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A DEVICE-BASED (GAITON) SAGITTAL PLANE KINEMATICS ANALYSIS OF LOWER EXTREMITY JOINTS AMONG PATIENTS WITH KNEE OSTEOARTHRITIS – A METHODOLOGICAL APPROACH.

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Background: Gait assessment is an effective method for identifying functional limitations associated with knee Osteoarthritis and understanding the relationship between disease symptoms and gait quality.

Objective: To evaluate the mean difference in the kinematics of lower extremity joints among patients with knee osteoarthritis.

Methods: A total of 20 people living with Knee OA were recruited as of 25th September 2024 in this prospective cross-sectional design study. The eligible participants were conveniently recruited from the SRM physiotherapy OPD based on voluntary participation after signing the informed consent. Adult participants aged 18 years and above, both sexes and able to walk independently without mobility aids were recruited and the joint kinematics were measured using the GaitOn Software, 2-dimensional analysis, and sagittal kinematic parameters of stance phase.

Results: The mean age of the patients was 53.6 ± 7.3 , and the mean BMI was 29.1 ± 4.6 . The one sample t-test demonstrated a statistically significant difference between kinematic angles of the lower extremity joint in sagittal plane of population mean (reference value) and sample mean (measured by GaitOn); Initial contact phase (hip: mean diff -4.06, $p < 0.01$, ankle: mean diff 34.1, $p < 0.0001$), Loading response (hip: mean diff -5.8, $p < 0.001$, knee: mean diff 9.6, $p < 0.001$, ankle: mean diff 32.4, $p < 0.001$). Midstance (hip: mean diff 11.06, $p < 0.001$, ankle: 31.4, $p < 0.001$). Terminal stance (hip: mean diff 28.3, $p < 0.004$, ankle: mean diff 31.4, $p < 0.001$) and Pre-swing (hip: mean diff 16.5, $p < 0.001$, ankle: mean diff 31.4, $p < 0.001$).

Conclusions: The hip and ankle joints equally share knee kinematic compensations. By acknowledging the complex interactions between the hip, ankle, and knee joints, healthcare providers can develop more comprehensive and effective treatment plans for individuals with knee OA.

Keywords: Osteoarthritis, kinematics, gait