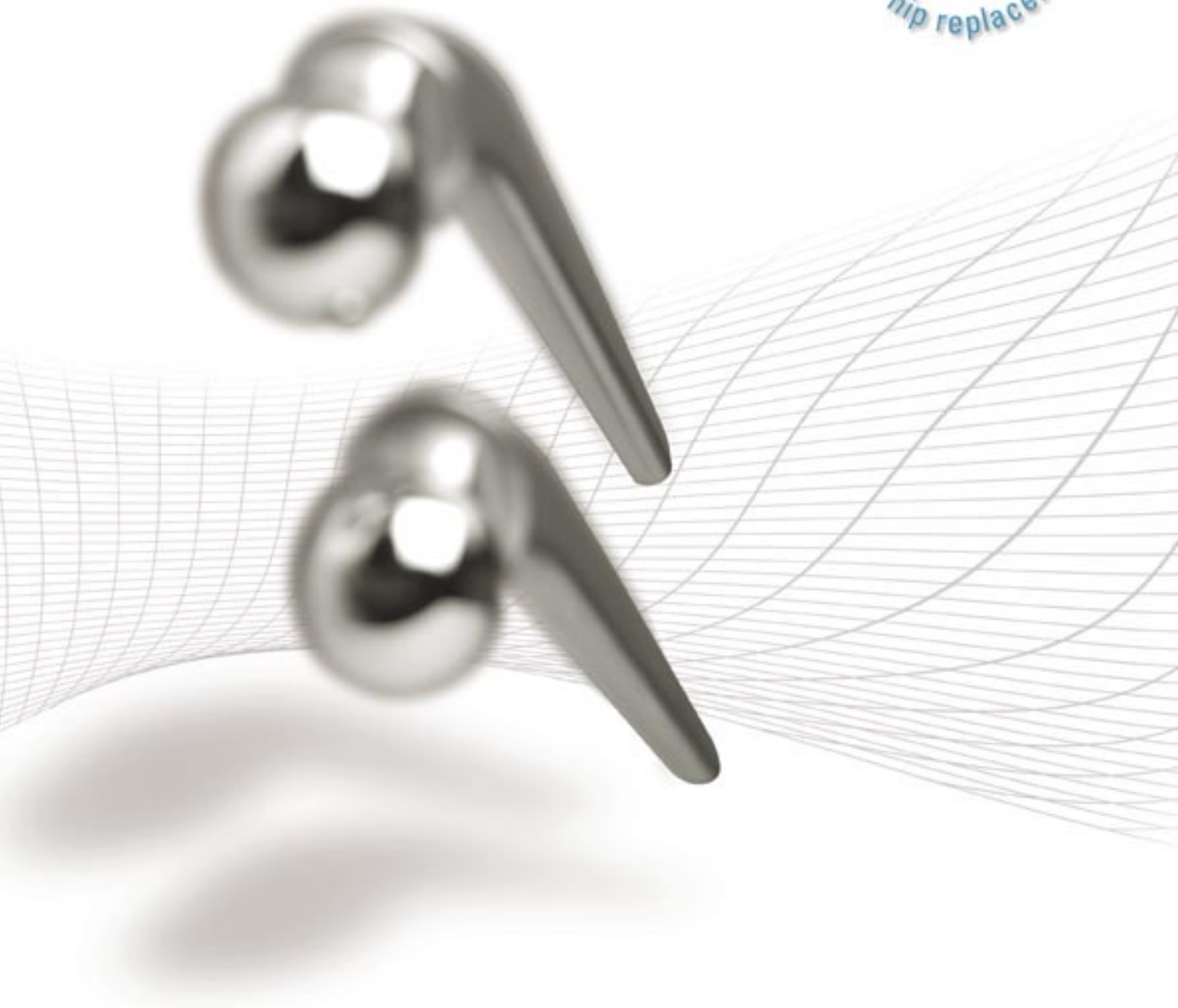
the stanmore™ hip replacement system



Operative **Technique**

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The Stanmore Hip Replacement System

The Stanmore Hip was developed at the Royal National Orthopaedic Hospital, Stanmore, Middlesex, England, and the department of Biomechanics and Surgical Materials, Institute of Orthopaedics, University of London by Professor John Scales, OBE, FRCS, MRCS, LRCP and Mr JN Wilson, OBE, ChM, FRCS. The first Stanmore Hip was implanted in April, 1963.

Since its inception, the Stanmore Hip has retained its original stem geometry, surface finish and material making it the only stem available with a 20 year plus follow-up that has not changed one or all of these features.[1] The proven design, reproducible and simple technique and comprehensive size range have led to genuine 20 - 22 year survivorship of 91% to 93.2%.[2,3]

Wear resistance in the acetabulum is increased by the use of ArCom™ polyethylene in the manufacture of all acetabular components. Compression moulded UHMWPE is more uniformly consolidated than extruded bar and sterilisation by gamma irradiation in inert gas (Argon) enhances molecular cross-linking.[4,5]

References

1 Murray DW, Can AJ, Bulstrode CJ. *Which Primary Hip Replacement?* JBJS, 1995 77-8, 520-7.

2 Deutman R. *The Stanmore Total Hip Replacement. A 22 Year Follow-up. JBJS, 2000 82-B, No 1, 97-102*

3 Guy JG. *A Radiographic and Clinical Review of Primary Stanmore Total Hip Replacements carried out between October 1974 and January 1978.* Presented at the 3rd Domestic Congress, European Hip Society, Beaune, France, June 1998.

4 Clarke IC, Gustafson A, Good V. *Hip Stimulator Testing ArCom™ vs. Extruded Bar Polyethylene.* Presented at the 7th Annual Conference on Techniques and Science for Successful Joint Arthroplasty, Burlington, Vermont, October 1995.

5 Schroeder DW, Pozorski KM. *Hip Stimulator Testing of Isostacically Moulded UHMWPF: Effect of EtO and Gamma Irradiation.* 42nd Annual Meeting, Orthopaedic Research Society, Atlanta, Georgia, February, 1996.

The Stanmore Hip Primary Operative Technique has been developed in conjunction with Mr T Briggs, FRCS of the Royal National Orthopaedic Hospital, Stanmore, Middlesex, England. Biomet UK Ltd would also like to extend their thanks to Mr SO Shafqat at Scunthorpe General Hospital, England for his comments and assistance.

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Disclaimer

Biomet UK Ltd, as the manufacturer of this device, does not practice medicine and does not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any procedure is responsible for determining and utilising the appropriate techniques for such procedure for each individual patient. Biomet UK Ltd is not responsible for selection of the appropriate surgical technique to be utilised for and individual patient.

Contents

Pre-Operative Planning

X-ray templates are available for both femoral and acetabular components in 10%, 15% and 20% magnifications.

Pre-operative templating of the femur and acetabulum serves to allow for the selection of the appropriate implant size for the hip being replaced. The position of the implant can be determined using templates to ensure a complete cement mantle is achieved.

Positioning of the Patient

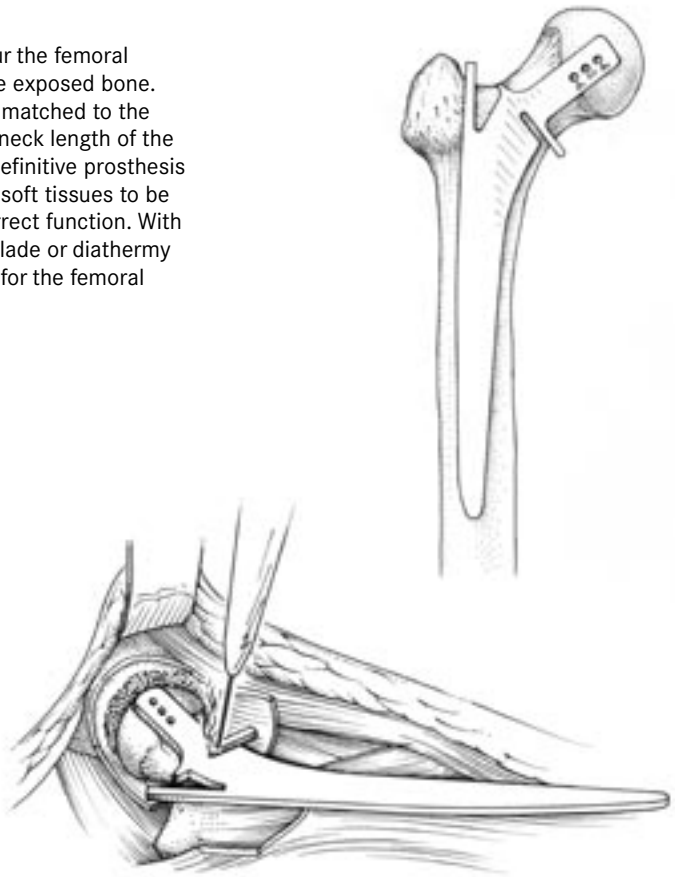
The Stanmore Hip can be implanted using any of the standard approaches for total hip arthroplasty. In any approach the goal is to achieve a full exposure of the proximal femur and the acetabulum.

Full exposure of the hip joint allows a direct view down the femoral canal and the visualisation of the rim and depth of the acetabulum. Effective preparation of the bone, cementing and implantation can be carried out when these are realised.

Step 1.0

Neck Resection

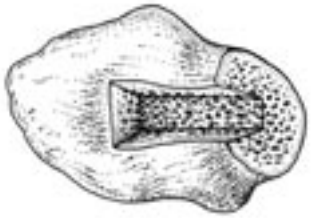
On exposure of the proximal femur the femoral cutting guide is placed against the exposed bone. The centre of the femoral head is matched to the holes in the guide to indicate the neck length of the modular head to be used. In the definitive prosthesis this allows optimal tension of the soft tissues to be achieved and so ensures their correct function. With the cutting guide in place a saw blade or diathermy is used to mark the correct angle for the femoral neck cut.



Step 2.0

Femoral Preparation

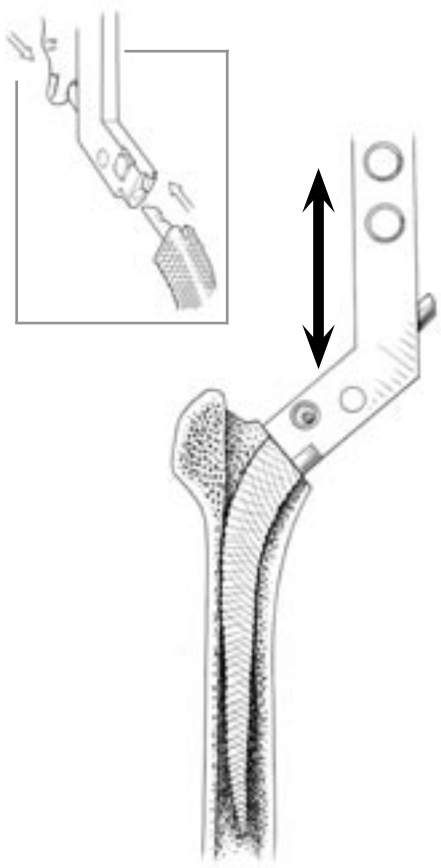
Once the femoral neck has been resected and the head removed the proximal canal is opened with the box chisel. Long stemmed curettes are then used to assist in opening the proximal canal and removing excess tissue.



Femoral Preparation

Step 3.0

After opening the femoral canal tapered reamers are used to initiate the preparation of the distal femur. Care should be taken to make sure the reamers are inserted straight down the medullary canal. The smaller tapered reamer is used first followed by the larger one.



Femoral Preparation

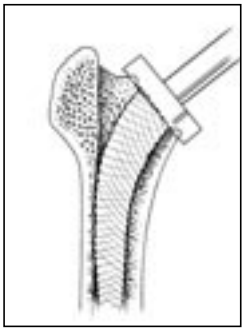
Step 4.0

Femoral rasps are now used to prepare the proximal femur. These are used in a sequential manner starting with the smallest rasp (i.e. size 1). The rasps are connected to the rasp handle as illustrated below, centre. Progressively larger rasps are then inserted until the correct size is achieved. The final rasp used indicates the size of the femoral stem to be implanted.

Step 5.0

Femoral Preparation

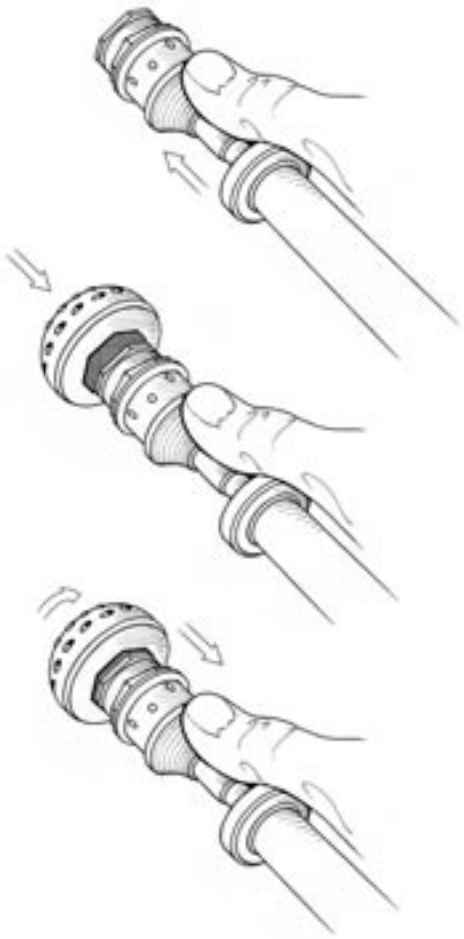
With the final rasp in position, the handle is removed and the calcar trimmer is placed over the rasp spigot and rotated to ensure the correct resection level and bone surface.

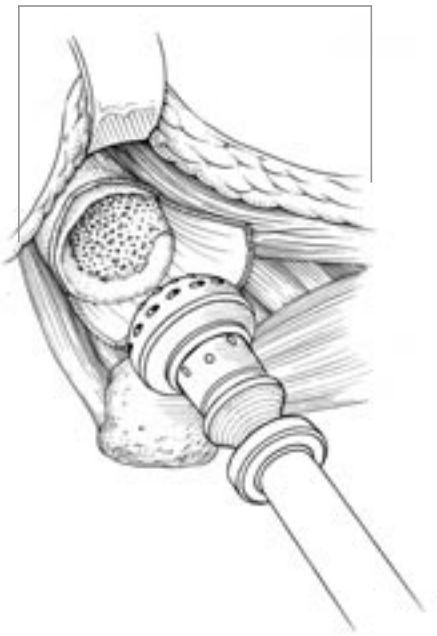


Step 6.0

Acetabular Preparation

The acetabular reamers are prepared by securely placing the grater onto the drive shaft using the locking mechanism shown below.





Acetabular Preparation

Step 7.0

The acetabular rim is identified and residual capsule, synovium and any osteophytes are removed. Capner Gouges can be used to remove any osteophytes and identify the true acetabular floor. Consecutive grater reamers shape and prepare the acetabulum. All articular cartilage is removed and a layer of bleeding subchondral bone exposed.

During reaming of the acetabulum the shaft of the reamer must be orientated at 30-40^{O} of abduction, with an element of anteversion depending on the approach used.

Supplementary holes can be drilled in the ilium, ischium and pubis to enhance cement fixation with the bone surface.

Acetabular Preparation

Step 8.0

Trial cups are inserted to confirm the correct size of the cup and to ensure it is correctly seated in the acetabulum. The head pusher can be used to assist the trial cup's insertion.

The prepared acetabular surface is cleaned and dried thoroughly and the cement inserted and thumbed firmly into the fixation holes and subchondral bone.

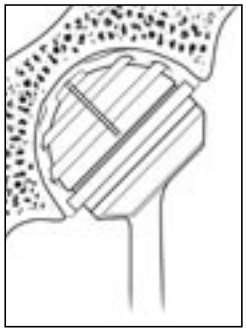
Step 9.0

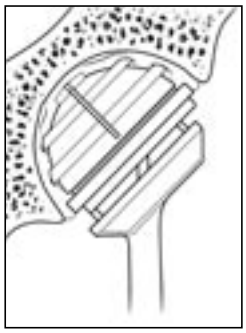
Cup Insertion

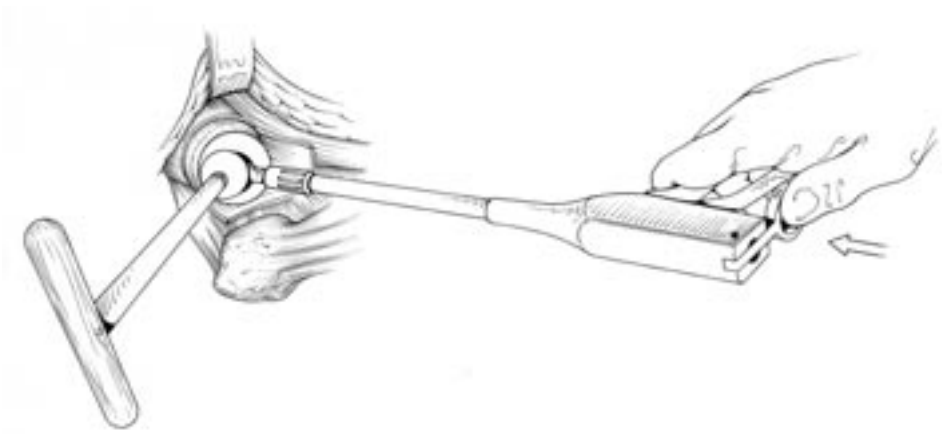
The appropriate adaptor is fitted to the cup inserter as shown left for the surgical approach used. The correct cup is positioned on the assembled cup inserter and introduced into the acetabulum.

To achieve the correct degree of abduction and anteversion the shaft of the introducer is designed to be orientated at 90^{o} to the long axis of the body. It can be rotated around this position to get the required orientation of the cup. This means that with the appropriate adaptor in place for the approach used, with the patient lying in the lateral decubitus position the shaft will be vertical. With the patient lying supine, the shaft will be horizontal.

Once in the correct position the cup is released by pressing the trigger on the inserter. This pushes the introducer away from the cup without compromising the cup position in the setting cement.







Cup Insertion

Step 10.0

Insertion can be aided by using the universal head pusher fitted with the appropriate head size to hold the cup in position while maintaining pressure on the cement until it has fully set. See diagram, left.

Femoral Stem Insertion

Step 11.0

With the cup in position a trial reduction can be carried out using the appropriate femoral rasp positioned in the proximal femur. The provisional head/neck is selected to match the required neck length and head diameter and inserted over the spigot of the rasp.

Note: The head diameter selected must match the inner diameter of the acetabular cup. Care should be taken to select the provisional head/neck (diagram, top) and not the trial head (diagram, bottom) for the prosthesis. The latter has no 'neck' other than in the longer versions and has a wider diameter insertion hole to fit onto the implant stem (see below).

The colour coding for the provisional head/neck and the trial head lengths is as follows:

Colour	Neck length (mm)
Burgundy	+12
Grey	+9
Black	+6
Brown	+3
White	standard
Green	-3
Blue	-6

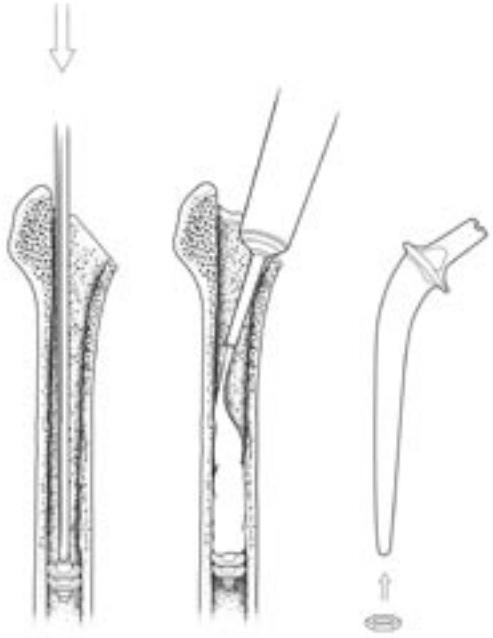
Step 12.0

Femoral Stem Insertion

After checking the stability of the joint and being satisfied with the range of movement the rasp and trial head are removed. A femoral plug is inserted to the correct depth in the proximal femur which must be a tight fit to allow adequate pressurisation of the femoral cement to take place.

The femoral shaft is cleaned and dried and cement is introduced into the plugged femoral canal using a cement gun. This should be done in a retrograde fashion, removing the cement gun nozzle as the cement is injected, which reduces the risk of voids in the cement mantle.

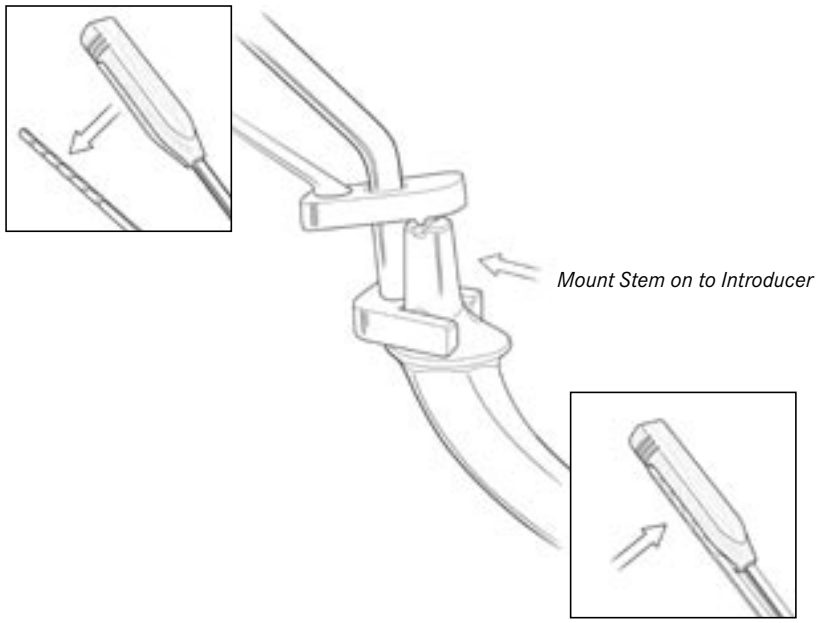
A distal stem centraliser can be positioned on the distal tip of the Stanmore Hip stem (diagram right).



Step 13.0

Femoral Stem Insertion

The prosthesis is mounted onto the stem as shown in the diagrams below, left to right. It is important that the key of the introducer locates securely into the slot at the end of the stem spigot as in the main diagram below.



Mount Stem on to Introducer

Close Handle

Femoral Stem Insertion

Step 14.0

When the cement is at the correct consistency the Stanmore Hip stem is introduced down the centre of the shaft of the femur until the collar rests on the prepared calcar.

To aid cement pressurisation the medial exit of the femur between the calcar and the stem should be occluded with the surgeon's thumb. All excess cement is removed.

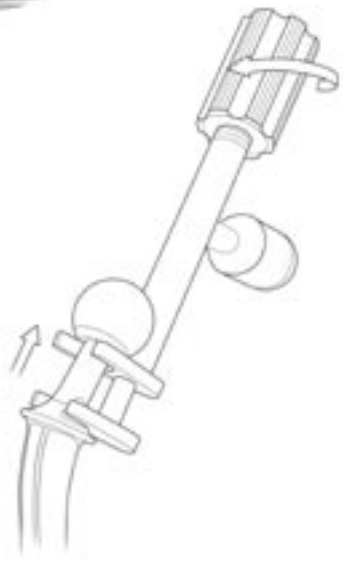
Once inserted the stem can be released from the introducer by releasing the lever arm. Pressure is maintained on the cement by placing a trial head onto the stem and pressing with the head pusher.

Final Reduction

Step 15.0

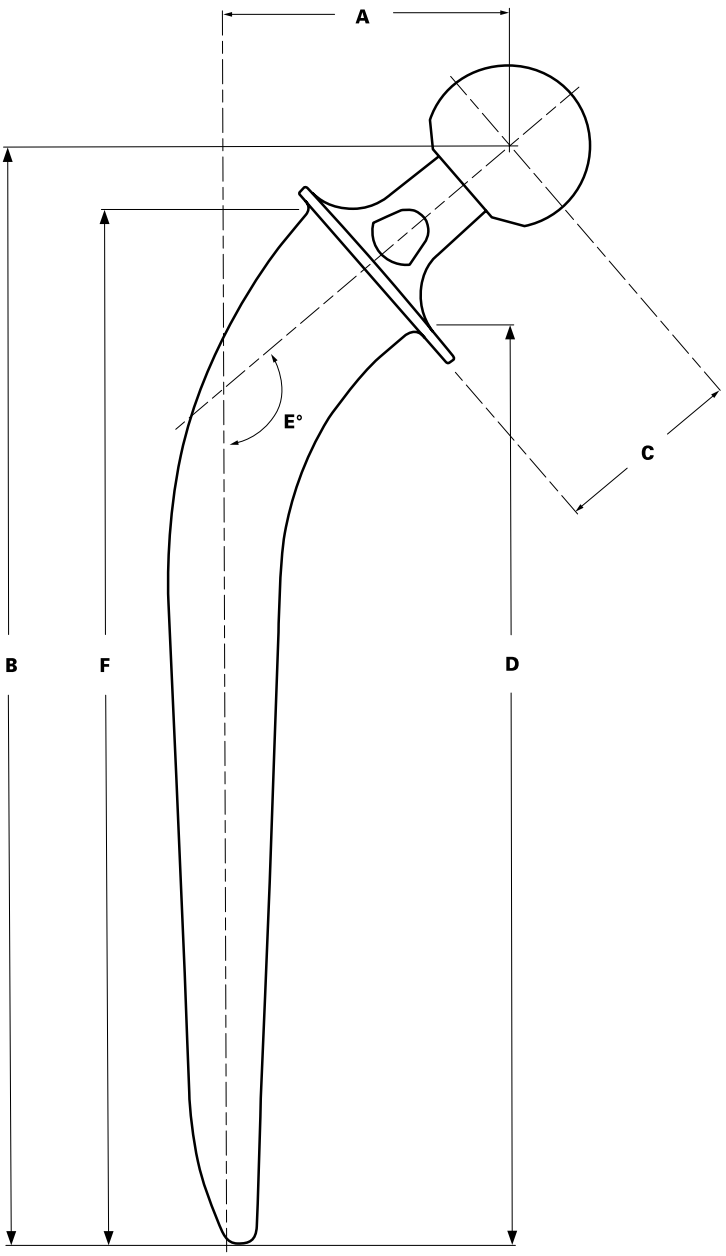
A final trial reduction is performed to determine the definitive modular head length, and the ROM and stability tested. The appropriate head is selected and placed onto the clean spigot, the hip is then reduced (see diagram left) and closed in the usual way.

Should the head require changing a head remover is available. This fits snugly between the collar of the prosthesis and the modular head. By turning the top screw the forks of the head remover are forced apart, so removing the head. See diagram, below.



Stanmore Standard Modular Femoral Stem

With Standard Modular Head Type 1 Morse Taper



Key

- A Lateral Offset
- B Total Length
- C Neck Length
- D Stem Length (from Calcar)
- E CCD Angle
- F Stem Length

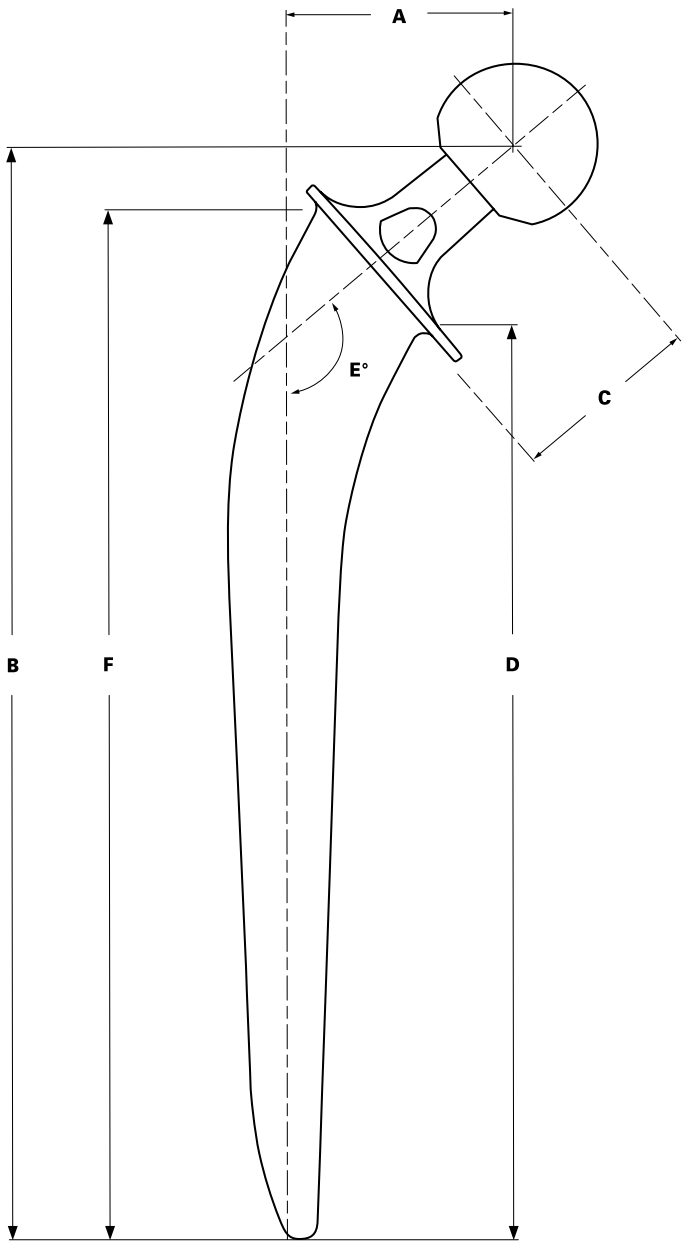
Stanmore Standard Modular Femoral Stem

	Cat No	Lateral offset A	Total length B	Neck length C	Stem length (from calcar) D	CCD angle E	Stem length F
Size 1	164241	42.5	151.7	32.0	124.8	130°	137.4
Size 2	164242	44.0	161.0	32.0	133.1	130°	147.6
Size 3	164243	45.6	161.0	32.0	141.2	130°	158.1
Size 4	164244	47.1	179.5	32.0	149.7	130°	168.1
Size 5	164245	48.6	188.8	32.0	157.9	130°	178.6

All lengths and offsets measured in millimetres

Stanmore Straight Modular Femoral Stem

With Standard Modular Head Type 1 Morse Taper



Key

- A Lateral Offset
- B Total Length
- C Neck Length
- D Stem Length (from Calcar)
- E CCD Angle
- F Stem Length

Stanmore Straight Modular Femoral Stem

	Cat No	Lateral offset A	Total length B	Neck length C	Stem length (from calcar) D	CCD angle E	Stem length F
Size 1	164251	33.5	151.7	32.0	124.8	130°	137.4
Size 2	164252	35.0	161.0	32.0	133.1	130°	147.6
Size 3	164253	36.6	161.0	32.0	141.2	130°	158.1
Size 4	164254	38.1	179.5	32.0	149.7	130°	168.1
Size 5	164255	39.6	188.8	32.0	157.9	130°	178.6

All lengths and offsets measured in millimetres

Implants

Co Cr Mo Forged Femoral Components

Standard Stems

Part No.	Description
164241	Stanmore modular femoral stem – standard size 1
164242	Stanmore modular femoral stem – standard size 2
164243	Stanmore modular femoral stem – standard size 3
164244	Stanmore modular femoral stem – standard size 4
164245	Stanmore modular femoral stem – standard size 5

Straight Stems

Part No.	Description
164251	Stanmore modular femoral stem – straight size 1
164252	Stanmore modular femoral stem – straight size 2
164253	Stanmore modular femoral stem – straight size 3
164254	Stanmore modular femoral stem – straight size 4
164255	Stanmore modular femoral stem – straight size 5

Co Cr Mo Femoral Modular Heads

Part No.	Description	Neck length
164445	Co Cr Mo Modular head 25mm diameter	+6mm
164201	Co Cr Mo Modular head 25mm diameter	+3mm
164446	Co Cr Mo Modular head 25mm diameter	standard
164200	Co Cr Mo Modular head 25mm diameter	-3mm
164447	Co Cr Mo Modular head 25mm diameter	-6mm
163664	Co Cr Mo Modular head 28mm diameter	+6mm
163663	Co Cr Mo Modular head 28mm diameter	+3mm
163662	Co Cr Mo Modular head 28mm diameter	standard
163661	Co Cr Mo Modular head 28mm diameter	-3mm
163660	Co Cr Mo Modular head 28mm diameter	-6mm
164168	Co Cr Mo Modular head 29mm diameter	+6mm
164167	Co Cr Mo Modular head 29mm diameter	+3mm
164166	Co Cr Mo Modular head 29mm diameter	standard
164165	Co Cr Mo Modular head 29mm diameter	-3mm
164164	Co Cr Mo Modular head 29mm diameter	-6mm
163669	Co Cr Mo Modular head 32mm diameter	+6mm
163670	Co Cr Mo Modular head 32mm diameter	+3mm
163671	Co Cr Mo Modular head 32mm diameter	standard
163672	Co Cr Mo Modular head 32mm diameter	-3mm
163673	Co Cr Mo Modular head 32mm diameter	-6mm

Stanmore Primary Hip Acetabular Components

25mm Articulating Diameter Acetabular Cups

Part No.	Description
6039-25	Stanmore acetabular component 40mm diameter x 25mm
6045-25	Stanmore acetabular component 45mm diameter x 25mm
6050-25	Stanmore acetabular component 50mm diameter x 25mm
6053-25	Stanmore acetabular component 53mm diameter x 25mm

28mm Articulating Diameter Acetabular Cups

Part No.	Description
165780	Stanmore acetabular component 45mm diameter x 28mm
165781	Stanmore acetabular component 50mm diameter x 28mm
165782	Stanmore acetabular component 53mm diameter x 28mm
165783	Stanmore acetabular component 57mm diameter x 28mm

29mm Articulating Diameter Acetabular Cups

Part No.	Description
6045-29	Stanmore acetabular component 45mm diameter x 29mm
6050-29	Stanmore acetabular component 50mm diameter x 29mm
6053-29	Stanmore acetabular component 53mm diameter x 29mm

32mm Articulating Diameter Acetabular Cups

Part No.	Description
6045-32	Stanmore acetabular component 45mm diameter x 32mm
6050-32	Stanmore acetabular component 50mm diameter x 32mm
6535-32	Stanmore acetabular component 53mm diameter x 32mm

PMMA Distal Stem Centralisers

Part No.	Description
164246	PMMA stem centraliser – size 1
164247	PMMA stem centraliser – size 2
164248	PMMA stem centraliser – size 3
164249	PMMA stem centraliser – size 4
164250	PMMA stem centraliser – size 5

Instrumentation

Femoral Instrumentation

Part No.	Description	Neck length
31-100290	**Rasp tray complete with instruments**	
31-100291	Sterilising tray	
31-400136	Rasp provisional/trial head 28mm diameter	-6mm
31-400137	Rasp provisional/trial head 28mm diameter	-3mm
31-400138	Rasp provisional/trial head 28mm diameter	standard
31-400139	Rasp provisional/trial head 28mm diameter	+3mm
31-400140	Rasp provisional/trial head 28mm diameter	+6mm
31-473526	Modular trial head 28mm diameter	-6mm
31-473525	Modular trial head 28mm diameter	-3mm
31-473528	Modular trial head 28mm diameter	standard
31-473527	Modular trial head 28mm diameter	+3mm
31-473530	Modular trial head 28mm diameter	+6mm

The Following Components are Available Seperately

31-400131	Rasp provisional/trial head 25mm diameter	-6mm
31-400132	Rasp provisional/trial head 25mm diameter	-3mm
31-400133	Rasp provisional/trial head 25mm diameter	standard
31-400134	Rasp provisional/trial head 25mm diameter	+3mm
31-400135	Rasp provisional/trial head 25mm diameter	+6mm
31-410105	Rasp provisional/trial head 29mm diameter	-6m
31-410106	Rasp provisional/trial head 29mm diameter	-3mm
31-410107	Rasp provisional/trial head 29mm diameter	standard
31-410108	Rasp provisional/trial head 29mm diameter	+3mm
31-410109	Rasp provisional/trial head 29mm diameter	+6mm
31-400141	Rasp provisional/trial head 32mm diameter	-6mm
31-400142	Rasp provisional/trial head 32mm diameter	-3mm
31-400143	Rasp provisional/trial head 32mm diameter	standard
31-400144	Rasp provisional/trial head 32mm diameter	+3mm
31-400145	Rasp provisional/trial head 32mm diameter	+6mm
31-400518	Modular trial head 25mm diameter	-6mm
31-410011	Modular trial head 25mm diameter	-3mm
31-400519	Modular trial head 25mm diameter	standard
31-410012	Modular trial head 25mm diameter	+3m
31-400661	Modular trial head 25mm diameter	+6mm
31-410096	Modular trial head 29mm diameter	-6mm
31-410097	Modular trial head 29mm diameter	-3mm
31-410098	Modular trial head 29mm diameter	standard
31-410099	Modular trial head 29mm diameter	+3mm
31-410100	Modular trial head 29mm diameter	+6mm
31-473532	Modular trial head 32mm diameter	-6mm
31-473533	Modular trial head 32mm diameter	-3mm
31-473534	Modular trial head 32mm diameter	standard
31-473535	Modular trial head 32mm diameter	+3mm
31-473536	Modular trial head 32mm diameter	+6mm

Instrumentation

Femoral Instrumentation

Part No.	Description
31-400066	Rasp/provisional standard stem size 1
31-400067	Rasp/provisional standard stem size 2
31-400068	Rasp/provisional standard stem size 3
31-400069	Rasp/provisional standard stem size 4
31-400070	Rasp/provisional standard stem size 5
31-400071	Rasp/provisional straight stem size 1
31-400072	Rasp/provisional straight stem size 2
31-400073	Rasp/provisional straight stem size 3
31-400074	Rasp/provisional straight stem size 4
31-400075	Rasp/provisional straight stem size 5
31-410080	Stanmore Rasp Handle

Femoral Instrumentation

Part No.	Description
31-100292	**General instrument tray complete with instruments**
31-100293	Instrument tray
31-410000	Angle cutting guide standard stem size 1
31-410001	Angle cutting guide standard stem size 2
31-410002	Angle cutting guide standard stem size 3
31-410003	Angle cutting guide standard stem size 4
31-410004	Angle cutting guide standard stem size 5
31-410005	Angle cutting guide straight stem size 1
31-410006	Angle cutting guide straight stem size 2
31-410007	Angle cutting guide straight stem size 3
31-410008	Angle cutting guide straight stem size 4
31-410009	Angle cutting guide straight stem size 5
31-410079*	Stanmore modular stem inserter
31-476946	Femoral driver 32mm
6015-A	Taper reamer 10mm diameter
6015-B	Taper reamer 12.5mm diameter
608	Hollow chisel
6011-B	Long stem curette – small scoop
6011-A	Long stem curette – large scoop
31-473624	Calcar trimmer

**optional stem inserter handles available*

31-400062	Modular stem introducer
31-400063	Modular stem introducer – 30 degree

Acetabular Instrumentation

Femoral Instrumentation

Part No.	Description
31-100294	**Acetabular instrument tray complete with instruments**
31-100295	Instrument tray
31-100636	Modular grater reamer shaft
31-100640	Grater reamer 40mm
31-100645	Grater reamer 45mm
31-100650	Grater reamer 50mm
31-100653	Grater reamer 53mm
31-100657	Grater reamer 57mm
31-410050	Acetabular cup inserter handle
31-410056*	Anterior/Lateral acetabular cup adaptor 25mm
31-410055*	Anterior/Lateral acetabular cup adaptor 28, 29, 32mm
31-410057*	Anterior/Lateral acetabular cup adaptor MMA
31-400380	AO to zimmer adaptor
468730	Hudson to zimmer adaptor
6039-25T	Stanmore trial acetabular cup 25mm x 40mm
6045-25T	Stanmore trial acetabular cup 25mm x 45mm
6050-25T	Stanmore trial acetabular cup 25mm x 50mm
6053-25T	Stanmore trial acetabular cup 25mm x 53mm
31-400058	Stanmore trial acetabular cup 28mm x 45mm
31-400059	Stanmore trial acetabular cup 28mm x 50mm
31-400060	Stanmore trial acetabular cup 28mm x 53mm
31-400061	Stanmore trial acetabular cup 28mm x 57mm
6045-29T	Stanmore trial acetabular cup 29mm x 45mm
6050-29T	Stanmore trial acetabular cup 29mm x 50mm
6053-29T	Stanmore trial acetabular cup 29mm x 53mm
6045-29T	Stanmore trial acetabular cup 32mm x 45mm
6050-29T	Stanmore trial acetabular cup 32mm x 50mm
6053-29T	Stanmore trial acetabular cup 32mm x 53mm
31-410041	T handle
31-410042	25mm pusher head
31-410043	28mm pusher head
31-410044	29mm pusher head
31-410045	32mm pusher head

** optional acetabular cup adaptors available*

31-410056	Posterior acetabular cup adaptor 25mm
31-410055	Posterior acetabular cup adaptor 28, 29, 32mm
31-410057	Posterior acetabular cup adaptor MMA

Modular Stem & Head Removal Instrumentation

Part No.	Description
31-100298	**Modular stem & head removal instrument tray complete with instruments**
31-100299	Instrument tray
31-473589	Modular stem extractor
31-410013	Modular head extractor

Stanmore Primary Hip X-Ray Overlays

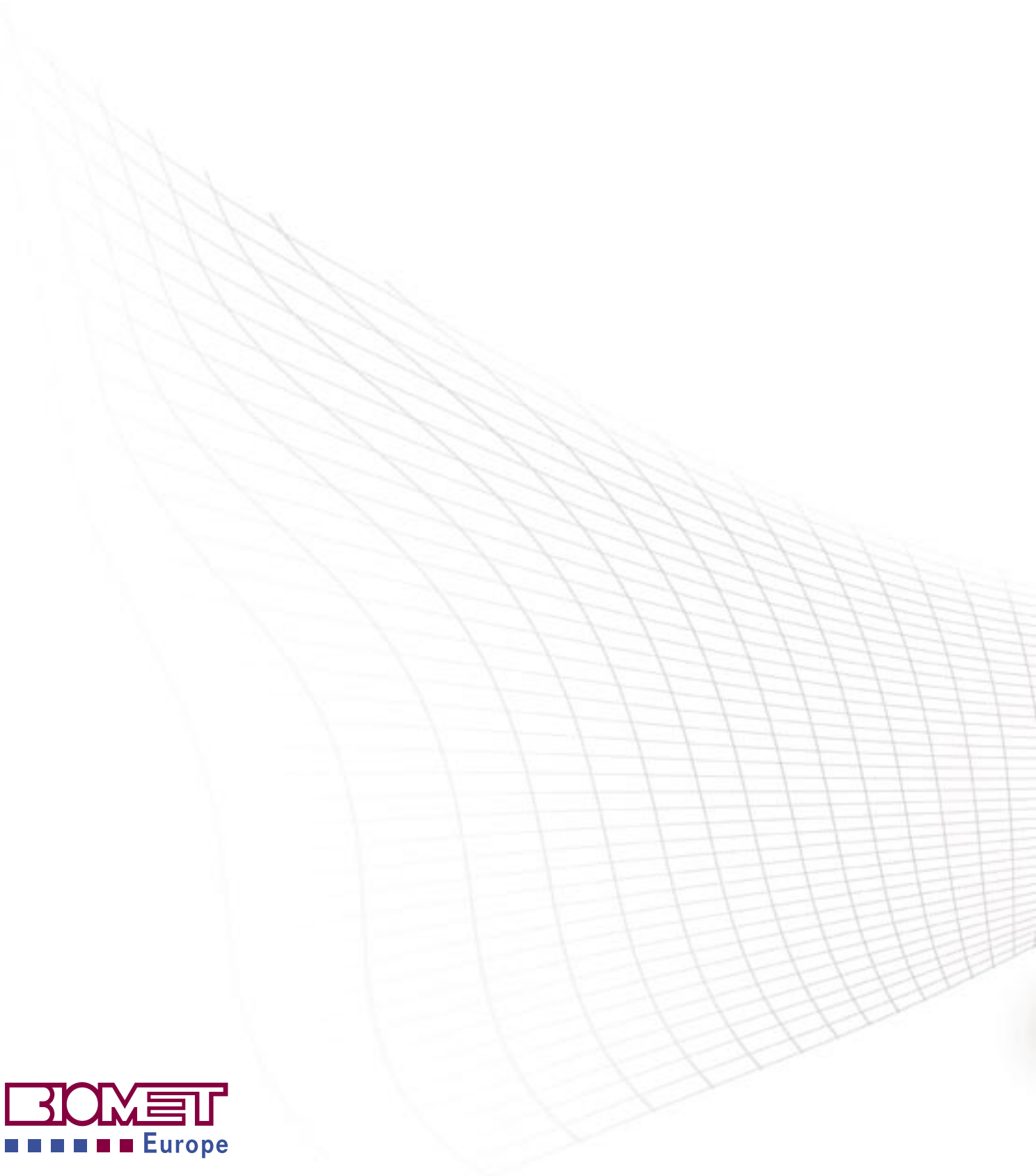
Acetabular X-Ray Overlays

Part No.	Description	Magnification
31-410133	Stanmore acetabular X-ray overlay	10%
31-410134	Stanmore acetabular X-ray overlay	15%
31-410135	Stanmore acetabular X-ray overlay	20%

Femoral X-Ray Overlays

Part No.	Description	Magnification
31-410140	Stanmore standard femoral stem X-ray overlay	10%
31-410141	Stanmore standard femoral stem X-ray overlay	15%
31-410142	Stanmore standard femoral stem X-ray overlay	20%
31-410143	Stanmore straight femoral stem X-ray overlay	10%
31-410144	Stanmore straight femoral stem X-ray overlay	15%
31-410145	Stanmore straight femoral stem X-ray overlay	20%

FLH 090 07/04



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