MRP-TITAN PFE
PROXIMAL FEMUR REPLACEMENT

SURGICAL TECHNIQUE
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MRP-TITAN PFE
PRODUCT DESCRIPTION
Introduction
PETER BREHM developed the MRP-TITAN pFE proximal femur replacement as a supplement to its proven MRP-TITAN system, which has been in clinical use since 1993. This prosthesis system is intended for use in difficult revision surgery where there is extensive loss of bone stock.

With the kind assistance of:
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Klinikum Wels-Grieskirchen GmbH
Wels, Austria

INDICATIONS
- Osteosarcomas and metastases
- Revision surgery with extensive bone resection
- Traumatic bone loss
- Major loss of bone stock
- Severe deformities as in osteomyelitis

OBJECTIVES AND TASKS OF MRP-TITAN PFE
- Modular anatomic design for functional reconstruction
- Allows unrestricted resection
- Optimal kinematics
- Precise implantation with MRP-TITAN instrumentation
- Allows fixation of soft tissue

ADVANTAGES AT A GLANCE
- MRP-TITAN anchoring stems cementless, with anchoring stem diameter available in 1 mm increments
- All the advantages of the MRP-TITAN system still apply
- Fully modular system design, extendable in 10 mm increments
- Instrumentation identical to MRP-TITAN
- Optional MRP-TITAN pFE lateral plate cementless for additional stabilization
Preoperative findings: 72-year-old woman with solitary metastasis in the right proximal femur, status post breast carcinoma.

Postoperative findings: MRP-TITAN anchoring stem curved cementless Ø 14 x 200 mm, neck segment with fin cementless, adapter straight cementless and end sleeve 10 mm.

Interactive DVD of MRP-TITAN

- Description of case
- Preoperative planning
- Instrumentation
- Surgical procedure
- Tips and tricks
- 3D animations
It is important to note the respective maximum sleeve length or size of resection allowed with each of the various anchoring stem diameters. Defects are bridged with 10 mm, 20 mm, and 30 mm modules.

### OVERVIEW OF LENGTHS

<table>
<thead>
<tr>
<th>Anchoring stem</th>
<th>Maximum sleeve length</th>
<th>Resection with neck section size M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø 15 mm x 140 / 200 mm straight</td>
<td>30 mm including end sleeve Ø 35 mm</td>
<td>130 mm</td>
</tr>
<tr>
<td>Ø 15 mm x 200 / 260 / 320 mm curved</td>
<td>30 mm including end sleeve Ø 35 mm</td>
<td>130 mm</td>
</tr>
<tr>
<td>Ø 16 mm x 140 / 200 mm straight</td>
<td>70 mm including end sleeve Ø 35 mm</td>
<td>170 mm</td>
</tr>
<tr>
<td>Ø 16 mm x 200 / 260 / 320 mm curved</td>
<td>30 mm including end sleeve Ø 35 mm</td>
<td>130 mm</td>
</tr>
<tr>
<td>Ø 17 mm x 140 / 200 mm straight</td>
<td>70 mm including end sleeve Ø 35 mm</td>
<td>170 mm</td>
</tr>
<tr>
<td>Ø 17 mm x 200 / 260 / 320 mm curved</td>
<td>30 mm including end sleeve Ø 35 mm</td>
<td>130 mm</td>
</tr>
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<td>70 mm including end sleeve Ø 35 mm</td>
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<td>130 mm</td>
</tr>
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<td>100 mm including end sleeve Ø 35 mm</td>
<td>200 mm</td>
</tr>
<tr>
<td>Ø 19 mm x 200 / 260 / 320 mm curved</td>
<td>30 mm including end sleeve Ø 35 mm</td>
<td>130 mm</td>
</tr>
<tr>
<td>Ø 20 mm x 140 / 200 mm straight</td>
<td>100 mm including end sleeve Ø 35 mm</td>
<td>200 mm</td>
</tr>
<tr>
<td>Ø 20 mm x 200 / 260 / 320 mm curved</td>
<td>30 mm including end sleeve Ø 35 mm</td>
<td>130 mm</td>
</tr>
<tr>
<td>Ø 21 mm x 140 / 200 mm straight</td>
<td>100 mm including end sleeve Ø 35 mm</td>
<td>200 mm</td>
</tr>
<tr>
<td>Ø 21 mm x 200 / 260 / 320 mm curved</td>
<td>30 mm including end sleeve Ø 35 mm</td>
<td>130 mm</td>
</tr>
<tr>
<td>Ø 22 mm x 140 / 200 mm straight</td>
<td>100 mm including end sleeve Ø 35 mm</td>
<td>200 mm</td>
</tr>
</tbody>
</table>
MRP-TITAN PFE
SURGICAL TECHNIQUE
Preoperative Planning

- The MRP-TITAN radiographic templates are used to determine the size and position of the femoral anchoring stem components.

- There are no alternate neck segment lengths K, M, and L with the MRP-TITAN pFE. The metaphyseal components require a neck segment length in the range of KH, MH, and LH.

- The possible resection lengths are evaluated using the MRP-TITAN pFE radiographic template.

### BASIC RULES

- Note the respective maximum allowable sleeve length.

- The tumor assembly must be terminated with an end sleeve.

- Do not use an MRP-TITAN extension sleeve.

### ANCHORING STEM SIZES

| Ø 15 x 140/200 | straight, including end sleeve |
| Ø 15 x 200/260/320 | curved, including end sleeve |
| Ø 16 x 200/260/320 | curved, including end sleeve |
| Ø 17 x 200/260/320 | curved, including end sleeve |
| Ø 18 x 200/260/320 | curved, including end sleeve |
| Ø 19 x 200/260/320 | curved, including end sleeve |
| Ø 20 x 200/260/320 | curved, including end sleeve |
| Ø 21 x 200/260/320 | curved, including end sleeve |
| Ø 22 x 200/260/320 | curved, including end sleeve |

- Ø 16 x 140/200 | straight, including end sleeve |
- Ø 17 x 140/200 | straight, including end sleeve |
- Ø 18 x 140/200 | straight, including end sleeve |

- Ø 19 x 140/200 | straight, including end sleeve |
- Ø 20 x 140/200 | straight, including end sleeve |
- Ø 21 x 140/200 | straight, including end sleeve |
- Ø 22 x 140/200 | straight, including end sleeve |
Technique for Trial Assembly

01

The implant bed is prepared with a flexible reamer or rasps with AO-Adapter.

The trial prosthesis is seated with the handle for prosthesis inserter/remover.

Neck segment length is measured on the scale on the handle for prosthesis inserter/remover. Target range: KH, MH, and LH.

NOTE

The technique for the MRP-TITAN system is described in detail in Surgical Technique for MRP-TITAN.

02

The target ranges K, M, and L do not apply to the use of the MRP-TITAN pFE system.

The metaphyseal components require a length in the range of KH, MH, and LH.
03
The trial prosthesis neck is connected to the trial adapter straight by pressing them tightly together.

04
The trial components are seated with the seating instrument prosthesis neck.

05
Anteversion can be adjusted as required. The position is locked by lightly tapping the seating instrument prosthesis neck with a hammer.
Trial reduction is performed, and leg length and soft-tissue tension are evaluated.

06

The difference is measured from the lower edge of the trial adapter straight to the surface of the osteotomy with the ruler 200 mm supplied.

07

The intention is not to create an interference fit between the MRP-TITAN pFE and the femur. Therefore, one should allow for a gap of 2-3 mm when determining the size of the resection. Immediate stable fixation of the anchoring stem must be achieved.
Technique for Definitive Implants

08
The entire trial implant is extracted.

09
The definitive sleeves are assembled. The sleeves are screwed together until hand tight. An end sleeve must always be used. See p. 19 for possible variations.

1. Adapter straight cementless
2. Connecting bush cementless, L = 30 mm
3. Connecting bush cementless, L = 10 mm
4. End sleeve
The definitive implants are tightened with the appropriate hook wrenches until hand tight.

**NOTE**

Every tumor assembly must be terminated with an end sleeve.

The definitive anchoring stem is seated.

**NOTE**

Der originale Verankerungsschaft muss exakt wie das Probeimplantat gesetzt werden. Es besteht die Möglichkeit, mit dem PROBE Adapter straight und dem Probe-Prothesenhalsschaft wiederholt bei Bedarf die Beinlänge, die Weichteilspannung und den Bewegungsumfang auf dem originalen Verankerungsschaft zu kontrollieren.

*Keine Übersetzung vorhanden*
Once stable fixation of the anchoring stem has been achieved, the entire MRP-TITAN pFE assembly is placed.

The intention is not to create an interference fit between the MRP-TITAN pFE and the femur. Therefore, one should allow for a gap of 2-3 mm when determining the size of the resection.

The definitive neck segment is placed.

Be sure to maintain the previously measured angle of anteversion.
The taper connections between the anchoring stem, adapter straight and neck segment are tightened at a defined torque with the torsionfree preloading instrument (TOV).

**NOTE**
Always use the counter holder.
The screw M6 cementless is tightened with the allen key SW 5.

**NOTE**
Always use the counter holder.

The screw M6 cementless is tightened with the torque limiter 25±1Nm.

Then the sealing screw cementless M14 x 1 is inserted into the neck segment and hand tightened.
The lateral plate is fastened to the special end sleeve with the two fixing screws M6 supplied.

**NOTE**

Connecting the lateral plate requires the use of special end sleeves (for lateral plates).

Once the lateral plate has been seated tightly, pilot holes are drilled and Titanium cortical screws self-tapping are inserted into the bone.

**NOTE**

Titanium cortical screws self-tapping:
- Thread 4.5 mm
- Head 8 mm
- Use a 3.2 mm drill bit
Fully assembled MRP-TITAN pFE with lateral plate installed.
## Overview

### IMPLANTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Item No.</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter, straight TiAl6V4</td>
<td>98187-01</td>
<td></td>
</tr>
<tr>
<td>Connector sleeve TiAl6V4</td>
<td>98187-02-10</td>
<td>L = 10 mm</td>
</tr>
<tr>
<td></td>
<td>98187-02-20</td>
<td>L = 20 mm</td>
</tr>
<tr>
<td></td>
<td>98187-02-30</td>
<td>L = 30 mm</td>
</tr>
<tr>
<td>End sleeve TiAl6V4</td>
<td>98187-13-25</td>
<td>L = 10 mm, outer Ø 35 mm</td>
</tr>
<tr>
<td>End sleeve (for lateral plate) TiAl6V4</td>
<td>98187-03-25</td>
<td>L = 20 mm, outer Ø 35 mm</td>
</tr>
<tr>
<td>Lateral plate with M6 screw (2x)</td>
<td>98187-04-00</td>
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### INSTRUMENTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Item No.</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial adapter, straight</td>
<td>98187-21</td>
<td></td>
</tr>
<tr>
<td>Hook wrench</td>
<td>98187-40</td>
<td>Ø 30 mm</td>
</tr>
<tr>
<td></td>
<td>98187-41</td>
<td>Ø 35 mm</td>
</tr>
<tr>
<td>Ruler</td>
<td>63050-50</td>
<td>200 mm</td>
</tr>
<tr>
<td>Hex key, 3.5 mm</td>
<td>97021-35</td>
<td></td>
</tr>
</tbody>
</table>