Surgical Technique

smith&nephew

TOEFIT-PLUS◇

Modular Replacement of the
First Metatarsophalangeal Joint



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Introduction

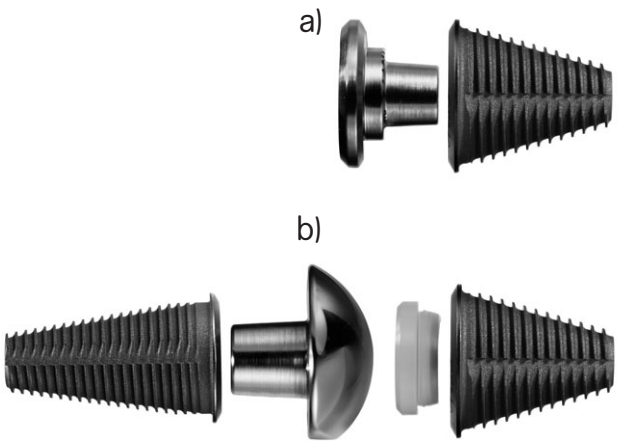
TOEFIT-PLUS◇ is a modular implant system for the hemiarthroplasty or total replacement of the first metatarsophalangeal joint (1st MPJ). The non-cemented implant is fixed in the host bone by means of a self-tapping threaded taper, which ensures excellent primary stability. The grit-blasted osteophilic titanium alloy surface provides ideal conditions for osseointegration, which will, in turn, ensure the secondary stability of the implant.

a) TOEFIT-PLUS hemiarthroplasty

The modular design of the implant permits its use in a wide range of anatomical patterns, and allows decisions on the type of joint replacement to be made intraoperatively. Modularity makes it possible to assemble either a hemiprosthesis (shown at (a)) or a total joint replacement (shown at (b)). The two types have different distal inserts: in the hemiprosthesis, the insert is made of CoCr alloy, while the total joint replacement has a distal insert made of PE.

b) TOEFIT-PLUS total joint replacement

TOEFIT-PLUS comes with a set of easy-to-use instruments for hemiarthroplasty and total joint replacement.





Indications

Hemiarthroplasty

- Hallux rigidus with mild to moderate arthrosis
- Advanced arthrosis, with a good weight-bearing layer of suchondral bone in the head of the 1st metatarsal
- Post-traumatic arthrosis
- Salvage operation following hallux valgus operation with trimming or arthrosis

Total joint replacements

- Hallux rigidus with moderate to severe arthrosis
- Pronounced post-traumatic arthrosis
- Rheumatoid arthritis
- Salvage operation in the presence of major destruction of joint proportions
- Revision of silicone rubber or metal joint implants

Contraindications

Hemiarthroplasty

- Hallux rigidus with severe arthrosis
- Rheumatoid arthritis
- Status after central osteochondritis disseacans/metatarsal head necrosis

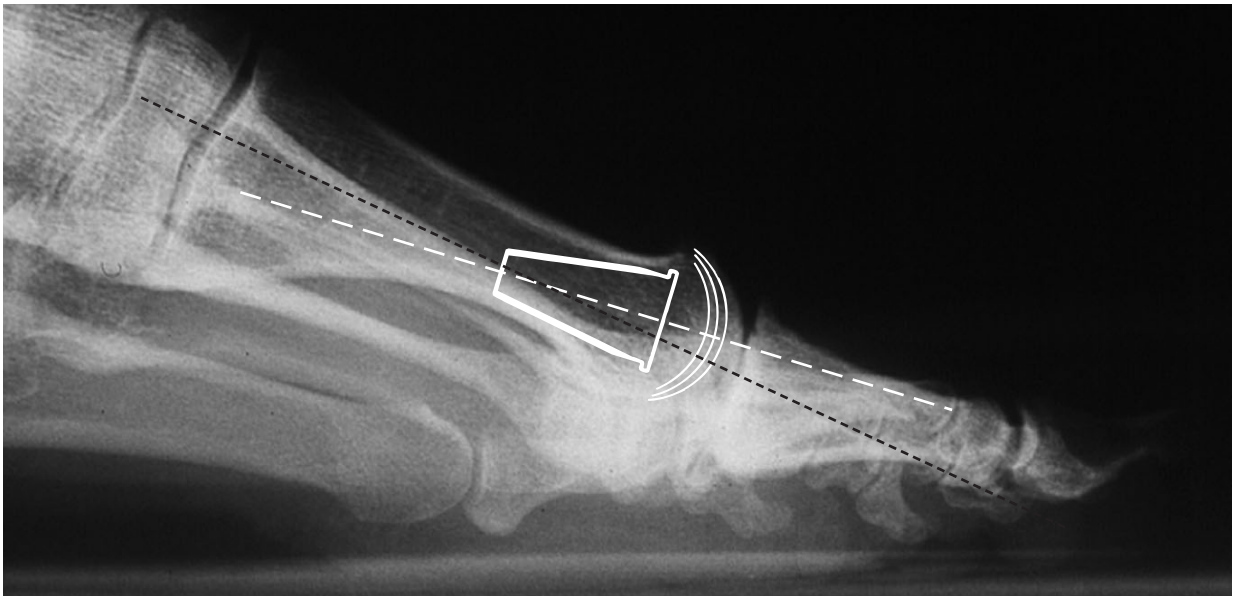
Hemi and total joint replacement

- Previous operations that make it impossible to position the implants correctly
- Acute or chronic infections, local or systemic
- Fungal foot diseases
- Local infections in the operated area
- Severe diseases of the muscles, nerves or blood vessels
- Lack of bone substance or poor bone quality that puts the stable seating of the prosthesis at risk
- Any concomitant condition that can hazard the function of the implant e.g.:
  - Allergies of all kinds
  - Renal insufficiency
  - Cardiac insufficiency (e.g. as a result of an increased concentration of metal ions in the blood)

Preoperative Planning

For correct preoperative planning, weight-bearing DP and lateral radiographs should be obtained. Templates are provided to help select the appropriate size of both the distal and the proximal component from the two radiographic projections. Please note that the size suggested by the lateral view is often smaller than that suggested by the DP film. In this event, the smaller size should be chosen. In both projections, the implant should be aligned parallel with the axis of the bone, with one exception:

For the total joint replacement, the metatarsal component should be aligned closer to parallel with the floor.



At the preoperative planning stage, the appropriate size of the (hemi and total joint replacement) inserts will also need to be determined. Consideration should also be given to the resulting toe length and digital pattern. The templates provided for preoperative planning are on a 1:1 scale, since magnification is not an issue in foot radiographs where the object-film distance is short. Further checks may be made intraoperatively using the trials, and any corrections required may be made at that stage.

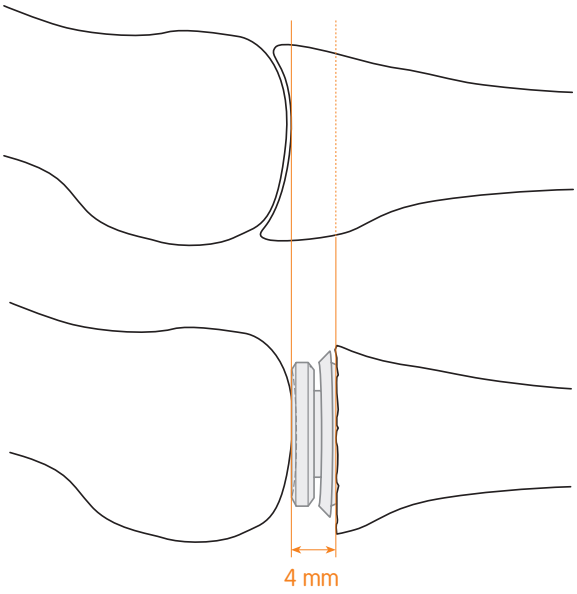
Comment

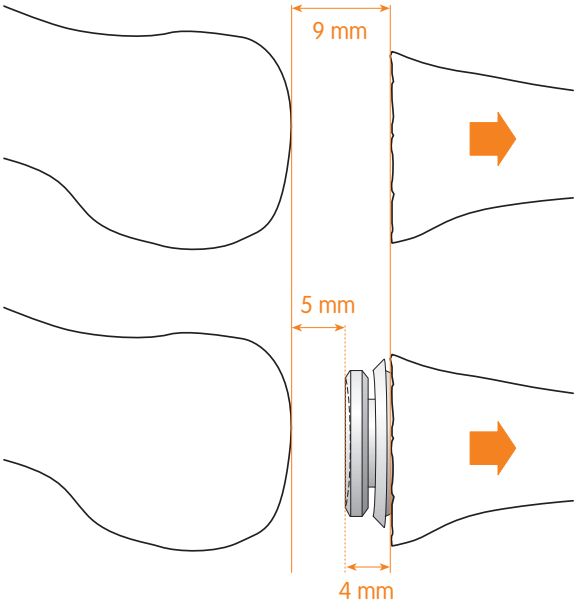
Sizing should be done by placing the templates provided on lateral or oblique-lateral radiographs. On the DP views, the bone tends to look cylindrical, whereas the lateral view shows it to be flared.

Determination of the Level for Resection

Measurements and Dimensions

Hemiarthroplasty

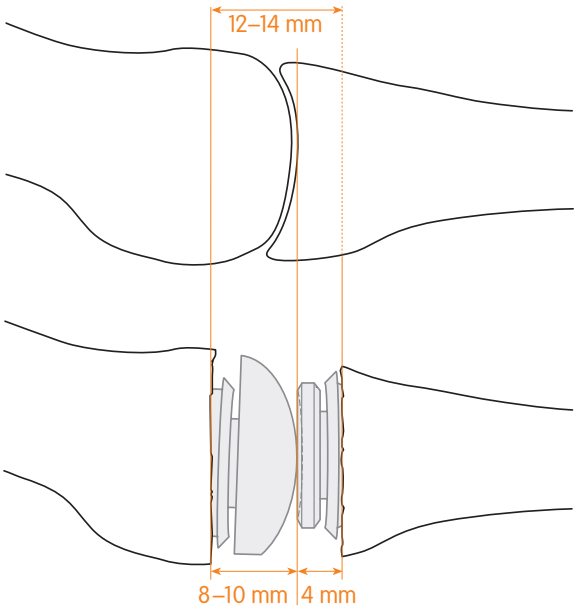




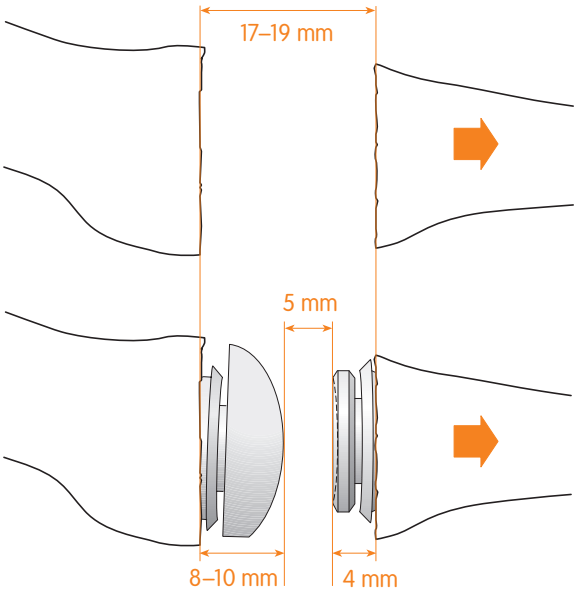
After the insertion of the prosthesis:
With axial traction, the joint space should be at least 5 mm.

Comment

If the joint is too taut, this may considerably reduce mobility.



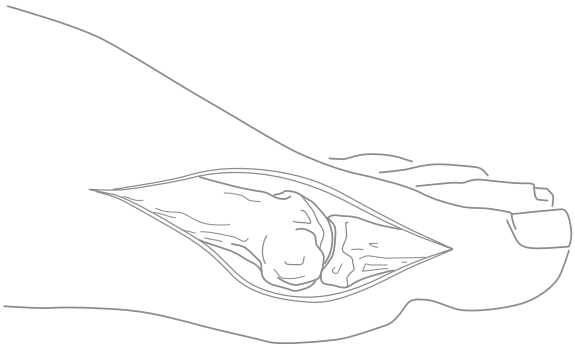
Total joint replacement



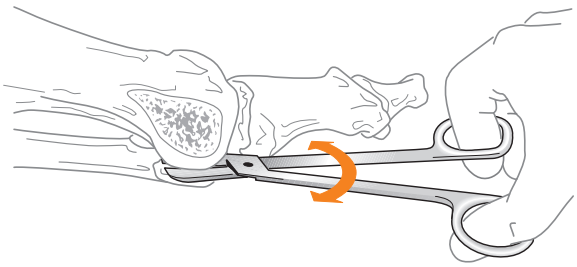
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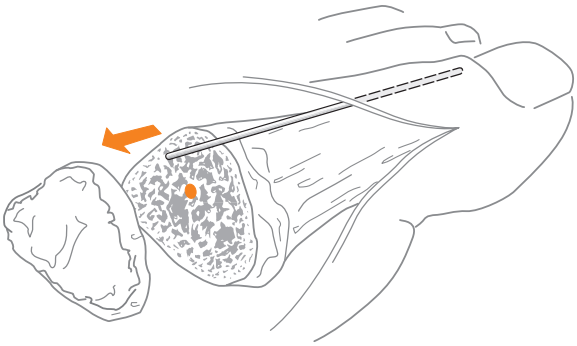
A medial or dorsomedial longitudinal skin incision is made. The capsule is divided, and the joint exposed.



The medial eminence is resected; osteophytes are removed. The sesamoids are mobilised.

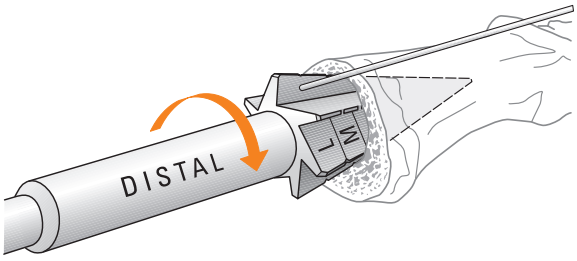
Comment

The removal of one or both sesamoid bones may lead to luxation of the joint in the plantar direction.

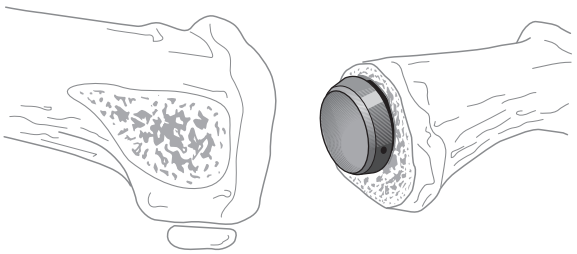


The base of the proximal phalanx is sparingly resected using an oscillating saw. For assistance in determining the level for resection see page 6.

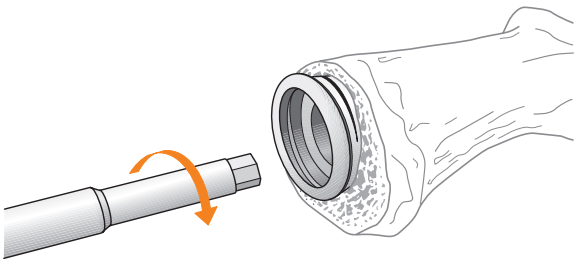
The centre of the phalanx is opened with an awl. The longitudinal toe axis is marked by a K-wire introduced dorsally alongside the bone.



Reaming is performed along the bone axis (parallel with the K-wire), inserting the distal reamer on the T-handle to the desired depth, using size marks as a guide.



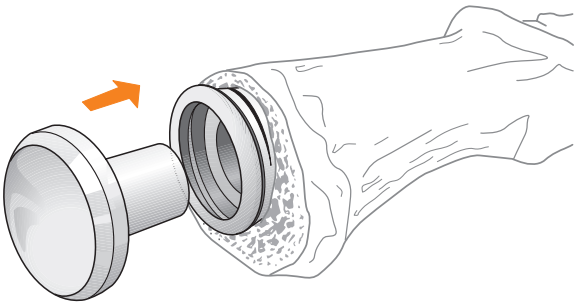
The appropriate trial is inserted and a trial reduction performed to check toe length, soft tissue tension, and mobility. With axial traction, the joint space should be at least 5 mm.



The phalangeal component is screwed in using the hex driver.

Comment

Unless the component is inserted in correct alignment, higher torque may be required and the bone may develop a fissure or fracture.



The socket in the component is cleaned with a moistened swab to remove any debris. The distal CoCr insert is tapped into position using the distal impactor.

Comment

Debris in the socket may prevent firm seating of the insert and thus, produce increased wear and, possibly, implant loosening.

The joint is reduced and function is tested. Lavage, hemostasis, and capsular reefing to stabilize the joint are performed.

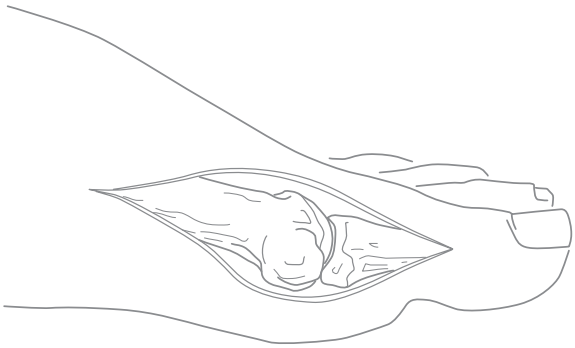
Comment

A stable joint is better able to transmit load and will be less likely to dislocate.

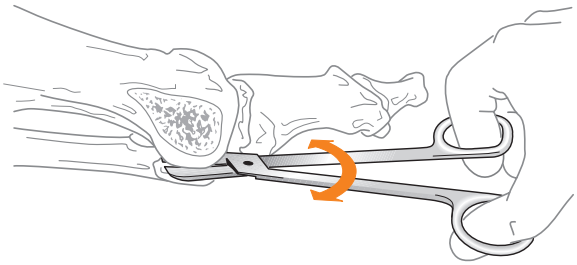
The wound is closed, and a toe splinting dressing is applied. Perioperative antibiotic cover is recommended.

Postoperative management

Prophylactic anticoagulant therapy should be given throughout the period of reduced weight-bearing. Partial weight-bearing for approximately one week, until postoperative pain has subsided; then walking, with full weight-bearing, wearing a shoe with a firm sole and a rockerbar for 3–4 weeks. Radiological and clinical follow-up.



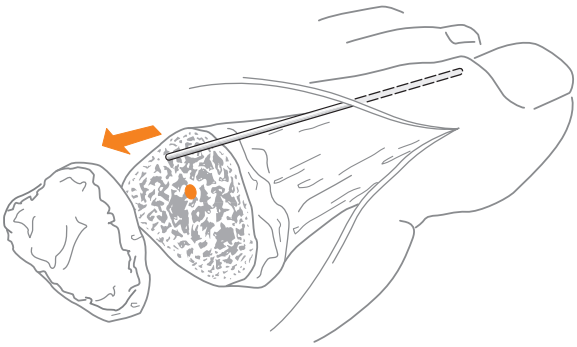
A medial or dorsomedial longitudinal skin incision is made. The capsule is divided, and the joint exposed.



The medial eminence is resected; osteophytes are removed. The sesamoids are mobilised.

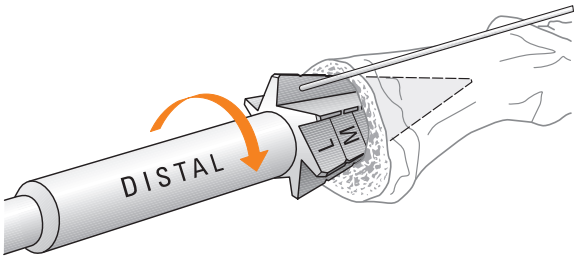
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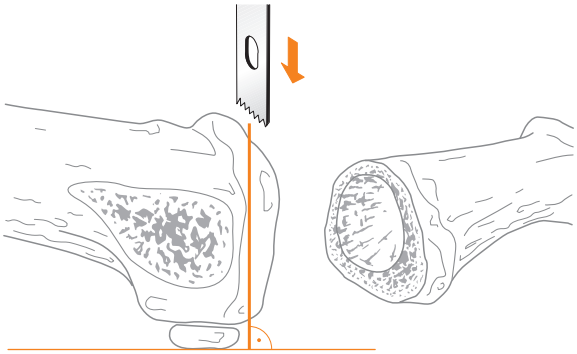


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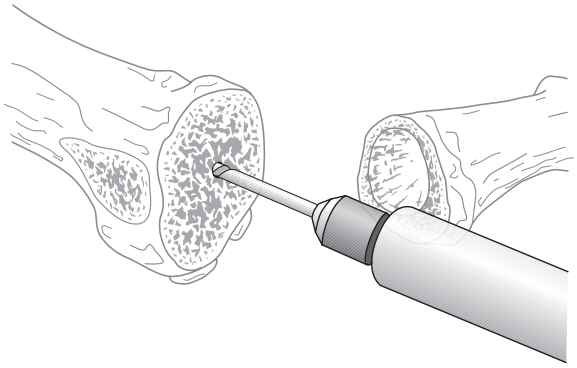


Reaming is performed along the bone axis (parallel with the K-wire), inserting the distal reamer on the T-handle to the desired depth, using size marks as a guide.



Osteophytes are removed from the first metatarsal.

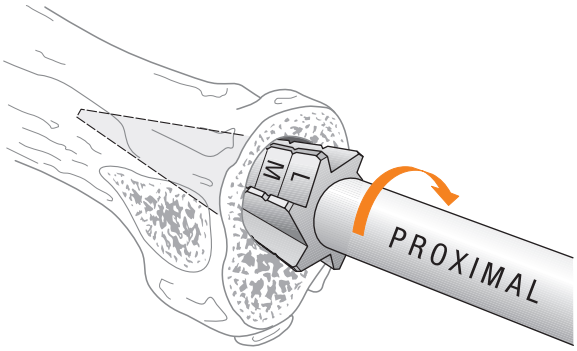
The osteotomy is made in a dorsoplantar direction at right angles to the plantar plane. For assistance in determining the level for resection see page 7.



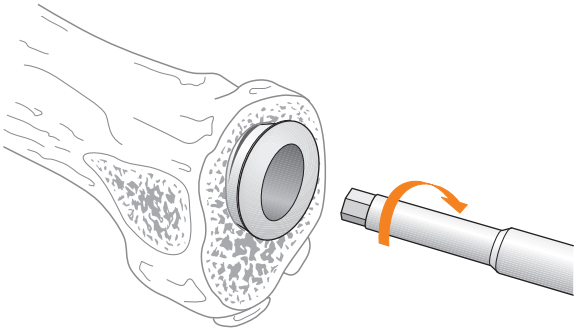
A central hole is made using a 3.2-mm drill.

Comment

The ideal axial orientation of the metatarsal component depends more on the axis of the biomechanical stress than on the anatomical axis of the metatarsal bone. Insertion with a slight valgus tendency and parallel to the sole may sometimes be of advantage.



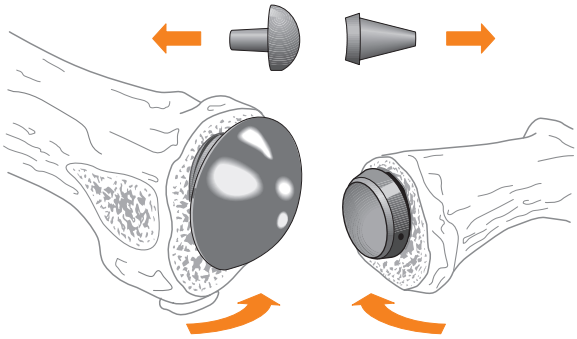
The proximal reamer on the T-handle is used to ream the cancellous bone of the metatarsal to the desired depth. A rim of cancellous bone should be left.



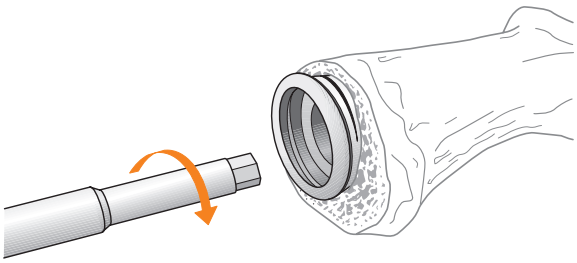
The proximal component is screwed in using the hex driver.

Comment

Unless the component is inserted in correct alignment, higher torque may be required and the bone may develop a fissure or fracture.



The distal trial implant and the proximal trial insert are inserted. A trial reduction is performed and toe length, position, as well as range and ease of motion are checked. With axial traction, the joint space should be at least 5 mm.



The phalangeal component is screwed in using the hex driver.

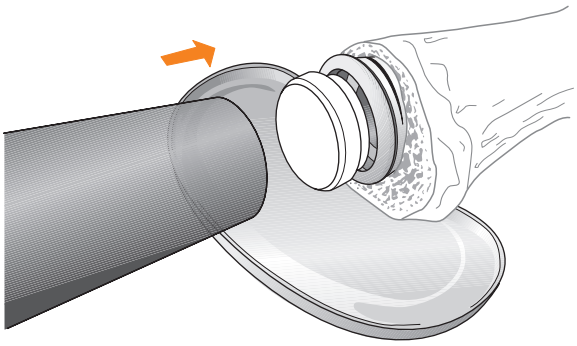
Comment

Unless the component is inserted in correct alignment, higher torque may be required and the bone may develop a fissure or fracture.

Cleaning of the internal surface of the phalangeal component by rinsing and drying. After the PE insert has been laid into the phalangeal component, it is important that the insert is fastened securely in the titanium component by multiple hammer blows on the appropriate impactor.

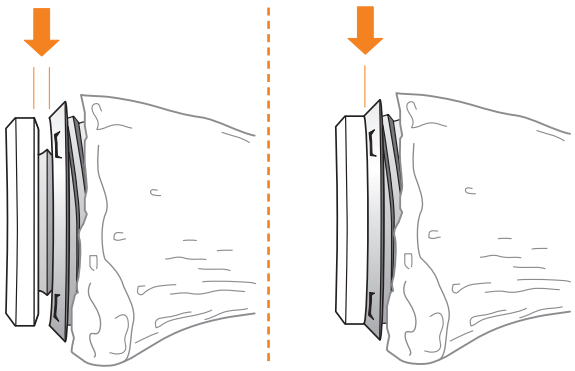
Comment

Foreign bodies or inclusion of soft tissue in the titanium component may prevent firm seating of the PE insert. Luxation of the insert and resulting wear may lead to reoperation.

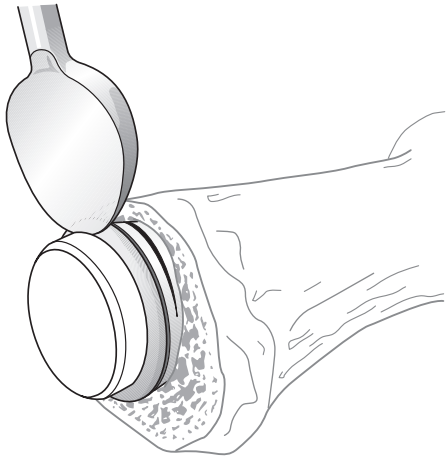


Comment

If the insert falls out, it may become non-sterile. This can be prevented if a kidney basin is placed under the forefoot.



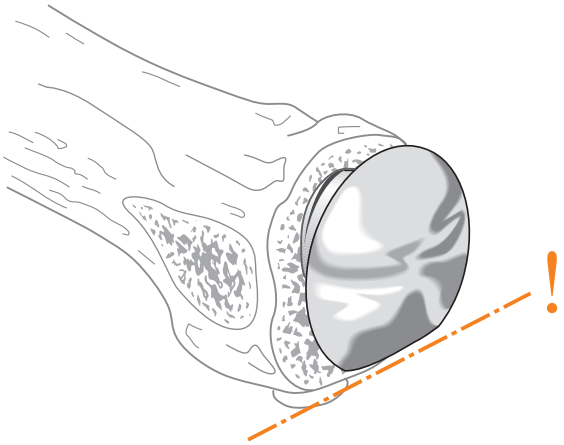
Visual check round the PE insert:
The space between the PE and the collar of the titanium component must be closed. If necessary, the PE insert should be set lower with more hammer blows on the impactor.



Finally check carefully that the fit of the PE insert is good with a rasp or forceps and without applying excessive force.

Comment

Even a well fitting PE insert can be removed by force and leverage. When checking the fit, be careful with the forceps or rasp, so that the PE articular surface is not scratched.



The socket in the metatarsal component is cleaned, and the proximal insert is inserted with the flat edge of its circumference facing plantarwards (towards the sesamoids). The insert is tapped into position using the proximal impactor.

Comment

The circumference of the proximal insert contains a straight portion, which prevents impingement on the sesamoids and the plantar ligaments.

The joint is reduced, and function is tested. Lavage, hemostasis, and capsular reefing to stabilize the joint are performed.

Comment

A stable joint is better able to transmit load and will be less likely to dislocate.

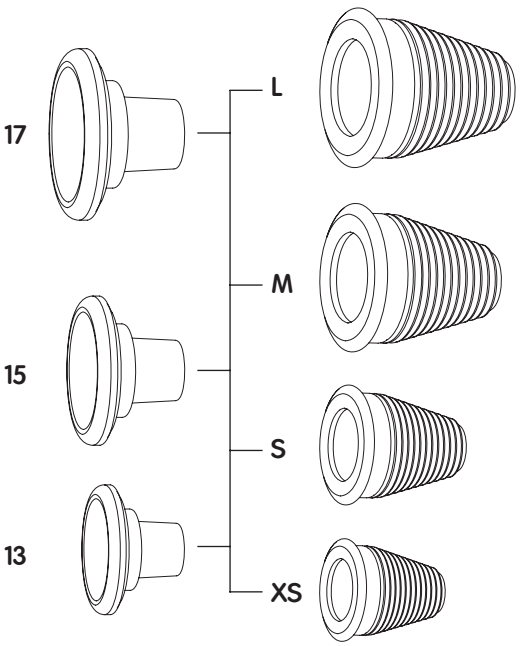
The wound is closed and a toe splinting dressing is applied. Perioperative antibiotic cover is recommended.

Postoperative management

Prophylactic anticoagulant therapy should be given throughout the period of reduced weight-bearing. Partial weight-bearing for approximately one week, until postoperative pain has subsided; then walking, with full weight-bearing, wearing a shoe with a firm sole and a rocker-bar for 6 weeks.

Implants

Hemiarthroplasty



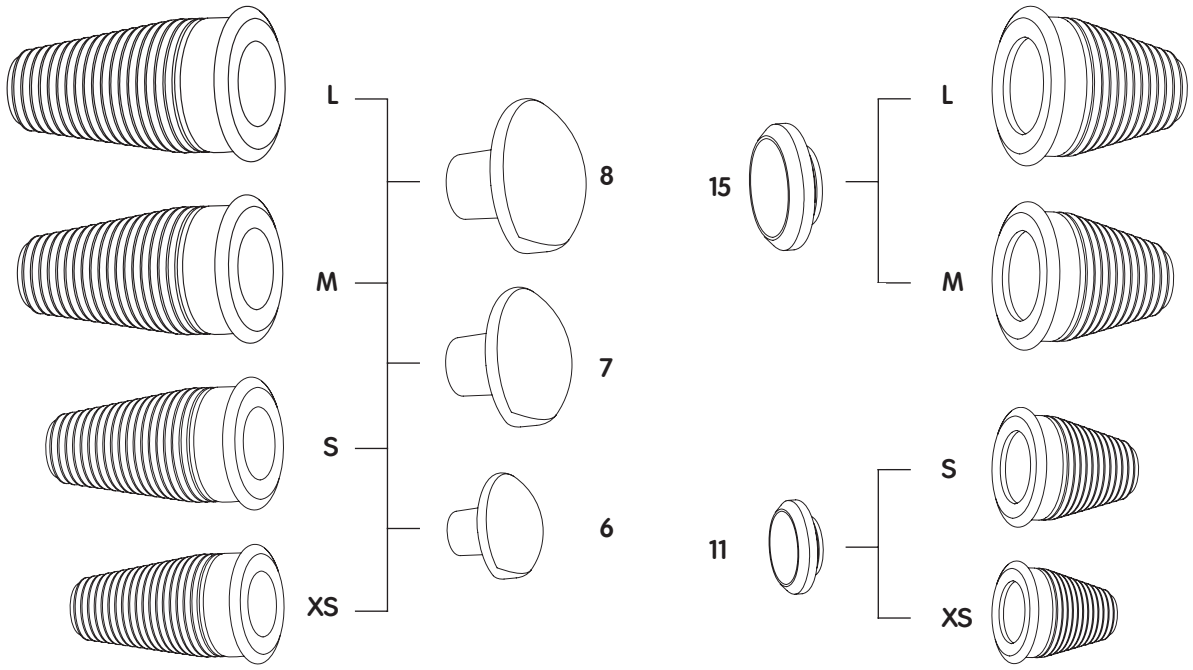
Phalangeal component

Art. No.	Size
44003	L
44002	M
44001	S
44000	XS

Distal CoCr insert

Art. No.	Size
44017	17
44014	15
44011	13

Total joint replacement



Comment

PE Insert, distal: Size 15 should only be combined with the phalangeal component size L and M.

Size 11 should only be combined with the phalangeal components size S and XS.

Metatarsal component

Art. No.	Size
44038	L
44037	M
44036	S
44035	XS

Phalangeal component

Art. No.	Size
44003	L
44002	M
44001	S
44000	XS

Proximal CoCr insert

Art. No.	Size
44043	8
44042	7
44041	6

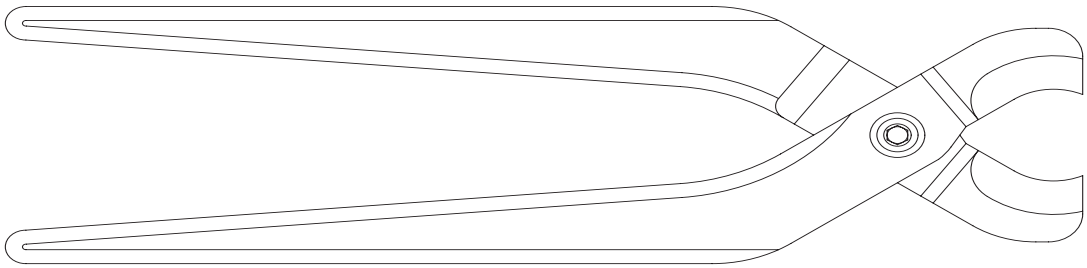
Distal PE insert

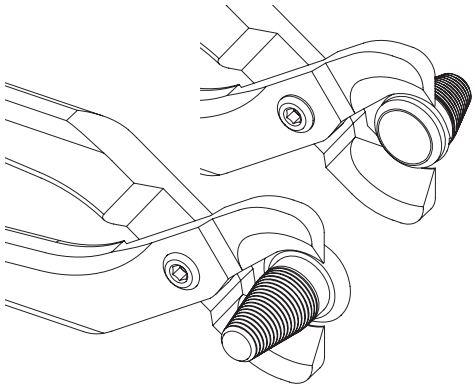
Art. No.	Size
44024	15
44020	11

Instrumentation

Extraction forceps for removal of proximal and distal inserts.

The instrument shown provides a ready means of detaching the tapered or PE snap-fit connections between the inserts and the metatarsal and phalangeal components without damaging the interfaces.



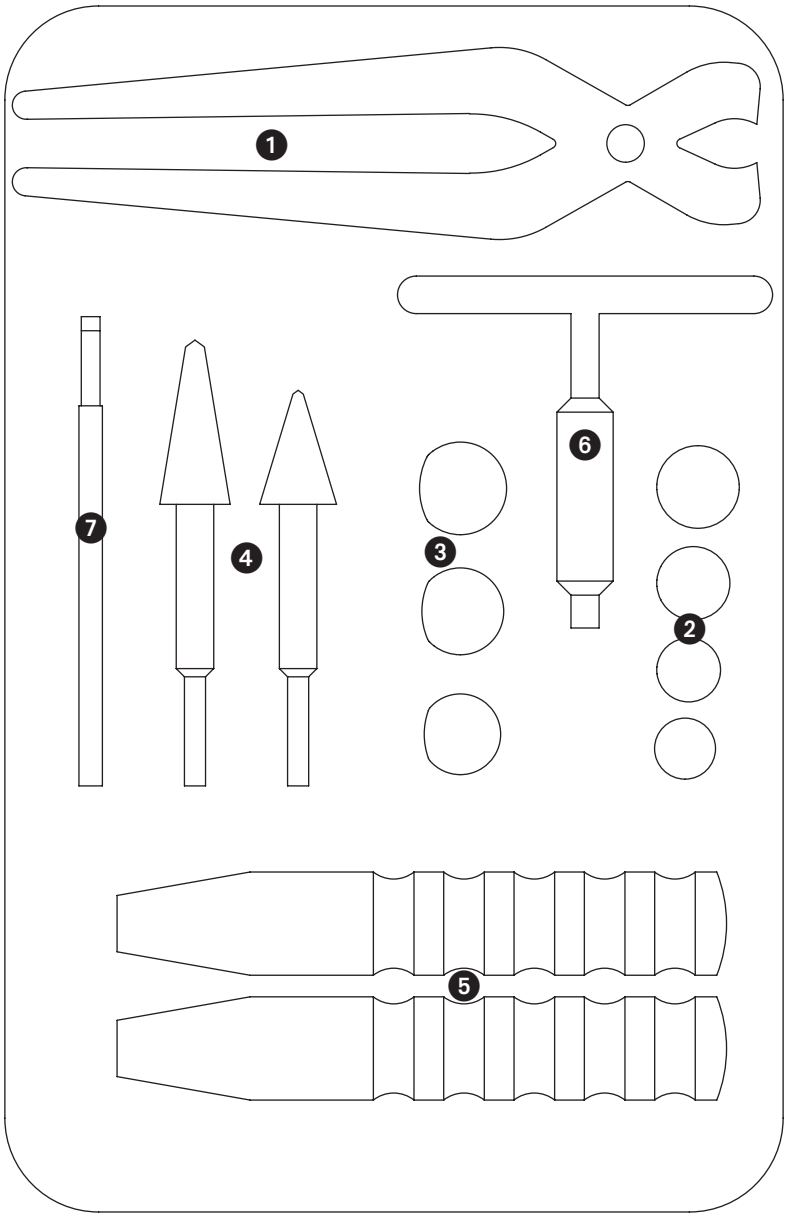


The tips of the jaws are inserted in the narrow gap between the insert and the metatarsal or the phalangeal component. With gentle pressure on the handles, the insert may be detached from the component without unduly stressing the implant bone bed.

Important Comment

If hemiarthroplasty is to be replaced by total joint replacement, the distal insert (CoCr) may only be removed with the extraction forceps, to prevent damage to the phalangeal component.

	Art. No.	Description
	440000	**Instrument tray with cover, empty**
1	440006	Extraction forceps
2	440030	Trial component, distal, size XS
	440031	Trial component, distal, size S
	440032	Trial component, distal, size M
	440033	Trial component, distal, size L
3	440041	Trial insert, proximal, size 6
	440042	Trial insert, proximal, size 7
	440043	Trial insert, proximal, size 8
4	440010	Reamer, distal
	440034	Reamer, proximal
5	440002	Impactor, proximal
	440003	Impactor, distal
6	MPT116375	T-handle with AO quick-release
7	MT0351702	Hex driver


1
7
4
3
6
2
5

Sterilization

Implants

All the implants described in this Operating Technique are sterile when they are delivered by the manufacturer. Resterilization is not allowed.

Instruments

System components and instruments are not sterile when they are delivered. Before use they must be cleaned by the usual methods in accordance with internal hospital regulations and sterilized in an autoclave in accordance with the legal regulations and guidelines applicable in the relevant country. (For detailed information please refer to leaflet Lit. No. 1363.)

The correct settings are given in the instructions for use issued by the autoclave manufacturer. Instrument manufacturers and dealers accept no responsibility for sterilization of products by the customer.

Manufacturer
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6343 Rotkreuz
Switzerland

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our local sales office.
www.smith-nephew.com

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