CLINICAL COMPARISON BETWEEN AUTOGRAFT BONE QUADRICEPS TENDON (BQT) VS. AUTOGRAFT SINGLE BUNDLE HAMSTRING TENDON (SBHT) IN ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

A NOVEL, PROSPECTIVE COHORT STUDY

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CONCLUSIONS: Use of the quadriceps tendon autograft for ACL reconstruction is supported by current orthopaedic literature. It is a safe, reproducible, and versatile graft that should be considered in future studies of ACL reconstruction.

LEVEL OF EVIDENCE: Level III, systematic review of Level I, II, and III studies.
Risk Factors Associated With Revision and Contralateral Anterior Cruciate Ligament Reconstructions in the Kaiser Permanente ACLR Registry

Gregory B. Maletis, MD*, Maria C. S. Inacio, PhD, Tadashi T. Funahashi, MD
First Published December 29, 2014 | Research Article

Hamstring $\rightarrow$ prone for revision

BPTB $\rightarrow$ prone for CACLR

Quadriceps $\rightarrow$ better results??
Socio-cultural challenge in Indonesia

- BPTB $\rightarrow$ anterior knee pain $\rightarrow$ disturbance of praying
- Hamstring $\rightarrow$ smaller dimension compared to Caucasian

**Demands other source of graft with similar biomechanical properties:** (1) less donor-site morbidity, and (2) less revision rate
THEORETICAL FRAMEWORK

Onset of ACL symptoms

Demographic data:
- Age
- Activity level
- Gender
- Occupation
- Drug consumption
- Smoking

Cost of treatment

Timing of surgery

Graft types
- Autograft
- Allograft
- Synthetic graft

Graft fixation techniques:
- Implant
- Implantless

Tunnel placement

Rehabilitation Protocol

Comorbid injury
- Meniscus
- Cartilage
- Other knee ligamentous disruption

Subjective Scoring:
- IKDC
- Tegner-Lysholm
- KOOS

Objective measurement:
- Rolimeter
- KT-1000/2000

Graft harvesting techniques:
- Quadriceps
- Hamstring
- BPTB
- Peroneal

Graft failure

Revision Rate
Residual laxity

Functional outcome of arthroscopic-assisted ACL reconstruction
METHODS OF RESEARCH

- **Prospective cohort**
- **Inclusion**
  - Monoarticular ACL rupture case
  - Age < 40 y.o.
- **Exclusion**
  - Multiple ligamentous rupture
  - Bilateral ACL rupture
  - Ligamentous laxity
  - Re-rupture during study
  - Previous history of knee operation
- **Time & Location**
  - February 2015 – February 2017
  - Multisite → CMH & AHGS (Jakarta)
- **Sample**
  - $N_1 = N_2 = \frac{2(z_\alpha + z_\beta)^2 \sigma^2}{(\epsilon-\delta)^2}$
  - 15 patients each group (30 subjects)
**DEMOGRAPHIC DATA**

**Hamstring Group**
- Athletic: 46%
- Traffic accident: 7%
- Soccer: 40%
- Basket: 7%

**Quadriceps Group**
- Soccer: 55%
- Athletic: 20%
- Traffic accident: 13%
- Basket: 27%
• Trends on repeated time measurements → significant and consistent results showing the comparison between BQT group and SBHT group (p < 0.05)
## OBJECTIVE MEASUREMENT – ROLIMETER
### [SIDE-TO-SIDE & TIME-TO-TIME]

<table>
<thead>
<tr>
<th>Rolimeter (mm)</th>
<th>BQT Group ($N_1=15$)</th>
<th>SBHT group ($N_2=15$)</th>
<th>p-Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6 Months Post Operative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difference of measurement between injured knee and post operative knee <em>(time to time difference)</em></td>
<td>$7,47 \pm 1,31$</td>
<td>$6,58 \pm 1,36$</td>
<td>0.080</td>
</tr>
<tr>
<td>Difference of measurement between contralateral normal knee and postoperative knee <em>(side to side difference)</em></td>
<td>$0,34 \pm 0,70$</td>
<td>$0,84 \pm 0,60$</td>
<td>0.044</td>
</tr>
</tbody>
</table>

Results were provided using mean (standard deviation) for the normally distributed data (in millimeters).

*p-value was calculated using parametric Student’s T test*
**Study Comparison**

  - Some kind of anterior knee laxity ~ comparable to BPTB
  - **Better rotational** stability\(^1\)

- **In this study**
  - Post operative knee stability of BQT >>> SBHT

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**STUDY COMPARISON**

- **Kim et al (2014)**
  - No significant differences between BQT & SBHT autograft in terms of stability and functional outcome

- **In this study**
  - BQT >>> SBHT in terms of functional / clinical outcome

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CONCLUSION

- Bone Quadriceps Tendon (BQT) autograft displays a superior clinical outcome (subjective & objective measurement) compared to Single-Bundle Hamstring Tendon (SBHT) autograft in patients with Anterior Cruciate Ligament (ACL) reconstruction.
THANK YOU FOR YOUR ATTENTION

Mens sana in corpore sano