ABSTRACT

Background: Cross-leg sitting (CLS) is a prevalent posture among university students, often adopted habitually with a consistent directional preference either right over left or left over right. While prior studies have documented CLS-induced pelvic asymmetry and spinal deviation, no investigation has directly tested whether this directional preference produces a predictable, lateralized pattern of hip rotation range-of-motion (ROM) asymmetry in an otherwise healthy population.

Methods: This observational cross-sectional study enrolled 120 Brainware University students aged 18–30 years, allocated into Group A (habitual CLS, n = 60) and Group B (non-CLS controls, n = 60). Hip internal and external rotation ROM was measured bilaterally using a universal goniometer in the sitting position (knee flexed 90°), with three trials averaged per side. Pelvic obliquity and torsion were assessed using an inclinometer. A structured questionnaire captured CLS directional preference, daily sitting duration, and musculoskeletal symptoms. Statistical analyses employed independent t-tests, one-way ANOVA, Pearson correlation, and multiple regression using SPSS v25.0 ($\alpha = 0.05$).

Results: Group A demonstrated significantly greater hip rotation ROM asymmetry indices compared to Group B (internal rotation asymmetry: 7.84 ± 3.12° vs. 2.31 ± 1.64°; $p < 0.001$; Cohen's $d = 2.16$; external rotation asymmetry: 6.47 ± 2.88° vs. 2.08 ± 1.52°; $p < 0.001$; $d = 1.96$). Within Group A, right-over-left CLS preferrers exhibited significantly reduced right-side internal rotation and elevated left-side external rotation compared to left-over-right preferrers ($p < 0.001$ for each). CLS daily duration showed a significant positive correlation with asymmetry magnitude ($r = 0.61$; $p < 0.001$). Multiple regression identified directional preference, CLS duration, and sex as significant predictors of hip rotation ROM asymmetry (adjusted $R^2 = 0.58$; $p < 0.001$).

Conclusion: Habitual CLS directional preference is significantly and independently associated with hip rotation ROM asymmetry in university students, with the direction of asymmetry corresponding predictably to the habitual leg-crossing side. These findings advocate for routine postural screening in campus physiotherapy and the inclusion of directional CLS habits in musculoskeletal risk assessment frameworks.

Keywords: Cross-leg sitting; Hip rotation range of motion; ROM asymmetry; Directional preference; Pelvic obliquity; University students; Musculoskeletal physiotherapy

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