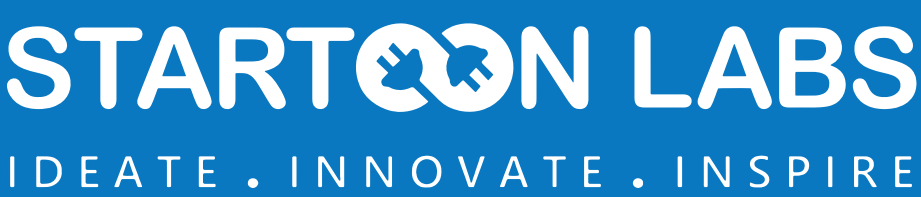


ACCURACY AND RELIABILITY OF THE PHEEZEE DEVICE FOR ASSESSING KNEE RANGE OF MOTION: A COMPARATIVE STUDY WITH AN ELECTRONIC GONIOMETER

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Background and Purpose

- Accurate assessment of joint range of motion (ROM) is essential for diagnosing movement impairments, planning treatments, and monitoring rehabilitation progress.
- Traditional ROM assessment methods, like manual goniometry, often lack consistency due to variability between raters and inconsistencies in measurement techniques. Recent advancements have introduced electronic devices aimed at enhancing accuracy and repeatability.
- The Pheeze device is an innovative tool that quantifies ROM and muscular activity during dynamic joint movements, offering real-time feedback and automated measurements to minimize rater variability. Despite its potential advantages, the reliability and validity of the Pheeze device compared to established electronic goniometers remain uncertain.
- This study aimed to evaluate the intra-rater and inter-rater reliability of the Pheeze device for assessing knee flexion and extension and to assess its concurrent validity compared to an electronic goniometer.



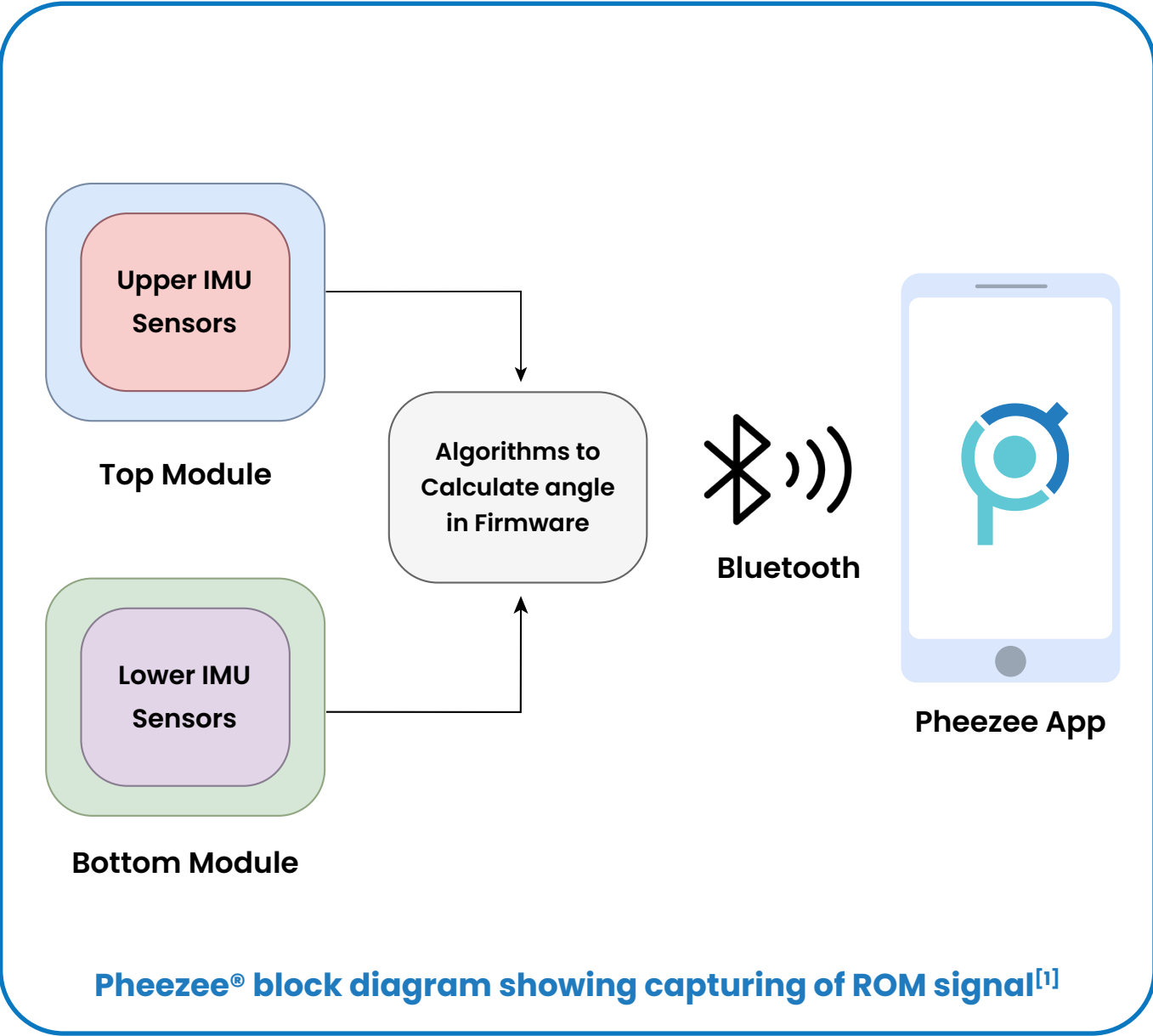
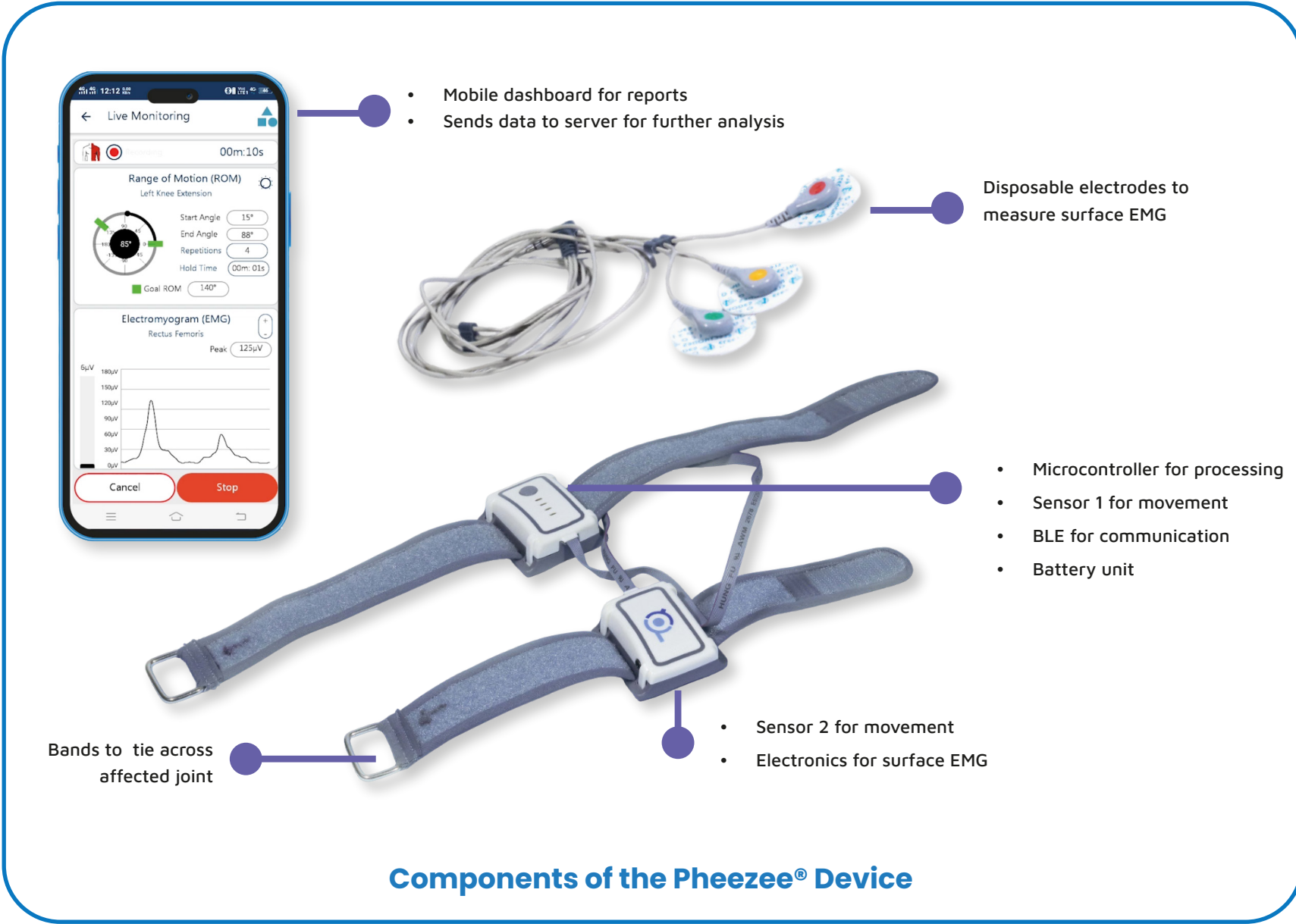
Keywords

- Pheeze, range of motion, knee, reliability, validity, electronic goniometer.

Discussion

- The **intra-rater reliability** of the Pheeze device for knee flexion ranged from 0.901 to 0.994 ($p < 0.001$), while for knee extension, it ranged from **0.878 to 0.982** ($p < 0.001$).
- Inter-rater reliability was also high, with ICC values ranging from **0.673 to 0.984 for knee flexion and 0.702 to 0.981 for knee extension** ($p < 0.001$).
- When comparing the Pheeze device to the electronic goniometer, the concurrent validity was found to be very high, with Pearson's correlation coefficients ranging from 0.703 to 0.983 ($p < 0.001$) for both flexion and extension.
- This demonstrates that the Pheeze device provides measurement accuracy comparable to the established electronic goniometer.
- Interestingly, body mass index (BMI) showed a moderate correlation with ROM measurements between the two raters ($r = 0.58$, $p < 0.05$), suggesting that variations in body composition might slightly influence the assessment.
- However, the consistency of the Pheeze device remained unaffected, reinforcing its reliability regardless of participant characteristics.

Methodology



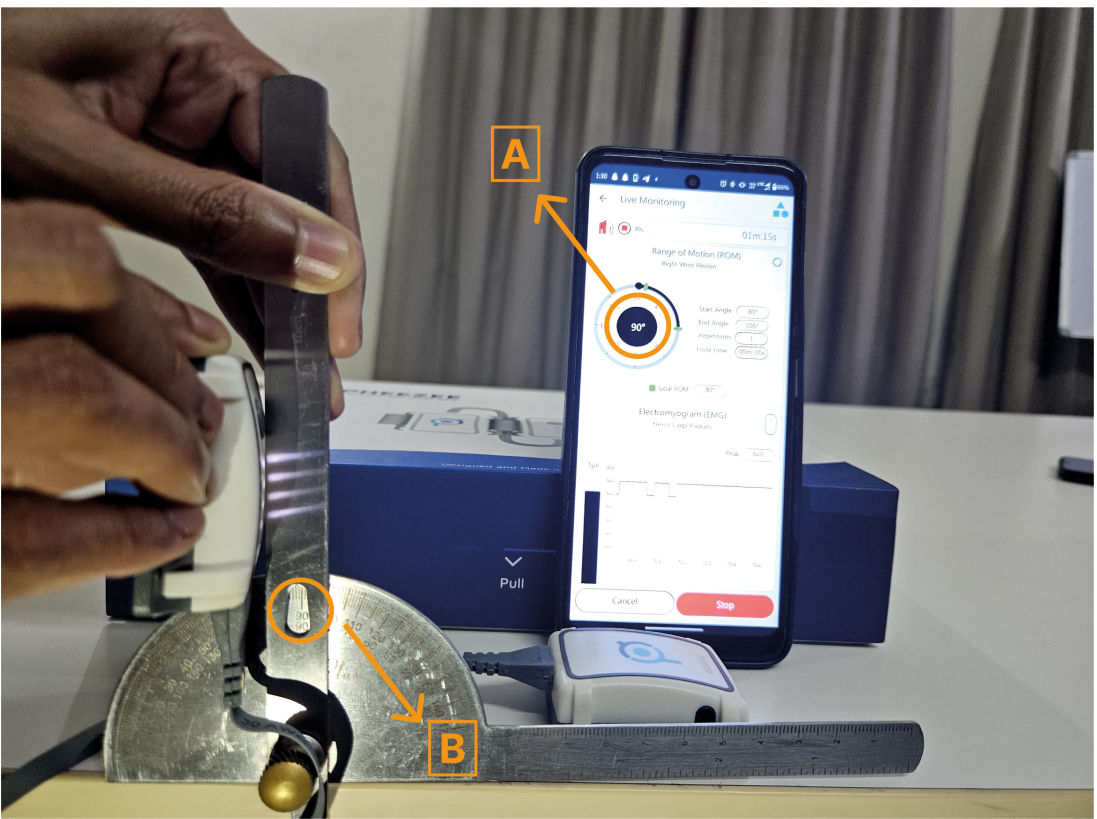
- A cross-sectional study was conducted at a single rehabilitation center.
- Forty-two healthy adults (mean age: 23.6 years)** were recruited through convenience sampling.
- Inclusion criteria** were individuals aged 18–35 years without a history of lower limb musculoskeletal disorders or recent injuries.
- Exclusion criteria** included neurological impairments or previous knee surgery.
- Participants underwent ROM assessment in a standardized sitting position. Knee flexion and extension were measured using both the Pheeze device and an electronic goniometer.
- Measurements were conducted independently by two trained raters. Intra-rater reliability was evaluated by repeating the measurements after one hour, while inter-rater reliability was assessed by comparing measurements obtained by both raters.
- The concurrent validity of the Pheeze device was determined by comparing its measurements to those obtained with the electronic goniometer.
- Reliability was analyzed using intraclass correlation coefficients (ICCs), with values above 0.75 considered excellent and those between 0.60 and 0.74 considered good.
- Concurrent validity was assessed using Pearson's correlation coefficient, with statistical significance set at $p < 0.05$.

Objective

- The primary objective was to assess the intra-rater and inter-rater reliability of the Pheeze device for knee flexion and extension.
- The secondary objective was to evaluate the concurrent validity of the Pheeze device compared to an electronic goniometer.

Conclusion

- The Pheeze device demonstrated **excellent intra-rater and inter-rater reliability** for assessing knee flexion and extension.
- Its high concurrent validity compared to the electronic goniometer indicates that it can be effectively used as a reliable tool for ROM measurement in clinical and rehabilitation settings.
- The automated and objective nature of the Pheeze device reduces rater-dependent variability, making it a valuable addition to modern orthopaedic practice.
- Given its ease of use and accuracy, the Pheeze device holds potential for routine clinical assessments and long-term monitoring of knee mobility.



Reference

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