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Cementless Revision Stem Type SF

Revision Implants of Hip Joint

ARTHROPLASTY

Introduction

The design of the cementless revision stem is based on the type S.F. total hip replacement stem, which is exceptionally also used for re-implantation, even though this implant is intended for primo-implantation. This concept allows the use of the majority of instruments from the instrumentarium intended for type S.F. stem insertion. The designers made use of their experience with type S.F. cementless stems, and the manufacturing process has utilized the most sophisticated technologies.

When using instruments supplied by the manufacturer, straightforward implantation and perfect fixation of the implants can be assured. The stem assortment enables the majority of cases that may arise in revision surgery of total hip replacement to be solved.

This publication should serve as surgical guidance for the particular implant and instrumentarium. For the sake of conciseness, it is focused only on the implantation of the given type of endoprosthesis, and it is assumed that the surgeon and other theatre staff are perfectly acquainted with general surgical principles of hip joint arthroplasty.

The aim of this publication is to provide surgeons and scrub nurses with a quick reference guide on the correct use of individual components of the instrumentarium, so that optimum outcomes are achieved and – last, but not the least – unnecessary damage or degradation of the instrumentarium and/or the implant are avoided. By no means is this intended as a manual for surgical technique.

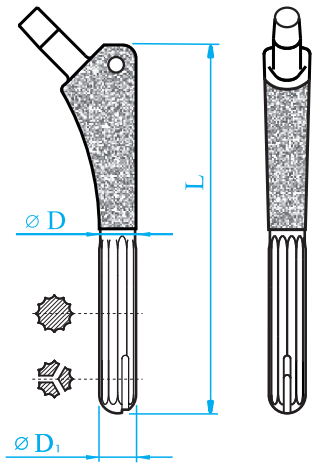
Femoral Stem

The hip joint revision stem intended for implantation without bone cement is manufactured from Ti6Al4V titanium alloy. It is supplied in two lengths – 190 mm and 230 mm, and in six diameters of the cylindrical groove stem – 13, 15, 17, 19, 21 and 23 mm.

The stem has 9 – 12 grooves (depending on the stem diameter), which ensure the rotatory stability of the stem.

The upper part of the stem is coated with plasma-sprayed titanium in the length of 95 - 115 mm. The lower part of the stem is cut in three directions to reduce its stiffness. The endoprosthesis neck is ended with a 12/14 cone (EURO), and the CD angle of the endoprosthesis is 135 grades.

Type SF Cementless Revision Stem – 12/14 Conical Neck

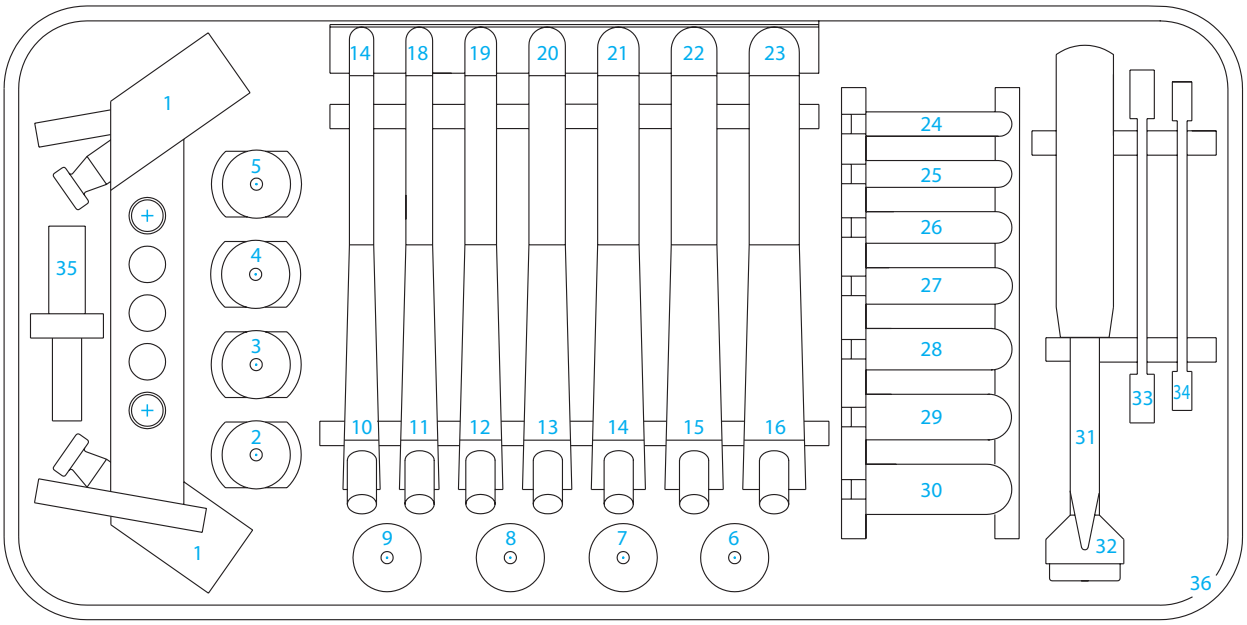


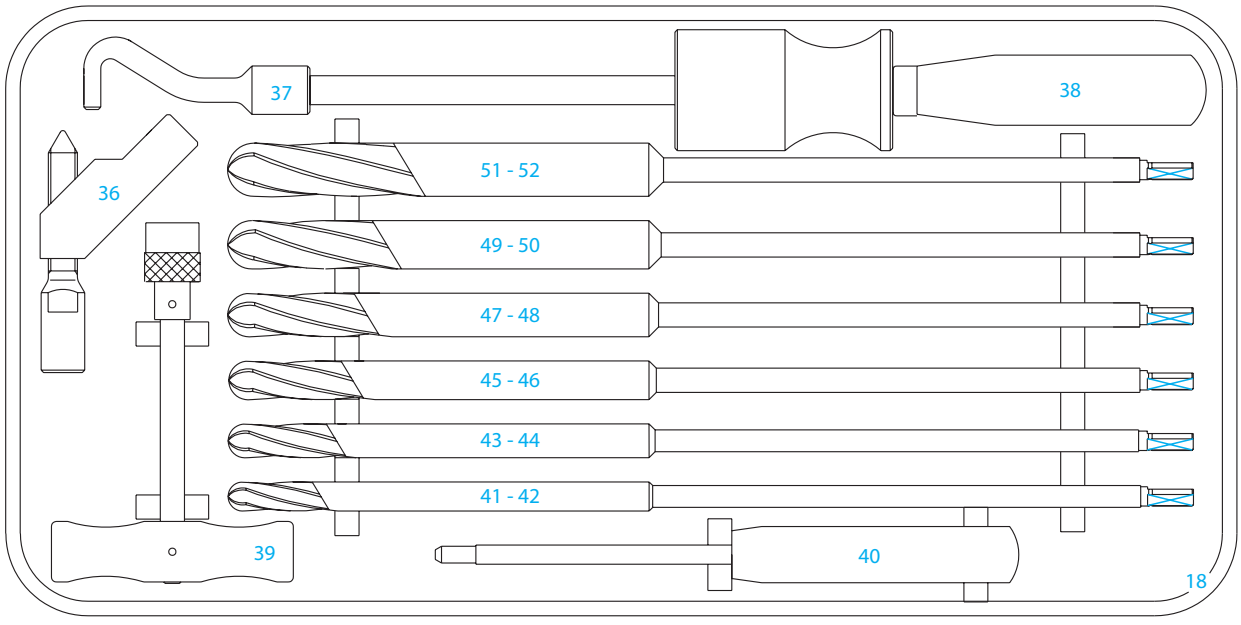
Straight Stem, L = 190		
Size	Ø D / Ø D_1 (mm)	Order Number
0	10/11	322050
1	12/13	322051
2	14/15	322052
3	16/17	322053
4	18/19	322054
5	20/21	322055
6	22/23	322056

Straight Stem, L = 230		
Size	Ø D / Ø D_1 (mm)	Order Number
0	10/11	322060
1	12/13	322061
2	14/15	322062
3	16/17	322063
4	18/19	322064
5	20/21	322065
6	22/23	322066

Instruments

The instrumentarium is placed in two trays, enabling a well-arranged layout for the instruments during surgery, and for their preparation, sterilisation and storage. The layout of the instruments in trays is pictured in the following figures. During transportation, the trays are placed in a Styrofoam container and then placed in a cardboard outer package.





Surgical Technique

General Principles for Implantation of Type S.F. Cementless Revision Stem

Prior to any revision surgery of total hip arthroplasty, a decision must be made whether this type of implant is suitable for the given case. Then it is necessary to carry out preoperative planning, allowing the size of the femoral component to be determined. Preoperative planning must include a pelvic x-ray, with both hips in A/P views, and axial views of both hip joints to determine the width of the metaphysis. The planning of the stem size is performed using transparent templates provided by the manufacturer. Place these templates on the x-ray images of the same scale and determine the length and diameter of the revision endoprosthesis stem.

Perform the revision surgery using an anterolateral approach by Bauer. During dissection around the upper end of the femur, it is convenient to use an electric scalpel.

After removal of the original implant and subsequently any residual bone cement, it is necessary to send any present effusion, soft tissue samples, and the removed implant for microbiological analysis and testing for antibiotic sensitivity; the implant has to be tested to determine microbiological findings in the film covering the implant surface.

After the bone marrow canal is prepared according to the mentioned surgical technique, insert the revision stem - in case of no or minimum damage to the proximal femur - directly to the bed prepared by the instruments. In case of more extensive damage, spongious debris or bone grafts should be used.

Primary fixation of the stem is ensured by insertion with a 0.5 mm overlap. In the proximal part of the stem, it is an overlap of the porous sprayed titanium, and in a cylindrical stem, it is an overlap of the groove struts, which ensures rotatory stability.

This primary fixation achieved during surgery is enhanced by ingrowing of the bone tissue, which is called secondary fixation. This fixation develops gradually during the period of 10 – 12 weeks after implantation. After this period, the implant is usually completely joined with the bone.

Instruments Needed for Insertion of SF Cementless Revision Stem

Straight Stem, L = 190		
Stem Diameter (mm)	Cylindrical Reamer Diameter (mm)	Rasp Size
10/11	10	0
12/13	12	1
14/15	14	2
16/17	16	3
18/19	18	4
20/21	20	5
22/23	22	6

Straight Stem, L = 230		
Size	Ø D / Ø D_1 (mm)	Order Number
0	10/11	322060
1	12/13	322061
2	14/15	322062
3	16/17	322063
4	18/19	322064
5	20/21	322065
6	22/23	322066

Surgical Technique

1. Reaming of Medullary Canal

After removing the original stem, as well as any residual bone cement, perform reaming of the medullary canal using cylindrical reamers 41 - 52. Fasten the reamers to the quick-lock "T" handle 39. Start reaming with a small diameter and gradually increase the reamer size until the entire medullary canal is prepared along the required length. The length of reaming with the cylindrical reamers is based on the length of the revision stem that is to be implanted. If the 190 mm stem is used, the reaming length is indicated by the 190 mark on the reamer; with the 230 mm stem, it is indicated by the 230 mark on the reamer (Fig. 1). When this mark, which is made of a black strip, reaches the upper end of the osteotomy, reaming must cease.

2. Preparation of Medullary Cavity

Final preparation of the medullary cavity is performed by means of a set of rasps 8 - 16 fastened into the handle 1 . For stems with a length of 190 mm, use a rasp with a blind end 17 - 23; for stems with a length of 230 mm, use a rasp with an extension piece 24 - 30. To tighten and to release the blind ends and the extension pieces sized 1, 2, and 3, use an 8/10 open-end wrench 34 ; for sizes 4, 5, and 6, use a size 13 open-end wrench 33. The rasp shapes correspond to the metaphyseal profile of the femur, and their dimension is 0.5 mm smaller than the size of the implant. The depth of the rasp insertion is indicated by the full insertion of the toothed part of the rasp into the osteotomy line (Fig. 2).

After reaming, we recommend adjusting the upper part of the medullary canal with a rasp of appropriate size. This would prevent excessive reaming of the medullary cavity under the metaphysis in the isthmus area, into which the cylindrical part of the stem could be inserted, although the upper part of the stem with spray application might - in the case of a tight diameter of the metaphysis - overlap it, and thus optimal insertion would not be possible. This applies only in case of no or minimum damage of the proximal femur. In case of more extensive damage that will prevent using the rasps, the proximal part of femur is to be filled with spongious debris or bone grafts.

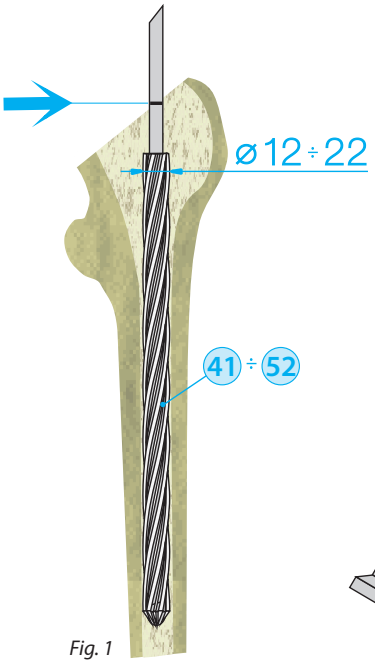


Fig. 1

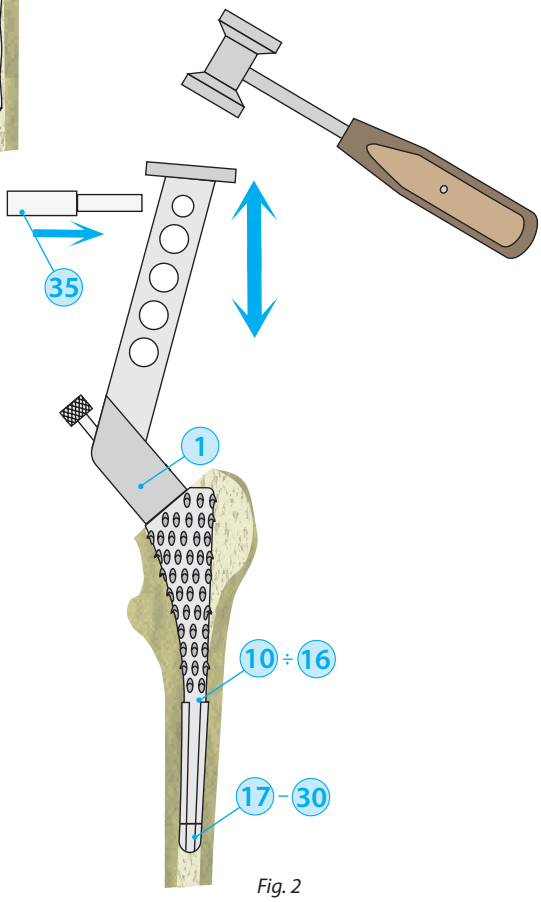


Fig. 2

3. Preliminary Articulation Test

Perform preliminary articulation by using test heads 2 - 5 placed on the cylindrical end of the rasp. The test heads are available with a short, medium, long or extra-long neck (Fig. 3). Once the rasp is removed from the medullary canal, the handle with the ejector pin must be re-mounted to the rasp 35.

4. Insertion of Endoprosthesis

To insert the cementless revision stem in the femur, use a stem impactor 31. To enable it to be fitted on the endoprosthesis, there is a 4 mm diameter hole in the stem axis. Insert the component so that it sits firmly on the femoral calcar (Fig. 4).

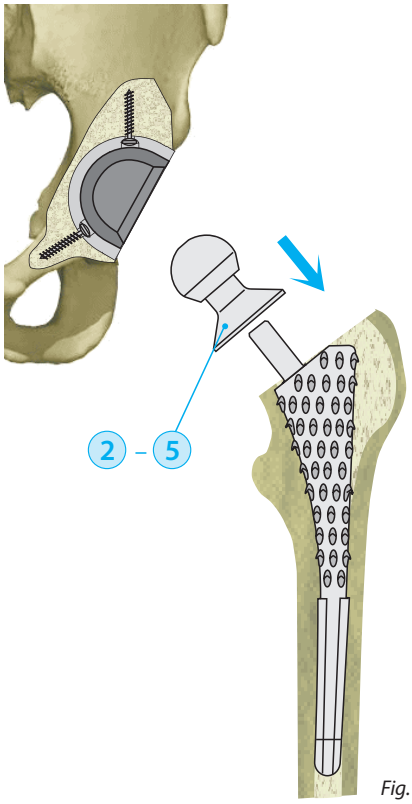


Fig. 3a

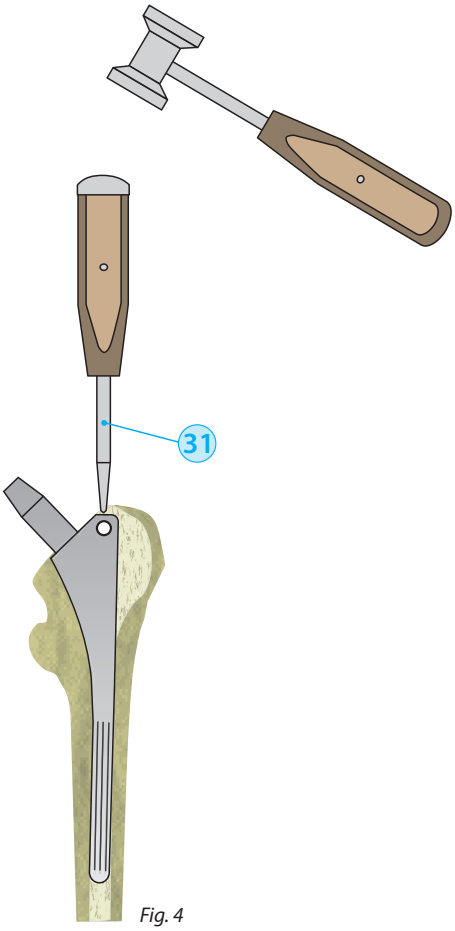


Fig. 4

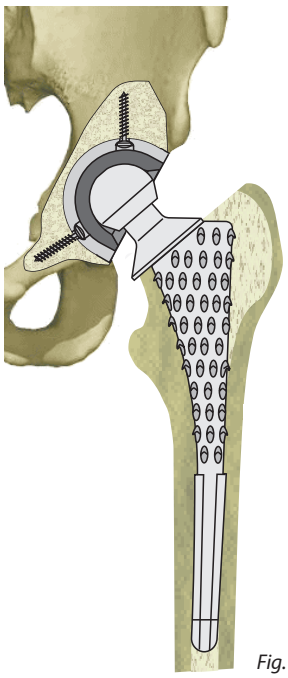


Fig. 3b

5. Final Articulation Test

To carry out the final articulation test, use one of the four plastic test heads – S, M, L, XL (6) - (9). Based on this test, select the corresponding metallic or ceramic head (Fig. 5).

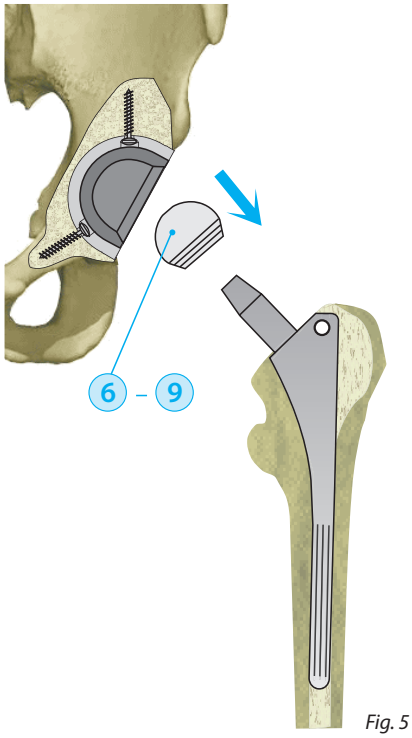


Fig. 5

6. Head Articulation

For articulation of the endoprosthesis head, use a head positioner (32) (Fig. 6).

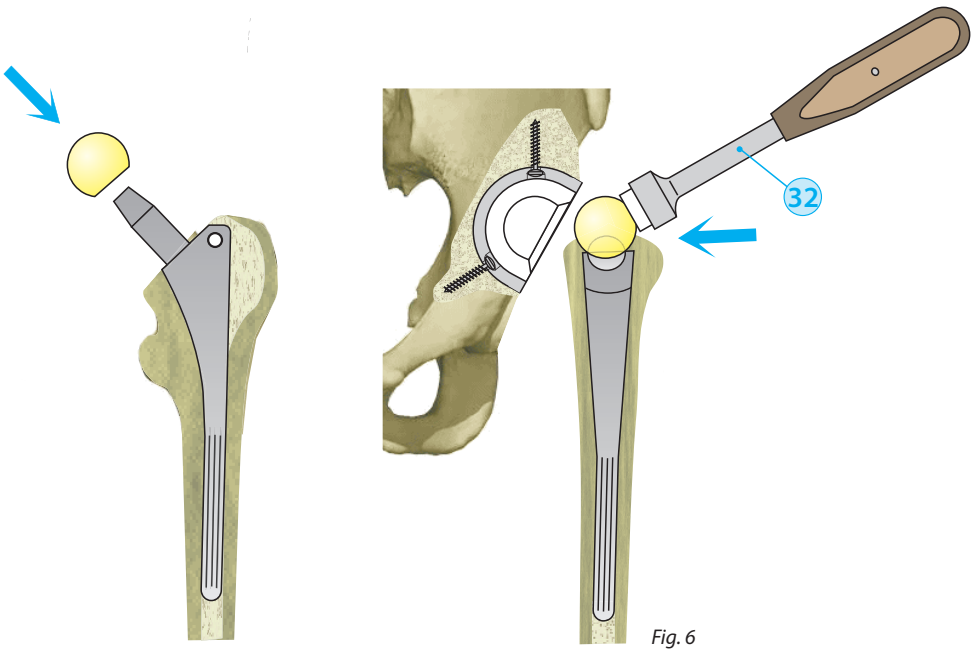


Fig. 6

7. Final Result

The final result is visualized in Fig. 7.

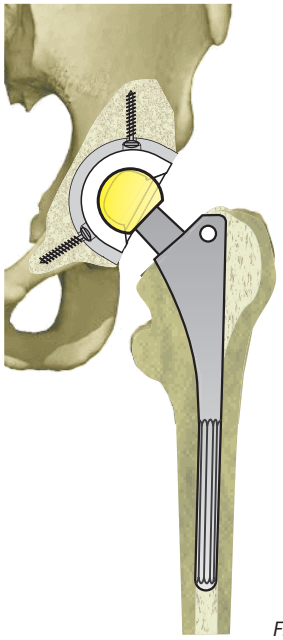


Fig. 7

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