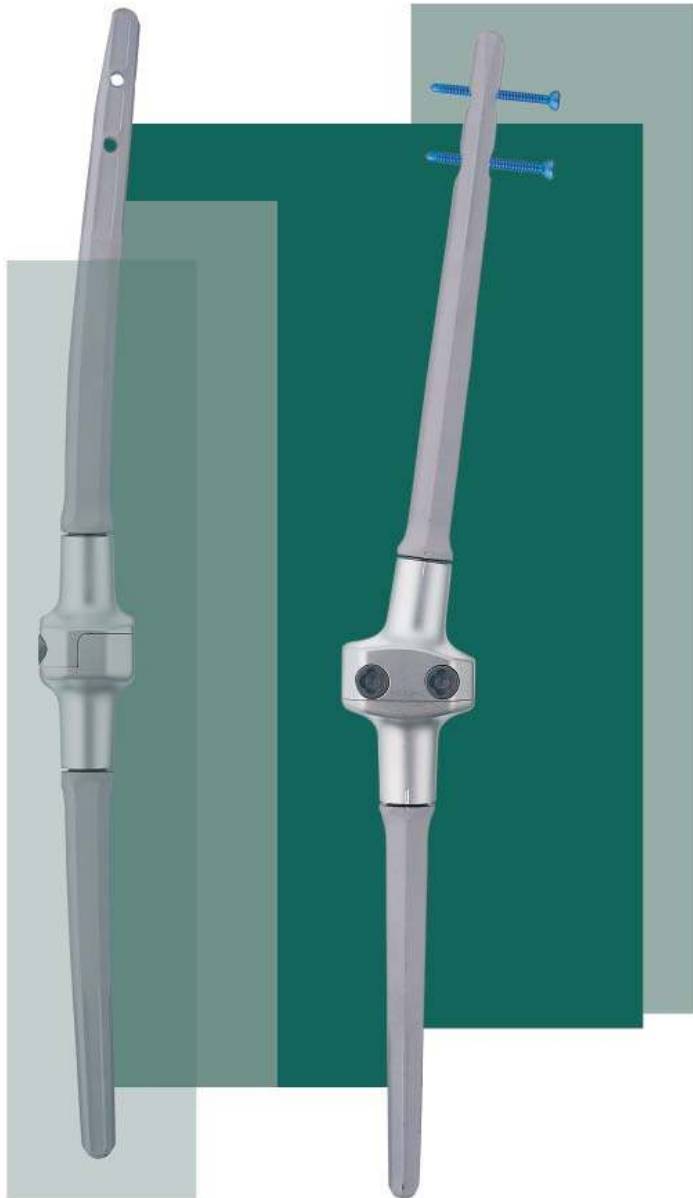


# MUTARS<sup>®</sup> RS

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implantcast



**RS Arthrodesis Implant**  
surgical technique



# MUTARS® RS

## RS Arthrodesis implant 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.

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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.

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## MUTARS® RS Arthrodesis Implant

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### 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 immunosuppression 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<sub>2</sub>O<sub>2</sub> – (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%.<sup>1</sup>

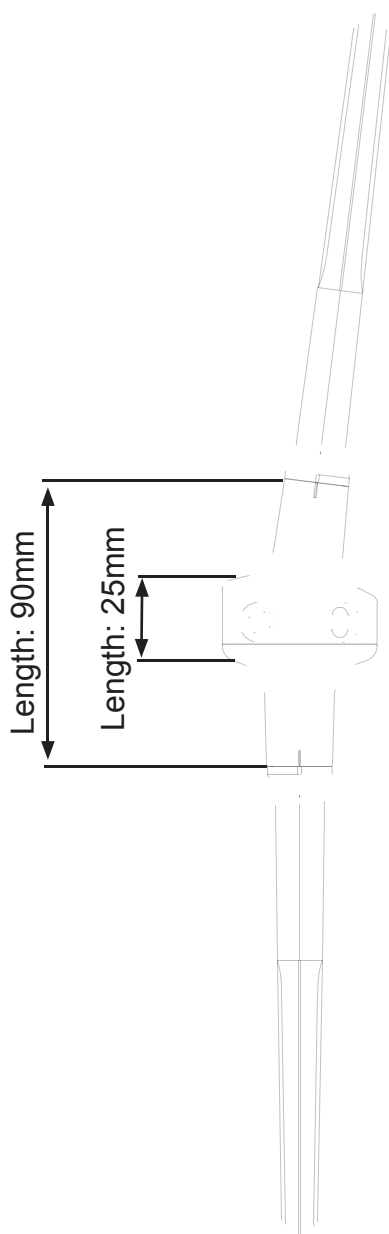
In order to prevent allergic reactions, certain parts of the prosthesis may be supplied with a ceramic coating (TiN). Since almost all components of the tumor system consist of titanium alloy, this only concerns those components, which are made of a cast CoCr alloy (CoCrMo). The REF-numbers of the TiN 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.

<sup>1</sup> 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



## **MUTARS® RS Stem cementless**

14-20mm, Length 150mm

14-20mm, Length 200mm

16-20mm, Length 250mm

## **MUTARS® RS Stem cemented**

12-18mm, Length 150mm

12-18mm, Length 200mm

**RS Arthrodesis implant**

## **MUTARS® RS Stem cementless**

14-20mm, Length 150mm

14-20mm, Length 200mm

16-20mm, Length 250mm

## **MUTARS® RS Stem cemented**

12-18mm, Length 150mm

12-18mm, Length 200mm

The femoral valgus angle is 7°.



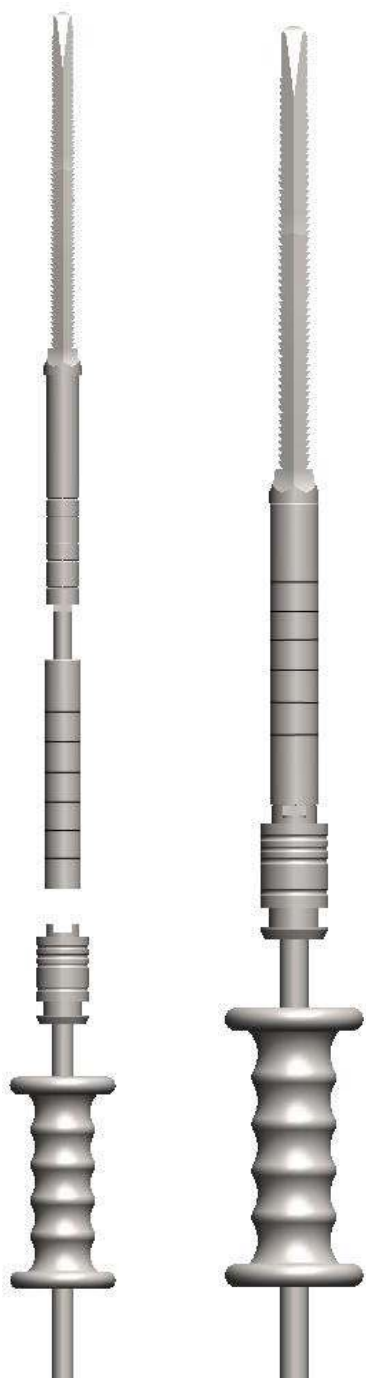


Figure 1a



Figure 1b

## SURGICAL TECHNIQUE

Prepare the femur and tibia. Remove any previous implants and bone cement if necessary.

### Preparation of the Distal Femur

For the **cementless** implantation, enlarge the femoral medullary canal with a flexible reamer, which is 3mm smaller in diameter than the planned RS Stem. Place the rasper sleeve (fig. 1b) on the rasper of the same size as the RS Stem and connect both components with the sliding hammer (fig. 1a).

For a **cemented** implantation, enlarge the medullary canal with a flexible reamer, which is 1mm smaller in diameter than the cemented RS Stem.

Place the rasper sleeve (fig. 1b) on the rasper, which is one number larger than the cemented stem and connect both components with the sliding hammer (fig. 1a).



## MUTARS® RS Arthrodesis Implant

Prepare the medullary canal with the MUTARS® RS Rasper. The marking 'Joint Line' shows the location of the reconstructed joint level. If the rasper sits firmly in this position, continue to the next step. If the joint level is level with the marking '+25mm', then use the rasper of the next size up. If the largest rasper is already being used, then use the rasper of the next possible length, or use a 25mm extension piece later. If the joint level is level with the marking '+50mm', use the rasper of the next possible length (fig. 3).

The 'bone' marking shows how much bone must be resected, if the Arthrodesis implant is not to be sunk into the bone. Should it happen, that the bone cavity needs to be retained, it can be necessary to ream the cavity further with suitable free hand instruments.



Figure 2



Figure 3



## Implantation of the Femoral Stem

Subsequently, connect the RS stem of the required size to the impactor (fig. 4).

**Please note:** It is optional to also use the trial stem. In this case, proceed in a way that is analogue to the use of the original stem.



Figure 4

Impact the stem (fig. 5). When using a cementless stem, then place the stem of the same size as the rasper in.

The upper marking gives the position of the reconstructed joint line for the stem; the lower marking gives the joint line with a 25mm extension piece.

For a cemented implantation, bring the cement and use the cemented stem, which is 2mm smaller than the measure of the last used reamer.

Whilst the cement is solidifying, remove the impactor so as to avoid the stem tilting to the sides.

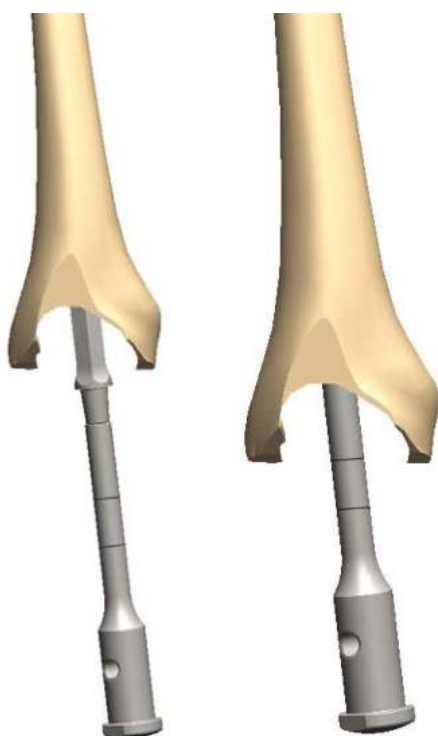


Figure 5



## MUTARS® RS Arthrodesis Implant

Subsequently, twist the fixation screw into the implanted RS stem with the help of the MUTARS® RS socket wrench (fig. 6).

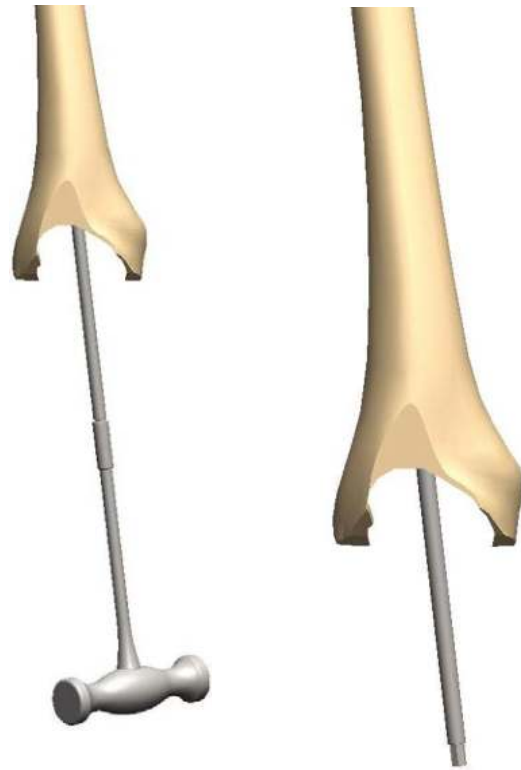


Figure 6

Prepare the bone with the help of a cavity reamer. Place the cavity reamer over the fixation pin. Ream until it comes to a complete stop. If necessary clean the drill and then complete the reaming with a second reaming procedure. Rinse the reamed bone area and ensure that there are no bone splinters in the cone (fig. 7).



Figure 7



Figure 8



Figure 9



Figure 10

## Preparation of the Tibia

For the **cementless** implantation, enlarge the femoral medullary canal with a flexible reamer, which is 3mm smaller in diameter than the planned RS Stem. Place the rasper sleeve (fig. 1b) on the rasper of the same size as the RS Stem and connect both components with the sliding hammer.

For a **cemented** implantation, enlarge the medullary canal with a flexible reamer, which is 1mm smaller in diameter than the cemented RS Stem.

Place the rasper sleeve (fig. 1b) on the rasper, which is one number larger than the cemented stem and connect both components with the sliding hammer.

Prepare the medullary canal with the MUTARS RS Rasper. The marking 'Joint Line' shows the location of the reconstructed joint level. If the rasper sits firmly in this position, continue to the next step. If the joint level is level with the marking '+25mm', then use the rasper of the next size up. If the largest rasper is already being used, then use the rasper of the next possible length, or use a 25mm extension piece later. If the joint level is level with the marking '+50mm', use the rasper of the next possible length (fig. 9).

The 'bone' marking shows how much bone must be resected, if the Arthrodesis implant is not to be sunk into the bone. Should it happen, that the bone cavity needs to be retained, it can be necessary to ream the cavity further with suitable free hand instruments.

Subsequently, connect the RS stem of the required size to the impactor (fig. 10).



## MUTARS® RS Arthrodesis Implant

Impact the stem. When using a cementless stem, then place the stem of the same size as the rasper in.

The lower marking gives the position of the reconstructed joint line for the stem; the upper marking gives the joint line with a 25mm extension piece.

For a cemented implantation, bring the cement and use the cemented stem, which is 2mm smaller than the measure of the last used reamer.

Whilst the cement is solidifying, remove the impactor so as to avoid the stem tilting to the sides.

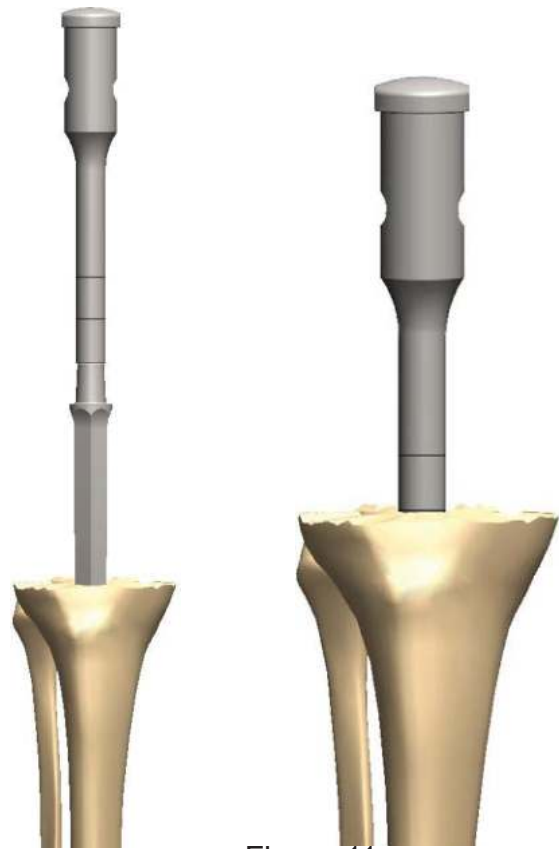


Figure 11

Subsequently, twist the fixation screw into the implanted RS stem with the help of the MUTARS RS socket wrench (fig. 12).

Prepare the bone with the help of a cavity reamer. Place the cavity reamer over the fixation pin. Ream until it comes to a complete stop. If necessary clean the drill and then complete the reaming with a second reaming procedure. Rinse the reamed bone area and ensure that there are no bone splinters in the cone (fig. 13).



Figure 12



Figure 13



Put the femoral RS Arthrodesis Implant trial and if necessary the trial extension piece in place and fasten the components with the provided trial screw (fig. 14). Only tighten the screw with the socket wrench.

RS Arthrodesis Implant  
Screw M 8 x 25

RS Arthrodesis Implant + Extension piece  
Screw M 8 x 50

Figure 14



Subsequently place the trial of the tibial RS Arthrodesis Implant and if necessary the trial extension piece, and fasten the components with the provided trial screw (fig. 15). Only tighten the screw with the socket wrench.

Figure 15



## MUTARS® RS Arthrodesis Implant

Now link the femoral component and the tibial component. Additionally bring the components together in flexion and then stretch the leg afterwards (fig. 16).



Figure 16

Screw the components together with the socket wrench (fig. 17). Use the trial screws M 8 x 20.

**Should the fit be satisfactory, continue with the implantation.**

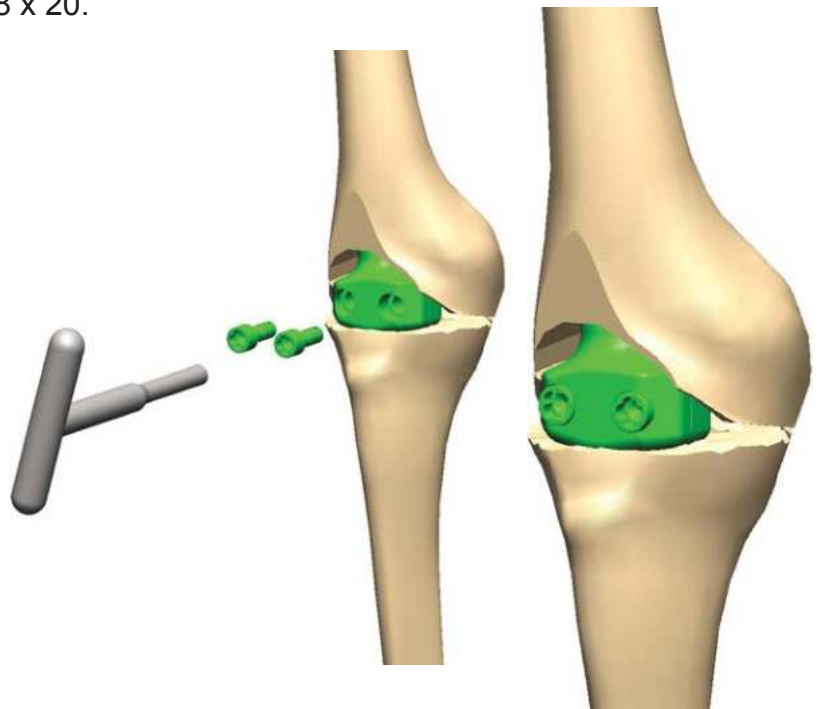


Figure 17

## MUTARS® RS Arthrodesis Implant

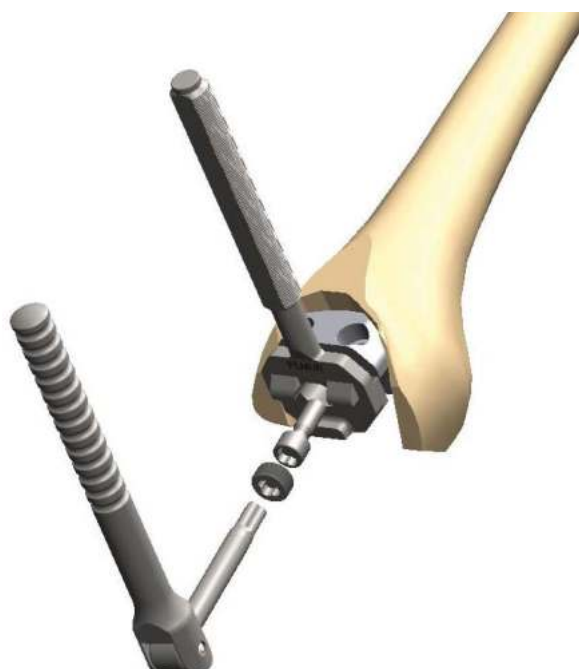


Figure 18

Put the femoral RS Arthrodesis Implant and if necessary the extension piece in place and fasten the components with the provided screw. Use the counter supporter in addition (fig. 18). When putting it in the marking 'FEMUR' must be visible. Fasten the screws with the articulated wrench. Subsequently also fasten the locking screw with the articulated wrench.

RS Arthrodesis Implant:  
Screw M 8 x 25

RS Arthrodesis Implant + Extension Piece  
Screw M 8 x 50

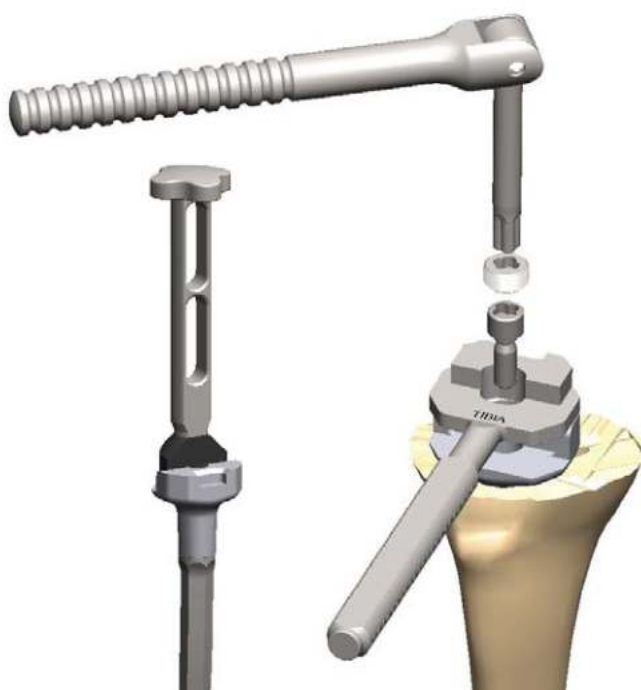


Figure 19

Put the tibial RS Arthrodesis Implant and if necessary the extension piece in place and fasten the components with the provided screw. Use the counter supporter in addition (fig. 19). When putting it in the marking 'TIBIA' must be visible. Fasten the screws with the articulated wrench. Subsequently also fasten the locking screw with the articulated wrench.

### Alternative way of implantation

When using cemented stems the components may alternatively be assembled before implantation and can subsequently be inserted with the help of the impactor (fig. 20).



Figure 20





## MUTARS® RS Arthrodesis Implant

Now link the femoral component and the tibial component. Additionally bring the components together in flexion and then stretch the leg afterwards (fig. 21).

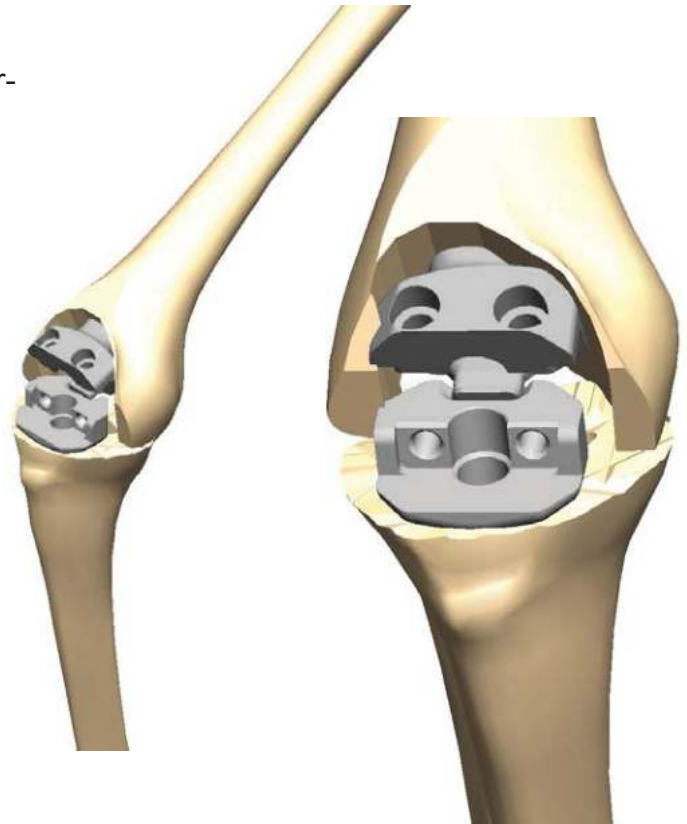


Figure 21

Screw the components together with the socket wrench (fig. 22).

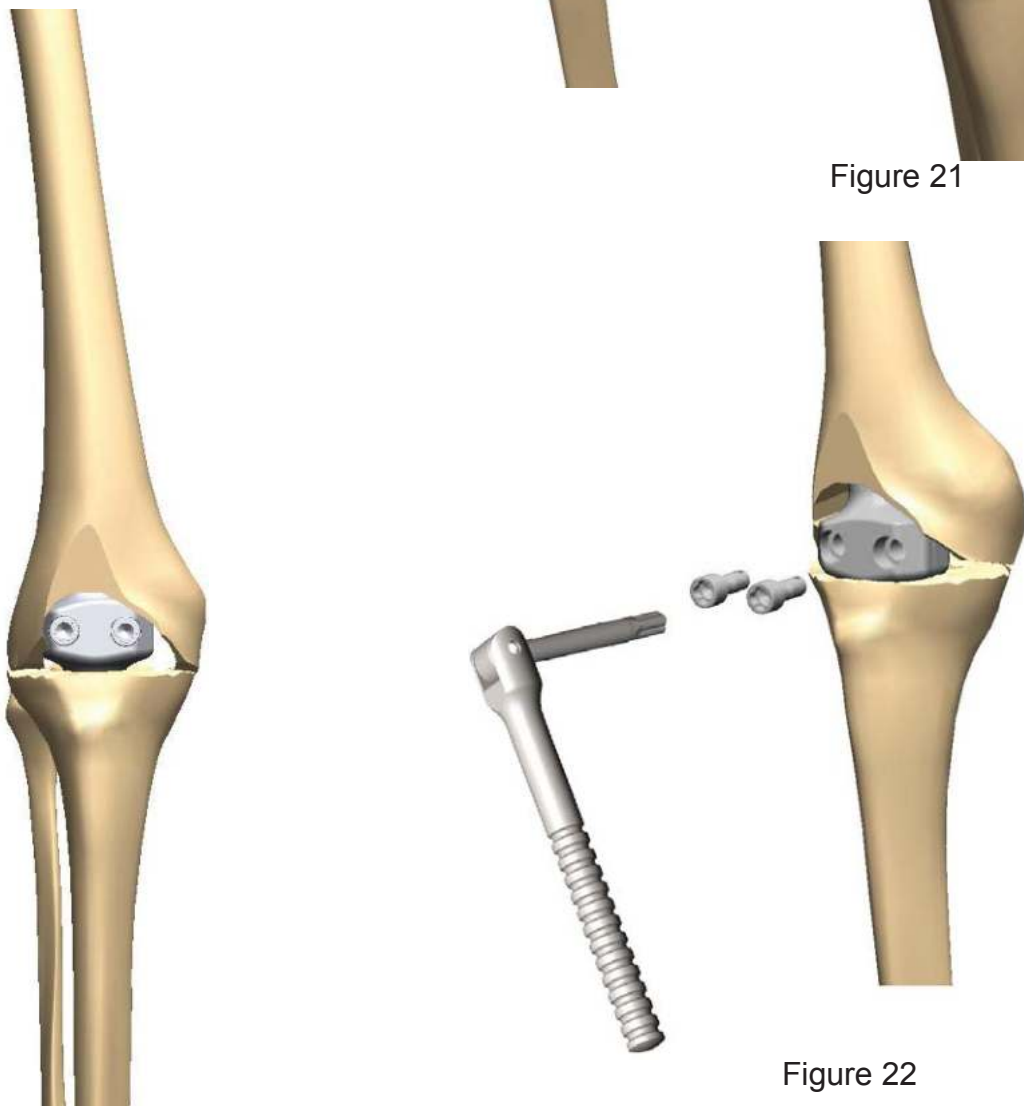


Figure 22



## IMPLANTS

\*S: For anti-infective treatment, silver coated implants are available.

\*N: For anti-allergic treatment, TiN coated implants are available.



### RS Arthrodesis implant femoral component \*S incl. locking screw

Mat.: implatan®, TiAl6V4 acc. to DIN ISO 5832/3

6770-0011 left

6770-0021 right



### RS Arthrodesis implant tibial component \*S

incl. locking screw & 2 MUTARS® screws M8 x 20  
(6770-0820)

Mat.: implatan®, TiAl6V4 acc. to DIN ISO 5832/3

6770-0031



### MUTARS® RS extension piece

Mat.: implatan®; TiAl6V4 acc. to DIN ISO 5832/3  
and hydroxyapatite coating

6730-0125 25mm



### Screw for KRI, M8

Mat.: implatan®; TiAl6V4 acc. to DIN ISO 5832/3

5720-2508 25mm

5720-5008 50mm



## MUTARS® RS Arthrodesis Implant

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### IMPLANTS

#### MUTARS® RS stem

##### cementless

Mat.: implatan®;TiAl6V4 acc. to DIN ISO 5832/3

+ hydroxyapatite coating

6762-1514	14/150 mm
6762-1516	16/150 mm
6762-1518	18/150 mm
6762-1520	20/150 mm
6762-2014	14/200 mm
6762-2016	16/200 mm*
6762-2018	18/200 mm*
6762-2020	20/200 mm*
6762-2516	16/250 mm
6762-2518	18/250 mm*
6762-2520	20/250 mm*

*\*marked sizes of length 200 and 250 mm have  
2 distal locking screw holes*



#### MUTARS® RS stem \*N

##### cemented

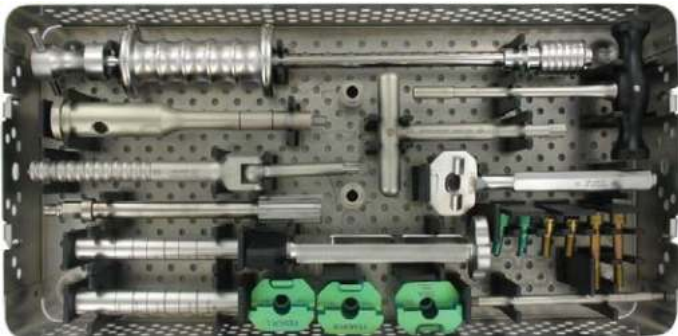
Mat.: implavit® CoCrMo-casting alloy acc. to  
DIN ISO 5832/4

6760-1215	12/150 mm
6760-1415	14/150 mm
6760-1615	16/150 mm
6760-1815	18/150 mm
6761-1220	12/200 mm
6761-1420	14/200 mm
6761-1620	16/200 mm
6761-1820	18/200 mm

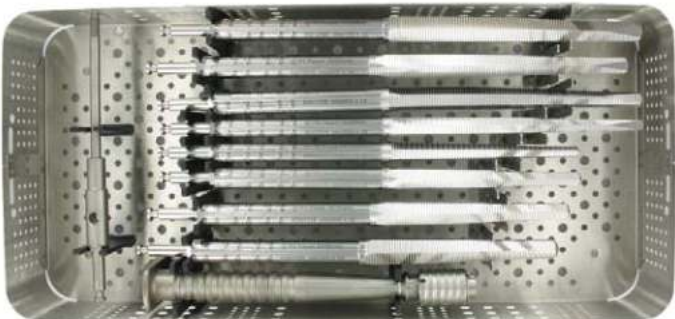




**INSTRUMENTS**



**MUTARS® RS Arthrodesis  
Instrument container**  
7999-6770



**MUTARS® RS  
Container 1**  
7999-6711



**MUTARS® RS  
Container 4**  
7999-6714



# MUTARS® RS Arthrodesis Implant

## INSTRUMENTS

Arthrodesis Implant femoral trial component

7770-0021 Right

7770-0011 Left



Arthrodesis Implant tibial trial component

7770-0031



trial connecting screw 2x

7700-0820



trial screw 2x

7700-2508 M8x25mm

7720-5008 M8x50mm



trial extension sleeve 25 mm

6500-0025



RS trial stem

6511-1415 14/150mm

6511-1615 16/150mm

6511-1815 18/150mm

6511-2015 20/150mm

6511-1420 14/200mm

6511-1620 16/200mm

6511-1820 18/200mm

6511-2020 20/200mm

6511-1625 16/250mm

6511-1825 18/250mm

6511-2025 20/250mm



## INSTRUMENTS



RS broach  
 6500-1514 14/150mm  
 6500-1516 16/150mm  
 6500-1518 18/150mm  
 6500-1520 20/150mm  
 6501-2014 14/200mm  
 6501-2016 16/200mm  
 6501-2018 18/200mm  
 6501-2020 20/200mm



MUTARS® RS broach handle  
 6500-0008



RS slide hammer with snap mechanism  
 6500-0012



RS Arthrodesis broach sleeve  
 7770-0014 14mm  
 7770-0016 16-20mm



guide rod  
 6500-0003



reamer 21mm  
 6500-0021



swing wrench  
 7411-0000



Arthrodesis stem impactor  
 6500-6701



RS socket wrench SW 6  
 6500-0013



# MUTARS® RS Arthrodesis Implant

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## INSTRUMENTS

MUTARS® RS ES Stem extractor adaptor  
6500-3007



Socket wrench  
7420-0000



Impactor for RS Arthrodesis implant



Counter instrument for RS Arthrodesis implant  
6500-6702







implantcast GmbH  
Lüneburger Schanze 26  
21614 Buxtehude  
phone: +49 4161 744-0  
fax: +49 4161 744-200  
e-mail: [info@implantcast.de](mailto:info@implantcast.de)  <sub>0482</sub>  
internet: [www.implantcast.de](http://www.implantcast.de)

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