ID 274

The Relationship between the Foot Progression Angle and Spatiotemporal Parameters of Gait with Fall Injury Risk in People with Knee Osteoarthritis

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Osteoarthritis (OA) affects the knee joint and increases fall risk, resulting in injuries.This study evaluates the relationship between the foot progression angle (FPA) and spatiotemporal gait parameters with fall injury risk in individuals with knee OA. Conducted at the National Hospital Sri Lanka and the Rheumatology and Rehabilitation Hospital, Ragama, the cross-sectional study involved 115 participants (mean age 60.57 ± 8.04 years). Data collection included interviews, TUG, POMA, FPA assessment, nd gait analysis using Kinovea® software. IBM SPSS version 25 was used for data analysis, with Mann Whitney U tests examining associations between gait parameters and fall injury risk, and Spearman's rank correlation assessing TUG and POMA scores with age. Results showed that 22% of participants were at fall risk, with significant relationships between out-toeing FPA and fall risk ($p=0.037$). Risk of fallers exhibited higher out-toeing (18.58 ± 6.43 degrees) compared to risk of non-fallers (14.39 ± 4.03 degrees). Significant associations were found between step length, step time, stride length, stride time, stride velocity, and fall risk ($p<0.001$). Risk of fallers had shorter step lengths (45.67 ± 8.79cm vs. 59.50 ± 10.62cm) and stride lengths (89.94 ± 21.85cm vs. 119.07 ± 18.58cm), longer step times (0.74 ± 0.12s vs. 0.64 ± 0.09s), and stride times (1.47 ± 0.24s vs. 1.28 ± 0.20s) and lower stride velocity (63.96 ± 22.66cm/s vs. 96.31 ± 21.94cm/s). Additionally, the risk of fallers was older on average. The study concludes that gait abnormalities in the symptomatic knee are linked to increased fall risk emphasizing the need for targeted OA management.

Keywords: *knee OA, foot progression angle, spatiotemporal parameters, fall risk, tug test*