QUADRA® SYSTEM

A NEW GENERATION

Surgical Technique

Hip | Knee | Spine | Navigation

Medacta International

INTRODUCTION

This document describes the Surgical Technique for the Quadra® System.

The Quadra® System consists of:

- *Quadra®-S: cementless stem in Titanium-Niobium alloy with sand-blasting treatment.*
- *Quadra®-H: cementless stem in Titanium-Niobium alloy with hydroxyapatite (HA) coating.*
- *Quadra®-C: cemented stem in high nitrogen stainless steel.*

This document describes the Surgical Technique for Manual Version and Motorized Version procedures to implant the Quadra® stems.

Carefully read the instructions for use and if you have any questions concerning product compatibility please contact your Medacta® representative.

Quadra®-H Quadra®-S Quadra®-C

CAUTION

Federal law (USA) restricts this device to sale distribution and use by or on the order of physician.

INDEX

1 INDICATIONS

The hip prosthesis QUADRA®-S, QUADRA®-H, QUADRA®-R are designed for cementless use in total or partial hip arthroplasty in primary or revision surgery.
The hip prosthesis QUADRA®-C is designed for cemented use in total or partial hip arthroplasty in primary or revision surgery.
Hip Replacement is indicated in the following cases:

- Severely painful and/or disabled joint as a result of arthritis, traumatic arthritis, rheumatoid arthritis or psoriactic arthritis or congenital hip dysplasia.
- Avascular necrosis of the femoral head.
- Acute traumatic fracture of the femoral head or neck.
- Failure of previous hip surgery: joint reconstruction, internal fixation, arthrodesis, hemiarthroplasty, surface replacement arthroplasty, or total hip replacement.

The QUADRA®-C size 0 implant should not be implanted in patients with a mass of 65 kg or greater.

2 CONTRAINDICATIONS

Total or partial hip replacement is contraindicated in the following cases:

- Acute, systemic or chronic infection.
- Muscular, neurological or vascular deficiency of the affected limb.
- Bone destruction, or loss of bone characteristics that may compromise the stability of the implant.
- Pathologies that may compromise the functionality of the implant in any way.

Mental or neuromuscular disorders may create an unacceptable risk to the patient and can be a source of postoperative complications.
It is the surgeon's responsibility to ensure that the patient has no known allergy to the materials used.

3 PREOPERATIVE PLANNING

Careful preoperative planning is essential. It will help the operator to pre-select the femoral implant size in order to restore an architecture corresponding to the operated patient's anatomy.
In addition, using the set of X-ray templates to the scale of 1.15:1 (with an X-ray of the same magnification), it will be possible to determine:

- The implant size.
- The level of the neck cut.
- The neck length.
- The prosthetic rotation center.

NOTICE

The final implant will be selected intra-operatively, because of possible discrepancies between actual conditions and templating.

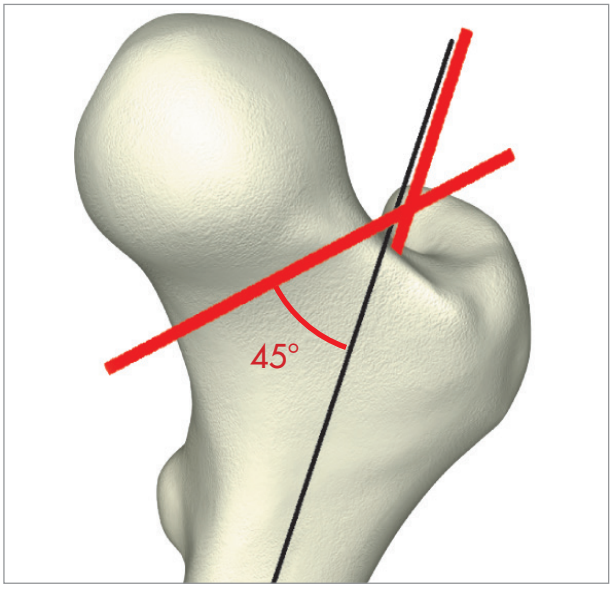
4 SURGICAL APPROACH

The choice of surgical approach is up to the surgeon.
The instrumentation has been developped for a posterior approach. A specific instrumentation for the anterior approach is available under request (For further information see the AMIS® dedicated surgical technique).

5 FEMORAL NECK OSTEOTOMY

The level of the neck cut is determined during preoperative planning using the X-ray templates.
The femoral neck osteotomy is at an angle of 45° to the diaphyseal axis of the femur.

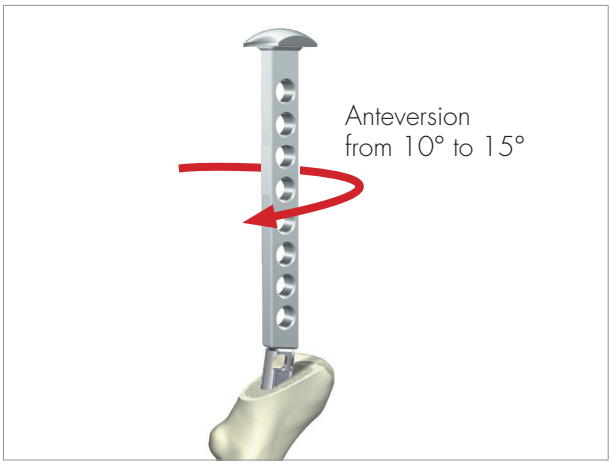
The resection is performed with an oscillating saw, taking care to maintain the 45° angle.
The femoral head is removed using an extractor.



6 FEMORAL PREPARATION

For access to the medullary canal, the thigh is held in the position providing the best exposure of the diaphyseal axis, depending on the selected approach.

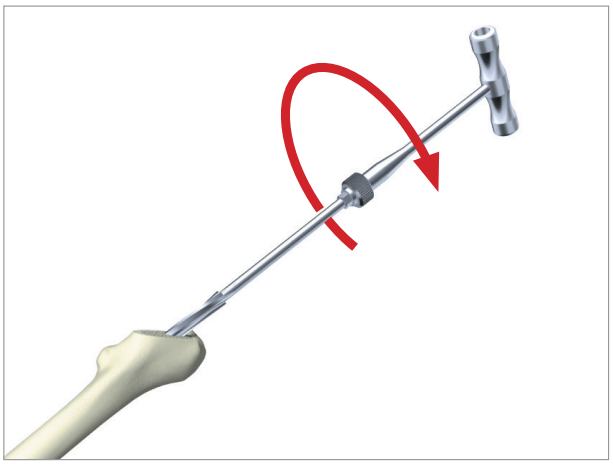
To avoid undersizing and varus positions of the stem, a box chisel is applied opposite the digital fossa of the femoral neck.



Guide the chisel with a slight anteversion: this step is essential for correct application of the broach and implant.

This removes a block of cancellous bone.
If needed, the endomedullary cancellous bone can be reamed using the metaphyseal reamer assembled with the T shaped Handle for reamer.

Check the axis and ensure cortical continuity.



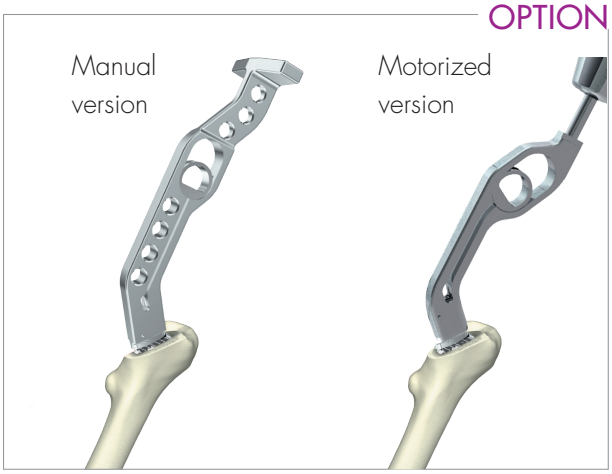
It is recommended to make a slight recess in the neck base or in the trochanteric overhang, if necessary to clear for the shoulder of the broach, then of the stem.

The femoral diaphysis is prepared using sequential broaches.
Assemble the broach with the broach handle.

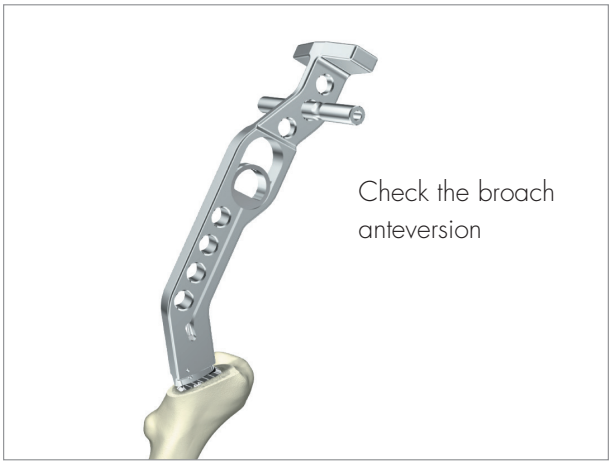
OPTION

As an option you can use the motorized broach handle or the monobloc broaches assembled with the motor.

OPTION



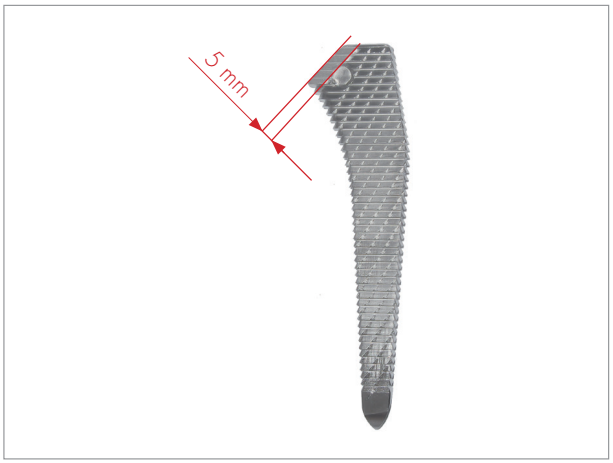
Broaches of increasing sizes, starting from size 0, are introduced until complete locking; the first broach determines the position of the following broaches.
Check the broach anteversion.



The broaches must be inserted to optimum level determined by the 45° cut.

NOTICE

The size 8, 9 and 10 broaches must not be inserted beyond the black laser mark located 5 mm from the top of the broach.



WARNING

Never force impaction when the broach is blocked in the diaphysis.

The final broach should be rotationally stable to assure stability of the implant.

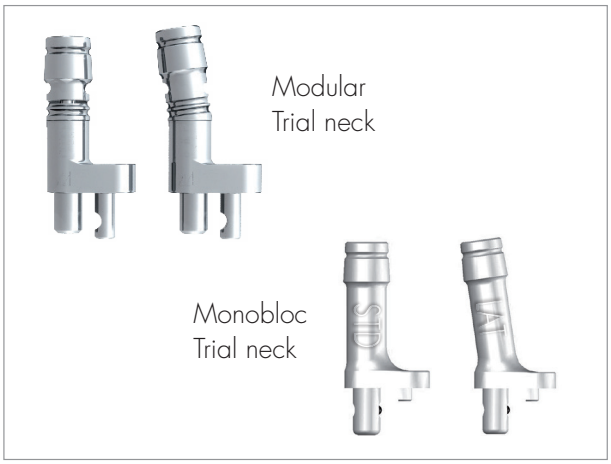
7 TRIALING

After complete locking of the broach in the diaphysis, the broach handle is removed.

OPTION

If the monobloc broach is used, the trial stems have to be used for the trial phase.

A trial neck, standard or lateralised, is fitted to the broach.

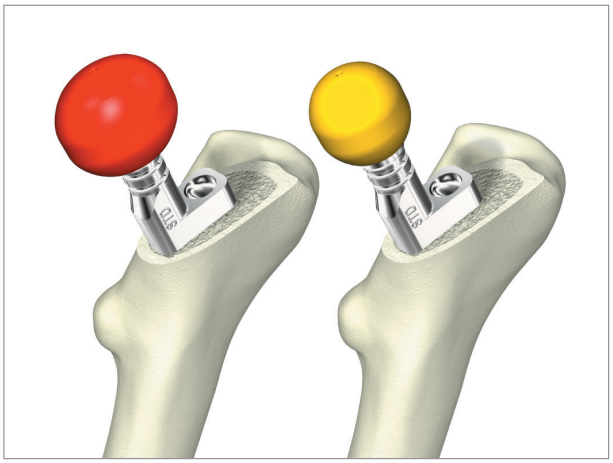


NOTICE

For Quadra® short neck stems use dedicated necks for trial tests. Modular trial necks for short neck stems are blue coloured.

To lock the trial necks to the broach, press onto the socket, to unlock, pull the neck.

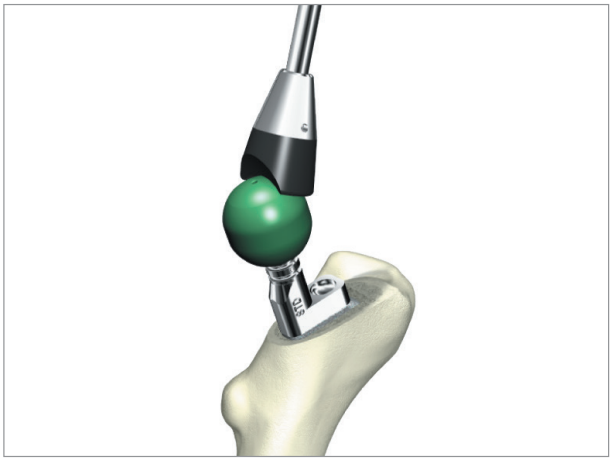
Trial heads of different diameters and heights are available to perform the trial reduction.



TRICK

To make head insertion easier wet the head before insertion.

A trial head is fitted to the trial neck by pushing it onto the taper. To remove a trial head, simply pull it.



TRICK

If the trial head is difficult to remove from the trial neck, wet the Trial Head-Trial Neck assembling. Turn and pull a little bit the trial head in order to facilitate its extraction.

After placement of the trial or final acetabular component, the trial reduction is performed with the help of the Head Impactor.

NOTICE

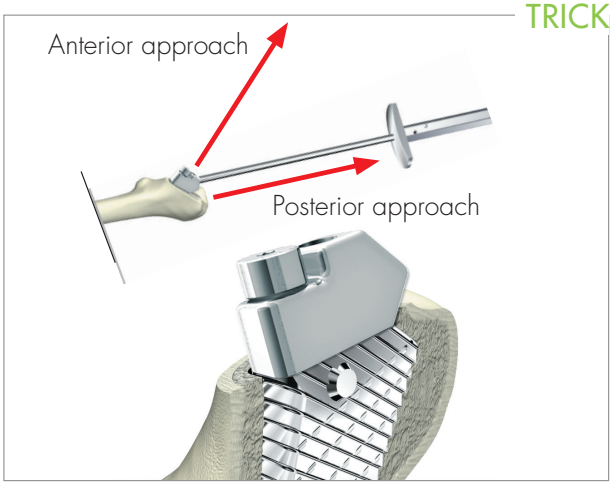
The head impactor must be used only for head impaction and not for the correction of the acetabular shell position.

After checking and testing mobility, joint stability and lower limb length, remove the broach.

TRICK

An extraction system can be used if the broach is difficult to remove. First screw the broach extractor into the broach. Depending on the selected approach, screw the Screwed Stem Extractor M8 onto the broach extractor. Pull out the broach.

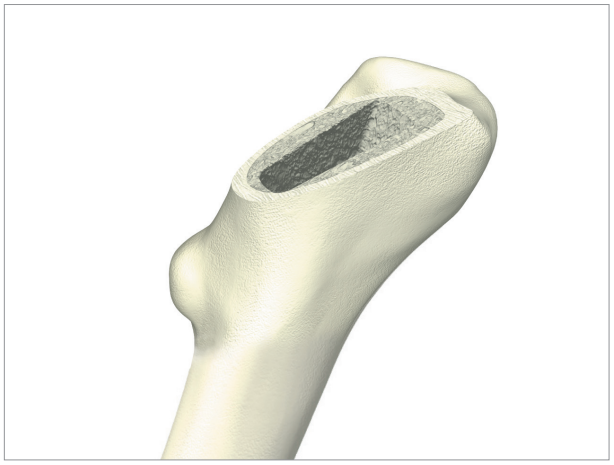
TRICK



8 FINAL IMPLANTS

8.1 Cementless implant

Insert the final prosthesis into place. The final prosthesis size corresponds to the one of the last trial stem or manual broach.



WARNING

Take care not to damage the taper's micro-thread while placing the final implant.

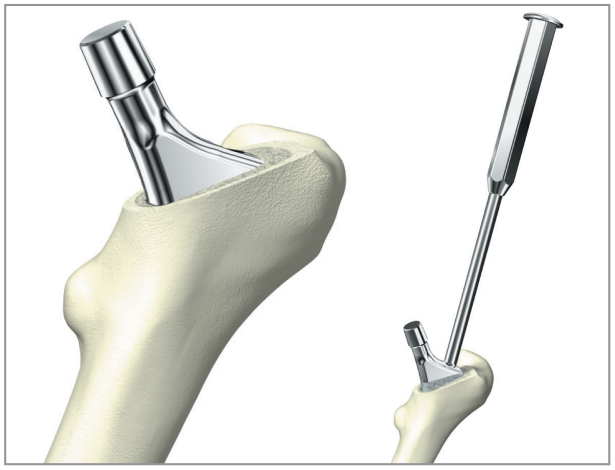
Insert the implant into the femoral cavity, using the stem impactor to push it down.

The anteversion of the stem is guided by the quadrangular recess left in the femur by the broaches.

CAUTION

Under no circumstances should the implant anteversion be changed at this stage.

The stem is moved down to the limit corresponding to the test. Final impaction is done carefully with dedicated impactor.



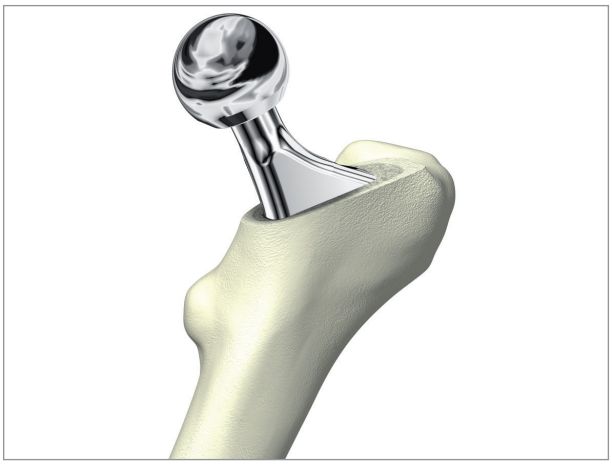
WARNING

Never force impaction when the stem is blocked in the diaphysis.

The protective cap is removed from the taper. Another trial reduction can be performed to determine the final neck length.

CAUTION

The head sizes XL (for Ø28 mm and Ø32 mm) and XXL (for Ø28 mm, Ø32 mm and Ø36 mm) have a collar. This may decrease the Range of Motion in comparison to smaller sizes. Always perform trial reduction with the chosen head.



The stem taper must be thoroughly cleaned before impacting the prosthetic head.

WARNING

Never use a metal hammer to fix a ceramic head. Use only the plastic head impactor provided for this purpose.
For further details, about ceramic femoral head, please refer to instruction for use for ceramic femoral heads.

8.2 Cemented implant

Two different techniques can be used for the final implant positioning. Technique 1 produces a thick and complete cement mantle around the stem: the reamed femoral cavity is 1.4 mm larger than the implanted prosthesis. Technique 2 (line-to-line reaming) has a thinner cement mantle and it produces a cavity which is the same size as the inserted prosthesis: after the cement insertion the prosthesis is implanted as a press-fit.[1]
Broach and stem selection has to be done according to the above table.

TABLE FOR BROACH AND STEM SELECTION

Broach size	Stem size Tech 1	Stem size Tech 2
0	-	0
1	0	1
2	1	2
3	2	3
4	3	4
5	4	5
6	5	6
7	6	7
8	7	-

NOTICE

Do not use broach sizes 9 and 10 because there are not stems of the corresponding size available.

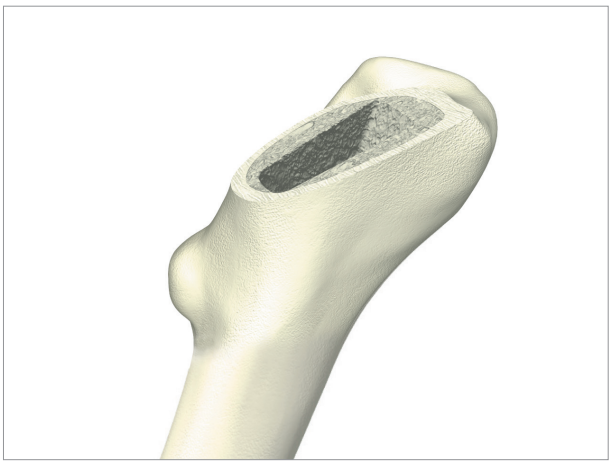
For the line-to-line reaming surgical technique (Tech 2) don't use the size 8 broach because there are not size 8 stems available.

CAUTION

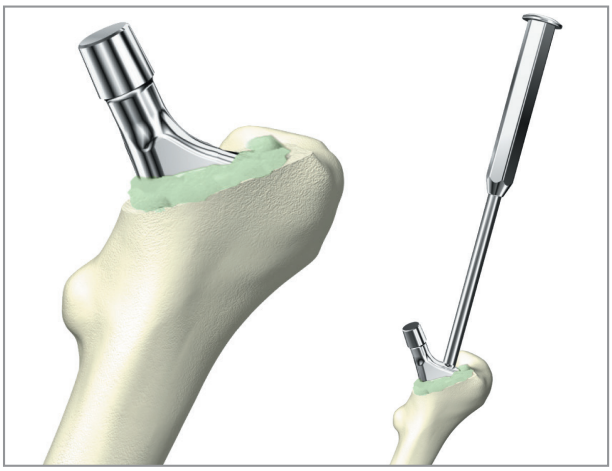
Size 8 broach sticks out of the bone 5 mm. Trial tests to implant a size 7 stem with technique 1 must always be performed using Standard Short Trial Necks, in order to restore the correct stem dimensions.

[1] Should the cement mantle around the femoral component be thick or thin? Skinner JA, Todo S, Taylor M, Wang JS, Pinskerova V, Scott G, The Journal of Bone and Joint Surgery: 85-B, n°1, January 2003.

Remove any loose, unsupportive, cancellous bone from the canal with a spoon or canal brush. Close the distal canal with a medullary plug at least at 1 cm distal to the tip of the stem. Pay attention in the choice of the distal plug, to ensure that it can resist to the cement pressure. Clean the intramedullary canal with pulse lavage and dry it. Keep the canal packed until cement is ready to be injected.



Introduce the cement into the canal retrograde using a cement gun. Pressurize the cement column to allow the cement to interdigitate into the cancellous bone.
Insert the implant into the femoral cavity, using the stem impactor to push it down. Introduce the femoral stem into the medullary canal until reaching the position judged as optimal during the trial step. Hold the stem securely in the correct position with the stem impactor, until the cement has hardened in order to avoid any improper stem movement from its optimal position.



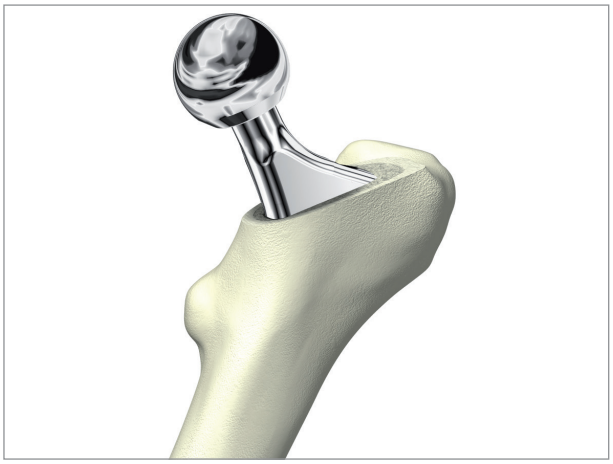
WARNING

Take care not to damage the taper's micro-thread while placing the final implant.

Another trial reduction can then be performed to determine the final neck length.

CAUTION

The head sizes XL (for Ø28 mm and Ø32 mm) and XXL (for Ø28 mm, Ø32 mm and Ø36 mm) have a collar. This may decrease the Range of Motion in comparison to smaller sizes. Always perform trial reduction with the chosen head.



The stem taper must be thoroughly cleaned before placing the prosthetic head.

WARNING

Never use a metal hammer to fix a ceramic head. Use only the plastic head impactor provided for this purpose.
For further details, about ceramic femoral head, please refer to instruction for use for ceramic femoral heads.

9 POSTOPERATIVE PROTOCOL

Partial weight bearing is permitted on the following day, subject to the use of two crutches and compliance with the clinician's or department's protocol.

10 IMPLANTS NOMENCLATURE

SAND BLASTED STEMS (QUADRA®-S)

Standard	Size	Lateralized
01.12.99SN	00SN[II]	-
01.12.00SN	0SN	-
01.12.01SN	1SN	01.12.11SN
01.12.02SN	2SN	01.12.12SN
01.12.03SN	3SN	01.12.13SN
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
01.12.000	0	-
01.12.001	1	01.12.011
01.12.002	2	01.12.012
01.12.003	3	01.12.013
01.12.004	4	01.12.014
01.12.005	5	01.12.015
01.12.006	6	01.12.016
01.12.007	7	01.12.017
01.12.008	8	-
01.12.009	9	-
01.12.010	10[II]	-

HA COATED STEMS (QUADRA®-H)

Standard	Size	Lateralized
01.12.98SN	00SN[II]	-
01.12.20SN	0SN	-
01.12.21SN	1SN	01.12.31SN
01.12.22SN	2SN	01.12.32SN
01.12.23SN	3SN	01.12.33SN
01.12.24SN	4SN	01.12.34SN
01.12.25SN	5SN	01.12.35SN
01.12.26SN	6SN	01.12.36SN
01.12.27SN	7SN	01.12.37SN
01.12.28SN	8SN	-
01.12.29SN	9SN	-
01.12.30SN	10SN	-
01.12.020	0	-
01.12.021	1	01.12.031
01.12.022	2	01.12.032
01.12.023	3	01.12.033
01.12.024	4	01.12.034
01.12.025	5	01.12.035
01.12.026	6	01.12.036
01.12.027	7	01.12.037
01.12.028	8	-
01.12.029	9	-
01.12.030	10[II]	-

CEMENTED STEMS (QUADRA®-C)

Standard	Size	Lateralized
-	-	-
01.12.40SN	0SN[I]	-
01.12.41SN	1SN	01.12.51SN
01.12.42SN	2SN	01.12.52SN
01.12.43SN	3SN	01.12.53SN
01.12.44SN	4SN	01.12.54SN
01.12.45SN	5SN	01.12.55SN
01.12.46SN	6SN	01.12.56SN
01.12.47SN	7SN	01.12.57SN
-	-	-
-	-	-
-	-	-
01.12.040	0[I]	-
01.12.041	1	-
01.12.042	2	-
01.12.043	3	-
01.12.044	4	-
01.12.045	5	-
01.12.046	6	-
01.12.047	7	-
-	8	-
-	9	-
-	10	-

[I] Limited use body mass not exceeding 65 kg
[II] On request

SN = Short Neck

HEADS



Diameter (mm)	Size	CoCr	MectaCer BIOLOX® *forte*	MectaCer BIOLOX® *delta*
Ø 22	S	01.25.124	-	-
Ø 22	M	01.25.123	-	-
Ø 28	S	01.25.011	38.39.7175.245.00	01.29.201
Ø 28	M	01.25.012	38.39.7175.255.00	01.29.202
Ø 28	L	01.25.013	38.39.7175.265.00	01.29.203
Ø 28	XL	01.25.014	-	-
Ø 28	XXL	01.25.015	-	-
Ø 32	S	01.25.021	38.39.7175.275.00	01.29.204
Ø 32	M	01.25.022	38.39.7175.285.00	01.29.205
Ø 32	L	01.25.023	38.39.7175.295.00	01.29.206
Ø 32	XL	01.25.024	-	01.29.207
Ø 32	XXL	01.25.025	-	-
Ø 36	S	01.25.030	38.39.7176.595.00	01.29.208
Ø 36	M	01.25.031	38.39.7176.605.00	01.29.209
Ø 36	L	01.25.032	38.39.7176.615.00	01.29.210
Ø 36	XL	01.25.033	-	01.29.211
Ø 36	XXL	01.25.034	-	-
Ø 40	S	01.25.085	-	01.29.212
Ø 40	M	01.25.086	-	01.29.213
Ø 40	L	01.25.087	-	01.29.214
Ø 40	XL	01.25.088	-	01.29.215
Ø 40	XXL	01.25.089	-	-

MectaCer BIOLOX® Option system[II]

Head Diameter (mm)	Reference
Ø 28	01.29.230H
Ø 32	01.29.231H
Ø 36	01.29.232H
Ø 40	01.29.233H
Ø 44	01.29.234H

Sleeve Size	Reference
S	01.29.240A
M	01.29.241A
L	01.29.242A
XL	01.29.243A

[II] Specific for revision cases.

NOTICE: The MectaCer BIOLOX® Option femoral heads cannot be combined with the Quadra®-C stem.

NOTES

Part numbers subject to change.

NOTE FOR STERILIZATION

The instruments are not sterile upon delivery. Instruments must be cleaned before use and sterilized in an autoclave respecting the US regulations, directives where applicable, and following the manufactures instructions for use of the autoclave.
For detailed instructions please refer to the document "Recommendations for cleaning decontamination and sterilization of Medacta® International reusable orthopaedic devices" available at www.medacta.com.

Medacta International

Medacta International SA
Strada Regina - 6874 Castel San Pietro
Switzerland
Phone +41 91 696 60 60
Fax +41 91 696 60 66
info@medacta.ch

DISTRIBUTED BY

Medacta USA, Inc.
1556 West Carroll Avenue - Chicago
Illinois 60607
Phone +1 312 878 2381
Fax +1 312 546 6881
info@medacta.us.com

Quadra® System
Surgical Technique
ref: 99.14HSC.12US
rev. 07
Last update: November 2013