Can Patellar Translation As Measured By Dynamic Ultrasound Predict Outcomes After Patellar Stabilization Surgery?

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Disclosures

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Background

- Dynamic portable ultrasound has been shown to accurately identify patellar instability.
- Prior studies demonstrate that a medial patellofemoral distance (MPFD) > 2 mm indicates medial patellofemoral complex (MPFC) insufficiency.
- Currently, no established method exists to predict knee function following medial patellofemoral ligament (MPFL) and medial quadriceps tendon femoral ligament (MQTFL) reconstruction.

Objective

- The purpose of this study was to determine whether MPFD measured on dynamic ultrasound images can predict postoperative function after patellar stabilization surgery.

Methods

- A retrospective cohort of patients was followed from the initial encounter up to one year post-surgery
- Dynamic portable ultrasound images were obtained at baseline, measuring medial patellofemoral distance (MPFD) with and without lateralizing load
- MPFD measurements quantified the space between the medial patella and trochlea
- Patients completed Kujala questionnaires at standard postoperative intervals; scores range from 0–100 with higher scores indicating better knee function

Methods

- Preoperative and postoperative MPFD measurements and Kujala scores were compared
- Previously established MPFD thresholds (>2 mm) were used to categorize patellar instability
- Linear regression analysis was performed to assess the relationship between ultrasound-based MPFD measurements and postoperative Kujala scores
- Sex-specific comparisons were performed to evaluate differences in outcomes

Results

- 40 patients were included (mean age: 23 ± 9.1 years; 17 males, 23 females)
  - 10 patients underwent MPFL reconstruction, 30 patients underwent MQTFL reconstruction
  - No patients experienced a re-dislocation during the follow-up period
- Mean MPFD-delta decreased from 3.6 ± 1.3 preoperatively to 1.1 ± 1.2 postoperatively, indicating improved patellar stability
- Mean Kujala score improved from 51.9 ± 24.2 preoperatively to 84.3 ± 14.1 at 6 months, demonstrating significant functional recovery

Results

- No significant relationship was found between postoperative ultrasound MPFD measurements and Kujala scores ($R^2 = 0.018$, $p = 0.320$)
- Sex-based analysis showed no significant relationship in males ($R^2 = 0.051$, $p = 0.337$) or females ($R^2 = 0.003$, $p = 0.761$)
- Ultrasound measurements did not predict postoperative functional outcomes in this cohort

Results

- Using the known MPFD threshold of 2 mm:
  - Patients with MPFD < 2 mm had a Kujala score of 82.9 ± 14.9
  - Patients with MPFD ≥ 2 mm had a Kujala score of 89.8 ± 7.5
  - No significant difference in functional outcomes based on MPFD threshold ($p = 0.229$)

Conclusions

- While dynamic portable ultrasound can accurately assess patellar instability, no significant relationship was found between ultrasound MPFD measurements and short-term functional outcomes in this surgical cohort
- Ultrasound-based MPFD measurements may have limited utility in predicting early postoperative knee function
- Further studies with larger cohorts and longer follow-up are needed to evaluate the role of ultrasound in assessing surgical success after patellar stabilization

Summary

- Although dynamic ultrasound effectively identifies patellar instability, it did not predict short-term functional outcomes after patellar stabilization surgery in this cohort.

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Thank you

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