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Foot Arch Measurement Tool: A Pilot Study

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Abstract

Introduction: Pes planus, the most common complex postural foot deformity, occurs when the medial longitudinal arch collapses. This condition can be due to obesity, congenital/genetic and malformations, congenital-vertical-talus, acquired PTTD, ligamentous laxity, or conditions such as CP, RA and DMD. Diagnosing pes planus can be costly and methods are not always available.

Objective: Design a simpler, portable, and inexpensive diagnostic tool to measure arch height and differentiate between flatfoot and non-flatfoot.

Methodology: The study involved 30 participants, 15 males and 15 females, with a mean age of 19.6 years. Approved by IEC, a right-angled triangle tool was designed and marked with graph paper for height measurement. The medial longitudinal arch height was measured for each foot in sitting and standing positions, recording the highest reading. Static footprints were

collected and evaluated using the CSI to classify foot types. Arch height measurements were then correlated with CSI-derived classifications.

Results: The study showed 25% of feet classified as flat and 75% as normal. Mean arch heights in sitting [Rt. 16.5 mm (± 3.5), Lt. 16.7 mm (±3.5)] and standing [Rt. 14 mm (± 3.6), Lt. 14 mm (±4)] were significantly different. Arch height ranges for non-flatfoot were 15-21 mm in sitting and 13-19 mm in standing, while flatfoot ranges were 10-14 mm in sitting and 8-12 mm in standing.

Conclusion: The designed tool effectively measures MLA height and differentiates between flatfoot and non-flatfoot. Its ease of use makes it valuable for clinical and large-scale studies, providing a reliable method for assessing and categorizing feet based on arch height.

Keywords: Arch Height; Chippaux-Smirak Index; Flat foot, Foot Posture valuation; Pes Planus; Static footprints