Reliability Of A Novel Method Of Predicting ACL Graft Size Using Preoperative MRI Does Not Differ Regardless Of Orthopedic Experience

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INTRODUCTION:

It is important to pre-operatively identify patients who may have small sized hamstring tendons, so surgeons can consider alternative graft sources. A novel and practical method was previously described to estimate the size of the hamstring tendon graft using preoperative MRI with a high specificity. However, the practicality of this method has not been assessed in a wider spectrum of clinicians ranging from medical students to senior Orthopedic surgeons. This study aims to (1) Determine the performance of this method amongst a broader range of medical practitioners (2) Perform an interobserver reliability study– to assess whether differences amongst members with various clinical experience can affect the accuracy of the estimation of the hamstring tendon graft size.

METHODS:

A retrospective review was conducted for 112 consecutive patients who underwent primary ACL reconstruction. Five evaluators were chosen to reflect a broad range of Orthopedic experience, including an Orthopedic senior consultant, a senior resident, a non-trainee medical officer and two medical students. All five evaluators measured the cross-sectional lengths and breadths of both semitendinosus and gracilis grafts in an independent and blinded manner.

RESULTS:

The Pearson's correlation coefficient for the predicted graft diameter to the actual graft diameter was 0.645 ($p < .001$), which shows a moderate positive correlation. Specificities ranged between 88.9% to 94.4% across all five evaluators. Percentage agreement was highest between the senior and junior surgeons (90.2%) but very high between the medical students (86.6%). High interobserver reliability was observed between the surgeons ($\kappa=0.795$) and between the medical students ($\kappa=0.713$). Overall, there is substantial interobserver reliability across all five evaluators ($\kappa=0.714$) based on the Landis & Koch scale[1]

Table 1 showing percentage agreement and Cohen's Kappa values

Parties involved	Percentage Agreement (%)	Kappa value
Senior surgeon, Junior surgeon	90.2	0.795
Senior surgeon, Junior resident	81.2	0.578
Junior surgeon, Junior resident	83.9	0.654
Medical student A, Medical student B	86.6	0.713
All 5 evaluators	73.2	0.714

DISCUSSIONS AND CONCLUSION:

We have further established the accuracy and reproducibility of this novel practical method through an inter-observer study, thus enabling junior members of the surgical team to complete this role with similar competency.

REFERENCES:

1 Landis Jr, Koch GG. The Measurement of Observer Agreement for Categorical Data. Biometrics 1977 Mar; 33(1): 159-74