

### Relationship between Gait Alterations and Microvascular Chronic Complications in Type 2 Diabetic Patients.

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We evaluated gait alterations and their correlations with microvascular chronic complications in type 2 diabetic patients (T2DM).

Thirty-six T2DM (M/F: 27/9; age: 63±10 yrs; diabetes duration: 12±11 yrs; BMI: 29.2±5.6 Kg/m<sup>2</sup>; HbA1c 8.1±0.9%) attending our outpatient clinic, were divided into 3 Groups: Group 1 (n=12) with no diabetic neuropathy (DN) and foot ulcerations (FU); Group 2 (n=10) with DN and no FU; Group 3 (n=15) with DN and non-infected, non-ischemic FU. We analyzed biomechanical alterations of lower limbs by motion analysis system (BTS Elite Clinic, BTS Bioengineering, Milan, Italy). Spatial-temporal and kinematics data were collected through photogrammetric infrared cameras while kinetics data with two forces plates. Data were correlated with patients' microvascular chronic complications; in particular, all patients were examined with indirect and direct retinoscopy and two non-stereoscopic 45° retinal photographs for each eye. The presence and severity of retinopathy (DR) was determined according to the Eurodiab Study classification.

Step Width (SW) was greater in Group 2 (240.9±47.5 mm) and Group 3 (271.6±41.7 mm, p<0.02 vs group 1); ankle range of motion (ROM) was significantly lower in Group 3 (Group 1: 26.6±5.6°, Group 2: 26.0±4.9°, Group 3: 23.6±4.7° (Group 3 p<0.05 vs Group 1 and 2); foot ROM was significantly lower in Group 3 (Group 1: 37.2±6.6°, Group 2: 34.8±1.7°, Group 3: 30.2±1.5° (Group 3 p<0.02 vs Group 1 and 2). There was no difference in vertical ground-reaction forces. When the whole population was considered, a positive correlation was apparent between DR presence and severity and SW (r=0.6; p< 0.05) and foot ROM (r=0.65; p< 0.05).

Our study demonstrated a positive correlation between biomechanical alterations and presence and severity of DR in T2DM, suggesting a possible contribution of the involvement of the microvascular bed in the pathogenesis of FU.