both red and blue show an upward trend in values over time.

[PP75] Dual-energy CT in differential diagnosis of diabetic foot osteomyelitis

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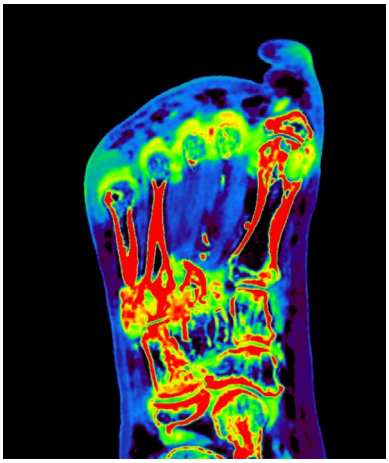
Aim: Diabetic Foot Osteomyelitis (DFO) is a severe complication of Diabetic Foot. In some patients diagnosis can be challenging because of similar medical condition or confounding factors. We present two complex cases in which correct diagnosis was made with dual-energy computed tomography (DECT).

Method: We present two cases referred to our Diabetic Foot Center for evaluation. Patient 1 presented with non-traumatic right foot pain and oedema without open wounds. He had history of peripheral neuropathy and hallux amputation. X-ray showed osteolytic lesions of 1st to 5th ray , lateral cuneiform and cuboid. Contrast MRI excluded acute Charcot but confirmed osteolytic lesions and oedema at 1st MTP suspicious for osteomyelitis. Infective disease specialist prescribed high-spectrum antibiotic therapy and collected blood culture, then asked for biopsy or partial foot amputation. At our evaluation the patient had no fever. Right foot appeared warm, mildly swollen without any ulcer or sign of acute infection or ischemia. Pedal pulses were normal. PCR levels were reduced in a few days. We estimated a low probability of osteomyelitis and decided to DECT, that showed monosodium urate crystal deposition in the metatarsophalangeal, tarsometatarsal joints, as in flexor tendons of fingers, peroneus muscles, suggesting gout arthritis. The patient started febuxostat and in few days was discharged. Patient 2 has history of gout and a previous 1st ray ulcer. He presented with 1st ray oedema and pain without ulcer. X-ray showed osteosclerosis of 1st MTP. DECT images showed urate deposition in 1st MTP joint.

Discussion: DFO was a suspicious diagnosis because of medical history and clinical presentation. DECT scan allowed correct diagnosis, prompt treatment and no need surgical procedure or long antibiotic therapy .

Conclusion: DECT is accurate in detection of urate deposits and differential diagnosis of DFO. Multidisciplinary approach is mandatory in diagnosis and treatment of diabetic foot patients.



[PP76] More than 50% of patients requiring total contact casting for diabetic foot disease are out of area - is it time for a decentralised approach?

Ava Khoshnaghsh[1], Wegin Tang[2], Amber London[2], Patricia Lee[2], Stephanie Tang[2], Timothy Jemmott[2], Maureen Bates[2], Erika Vainieri, Michael Edmonds[2], Chris Manu, Nina Petrova[2]

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Aim: There is a huge disparity in the provision of total contact casting for the acute diabetic foot among specialised diabetic foot services. Data from a recent 6-week audit indicates that more than 50% of persons living with diabetes receive casting therapy outside their catchment area.

Method: A prospective 6-week anonymised audit was carried out. Captured data included reason for cast application and frequency of cast replacement. The first three letters of the postcode were used to categorise catchment area.

Results / Discussion: Overall, 126 persons living with diabetes required an application of a total contact cast. Of these, 17 were initial cast applications, 96 were cast replacements and 13 patients required the manufacture of a bivalve cast. Total contact casting was indicated for the management of an active Charcot foot ±ulcer in 36 patients (28.6%) and diabetic foot ulcer in 39 patients (31%). Twenty-four patients (19%) were managed in a total contact cast whilst waiting for reconstructive surgery and 27 patients (21.4%) were managed in a cast post-surgery.

During the 6-week period, the total number of the cast replacement visits was 301. Twelve patients had 5 or more cast replacements, 14 had 4 cast replacements, 25 had 3 cast replacements, 47 had 2 cast replacements, and the remaining 28 patients had one visit. On average, casts were replaced every 2.5 ±1.5 weeks. Sixty-four of patients (51%) were external referrals and were living outside the clinic catchment area.

Conclusion: This audit shows significant demand on specialised foot clinics for provision of total contact casting. A way forward will be a shared-care approach by upskilling local services. This will result in significant patient benefit as it will reduce the number of out-of-area appointments.

Acknowledgement: King's Undergraduate Research Fellowship Award

[PP77] Distal symmetric polyneuropathy and cardiovascular autonomic neuropathy in diabetes mellitus: Perspectives from a Danish cohort study

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Aim: Cardiovascular Autonomic Neuropathy(CAN) may precede Distal Symmetric Polyneuropathy(DSPN) in individuals with diabetes mellitus. Identification of individuals with CAN may be useful for early identification of individuals at high-risk for DSPN, and consequent diabetic foot complications. This study aims to describe the incidence of DSPN in individuals with and without CAN.

Method: : This cohort study included adults with type-1(T1D) and type-2 diabetes(T2D), screened for CAN between May 2013 and February 2015 at a diabetes outpatient clinic. Baseline was defined as the first CAN screening visit. CAN diagnosis criteria were heart rate response to cardiovascular reflex tests(CARTS): the lying-to-standing test (30:15 ratio), the deep breathing test (E:I ratio) and the Valsalva maneuver. CAN was defined as ≥2 abnormal CARTS. DSPN was diagnosed as bilateral detection of vibration perception threshold ≥25V, collected from annual clinical records. A multistate model was applied to estimate the incidence rate of DSPN in individuals, with and without CAN. Follow-up ended with first DSPN diagnosis, death, emigration, or end of data availability (January 1, 2021).

Results / Discussion: Out of 1305 screened individuals, 674 individuals with diabetes(286 T1D, 388 T2D) and without previous DSPN were included in this study with a median follow-up time of 4,982.40 person-years(PY). At baseline, individuals with CAN (n=68) had significantly higher HbA1c and reduced physical activity levels than those without CAN (n=606). The mean(SD) age and diabetes duration for the CAN group was 51.2(12.4) and 15.4(10.4) years. The crude incidence rate of DSPN in individuals with CAN was 87.4/1000 PY and 54/1000 PY in individuals without CAN.

Conclusion: Preliminary analysis indicate that CAN could be an important risk predictor for DSPN. CAN screening may act as an early preventive tool for DSPN detection. Detailed analysis with adjustment for significant covariates is ongoing.

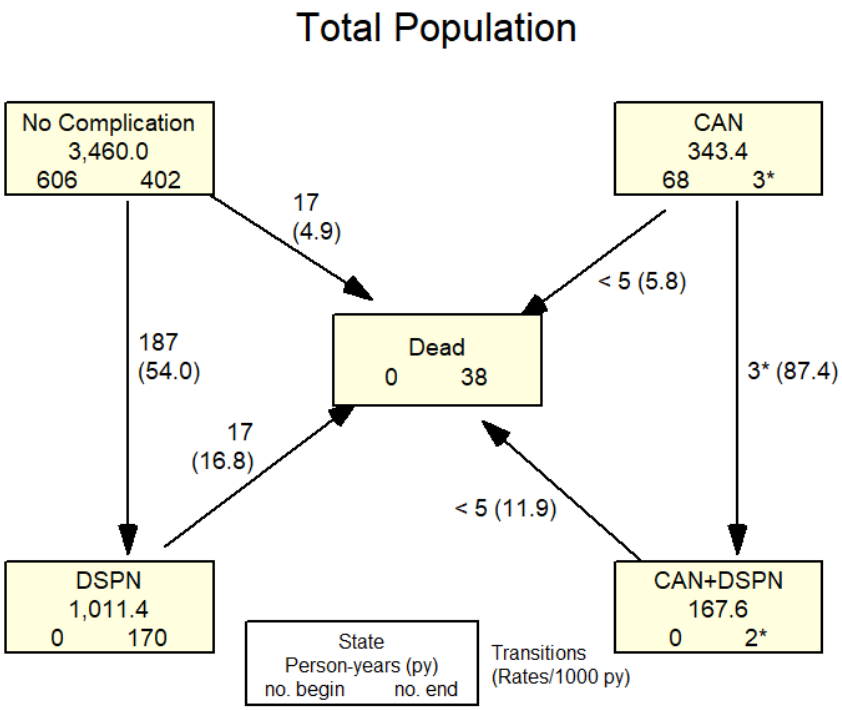

Figure1: Multistate model showing crude incidence rates.

[PP78] Mind the Gap: Healing vs. Remission in Diabetic Foot Ulcers

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Aim: The recurrence of diabetic foot ulcers (DFUs) remains a major clinical challenge, with a significant proportion of ulcers recurring within months after healing. This study explores the transition phase between healing and remission, emphasizing the role of tissue mechanics and offloading strategies in preventing recurrence.

Method:

A comprehensive search on PubMed from May to December 2024 was performed to analyze DFU recurrence, tissue biomechanics, and offloading for people with diabetes. Clinical trials, observational studies, systematic reviews, and meta-analyses were included. Case reports, pilot studies, and studies without clear methods were excluded.

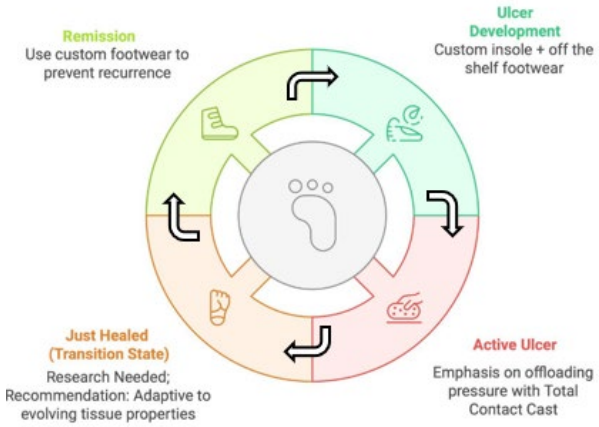

Figure 1 – Ulcer-recurrence cycle of DFUs and standard of care

Results/Discussion:

Sixty-one studies were included in the review. We found out that the history of DFUs leads to altered mechanical properties of the plantar skin and soft tissue, increasing stiffness while decreasing thickness. These alterations, coupled with neuropathy and poor blood flow, contribute to an elevated risk of DFU recurrence. This recurrence may start to occur within a few months after the healing of the previous ulcer, a period during which tissue properties are still evolving. Current offloading solutions are either based on the IWGDF risk categories or the independent risk factors associated with forming an ulcer. There exists a gap in the standard of care targeting the crucial time just after ulcer healing, here referred to as the 'transition state' (Fig 1). Evidence suggests that custom-made shoes designed to offload pressure can reduce recurrence rates. Likewise, footwear specifically designed to address this phase would likely further decrease the chances of ulceration.

Conclusion:

The rate of DFU recurrence has not decreased over the past two decades1 despite considerable improvements in pressure offloading modalities. More research is needed to understand foot mechanics just after ulcer healing and to develop beyond-state-of-the-art targeted offloading strategies for this period.

References:

1. Fu et al. - Diabetes/Metabolism Research and Reviews - 2019

[PP79] Protecting feet at risk in people with diabetes - The PREFERD programme

Kavita Venkataraman[1]

[1]*National University of Singapore, Singapore, Singapore*

Aim: The global incidence of diabetes related lower extremity amputations remains high, with foot ulcers being the main antecedent cause. Primary prevention is likely to be cost saving; however, less is known about the factors involved in the development of a first ulcer, beyond peripheral neuropathy (DPN) and peripheral arterial disease (PAD). This is a critical and unmet healthcare need. Hence, we have initiated a programme of work to identify risk factors for first foot ulceration, and design and test interventions to protect feet at risk.

Method: This is a prospective cohort study of individuals with type 2 diabetes at higher ulcer risk (≥1 of DPN, PAD, foot deformity, thick callus, diabetic retinopathy, diabetic nephropathy) and no previous foot ulcer or amputation. All participants undergo detailed assessments at baseline and annually on patient factors (social support, self-efficacy, self-care, psychological wellbeing, barriers for preventive footcare utilization), foot status (thermometry, thermography, plantar pressures, muscle strength and range of motion), footwear (fit, structure, motion, cushioning, wear), and risk factors for microtrauma.

Results / Discussion: Till date, 206 participants have been recruited with median age of 68 years and median diabetes duration of 19 years. Planned follow up is for 3 years with first ever foot ulcer as the primary outcome of interest, and new pre-ulcerative lesions (blisters, fissures, haemorrhage), and new or worsening callus, deformity, peripheral neuropathy, peripheral arterial disease as key secondary outcomes. The data generated will be used to improve the identification of those at higher risk, and to design and test new interventions for primary prevention.

Conclusion: This programme will identify additional factors driving risk and test effective interventions, thereby averting ulcer events. This will translate to substantial cost savings for the health system as well as reduced disease and healthcare burden for individuals and communities.

[PP80] Diabetic Foot Talk Time: Framework for effective communication in diabetic foot management

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Aim: Evaluate current communication strategies in diabetic foot management and develop a structured digital framework to enhance therapeutic education and treatment adherence.

Method: A systematic literature review of the past five years was conducted using the PICO method on Medline via PubMed, selecting 8 relevant articles out of 273 initially identified. Concurrently, a descriptive survey involving 165 participants (85 healthcare professionals and 80 diabetic patients) was carried out to explore communication challenges, improvement strategies, and patient awareness levels.

Results / Discussion: The analysis highlighted that self-management, effective communication, professional training in therapeutic education, and the use of information and communication technologies (ICT) are crucial for improving patient adherence to diabetic foot care and optimizing therapeutic outcomes. The survey revealed that a significant proportion of diabetic patients do not receive adequate information about diabetic foot from healthcare professionals or receive it only after complications arise, leading many to seek information online. Both professionals and patients acknowledged that online resources can enhance adherence to care.

Conclusion: The study underscores the need for reliable and accessible resources, including multimedia support for active health education, targeting both healthcare professionals and diabetic patients at risk of foot complications. Based on these findings, a prototype web platform was developed to support professionals and diabetic patients with features such as daily podiatric routines, alert systems, illustrative images, and practical examples to integrate into clinical practice. Additionally, the platform includes a community space for feedback and interprofessional communication. The long-term goal is to develop a mobile application functioning as a “virtual network of connection,” designed to enhance the training of healthcare professionals and the care of diabetic patients at risk of foot complications. By integrating into a secure web-based health network, it aims to provide accessible and reliable resources for better management of diabetic foot health.

[PP81] “Communication with a part of my body is missing”: Aspects of the quality of life of people with diabetes, foot ulcer and missing pain perception: the previously forgotten dimension – a qualitative analysis

Ralf Lobmann[1], Alexander Risse[2], Arthur Grünerbel[3], Claas Lüdemann[4], Stephan Morbach[5], Holger Lawall[6], Holger Diener[7], Christoph Volkering[8], Bernhard Kulzer[9]

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Aim:

Quality of life (QoL)in people with diabetic foot syndrome (DFS) focuses solely on pain. The lack of pain perception (loss of protective pain [LOPP]) is not described. However, the majority of patients are anesthetized. This is the first analysis to focus on LOPP.

Method:

10 people with type 2 diabetes (DM) and LOPP who were treated as inpatients or in the outpatient foot clinic were interviewed using a semi-structured guide. Thematic content analysis was used to identify key aspects of QoL.

Results / Discussion:

Mean age: 73.9±11.4 years. DM duration: 23.9±12.6 years. DFS duration: 9.4±8.1 years. 70% of the participants: with no, 30%: with severely reduced pain sensation. All respondents: at times of pain, their QoL was particularly reduced due to reduced sleep quality. Patients are aware that the lack of pain perception means new risks for the prognosis of their foot ulcer, since they no longer feel their feet (“the communication with a part of my body is missing”). It is difficult to deal with the unknowable, abstract risk. Injuries are common. LOPP means an increased time/planning effort for e.g. daily foot checks, shoe care etc. They feel more helpless with LOPP and describe a lower self-efficacy in relation to the prognosis of the foot ulcer. Due to the lack of perception, there is a higher degree of dependence on other people for the treatment of the foot. Trust in the partner, the nursing staff and the medical team is of central importance for the QoL.

Conclusion:

The interviews provided important insights into significant aspects of QoL in patients with LOPP. The focus on the absence of pain is not yet reflected in the literature. The results will be used to develop LOPP-specific items for a supplementary standardized questionnaire for the systematic assessment of wound-specific QoL (Wound-QoL).

[PP82] Exploring perspectives and experiences of individuals with diabetes towards prescribed foot orthoses

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[1]Glasgow Caledonian University, Glasgow, United Kingdom; [2]Taika 3D Oy, Espoo, Finland

Aim: Previous research suggest that adherence to prescribed footwear is often insufficient among individuals with diabetes. While various studies have investigated factors influencing adherence behaviours, there's limited research focusing on understanding the experiences of people with diabetes regarding the use of prescribed foot orthoses. This study aims to bridge that gap by exploring how individuals with diabetes perceive and engage with their prescribed foot orthoses.

Method: Qualitative data was collected through online focus groups and individual interviews from people at risk of diabetes-related foot ulcers regarding their experiences of using prescribed foot orthoses. Following a six-step thematic analysis framework, all of the pre-recorded and transcribed data were coded, and themes were identified.

Results / Discussion: Eight individuals with diabetes at risk of foot ulceration who had been prescribed foot orthoses were recruited. Through thematic analysis, three major emerging themes were identified; (i) adherence and barriers to effective use of foot orthoses, which highlighted the interconnected relationship between footwear and foot orthoses as well as the role of healthcare professionals in adherence behaviours; (ii) perceived benefits of foot orthoses and desired improvements; (iii) anxiety and psychological impact, which explored the influence of anxiety and fear on footcare behaviours, both as motivators and barriers.

Conclusion: This study highlights user experiences with prescribed foot orthoses and factors influencing foot orthoses related behavioural choices, offering valuable insights that may benefit researchers and healthcare professionals in designing and developing foot orthoses that better support the needs of users. Important factors to consider include the perception of balance and stability; the psychological impact of diabetes-related foot disease and the role of the healthcare professional in offering support both during and after foot orthoses provision.

[PP83] Paradoxical Embolism: A Hidden Cause of Acute Limb Ischaemia in a Young Adult with Diabetes and Atrial Septal Defect

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[1]University Hospitals of Leicester NHS Trust, Leicester, United Kingdom

Introduction:

We present a rare case of gangrenous toe from a cardio-embolic source.

Case presentation:

A 36-year-old female presented to the urgent care centre with a one-week history of right leg pain, associated with occasional paraesthesia over the preceding months. She had untreated type 2 diabetes, and a diagnosis of diabetic neuropathy was made.

Hours later she attended the Emergency Department with a cold, painful right leg, with weak pulses compatible with critical limb ischaemia.

Subacute tight stenosis of the distal aorta, occlusion of the right external iliac artery and right trifurcation were identified on Duplex. CT angiogram showed a small filling defect of the distal aortic arch, occlusions of both common iliac arteries, and right tibio-peroneal trunk. No viable options for revascularisation were identified. She was treated medically with warfarin.

Extensive investigation of thrombophilia did not reveal predisposition to thrombosis. Cardiac tape demonstrated no atrial fibrillation. Transthoracic echocardiogram showed a left atrial mass, re-imaged with cardiac MRI, with uncertain tissue characterisation. A secundum atrial septal defect (ASD) was apparent, with left to right shunting, confirmed on trans-oesophageal echocardiogram. Lifelong anticoagulation and ASD closure was recommended.

Two months later, she re-presented with limb-threatening ischaemia, gangrene of the second toe and right hallux embolic patches. She underwent bilateral iliac embolectomy and kissing common aorto-iliac revascularization procedure. The right second toe subsequently auto-amputated.

In July 2024, she underwent ASD closure.

Conclusion:

This is an unusual case of acute limb ischaemia resulting from a paradoxical embolus, from an undiagnosed congenital ASD in a young woman. Clinicians should have a high index of suspicion for embolic events in the setting of acute gangrene. Structural cardiac disease should be considered if there is no identifiable embolic phenomenon. Diagnosis can be challenging and requires prompt intervention to salvage extremities in patients with limb-threatening ischaemia.

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