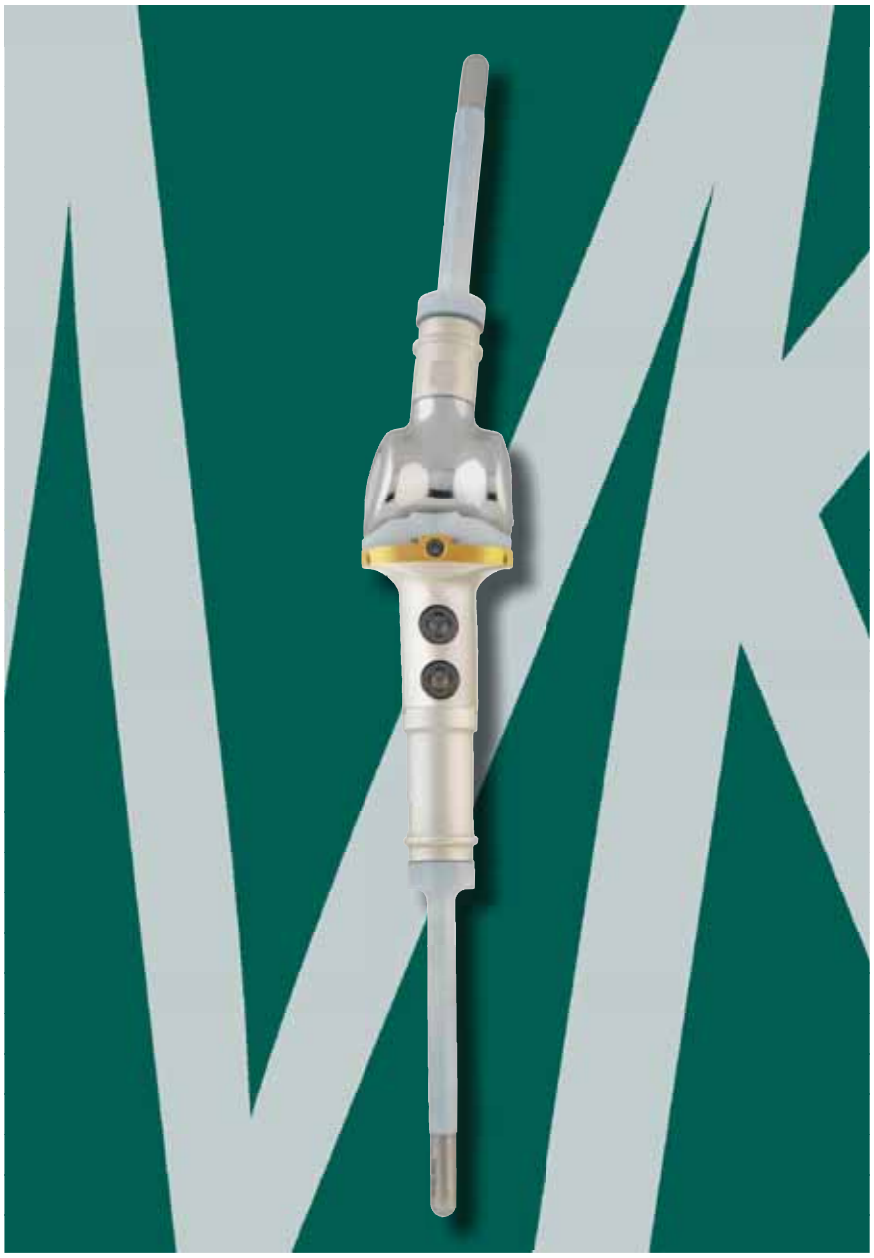
MUTARS®

implantcast



Total Knee MK

Surgical technique

Digitally signed by Kojevnikov Dmitrii
Date: 2023.12.08 17:32:27 EET
Reason: MoldSign Signature
Location: Moldova

MUTARS®

Total Knee MK

Surgical technique

MUTARS® was developed in co-operation with
Prof. Dr. W. Winkelmann* (former director)
and Prof. Dr. G. Gosheger (director), Clinic and
Polyclinic for General Orthopedics and Tumororthopedics
at the University Hospital of Münster, Germany.
MUTARS® has been in successful clinical use since 1992.
**now Consultant for Orthopaedic Oncology,*
Schönklinik Eilbek

Table of contents

Nota Bene: The described surgical technique is the suggested treatment for uncomplicated procedures. In the final analysis the preferred treatment is that which addresses the needs of the individual patient.

CAUTION: Federal law (USA) restricts this device to sale on or by the order of a physician.

MUTARS® Total Knee MK - the modular tumor system

characteristics

- full constrained knee system
- Mobile-Bearing and Fixed Bearing PE-inserts
- up to 20° rotation (Mobile-Bearing)
- cemented and cementless
- 2 femoral length
- 1 tibial sizes

Preoperative Planning

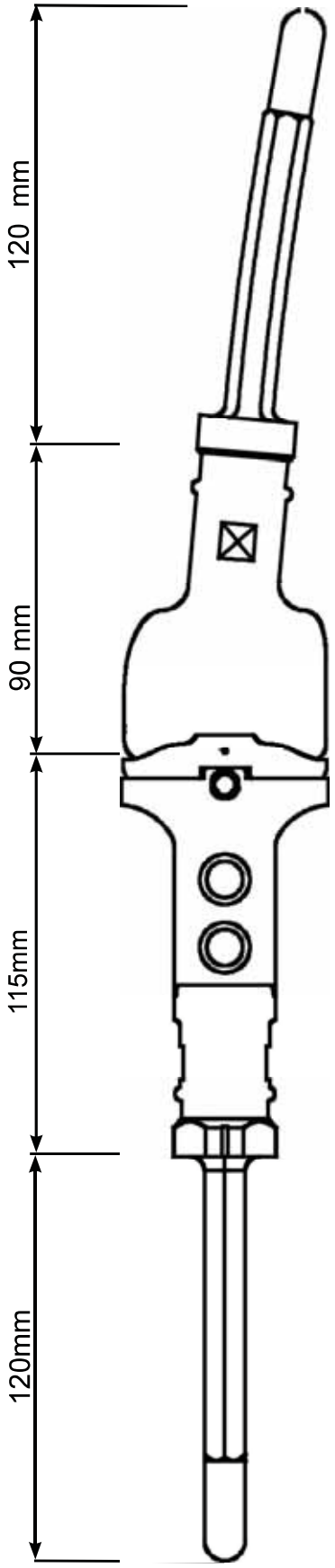
Preoperative planning and precise surgical techniques are mandatory for optimal results. The instructions and the procedure given in the surgical technique to the system must be adhered to. Familiarity with the recommended surgical technique and its careful application is essential to achieve the best possible outcome.

Prior to surgery a surgical planning with regard to the dimensions of the prosthetic model and the positioning of the implant components in the bone has to be carried out by the surgeon. For this purpose, x-ray templates are available from implantcast GmbH.

Figure A: MUTARS® Total Knee MK Implant in A/P-View

Figure B: MUTARS® Total Knee MK Implant in M/L-View

System Overview



MUTARS® femoral stem
Ø 11-17mm cemented
length: 120, 160, 200, 240mm
Ø 10-20mm cementless
length:120 mm

MUTARS® Distal Femur M-O-M
length: 90, 100 mm

MUTARS® GenuX® MK
PE-Insert
size 2
MB and FB

MUTARS® MK
Proximal Tibia

MUTARS® tibial stem
length: 120mm
Ø 11-15mm cemented

Compatibility Matrix

Distal Femur M-O-M

Distal Femur
90 mm
110 mm

PE-inserts MK
MB and FB

Size 2

Proximal Tibia MK

Assembling Options

(Length in mm)

Components				
femoral reconstruction length	**distal femur**	**connecting part**	**extension piece**	**screw**
100 mm	90	-	-	25
120 mm	110	-	-	45
140 mm	90	-	40	65
160 mm	110	-	40	85
180 mm	110	-	60	105
200 mm	110	-	80	125
220 mm	110	100	-	45+25
240 mm	110	-	80+40	165
260 mm	110	100	40	45+65
280 mm	110	100	60	45+85
300 mm	110	100	80	45+105
320 mm	110	100	60+40	45+125

Components				
tibial reconstruction length	**prox. tibia MK**	**connecting part for prox. tibia**	**extension piece**	**screw**
115 mm	x	105	-	25
135 mm	x	125	-	45
155 mm	x	105	40	65
175 mm	x	105	60	85
195 mm	x	105	80	105
215 mm	x	125	80	125
235 mm	x	125	40 + 60	145

Note: Please notice that the amount of implants and instruments send with an individual shipment may differ from the information in the catalogue information of this brochure. Please make sure, during the preoperatively planning, that all necessary implants and instruments are available for the surgery.

Distal femoral resection

Resect the tumour and measure the length of the explant.
The minimum bone resection should be 120mm (or 100 mm if the special Distal Femur 90 mm is used, available on demand). Remove the menisci.

Femoral preparation

Cemented fixation

Ream the femoral medullary cavity preferably up to a depth of 130 mm with a flexible reamer 2 mm larger than the preoperatively chosen femoral stem.

Cementless fixation

Ream the femoral medullary cavity preferably up to a depth of 130 mm with a flexible reamer that is 1,5 mm smaller than the preoperatively chosen femoral stem.

Chamfering of the medullary cavity

Prepare the femoral medullary cavity with the medullary cavity reamer cross-hole inside of the medullary cavity chamfer.

Note

If no flexible reamer in the clinic to be present, they are available on request!

Rasping of the femoral cavity

Cemented Implantation

Assemble the femur rasp of the appropriate size (see tables below), the sleeve and the slide hammer. Lock the rasp on the slide hammer by using the engineers' wrench.

Mark the anterior aspect of the femoral bone to meet the correct antecurvation of the femur

Note

If you want to prepare for a cemented stem with the femoral rasp, please use the rasp which is 2 mm larger than the preoperatively chosen cemented femoral stem.

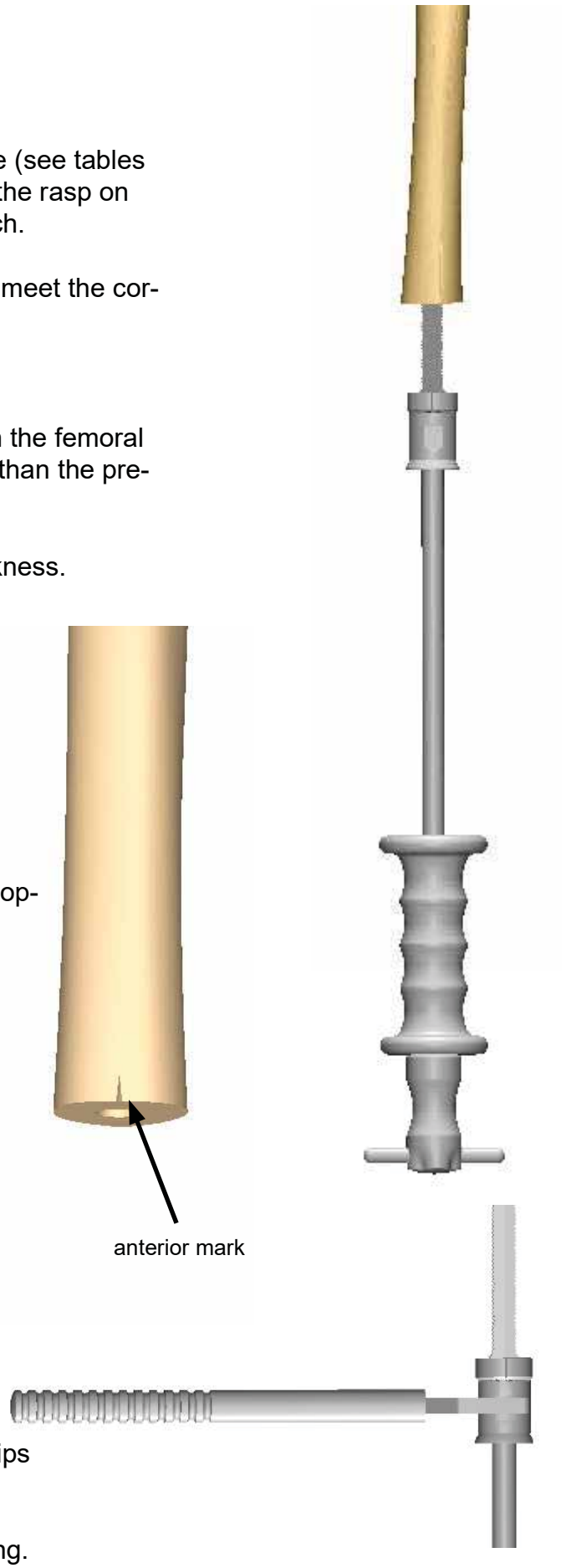
That will provide a cement mantle of 1 mm thickness.

Stem size	Rasp size
11 mm	13 mm
13 mm	15 mm
15 mm	17 mm
17 mm	19 mm

Cementless Implantation

Use of cementless stems
Use the femur rasp, of the same size as the preoperatively chosen femoral stem.

Stem size	Rasp size
12 mm	12 mm
13 mm	13 mm
14 mm	14 mm
15 mm	15 mm
16 mm	16 mm
17 mm	17 mm
18 mm	18 mm
19 mm	19 mm
20 mm	20 mm



Note

It is recommended to clean the rasp of bone chips during the rasping.

Leave the femoral rasp in the bone for the trialing.

Tibial resection

Resect the tumour and measure the length of the explant.
The minimum bone resection should be 115mm.
Remove the menisci.

Tibial bone preparation

Use the medullary cavity reamer cross-hole to prepare the tibial bone.

Cemented fixation

Ream the tibial medullary cavity preferably up to a depth of 130 mm with a rigid reamer 2 mm larger than the size of the tibial stem.

Cementless fixation

Ream the femoral medullary cavity preferably up to a depth of 130 mm with a flexible reamer that is 1,5 mm smaller than the preoperatively chosen femoral stem.

Note

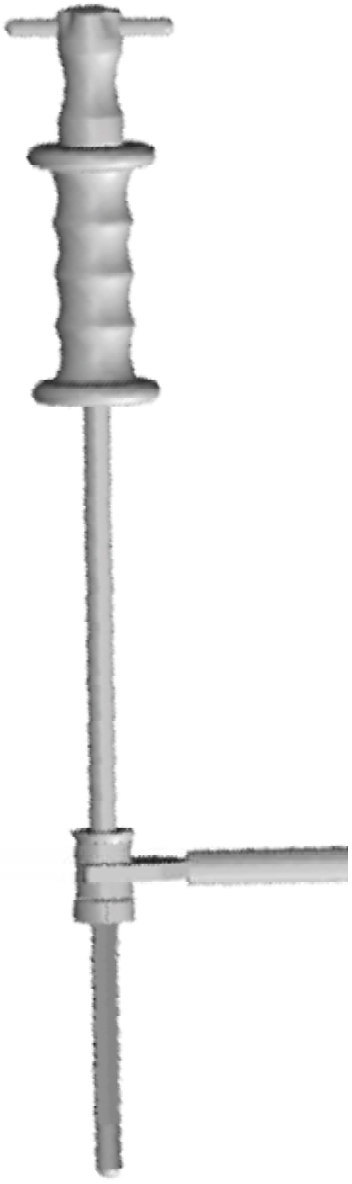
The use of a tibial rasp for a cemented stem is optional. Generally you can proceed with the trial reduction.

Cemented preparation

If you want to prepare for a cemented stem with the tibial rasp, please use the rasp which is 2 mm larger than the preoperatively chosen cemented tibial stem.

That will provide a cement mantle of 1 mm thickness. Use the 16mm rasp to prepare for the 15 mm stem.

Stem size	Rasp size
11mm	13mm
13mm	15mm
15mm	16mm



Cementless preparation

Choose the tibial rasp of the preoperatively planned size.

Assemble the tibial rasp of the appropriated size (see table below), the sleeve and the slide hammer. Lock the rasp on the slide hammer by using the engineers' wrench.

Stem size	Rasp Size
12mm	12mm
13mm	13mm
14mm	14mm
15mm	15mm
16mm	16mm

Although the tibial stem is not curved it is recommended to mark the anterior aspect of the tibial bone to assure that the rotation of the final stem is corresponding to the rotation of the rasp.

Rasp the medullary cavity with the chosen tibial rasp. A carefully use of the slap hammer is recommended.

To prevent fractures of the cortical bone it is helpful to fix a bone forceps around the tibial bone while rasping.

Note

It is recommended to clean the rasp of bone chips during the rasping.

Leave the tibial rasp in the bone for the trialing.

Trial reduction

Mount the trial Distal Femur and the possibly needed extension pieces (possible enlargement from 20 to 260 mm; see table page 8) to the top of the rasp.

Note

Please insert the cemented stem (without cement) or the trial stem for trialing purposes.

At that stage the use of a screw is optional, because the teeth mechanism gives the assembly a reasonable stability.

Insert the trial-Insert size 2 (MB or FB) in the trial Proximal Tibia MK.

Attach the trial connecting part for the Proximal Tibia (length: 105 mm or 125 mm) to the tibial rasp.

Note

Connect the trial Proximal Tibia MK and the connecting part. At that stage a bar screw is not needed, because the teeth mechanism provides reasonable stability.

Perform a trial reduction and check the joint stability and the rotational alignment.

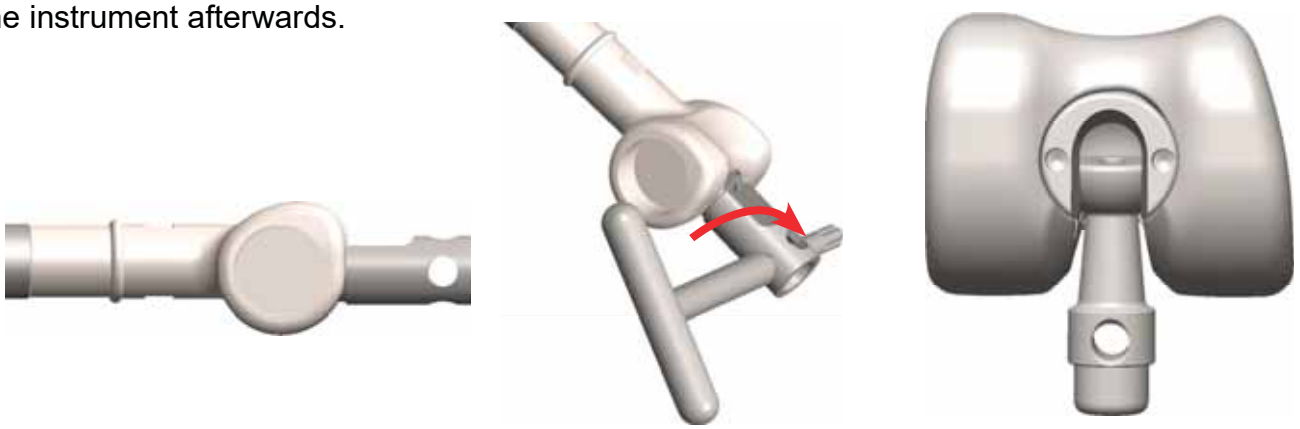
Adjust the rotation if necessary. If the joint line could not be restored correctly, it might be necessary to change the length of the tibial reconstruction by a change of the connecting part, or adding of an extension piece in conjunction with an enlarged tibial bone resection.

If the correct position of the joint, the optimal reconstruction length as well as the stability and the rotational alignment is achieved, please remove all implant components.

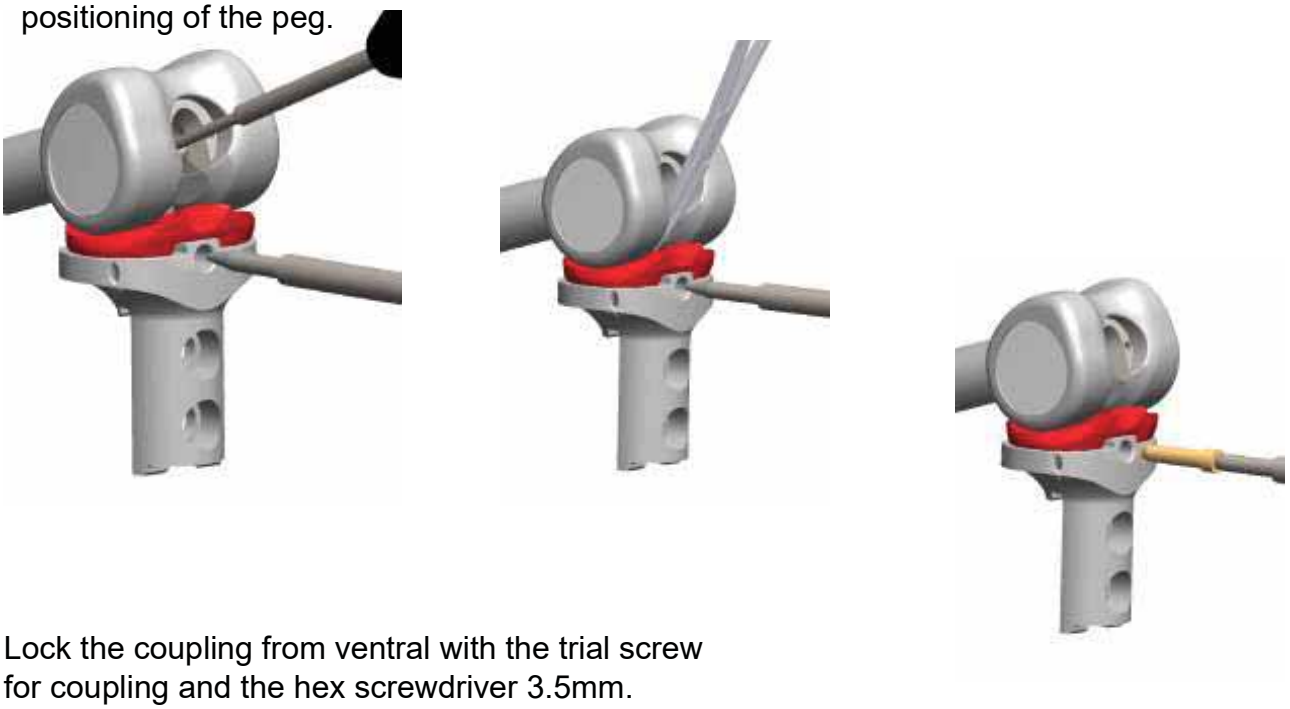
Remove the tibial rasp, but consider the rotational alignment marks. Leave the Proximal Tibia and the PE-Insert combined.

Use the instrument for the locking mechanism to insert the GenuX® MK trial coupling into the femoral trial component.
The trial coupling and the instrument for the locking mechanism are assembled as shown **1**. Turn the coupling in a way that it falls into the sleeve of the instrument **2**.

Afterwards insert the coupling into the femoral box with the knee in flexion. For fixation turn the coupling via the instrument by 90° clockwise.
The coupling is positioned correct, when the peg falls out of the sleeve of the instrument. Remove the instrument afterwards.



Place the peg of the coupling in the opening of the tibial trial component in a way that the hole is directed towards anterior. Use the setting instrument for the locking mechanism or the assembling forceps as aid in positioning.
Insert the positioner from ventral into the hole of the tibial trial component to ensure the correct positioning of the peg.



Lock the coupling from ventral with the trial screw for coupling and the hex screwdriver 3.5mm.

Assamble the trial Proximal Tibia MK to the trial connecting part for proximal tibia by using the socket wrench and check the joint stability in flexion and extension.

Afterwards remove all trial components.

Implantation of the tibial / femoral stem

Impact the MUTARS® stem.

For a cemented implantation, insert the bone cement and use the cemented stem which is 2 mm smaller than the previously used reamer or rasp.

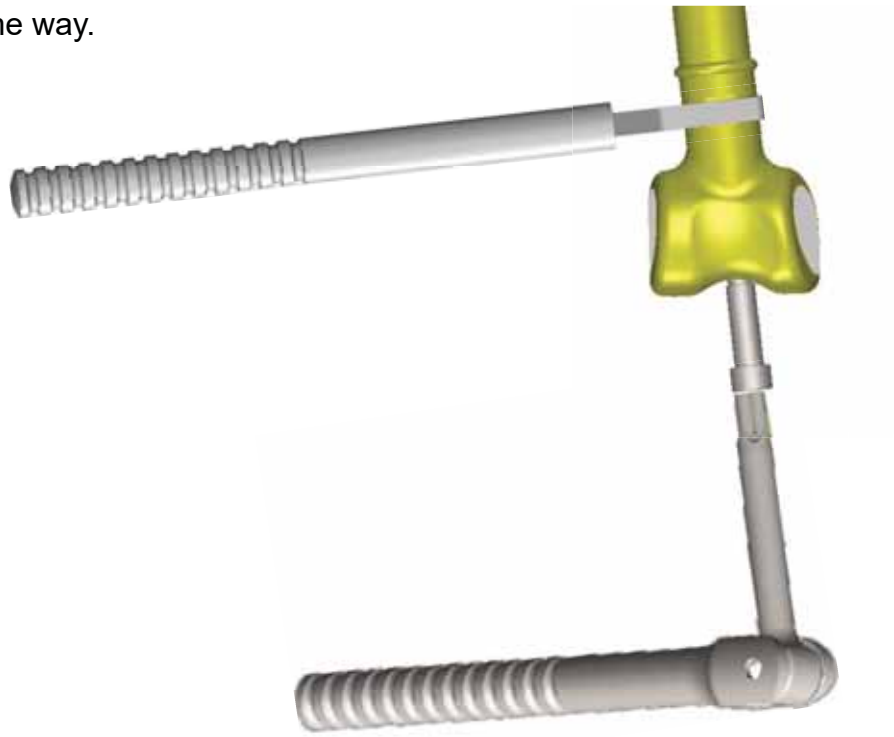
Remove all instruments, especially during the cement hardening to prevent bending moments.

Implantation of the femoral component

Combine the Distal Femur and possibly needed extension pieces with the femoral stem. Make sure that the correct rotation of the distal femur is achieved. Insert the bar screw of the correct length (see table on page 8).

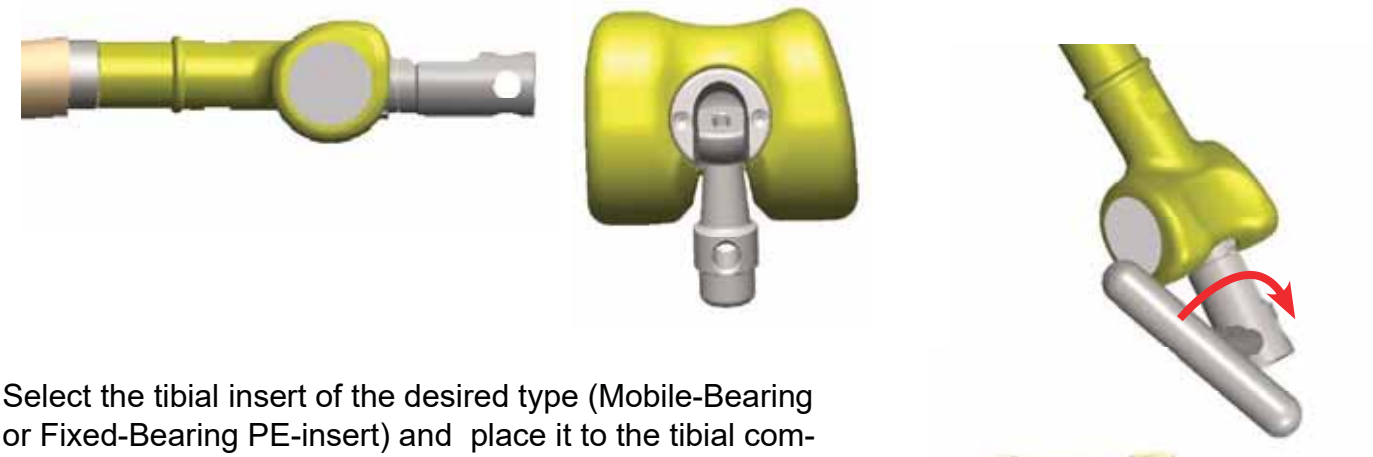
Lock the bar screw with the MUTARS® swing wrench.
Secure the assembly with the engineers' wrench.

Lock the safety screw in the same way.



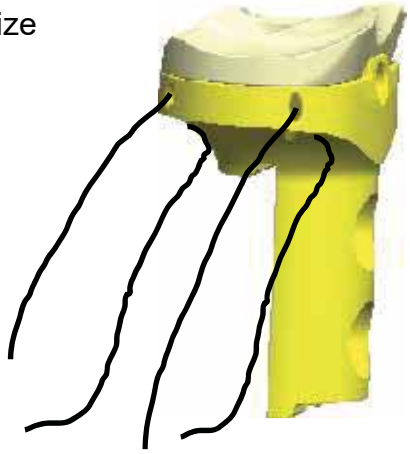
Use the instrument for the locking mechanism to insert the GenuX® MK coupling into the femoral compoent. The coupling and the instrument are assembled as shown 1. Turn the coupling and the instrument in a way that the coupling falls into the sleeve of the instrument 2.

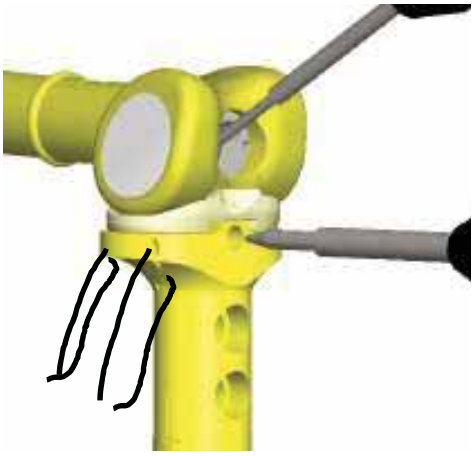
Afterwards insert the coupling into the femoral box with the knee in flexion. For fixation of the coupling turn the coupling by 180° clockwise by use of the positioner as lever. The coupling is positioned correct, when the peg of the coupling falls out of the sleeve of the instrument. Remove the instrument for the locking mechanism afterwards.

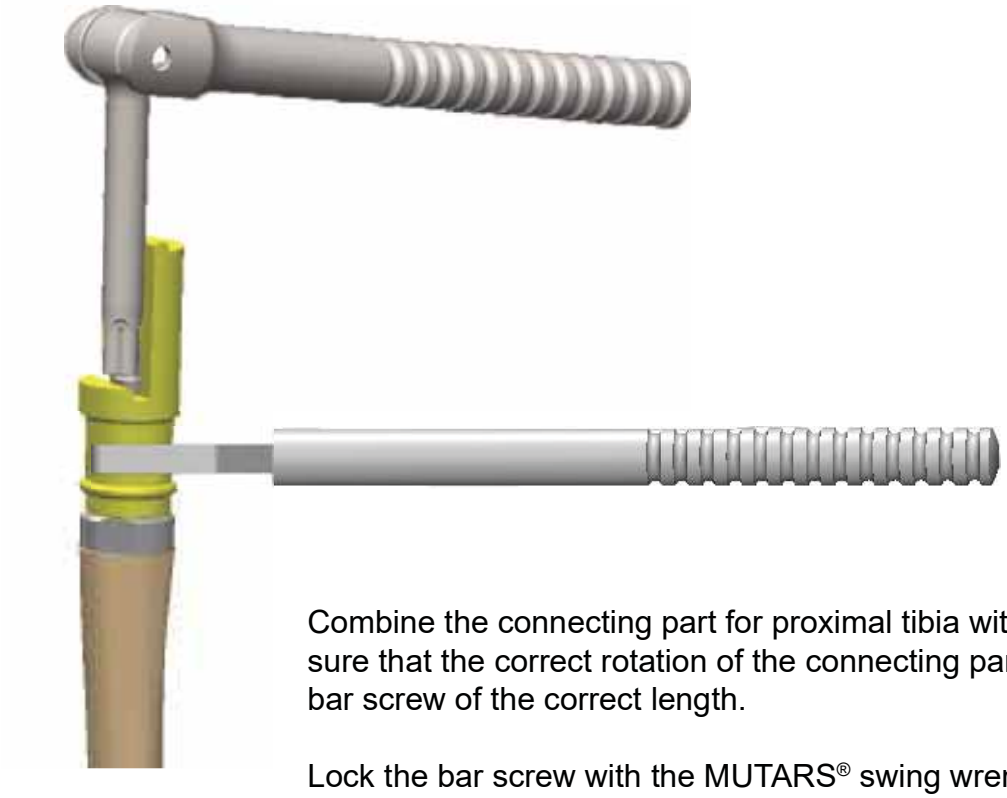


Select the tibial insert of the desired type (Mobile-Bearing or Fixed-Bearing PE-insert) and place it to the tibial component. The size of the PE-insert corresponds to the size of the tibial component.

Place the peg of the coupling in the opening of the Proximale Tibia in a way that the hole is directed towards anterior. Use the setting instrument for the locking mechanism or the assembling forceps as aid in positioning.
Insert the positioner from ventral into the hole of the Proximal Tibia to ensure the correct positioning of the peg.







Combine the connecting part for proximal tibia with the femoral stem. Make sure that the correct rotation of the connecting part is achieved. Insert the bar screw of the correct length.

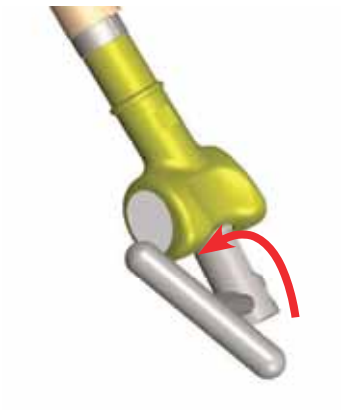
Lock the bar screw with the MUTARS® swing wrench.
Secure the assembly with the engineers' wrench.

Lock the safety screw in the same way.

Slide over the attachment tube. The trevira tube should be turned up inward on the end. If necessary cut the tube to the correct length

Explantation of the components

In case of an explantation please unlock the tibial counter screw and the locking screw from ventral first by use of the hex screwdriver 3.5mm.
Use the instrument for the locking mechanism to remove the coupling from the Distal Femur MOM component.



Subsequently the safety screw and the M10 bar screw are removed.The Distal Femur MOM can be easily removed from the stem now.
For the removal of the tibial components, please attach the tibial extractor to the slap hammer and insert it from above into the locking hole of the tibial component. Then lock the extractor with the locking tab of ventral. Subsequently the tibial component can be removed by the use of slap hammer.

Remove the two anterior screws from the proximal tibia by using the soket wrench and remove the proximal tibia.
Further loose the M10 screw by using the socket wrench and while counter with the engineers´wrench.
The connecting part for proximal tibia can be easily removed from the stem now.

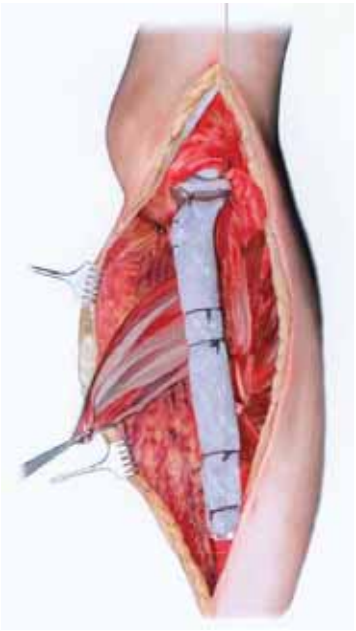
Fixation on the attachment tube

Please fix the tube to the upper part of the Proximal Tibia by using the previously inserted 4 sutures.

Fold the tube to achieve a very close covering of the components. Insert additional sutures around the attachment pads of the implant components.

To reconstruct the extensor mechanism it is mandatory to perform a gastrocnemius muscle transfer. Release the muscle at its distal insertion. Suture the muscle to the anterior portion of the attachment tube.

Reinsert the extensor structures to the gastrocnemius muscle and the tube to restore a reasonable function of the joint.



Implants

***S:** For anti-infective treatment, silver coated implants are available.
***N:** For anti-allergic treatment, TiN coated implants are available.
***SN:** Implants with Silver and TiN coating!

MUTARS® GenuX® MK MB PE Insert

mat.: UHMW-PE acc. to ISO 5834-2

size

2 5721-0102

MUTARS® GenuX® MK FB PE Insert

mat.: UHMW-PE acc. to ISO 5834-2

size

2 5721-0202

MUTARS® MK proximal tibia *S *SN

mat.: implatan®; $TiAl_6V_4$ acc. to ISO 5832-3

5750-0005

MUTARS® connecting part for modular proximal Tibia *S

mat.: implatan®; $TiAl_6V_4$ acc. to ISO 5832-3

5750-0105 105 mm
5750-0125 125 mm

MUTARS® extension piece *S

mat.: implatan®;$TiAl_6V_4$ acc. to ISO 5832-3

5772-2504 40 mm
5772-2506 60 mm
5772-2508 80 mm
5772-2510 100 mm

MUTARS® connecting part *S

mat.: implatan®;$TiAl_6V_4$ acc. to DIN ISO 5832-3

5730-0100	100mm

MUTARS® GenuX® MK coupling *N

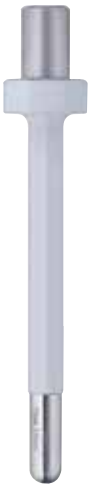
mat.: implavit®, *CoCrMo acc. to ISO 5832-12*

5720-1210

MUTARS® tibial stem cemented *N

mat.: implavit®; CoCrMo acc. to ISO 5832-4

5750-0511	11 mm
5750-0513	13 mm
5750-0515	15 mm



MUTARS® tibial stem cementless

mat.: implatan®; $TiAl_6V_4$ acc. to ISO 5832-3 with HA-coating acc. to ISO 13779-2

5750-1512	12 mm
5750-1513	13 mm
5750-1514	14 mm
5750-1515	15 mm
5750-1516	16 mm

MUTARS® tibial stem cemented with TiN-coating and HA-collar

mat.: implavit®; CoCrMo acc. to ISO 5832-4
with TiN and HA coating acc. to ISO 13779-2

5759-1211	11 mm
5759-1213	13 mm
5759-1215	15 mm

MUTARS® Distal Femur M-O-M, incl. safety screw *S *N *SN

mat.: implavit®;CoCrMo acc. to ISO 5832-4

5720-0045	110 mm	left
5720-0040	110 mm	right
5720-0047	90 mm	left
5720-0042	90 mm	right

MUTARS® screw

mat.: implatan®; $TiAl_6V_4$ acc. to ISO 5832-3

5792-1002	M10x 25 mm
5792-1004	M10x 45 mm
5792-1006	M10x 65 mm
5792-1008	M10x 85 mm
5792-1010	M10x105 mm
5792-1012	M10x125 mm
5792-1014	M10x145 mm
5792-1016	M10x165 mm
5792-1018	M10x185 mm
5792-1020	M10x205 mm
5792-1022	M10x225 mm

MUTARS® femoral stem cemented *N

mat.: implavit®;CoCrMo acc. to ISO 5832-4

5760-0011	11 mm
5760-0013	13 mm
5760-0015	15 mm
5760-0017	17 mm

MUTARS® femoral stem cementless

mat.: implatan®, $TiAl_6V_4$ acc. to ISO 5832-3 with HA-coating acc. to ISO 13779-2

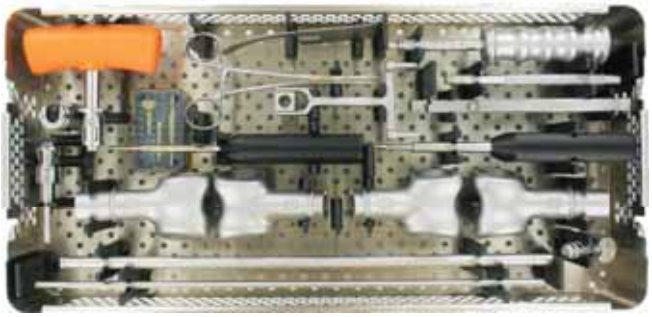
5760-0111	11x120mm
5760-0012	12x120mm
5760-0113	13x120mm
5760-0014	14x120mm
5760-0115	15x120mm
5760-0016	16x120mm
5760-0117	17x120mm
5760-0018	18x120mm
5760-0019	19x120mm
5760-0020	20x120mm

MUTARS® attachment tube

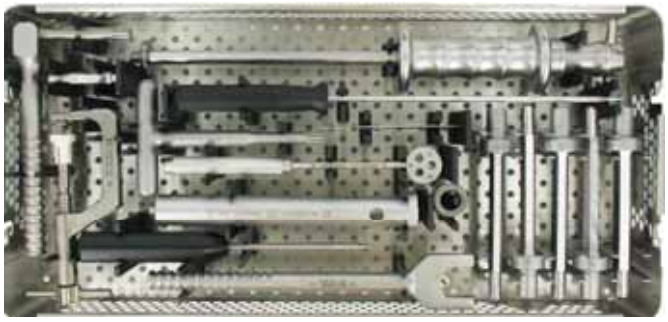
mat.: Polyethylenterephtalat (PET)

5900-0300	Ø: 35 mm
5900-0310	Ø: 55 mm

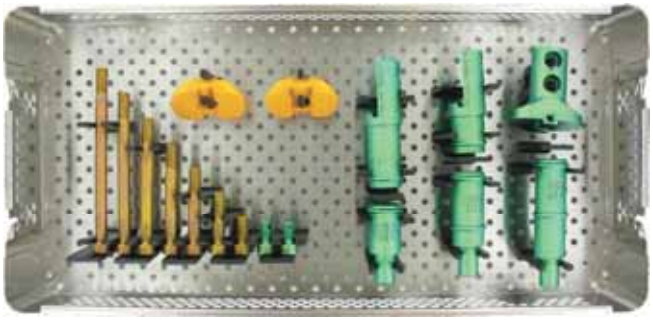
Instruments



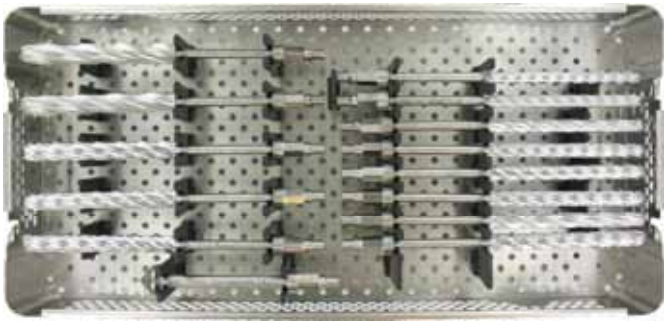
7999-5821 MUTARS® distal femur MK basic container



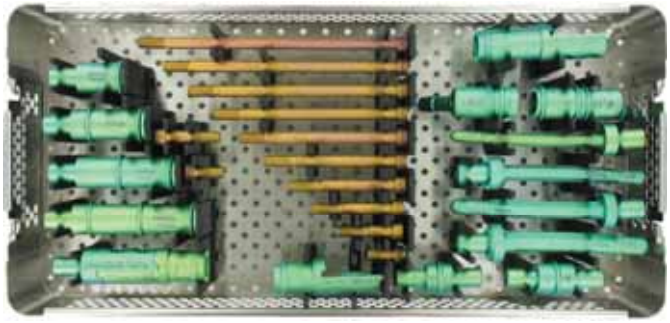
7999-5834 MUTARS® proximal tibia MK basic container



7999-5836 MUTARS® proximal tibia MK trial container

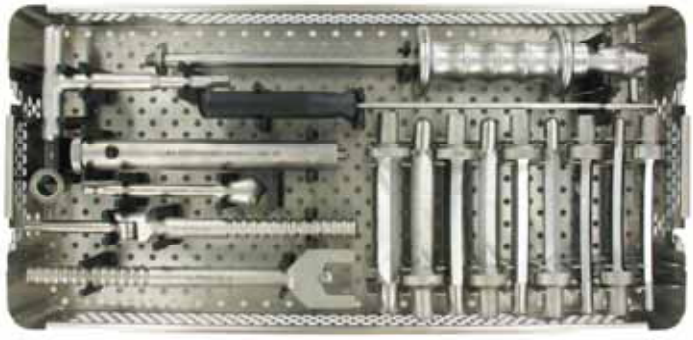


7999-5835 MUTARS® proximal tibia MK drill container



7999-7701 MUTARS® trial container

7999-5745 MUTARS® patella container



7999-5712 MUTARS® basic container

MUTARS® distal femur MK basic container 7999-5821

resection check long
4220-0318

external alignment host
4223-0004

pin inserter 3,2 mm
4223-0006

ic T-handle Zimmer-Jakobs
4223-0023

slap hammer short
4223-0031

adapter M8 for slap hammer
4223-0032

external alignment rod 6x400mm
4223-0035

pin extractor
7512-0800

MUTARS® MK trial distal femur right/left

7720-0140	110mm right
7720-0142	90mm right
7720-0145	110mm left
7720-0147	90mm left

MUTARS® positioner for locking mechanism
7610-0003

MUTARS® instrument for locking mechanism
7720-1201

MUTARS® assembling forceps
7720-1202

GenuX® MK trial coupling
7720-1210

GenuX® MK trial screw for coupling
7720-1213

setting instrument for locking mechanism
7751-1200

ic pin adapter
4223-0421

ic adapter
4223-0022

MUTARS® proximal tibia MK basic container 7999-5834

MUTARS® patella drill guide
7350-0000

MUTARS® patella - clamp
7352-0001

extractor universal
7512-2026

hexagon screw driver short 3,5 mm
0280-1007

resection check
4223-0009

MUTARS® impact and extract sleeve
7230-0000

MUTARS® socket wrench
7420-0000

MUTARS® swing wrench
7411-0000

MUTARS® engineers‘ wrench SW 24
7490-0000

MUTARS® slide hammer
7220-0001

MUTARS® universal impactor
7210-0000

handle for intramedullary plug
7512-4001

MUTARS® rasp for tibial stem

7750-0312	12 mm
7750-0313	13 mm
7750-0314	14 mm
7750-0315	15 mm
7750-0316	16 mm

MUTARS® proximal tibia MK trial container 7999-5836

MUTARS® MK trial proximal tibia
7750-0005

MUTARS® trial screw for trial connecting part 100mm (2 pieces)
7730-0106

MUTARS® trial extension piece for mod. prox. tibia

7750-0105	105mm
7750-0125	125mm

MUTARS® trial extension piece

7772-2504	40mm
7772-2506	60mm
7772-2508	80mm

MUTARS® trial bar screw

7792-1002	M10x25mm
7792-1004	M10x45mm
7792-1006	M10x65mm
7792-1008	M10x85mm
7792-1010	M10x105mm
7792-1012	M10x125mm
7792-1014	M10x145mm

GenuX® MK MB trial PE-insert 2
7721-0102

GenuX® MK FB trial PE-insert 2
7721-0202

MUTARS® proximal tibia MK drill container 7999-5835

MUTARS® rigid reamer

7700-2110	10,0 mm
7700-2210	10,5 mm
7700-2111	11,0 mm
7700-2211	11,5 mm
7700-2112	12,0 mm
7700-2212	12,5 mm
7700-2113	13,0 mm
7700-2213	13,5 mm
7700-2114	14,0 mm
7700-2214	14,5 mm
7700-2115	15,0 mm
7700-2116	16,0 mm
7700-2117	17,0 mm

MUTARS® medullary cavity reamer
7760-0501

MUTARS® patella container 7999-5745

MUTARS® patella drill guide
7350-0000

MUTARS® patella - clamp
7352-0001

MUTARS® patella drill
7351-0000

MUTARS® trial container 7999-7701

MUTARS® trial prox. femur
7710-0205 50mm
7710-0207 70mm

MUTARS® trial reducer
7730-0220 20mm
7730-0230 30mm

MUTARS® trial connecting part 100 mm
7730-0100

MUTARS® trial extension piece for mod. prox. tibia
7750-0105 105mm
7750-0125 125mm

MUTARS® trial extension piece
7772-2504 40mm
7772-2506 60mm
7772-2508 80mm
7772-2510 100mm

MUTARS® trial femoral stem
7760-0011 11mm
7760-0013 13mm
7760-0015 15mm
7760-0017 17mm

MUTARS® trial bar screw
7792-1002 M10x25mm
7792-1004 M10x45mm
7792-1006 M10x65mm
7792-1008 M10x85mm
7792-1010 M10x105mm
7792-1012 M10x125mm
7792-1014 M10x145mm
7792-1016 M10x165mm
7792-1018 M10x185mm
7792-1020 M10x205mm

MUTARS® basic container 7999-5712

MUTARS® universal impactor
7210-0000

MUTARS® impact and extract sleeve
7230-0000

MUTARS® socket wrench
7420-0000

MUTARS® swing wrench
7411-0000

MUTARS® engineers‘ wrench SW 24
7490-0000

MUTARS® slide hammer
7220-0001

MUTARS® rasp for femoral stem
7760-0112 12 mm
7760-0113 13 mm
7760-0114 14 mm
7760-0115 15 mm
7760-0116 16 mm
7760-0117 17 mm
7760-0118 18 mm
7760-0119 19 mm
7760-0120 20 mm

handle for intramedullary plug
7512-4001

MUTARS® medullary cavity reamer cross-hole
4220-0000

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