System for Anterior Cruciate Ligament Reconstruction
with rectangular bone tunnels using the quadriceps tendon
The Quadriceps Tendon

The quadriceps tendon is used in cruciate ligament revision surgery and, more and more frequently, for the primary reconstruction of the anterior (ACL) and posterior (PCL) cruciate ligaments.\(^1\)

The quadriceps tendon has also emerged as a suitable graft source for the reconstruction of the medial patellofemoral ligament (MPFL).\(^2\)

This is mainly due to the following properties of the quadriceps tendon:

**Benefits of the quadriceps tendon:**
- Lower harvest site morbidity in comparison to the patellar tendon
- Harvesting with or without a bone block possible
- Good biomechanical properties

A special tendon harvesting system was designed to provide fast, safe and atraumatic tendon harvesting, featuring the following properties:
- Reproducible technique
- Safe subcutaneous tendon harvesting
- Defined harvesting depth
- Attractive cosmetic results

**Studies on the Quadriceps Tendon**

1. Fink C, Herbort M, Abermann E, Hoser C. Minimally invasive harvest of a quadriceps tendon graft with or without a bone block. Arthros Tech 2014

2. Fink C, Veselko M, Herbort M, Hoser C. Minimal invasive reconstruction of the MPFL using the quadriceps tendon. Arthros Tech 2014, 3(3) e325 - e329 [Epub ahead of print]

Note
ENDOWORLD® “Quadriceps Tendon Harvesting System” (96152047) is available on request.
Subcutaneous harvesting of quadriceps tendon using a special system via a minimal skin incision.

For cruciate ligament reconstruction, an oscillating saw can be used to harvest a bone block from the proximal patella.

The quadriceps tendon (QT) can be used with or without a bone block.

Cruciate ligament reconstruction techniques using the semitendinosus and/or gracilis tendon have gained increasing attention in recent years. However, there has been little focus on the quadriceps tendon.

Today many knee surgeons value the quadriceps tendon not only as a revision graft, but also use the quadriceps tendon more and more frequently for primary reconstruction of the anterior (ACL) and posterior (PCL) cruciate ligaments.

For more information about the System for Anterior Cruciate Ligament Reconstruction with rectangular bone tunnels using the Quadriceps tendon, please refer to the Silver Book, code 96155016: Anatomic reconstruction of the Anterior Cruciate Ligament – Quadriceps tendon and rectangular bone tunnels. Fink C, Hoser C, Gföller P and Heribort M.

Link to video
System for ACL Reconstruction with Rectangular Bone Tunnels using the Quadriceps Tendon

The actual anatomy of the anterior cruciate ligament insertion site gave rise to the idea of a system that would best match the insertion-site anatomy.

In cooperation with Prof. Christian Fink, Sportsclinic Austria (Innsbruck, Austria), a compact system was developed for creating rectangular femoral and tibial bone tunnels.
Application Description

1. Measuring the graft diameter with the tendon thickness tester

A range of different target guides with various offsets are available for use in positioning the femoral tunnel. The femoral tunnel is created using the “Medial Portal Aimers”.

2. Rasps and Dilators for creation of the femoral bone tunnel

QR code for the femoral tunnel
3. Dilators for creating the tibial tunnel

The **tibial aimer** features a special tip design. This allows the placement of two K-wires to align the tunnel on the tibial plateau.

A **conventional round** or a **rectangular** tibial tunnel can be created.
**Benefits of creating rectangular bone tunnels:**

- Enables the creation of both femoral and tibial rectangular tunnels
- Rasp with smooth side to protect the PCL
- Distal tip of the tibial aimer with target marks for additional K-wires to align the tunnel on the tibial plateau
- Anatomical insertion area for the graft used
- Compact instrument set
- Compatible with existing instruments for cruciate ligaments
- Suitable for primary and revision ACL
- Provides good anatomical and cosmetically attractive results for the patient in combination with minimally invasive harvesting system for the quadriceps tendon

**Tips**

In revision surgery, it is often advantageous to reuse a previously placed round tibial tunnel and only create a rectangular femoral tunnel.

If a patellar tendon graft is used as a bone-ligament-bone graft, it is also recommended to create a femoral bone tunnel and a conventional round tibial tunnel.
System Components

- Tendon thickness tester
- Rasps and dilators for femoral rectangular bone tunnels
- Target aimer and dilators for tibial rectangular bone tunnels

Tendon thickness tester:
- For measuring the following bone blocks: 8.0 mm, 9.0 mm, 10.0 mm and 12.0 mm x 5.0 mm

Rasps:
- 8.0 and 10.0 mm widths
- Each with 11.0 mm rasp depth
- 3 sides with cutting teeth
- 1 smooth side
- Tip with 4.5 mm outer diameter to accommodate 2.4 mm K-wires
- Laser marked in 5.0 mm increments
- Removal aid at the handle

Dilator, femoral:
- 8.0, 9.0, 10.0 and 12.0 mm wide and 5.0 mm thick
- 20.0 mm at full dilation width
- Laser marked in 5.0 mm increments
- Removal aid at the handle
Aimer, tibial:
- 98° fixed bending angle
- Distal tip with target marking for additional K-wires to align tunnel on the tibial plateau
- Target sleeve with additional ventral and dorsal K-wire guide
- Target sleeve with measuring scale for tibial tunnel length

Dilator, tibial:
- 8.5, 9.5, 10.5 and 12.5 mm wide and 5.5 mm thick
- 55.0 mm at full dilation width
- Laser marked in 5.0 mm increments
- Removal aid at the handle

<table>
<thead>
<tr>
<th>Graft diameter</th>
<th>Rasp, femoral</th>
<th>Dilator, femoral</th>
<th>K-wires, tibial</th>
<th>Drill bit, tibial</th>
<th>Dilator, tibial</th>
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</thead>
<tbody>
<tr>
<td>8.00 mm</td>
<td>8.00 mm</td>
<td>8.00 mm not absolutely necessary</td>
<td>2</td>
<td>5.00 mm</td>
<td>8.5 mm</td>
</tr>
<tr>
<td>9.00 mm</td>
<td>8.00 mm</td>
<td>9.00 mm</td>
<td>2</td>
<td>5.00 mm</td>
<td>9.5 mm</td>
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<tr>
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<tr>
<td>12.00 mm</td>
<td>10.00 mm</td>
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<td>2</td>
<td>5.00 mm</td>
<td>12.5 mm</td>
</tr>
</tbody>
</table>
**Instruments**

28185QS  **Quadriceps Tendon Cutter**, for subcutaneous terminal cutting of the quadriceps tendon

28185MH  **Handle**, for use with Quadriceps Tendon Knives 28185FA – FF and Quadriceps Tendon Separators 28185EA – EC

28185MB  **Tendon Thickness Tester**, for determining the thickness of the quadriceps tendon

28185GA  **Rasp**, femoral, cannulated, straight, coarse, one side smooth, width 8 mm, height 5 mm, working length 15 cm

28185GB  **Same**, width 10 mm
### 28729CF  
**Tibial Target Guide**, for the placement of a maximum of 3 parallel drilling wires

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
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<td><strong>Dilator</strong>, rectangular, femoral, width 8 mm, height 5 mm, working length 15 cm</td>
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<tr>
<td>28185HB</td>
<td>Same, width 9 mm</td>
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<tr>
<td>28185HC</td>
<td>Same, width 10 mm</td>
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<tr>
<td>28185HD</td>
<td>Same, width 12 mm</td>
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</table>

<table>
<thead>
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<th>Description</th>
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</thead>
<tbody>
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<td>28185IA</td>
<td><strong>Dilator</strong>, rectangular, tibial, width 8.5 mm, height 5.5 mm, working length 15 cm</td>
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<tr>
<td>28185IB</td>
<td>Same, width 9.5 mm</td>
</tr>
<tr>
<td>28185IC</td>
<td>Same, width 10.5 mm</td>
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<tr>
<td>28185ID</td>
<td>Same, width 12.5 mm</td>
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Knives for quadriceps tendon harvesting for cruciate ligament reconstruction

<table>
<thead>
<tr>
<th>Cutting</th>
<th>Dimensions (w x h)</th>
<th>Art. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tendon Knife</td>
<td>Vertical parallel</td>
<td>8 x 6 mm</td>
</tr>
<tr>
<td>Tendon Knife</td>
<td>Vertical parallel</td>
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<tr>
<td>Tendon Knife</td>
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<td>Tendon Knife</td>
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<td>12 x 6 mm</td>
</tr>
<tr>
<td>Tendon Knife</td>
<td>Horizontal parallel</td>
<td>5 mm height</td>
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</tbody>
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Knives for quadriceps tendon harvesting for MPFL reconstruction

<table>
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<th>Cutting</th>
<th>Dimensions (w x h)</th>
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<tr>
<td>Tendon Knife</td>
<td>Vertical parallel</td>
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<td>Tendon Separator</td>
<td>Horizontal parallel</td>
<td>2 mm height</td>
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<tr>
<td>Tendon Separator</td>
<td>Horizontal parallel</td>
<td>3 mm height</td>
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</tbody>
</table>
It is recommended to check the suitability of the product for the intended procedure prior to use. Please note that the described products in this medium may not be available yet in all countries due to different regulatory requirements.
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