MUTARS®

implantcast

Diaphyseal implant

surgical technique

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MUTARS® was developed in co-operation with
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at the University Hospital of Münster, Germany.
MUTARS® has been in successful clinical use since 1992.

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

The *Silver* coating

Early and late infections represent the most severe complications of tumour arthroplastic treatments. Although local and systemic antibiotic treatments are considered, the scientific literature reports of infection rates from 5 to 35 percent. Reasons for these high rates are, for example, the long surgery time, the large incisions and the immunosupression due to chemo therapy and radio therapy as well as the increasing resistance of the bacteria against antibiotic drugs.
The anti-infective effect of silver ions has been known for centuries i.e. the disinfection of potable water is based on this principle. This special property of silver is used for the silver coated components of MUTARS® to build an intelligent protection against bacteria.
Until now only non-articulating surfaces and surfaces without direct bony contact are coated with silver.
In the catalogue information of this brochure you can find the supplement *S indicating which MUTARS® components are available in a silver coated version. The eight digit REF number receives an addition after the last digit (e.g. 5220-0020S).

It is not permitted to flush the wound with antiseptics that contain Iodine or heavy metals (such as Betaisodona®)

Iodine and Silver form insoluble salt complexes not only with the silver ions that are released post-operatively but also with the silver layer of the implant that will be covered with an insoluble silver-iodine (AgI) film. This will destroy the anti-adhesive protective layer irreversibly. Iodine or heavy metal based antiseptics may not be used at any time. Alternatively solutions containing H_2O_2 – (like Lavasept®, Prontosan® or similar) can be used.
The silver coating can be destroyed in its function by two factors: large amounts of albumin from seroma or hematoma can bind larger amounts of silver (1 mol Albumin inactivates 3 moles Silver ions). This should be minimized by using an attachment tube. In the instance that an infection is known pre-operatively, antibiotics like Vancomycin can be mixed with the bone cement. The intramedullary stems are not silver coated and cemented components are preferred in case of a septic revision.

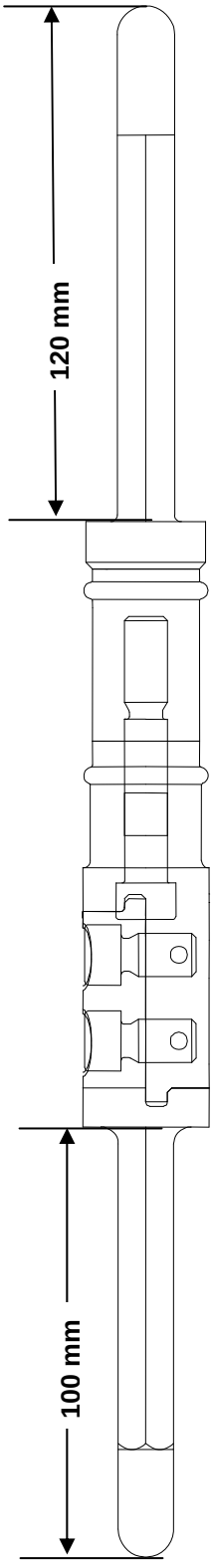
The TiN coating for allergy prophylaxis

As the metallic components of total knee replacements, the articulating metallic parts of the MUTARS® system are made of casted CoCrMo alloy. In the late 70's and 80's of the last century, some of the Cobalt Chromium implants had a small Nickel content to add strength to the implant. Nickel is the primary cause for metal sensitivity, although some patients have shown to be hypersensitive to other metals such as Cobalt and Chromium. The use of titanium components can't solve this problem, because the wear of the articulating polyethylene inlays will increase and so the survival time of the prosthesis is reduced. Since the end of the 1990's TiN (Titanium Nitride coating) has been successfully applied to protect the body against metal ions that could cause allergic reactions.
The metal ion release of TiN coated or TiNbN coated implants is reduced down to 10%.[1]
In order to prevent allergic reactions, certain parts of the prosthesis may be supplied with a ceramic coating (TiN). Since almost all components of the tumor system consist of titanium alloy, this only concerns those components, which are made of a cast CoCr alloy (CoCrMo). The REF-numbers of the TiN coated implants have the suffix N after the last digit (e.g. 5720-0005N).

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

[1] Metal Ion Release from Non-Coated and Ceramic Coated Femoral Knee Components: Boil test 240h in NaCl-solution nach FMZ PhysWerk VA 97350, University Würzburg (D) (On File)

System Overview



Femoral stem
ø12-18mm cementless
ø11-17mm cemented

Extension piece

Connecting for diaphyseal implant

Diaphyseal implant
cemented
ø15, 17, 19 mm

Diaphyseal implant

assembling options

(length in mm)

Remark: The MUTARS® Diapyseal implant was developed to bridge diaphyseal bone defects of the femoral bone. For the part which is closer to the diapyseal part with the shorter stem of 100 mm length is recommended. It is available only in cemented version in diameters of 15, 17 and 19mm. For the part which is farer from the joint the cemented and cementless femoral stems should be used.

assembling options

(length in mm)

components					
reconstruction length	**Diaphyseal implant**	**connecting part for Diaphyseal implant**	**Extension piece**	**screw**	**screws**
100	**-**	**100**	**-**		**25**
120	**-**	**120**	**-**		**45**
140	**-**	**100**	**40**		**65**
160	**-**	**100**	**60**		**85**
180	**-**	**100**	**80**		**105**
200	**-**	**100**		**100**	**25+25**
220	**-**	**120**		**100**	**25+45**
240	**-**	**100**	**40**	**100**	**25+65**
260	**-**	**100**	**60**	**100**	**25+85**
280	**-**	**100**	**80**	**100**	**25+105**
300	**-**	**120**	**80**	**100**	**25+125**
320	**-**	**100**	**80+40**	**100**	**25+145**

*The reconstruction length includes both collars on the stems.

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.

figure 1a and 1b

Resection of the tumor

Start with the resection of the tumor. Please measure the length of the resected bone. The minimum resection is 100 mm.

Preparation of the medullary cavities

Prepare the proximal (fig. 1a) and the distal (fig. 1b) femoral medullary cavities with the MUTARS® medullary cavity reamer.

figure 2

Cementless fixation of the stem.

Ream the femoral medullary cavity preferably up to a depth of 130mm with a flexible reamer 1,5 mm smaller than the preoperatively chosen femoral stem (fig. 2).

Cemented fixation

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

Remark
In case flexible reamers are not part of the inventory of the hospital flexible reamers can be provided on special demand.

Rasping of the femoral cavity

Mark the anterior aspect of the femoral bone to meet the correct antecurvation of the femur (fig. 3).

Remark
The use of a femoral rasp for a **cemented stem** is optional. Generally you can proceed with the trial assembly.

Assemble the femoral rasp of the appropriate size (table 1), the sleeve and the slide hammer. Lock the rasp on the slide impactor by using the engineers' wrench (fig. 4a).

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

table 1

Optional technique for the use of cemented stems
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 (fig. 4b). That will provide a cement mantle of 1mm thickness (table 2). Use the 18mm rasp to prepare for the 17mm stem.

Stem size	Rasp size
11mm	13mm
13mm	15mm
15mm	17mm
17mm	18mm

table 2

Remark
It is recommended to clean the rasp from bone chips during the rasping. Leave the femoral rasp in the bone for the trialing.

figure 3

figure 4a and 4b

figure 5

figure 6

Preparation for the Diaphyseal implant

As the Diaphyseal implant for the distal part of the femur is only available in cemented version the intramedullary cavity is reamed with a flexible reamer which is 2 mm larger than the preoperatively chosen implant (fig. 5).

That will provide a cement mantle of 1mm thickness (table 3).

Implant size	Reamer size
15mm	17mm
17mm	19mm
19mm	21mm

table 3

Trial assembly

Please check the correct length and position of the implants by inserting the Diaphyseal implant (without cement), the connecting module and combine it with the femoral rasp (fig. 6).

Remark
For the **cemented procedure** femoral rasps are usually not available. Please insert the cemented stems (without cement) for trialing purposes.

Use additional extension pieces to enlarge the prosthesis if necessary. Consider the assembling options on page 1 of this brochure. Please resect more bone if necessary.

Implantation of the femoral stem

Impact the MUTARS® femoral stem (fig. 21).
Insert the stem of the same size as the rasp if a **cementless stem** is used.
To prevent fractures of the cortical bone it is helpful to fix a bone forceps around the femoral bone during impaction.

If a cemented implantation is planned, insert the cement and use the **cementless stem** which is 2 mm smaller than the previously used reamer or rasp.

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

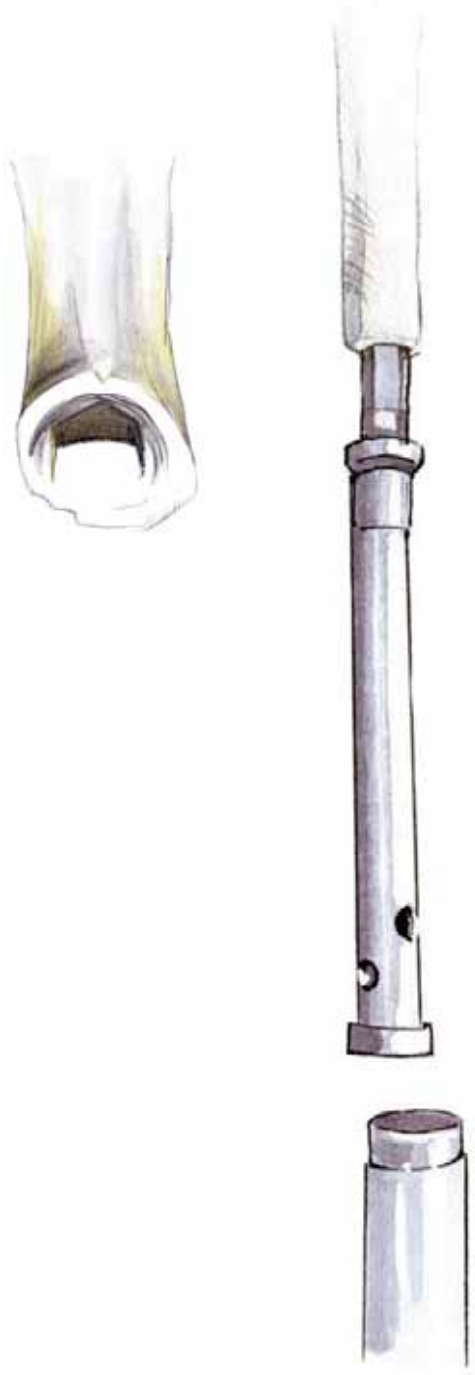


figure 7

figure 8

Implantation of the Diaphyseal implant

Please use an intramedullary plug before inserting bone cement.

Choose the Diaphyseal implant with a stem diameter which is 2 mm smaller than the previously used reamer or rasp.

Bring bone cement into the intramedullary canal and slide in the diaphyseal implant (fig. 8).

Remark
It is recommended to insert additional bone locking screws to enhance rotational stability of the implant.

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Combining of the implant components

Mount the connecting module to the femoral stem. If necessary add the extension piece.

Insert the bar screw of the appropriated length (see page 1) and lock it with the socket wrench (fig. 9).

Perform a trial assembling and, if necessary, readjust the rotation, of the implant by unlocking the screw and turning the clock mechanism (adjustable by 5° steps).

If the correct position is found, lock the connecting screw by using the swing wrench and the engineers' wrench to counter (fig. 10).

figure 9

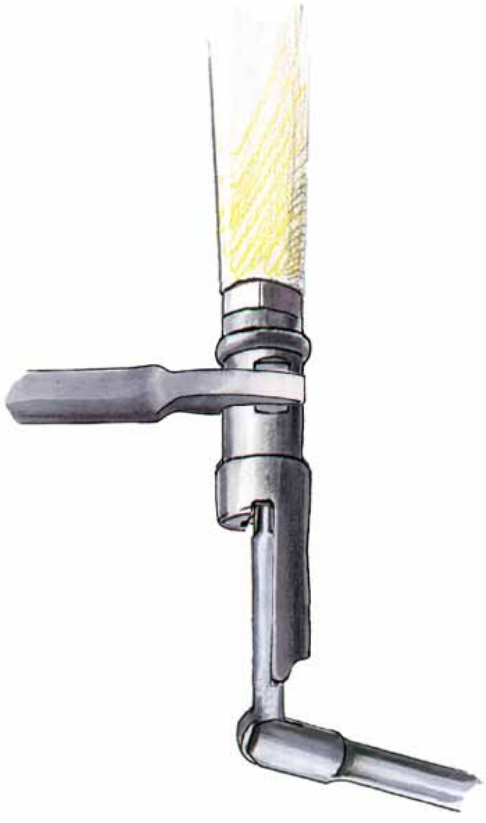


figure 10

Final implant locking

Connect the Diaphyseal implant and the connecting part with the two locking screws.

Use the swing wrench to lock the screws (fig. 11).

figure 11

IMPLANTS

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

MUTARS® Diaphyseal implant *S *N

incl. 2 locking screws
mat.: implavit®; CoCrMo casting alloy according to DIN ISO 5832/4

5730-1015	15 mm
5730-1017	17 mm
5730-1019	19 mm

MUTARS® connecting part for Diaphyseal implant *S

mat.: implatan®; $TiAl_6V_4$ according to DIN ISO 5832/3

5730-1100	100 mm
5730-1120	120 mm

MUTARS® extension piece *S

mat.: implatan®; $TiAl_6V_4$ according to DIN 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®;$TiAl_6V_4$ according to DIN ISO 5832/3

5730-0100	100 mm

IMPLANTS

MUTARS® screw

mat.: implatan®; $TiAl_6V_4$ according to DIN 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

MUTARS® femoral stem cemented *N

mat.: implavit®; CoCrMo casting alloy according to DIN 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®; $TiAl_6V_4$ according to DIN ISO 5832/3 with HA coating

5760-0012	12 mm
5760-0113	13 mm
5760-0014	14 mm
5760-0115	15 mm
5760-0016	16 mm
5760-0117	17 mm
5760-0018	18 mm

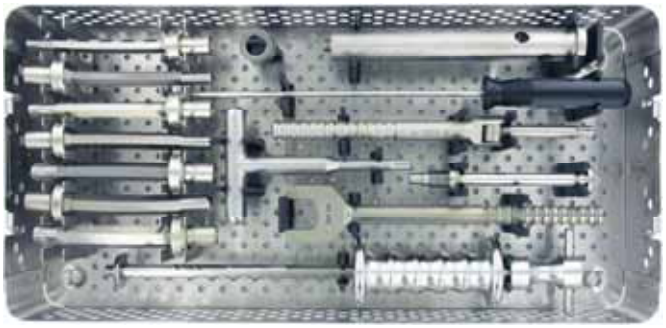
Available without HA-Coating on request.

MUTARS® cortical screw Ø 4,5 mm

mat.: implatan®; $TiAl_6V_4$ according to DIN ISO 5832/3

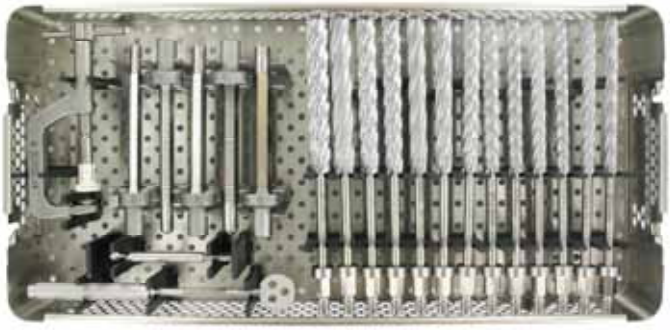
5792-4525	L: 25 mm
5792-4530	L: 30 mm
5792-4535	L: 35 mm
5792-4540	L: 40 mm
5792-4545	L: 45 mm
5792-4550	L: 50 mm
5792-4555	L: 55 mm
5792-4560	L: 60 mm

INSTRUMENTE



MUTARS® Basis Container
7999-5712

MUTARS® trial component tray
7999-7701



MUTARS® rigid drills tibia rasps patella container
7999-7700

INSTRUMENTS

Content MUTARS® basic container

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

handle for intramedullary plug
7512-4001

MUTARS® medullary cavity reamer
7760-0501

INSTRUMENTS

Content MUTARS® trial component tray

MUTARS® trial prox. femur

7710-0205	50 mm
7710-0207	70 mm

MUTARS® trial reducer

7730-0220	20 mm
7730-0230	30 mm

MUTARS® trial connecting part

7730-0100	100 mm

MUTARS® trial extension piece

7750-0105	105 mm
7750-0125	125 mm

MUTARS® trial extension piece

7772-2504	40 mm
7772-2506	60 mm
7772-2508	80 mm
7772-2510	100 mm

MUTARS® trial femoral stem

7760-0011	11 mm
7760-0013	13 mm
7760-0015	15 mm
7760-0017	17 mm

MUTARS® trial bar screw

7792-1002	M10x25 mm
7792-1004	M10x45 mm
7792-1006	M10x65 mm
7792-1008	M10x85 mm
7792-1010	M10x105 mm
7792-1012	M10x125 mm
7792-1014	M10x145 mm
7792-1016	M10x165 mm
7792-1018	M10x185 mm
7792-1020	M10x205 mm

INSTRUMENTS

Content MUTARS® rigid drills tibia rasps patella container

MUTARS® patella drill guide
7350-0000

MUTARS® patella - clamp
7352-0001

MUTARS® patella drill
7351-0000

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® rasp for tibial stem

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

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