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Do Not Forget About Saggital Trochlea Length when Assessing Patellofemoral Instability

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Summary:
Sagittal Patellofemoral Engagement Index is Key Determinant for Symptom Severity in Patients with Patellofemoral Instability

Abstract:

There are many factors that predispose a patient to patellofemoral instability. Initially, radiographic features such as patella alta or markers for trochlea dysplasia such as the crossover sign, supratrochlear spur and the double contour sign were used to assess for the underlying cause for patellofemoral instability. With widespread use of cross-sectional imaging, novel parameters have been widely used and adopted including the tibial tubercle – trochlea groove (TT-TG) distance and newer measures such as the sagittal patellofemoral engagement index (SPE) and patellofemoral axial engagement index (AEI).

Our study aims to identify if any of these imaging parameters correlated with patient reported outcome scores (PROS). Our study population was derived from consecutive series of 37 medial patellofemoral ligament reconstructions (32 patients) between 13th of August 2014 and 20th September 2017. 15 exclusions were made from final analysis due to unavailable imaging (4), incomplete questionnaires (11). 22 knees (19 patients) were included in the final analysis.

All patients completed the International Knee Documentation Committee Questionnaire, the Kujala Anterior Knee Pain Score and the Knee Injury and Osteoarthritis Outcome Score (KOOS). MRI scans were reviewed and measures recorded by the primary author. The surgery was performed by the senior author using an ipsilateral gracilis autograft and patella inlay technique. All statistical calculations were conducted using Microsoft Excel. Normality of data was confirmed through histograms and Kurtosis calculation. Paired student-t test was conducted to compare parametric data (pre and post intervention patient reported outcomes). Spearman correlation co-efficients were calculated for all PROS and MRI parameters to identify trends.

SPE was positively correlated IKDC (r= 0.24), KOOS pain (r= 0.35), KOOS Symptoms (r= 0.27), KOOS ADL (r= 0.43) and KOOS Sport (r= 0.31). The primary contributing factor to this was trochlea length, which also independently positively correlated with the same PROS. A small negative correlation was seen between PFEI and all PROS (range of r values = -0.11 to -0.35). All patients in our study population had MPFL reconstruction by the senior surgeon using an ipsilateral gracilis autograft. There was a statistically significant (p<0.0001) improvement in all recorded outcome measures.

Our study shows that SPE and particularly trochlea length in the sagittal plane was the key determinant of symptom severity in patients with symptomatic patellofemoral instability. SPE can be used as an additional classifier for patients with patellofemoral instability. It aids trochlea assessment by adding the 'third dimension' and

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complementing traditional classification methods such as Dejour, which are more focused on the axial topography of the trochlear and more traditional radiographic measures of patellar height. Questions regarding causality still remain i.e. did patella alta lead to dysplasia during trochlea formation or did a dysplastic trochlea eventually lead to patella alta? Either way, we would recommend use of the SPE to provide a complete assessment of trochlea shape as we have demonstrated its clinical importance in predicting symptom severity.