

## **The Associations of Pes Planus Plantaris (Flat Foot) to the Postural Stability of Basketball Student-Athletes Through the Ground Reaction Force Vector (vGRF)**

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**Abstract :** Purpose: The main objective of this study is to determine the pes planus plantaris (flat foot) condition can contribute to the disturbance of postural stability in basketball athletes in static and dynamic activities. Methods: This cross-sectional quantitative analytical retrospective study on 47 subjects of basketball student-athletes identified the foot arch index by extensive footprint area and AMTI (Advanced Mechanical Technology Inc.) Force flat-form (force plate) determined their postural stability. Subjects were conducted in three activities (static, dynamic vertical jump, and dynamic loading response) for ground reaction force (GRF) resultant vectors towards the vertical plane of body mass (W). Results Analytical results obtained that 80.9% of subjects had pes planus plantaris. It shows no significant differences in pes planus plantaris incidence in both sexes subject ( $p>0.005$ ); however, there are differences in athlete's exercise period aspect. Athlete students who have practiced strictly for more than four years' experience over 50% of pes planus plantaris; furthermore, a long period of exercise was believed to stimulate pes planus. The average value of GRF vectors of pes planus plantaris subjects on three different basketball movements shows a significant correlation to postural stability. Conclusions Pes planus plantaris affected almost basketball athletes regarding the length and intensity of exercise performed. The condition significantly contributes to postural stability disturbance on a static condition, dynamic vertical jump, and dynamic vertical jump loading response.

**Keywords :** pes planus plantaris, flatfoot, ground reaction force, static and dynamic stability

**Conference Title :** ICPESS 2022 : International Conference on Physical Education and Sport Science

**Conference Location :** Singapore, Singapore

**Conference Dates :** November 18-19, 2022