



CORAIL[®]

HIP SYSTEM

Product Portfolio

never stop moving™

 **DePuy**
companies of *Johnson & Johnson*

“Corail®... a system for all my patients”

Dr JP Vidalain, France

“Corail®... proven and reliable”

Mr D Beverland, UK

“A simple system ... popular with the OR team”

Dr C Clark , USA

“Corail® ... ideal for minimal invasive surgery”

Dr M Michel, Switzerland

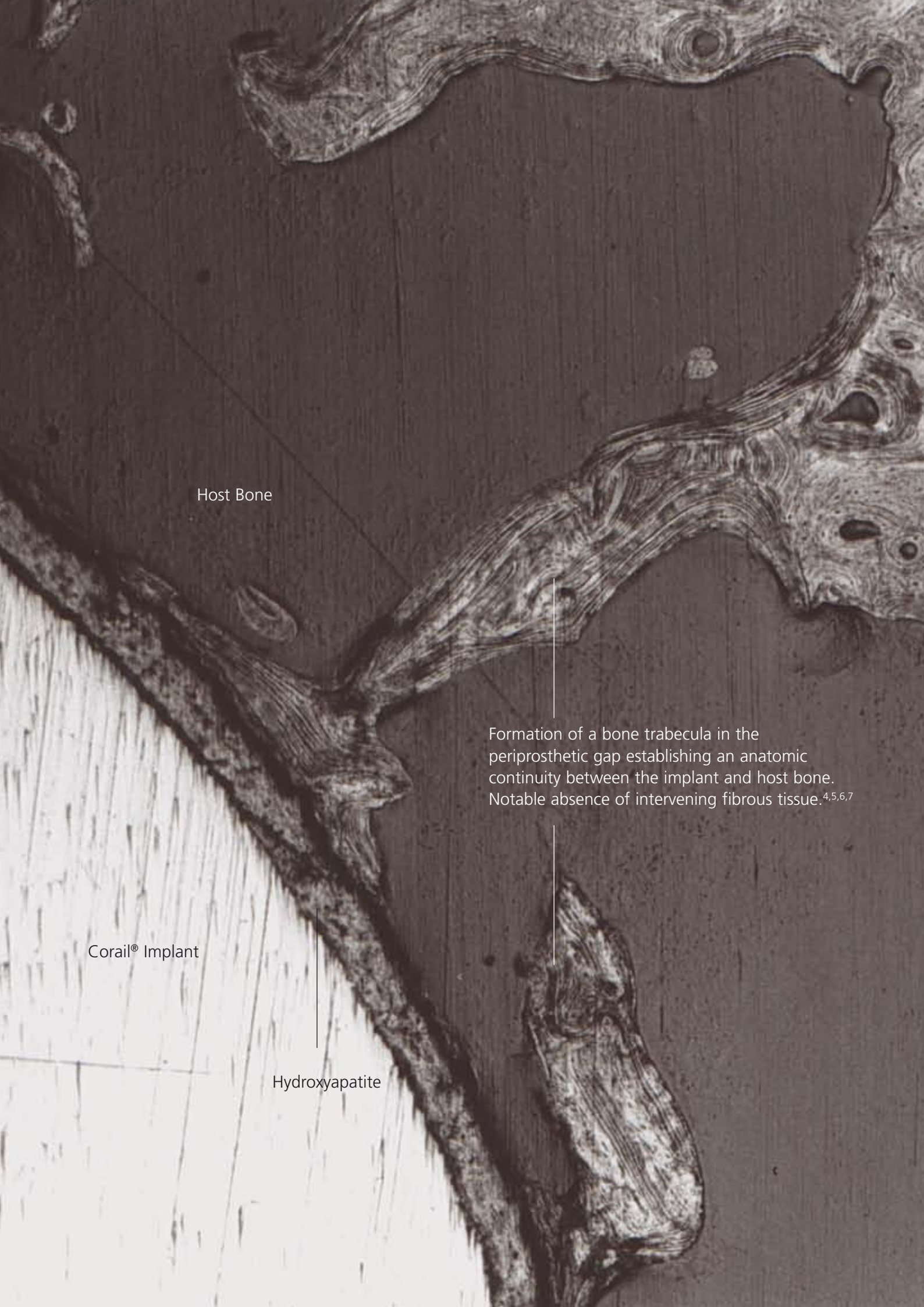
“Ideal system for a wide number of indications”

Prof KH Koo, Korea

Introduction

"In use worldwide; unchanged since 1986; FDA cleared in 1996; recognised at the highest level (10A) in 2004 by ODEP (Orthopaedic Data Evaluation Panel) in the UK. The Corail® philosophy is based on simple principles: primary mechanical stability, secondary biological integration, bone preservation and harmonious stress transfer. The design geometry gives the primary mechanical stability. The Hydroxyapatite (HA) coating allows secondary biological integration. The combination of the design and the HA coating of the Corail® Hip System has been proven to work.¹⁻³ The surgical technique is simple and allows for bone preservation as we are looking for "optimum filling" and not close cortical contact with the implant. The restoration of bone stock occurs with the creation of newly formed bone all around the stem thanks to the effect of both the design and the HA coating. The compaction broaching surgical technique is reproducible and straightforward. There are no long-term radiographic changes. The Corail® Hip System has now become a Gold Standard among primary cementless stems."

ARTRO Group. Corail® Design Surgeon Team.
Clinique d'Argonay. International Visitation Centre Corail®, Annecy, France



Host Bone

Formation of a bone trabecula in the periprosthetic gap establishing an anatomic continuity between the implant and host bone. Notable absence of intervening fibrous tissue.^{4,5,6,7}

Corail® Implant

Hydroxyapatite

Proven Results

97.0%

Survivorship in 5456 cases at 15 years. Havelin L., J. Bone and Joint Surg., 2007¹

98.9%

Survivorship in 100 consecutive cases at 8 years. Røkkum M., J. Bone and Joint Surg., 1999²

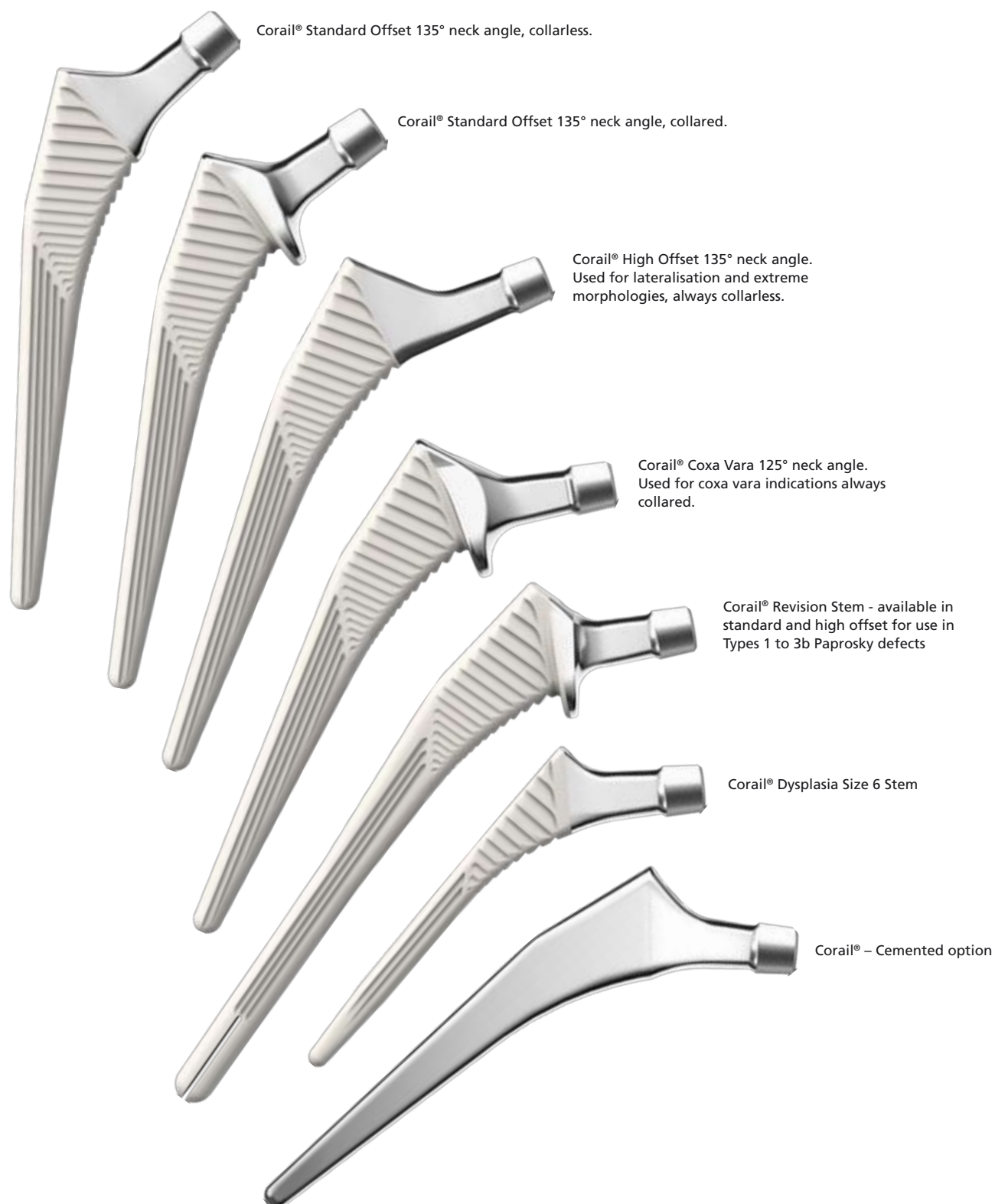
98.3%

Survivorship in 2,956 cases at 10 and 14 years. Vidalain JP. Artro Group., 1998³

“The most striking clinical finding in our material was the absence of thigh pain, which is often seen both in proximally and fully porous-coated stems...thigh pain, seems to be eliminated with the entirely HA-coated stem, probably because of comprehensive diaphyseal bonding.”

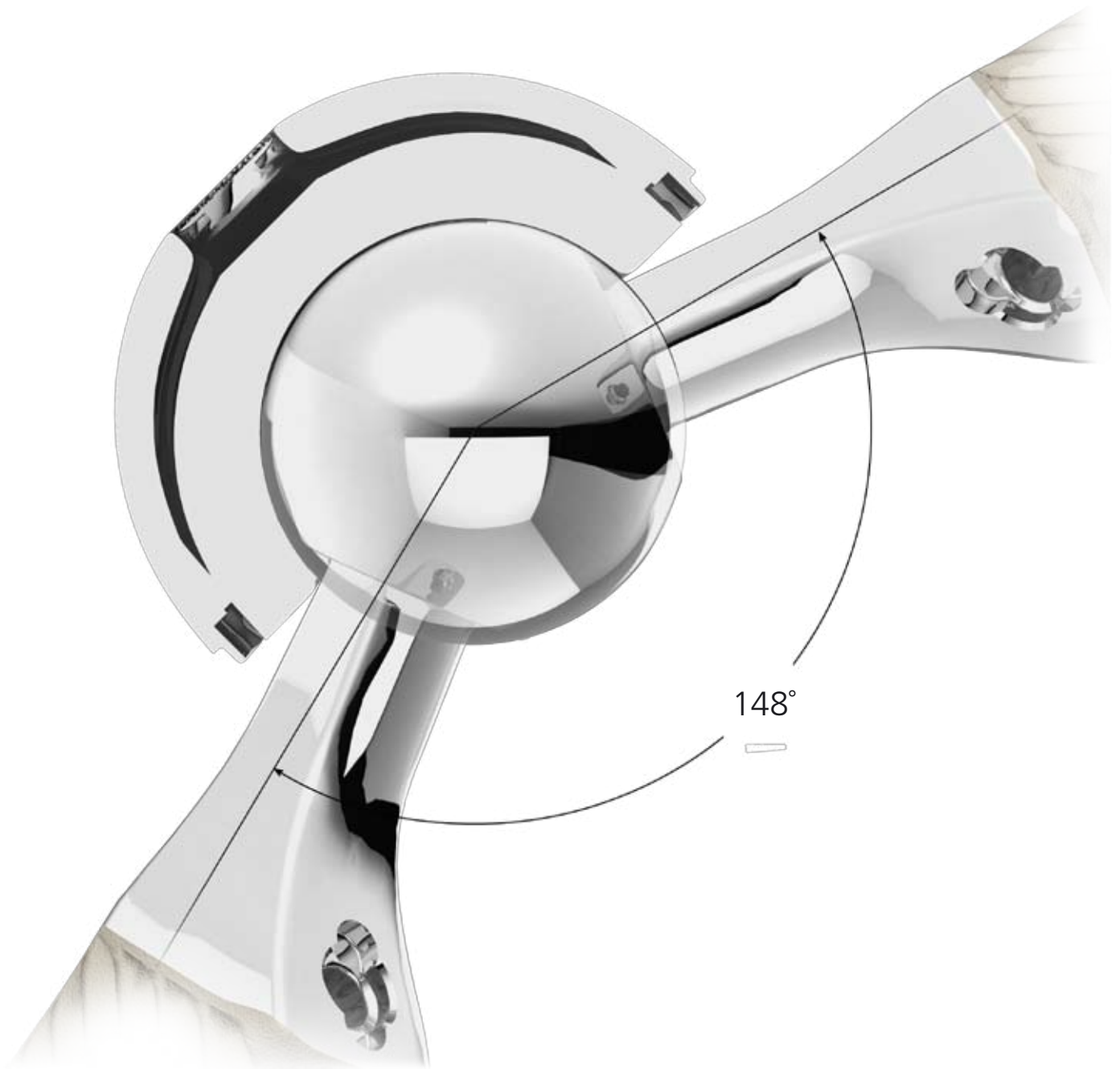
Røkkum M., J. Arthroplasty, 1999⁸

Extensive Range – Wider Indications



The Corail® Hip System offers five different primary stems, a revision stem and a cemented stem.

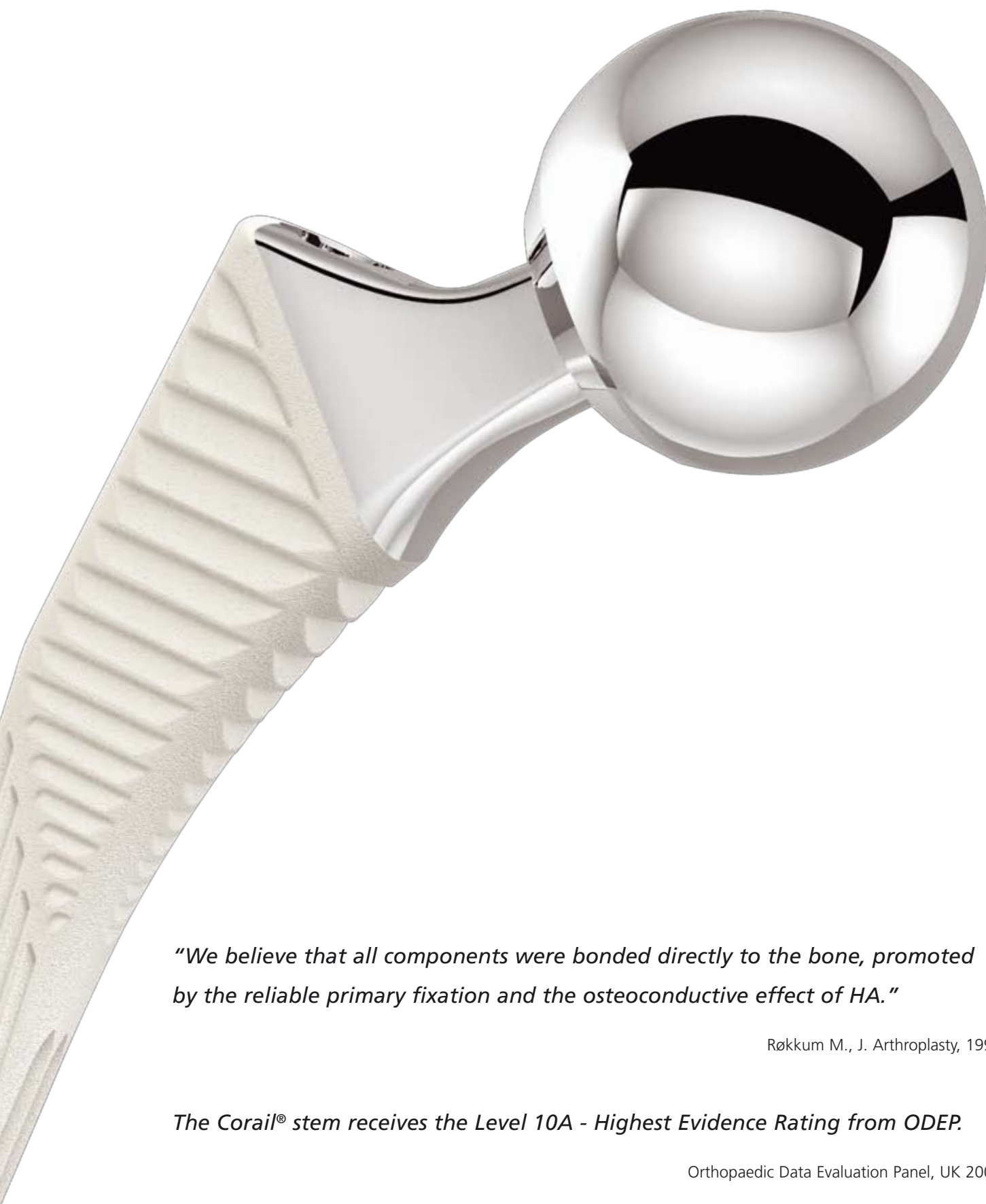
Optimised Neck Geometry – Wider Range of Motion



Abduction / Adduction

The Corail® Stem features a 12/14 Articul/eze® Mini Taper (AMT) which allows a range of motion of up to 148° with the Pinnacle™ Cup System.

Proven Fixation

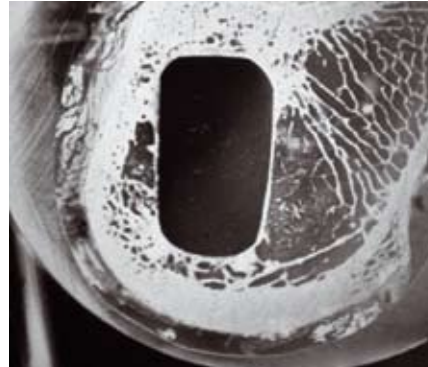


"We believe that all components were bonded directly to the bone, promoted by the reliable primary fixation and the osteoconductive effect of HA."

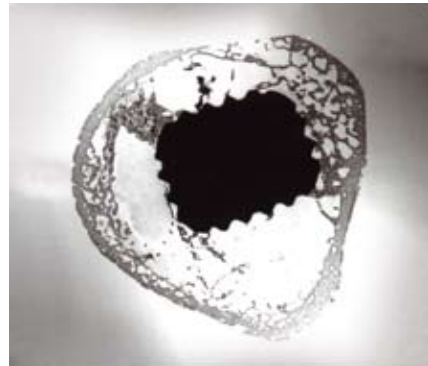
Røkkum M., J. Arthroplasty, 1998

The Corail® stem receives the Level 10A - Highest Evidence Rating from ODEP.

Orthopaedic Data Evaluation Panel, UK 2004



The medial to lateral taper resists axial / torsional stresses. HA coating promotes osteointegration for optimum fixation³



Vertical grooves and HA coating provide stabilisation to avoid distal thigh pain³

The design of the extra medullary section improves the biomechanics of the stem. The low profile neck increases the range of motion of the stem within the cup before the neck impinges on the cup. The AMT taper (Articul/eze® Mini Taper) captures completely the femoral head reducing the potential for impingement of the cup.

155 μ m hydroxyapatite coating on the grit-blasted surface of the Corail® stem induces rapid osteointegration. The HA coated medial to lateral taper resists axial / torsional stresses and promotes osteointegration for optimum fixation.¹¹

The design of the Corail® stem, with its titanium alloy and its full hydroxyapatite coating ensures load transfer without abnormal peak forces^{3,4,11,12} and allows a very low incidence of thigh pain.^{3,5,8,11,13,14,15}

Corail® as a Primary Cementless Stem



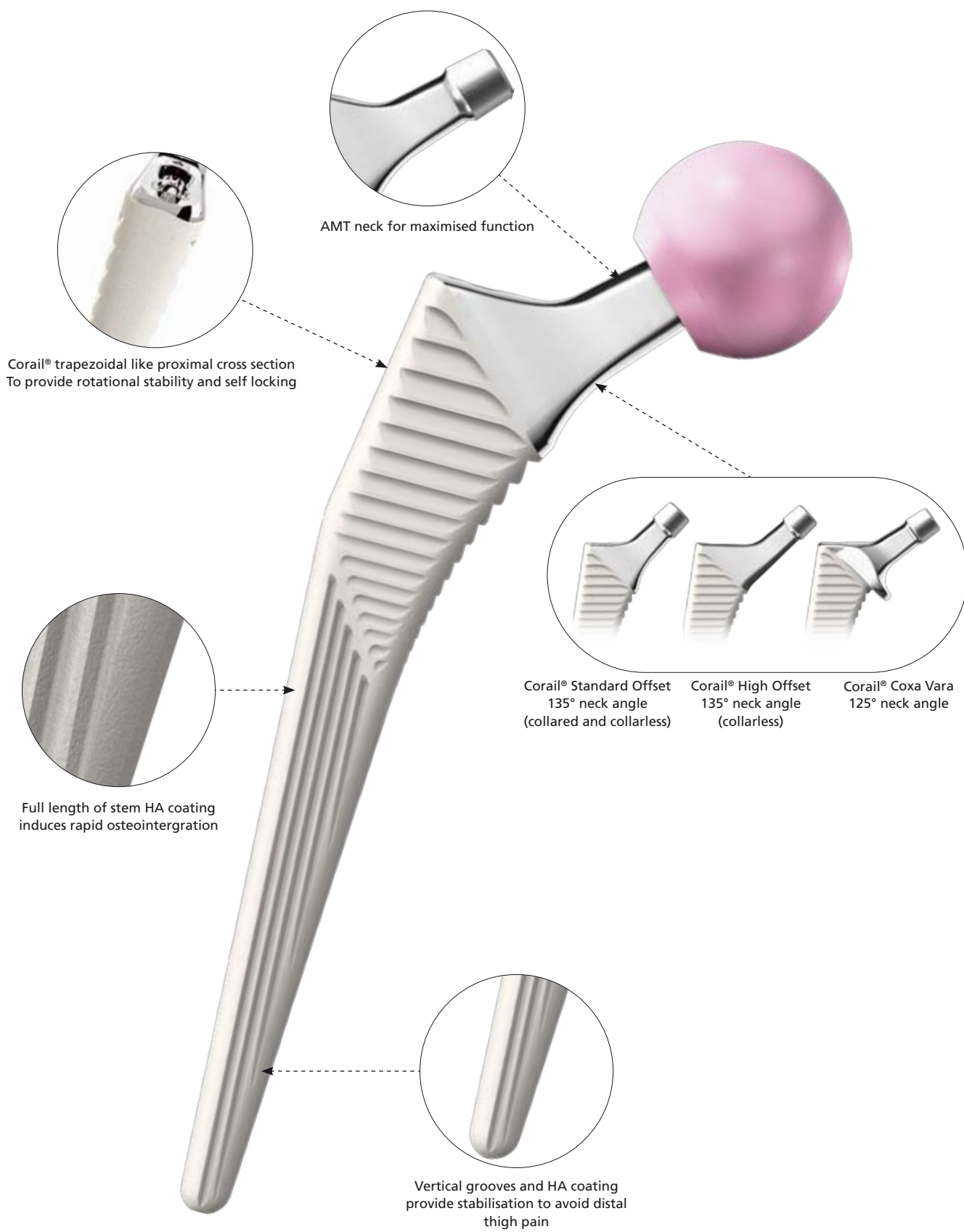
After twelve years of constant pain, this young patient was unable to sleep through the night and facing the fact that he could no longer run his business as his quality of life was extremely poor. However, only seven months after his Corail® Hip surgery (Pinnacle™ 36 mm Ceramic-on-Ceramic), he was back enjoying life with friends, skiing and ice climbing.



Pre-op x-ray



Post-op x-ray (7 months)



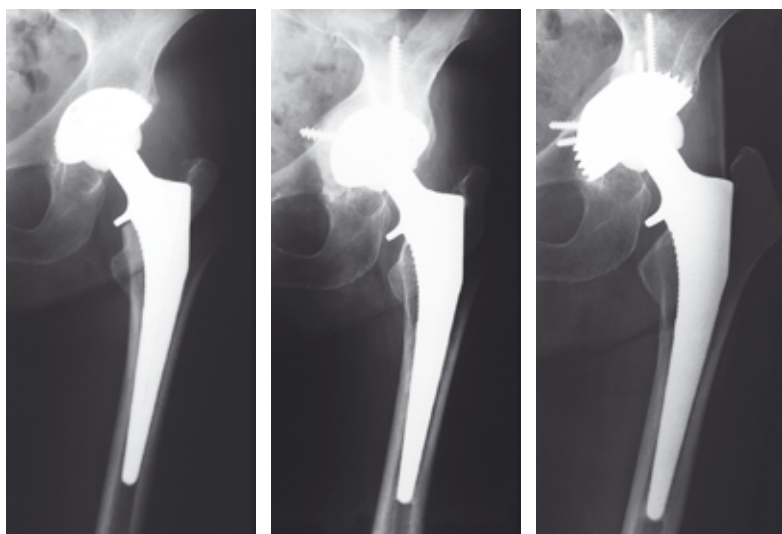
Corail® as a Fracture Stem



This lady was the very first Corail® stem patient and the first fractured neck of femur case treated with Corail®. Although suffering from severe osteoporosis, she was then a very active woman - a keen alpine skier and mountaineer. In August 1986, she suffered a fractured neck of femur after a mountain accident. She was operated on at the Clinique d'Argonnay, Annecy, by Dr Machenaud of the ARTRO Group, who implanted the first Corail® Stem.

Although this patient has been reoperated for acetabular wear, she is still doing very well and participates in winter sports with family and friends. This patient is just one of the many fractured neck of femur patients who have benefited from the Corail® stem's reliability.

Recent results of fractured neck of femur trials show that primary arthroplasty provides a better solution than hemi-arthroplasty or internal fixation. In randomised clinical trials Total Hip Replacement (THR) has been found to provide improved clinical results in relation to hip function, level of pain and health-related quality of life than either internal fixation or hemiarthroplasty, in previously mobile, otherwise healthy lucid fractured neck of femur patients aged more than 60 years old.^{16,18,19} In those patients, randomised clinical trials have also reported lower revision rates for THR than either hemi-arthroplasty or internal fixation.¹⁹

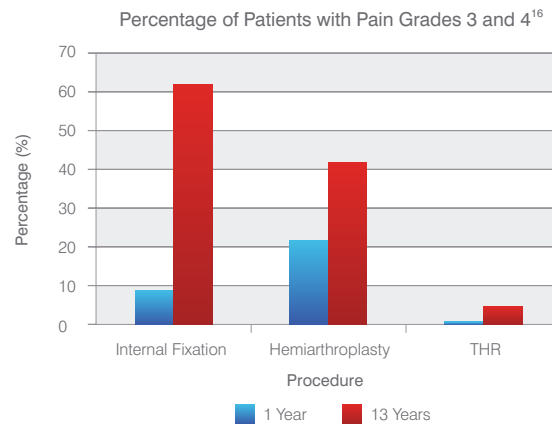


Post-op x-ray (immediate)

13 year follow-up

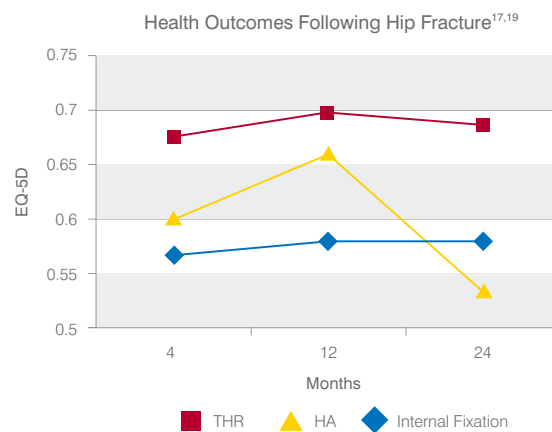
21 year follow-up

Pain Grades



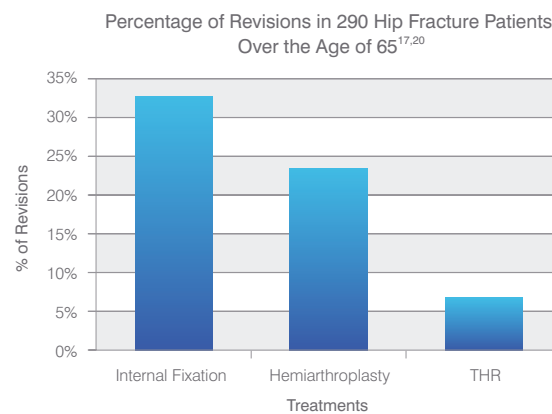
THR following femoral neck fracture consistently leads to reduced post-operative pain.

Health Outcomes



THR is associated with improved health and overall quality of life relative to other treatment options

Revision Rates in Fracture



The Corail® stem extramedullary geometry is designed for extended range of motion to provide increased stability reducing the risk of dislocation and revision surgery.

Corail® as a Revision Cementless Stem – Corail® Revision Stem



This retired gentleman, who previously worked as a bricklayer, presented with a painful right total hip replacement. The primary surgery had been performed 4 years previously and over the last 2 years he had been unable to weight bear on the right side.

On examination there was shortening of the right leg of around 1 cm. There was flexion of 90 degrees and 10 degrees of internal and external rotation which was painful. His X-rays showed significant loosening of the stem and the socket with subsidence of the stem and a degree of varus tilting. The lateral X-ray showed the stem sitting in an antero-posterior direction with probable perforation of the cortex at the tip.

Procedure: Revision right hip replacement, KAR™ stem, impaction bone grafting to socket.

Post-op x-rays show stable prosthesis, with cerclage wiring to prevent periprosthetic fracture around the previous canal perforation.



Pre-op x-ray



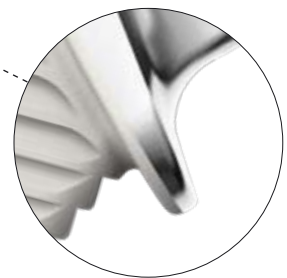
Post-op x-ray



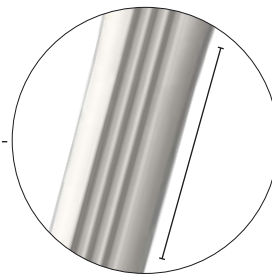
The Corail® Revision Stem prosthesis features a 12/14 Articuleze® mini taper which is compatible with Pinnacle™ High Performance Bearings.



Corail® trapezoidal like proximal cross section
To provide rotational stability and self locking



Collar for additional proximal support and
to load horseshoe calcar graft if required



Consistent 40 mm longer than standard Corail® Stem



The long flexion slot in the coronal plane and the shorter slot in the sagittal plane allow for the stem to adapt to the femoral curve and minimise the risks of thigh pain and stress shielding.

Corail® as a Cemented Stem



Pre-op x-ray



Post-op x-ray

Following an 'intra-capsular fracture' this male was templated for a hydroxyapatite coated Corail® stem.

Having prepared the femur for a Corail® Stem, the surgical team selected the cemented option from the Corail® Hip System. This was a more suitable implant for this patient. Both hydroxyapatite coated and cemented options share exactly the same broach envelope and instrumentation.

"The cement mantle distribution was similar for the Titan and Cemented version of the Corail® Hip System."

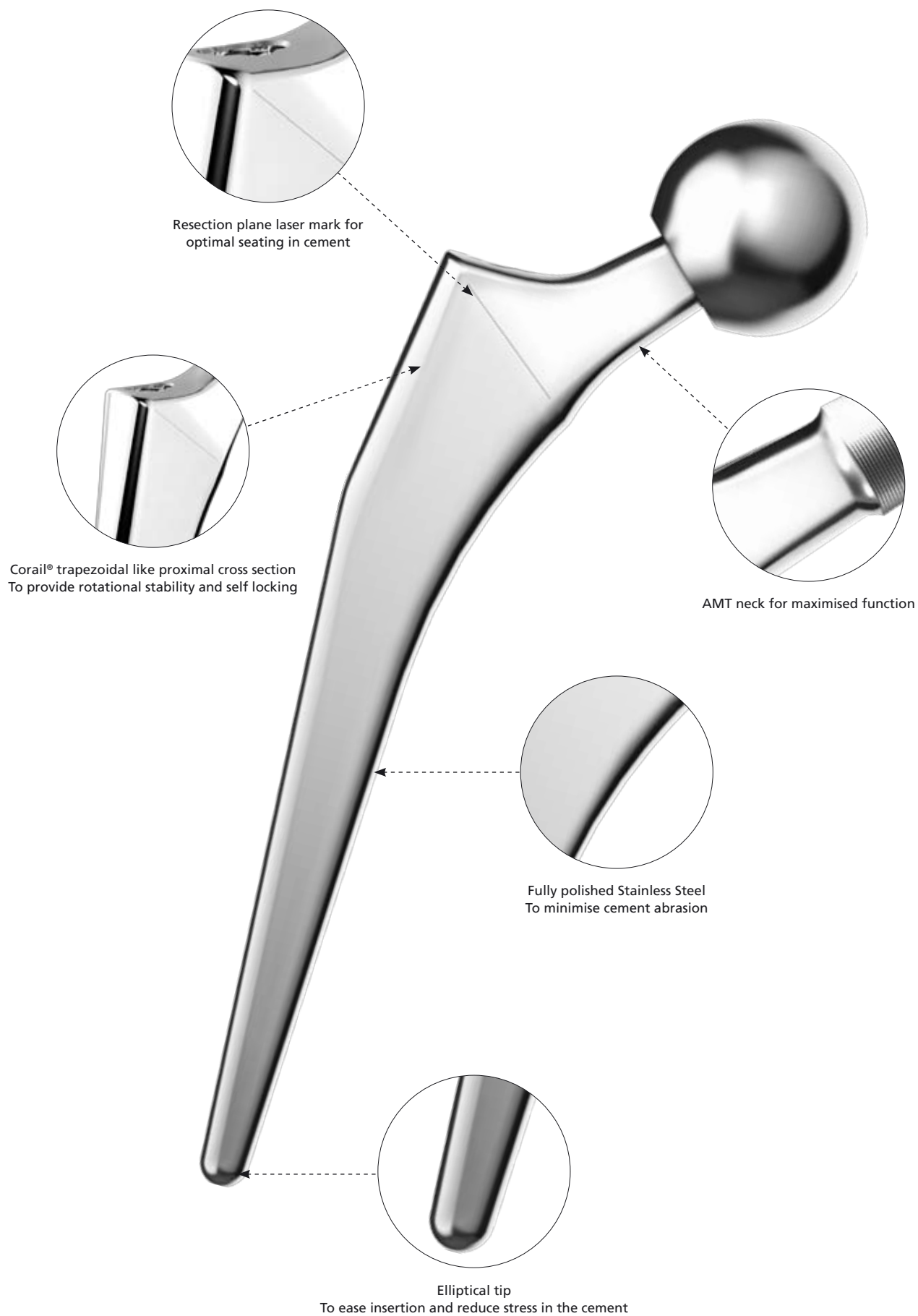
Nick Bishop, Dr MM Morlock, Ph.D.

Technical University Hamburg-Harburg, Biomechanics Section. Hamburg, Germany, Sept 2008

"In the current FEA study, the mechanical performance of the Corail® Hip System Cemented implant was analyzed and compared to that of the Titan and Charnley® implants. The simulations indicated that the mechanical performance of the Corail® Hip System Cemented was superior to that of the Titan and Charnley® stems. Fewer cracks were formed in the cement mantle surrounding the Cemented version of the Corail® Hip System during the loading history. Furthermore, the migration values for the Corail® Hip System implant were very small (lower than 20 µm)."

Dennis Janssen, MSc, Nico Verdonschot, PhD, Radboud

University Nijmegen Medical Centre Orthopaedic Research Lab, Nijmegen, The Netherlands, Apr 2008



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Corail® Dysplasia Size 6 Stem - Surgical Technique



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Corail® Revision Stem (Cementless) - Surgical Technique

Surgical Approach, Femoral Neck Resection, Proximal Cancellous Bone Compaction (please refer to the Corail® Primary Stem (Cementless) Surgical Technique pages 19-22)



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Corail® Primary Stem (Cemented) - Surgical Technique

Pre-operative Planning, Surgical Approach, Femoral Neck Resection, Proximal Cancellous Bone Compaction, Femoral Canal Preparation, Trial Reduction (please refer to the Corail® Primary Stem (Cementless) Surgical Technique pages 19-22)



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Corail® Primary Stem (Cementless) - Surgical Technique

Pre-operative Planning



Pre-op templating

The Corail® Hip System provides pre-operative templates at three different magnifications (100%, 115% and 120%). The templates are placed over the AP and lateral radiographs to help determine the implant size in order to restore the patient's natural anatomy. When templating ensure that the prosthesis does not make cortical contact. Understand the difference between fit and fill and optimum fit. The surgical objective is a 1–2 mm gap between the cortices and the implant. If in doubt template a size that contacts the cortex and then go down a size. Templating should be done with a medium neck so that the possibility to change to a short or a long neck still remains in order to adjust leg length. The pre-operative templating will indicate the level of neck resection.

Surgical Approach



Posterolateral approach



Anterolateral approach



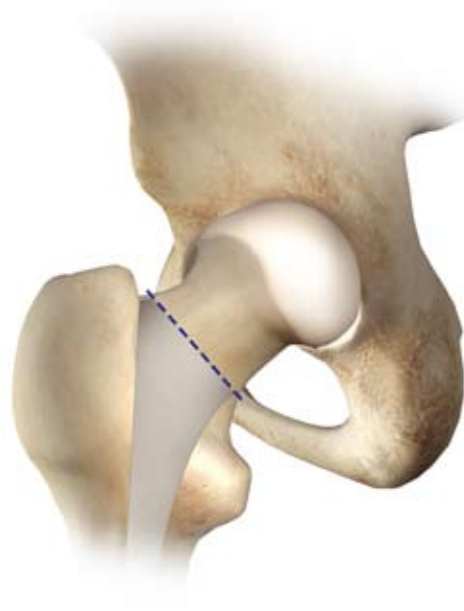
MicroHip™ direct-anterior approach

The Corail® stem can be used with any surgical approach that the surgeon is familiar with.

Femoral Neck Resection

The angle of resection should be 45°. The neck resection guide should be used to determine the level of the femoral neck resection in conjunction with pre-operative templating. If the resection is too high, it may result in a varus positioned stem.

Note: the osteotomy can be performed in one or two steps depending on the surgeon's preference.



Proximal Cancellous Bone Compaction

It is important to select a point of entry posterolaterally to the Piriformis Fossa to avoid varus positioning. Use a curette or general instrument to indicate the direction of the canal. Use the bone tamp to compact the cancellous bone proximally. This is an important step as the philosophy of the Corail® stem is based on bone preservation.

To prevent under-sizing or varus positioning, the greater trochanter may be prepared with an osteotome to allow better insertion of the broaches.

Please refer to the Pinnacle™ Surgical Technique for full details with regards to the acetabulum preparation (Cat No: 9068-80-050).



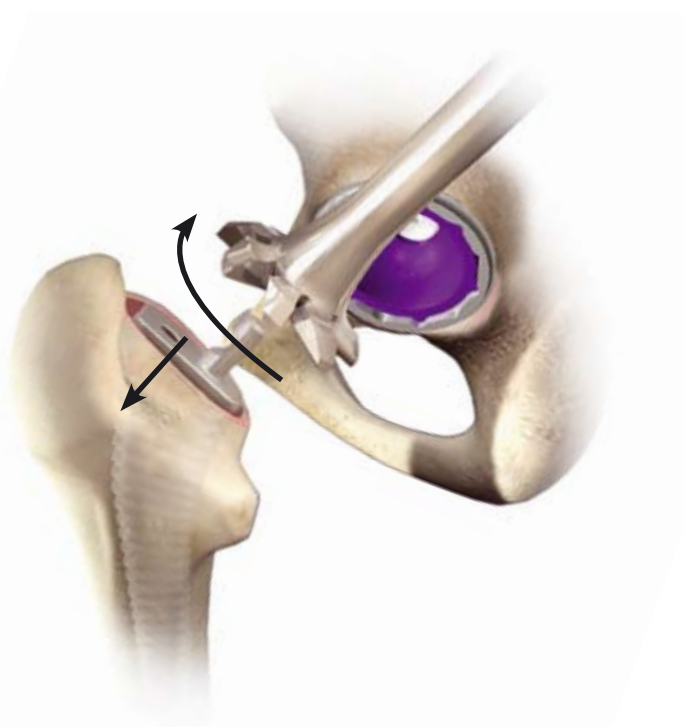
Femoral Canal Preparation



Ensure that broaching is started postero-laterally. The broach should run parallel to the posterior cortex following the natural anatomy of the femur. Begin with the smallest broach attached to the broach handle and increase the size of broach sequentially until longitudinal and rotational stability is achieved, broaching should then be stopped. Careful preoperative planning is key to help selection of the final broach size. The version will be determined by the natural version of the femur.

In Type A Femurs²¹, the diaphysis should be reamed prior to broaching to ensure that the Corail® stem is implanted into compacted cancellous bone in the metaphysis.

Calcar Reaming

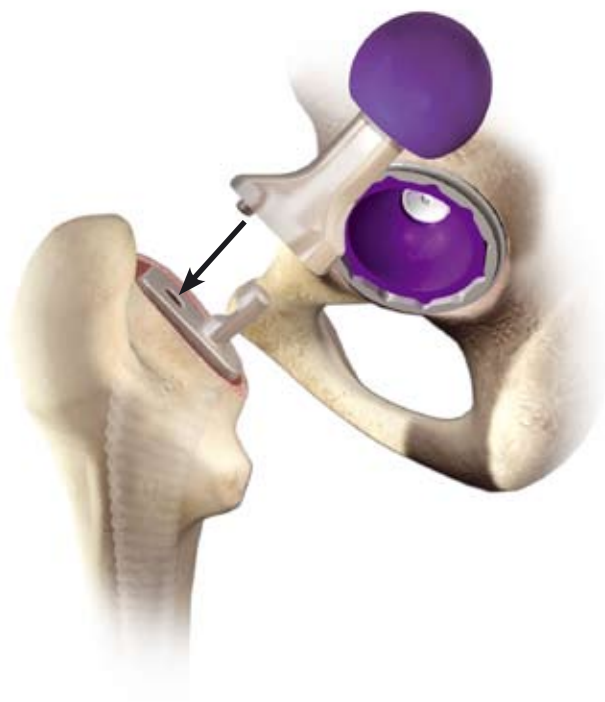


Leave the last broach in place and use the calcar mill to achieve a flat resection surface. The calcar reaming should allow an optimised fit of the collar on the calcar.

Note: Ensure all soft tissue is clear before performing calcar reaming.

Trial Reduction

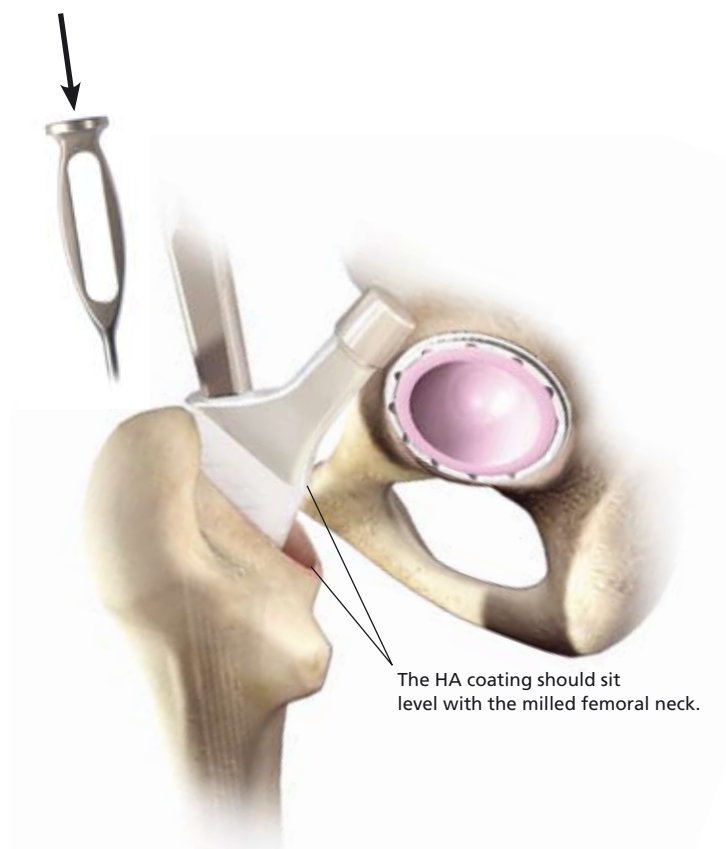
With the final broach in situ, attach the appropriate trial neck and trial head. Reduce the hip and assess what adjustments, if any, are required to ensure stability through a full range of motion. Remove the trial head, neck trial and final broach. Do not irrigate or dry the femoral canal. This will help to preserve the compacted cancellous bone quality and encourage osteointegration of the stem.



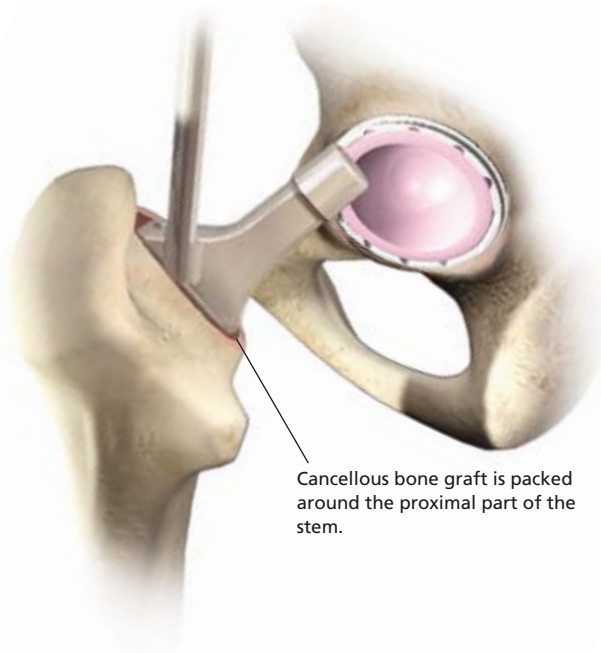
Femoral Component Insertion

When implanting the definitive stem (that has the same size as the final broach) in the femoral canal, ensure that it is directed in by hand. This will help avoid changing the version as a precautionary measure. You should not have more than a thumb's breadth between the resection line and the top of the HA coating on the stem. If the stem does not readily go down this far, the surgeon should broach again. If the HA level of the stem sinks below the resection line, the surgeon should consider a larger stem or using a collar. Then lightly tap the stem impactor to fully seat the stem.

Note: The stem is 0.31 mm thicker than the broach to allow the necessary press-fit.



Addition of Bone Graft



Once the Corail® stem is fully seated, cancellous bone from the resected femoral head is added around the proximal part of the stem using the bone tamp to seal the femoral canal and to reduce the time for osteointegration which provides definitive stability.

Femoral Head Impaction



A final trial reduction is carried out to confirm joint stability and range of motion.

A DePuy 12/14 Articul/eze® head must be used. Clean and dry the stem taper carefully to remove any particulate debris. Place the femoral head onto the taper and lightly tap it (especially if a ceramic head is used) using the head impactor. Ensure bearing surfaces are clean and finally reduce the hip.

Corail® Dysplasia Size 6 Stem - Surgical Technique

Pre-operative Planning

X-ray templates are used during the pre-operative planning to define the femoral neck cutting plane, the degree of lateralisation and the positioning of the cup inside the native acetabular cavity.

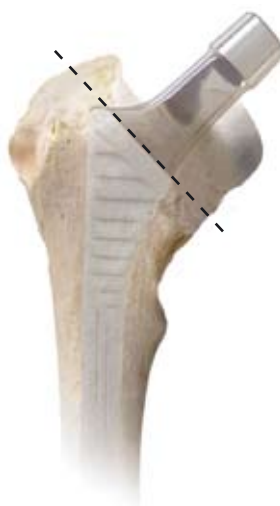


Pre-op templating

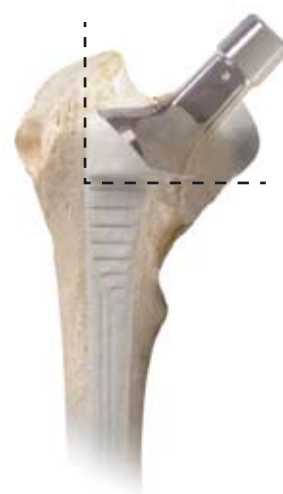
Femoral Neck Resection

Following exposure of the proximal femur, the first neck cut is made higher than the one planned, in order to remove the femoral head. The second neck cut will depend on the implant chosen during the pre-operative planning. If the implant chosen is the K6S, then the neck cut will be a 45° angle cut. If the implant chosen is the K6A, then the neck cut will be biplanar as identified.

The axis of the femoral cavity is then located using a curette.



Implant K6S



Implant K6A

Femoral Canal Preparation



Implant K6S

Implant K6A

The femoral cavity is prepared using the single monobloc broach specific to each type of implant.

The chosen broach is inserted firmly down to the level of the cervical cutting plane.

Trial Reduction



Implant K6S

Implant K6A

The trial stem is introduced to the prepared cavity.

Joint mobility and stability tests can be carried out using trial heads.

Femoral Component Insertion

The stem is introduced by hand first and then impacted down to the level of either the hydroxyapatite coating in case of the K6S or at the level of the trochanteric bearing in case of the K6A.



Implant K6S



Implant K6A

Femoral Head Impaction

A final trial reduction is carried out to confirm joint stability and range of motion.

A DePuy 12/14 Articul/eze® head must be used. Clean and dry the stem taper carefully to remove any particulate debris. Place the femoral head onto the taper and lightly tap it (especially if a ceramic head is used) using the head impactor. Ensure bearing surfaces are clean and finally reduce the hip.



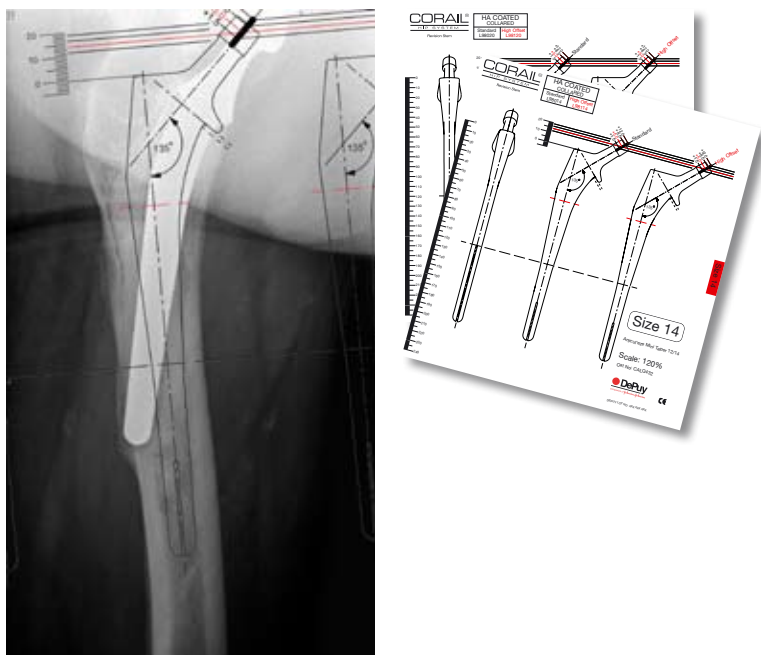
Implant K6S



Implant K6A

Corail® Revision Stem – Surgical Technique

Pre-operative Planning



Pre-op templating

Pre-operative planning is essential for precise reconstruction of the hip joint. The Corail® Revision Stem prosthesis comes with a comprehensive set of X-ray templates which include a clear indication of the scale used and both standard and high offsets for all sizes of the range. These are used with radiographs showing the AP view of the pelvis and AP and lateral views of the affected femur, covering the full length of the prosthesis to be revised, as well as any occlusion in the distal femoral canal.

The AP view provides the necessary information needed to determine:

- Implant alignment and the size of component required to fit and fill the metaphysis and diaphysis: in accordance with the philosophy of three-point-contact.
- Dedicated witness marks on both the X-ray templates and the trial stems define the required level of implantation, described as the 'minimal embedding level'.
- The type of implant, Standard or High Offset. Associated with neck length, this choice allows restoration of the offset, leg length and patient's natural anatomy
- Where necessary, the appropriate height of calcar bone grafting required

The lateral view may then be used to confirm implant alignment, to identify any defects that cannot be seen on the AP view and to check the compatibility of the stem with the femoral curvature.

A transfemoral approach to retrieve the femoral implant is not a contraindication for the Corail® Revision Stem. The level must be defined using X-rays templates and be above the longitudinal distal slots.

Femoral Canal Preparation

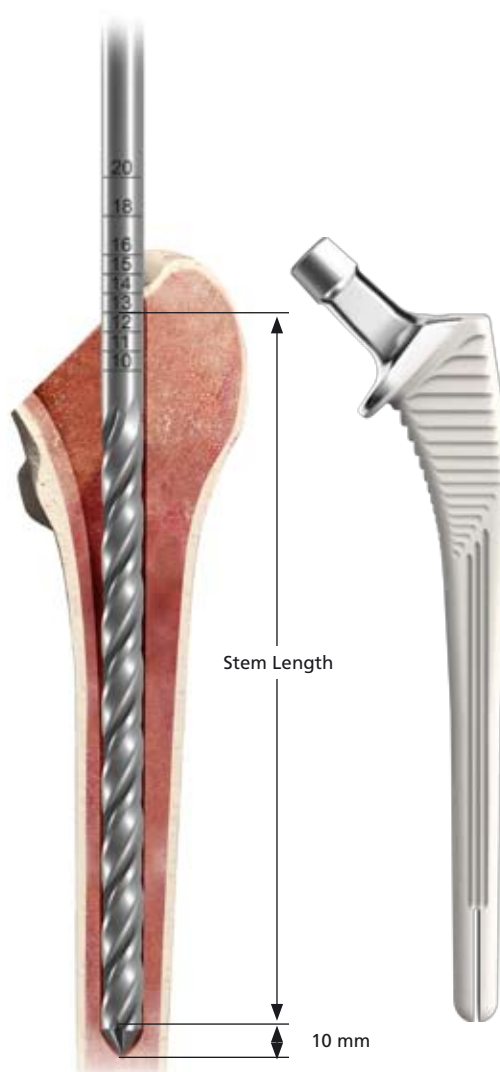
Distal Reaming

Once the failed implant has been retrieved, the femur is cleared of any remaining cement or debris, if present. Rigid reamers are available in sizes 10 mm, 11 mm, 12 mm and 13 mm and should be used sequentially to prepare the distal femoral canal.

All sizes of Corail® Revision Stem have a distal diameter of 11 mm and so reaming should increase to at least 11 mm. A 10 mm reamer can be used as a starter to allow the easy introduction of the 11 mm reamer. It may be necessary to over-ream by 1 mm or 2 mm, using a 12 mm or 13 mm reamer to allow free passage of the trial stem to the desired depth. In all cases, over-reaming should be done during trialling. Care should be taken to maintain the integrity of the endosteal cortices.

Each rigid reamer has mechanical engravings showing the desirable depth of reaming, corresponding to each stem length (lengthened by 10 mm to take into account the tapered shape) as referenced from the tip of the stem to the shoulder of the stem.

Note: The use of a transfemoral approach can be used during the implantation of a Corail® Revision Stem. Generally, the femoral tube is closed by cerclage wiring to reconstruct the femoral shaft, and then the femoral preparation is carried out as it would be for a closed femur procedure. The primary stability of the stem inside the host bone is the limiting factor. In the case of a highly enlarged metaphysis, the gap should not be filled by bone graft but a tightening femoroplasty performed around the Corail® Revision Stem (using cerclage wiring).



Metaphyseal Preparation



Access to the femoral canal should be enlarged laterally into the greater trochanter, using a box chisel, to ensure that the broaches do not enter the femur in varus. The first broach, with a size adapted to the defect, is attached to the broach handle and the proximal femur is prepared by progressively increasing broach sizes.

The Corail® Revision Stem instrument set contains both size 8 and size 9 diamond-tooth broaches which can be used as 'starter' broaches.

The preparation of the proximal femur requires the metaphyseal region to be re-shaped to a quadrangular envelope delivering the correct anteversion by using the broaches. It is essential that the final broach is completely rotationally and axially stable in the femur in order to ensure stem stability in the metaphysis. To test for appropriate stability, rotational and axial pressure should be applied to the broach handle without movement of the broach inside the femoral canal. Distal stem stability alone is not sufficient.

If necessary, the calcar mill can be used carefully on the remaining calcar in order to produce a flat surface upon which to seat the implant collar.

Caution: *The Corail® Revision Stem Broach should not be used to perform a trial reduction of the hip. This is to ensure that the integrity of the prepared femoral envelope is maintained. In this instance, the trial stem should be used.*

Trial Stem Introduction

The final broach is extracted and the trial stem of the same size is attached to the broach handle. The trial stem is lightly inserted into the femoral canal using a hammer. It should be stable at the level defined during pre-operative planning relative to the greater and lesser trochanter.

It may be necessary to over-ream distally by 1 or 2 mm, using a 12 or 13 mm reamer to allow free passage of the trial stem to the desired depth.

If the trial stem is not stable, a trial stem one size larger can be tried in order to obtain stability at the correct level. In case visual access is available, it can be useful to check that the “minimal embedding level” is reached using the dedicated witness groove on the trial stem.



Neck and Head Trialing



The corresponding type of trial neck is then attached into the trial stem. Two options are available, standard (STD) and high offset (KHO).

Important: When using the Corail® Revision Stem upgrade set, care should be taken not to use the coxa-vara trial neck (KLA) which is available as part of the Corail® primary instrument set.

The high offset variant offers up to 7 mm of direct lateralisation, depending on the size and will increase soft tissue tension without affecting leg length.

A trial head is placed on the neck of the trial stem, and the hip is reduced and assessed for stability, through a full range of motion.

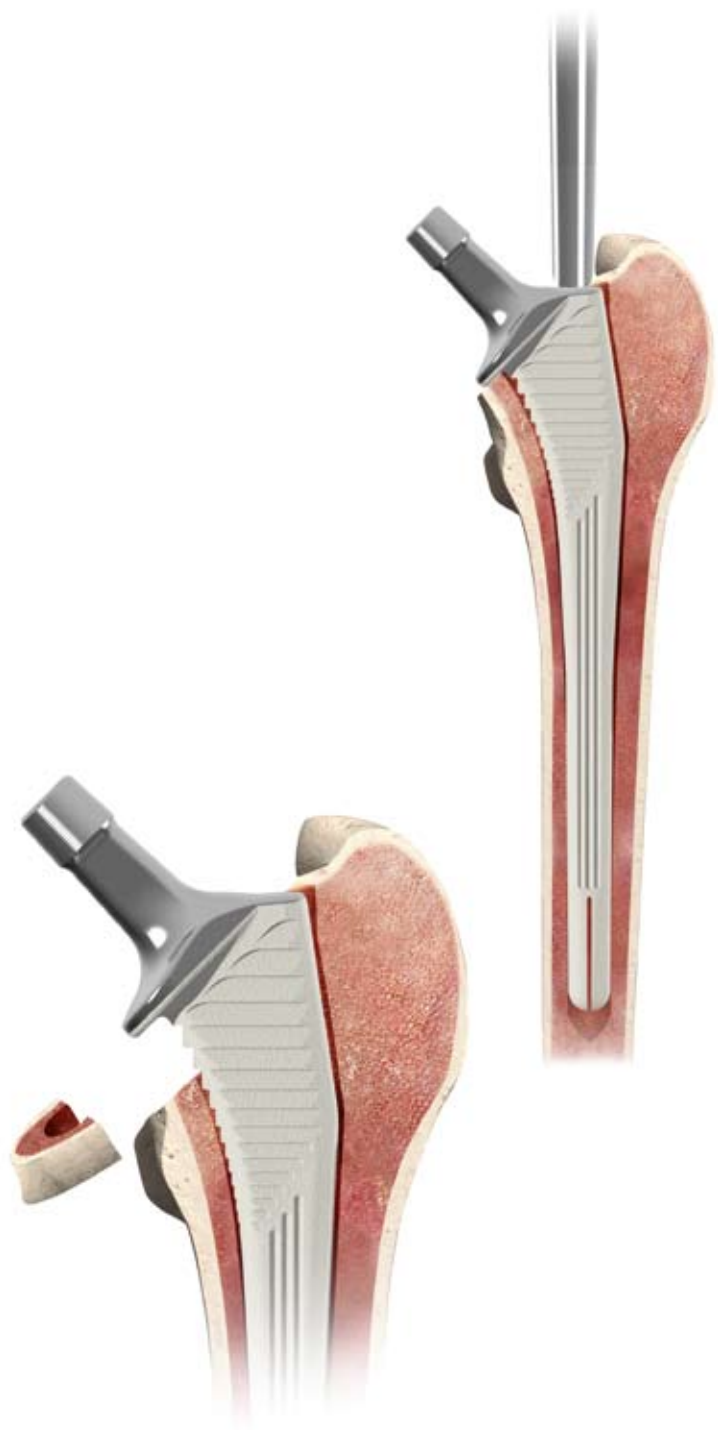
Definitive Stem Introduction

The definitive implant of same size as the trial stem and same offset as the trial neck is inserted into the femoral canal. The introduction is managed using the stem impactor while ensuring the correct restored anteversion is applied.

The stem is cautiously impacted using a hammer while avoiding any impact on the neck.

Where a horseshoe-shaped structural allograft is used, this should be placed to fill the defect before final impaction. The graft will be stabilised by the collar after final impaction. The goal of this calcar graft is to ensure the right level of implantation and minimise the potential for subsidence.

An optional reduction using a the trial head can be done at this stage.



Femoral Head Impaction



A DePuy 12/14 Articulate® modular head must be used. Clean and dry the stem taper carefully to remove any particulate debris. Place the femoral head onto the taper and lightly tap using the head impactor. Ensure bearing surfaces are clean and avoid any damage to the bearing surface during reduction.

Post-operative Protocol

The post-operative management of the patient, including the extent to which weight bearing is permitted, is defined by the surgeon according to quality of the bone stock and the stability of the implant. Immediate weight bearing can thus be considered for primary or revision surgery if adequate bone stock remains.

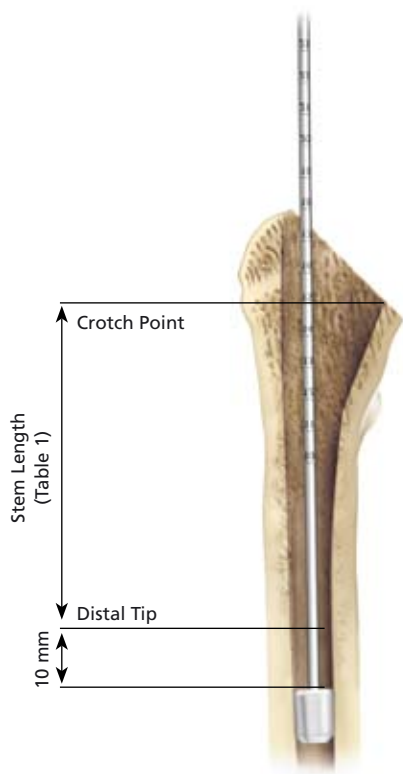
In all the cases, the duration of protected weight bearing is dependent upon the condition of the femur and radiological evidence of osteointegration (assessed optionally using the dedicated witness mark on the x-ray templates) and if applicable, the consolidation and/or healing of the transfemoral osteotomy or the femoroplasty. This is generally reached after 45 days.

Corail® Primary Stem (Cemented) - Surgical Technique

The canal is prepared in exactly the same way as for the Corail® Cementless. To implant the cemented option the following additional steps are required.

(For a full description, please refer to the Corail® Primary Stem (Cementless) Surgical Technique pages 19-22).

Cement Restrictor - Trial



Select the size of trial cement restrictor identified during pre-operative templating to fit the distal canal. Attach it to the cement restrictor inserter and insert the trial cement restrictor to the planned depth. Check that it is firmly seated in the canal. Remove the trial cement restrictor.

Pulse Lavage



The use of pulse lavage is recommended to clean the femoral canal of debris and to open the interstices of the bone.

By using pulse lavage prior to setting the cement restrictor, the risks of creating fatty embolism will be reduced.²²

Cement Restrictor - Implant

Insert the selected DePuy cement restrictor implant at the same level as the restrictor trial.

Note: The size of the cement restrictor should be one size larger than the last trial restrictor inserted to the planned level. The planned level should be 1cm below the tip of the implant

Implant Size	Stem Length Crotch point to distal tip	Restrictor Depth
8	95 mm	105 mm
9	110 mm	120 mm
10	120 mm	130 mm
11	125 mm	135 mm
12	130 mm	140 mm
13	135 mm	145 mm
14	140 mm	150 mm
15	145 mm	155 mm
16	150 mm	160 mm
18	160 mm	170 mm
20	170 mm	180 mm

Table 1



Final Bone Preparation

The bone can be dried by passing a swab down the femoral canal which helps to remove any remaining debris.



Cementing Technique



High viscosity cement should be used (SmartSet® HV or SmartSet® GHV Gentamicin bone cement with the Cemvac® Vacuum Mixing System). Attach the syringe to the Cemvac® cement injection gun. Assess the viscosity of the cement. The cement is ready for insertion when it has taken on a dull, doughy appearance and does not adhere to the surgeon's glove. Start at the distal part of the femoral canal and inject the cement in a retrograde fashion, allowing the cement to push the nozzle gently back, until the canal is completely filled and the distal tip of the nozzle is clear of the canal.

Note: *Setting time may vary if the cement components or mixing equipment have not been fully equilibrated to 23°C before use.*



Cut the nozzle and place a femoral pressuriser over the end. The cement must be pressurised to ensure good interdigitation of the cement into the trabecular bone. Continually inject cement during the period of pressurisation. Use the femoral preparation kit curettes to remove excess bone cement. Implant insertion can begin when the cement can be pressed together without sticking to itself. For a full description, please see the Utilising Modern Cementing Techniques literature (Cat No:4010030).

Femoral Component Insertion

Select a stem of the same size as the final broach inserted. Introduce the implant using the curved stem inserter in line with the long axis of the femur in one slow movement. Its entry point should be lateral, close to the greater trochanter.

During stem insertion maintain thumb pressure on the cement at the medial femoral neck. Insert the stem up to the resection level. If necessary, a few light taps on the stem inserter will bring the stem to the right level.

Remove excess cement with a curette. Maintain pressure until the cement is completely polymerised.

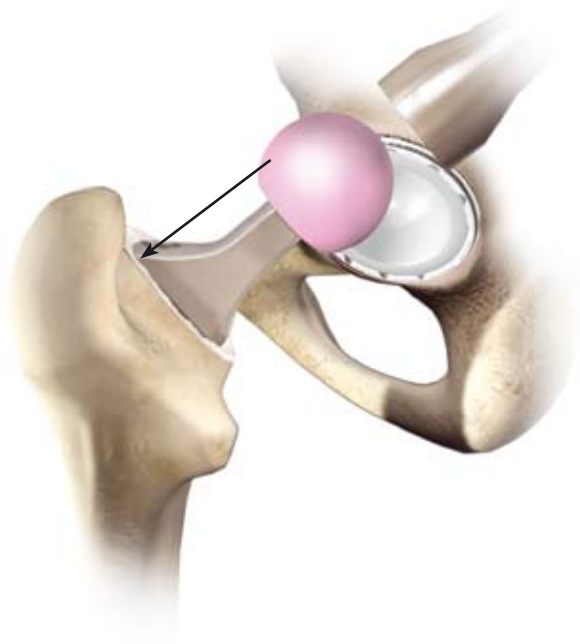
The curved stem inserter is used to impact the stem for the last few centimetres



Femoral Head Impaction

A final trial reduction is carried out to confirm joint stability and range of motion.

A DePuy 12/14 Articul/eze® head must be used. Clean and dry the stem taper carefully to remove any particulate debris. Place the femoral head onto the taper and lightly tap it (especially if a ceramic head is used) using the head impactor. Ensure bearing surfaces are clean and finally reduce the hip.



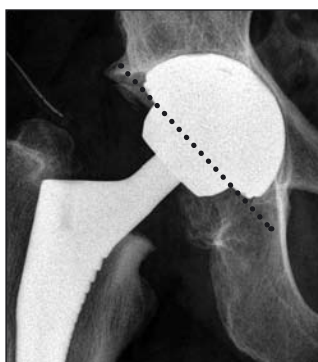
Acetabular Cup Trialing and Positioning

Current studies have highlighted that correct acetabular component positioning is a key element to success with all types of bearings used in hip replacement surgery. As well as subluxation, impingement, fixation and range of motion; optimum femoral head coverage and mechanical loading of the bearing must also be considered when positioning the acetabular component. Incorrect acetabular component positioning can lead to edge loading and undesirable effects across all bearings, such as dislocation, increased wear, ceramic squeaking, elevated metal ion release and polyethylene fractures.^{23,24,25,26,27,28,29,30}



Correct Positioning

Inclination 40°– 45°, Anteversion 15°– 20°*



Cups which are placed in the optimum inclination of 40°– 45° and an anteversion of 15°– 20°, give the correct cup alignment, allowing for correct loading of the bearing, which provides a significant reduction in wear during both the bedding-in and steady-state phase.^{31,32}

When using the Pinnacle™ Cup System, no negative implications have been identified when leaving Porocoat® exposed superior laterally. It often ensures that the correct inclination has been achieved.



Incorrect Positioning

Inclination >45°, Anteversion >20°*



An inclination angle above 45° and an anteversion angle above 20° can result in dislocation, impingement, a reduced range of motion and edge loading. Edge loading can potentially lead to increased wear rates and adverse effects.

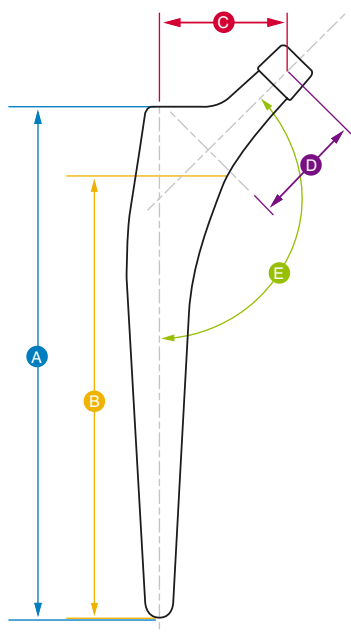
It has been highlighted in several studies that a greater abduction angle for metal-on-metal bearings can generate higher wear rates, which can in turn create increased metal ions and debris within the joint. It should be noted that metal ion levels cannot be directly related to wear.^{31,32}

* assuming 10° - 15° of femoral anteversion

** assuming femoral anteversion is no more than 10°

For more detail regarding acetabular cup positioning please refer to the brochure "The Importance of Correct Acetabular Component Positioning" (Cat. No. 9066-00-001)

Sizing Information



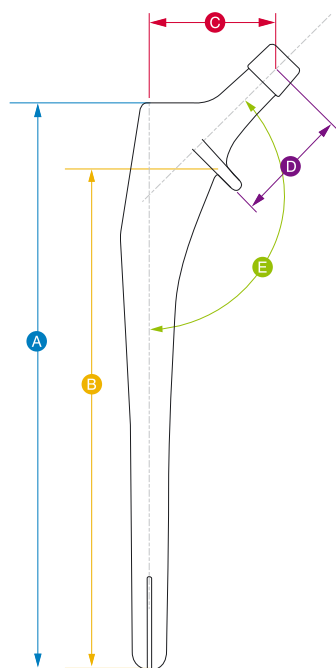
STANDARD OFFSET – COLLARLESS/COLLARED					
Size	Stem Length (mm) (A)	Stem Length (mm) (B)	Offset (mm) (C)	Neck Length (mm) (D)	Neck Shaft Angle (E)
8	115	95	38.0	38.5	135°
9	130	110	38.5	38.5	135°
10	140	120	39.5	38.5	135°
11	145	125	40.0	38.5	135°
12	150	130	41.0	38.5	135°
13	155	135	41.5	38.5	135°
14	160	140	42.0	38.5	135°
15	165	145	43.0	38.5	135°
16	170	150	43.5	38.5	135°
18	180	160	44.5	38.5	135°
20	190	170	45.5	38.5	135°

HIGH OFFSET – COLLARLESS					
Size	Stem Length (mm) (A)	Stem Length (mm) (B)	Offset (mm) (C)	Neck Length (mm) (D)	Neck Shaft Angle (E)
9	130	110	45.5	43.2	135°
10	140	120	46.5	43.2	135°
11	145	125	47.0	43.2	135°
12	150	130	48.0	43.2	135°
13	155	135	48.5	43.2	135°
14	160	140	49.0	43.2	135°
15	165	145	50.0	43.2	135°
16	170	150	50.5	43.2	135°
18	180	160	51.5	43.2	135°
20	190	170	52.5	43.2	135°

COXA VARA – COLLARED					
Size	Stem Length (mm) (A)	Stem Length (mm) (B)	Offset (mm) (C)	Neck Length (mm) (D)	Neck Shaft Angle (E)
9	130	110	45.5	40.3	125°
10	140	120	46.5	40.3	125°
11	145	125	47.0	40.3	125°
12	150	130	48.0	40.3	125°
13	155	135	48.5	40.3	125°
14	160	140	49.0	40.3	125°
15	165	145	50.0	40.3	125°
16	170	150	50.5	40.3	125°
18	180	160	51.5	40.3	125°
20	190	170	52.5	40.3	125°

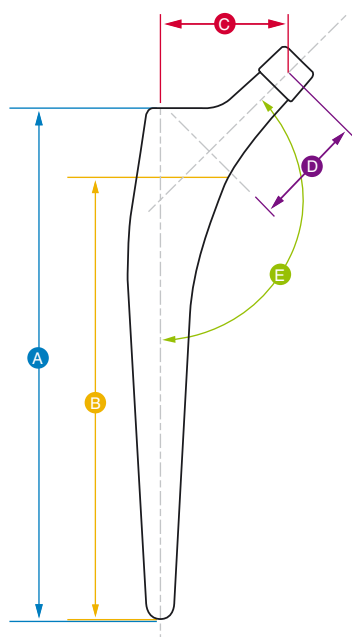
DYSPLASIA RANGE – SIZE 6			
Size	Stem Length (mm) (B)	Offset (mm) (C)	Neck Shaft Angle (D)
6A	110	34.4	135°
6S	110	30.8	135°

Sizing Information



CORAIL® REVISION STEM - STANDARD OFFSET					
Size	Stem Length (mm) (A)	Stem Length (mm) (B)	Offset (mm) (C)	Neck Length (mm) (D)	Neck Shaft Angle (E)
10	180	157	39.5	38.5	135°
11	185	162	40.0	38.5	135°
12	190	167	41	38.5	135°
13	195	172	41.5	38.5	135°
14	200	177	42.5	38.5	135°
15	205	182	43	38.5	135°
16	210	187	44	38.5	135°
18	220	197	45	38.5	135°
20	230	207	46	38.5	135°

CORAIL® REVISION STEM - HIGH OFFSET					
Size	Stem Length (mm) (A)	Stem Length (mm) (B)	Offset (mm) (C)	Neck Length (mm) (D)	Neck Shaft Angle (E)
10	180	157	46.5	43.2	135°
11	185	162	47.0	43.2	135°
12	190	167	48.0	43.2	135°
13	195	172	48.5	43.2	135°
14	200	177	49.0	43.2	135°
15	205	182	50.0	43.2	135°
16	210	187	50.5	43.2	135°
18	220	197	51.5	43.2	135°
20	230	207	52.5	43.2	135°



STANDARD OFFSET – CEMENTED					
Size	Stem Length (mm) (A)	Stem Length (mm) (B)	Offset (mm) (C)	Neck Length (mm) (D)	Neck Shaft Angle (E)
8	115	95	38.0	38.5	135°
9	130	110	38.5	38.5	135°
10	140	120	39.5	38.5	135°
11	145	125	40.0	38.5	135°
12	150	130	41.0	38.5	135°
13	155	135	41.5	38.5	135°
14	160	140	42.0	38.5	135°
15	165	145	43.0	38.5	135°
16	170	150	43.5	38.5	135°
18	180	160	44.5	38.5	135°
20	190	170	45.5	38.5	135°

HIGH OFFSET – CEMENTED					
Size	Stem Length (mm) (A)	Stem Length (mm) (B)	Offset (mm) (C)	Neck Length (mm) (D)	Neck Shaft Angle (E)
9	130	110	45.5	43.2	135°
10	140	120	46.5	43.2	135°
11	145	125	47.0	43.2	135°
12	150	130	48.0	43.2	135°
13	155	135	48.5	43.2	135°
14	160	140	49.0	43.2	135°
15	165	145	50.0	43.2	135°
16	170	150	50.5	43.2	135°
18	180	160	51.5	43.2	135°
20	190	170	52.5	43.2	135°

Note: All measurements are based on a 28 mm +5.0 Articulleze® head.

Ordering Information

Implants

Corail® Standard Offset Stem (Collarless)

3L92507	Corail® Size 8
3L92509	Corail® Size 9
3L92510	Corail® Size 10
3L92511	Corail® Size 11
3L92512	Corail® Size 12
3L92513	Corail® Size 13
3L92514	Corail® Size 14
3L92515	Corail® Size 15
3L92516	Corail® Size 16
3L92518	Corail® Size 18
3L92520	Corail® Size 20



Corail® Standard Offset Stem (Collared)

3L92498	Corail® Size 8
3L92499	Corail® Size 9
3L92500	Corail® Size 10
3L92501	Corail® Size 11
3L92502	Corail® Size 12
3L92503	Corail® Size 13
3L92504	Corail® Size 14
3L92505	Corail® Size 15
3L92506	Corail® Size 16
3L92508	Corail® Size 18
3L92521	Corail® Size 20



Corail® High Offset Stem (Collarless)

L20309	Corail® Size 9
L20310	Corail® Size 10
L20311	Corail® Size 11
L20312	Corail® Size 12
L20313	Corail® Size 13
L20314	Corail® Size 14
L20315	Corail® Size 15
L20316	Corail® Size 16
L20318	Corail® Size 18
L20320	Corail® Size 20



Corail® Coxa Vara High Offset Stem (Collared)

3L93709	Corail® Size 9
3L93710	Corail® Size 10
3L93711	Corail® Size 11
3L93712	Corail® Size 12
3L93713	Corail® Size 13
3L93714	Corail® Size 14
3L93715	Corail® Size 15
3L93716	Corail® Size 16
3L93718	Corail® Size 18
3L93720	Corail® Size 20



Corail® Revision Stem

L98010	Corail® Revision Stem STD 10
L98011	Corail® Revision Stem STD 11
L98012	Corail® Revision Stem STD 12
L98013	Corail® Revision Stem STD 13
L98014	Corail® Revision Stem STD 14
L98015	Corail® Revision Stem STD 15
L98016	Corail® Revision Stem STD 16
L98018	Corail® Revision Stem STD 18
L98020	Corail® Revision Stem STD 20



L98110	Corail® Revision Stem HO 10
L98111	Corail® Revision Stem HO 11
L98112	Corail® Revision Stem HO 12
L98113	Corail® Revision Stem HO 13
L98114	Corail® Revision Stem HO 14
L98115	Corail® Revision Stem HO 15
L98116	Corail® Revision Stem HO 16
L98118	Corail® Revision Stem HO 18
L98120	Corail® Revision Stem HO 20

Corail® Cemented Standard Offset

L96408	Corail® Cemented Size 8
L96409	Corail® Cemented Size 9
L96410	Corail® Cemented Size 10
L96411	Corail® Cemented Size 11
L96412	Corail® Cemented Size 12
L96413	Corail® Cemented Size 13
L96414	Corail® Cemented Size 14
L96415	Corail® Cemented Size 15
L96416	Corail® Cemented Size 16
L96418	Corail® Cemented Size 18
L96420	Corail® Cemented Size 20



Corail® Cemented High Offset

L96509	Corail® Cemented Size 9
L96510	Corail® Cemented Size 10
L96511	Corail® Cemented Size 11
L96512	Corail® Cemented Size 12
L96513	Corail® Cemented Size 13
L96514	Corail® Cemented Size 14
L96515	Corail® Cemented Size 15
L96516	Corail® Cemented Size 16
L96518	Corail® Cemented Size 18



L96520	Corail® Cemented Size 20
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Standard Dysplastic Corail® Stem

L20106	K6S
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Corail® Stem with Trochanteric Base

L20006	K6A
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Ordering Information

Implants

Femoral Heads

Articulaze® BioloX® delta

1365-28-310	28 mm +1.5
1365-28-320	28 mm +5
1365-28-330	28 mm +8.5
1365-32-310	32 mm +1
1365-32-320	32 mm +5
1365-32-330	32 mm +9
1365-36-310	36 mm +1.5
1365-36-320	36 mm +5
1365-36-330	36 mm +8.5
1365-36-340	36 mm +12

Articulaze® Ultamet™

1365-11-500	28 mm +1.5
1365-12-500	28 mm +5
1365-13-500	28 mm +8.5
1365-50-000	36 mm -2
1365-51-000	36 mm +1.5
1365-52-000	36 mm +5
1365-53-000	36 mm +8.5
1365-54-000	36 mm +12
1365-55-000	36 mm +15.5
1365-04-000	40 mm -2
1365-05-000	40 mm +1.5
1365-06-000	40 mm +5
1365-07-000	40 mm +8.5
1365-08-000	40 mm +12
1365-09-000	40 mm +15.5
1365-60-000	44 mm -2
1365-61-000	44 mm +1.5
1365-62-000	44 mm +5
1365-63-000	44 mm +8.5
1365-64-000	44 mm +12
1365-65-000	44 mm +15.5

All 12/14 heads available in the DePuy portfolio are compatible with the Corail® Revision Stem with a maximum offset of 13 mm:

- "Classical" heads: all 12/14 Articulaze®, 12/14 CoCr, 12/14 BioloX® femoral heads, aSPHERE Articulaze® 12/14
- In case of ceramic head revision, BioloX® delta TS heads should be used, as these are designed for revision of BioloX® Articulaze® heads.



Core Instrumentation

CONTK2	Sterilisation Case
L20500	Base Aluminium Basket
L20501	Bottom Thermoformed Tray
L20502	Middle Thermoformed Tray
L20503	Top Thermoformed Tray
L20504	Top Basket

L20408	Broach 8
L20409	Broach 9
L20410	Broach 10
L20411	Broach 11
L20412	Broach 12
L20413	Broach 13
L20414	Broach 14
L20415	Broach 15
L20416	Broach 16
L20418	Broach 18
L20420	Broach 20

Articulaze® Trial Head

2530-81-000	28 mm +1.5
2530-82-000	28 mm +5
2530-83-000	28 mm +8.5
2530-84-000	28 mm +12
2530-85-000	28 mm +15.5
2530-91-000	32 mm +1
2530-92-000	32 mm +5
2530-93-000	32 mm +9
2530-94-000	32 mm +13
2530-95-000	32 mm +17
2531-50-000	36 mm -2
2531-51-000	36 mm +1.5
2531-52-000	36 mm +5
2531-53-000	36 mm +8.5
2531-54-000	36 mm +12
2531-55-000	36 mm +15.5
2531-04-000	40 mm -2
2531-05-000	40 mm +1.5
2531-06-000	40 mm +5
2531-07-000	40 mm +8.5
2531-08-000	40 mm +12
2531-09-000	40 mm +15.5
2531-60-000	44 mm -2
2531-61-000	44 mm +1.5
2531-62-000	44 mm +5
2531-63-000	44 mm +8.5
2531-64-000	44 mm +12
2531-65-000	44 mm +15.5



Ordering Information

L20431 Standard Offset Neck Segment

L20432 Coxa Vara Neck Segment

L20433 High Offset Neck Segment

2570-04-200 Calcar Mill Large

2570-04-100 Calcar Mill Small

2598-07-570 Positioner Inserter

2570-05-100 Stem Impactor

2001-65-000 Head Impactor

9653-68-000 Anteversion Axis

L20440 Neck Resection Guide

L93606 Bone Tamp

L93205 Bone Impactor

2002-31-000 Osteotome

9522-11-500 Curved Broach Handle

Optional Instruments

2598-07-350 Universal Anterior Broach Handle, Left

2598-07-360 Universal Anterior Broach Handle, Right

9522-10-500F Straight Broach Handle

9522-12-500F Extra Curved Broach Handle

2598-07-460 Universal Stem Inserter Handle

2598-07-440 Curved Inserter Shaft (Corail®/Tri-Lock®)

9400-80-007 MI Calcar Reamer Small

L20464 Corail® Dysplasia Tray

DDH – Size 6 Instrumentation

L20465 Corail® Dysplasia Tray Cover

L20462 Trial stem K6S

L20463 Trial stem K6A

L20461 Monobloc Broach for stem K6S

L20460 Monobloc Broach for stem K6A

Corail® Revision Stem Instrumentation

Femoral Preparation Instrument Trays

L98704 Corail® Revision Set Femoral Preparation Lid

L98703 Corail® Revision Set Femoral Preparation Top

L98702 Corail® Revision Set Femoral Preparation Middle

L98701 Corail® Revision Set Femoral Preparation Bottom

L98700 Corail® Revision Set Femoral Preparation Base

Femoral Preparation Set Parts

L98610 Reamer - Diameter 10 mm

L98611 Reamer - Diameter 11 mm

L98612 Reamer - Diameter 12 mm

L98613 Reamer - Diameter 13 mm

L98408 Diamond Tooth Broach - Size 8

L98409 Diamond Tooth Broach - Size 9

L98410 Diamond Tooth Broach - Size 10

L98411 Diamond Tooth Broach - Size 11

L98412 Diamond Tooth Broach - Size 12

L98413 Diamond Tooth Broach - Size 13

L98414 Diamond Tooth Broach - Size 14

L98415 Diamond Tooth Broach - Size 15

L98416 Diamond Tooth Broach - Size 16

L98418 Diamond Tooth Broach - Size 18

L98420 Diamond Tooth Broach - Size 20

L98510 Trial Stem - Size 10

L98511 Trial Stem - Size 11

L98512 Trial Stem - Size 12

L98513 Trial Stem - Size 13

L98514 Trial Stem - Size 14

L98515 Trial Stem - Size 15

L98516 Trial Stem - Size 16

L98518 Trial Stem - Size 18

L98520 Trial Stem - Size 20

Core Instrument Trays

L98705 Corail® Revision Set Core Instrument - Lid

L20503 Superior Thermoformed Tray

L98702 Corail® Revision Set Core Instrument - Middle Tray

L20501 Inferior Thermoformed Tray

L98707 Corail® Revision Set Core Instrument - Base

Core Instrument Set Parts

1524-00-000 Hudson Müller Adaptor*

2001-65-000 Head Impactor

2002-31-000 Osteotome

2530-69-000 Trial Head 22,2 mm +4

2530-70-000 Trial Head 22,2 mm +7

2530-81-000 Trial Head 28 mm +1,5

2530-82-000 Trial Head 28 mm +5

2530-83-000 Trial Head 28 mm +8,5

2530-84-000 Trial Head 28 mm +12

2530-91-000 Trial Head 32 mm +1

2530-92-000 Trial Head 32 mm +5

2530-93-000 Trial Head 32 mm +9

2530-94-000 Trial Head 32 mm +13

* Sodernsystems
110 CH Du pont du Centenaire
Geneva
1228

Ordering Information

Corail® Revision Stem Instrumentation

Core Instrument Continued

2570-04-100	Calcar Mill Small
2570-04-200	Calcar Mill Large

2598-07-570	Positioner
2570-05-100	Stem Impactor
9522-11-500	Curved Broach Handle
9653-68-000	Anteversion Axis

L20431	Standard Neck Segment
L20433	High Offset Neck Segment
L20440	Neck Resection Guide
L93205	Bone Impactor
L93606	Bone Tamp

Cementing Instrumentation

Cement Restrictor Kit

5460-02-000	Cement Restrictor Inserter
5460-30-000	Cement Restrictor Trial 1
5460-32-000	Cement Restrictor Trial 2
5460-34-000	Cement Restrictor Trial 3
5460-36-000	Cement Restrictor Trial 4
5460-38-000	Cement Restrictor Trial 5
5460-40-000	Cement Restrictor Trial 6
5460-42-000	Cement Restrictor Trial 7

DePuy Bone Cements

3092040	SmartSet® HV Bone Cement 40g
3095040	SmartSet® GHV Gentamicin Bone Cement 40g

CEMVAC® Vacuum Mixing System

Hardware

831401	DePuy Multi-Pressure Vacuum Pump
3210031	International Air Hose
831202	Syringe Holder
831205	Cemvac® 1 Piece Gun
3210016	Nozzle Cutter

Disposables

831215	Single Syringe Set (Box 20 x 1 single sterile pack)
831220	Double Syringe Set (Box 10 x 2 double sterile pack)
831230	Revision Nozzle (8.5 mm x 5)
831231	Revision Nozzle (6.5 mm x 5)
831234	Nozzle Adaptor 90 Degree (x 5)
3206005	Standard Femoral Pressuriser (x 5)
3206002	Wedge Femoral Pressuriser Large (x 5)

Templating

Pre-operative Templates

CALQ400	X-ray Templates (100%)
CALQ415	X-ray Templates (115%)
CALQ420	X-ray Templates (120%)

Dysplasia

CALQ854	Set of Dysplasia Templates (120%)
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Corail® Revision Stem

CALQ430	Corail® Revision Stem - Scale 100%
CALQ431	Corail® Revision Stem - Scale 115%
CALQ432	Corail® Revision Stem - Scale 120%

Digital Templates

The availability of digital templates depends on DePuy International's agreement with the vendors.

Please contact DePuy International for more information

DNIs

L98714	DNI Corail® Revision Stem STD Size 14 HA
L98724	DNI Corail® Revision Stem STD 14
23L92501	DNI Corail® Standard with Collar Size 11 HA
23L92521	DNI Corail® Standard with Collar Size 20 HA
23L92512	DNI Corail® Standard Size 12 HA
23L93711	DNI Corail® Coxa Vara Size 11 HA
23L92511	DNI Corail® Standard Size 11 HA
2L20311	DNI Corail® High Offset Size 11 HA
2L20006	DNI Corail® Dysplasia with Trochanteric Base Size 6 HA
2L20106	DNI Corail® Dysplasia Size 6 HA

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