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The Study of Risk Factors in Post-Operative Results of MPFL Reconstruction

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Summary:
The purpose of this study was to investigate cases where MPFL reconstruction was performed and examine the factors that influenced clinical results.By opening the optimal femoral tunnel position, we suggest that it is possible to obtain good postoperative results in this type of operation alone.

Abstract:
MPFL reconstruction surgery was reported in Japan in 1989. It has since become the first choice in operative treatment of patella dislocation. However, various postoperative complications have been reported, including restricted range of motion of the knee joint due to excess tension in the transplanted tissue, arthrofibrosis, and patellofemoral joint disease caused by excessive compression of the patella. Despite this, there is a paucity of investigative studies on the factors affecting the clinical outcome following this surgery. The purpose of this study was to investigate cases where MPFL reconstruction was performed and examine the factors that influenced clinical results.

We conducted Bi-socket method MPFL reconstructions using either semitendinosus or gracilis tendons.As endogenous factors we selected gender, age, BMI, autologous tendons, simple X-ray imagery of patella height in Insall-Salvati Ratio (ISR), femoro-tibial angle, Wiberg classification, sulcus angle, congruence angle and femoral tunnel position as explanatory variables. In CT, tibial tuberosity-trochlea groove (TT-TG) was selected.

We examined postoperative failure factors statistically by splitting the sample into good and poor groups based on clinical outcome and designated them as the objective variable.

Re-dislocation, the presence or absence of restricted knee flexion (less than 120°), in addition to assessments using the Crosby-Insall Grading System and the Kujala Score were adopted as the endpoint of postoperative clinical outcomes to classify good (n=42) and bad (n=5) groups. Univariate analysis was performed. For qualitative variables Fisher's exact probability test was used, whereas for quantitative variables the t-test and Mann-Whitney U tests were applied. P-value of <0.05 was deemed as statistically significant. Further, multivariate analysis using logistic regression analysis was performed.

RESULTS
The results of univariate analysis between each group showed that in the explanatory variable of femoral tunnel position, the difference in anteroposterior direction ($p = 0.04$) and distance ($p = 0.027$) compared to the reference line between the objective variables of good/poor groups was statistically significant.

The remaining explanatory variables: sex ($p=0.967$), age ($p=0.303$), BMI ($p=0.463$), Insall-Salvati ratio ($p=0.521$) in preoperative simple X-ray imagery, femoro-tibial angle ($p=0.817$), Wiberg classification ($p=0.761$), sulcus angle

(p=0.801), congruence angle (p=0.356) and TT-TG (p=0.591) under CT did not have a significant difference between two groups. Next, we performed a logistic regression analysis. This found that cases where the femoral tunnel was positioned anteriorly to the reference line, as compared with those positioned on it, resulted in a higher failure rate of 2.15 times, but was not of statistically significant difference (p = 0.527). No other factors with statistically significant differences were found.

Various measurement values in the preoperative X-ray imagery were not considered as endogenous factors of postoperative results in this study. By opening the optimal femoral tunnel position, we suggest that it is possible to obtain good postoperative results in this type of operation alone.