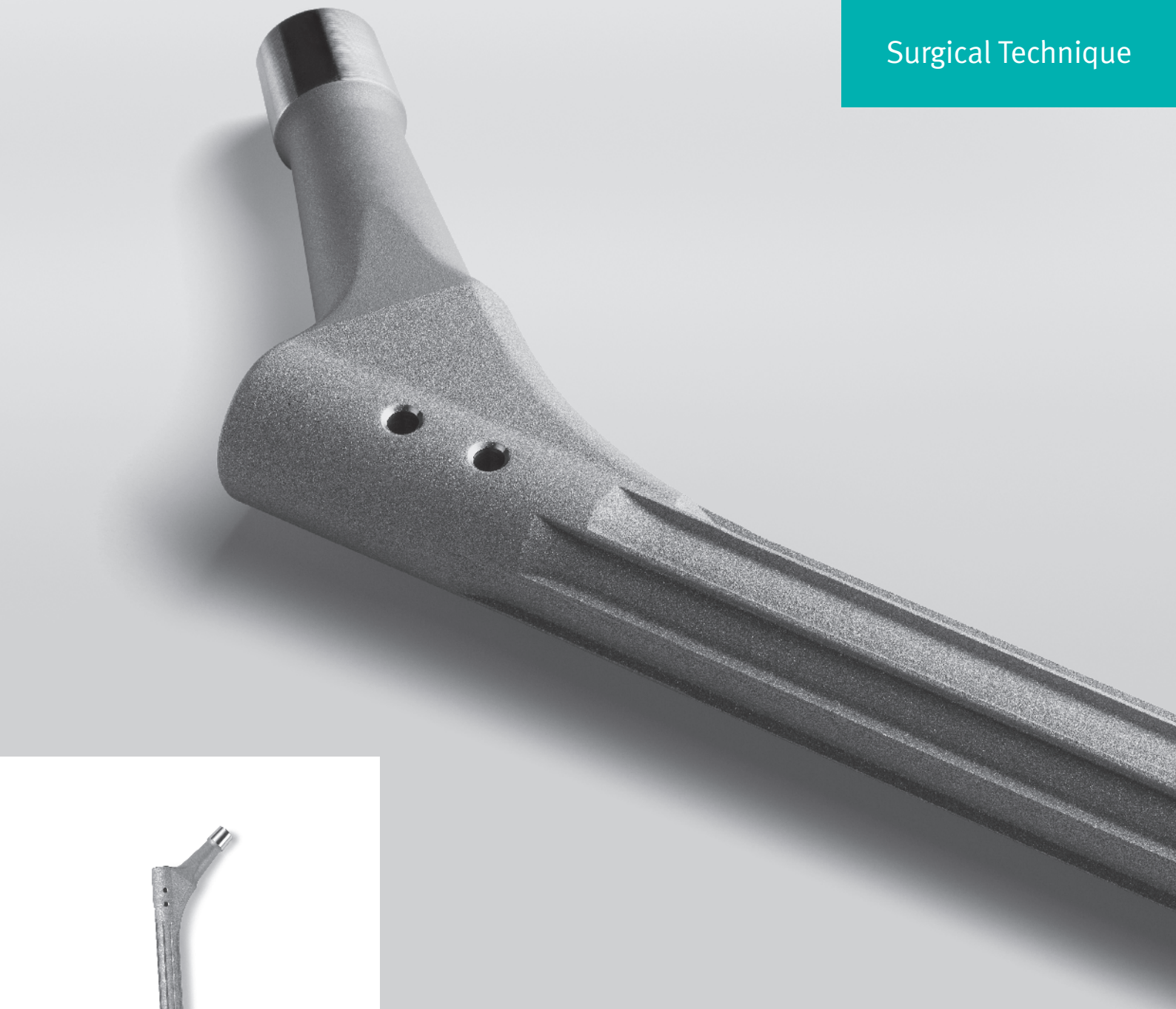
Wagner SL Revision™ Stem

Surgical Technique



Femur Revision Prosthesis
for Extensive Bone Loss

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Wagner SL Revision

Developed in conjunction with

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Content

Concept

Since its introduction in 1986, this reliable and user-friendly stem system has been implanted successfully in more than 85,000 cases. The positive experiences of its internationally known users are reflected in a large number of clinical publications. These studies testify to the high quality and reliability of the *Wagner SL Revision* Stem with its osteophilic design.

The tested concept of the *Wagner SL Revision* Stem has only been modified a few times in its history. With the focus on a lateralized stem design, the original once more lives up to its reputation as the hip revision solution of the future.

The *Wagner SL Revision* prosthesis, firmly and rotationally stable fixed in the medullary cavity of the healthy bone distal from the original prosthetic bed, with its conical longitudinal ribs and cementless anchorage, bridges the defective prosthetic bed and hereby leads to a condition of relative mechanical stability. With time, there is active ossification in the old prosthetic bed, replacing lost bone.

The cementless anchorage is important as it permits reliable secondary stabilization through osseointegration at the rough-blasted titanium surface. Therefore, in the interest of good bone regeneration, the often paper-thin cortical layer of the old prosthetic bed may not be separated from the surrounding soft tissue, independently of the operative approach. The thin bony shell must remain healthy so that rapid regeneration of bone can actually take place.

Implantation of the *Wagner SL Revision* Stem requires both extreme care in dealing with the damaged bone and the surrounding tissues and achieving stable implant fixation. It is only under such conditions that good formation of new bone and secure prosthetic fixation can be expected. In young patients it is particularly important to insure that the shortest possible prostheses are implanted. This makes great technical demands on the surgeon. Therefore, the revision prosthesis should only be used by experienced hip surgeons.

Indications and Contraindications

Indications

1. Revision of loosened total hip prostheses after the first implantation and after prosthetic replacement where extensive bone resorption has caused considerable widening of the medullary cavity with grave cortical bone thinning and the fixation of a new standard prosthesis is not possible.

2. Revision of loosened total hip prostheses with fractures or cortical bone defects in the prosthetic bed.

3. Extensive comminuted fractures in the proximal third of the femur in elderly patients, for whom the indication for a prosthesis clearly exists but in whom a standard total hip prosthesis cannot be anchored.

4. Deformation or osseous cicatrization on the proximal third of the femur after fractures or osteotomies where preparation for the prosthesis with rasps is not possible, but careful cortical reaming of the proximal medullary cavity for the seat of the short revision stem can be carried out without any problem, unless the shorter *Wagner Cone prosthesis™* is indicated.

5. Deformations of the proximal third of the femur for which a corrective osteotomy is to be carried out at the same time as fitting a prosthesis. Here the *Wagner SL Revision* Stem can be used as a medullary pin to stabilize the osteotomy.

Contraindications

Severe atrophy of the femoral diaphysis which rules out reliable fixation of the revision prosthesis.

Preoperative Planning

Objective

The most important task in the preoperative planning is the choice of the correct length of the prosthesis and the necessary stem diameter. Since the depth of penetration of the longitudinal ribs into the bone depends on the strength of the bone, which cannot be estimated with sufficient certainty in the x-ray image, stems of the next larger and smaller diameters should be available during the operation in order to permit the selection of the definitive stem diameter according to the depth of penetration of the conical awl and the fitting trial prosthesis.

In the diagrammatic planning it is possible to compensate for the shortening of the leg resulting from the previous loosening of the prosthesis and to determine the length of a possibly necessary transfemoral approach, taking into account the bone loss in the old prosthetic bed. The decisive advantage of preoperative planning is that the individual steps of the operation and their sequence can be thought out and established in diagrammatic form before the operation. The planned operation can then be performed with confidence. This shortens the time required for the operation and prevents surprises because all the details have been planned and laid down in diagrammatic form. Detailed planning should improve the quality of the surgical intervention.

X-Ray Image

The basis for the preoperative planning is provided by x-ray images with a defined magnification scale. It has become customary to use the average magnification scale of the standard x-ray technique of 1.15:1. The planning templates are also adjusted to this factor.
Digital templates are also available.

Planning templates can be obtained under order nos.:

Art. No.	∅	Lengths
06.01165.000x	14 mm–25 mm	190 mm, 225 mm, 265 mm and 305 mm
94.00.52x	14 mm–25 mm	345 mm, 385 mm

Selection of the Implant Length

With the planning template that is placed on the x-ray image, the appropriate length of the prosthesis and the desired elongation of the femur are determined.

The prosthesis should be as short as possible but sufficiently long for the reference line for the center of the head of the prosthesis to touch the tip of the greater trochanter and for the tip of the stem of the prosthesis to penetrate into the intact medullary cavity at least 7 cm distally from the old prosthetic bed. In order to ensure equal length of both legs, comparison with the x-ray image of the contralateral hip is necessary. This can lead to a variation in the height of the head of the prosthesis in relation to the greater trochanter.

Note: If the *Wagner SL Revision* Stem is only anchored in the region of the tip of the stem or the zone of anchorage measures less than 7 cm, there is a risk of material fatigue.

Selection of the Implant Diameter

At the same time, the diameter of the stem of the prosthesis is also determined with the planning template. This is a particularly important part of the preoperative planning because it is here that most crucial mistakes are made by using stems that are too thin.

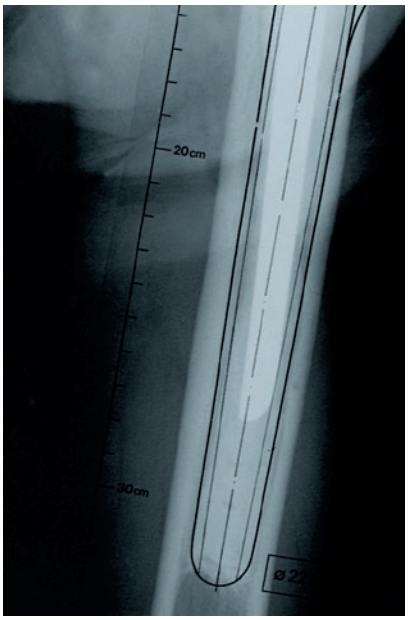
The diameter of the stem must be determined in the zone of anchorage, that is, at least 7 cm distally from the zone of the femur that has undergone significant mechanical damage by osteolysis or fracture.

The outline of the planning template corresponds to the contour of the prosthesis. If the correct diameter is chosen, the outline of the prosthesis on the template must overlap the inner contour of the cortical bone by 1 mm on both sides, over a length of at least 7 cm. This extra millimeter takes into account the cutting of the longitudinal ribs into the bone and the small loss of substance due to reaming.

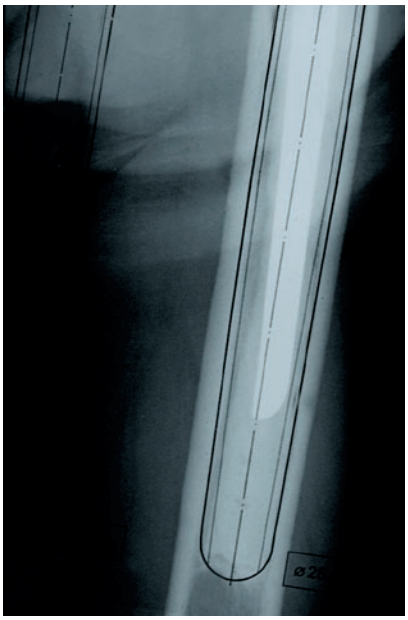
The most common mistake made in the preoperative planning, and consequently in the implantation of the prosthesis, is to choose stems that are too thin and too long. If the stem diameter is correct, then anchorage over a length of 7 cm is sufficient.

Effect of the Bone Quality

In general it is desirable to ream the medullary cavity with the awl until bony resistance is encountered and the marking for the planned center of articulation is level with the tip of the greater trochanter. The depth of anchorage is then checked using the trial prosthesis in order to be able to proceed appropriately by further reaming or use of an implant with a larger diameter. Thanks to the use of trial prostheses, the surgeon can react intraoperatively to variations in bone quality without having to use a number of implants.



Determination of the appropriate stem diameter with the planning template. The contour of the template lies on the contour of the cortical bone. This stem diameter is too small.



With the correct stem diameter, the contour of the template must overlap the contour of the cortical bone by 1 mm.

Drawing the Preoperative Plan

After the size of the implant has been determined with the help of the x-ray template and the x-ray images, the planning diagram can be drawn.

First the contour of the iliac bone, including the acetabulum, and the planned acetabular cup are drawn in and the centerpoint of the articulation is marked. In addition, the preoperative position of the femur is drawn in by marking the tip of the greater trochanter (or another reference point) in order to check the intended correction of the length of the leg (Fig. 1).

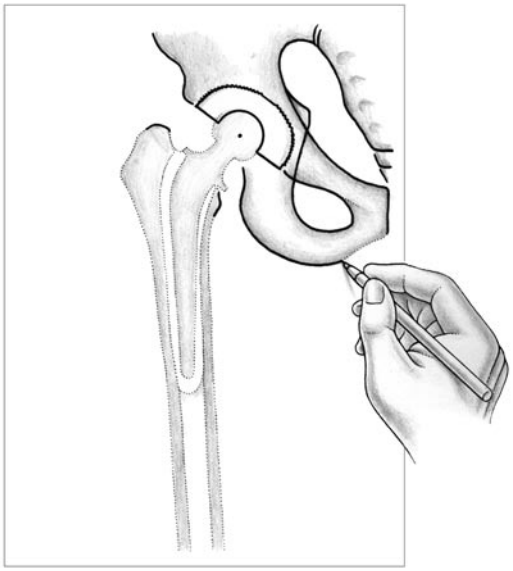


Fig. 1

The planning template, with the selected *Wagner SL Revision* Stem in a physiological slight adduction position, is then placed under this outline drawing so that the center point of the head of the prosthesis on the template lies on top of the previously marked center point of the acetabular implant. The contour of the prosthesis of the template is then transferred onto the outline drawing (Fig. 2).

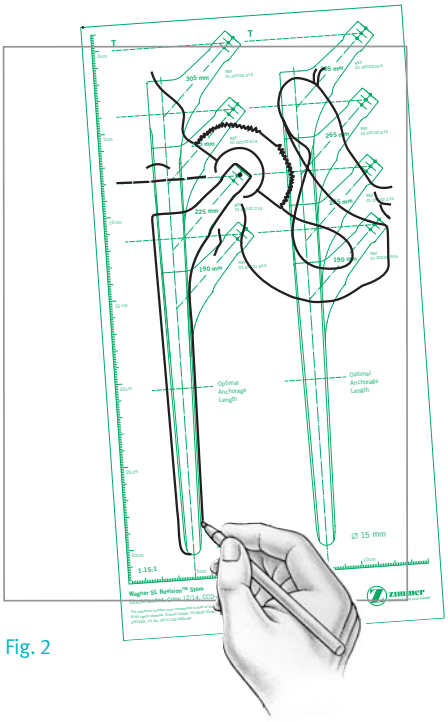


Fig. 2

This outline drawing is now placed onto the x-ray image. By appropriate adjustment the prosthetic stem can be brought into the center of the medullary cavity. At the tip of the greater trochanter (or another previously selected reference point) the length or the lengthening of the leg can be checked against the preoperative marking (Fig. 3). The outer and inner contours of the femur are then drawn in. The tip of the stem of the loosened prosthesis and the distal boundary of the old cement mantle should also be drawn in for the purpose of orientation during the operation.

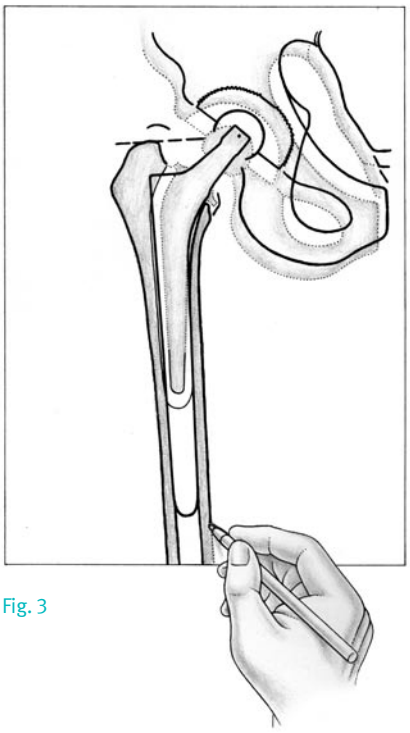


Fig. 3

The sizes of the prostheses and the important length measurements are now entered in this planning drawing: depth of the tip of the stem of the loosened prosthesis (SP), depth of the old cement mantle (ZS), depth of the tip of the stem of the planned *Wagner SL Revision* Prosthesis (SR) and site of the transverse osteotomy (QO) if a transfemoral approach is planned (Fig. 4). The distally limiting transverse osteotomy for the transfemoral approach is generally sited at the distal end of the bone defect. In the case of fractured prosthetic stems or particularly long cement cones, it is often necessary to deviate from this rule. All length measurements are determined according to the scale of the template, which already takes into account the magnification factor of the x-ray image of 1.15: 1.

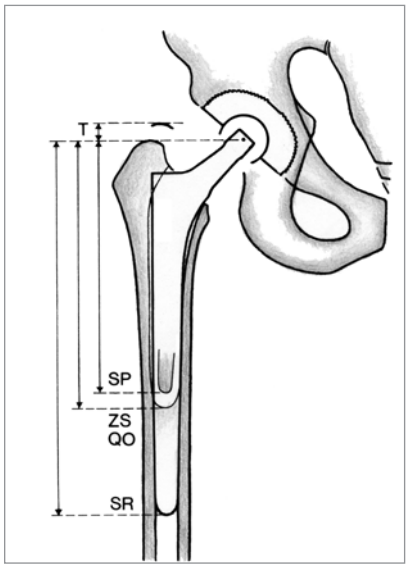


Fig. 4

Reference Points

All these measurements must be made from a reliable reference point that can also be easily located during the operation. The tip of the greater trochanter is almost always used as the reference point, which during the operation can be located and marked with a Steinmann pin.

In the case of very severe bone loss it can happen that the tip of the trochanter cannot be used as reference point. Then other, and if necessary several, reliable reference points have to be selected, for example a prominent bony eminence, cerclage wires or screws on or in the bone or, in particularly severe cases, the epicondylus lateralis femoris or even the lateral knee-joint line.

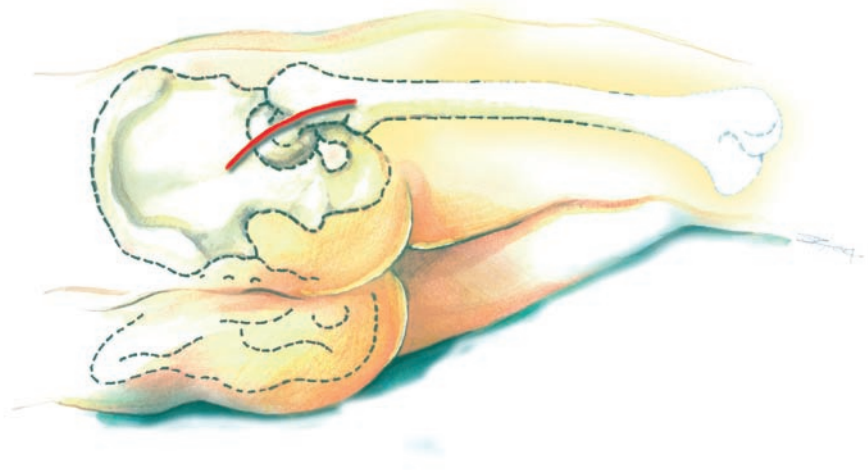
With the transfemoral approach, the greater trochanter is split longitudinally. In the second phase of the operation, the tip of the trochanter is then no longer suitable as a reference point. Here, the necessary measurements, especially the depth of penetration of the prosthesis, can be taken from the transverse osteotomy, the location of which is exactly defined in the planning drawing.

Endofemoral Procedure with Posterior Approach

Surgical Technique

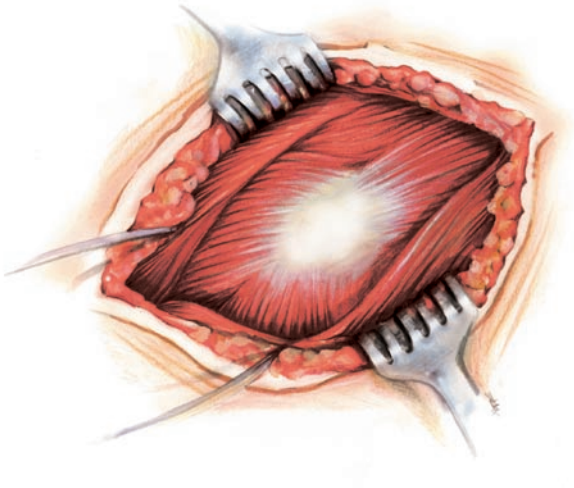
Step 1

The patient is in the lateral position. The incision lies 3 cm dorsally from the crista trochanterica and follows the direction of the fibers of the gluteus maximus and the fascia lata.



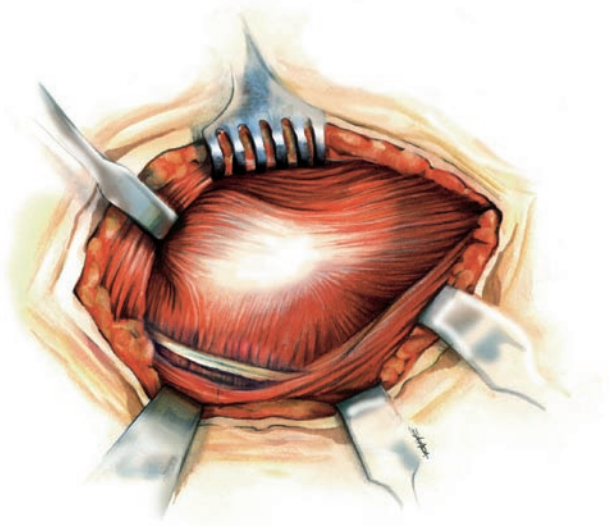
Step 2

The gluteus maximus and the fascia lata are split parallel to the direction of the muscle fibers. The retracted edges of the gluteus maximus and the fascia lata are spread apart, exposing the greater trochanter and the short external rotators.



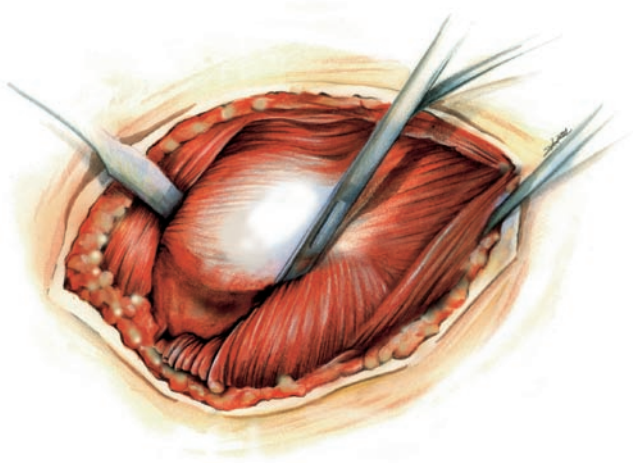
Step 3

The ischiadic nerve is identified. Adherent scar tissue can be resected. Detachment of the tendon of the gluteus maximus is only seldom necessary.



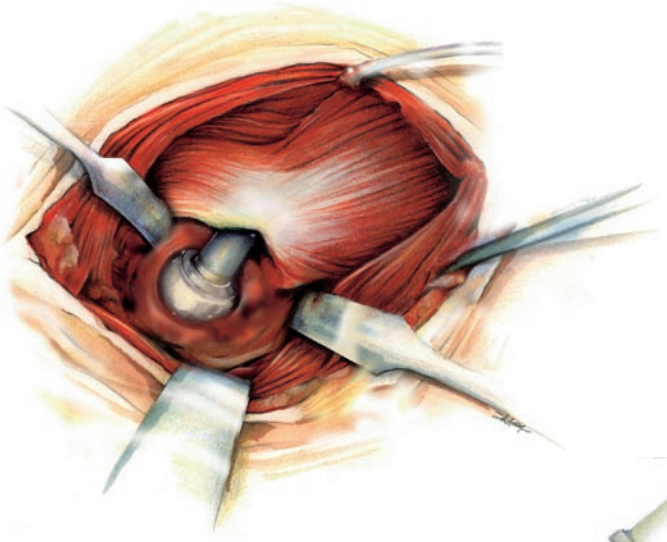
Step 4

The short external rotators, as well as the piriform muscle, are severed at their tendonous portion at the point of their insertion into the greater trochanter. A slight inward rotation of the leg facilitates the preparation. Then the posterior hip joint capsule is exposed.



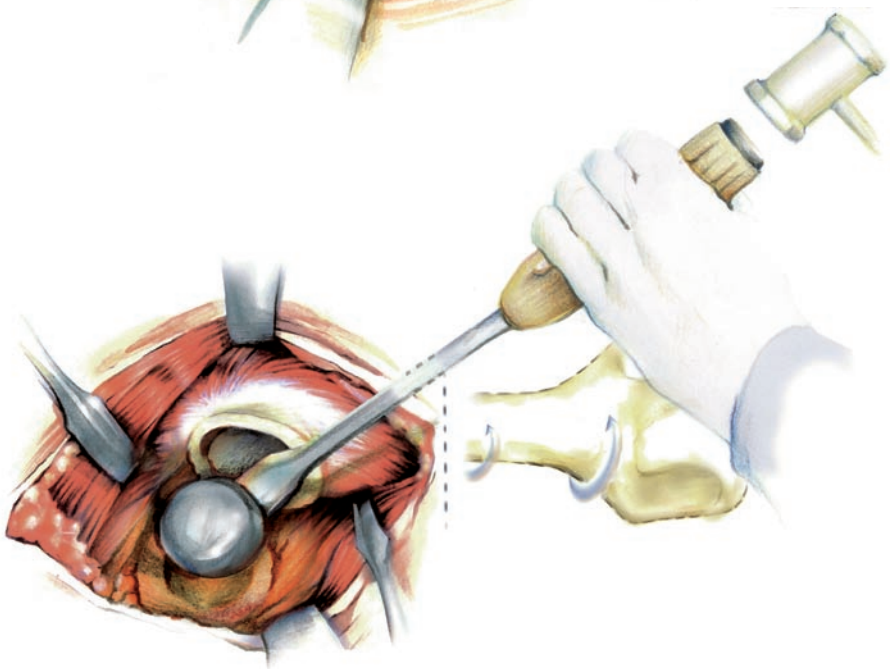
Step 5

After the posterior capsule has been exposed, one Hohmann retractor is inserted under the cranial edge and one under the caudal edge of the neck of the femur and the posterior edge of the acetabulum is adjusted with a lever.



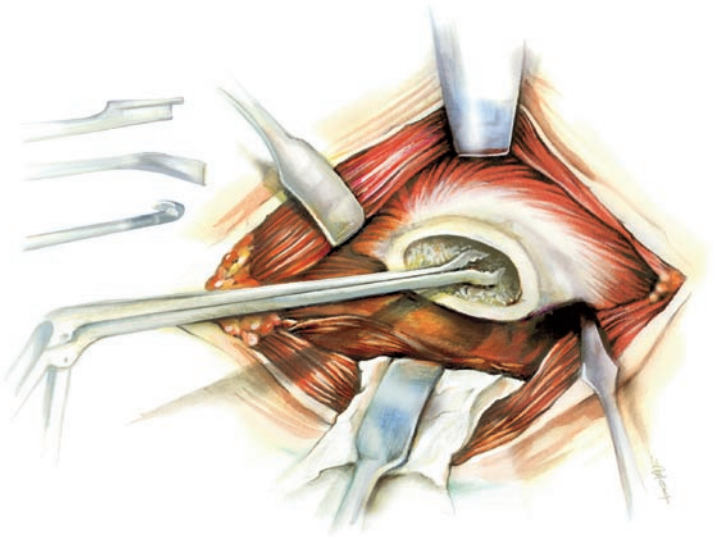
Step 6

After the posterior joint capsule has been opened, the femoral prosthesis is dislocated dorsally out of the prosthetic cup with the hip flexed and rotated inward. Now the loosened femoral prosthesis can be extracted from the medullary cavity.



Step 7

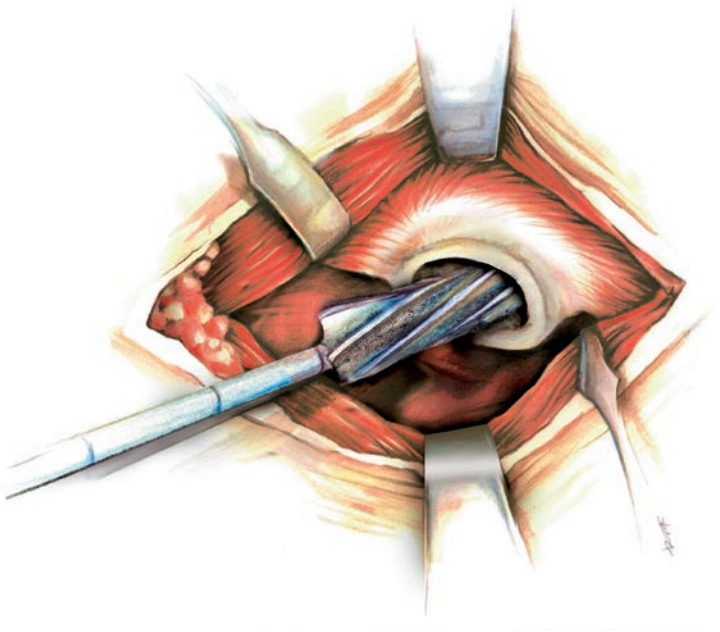
The bone cement still in the medullary cavity is broken up with the appropriate instruments and completely removed.



Step 8

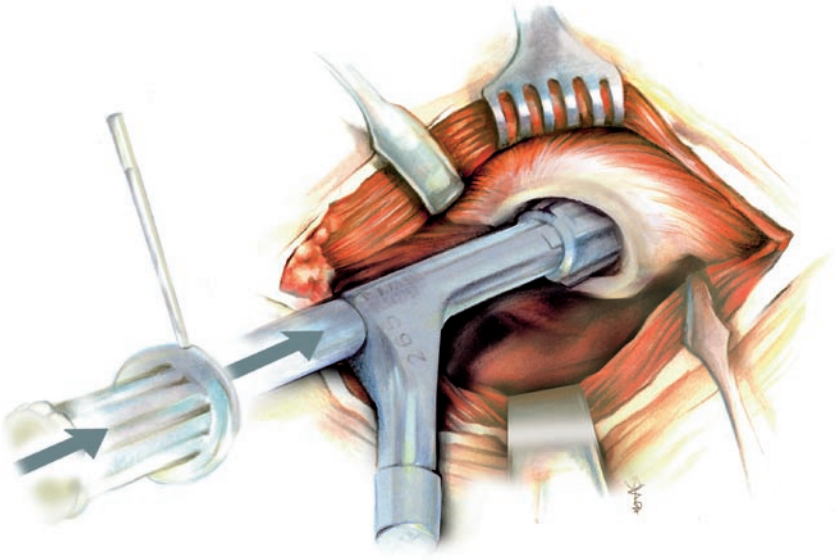
After careful removal of the scar and granulation tissue from the prosthetic bed, the medullary cavity of the femur is gradually widened by conical reaming distally from the old prosthetic bed, using the modular awls. The ring-shaped grooves on the stem of the awl mark the level of the average center of the head for the revision prosthesis of each length.

The awls are introduced to a depth at which the mark corresponding to the length of the prosthesis is level with the tip of the greater trochanter. The necessary diameter for the prosthesis has been reached when the resistance to abrasion is markedly increased. The length of the prosthesis has already been determined during preoperative planning.



Step 9

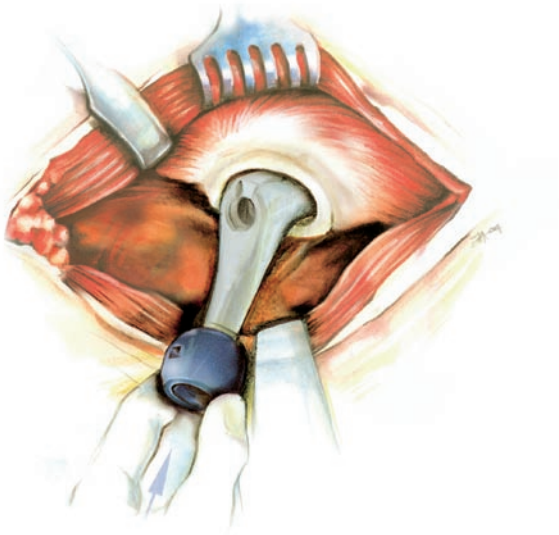
To check the depth of implantation and exact positioning of the prosthesis, the modular trial prostheses are used. A trial prosthesis corresponding to the prosthesis size defined in preoperative planning is assembled in advance, with a diameter corresponding to the awl last used, and inserted into the prepared medullary cavity. The trial prosthesis is driven into the final position with the impactor/extractor.



Step 10

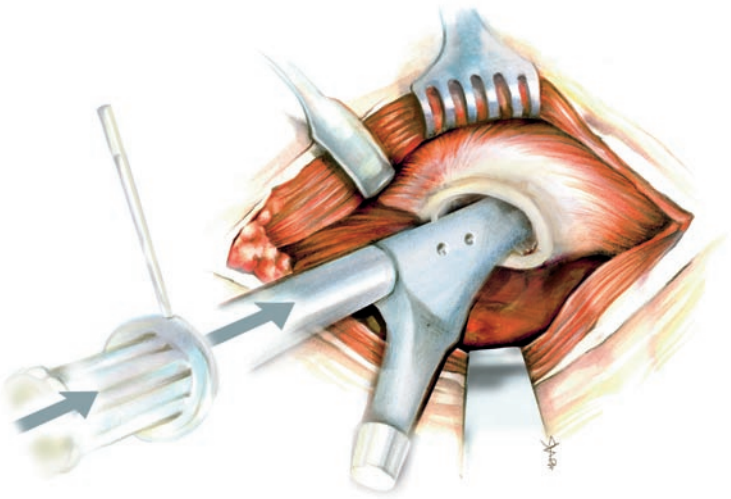
For a test reduction, a test head with a planned neck length is set onto the trial stem. Antetorsion, range of motion and soft tissue tension are checked.

After the test reduction the trial stem is again removed from the medullary cavity. If the test reduction did not yield the desired result, preparation must be made to implant a thicker or thinner prosthesis.



Step 11

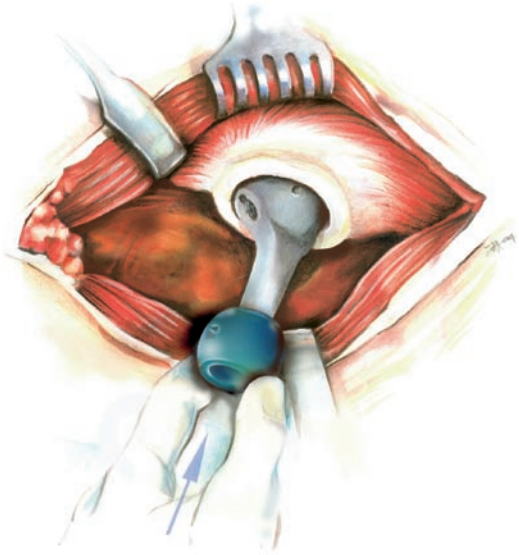
For the placement of the implant, the impactor/extractor is screwed onto the threaded hole at the shoulder of the prosthesis. In screwing it on, care must be taken that the positioning pin at the end of the impactor is screwed in as far as it will go. With the positioning bar, the antetorsion angle can be checked against the lower leg, bent at right angles. The revision prosthesis is placed in the prepared medullary cavity and driven into its definitive position with a few hammer blows. The stability of the anchorage is recognized in the following way:
At first the prosthesis penetrates somewhat deeper into the medullary cavity with each hammer blow, until the required stability has been achieved and the prosthesis no longer moves under continued hammer blows.
At the same time, the sound of the hammering changes. Usually the elasticity of the bone allows the stem to be driven in by another 2–3 mm after about 2 minutes' waiting time. Finally the depth of penetration is checked with the tape measure, as determined in the preoperative planning.



Step 12

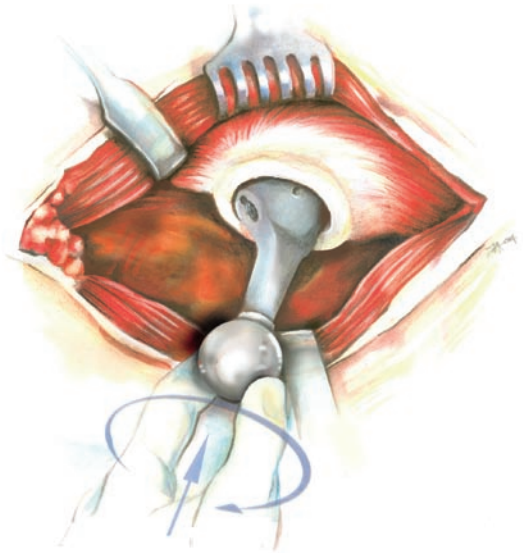
To prepare the final test reduction, a trial head is set onto the taper. The soft-tissue tension is checked by longitudinal traction on the extended leg: under this traction the prosthetic articulation should only open a few millimeters. It may be the case that a longer prosthetic head must be selected. If the leg has been lengthened considerably, the tension of the ischiadic nerve is now checked.

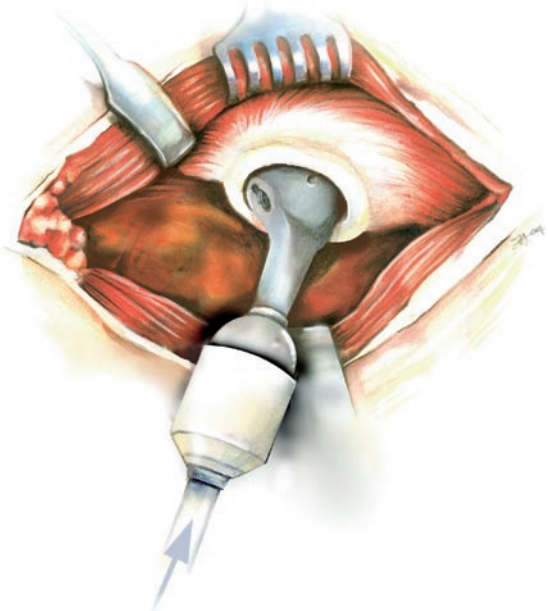
Any remaining cavities between the prosthesis and the surrounding cortical bone of the previous prosthetic bed can be filled with bone chips.



Step 13

After careful cleaning of the taper, the definitive head is mounted using a slight rotational movement. The head is locked in place by a light hammer blow on the nylon impactor.





Transfemoral Approach

After revision of a loosened femoral prosthesis the loss of bone substance can be so severe that only paper-thin cortical bone remains in the region of the prosthetic bed, often showing defects and fractures. In such grave cases, where the bone of the previous prosthetic bed no longer has any mechanical resistance left, the replacement with the revision prosthesis can be carried out through the transfemoral approach. This procedure simplifies and shortens the operation.

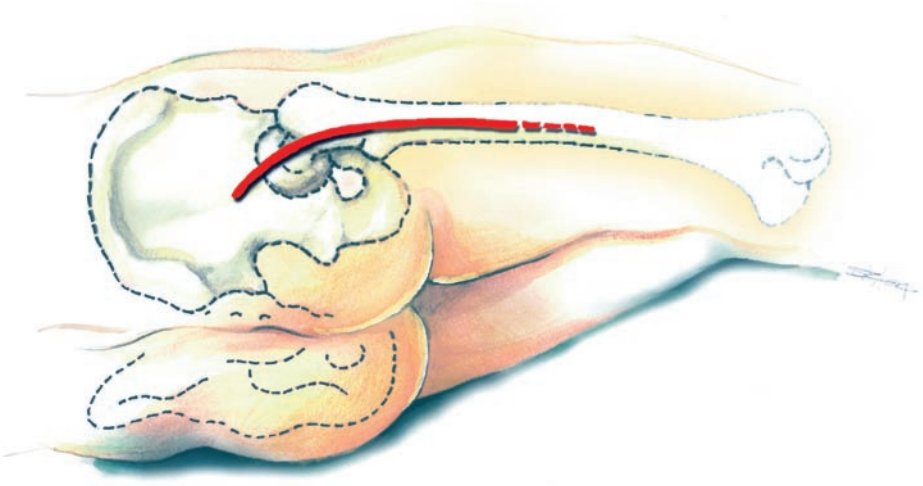
A straight stem has the disadvantage that with long prostheses with a length of more than 225 mm the tip of the stem can perforate the ventral cortical bone. Long stems can therefore only be implanted in combination with a transfemoral approach where the antecurvation can be reduced at the point of the transverse osteotomy. This is only of theoretical interest, however, because particularly long stems are only used in cases with very extensive bone damage anyway, for which a transfemoral approach is therefore already indicated.

The intervention requires a precise operative technique and exact preoperative planning. Otherwise there is a risk of serious perioperative complications.

Surgical Technique

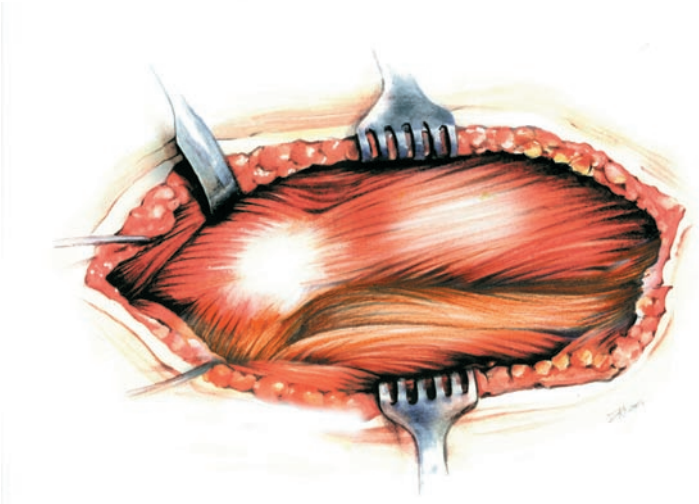
Step 1

The patient is in the lateral position. The operative approach is a variation of the posterior approach, being lengthened distally. The incision, following the direction of the fibers of the gluteus maximus and the fascia lata, runs three centimeters dorsally from the crista trochanterica toward the lateral femoral epicondyle and ends in the middle third of the thigh.



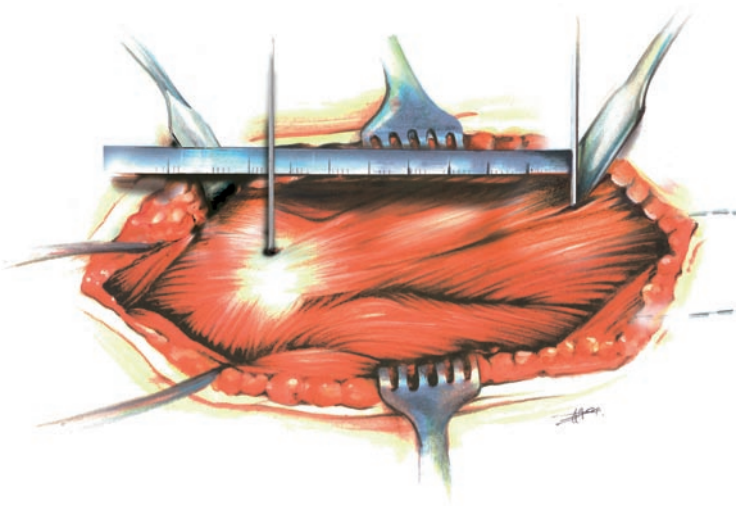
Step 2

After the fascia lata and the gluteus maximus have been split parallel to the direction of their fibers, the greater trochanter and the vastus lateralis are exposed.



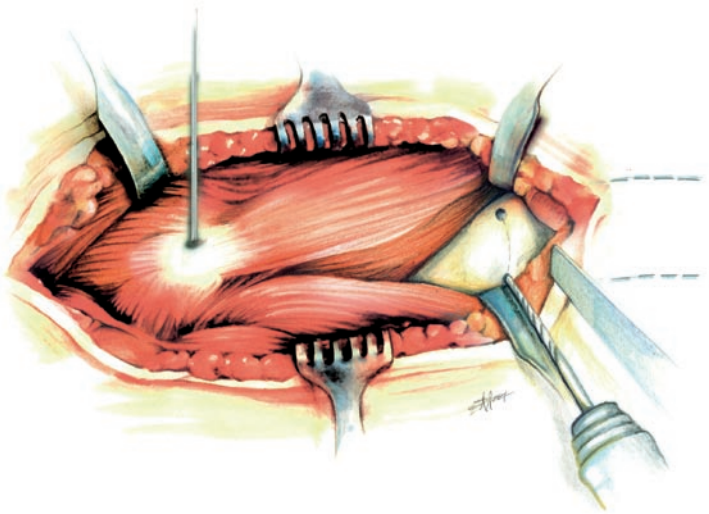
Step 3

For the opening of the lateral periosteum, in the transfemoral approach, the level for the semicircular or complete transverse osteotomy, determined during preoperative planning, is marked. This distance corresponds to the length of the previous prosthetic bed. A Steinmann pin is set on the tip of the greater trochanter. The distance for the osteotomy is measured from this point and is marked with a distal Steinmann pin.



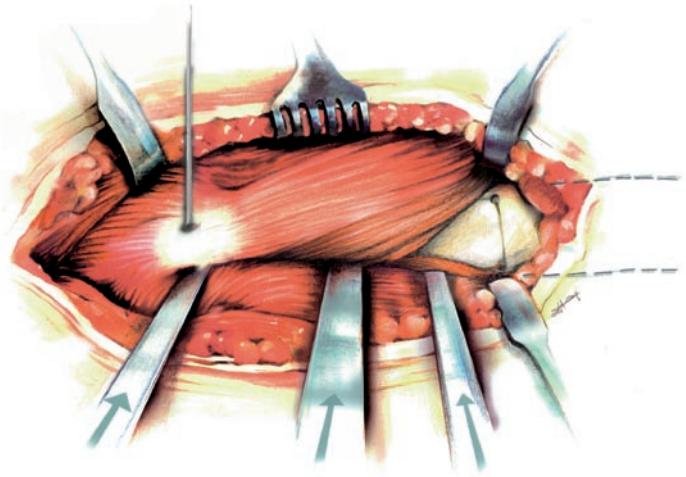
Step 4

Semicircular or complete transverse osteotomy for the distal boundary of the transfemoral approach. Complete transverse osteotomy also starts with a semicircular osteotomy and is completed, after removal of the prosthesis, with the oscillating saw. The bone flap is demarcated at the marking-point with a dorsal and a ventral drill hole, and the cortical bone between the two drill holes is then carefully separated with a sharp-bladed chisel or an oscillating saw. The distance between the two drill holes determines the width of the bone flap.



Step 5

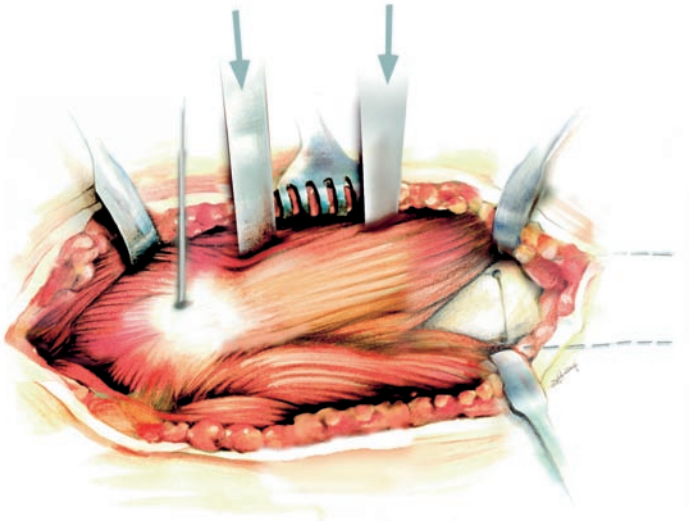
The dorsal boundary of the bone flap is set by splitting the cortical bone from the semicircular transverse osteotomy along the linea aspera. In the proximal direction, the osteotomy runs through the middle of the greater trochanter. Likewise the insertion of the gluteus medius should be split over a distance of approximately 3 cm. The tendon of origin of the vastus lateralis should be treated with care because it absorbs the tensile force of the gluteus medius and prevents the greater trochanter from rising.



Step 6

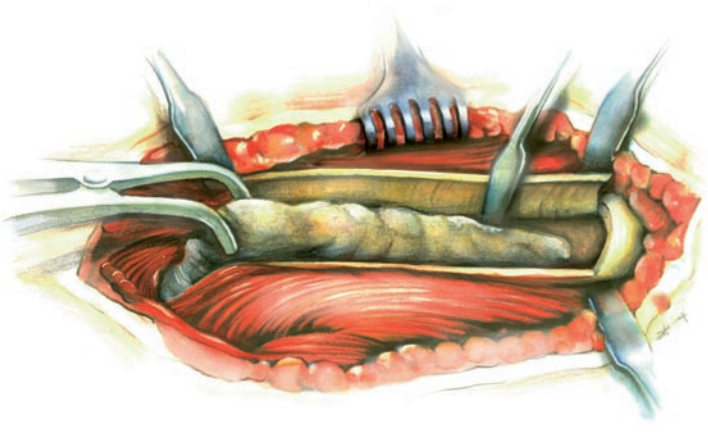
To demarcate the ventral boundary of the bone flap, a row of small stab osteotomies is placed along the boundary line in continuation of the ventral drill hole in the proximal direction. A narrow straight chisel is bluntly introduced between the fibers of the vastus lateralis until it reaches the surface of the bone. At this point the chisel is twisted toward the boundary line and the thin cortical bone is separated. This procedure is repeated a number of times along the boundary line. In this way the muscles will not be detached from the surface of the bone, so that the blood supply of the bone flap is preserved.

In the case of very thin and flexible cortical bone, the bone flap can first be lifted slightly and the stab osteotomies marking the boundary can be made beneath the flap through the medullary cavity.



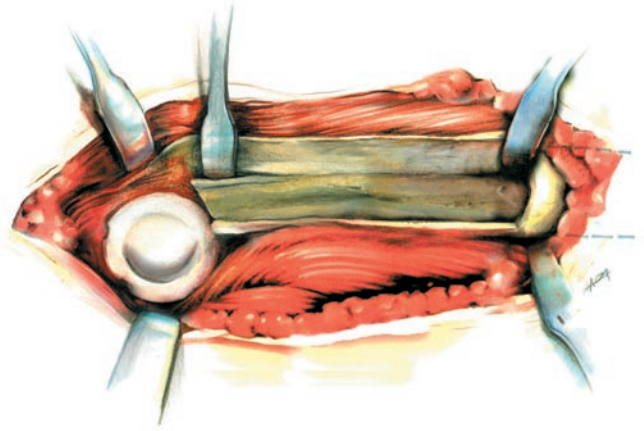
Step 7

Bone spreaders are introduced into the dorsal osteotomy fissure and used cautiously to lift the bone flap. The cortical bone will break at the ventral row of stab osteotomies. Then the flap can be completely opened. However, the connection to its muscular covering remains intact. After the flap has been opened and the cicatricial tissue on the neck of the prosthesis has been resected, the loosened femoral prosthesis will be accessible along its entire length, together with the attached cement. It can now be easily removed from the femur.



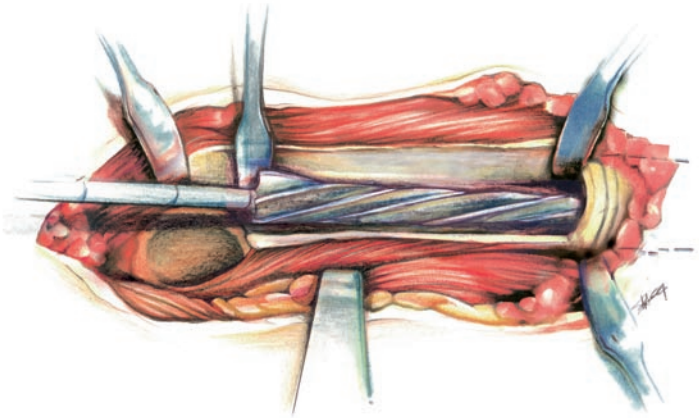
Step 8

After removal of the loosened femoral prosthesis, the prosthetic cup will also be readily accessible. If necessary, it can be replaced transfemorally. The femoral stem can be secured against breaking with a double cerclage of steel wire of 1.5 mm diameter. The need for cerclage depends on the strength of the bone. In case of doubt, a cerclage should always be applied, with great care being taken to ensure that the wire does not touch the stem of the prosthesis.



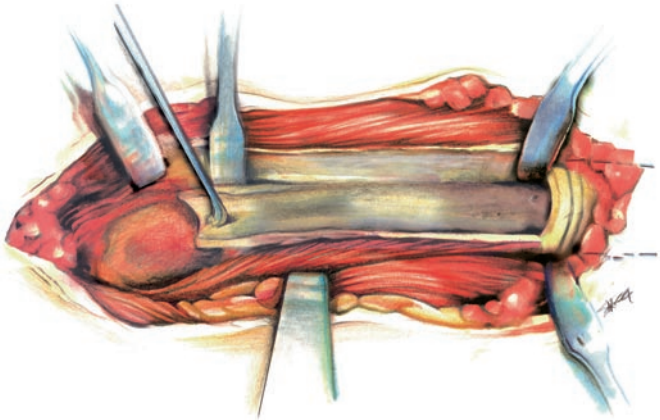
Step 9

The femoral medullary cavity is conically widened with the awls distal from the original prosthetic bed.



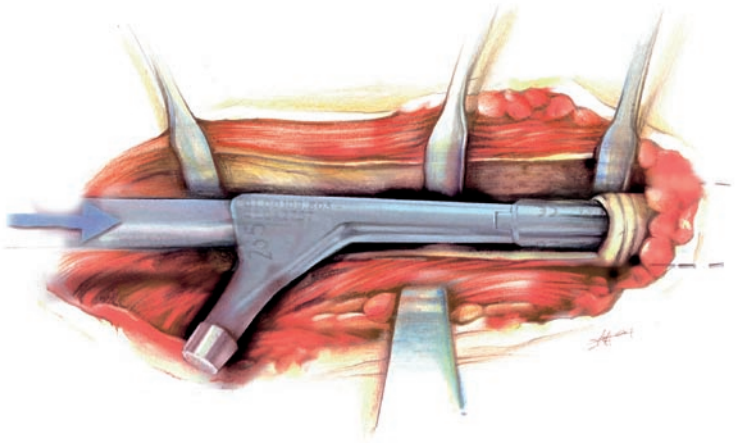
Step 10

The internal surface of the bony shell surrounding the original prosthetic bed is mechanically cleaned, with great care, until spots of blood appear everywhere.



Step 11

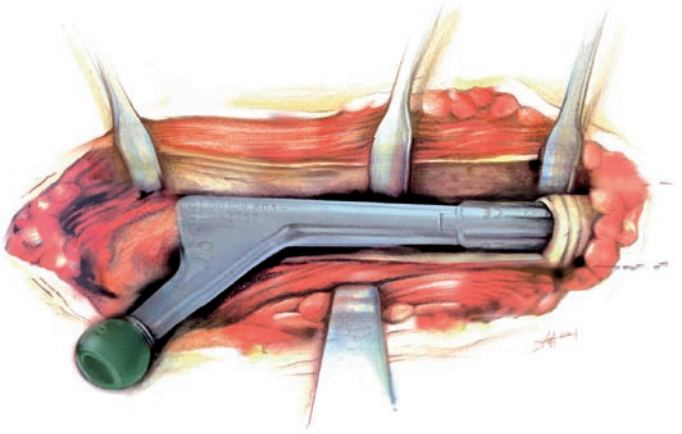
To check the depth of implantation and the positioning of the prosthesis, the modular trial prostheses, specially developed for this purpose, are used. A trial prosthesis corresponding to the prosthesis size defined in preoperative planning is assembled in advance, with a diameter corresponding to the awl last used, and inserted into the prepared medullary cavity. The trial prosthesis is driven into the final position with the impactor/extractor.



Step 12

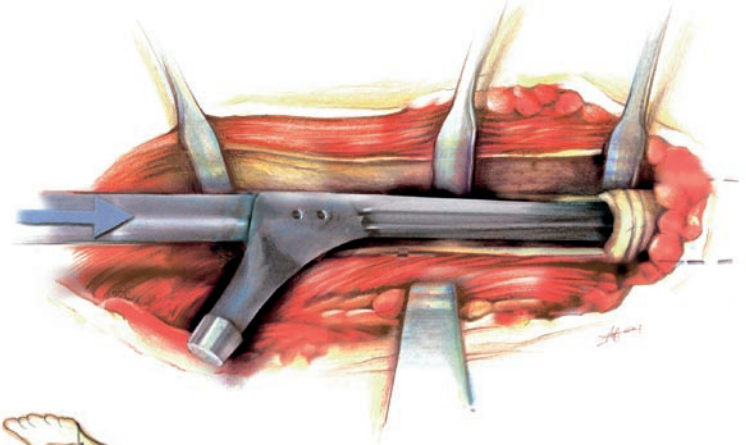
For a test reduction, a test head with a planned neck length is set onto the trial stem. Antetorsion, range of motion and soft tissue tension are checked.

After the test reduction, the trial stem is again removed from the medullary cavity. If the test reduction did not yield the desired result, preparation must be made for implanting a thicker or thinner prosthesis.

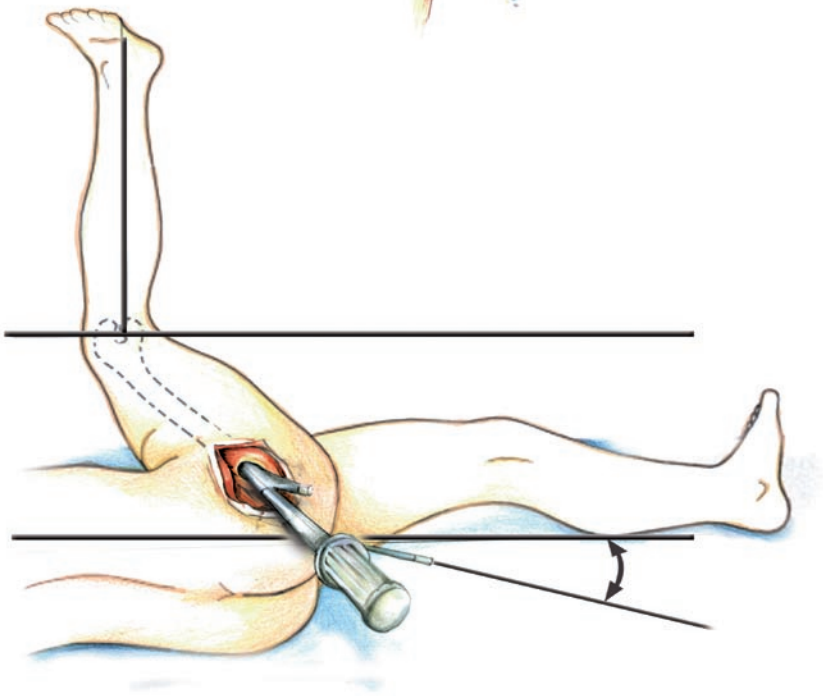


Step 13

For the placement of the prosthesis, the impactor/extractor is screwed onto the threaded hole at the shoulder of the prosthesis. In screwing it on, care must be taken that the positioning pin at the end of the impactor is screwed in as far as it will go. The positioning pin on the impactor handle permits optimal setting of antetorsion.

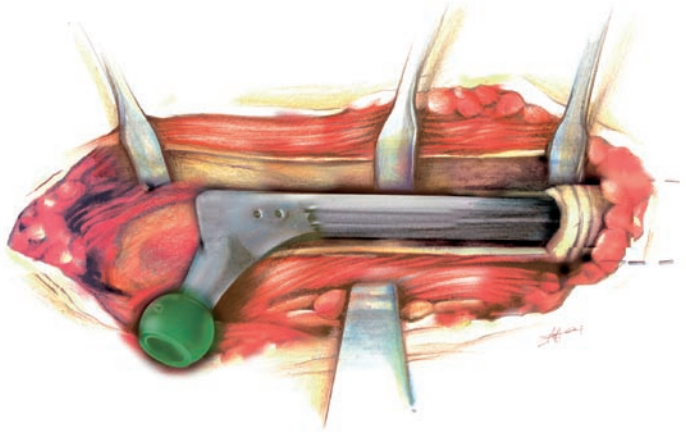


The *Wagner SL Revision* Prosthesis is placed in the prepared medullary cavity of the femur and driven into its definitive position with a few hammer blows. The stability of the anchorage is recognized in the following way: By referring to the transverse osteotomy (or some other point of reference), it is possible to see how the prosthesis penetrates somewhat further into the bone with each blow of the hammer until, with continued hammer blows of the same intensity, the prosthesis no longer moves relative to the bone. In this phase, the sound of the hammering changes. Usually the elasticity of the bone allows the stem to be driven in by another 2–3 mm after about 2 minutes' waiting time. Finally the depth of penetration is checked with the tape measure, as determined in the preoperative planning.



Step 14

To prepare the test reduction, a test head is set onto the taper. In the test reduction, the stable joint closure of the prosthesis is checked in inward rotation and flexion. The soft-tissue tension is checked by longitudinal traction on the extended leg: under this traction the prosthetic articulation should only open a few millimeters. It may be the case that a longer prosthetic head must be selected. If the leg has been lengthened considerably, the tension of the ischiadic nerve is now checked.



Step 15

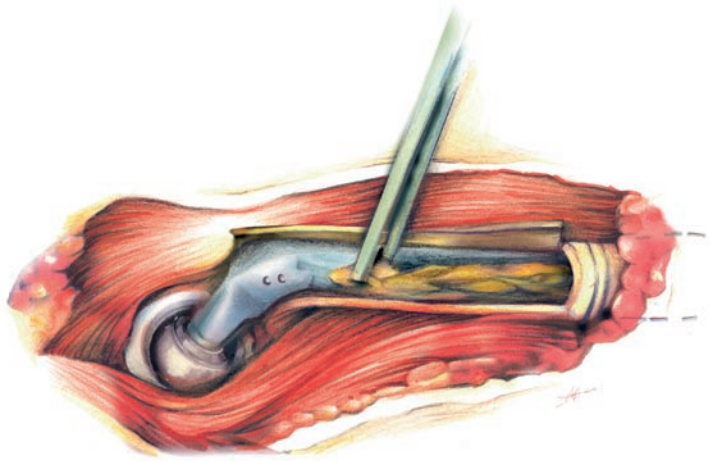
After careful cleaning of the taper, the definitive head is mounted, using a slight rotational movement. The head is locked in place by a light hammer blow on the nylon impactor. The prosthesis is then ready for reduction.

After reduction, the bone flap of the transfemoral approach often has the tendency to remain on the anterior surface of the prosthesis and must be reduced onto the lateral surface. A diastasis at the level of the transverse osteotomy must be avoided. It may be necessary to fix the bone flap in the reduced position with a strong suture or with a cerclage. Care must be taken that the wire does not touch the prosthesis. No metal cerclage wires may be fixed through the drill holes in the proximal region of the prosthesis, since these can lead to the production of undesirable metal abrasion particles or entail the risk of corrosion of the implants.

If bone defects remain on the lateral surface of the femur, these should be filled with bone chips. Bone defects on the medial surface of the femur do not require special attention because here, the spontaneous ossification is rapid.

Finally, the two parts of the greater trochanter are adapted and, like the longitudinally separated tendon of the gluteus medius, firmly sutured. Because of the longitudinal separation of these structures in the direction of the tensile forces, the healing here is without problems.

After insertion of suction drainage the fascia lata, as an important traction structure, is closed with purse-string sutures.

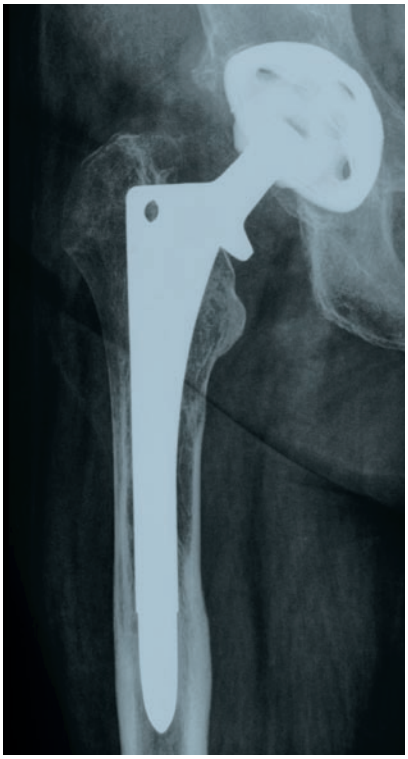


Postoperative Treatment

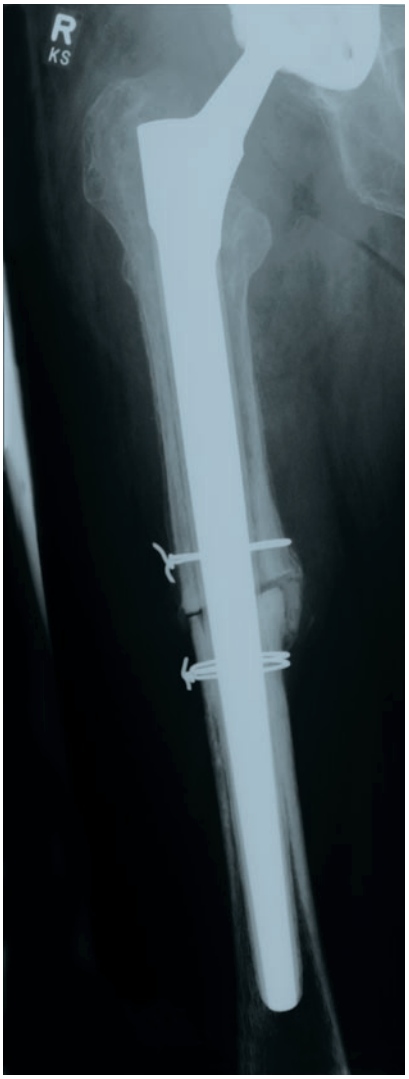
The *Wagner SL Revision* Stem, firmly anchored in stable bone, permits immediate full weight bearing. With extensive reconstruction of the acetabulum, the surgeon must decide how soon the patient may bear full weight on the leg. In general, it will be possible to mobilize the patient on the first or second postoperative day. Until the incision has healed and neuromuscular coordination has been regained, the use of crutches is advisable. In the case of very complex reconstructions and poor bone condition, the surgeon must establish an individual aftercare program.

Case Studies

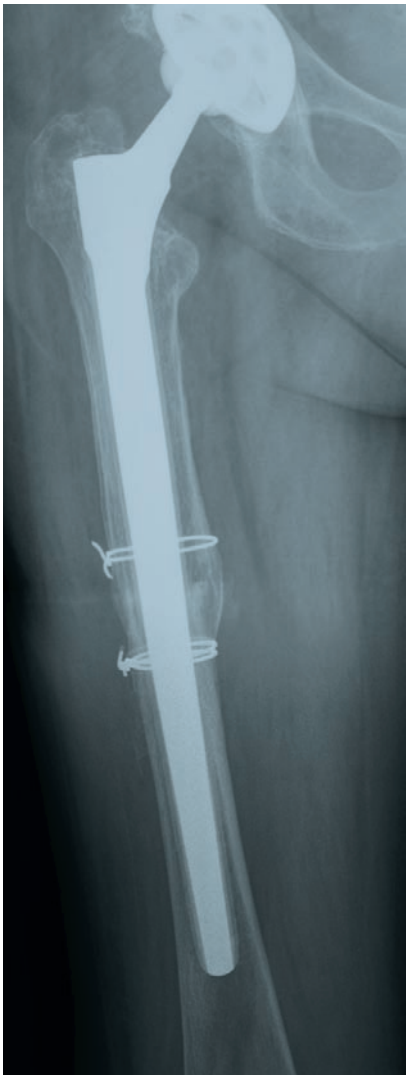
Case Study
Transfemoral Approach



Loosening of a cementless primary prosthesis implanted 8 years earlier in a 66-year-old woman. There is massive stress shielding and paper-thin cortical bone in the femur.

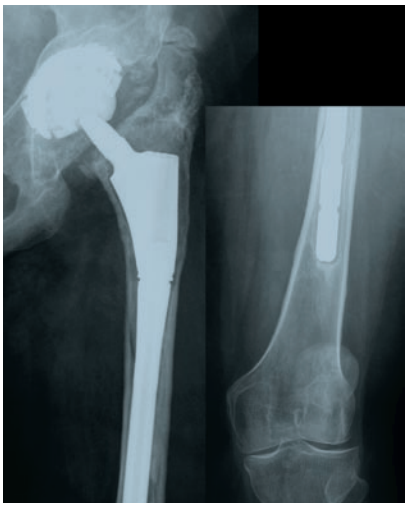


One year postoperative, after prosthesis exchange with a Wagner SL Revision Stem through a transfemoral approach.

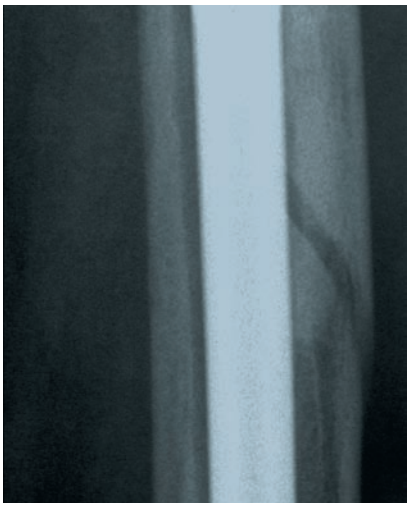


Two years postoperative: good consolidation of the transfemoral approach.

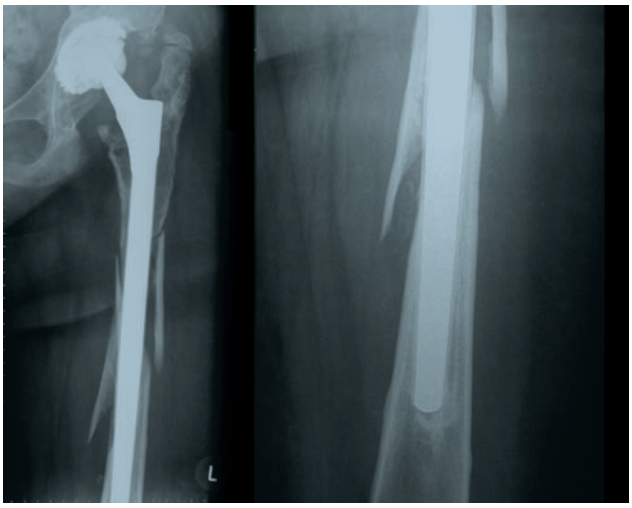
Case Study
Periprosthetic Fracture



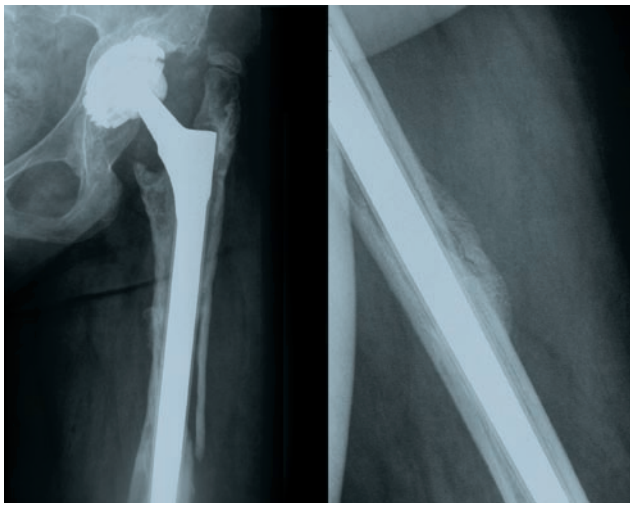
Two years after implantation of a modular revision prosthesis, there was considerable subsidence of the prosthesis with a leg shortening of 2.5 cm. A minor accident caused an extensive spiral fracture.



Detail of the spiral fracture. The remains of bone cement not removed after the earlier revision are also recognizable.

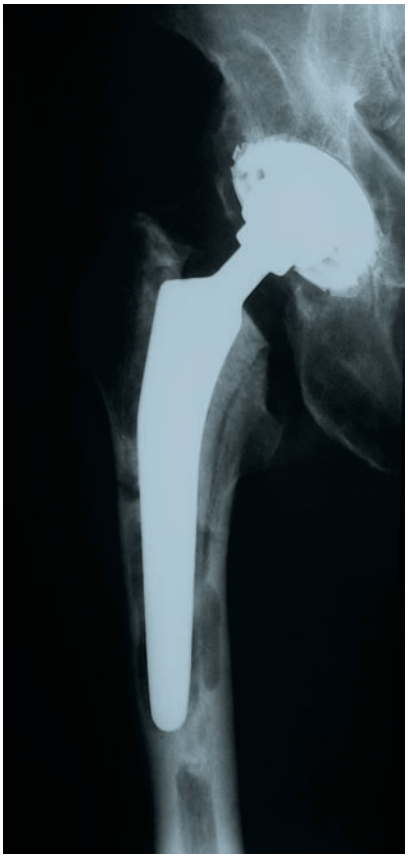


X-ray image 3 weeks postoperative. The fracture has been “threaded up” with a Wagner SL Revision Stem with very scant removal of soft tissue. The tip of the prosthesis is stably anchored in the distal femur.

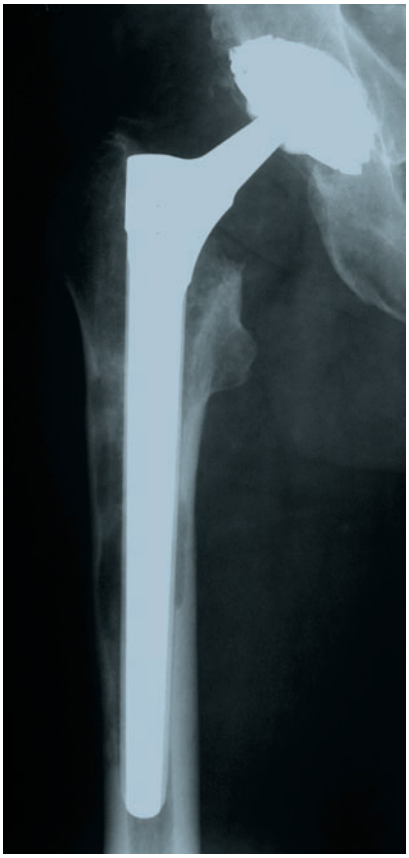


X-ray image 6 weeks postoperative. The fracture shows active callous formation. The patient is without complaints and in particular, no thigh pain can be elicited.

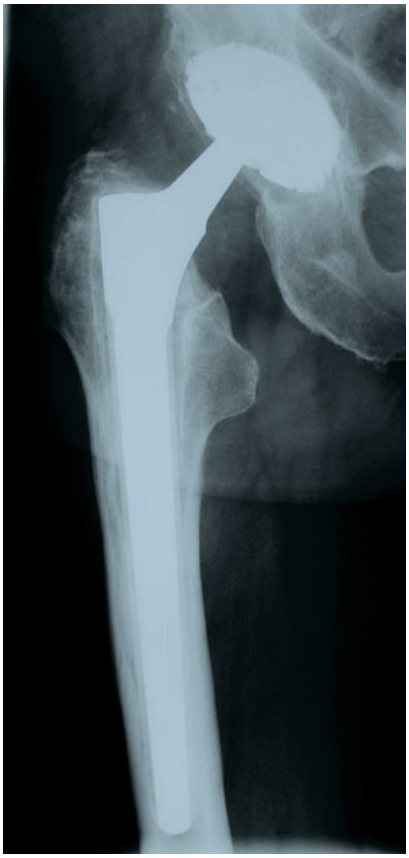
Case Study
Endofemoral Approach



61-year-old patient, 4 years after implantation of a cemented primary prosthesis. Chronic Staphylococcus epidermis infection. Septic loosening with considerable osteolysis.

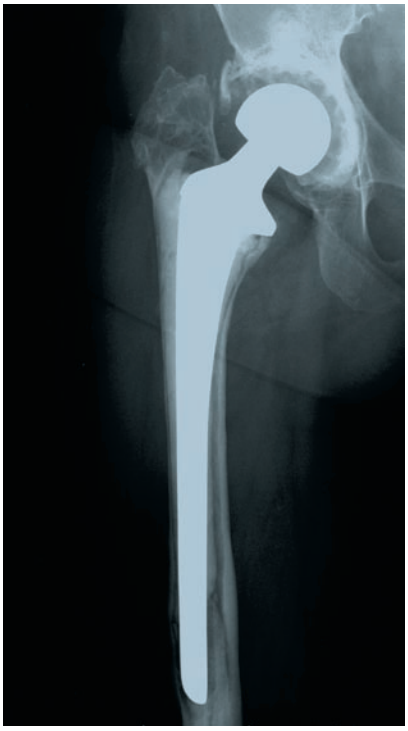


After 3 weeks: revision with endofemoral approach and radical debridement.
No transplant at stem, only implantation of a Wagner SL Revision Stem.

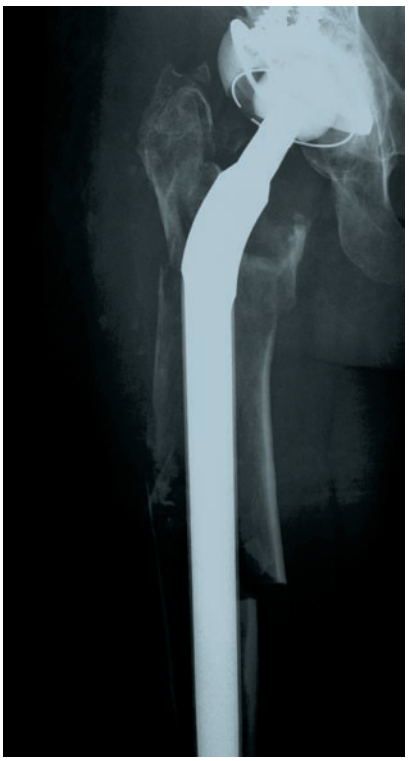


After one year, the defects have largely been filled. Normalization of laboratory parameters.

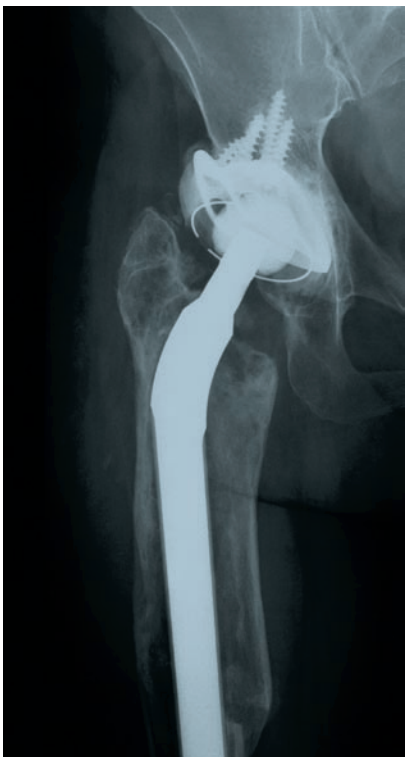
Case Study
Nine-Year Result



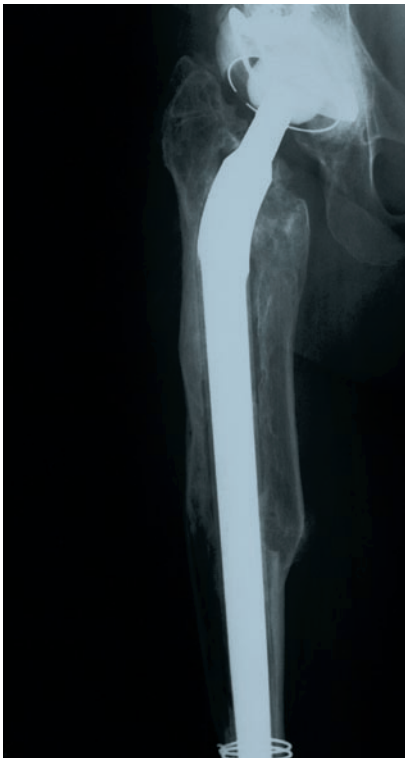
58-year-old woman, 5 years after implantation of a long-stemmed cemented revision prosthesis. The prosthesis has migrated toward varus and has perforated the lateral cortical bone distally. The bone quality proximally is extraordinarily poor, which makes implantation of a short stem prosthesis impossible.

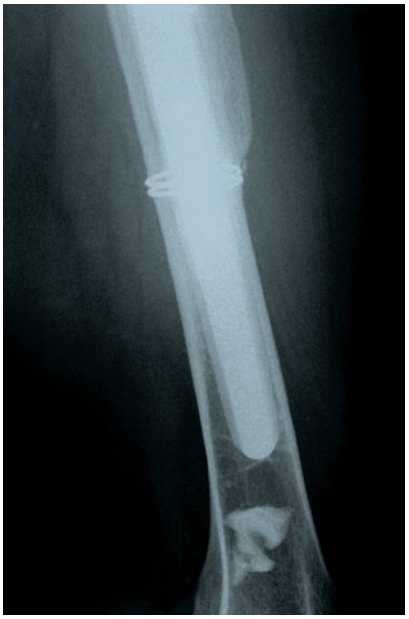


Three weeks after implantation of a Wagner SL Revision Stem of the earlier generation by a transfemoral approach. The thin cortical bone permitted no osteosynthesis of the bone flap.



Six months postoperative the bone flap shows the beginning of bone healing. The soft tissue tension of the thigh muscles has pressed the bony shell onto the implant.





Nine years postoperative there has been further recovery of the bone. As a sure radiological sign of osseointegration there are strong bony bridges at the tip of the prosthesis.

Implants

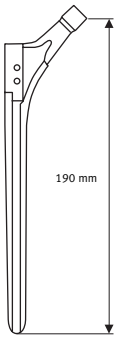
Wagner SL Revision™
190 mm

H. Wagner

Details
Taper 12/14
Uncemented

Ti6Al7Nb
Protasul®-100

STERILE R



∅ mm	REF
14	01.00101.914*
15	01.00101.915*
16	01.00101.916
17	01.00101.917
18	01.00101.918
19	01.00101.919
20	01.00101.920

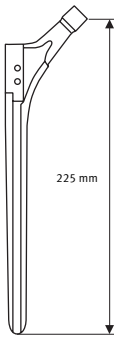
Wagner SL Revision™
225 mm

H. Wagner

Details
Taper 12/14
Uncemented

Ti6Al7Nb
Protasul®-100

STERILE R



∅ mm	REF
14	01.00102.214*
15	01.00102.215*
16	01.00102.216
17	01.00102.217
18	01.00102.218
19	01.00102.219
20	01.00102.220
21	01.00102.221
22	01.00102.222

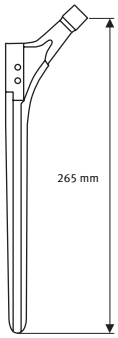
Wagner SL Revision™
265 mm

H. Wagner

Details
Taper 12/14
Uncemented

Ti6Al7Nb
Protasul®-100

STERILE R



∅ mm	REF
14	01.00102.614*
15	01.00102.615*
16	01.00102.616
17	01.00102.617
18	01.00102.618
19	01.00102.619
20	01.00102.620
21	01.00102.621
22	01.00102.622
23	01.00102.623
24	01.00102.624
25	01.00102.625

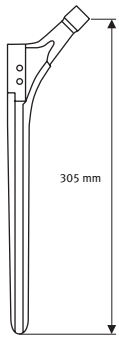
Wagner SL Revision™
305 mm

H. Wagner

Details
Taper 12/14
Uncemented

Ti6Al7Nb
Protasul®-100

STERILE R



∅ mm	REF
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15	01.00103.015*
16	01.00103.016
17	01.00103.017
18	01.00103.018
19	01.00103.019
20	01.00103.020
21	01.00103.021
22	01.00103.022
23	01.00103.023
24	01.00103.024
25	01.00103.025

* Do not use with femoral heads longer than L (+4 mm)

Lengths of 345 mm (34.00.79.XXX) and 385 mm (34.00.79-XXX) available on request and only in the design with CCD of 145°. Impactor/extractor and slot hammer for these selections are also only available by request.

Instruments

Tray basic instruments and awls (complete)

REF
ZS01.00109.000

Tray basic instruments (empty)

REF
01.00109.031

Tray insert basic instruments (empty)

REF
01.00109.032

Tray awls (empty)

REF
01.00109.033

Tray insert awls (empty)

REF
01.00109.034

Standard cover, gray

REF
01.00029.031

Awl for 75.00.25*

∅ mm	REF
14	01.00109.014
15	01.00109.015
16	01.00109.016
17	01.00109.017
18	01.00109.018
19	01.00109.019
20	01.00109.020
21	01.00109.021
22	01.00109.022
23	01.00109.023
24	01.00109.024
25	01.00109.025

Impactor and positioning bar

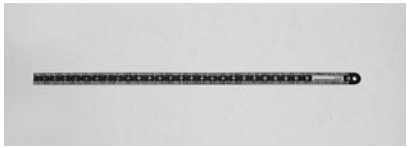
	REF
Impactor	01.00109.808
Positioning bar	75.85.00

Handle with quick coupling

REF
75.00.25

Impactor consisting of:

	REF
Handle	75.11.00-02
Synthetic top	75.11.00-03



Ruler, long

mm	REF
300	75.11.30

Osteotome, straight

Size in mm	REF
4×10	75.11.45-10
5×15	75.11.45-15
5×20	75.11.45-20

Extractor connector for slap hammer REF 01.00129.190

REF
01.00109.801

Test head for HTP, taper 12/14

Size	∅ mm	REF
S	28	01.01559.128
M	28	01.01559.228
L	28	01.01559.328
XL	28	01.01559.428
S	32	01.01559.132
M	32	01.01559.232
L	32	01.01559.332
XL	32	01.01559.432

* The new awl (01.00109.014–025) must under no circumstances be mixed with the old awl (75.11.00-140–205).

All instruments not sterile

Tray trial stems (complete)

REF

ZS01.00109.100

Tray trial stems (empty)

REF

01.00109.110

Standard cover, gray

REF

01.00029.031

Trial stems, distal

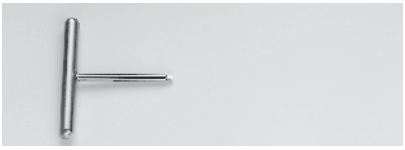
∅ mm	REF
14	01.00109.114
15	01.00109.115
16	01.00109.116
17	01.00109.117
18	01.00109.118
19	01.00109.119
20	01.00109.120
21	01.00109.121
22	01.00109.122
23	01.00109.123
24	01.00109.124
25	01.00109.125

Trial stems, proximal

mm	REF
190	01.00109.810
225	01.00109.802
265	01.00109.803
305	01.00109.804

Screws for proximal part

mm	REF
190	01.00109.809
225	01.00109.805
265	01.00109.806
305	01.00109.807



Hex wrench

mm	REF
3,5	79.15.84

On request

Cerclage pliers

∅ mm	REF
1–2	75.11.00-080

Awls ∅ 13 for 75.00.25

REF
01.00109.013

Slot hammer

REF
75.11.00-10

Impactor/extractor
For 345 and 385 mm stems

	REF
Basic element	75.11.00-11
Adapter sleeve	75.11.00-12

Test head for THP, taper 12/14

Size	∅ mm	REF
S	36	01.01559.136
M	36	01.01559.236
L	36	01.01559.336
XL	36	01.01559.436

All instruments not sterile

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