

MEETING ABSTRACT

Open Access

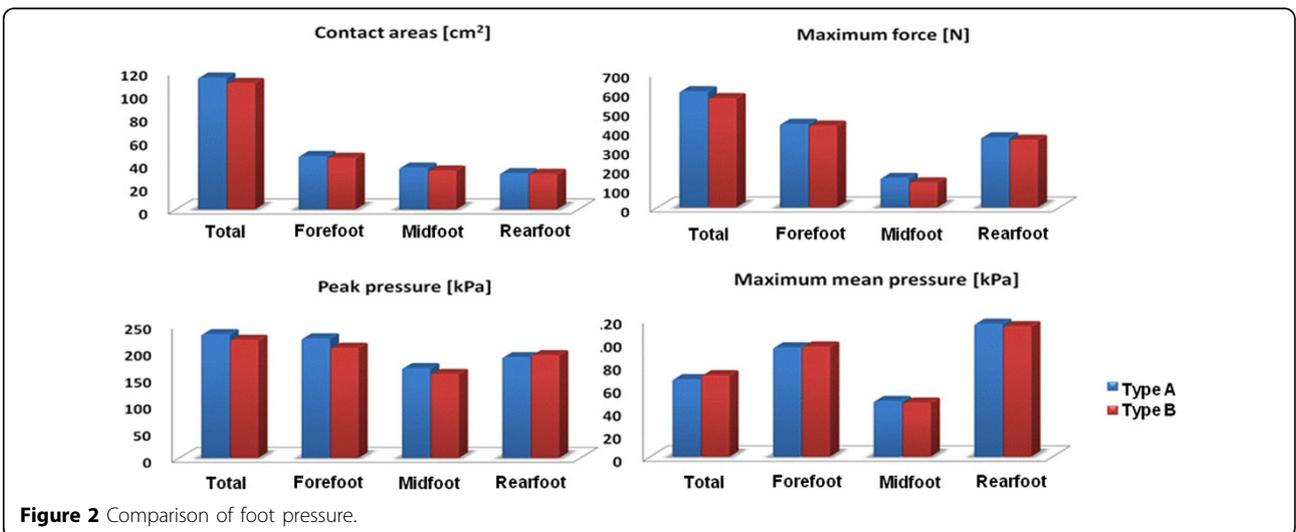
Plantar pressure distribution during treadmill walking in comfort shoes with PLA(Poly Lactic Acid) resins

Seung-Bum Park*, Kyung-Deuk Lee, Dae-Woong Kim, Jung-Hyeon Yoo, Kyung-Hun Kim

From 4th Congress of the International Foot and Ankle Biomechanics (i-FAB) Community Busan, Korea. 8-11 April 2014

In the framework of environmentally friendly processes and products, poly lactic acid(PLA) represents the best polymeric substitutes for various petropolymers because of its renewability, biodegradability, biocompatibility and

good thermomechanical properties [1]. The purpose of this study was to analyze foot pressure distribution of PLA materials in functional shoes. Comfort is an important aspect in footwear. Footwear comfort has an influence on



* Correspondence: sbpark@shoenet.org
Footwear Biomechanics Team, Footwear Industrial Promotion Center, Busan, Korea

injury [2,3]. The development of new materials is considered as the important point for manufacturing functional shoes [4].

Ten healthy female (mean height: 159.8 cm, mean body mass: 54.8 kg, mean age 20.8 yrs.) participated in this study. All subjects were free of lower extremity pain, history of serious injuries or operative treatment, or subjective symptoms interfering with walking.

The subjects were required to walking (3.2 km/h) for treadmill. Each subject wore two different shoes, type A (PLA) and Type B (control) (figure 1) during walking. The PEDAR[®]-X insole system (Novel GmbH, Germany) was used to measure the foot pressure and force. Pressure distribution data (contact areas, maximum force, peak pressure, maximum mean pressure) was collected with pressure device at a sampling rate of 100 Hz. The feet were divided into four regions: foot (Total), forefoot, midfoot, rearfoot.

Results of foot pressure distribution data show that (figure 2) contact area increased by 4% in the type A compared to type B. Also, maximum mean pressure decreased by 5%. However, peak force increased by 6%, and peak pressure increased by 5% as well. As a result PLA resins may be helpful in decreasing overall pressure in foot therefore provide better comfort in foot.

Published: 8 April 2014

References

1. Jean-Marie R, Youssef H, Marius M, Philippe D: **Poly lactide (PLA)-based nanocomposites.** *Progress in Polymer Science* 2013, **38**(10-11):1504-1542.
2. Nigg BM, Hintzen S, Ferber R: **Effect of an unstable shoe construction on lower extremity gait characteristics.** *Clinical Biomechanics* 2006, **21**(1):82-88.
3. Ramanathan AK, Kiran P, Arnold GP, Wang W, Abboud RJ: **Repeatability of the Pedar-X in-shoe pressure measuring system.** *Foot and Ankle Surgery* 2010, **16**:70-73.
4. Kim EH, Cho HK, Jung TW, Kim SS, Chung JW: **The Biomechanical Evaluation of Functional Insoles.** *Korean Journal of Sport Biomechanics* 2010, **20**(3):345-353.

doi:10.1186/1757-1146-7-S1-A123

Cite this article as: Park et al.: Plantar pressure distribution during treadmill walking in comfort shoes with PLA (Poly Lactic Acid) resins. *Journal of Foot and Ankle Research* 2014 **7**(Suppl 1):A123.

Submit your next manuscript to BioMed Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit

