Outcomes following Anatomic SB- vs DB ACLR - What Are We Missing?

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I or a member of my immediate family **DO NOT** have a financial interest or other relationship with a commercial company or institution.
What should be the true appearance of the ACL footprint?
Any Two Knees Never Have the Same ACL Footprints

22 ACL **Femoral** Footprints with Knee Flex to 90°
2015 KSSTA, Robert Smigielski’s ribbon results
Lateral Intercondylar Ridge
Bifurcate Ridge
Old→Resident Ridge or Ribbon→Dire vs Indire Insertions→Biomechanical
22 ACL Tibial Footprints with Knee Flex to 90°
Rainer Siebold & Robert Smigielski-tibial L, C and CC types of ribbon
The Focus of the Footprint Shapes

The dense zone of the ACL footprint is important, but the loose zone is useless?
How to use the Histological Result of the ACL Footprint?
Tibial Insertion Histology
10 Years Ago
The Focus of the Tibial Insertion Histology

- Is it Right if the Tunnel was Located to the center of the Footprint?

- The Indirect Insertion Contributed 20% AP Stability, Should Be Ignored?
Arthroscopic View of the ACL Footprint
2005, DB-ACLR

Old Technique was Right
Individualized Femoral Footprint
Debate on Footprint View under Arthroscopy

- Individualized Femoral and Tibial Footprint.
- Reasons for ACLR Caused by the Displastic Footprint.
- Reconstructing the Native ACL Footprint?
Tunnel Techniques For DB-ACLRs
1. Rectangular Socket Tunnels

AIR: anterior intercondylar ridge
2. Oval Tunnels

Anatomic ACL reconstruction: rectangular tunnel/bone–patellar tendon–bone or triple-bundle/semitendinosus tendon grafting

Kosei Shino · Tatsuo Mae · Yuta Tachibana

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Abstract Anatomic ACL reconstruction is the reasonable approach to restore stability without loss of motion after ACL tear. To mimic the normal ACL like a ribbon, our preferred procedures is the anatomic rectangular tunnel (ART) technique with a bone-patellar tendon-bone (BTB) graft or the anatomic triple bundle (ATB) procedure with a hamstring (HS) tendon graft. It is important to create tunnel apertures inside the attachment areas to lessen the tunnel widening. To identify the crescent-shaped ACL femoral attachment area, the upper cartilage margin, the posterior cartilage margin and the resident’s ridge are used as landmarks. To delineate the C-shaped tibial insertion, medial intercondylar ridge, Parson’s knot and anterior horn of the lateral meniscus are helpful. In ART-BTB procedure which is suitable for male patients engaged in contact sports, the parallelepiped tunnels with rectangular apertures are made within the femoral and tibial attachment areas. In ATB-HS technique which is mainly applied to female athletes engaged in non-contact sports including skiing or basketball, 2 femoral and 3 tibial round tunnels are created inside the attachment areas. These techniques make it possible for the grafts to run as the native ACL without impingement to the notch or PCL. After femoral fixation with an interference screw or cortical fixation devices including Endobutton, the graft is pretensioned in situ by repetitive manual pulls at 15–20° of flexion, monitoring the graft tension with tensioners on a tensioning boot installed on the calf. Tibial fixation with pullout sutures is achieved using Double Spike Plate and a screw at the pre-determined amount of tension of 10–20N. While better outcomes with less failure rate are being obtained compared to those in the past, higher graft tear rate remains a problem. Improved preventive training may be required to avoid secondary ACL injuries.

Introduction

Anterior cruciate ligament reconstruction (ACL-R) is a common surgical procedure in orthopaedic practice. It is our strong belief that a graft that is placed to mimic the native ACL is functionally capable of properly stabilizing the knee without loss of motion. Thus, anatomic graft placement is the key to successful ACL-R.

In order to precisely mimic the fiber orientation of the native ACL, which is a flat ribbon-like structure [1], simply creating a single round tunnel in the attachment area is far from ideal. The tunnel aperture(s) should be adjusted to the shape of the attachment area, and the selected graft should
4. Old ADB-ACLIR

Sasaki, 2012
Rainer Siebold’s Ribbon Technique
Rainer Siebold’s C Type Ribbon Technique
MRI 3D Reconstruction
Accuration for Evaluation Is Enough?
机械臂平台搭建
Clinical Scores No Difference?
# Subjective IKDC Scoring

11 Questions & Answers

# Objective IKDC Scoring

<table>
<thead>
<tr>
<th></th>
<th>A normal</th>
<th>B Near normal</th>
<th>C abnormal</th>
<th>D Serious abnormal</th>
<th>A, B, C, D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 effusion</td>
<td>0</td>
<td>&lt;25ml</td>
<td>25-60ml</td>
<td>&gt;60ml</td>
<td></td>
</tr>
<tr>
<td>2 PROM deficiency</td>
<td>&lt;3°</td>
<td>3~5°</td>
<td>6~15°</td>
<td>6~10°</td>
<td>&gt;10°</td>
</tr>
<tr>
<td>3.1 Lachman (25°, 30 lb)</td>
<td>0~2mm</td>
<td>3~5mm(1')</td>
<td>6~10mm(2')</td>
<td>&gt;10mm(3')</td>
<td></td>
</tr>
<tr>
<td>3.2 END-Point</td>
<td>very strong</td>
<td>strong</td>
<td>weak</td>
<td>very weak</td>
<td></td>
</tr>
<tr>
<td>3.3PDT(70°)</td>
<td>0~2mm</td>
<td>3~5mm</td>
<td>6~10mm</td>
<td>&gt;10mm</td>
<td></td>
</tr>
</tbody>
</table>

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3.9

4......

5......

6......

7......
In Vivo the Knee Kinematics & Joint Moments
In Press

- No Diff DB vs Normal Groups.
- SB and ASB Diff from the Normal Group.
High Level Clinical Study Were Enough?
- Multicenter Evidence of Level I RCT.
- Accurate Anatomic Study.
- New Histological Study
- Robertic Measurements.
- Objective Scorings.
- More than 10 Years of FU.
Many Missing Factors Were very Important not only for the DB-ACLR, also for the SB-ACLR.

Different Techniques, Equal Results? Caused by Bad Evaluation?

High Level of Clinical Trials Should Be Encouraged and Supported.
References


Thank You!