

*International Conference on***PHARMACEUTICAL AND BIOMEDICAL ENGINEERING***October 16-17, 2017 Osaka, Japan***Investigation of pes planus in children between 6 and 12 years and sustainable devices for its correction****Paul Bekampien**

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**P**es planus is a common orthopedic problem especially amongst children described as a condition in which the longitudinal (lengthwise) and/or medial (crosswise) arches of the foot are dropped down or flat, where pronounced deformity needs treatment to prevent further injury. In order to alter the pattern of lower extremity joint's the orthoses and shoe inserts are widely prescribed which functions involve the distribution of plantar pressure, the absorption of impact and postural adjustments. To demonstrate such performance the device should combine contradictory properties as shock absorption and maximal energy return. Traditional orthotic materials have been largely replaced by high performance composites. The requirements of low weight, size reduction and energy adsorption have made inorganic fiber (carbon, glass) composites very attractive. However, it should be considered that many of these products are for personal use, worn limited period of time or by patients with changeable body dimensions as children. Thus the use of bio-based renewable materials could make a valuable contribution towards sustainability. This research presents a case study of environmentally friendly orthoses intended for treatment of pediatric pes planus. The study discusses the prevalence and degree of pes planus deformity amongst the children between 6 and 12 years, the gait biomechanics, the component and material selection. The results revealed that 13% of children have pronounced low-arched or flat foot problems and needs orthoses to prevent further injury, where biodegradable natural fiber reinforced composites could be valuable alternative replacing non-degradable inorganic fiber composites. These composites not only have higher flexibility and wearing comfort properties, good impact absorbing properties in comparison with carbon fiber composites but also lower environmental impact.

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