A KINEMATIC ANALYSIS OF THE EFFECTS OF FOOT COVERAGE CONDITIONS ON AERIAL POSTURE AND HIP–KNEE JOINT COORDINATION DURING THE GRAND JETÉ

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Purpose:
This study investigated the effects of foot–surface interface conditions (socks vs. barefoot) on movement control during the Grand Jeté. Specifically, it examined whether dancers adopt anticipatory psychological adjustments due to slippage concerns, thereby modifying aerial strategies.

Methods:
Thirteen professional dancers performed the Grand Jeté under two randomized conditions. Kinematic analysis quantified three key variables at the jump's peak: right hip flexion (lead-leg), left hip extension (rear-leg), and total hip split angle. Data were analyzed using paired t-tests.

Results:
Analysis revealed significant differences across multiple variables. **Left hip extension** was significantly greater in the barefoot condition (51.13 ± 8.81°) than in the sock condition (47.39 ± 9.50°, $p = .027$). The **total hip angle** was also significantly larger when barefoot (158.88 ± 15.96°) compared to wearing socks (152.00 ± 11.92°, $p = .014$). While **right hip flexion** also showed a significant difference between barefoot (107.75 ± 15.59°) and sock conditions (104.62 ± 14.15°, $p = .018$), the reduction in overall aerial amplitude was primarily driven by the restriction of rear-leg extension under perceived instability.

Conclusion:
The findings support an "anticipatory regulation" framework (Pageaux & Lepers, 2023), where dancers subconsciously restrict hip extension to prioritize landing stability over aesthetic amplitude (Thomas et al., 2018). These results indicate that unstable interfaces lead to measurable reductions in aesthetic tension. To optimize performance, ensuring adequate ground feedback and friction is essential to maximize lower-limb extension.

References:

Thomas et al., 2018.;Pageaux & Lepers, 2023.

Keywords: grand jeté, kinematic analysis, anticipatory effect, foot-ground interface, dance aesthetics