

MiniHip™

Bone Conserving Hip Replacement
Surgical technique

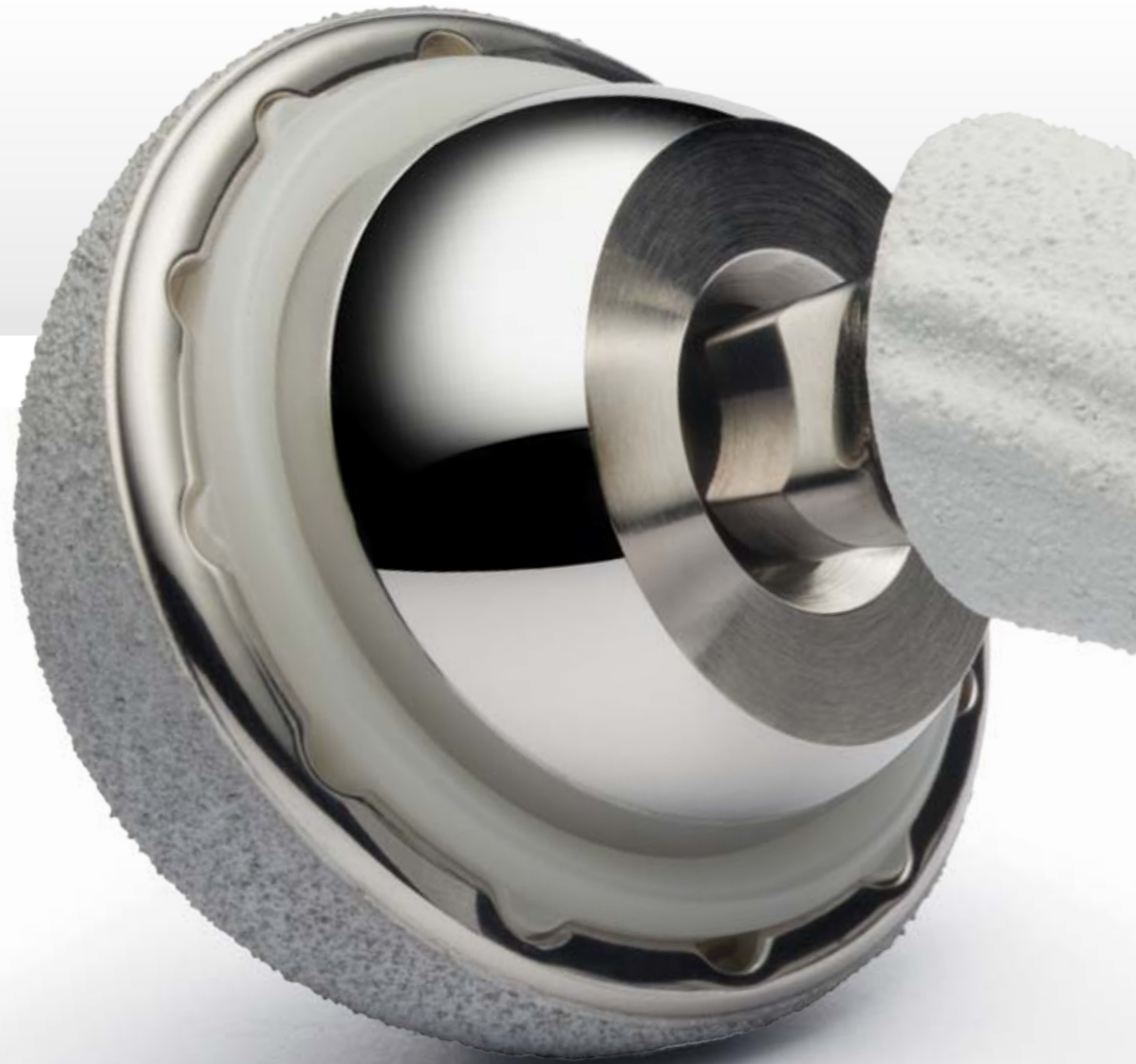


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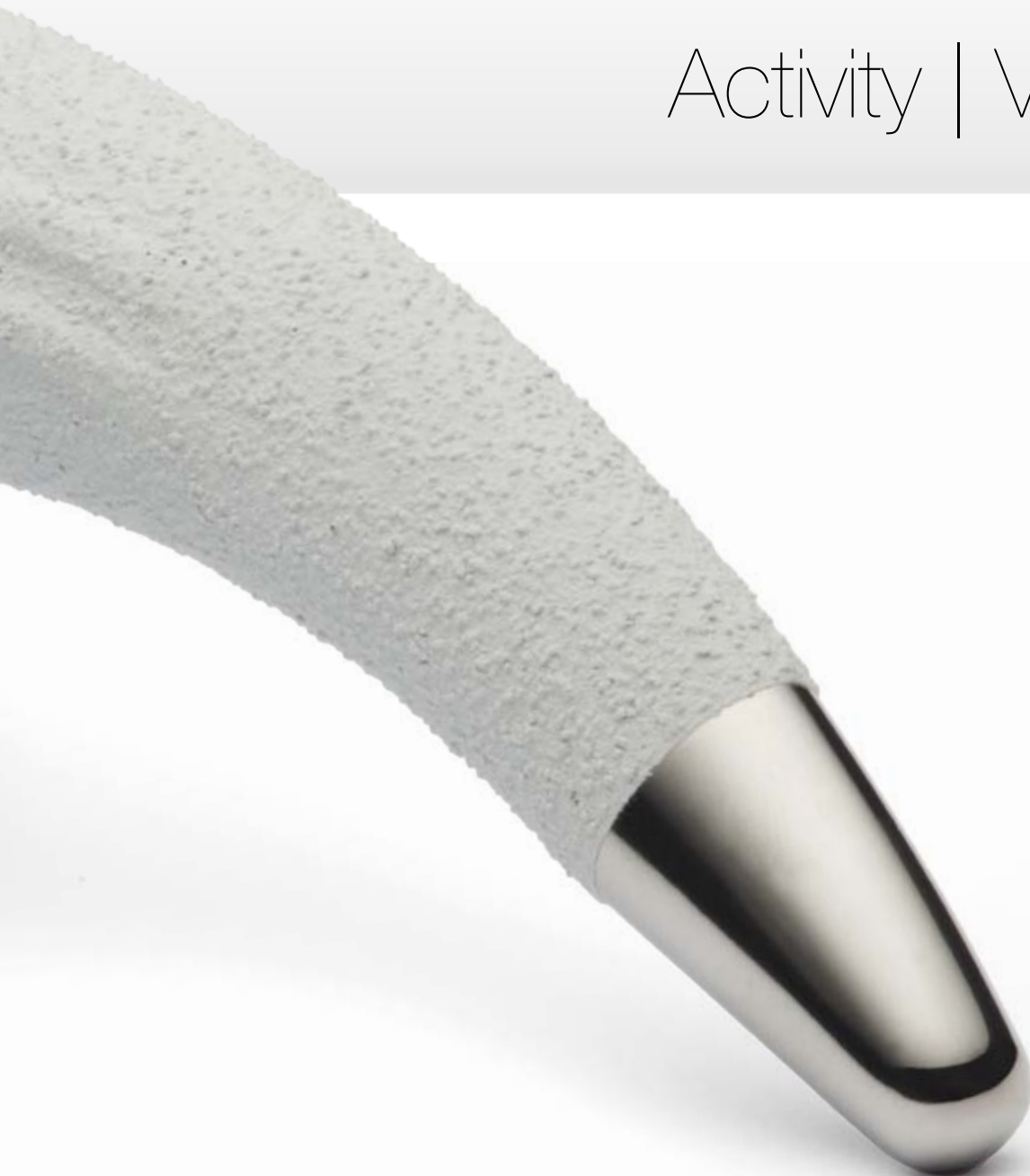
MiniHip™

Contents

Operative summary	4
Overview	5
Pre-operative templating	6
Operative technique	7
Neck resection	7
Femoral canal preparation	7
Trial reduction	8
Implantation of the stem	8
Final reduction	9
Appendix: Stem extraction	9
Sizing guide	10
Description	11
Indications	11
Contraindications	11
Ordering information	11



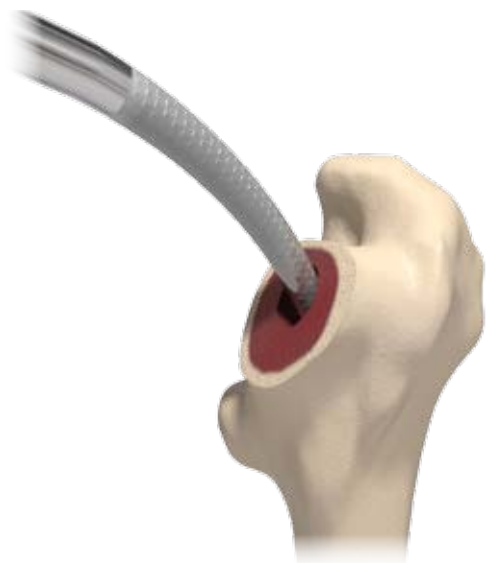
Activity | Versatility | Efficiency



The bone conserving hip
for active patients

MiniHip™

Operative summary



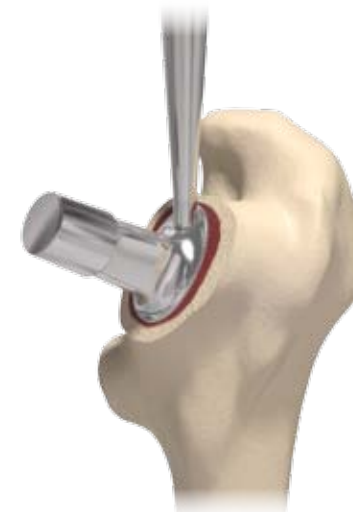
a. Curved awl



b. Broaching



c. Trial reduction



d. Implantation

Overview

The MiniHip bone preserving, physiological hip replacement has been specifically designed to address the clinical needs of active men and women of all ages who would usually be appropriate for a standard uncemented hip replacement.

Anatomic restoration can be achieved by utilising an optimal neck resection (Figure 1). The dedicated short stem design of the MiniHip combines the bone preserving benefits of hip resurfacing with the inherent stability of traditional total hip replacement, providing a solution for demanding uncemented patients.

Designed to 'fit and fill' the proximal neck, the MiniHip ensures immediate and long-term proximal stability, which is further enhanced with a hydroxyapatite coating for stable cementless fixation (Bi-coat™). The initial press fit coating facilitates primary stability to help promote bone integration.

The specialised instrumentation designed for all minimally invasive approaches, combined with a practical operative technique, assists in facilitating:

- Greater bone preservation
- Superior physiological load transfer compared to standard THR¹
- Proven Bi-coat fixation²
- Reproducible anatomical restoration^{3,4}
- Efficient three stage procedure

Note: MiniHip is suitable for Dorr type A and B bone quality. MiniHip is not suitable for type C, osteoporotic stove femurs.

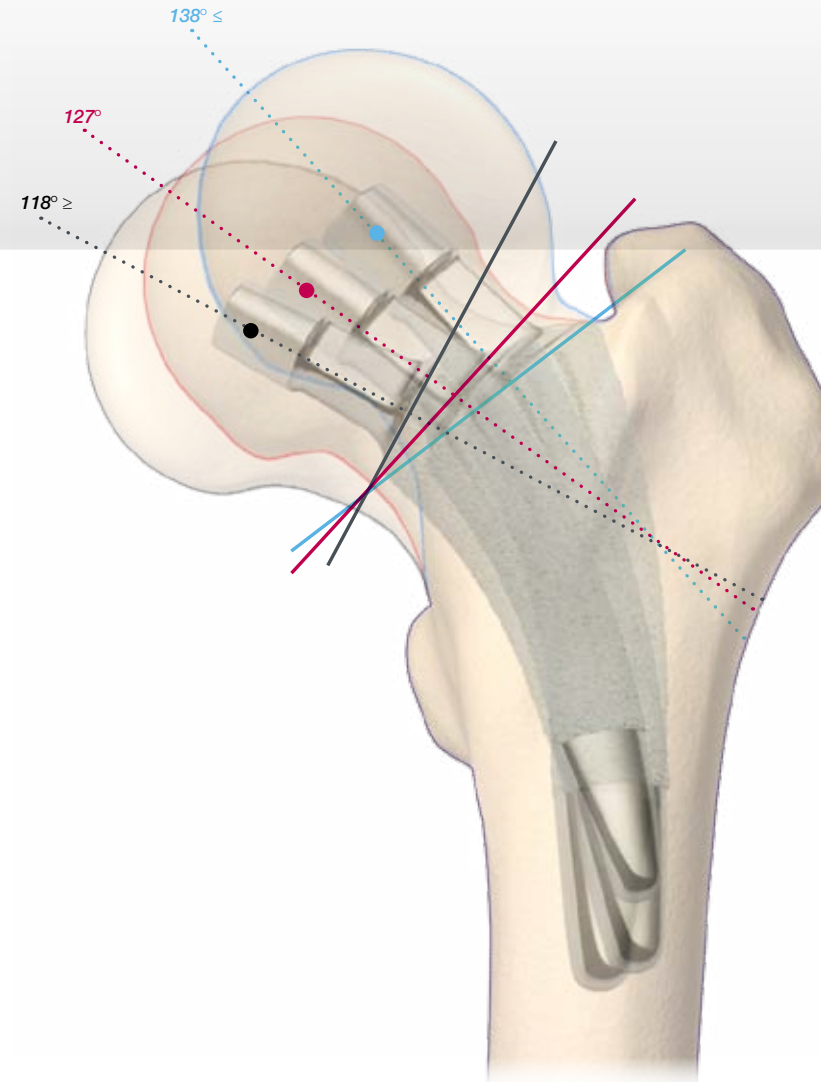


Figure 1. Reproducibility through anatomical restoration

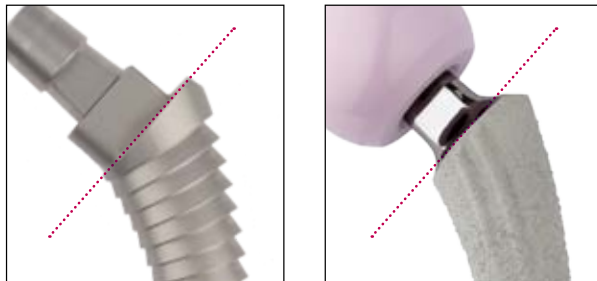
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Pre-operative templating

When using the MiniHip system, pre-operative planning is critical to determine the optimal size, neck angle and offset of the implant. Templating will help determine the level of neck resection and optimal cup position. The MiniHip X-ray templates are available in four different magnifications (100%, 110%, 115% and 120%). The 115% magnification is provided as standard.

A/P and M/L X-rays should be used in combination with the templates to determine the correct size and positioning of the implant. The resection guideline or demarcation line is defined by using a medium length head (0mm) on the template overlaid onto the centre of rotation. The template is then rotated to achieve fit and fill of the neck superior/laterally whilst in turn maximising coverage of the medial calcar and then finally distal lateral cortices contact. When using the M/L X-ray, proximal contact should be achieved posteriorly and anteriorly, and distal contact should be achieved posteriorly.

⚠ The demarcation line is where the cementless coating ends proximally.



To achieve anatomical restoration the following four key stages need to be implemented:

- Define centre of rotation
- Fit and fill in the neck
- Maximal medial calcar contact
- Distal lateral contact/fill (posterior, anterior, posterior- PAP)

⚠ The neck resection/demarcation line of the stem should always be parallel to the head-neck junction as shown by the red line in Figure 2.

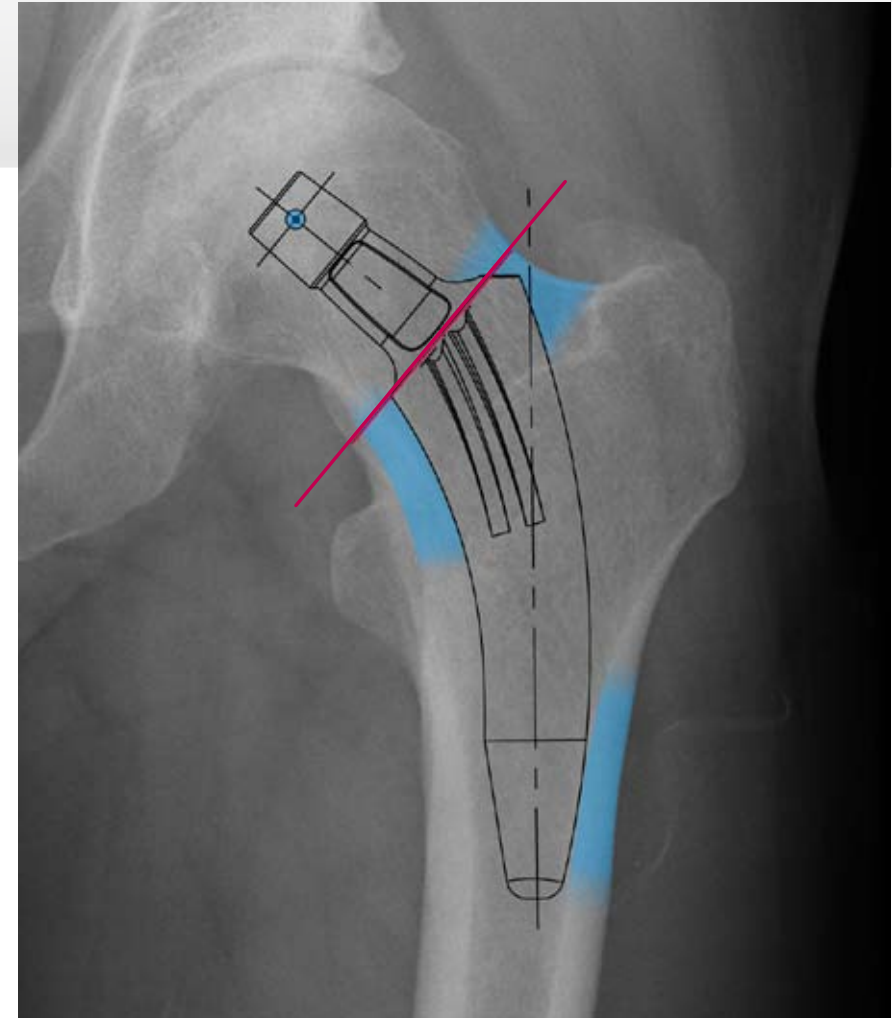


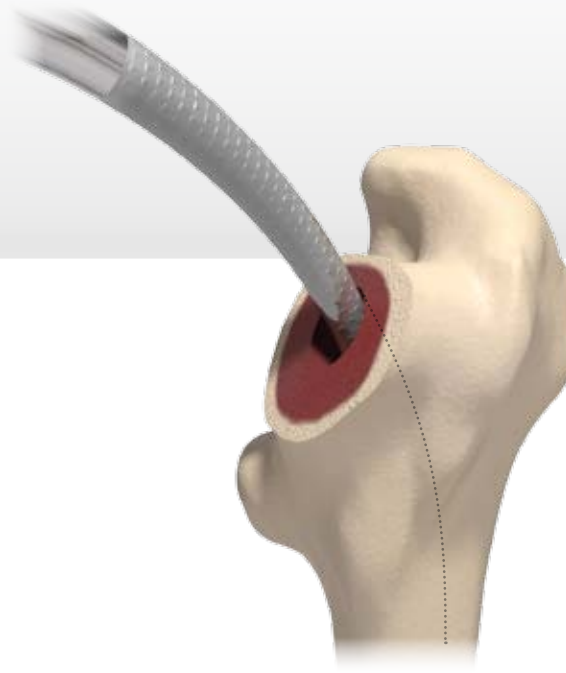
Figure 2. Pre-operative templating

Operative technique



Step 1. Intra-operative templating

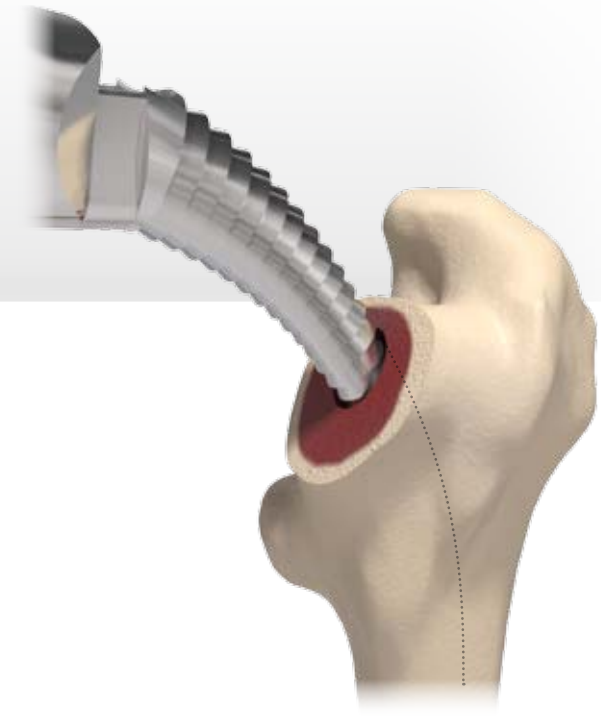
When defining the neck resection *in situ*, use the piriformis fossa as a constant landmark to determine the level of resection.



Step 2. Curved starter awl

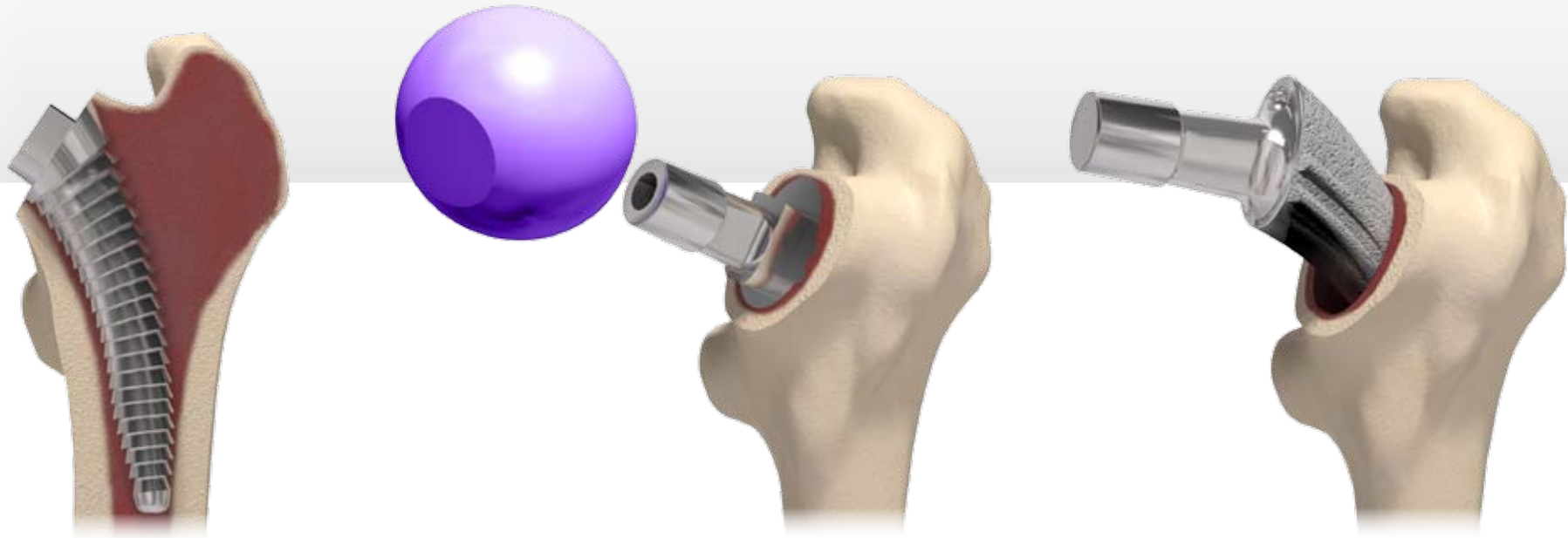
The entry point of the starter awl should be 3-4mm superior to the centre of the neck to create a pathway into the top of the diaphysis. This will help prevent both undersizing of the stem and misalignment of the broaches.

The curved starter awl is used for further femoral preparation accommodating the natural curvature of the proximal femur allowing the compaction broaches to follow a sequential pathway.



Step 3. Femoral canal preparation

The stem is designed to be supported by compacted cancellous bone gaining mechanical stability and fixation in the neck and metaphysis. Always start with the smallest broach, progressively using larger broaches until the pre-templated size is achieved.



A stable fit is achieved when the broach fits and fills the proximal femur and the face of the final broach sits flush with the resection line, as detailed in the pre-operative templating on page 6.

⚠ In order to ensure that the femur will accommodate the planned size of implant, a 1mm cancellous ring should be maintained around the broach for sizes 1-4 and a 2mm ring for sizes 5-9. Usually a 2-4mm ring of cancellous bone around the medial calcar is also observed.

Step 4. Trial reduction

A trial reduction may then be performed using a trial head and the broach.

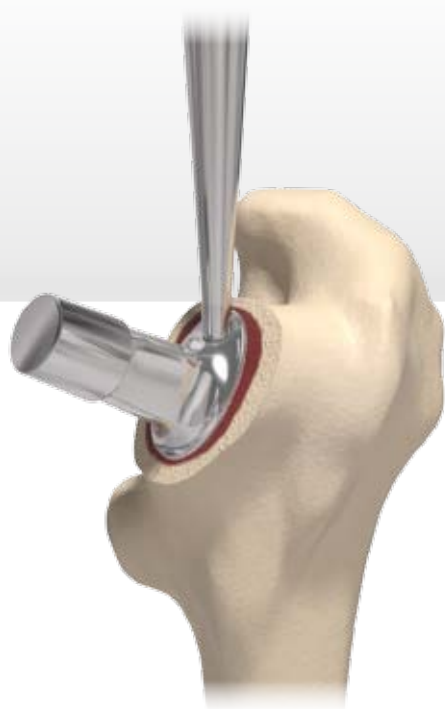
Intraoperative X-ray

To assess the trial orientation and sizing, it is recommended that an intraoperative X-ray using a C-arm be taken whilst the broach, trial neck and head are in situ prior to implantation of the definitive implants.

Step 5. Implantation of the stem

The final broach indicates the size of the definitive implant, which is inserted by hand.

⚠ If the definitive stem seats by more than 10mm proud above the resection line, remove the stem and re-broach with the finishing broach 2-4mm below the resection line.



Once the stem is seated by hand, the stem impactor can be used to fully seat the implant until the edge of the Bi-coat (demarcation line) is flush with the resection line.



Step 6. Final reduction

Once the acetabular cup is implanted, a full trial reduction can be performed allowing for fine tuning of the head offset. The definitive head is impacted onto the stem ensuring the trunnion is free from debris. The hip can then be reduced and closure performed.

Appendix



Stem extraction

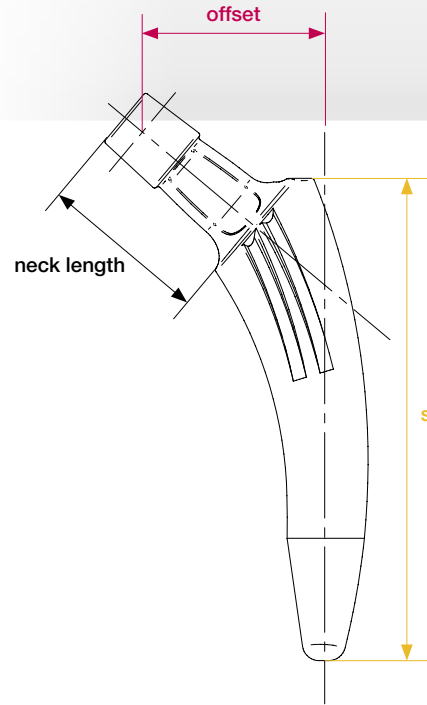
In the unlikely event that the stem needs to be removed the stem extractor set can be used. The extractor device is placed over the 12/14 trunnion and the slap hammer is rotated until the trunnion is securely clamped. **Do not implant the stem with this instrument.**

Note: Do not overtighten the thread as this will cause damage to the plastic collar on the extractor. It should be tight enough to form an interference fit around the base of the neck to aid removal. The stem can then be extracted in conjunction with revision ancillary instruments.

⚠ If the stem extractor is required it should be ordered separately prior to the operation.

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Sizing guide



Size	1	2	3	4	5	6	7	8	9
offset (mm)	32.2	33.3	34.5	35.6	36.8	37.9	39.1	40.2	41.4
neck length (mm)	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5
stem length (mm)	79.5	84.2	89.0	93.8	98.5	103.3	108.0	112.8	117.5

Description

The MiniHip is a titanium femoral stem (Ti-6Al-4V) coated with a layer of hydroxyapatite applied over a layer of pure titanium. The distal section of the stem is polished. The device is available in a range of nine sizes each providing a 130° CCD neck angle. The device is intended to be used with 12/14 modular taper heads.

The MiniHip is intended to provide increased patient mobility and reduce pain by replacing the damaged hip joint articulation in patients where there is evidence of sufficient sound bone to seat and support the components.

Indications

The indications for the MiniHip stem as a total hip arthroplasty include:

- Non-inflammatory degenerative joint disease including osteoarthritis and avascular necrosis
- Rheumatoid arthritis
- Correction of functional deformity
- Developmental dysplasia/congenital dislocation of the hip

The MiniHip stem is indicated for cementless use only.

Contraindications

- Infection
- Osteomyelitis
- Sepsis
- Osteomalacia
- Distant foci of infections
- Osteoporosis
- Marked bone loss or bone resorption
- Metabolic disorders which may impair bone formation
- Vascular insufficiency
- Muscular atrophy or neuromuscular disease
- Allergy to implant material
- Severe deformity

Ordering information

Implants

580.0001	Size 1 Standard Stem
580.0002	Size 2 Standard Stem
580.0003	Size 3 Standard Stem
580.0004	Size 4 Standard Stem
580.0005	Size 5 Standard Stem
580.0006	Size 6 Standard Stem
580.0007	Size 7 Standard Stem
580.0008	Size 8 Standard Stem
580.0009	Size 9 Standard Stem

Instruments

580.9991	MiniHip Cementless Stem System
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X-Ray templates

580.9190	MiniHip X-ray template 115%
580.9090	MiniHip X-ray template 100%

Stem extractor set

580.9410	Stem Extractor Set
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References:

1. Short stems are less likely to lead to bone resorption; bone remodeling following THR. Yeoman M, Cizinauskas A, Lowry C, Vincent G, Collins SN, Simpson DJ, Continuum Blue, UK; 2 – Corin Ltd, UK; 3 – Imorphics, UK. Data held on file at Corin
2. Collier CG. The assessment of early osteointegration, as a function of coating. August 2002. Report held on file.
3. Short stem total hip replacement: are you being conservative enough? Simpson DJ, Lowry C, Yeoman M, Cizinauskas A, Vincent G, Collins SN, Corin, UK; 2 - Continuum Blue, UK; 3 - Imorphics, UK. Data held on file at Corin
4. Presented data at the Baden Baden 58th Annual VSO meeting, (Tetnang, Germany) 2010. Dr Christian Grasselli discussed the multicentre clinical data for 250 bone conserving MiniHips.

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