ABSTRACT

Background: Football players are exposed to repetitive asymmetrical mechanical loading of the dominant and non-dominant limb during kicking, sprinting and stabilization demands. This persistent loading asymmetry may be a contributing factor to inter-limb differences in lower limb biomechanical alignment, specifically dynamic Q-angle and first ray alignment. No study has investigate both parameters together in dominant and non-dominant limbs of football players during functional walking.

Methodology: A cross-sectional observational study was done on 33 male football players aged between 18 and 25 years of age. The bilateral dynamic Q-angle was measured while the subjects were walking barefoot using the GaitON Motion Analysis System. The Jack test was employed for clinical assessment of first ray alignment to ascertain if the deformity was flexible or rigid. A paired samples t-test compared Q-angle between limbs and Pearson correlation assessed the relationship between first ray alignment and dynamic Q-angle within each limb.

Results: The non-dominant leg demonstrated a significantly higher dynamic Q-angle than the dominant leg (11.15° VS 9.91°, $p = 0.013$). Flat foot prevalence was 97% bilaterally. The dominant leg showed a greater proportion of rigid deformity (63.6%) compared to the non-dominant leg (48.5%), No significant correlation was found between first ray alignment and dynamic Q-angle in either limb (dominant: $r = -0.112$, $p = 0.533$; non-dominant: $r = 0.106$, $p = 0.559$).

Conclusion: A statistically significant inter-limb difference in dynamic Q-angle was identified, with the non-dominant limb exhibiting greater frontal-plane knee alignment deviation. The dominant limb demonstrated more structurally advanced rigid flat foot deformity. First ray alignment did not directly predict dynamic Q-angle, suggesting the foot-knee relationship in football players is mediated by multiple proximal and distal factors including limb-specific functional loading patterns.

Keywords: Dynamic Q-angle, first ray alignment, football players, limb dominance, Jack test, GaitON

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