2004 ESM

emed scientific meeting 2004

Proceedings

Leeds, UK, Jul. 29 - Aug. 1, 2004

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ESM 2004 Program

Thursday 29th, July, 2004

Welcome to ESM2004

18:00 - 21:00	Registration
18:30 - 21:00	Buffet and Wine Reception (Piano by Matthew Whitham) Welcome address : Jim Woodburn (Foot pressure distribution measurement in Leeds: work in progress in the field of rheumatology)
18:30 - 20:30	novel (GmbH) Workshops : Workshop I Hardware (emed recorder, pedar-x, pliance-x, sensors) Workshop II Software (Databases, Projects, Reports, Clinics, Diabetes software)

Friday 30th, July, 2004

Session 1 Biomechanics I

Chair: Dr Jim Woodburn, University of Leeds, UK

7:30 - 8:30	Registration
8:30 - 9:15	*Keynote Lecture,* a personal perspective on past, current and future use of foot pressure measurement *Klenerman L*
9:15 - 9:30	Using pressure distribution technology for evaluating foot function in toddlers *Hallemans A, de Clercq D, Aerts P*
9:30 - 9:45	Do ankle foot orthoses improve force and pressure distribution during standing in children with hemiplegia? *Hunt A, O' Reilly T, Megy M, Bronwyn T*
9:45 - 10:00	Changes in foot geometry parameters in 30 infants during the first three years of independent walking *Bosch K, Rosenbaum D*
10:00 - 10:15	Between-day reliability of repeated plantar pressure distribution measurements in a normal population *Rosenbaum D, Kersting U*
10:15 - 10:45	**Coffee break**

• Instruments are behoudbaar

Roberts v Deursen: "kenmerk van human gait is variability

Mueller: lopsnelheid ↑ → variability ↓

Friday 30th, July, 2004 cont.

Session 2 Diabetes, Multiple Sclerosis and Rheumatoid Arthritis

Chair: Dr Nick Guldemond, University Hospital Maastricht, The Netherlands

10:45 - 11:00	Synergistic effects of immuno-incompetence & plantar pressures on healing of neuropathic pedal ulcers treated by off-loading *Sinacore DR, Mueller MJ, Hastings MK, Johnson JE*
11:00 - 11:15	Risk of plantar ulceration to the surviving foot in the patients with diabetic neuropathy following trans-tibial amputation *Kanade RV, Price PE, Harding KG, van Deursen RW*
11:15 - 11:30	How are we walking in Georgia? Plantar pressure comparison in healthy and diabetic feet *Tchitchinadze N, Pargalava N, Kotaria I, Tchitchinadze T*
11:30 - 11:45	Loading pattern of the foot of patients with multiple sclerosis *Tsvetkova TL, Stoliarov ID, Abdurahmanov MA, Leberdev VV, Ilves AG*
11:45 - 12:00	Plantar sensitivity and pedobarographic patterns in patients with rheumatoid arthritis *Schmiegel A, Meermeier M, Rosenbaum D*
12:00 - 12:15	Reproducibility of plantar pressure measurements in patients with chronic arthritis *van der Leeden M, Dekker J, Siemonsma P, Lek-Westerhof S, Steultjens M*
12:15 - 13:30	**Lunch break**

Session 3 novel awards Finalists I

Chair: Dr Philip Helliwell, University of Leeds, UK

13:30 - 13:55	The effect of pes cavus on foot pain and plantar pressure *Burns J, Crosbie J, Ouvrier R, Hunt A*
13:55 - 14:20	Validity and reliability of plantar pressure measurements in the diabetic neuropathic foot: a comparison of three step-protocols *Bus SA, Lange A*
14:20 - 14:45	Testing the characteristics of replicas of stone age footwear discovered in the Oetz Italian alps *Hlavacek P, Ostravska L, Gresak V, Blaha A, Vaculik J*
14:45 - 15:15	**Coffee break**

Session 4 novel awards Finalists II

Chair: Dr Mark Cornwall, University of Northern Arizona, USA

15:15 - 15:40	Gait Evaluation during Fracture Healing in Sheep *Seebeck P, Thompson M, Parwani A, Schell H, Duda G.N*
15:40 - 16:05	Forces acting in the forefoot during normal gait : a clinical application *Wyss C*
16:05 - 16:15	Final questions and closing remarks on the novel awards session *Chairpersons, Cornwall and Helliwell*
16:15 - 16:30	**Short break**

Friday 30th, July, 2004 cont.

Session 5 Posters

16:30 - 17:30

- Dynamic pedography in patients with diabetic polyneuropathy after orthopaedics surgery of the lower extremity
  Vasarhelyi A, Hansen T, Fritsch C, Mittlmeier T
- Biomechanical abnormalities in patients with high risk of foot ulcer or amputations *Tsvetkova TL, Kushnir AN, Bregovsky VB, Kruchkova ZV*
- Remote pressure distribution measurement data analysis and data collection: telemedicine project
  Volkov AM, Seitz P, Tsvetkova TL, Fritsch C, Lebedev VV
- Prevention of plantar foot traumas in weight-lifting practice
  Macellari V, Varala C, Giacomozzi C
- Plantar orthoses: Towards a better design to improve their effectiveness in diabetic ulcer prevention
  Giacomozzi C, D'Ambrogi E, Uccioli L, Macellari V
- Changes of foot load and functional characteristics in the group of obese children during reduction of weight *Kostelnikova L, Hlavacek P*
- Might normalisation techniques improve the correctness of plantar pressure measurements? *Giacomozzi C, Macellari V*
- Foot function and morphology in different diabetic populations in New Zealand
  Kersting UG, Aitken K, Gurney J, Martin S, Rosenbaum D

Posters of current work from the host institute

- Multi-segment foot motion during gait: proof of concept in rheumatoid arthritis
  Woodburn J, Nelson KM, Lohmann Siegel K, Keeple TM, Gerber LH
- Off-loading the painful forefoot in rheumatoid arthritis is characterised by changes to the regional velocity of the centre of pressure
  Turner DE, Helliwell PS, Wakefield RJ, Emery P, Woodburn J
- Debridement Of Plantar Callosities In Rheumatoid Arthritis: A Randomised Controlled Trial *Davys HJ, Turner DE, Helliwell PS, Conaghan PG, Emery P, Woodburn J*
- Off-the-shelf contoured orthoses demonstrate comparable mechanical properties to custom-made foot orthoses at less cost
  Redmond A, Landorf K, Keenan AM, Emery P

18:15 ~ 21:00 Reception at Thackray Medical Museum :
a wine and buffet reception provided, including gallery tour

ESM 2004 Program

Saturday 31th, July, 2004

Activity day

7:00 - 21:00 *Getting to know each other with lots of fun outdoors*
hiking, biking, communicating, and celebrating

Sunday 1st August, 2004

Session 1 Foot deformities and other pathologies

Chair: Adrienne Hunt, The University of Sydney, Australia

8:30 - 9:15 *Keynote Lecture*
The art of using foot pressure systems as a clinical tool
Abboud R, Department of Orthopaedic & Trauma Surgery, University of Dundee, UK

9:15 - 9:30 Sagittal thickness of the plantar fascia is related to static arch shape and regional loading of the foot in plantar fasciitis
Wearing SC, Smeathers JE, Yates B, Sullivan PM, Urry SR, Dubois P

9:30 - 9:45 How to evaluate a result in conservative flatfoot surgery with dynamic pedobarography analysis? *Toullec E*

9:45 - 10:00 Detecting the presence of functional hallux limitus using dynamic foot pressure *Yizhar SKZ, Khamis S*

10:00 - 10:15 Changes in the plantar pressure patterns after correction of hallux valgus deformity with the scarf osteotomy *Lorei T.J, Rosenbaum D, Klämer H, Kinast C*

10:15 - 10:30 The impact of exercising on school children with valgus heel and flatfeet
Badurova J, Samsonova H

10:30 - 11:00 **Coffee break**

Session 2 Biomechanics II

Chair: Sharon Dixon, University of Exeter, UK

11:00 - 11:15 The problem of footwear for women in the final term of pregnancy
Cernekova M, Hlavacek P

11:15 - 11:30 Dynamic calibration and frequency response of capacitive film printed transducers *Paone N, Scalise L*

11:30 - 11:45 Accuracy of sensors and electronics with pedar-x insole measurements
Geuder M, Kalpen A, Seitz P

11:45 - 12:00 Biomechanical Assessment of the structure and function of Birkenstock footbed technologies
Bray LE, Hillstrom HJ, Kim EH, Heilman BP, Song J

12:00 - 12:15 Casting methods and plantar pressure: The effects of custom made foot orthoses on plantar pressure distribution
Guldemond N, Leffers P, Sanders A, Schaper N, Walenkamp G

12:15 - 13:30 **Lunch break**

ESM 2004 Program

Sunday 1st August, 2004

Session 3 Sports

Chair: Mario Lafortune, Nike, Beaverton, Oregon, USA

13:30 - 14:15 *Keynote Lecture,* Pressure distribution measurement at the University Hospital Muenster: past,present and future uses
Rosenbaum D, University Hospital Muenster, Germany

14:15 - 14:30 Plantar pressures and foot geometry in athletes of different ethnicity
Kersting UG, Gurney J, Rosenbaum D

14:30 - 14:45 Temporal characteristic of foot rollover during barefoot jogging: Reference data for young adults *de Cock A, de Clercq D, Willems T, Vitvrouw E*

14:45 - 15:00 Relationship between gait biomechanics and exercise-induced lower leg pain: a prospective study on risk factors
Willems T, Witvrouw E, Cock AD, de Clercq D

15:00 - 15:15 Changes in plantar surface area under different loading conditions
Vicenzino B, McPoil TG, Cornwall MW

15:15 - 15:30 Application of centre of pressure to indicate rearfoot inversion-eversion in a simulated shoe shop setting *Dixon SJ*

15:30 - 16:00 **Coffee break**

Session 4 Pressure technology applications

Chair: Scott Wearing, University of Queensland, Australia

16:00 - 16:15 Clinical proficiency of Dutch podiatrists, pedorthists and orthotists regarding plantar pressure reduction
Guldemond N, Leffers P, Sanders A, Schaper A, Walenkamp G

16:15 - 16:30 Validity of the pedar mobile system of vertical force measurement during a long-term period *Hurkmans HLP, Bussmann JPG, Selles RW, Horemans HLD, Benda E, Stam HJ, Verhaar JAN*

16:30 - 16:45 Evaluation of a capacitive pressure sensor for joint contact stress measurements *Martinelli L, Rosenbaum D, D'Alessio T*

16:45 - 17:00 Publicity of pressure distribution *Spodrina I, Krumins M, Vetra A*

17:00 Closing remarks *Woodburn J, Seitz P*

CASTING METHODS AND PLANTAR PRESSURE
'THE EFFECTS OF CUSTOM MADE FOOT ORTHOSES ON PLANTAR PRESSURE DISTRIBUTION'

Nick Guldemond (1a), Pieter Leffers (2), Antal Sanders (1b), Hans Emmen (1b), Nicolaas Schaper (1c), Geert Walenkamp (1a)

1. a) Orthopaedic Surgery, b) Rehabilitation Medicine, c) Internal Medicine. University Hospital Maastricht, The Netherlands
2. Fac. Medicine, Dept. Epidemiology, Maastricht University, The Netherlands

BACKGROUND

Custom-made foot orthoses are widely used to treat various problems of the feet. No publications regarding differences in plantar pressure distribution resulting from different casting methods for the construction of custom-made foot orthoses have been found.

METHODS

Four casting methods were used for construction of accommodative and functional orthoses for the feet of ten healthy women. Two foam box techniques were used: A) accommodative full weight bearing method; B) functional semi-weight bearing subtalar joint neutral-position method. Also two suspension plaster casting techniques were used: C) accommodative casting; D) functional subtalar joint neutral position (Root) method. Their effect on contact area, plantar pressure and walking convenience was evaluated on a treadmill in standard shoes with the Novel Pedar Insole-system®. For each orthosis 45 steps were used to estimate contact area and peak pressures. Walking convenience was scored on a ten-point scale.

RESULTS

Compared to shoes without orthosis, all orthoses increased the total contact area, mean: 21.5 cm^2 (17.4%). The mean increase in the medial mid foot region was 12.9 cm^2. Differences in contact areas between orthoses, for total plantar surface and medial mid foot, were statistically significant ($p \leq .015$), except between orthoses A-B and A-C ($p \geq .057$).

Peak pressures for the total plantar surface with orthoses were lower than without orthoses, mean: -7.3 N/cm2 (22.8%). Among orthoses, only the difference between orthoses A and B was statistically significant ($p = .008$). Differences between orthoses for the fore foot were small (≤ 1.0 N/cm^2) and none of them were statistically significant ($p \geq .083$): figure 1. All orthoses increased peak pressures in the toe regions.

All orthoses produced shorter gait lines compared to the shoe without insole (figure 2). The gait lines of the shoe without insole and accommodative orthoses are more medially located compared to functional orthoses.

Walking convenience in the shoe was better rated than with orthoses ($p \leq 0.05$). There were no differences in appreciation of walking convenience between orthoses A, B and C ($p \geq 0.20$). Orthoses D had the lowest appreciation ($p \leq 0.004$).

CONCLUSIONS

The four casting methods resulted in differences between orthoses with respect to contact areas but only slight differences in peak pressures. In comparison with plaster casting, foam box techniques lead to accommodative and functional orthoses with similar plantar pressure patterns and better walking convenience.

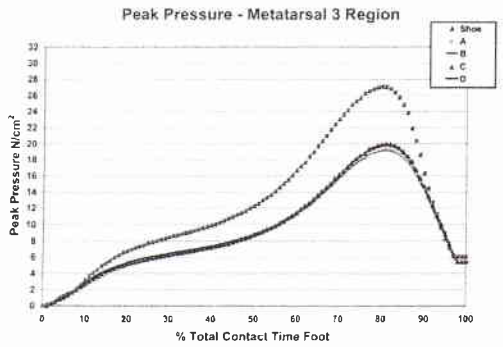

Figure 1: Peak pressure curve for metatarsal 3 region.

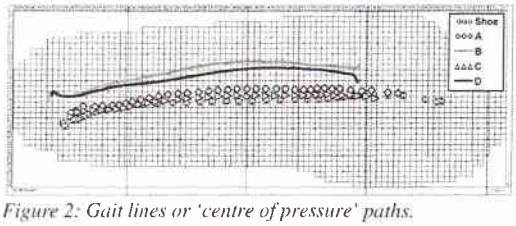

Figure 2: Gait lines or 'centre of pressure' paths.