Individual approach to off-loading in patients with diabetes mellitus

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- **Introduction**
- Foot pressure studies can be used in patients with diabetic neuropathy to predict and as management tools to determine the specific areas under the foot that are prone to ulceration (1,2)
- The comfort of an insole, footwear can often not be perceived by the neuropathic patient.
- Aim: To prove that custom-made insoles off-load effectively the feet of patients with diabetes mellitus and foot deformity.

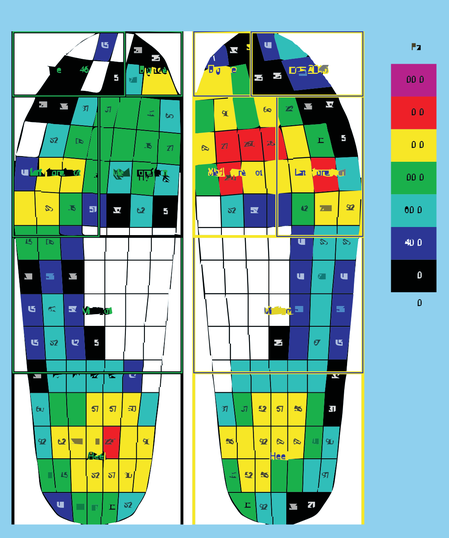
•In-shoe measurements
- with pedar-x system
(novel GmbH, Germany)

- **Method**
- Subjects: 9 patients with different deformities:
  - hallux limitus, forefoot adduction, forefoot abduction,
  - forefoot valgus, pes planus, pes cavus
  - They were measured with shoes WITH and WITHOUT custom made insoles using the in-shoe measurement system PEDAR. Patients wore podartis shoes, botero and venezia
  - Peak pressure, maximum force, force-time and pressure-time integrals, contact area, and contact time.
  - Statistical Analysis with one-factor ANOVA

Shoes were Podartis,
Botero (men) and Venezia (women)

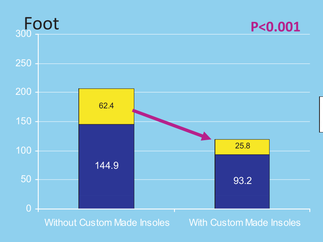
Protocol

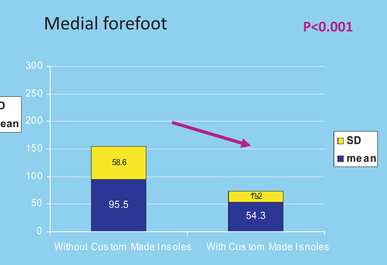
- Two series of dynamic measurements for each foot Pedar X – in shoes system
- novel database medical – data collection
- Novel projects – data analysis
- Peak pressure, maximum force, force-time and pressure-time integrals, contact area, contact time were compared in the insole versus without insole trials with one-factor Anova.
- To Pedar Standard Masking program
- πρόγραμμα αναγνώρισε τις διάφορες περιοχές. (hindfoot, midfoot, medial and lateral forefoot, big toe, second and lateral toes)

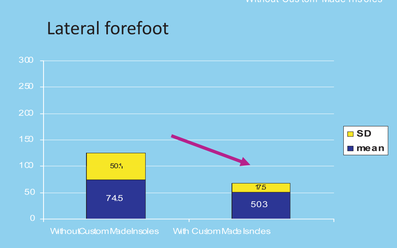


Results

Pressure – Time Integral (kPa - sec)

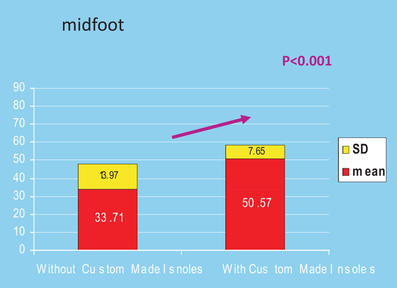


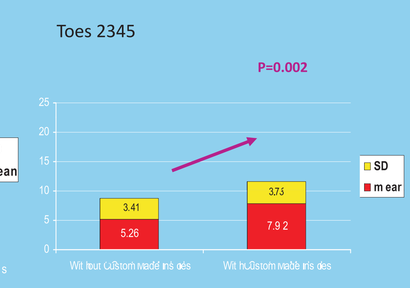




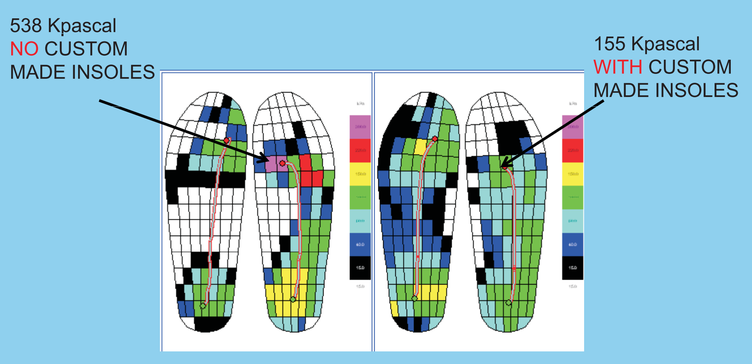
Peak pressure (kPa)

Contact Area (cm2)





An example of a measurement



- **Conclusions**
- Custom-made insoles really off-load the areas of excess loading caused with existing deformities.
- Redistribution of plantar pressure results sometimes in changes in gait line course.
- In-shoe evaluation measurements are important to monitor the effective plantar pressure distribution (3).

- **References**

1. AJ Boulton, et al. Diabetes Care, 6.1: 26-33, 1983.
2. Veves, A et al. Diabetologia 35:660-663,1992
3. Bus, S.A et al. Clinical Biomechanics 19: 629-638, 2004