How to improve the prediction of quadruple semitendinosus and gracilis autograft sizes with magnetic resonance imaging and ultrasonography

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Introduction

- Hamstrings vs B-Patellar tendon-Bone
  - Comparable functional results
  - Hamstring less morbidity at the donor site

May have unacceptable size for ACL-reconstruction
OBJETIVE

Predict diameter of the 4STGT with US and MRI

Methods

- 33 patients
  - Scheduled for ACL-r with Hamstring autograft
  - MRI performed at our institution
  - Ultrasonography of the ST and GT tendons

- No previous ACL-r, Hamstring injury, partial ACL, multiligament knee injuries
Methods

Ultrasonography

- Cross sectional area (CSA) of ST and GT
- Performed by the same person
- Same US device (LOGIQe, GE Healthcare, Milwaukee)
- Same linear array probe (7-12 MHz)

MRI

- CSA of ST and GT
- 1.5T at widest point of medial femoral condyle
- Under 2x and 4x magnification
- Assessed with PACS workstation (Centricity Enterprise Web V3.0)
Results

Ultrasonography

CSA

- **GT** 6.2 ± 0.9 mm²
- **ST** 9.5 ± 1.7 mm²
- **GT+ST** 15.7 ± 2 mm²

US-CSA ↔ graft ↔ Pearson CC 0.51

CSA > 14 mm² ≥ 8mm sensibility 81%
< 8mm specificity 100%

4ST-GT diameter = 3.658 + 0.294 x US-CSA
Results

2xMRI

CSA

• GT+ST 27.2 ± 4.4 mm²

CSA > 25 mm² ≥ 8mm sensibility 75%
< 8mm specificity 85%

4ST-GT diameter = 5.81 + 0.667 x 2xMRI-CSA

4x-MRI

CSA

• GT+ST 18.8 ± 2.3 mm²

CSA > 17 mm² ≥ 8mm sensibility 96%
< 8mm specificity 100%

4ST-GT diameter = 3.84 + 0.228 x 4xMRI-CSA
Discussion

• Graft <8mm: ⬆️⬆️ graft failure?
• Antropometrics measurements and conventional MRI have shown lower predictibility

Limitations

• No measurement of ST and GT separately
• No measurement of the tendon lengths
• Intra-inter obs. variability not calculated with US
Conclusions

• US and 2xMRI good and similar predictibility
• 4xMRI much greater accuracy

• 25mm², 17mm² and 14mm² are needed to reliably predict a 4ST+GT of at least 8mm in diameter
