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Geometric parameters based on plantar pressure measurements in patients with diabetes

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Objective: To assess the geometric parameters based on plantar pressure measurements in patients with diabetes during gait. **Methods:** 195 patients without Charcot arthropathy were separated in 2 groups: without amputations (Gr.1) and in presence of toes amputations only (Gr.2). Each group was separated in the subgroups based on gender: females and males and age: A-pts ≤ 39 years, B-pts - 40-59 years, and C-pts - ≥ 60 . Pedography was performed with emed-AT 25 system (novel, Munich). Foot length, forefoot, midfoot, heel, and instep width, foot width (instep), foot width (narrowest), and midfoot and forefoot coefficient were calculated. One-factor ANOVA (a significance level 0.001) was used for inter group comparison. **Results:** Gr.1 (females): significant increase with age of foot width (narrowest) ($2,1 \pm 0,9$ vs. $2,6 \pm 1,2$ vs. $3,1 \pm 1,2$); heel width ($5,4 \pm 0,6$ vs. $5,7 \pm 0,5$ vs. $5,8 \pm 0,5$); midfoot width ($2,5 \pm 1,0$ vs. $3,1 \pm 1,2$ vs. $3,6 \pm 1,3$) and midfoot and forefoot coefficient ($0,27 \pm 0,11$ vs. $0,33 \pm 0,12$ vs. $0,38 \pm 0,14$). Additionally, B-pts vs. C-pts showed significant decrease of foot length ($24,7 \pm 1,3$ vs. $24,2 \pm 1,4$) and instep width ($4,1 \pm 0,9$ vs. $3,8 \pm 1,1$); significant increase of foot width (instep) ($3,6 \pm 1,2$ vs. $4,2 \pm 1,3$) and forefoot width ($9,4 \pm 0,5$ vs. $9,6 \pm 0,6$). Gr.1 (males): no significant changes in A-pts vs. B-pts, while B-pts vs. C-pts - significant increase of forefoot width ($10,2 \pm 0,7$ vs. $10,5 \pm 0,6$) and instep width ($4,5 \pm 0,9$ vs. $4,9 \pm 0,7$). Gr.2 vs. Gr.1 (females): B-pts with significant increase of foot width (instep) ($4,5 \pm 1,3$) and midfoot width ($3,9 \pm 1,6$) and significant decrease of foot length ($23,8 \pm 1,9$) and instep width ($3,5 \pm 1,5$) and no changes in C-pts. Gr.2 vs. Gr.1 (males): significant decrease of foot length in B-pts ($27,2 \pm 1,7$ vs. $26,0 \pm 1,5$) and in C-pts ($27,2 \pm 1,1$ vs. $25,4 \pm 1,4$) and forefoot width in C-pts ($10,5 \pm 0,6$ vs. $9,8 \pm 0,9$). **Conclusion:** The present results show the significant changes of the foot geometry in diabetic patients. These changes increase with age. Amputations of toes significantly influence on the foot length and width in the different regions of the foot. These data can be used in designing of custom-made or of-shelf orthopedic shoes for diabetic patients.