World Academy of Science, Engineering and Technology
International Journal of Bioengineering and Life Sciences
Vol:10, No:02, 2016

The Characteristics of Static Plantar Loading in the First-Division College Sprint Athletes

Authors : Tong-Hsien Chow

Abstract : Background: Plantar pressure measurement is an effective method for assessing plantar loading and can be applied to evaluating movement performance of the foot. The purpose of this study is to explore the sprint athletes' plantar loading characteristics and pain profiles in static standing. Methods: Experiments were undertaken on 80 first-division college sprint athletes and 85 healthy non-sprinters. 'JC Mat', the optical plantar pressure measurement was applied to examining the differences between both groups in the arch index (AI), three regional and six distinct sub-regional plantar pressure distributions (PPD), and footprint characteristics. Pain assessment and self-reported health status in sprint athletes were examined for evaluating their common pain areas. Results: Findings from the control group, the males' AI fell into the normal range. Yet, the females' AI was classified as the high-arch type. AI values of the sprint group were found to be significantly lower than the control group. PPD were higher at the medial metatarsal bone of both feet and the lateral heel of the right foot in the sprint group, the males in particular, whereas lower at the medial and lateral longitudinal arches of both feet. Footprint characteristics tended to support the results of the AI and PPD, and this reflected the corresponding pressure profiles. For the sprint athletes, the lateral knee joint and biceps femoris were the most common musculoskeletal pains. Conclusions: The sprint athletes' AI were generally classified as high arches, and that their PPD were categorized between the features of runners and high-arched runners. These findings also correspond to the profiles of patellofemoral pain syndrome (PFPS)-related plantar pressure. The pain profiles appeared to correspond to the symptoms of high-arched runners and PFPS. The findings reflected upon the possible link between high arches and PFPS. The correlation between high-arched runners and PFPS development is worth further studies.

Keywords : sprint athletes, arch index, plantar pressure distributions, high arches, patellofemoral pain syndrome
Conference Title : ICSBS 2016 : International Conference on Sport and Biomedical Sciences
Conference Location : Kuala Lumpur, Malaysia
Conference Dates : February 11-12, 2016