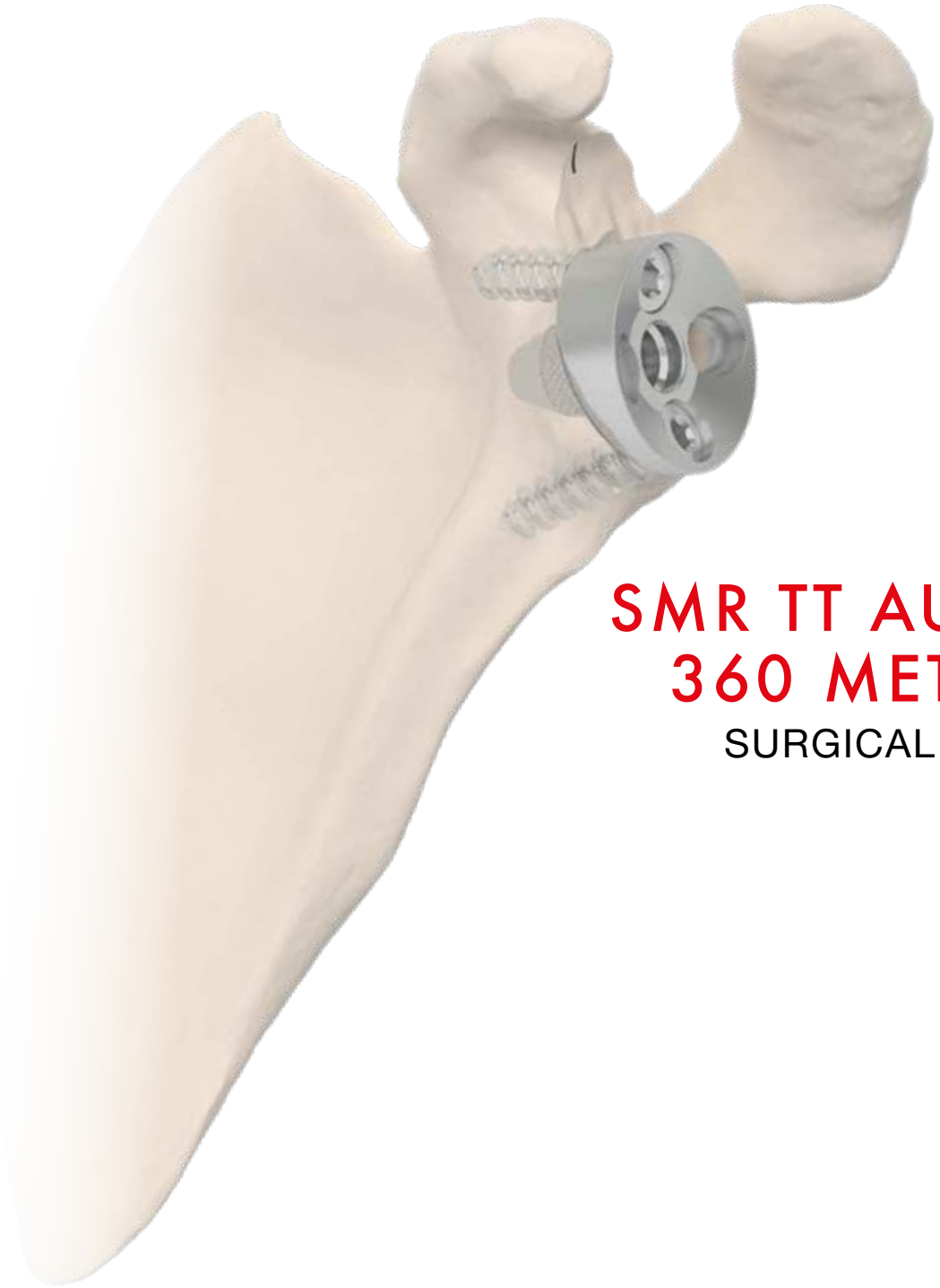
SMR

MODULAR SHOULDER REPLACEMENT



SMR TT AUGMENTED 360 METAL BACK

SURGICAL TECHNIQUE

Lima Corporate
Orthopaedic motion

SMR TT AUGMENTED 360 METAL BACK SURGICAL TECHNIQUE

Index

Limacorporate S.p.A., as manufacturer of prosthetic devices, dœs not practice medicine. This surgical technique brochure has been developed in consultation with an experienced surgeon team and provides the surgeon with general guidance when implanting SMR TT Augmented 360 Metal Back. Proper surgical procedures and techniques are necessarily the responsibility of the medical professional. Each surgeon must evaluate the appropriateness of the surgical technique used based on personal medical training, experience and clinical evaluation of each individual patient.

Indications, Contraindications and Warnings

INTENDED USE

The SMR TT Augmented 360 Baseplate is intended only for Reverse Shoulder replacement.
The implant is intended for single use, with permanent contact in the shoulder joint, and must not be reused.
SMR TT Augmented 360 Baseplate is intended for adults with skeletal maturity and must be used only by surgeons familiar with the joint replacement procedures described in the specific surgical techniques.

In the Reverse shoulder the humeral construct consists of the humeral stem, the reverse humeral body and the reverse liner On the humeral side the fxation of the humeral stem determines if the construct is cemented or uncemented.
The Modular SMR Shoulder System allows the assembly of components in various humeral and glenoid constructs.

INDICATIONS

SMR TT Augmented 360 Baseplate is used in combination with the SMR Reverse Shoulder System. The SMR Reverse Shoulder System is indicated for primary, fracture or revision total shoulder replacement in a grossly rotator cuff deficient joint with severe arthropathy (disabled shoulder). The patient's joint must be anatomically and structurally suited to receive the selected implants and a functional deltoid muscle is necessary to use the device.
The SMR TT Augmented 360 Baseplate is intended for uncemented use with the addition of bone screws for fixation.

Please follow the instructions for use enclosed in the product packaging.

SMR TT AUGMENTED 360 METAL BACK SURGICAL TECHNIQUE

Indications, Contraindications and Warnings

System				Use	
Anatomic	Reverse	Components	Material	Cem	Not Cem
•	•	SMR Stems (Cemented, Cemented Revision)	Ti6Al4V	X	
•	•	SMR Stems (Cementless Finned, Cementless Revision)	Ti6Al4V		X
•	•	SMR Short Stems (Cementless Finned)	Ti6Al4V		X
•	•	SMR Large Resection Stems	Ti6Al4V	X	
•	•	SMR Modular Spacers for Large Resection Stems	Ti6Al4V	X	
•		SMR Humeral Bodies (Trauma, Finned)	Ti6Al4V	X	X
•	•	SMR Reverse Humeral Body	Ti6Al4V	X	X
	•	SMR Reverse HA Coated Humeral Body	Ti6Al4V+HA		X
•	•	SMR Humeral Extension	Ti6Al4V	X	X
•		SMR Humeral Heads (Standard, CTA)	CoCrMo	X	X
			Ti6Al4V	X	X
•		SMR Adaptor Tapers (Neutral, Eccentric)	Ti6Al4V	X	X
•	•	SMR CTA Head Adaptor for Reverse Humeral Body	Ti6Al4V	X	X
	•	SMR Glenospheres	CoCrMo		X
			Ti6Al4V		X
			UHMWPE X-Lima +Ti6Al4V		X
	•	SMR Connectors	Ti6Al4V		X
	•	Reverse Liners	UHMWPE	X	X
			UHMWPE X-Lima	X	X
			LimaVit™	X	X
			CoCrMo	X	X
			Alumina	X	X
•		SMR Cemented Glenoids	UHMWPE	X	
•		SMR 3 Pegs Cemented Glenoids	UHMWPE X-Lima	X	
			UHMWPE	X	
•	•	SMR TT Hybrid Glenoid	UHMWPE+Ti6Al4V +Tantalum	X	X
	•	SMR TT Hybrid Glenoid Baseplate + Screw	Ti6Al4V		X
		SMR Metal Back Glenoids	Ti6Al4V+PoroTi+HA		X
•	•	Axioma TT Baseplate	Ti6Al4V		X
	•	SMR TT Augmented 360 Baseplate	Ti6Al4V		X
•	•	Axioma TT Glenoid Peg	Ti6Al4V		X
•		Metal Back Glenoid Liner	UHMWPE		X
•		Axioma Metal Back Glenoid Liner	UHMWPE		X
•	•	SMR Bone screws	Ti6Al4V		X
	•	SMR Glenoid Plates	Ti		X

Material Standards

Ti6Al4V (ISO 5832-3 - ASTM F1472) - **CoCrMo** (ISO 5832-12 - ASTM F1537) - **Ti** (ASTM F67) - **UHMWPE** (ISO 5834-2 - ASTM F648) - **Alumina** (ISO 6474) - **PoroTi Titanium Coating** (ASTM F1580) - **LimaVit™** (UHMWPE X-Lima* + Vitamin E) (ISO 5834-2 and ASTM F2695) - **HA Hydroxyapatite Coating** (ISO 13779-6) - **Tantalum** (AST M F 56 0 / ISO 13782) *crosslinked UHMWPE

WARNINGS

In selecting patients for surgery, the following factors can be critical to the success of the procedure:

- **Reverse Shoulder Replacement:** The bone stock of the glenoid and humerus must be able to support the implant. In cases with significant bone loss and in which adequate fixation on the glenoid side cannot be obtained, a hemiarthroplasty with a CTA-head should be performed.

Note. *The SMR TT Augmented 360 Baseplate is not suitable when bone grafting technique is needed.*

Note. *The SMR TT Augmented 360 Baseplate is compatible only with glenosphere connectors size Small-R and TT Glenoid Peg sizes Small-R Medium, S- Long and S-R X-Long.*

Note. *The SMR TT Augmented 360 Baseplate is compatible with cortical bone screws dia 4.5 mm (product code 8431.15. XXX) with minimum length 26 mm and must be fixed to the glenoid bone with a minimum of three bone screws.*

Note. *The SMR TT Augmented 360 Baseplate is compatible with bone screws dia 6.5 mm (minimum length 25 mm) and must be fixed to the glenoid bone with a minimum of two bone screws.*

Note. *The SMR TT Augmented 360 Baseplate is compatible with cortical bone screws dia. 5mm (product code 8432.15. XXX) and must be fixed to the glenoid bone with a minimum of three bone screws (two bone screws with minimum length 26mm and one with minimum length 18mm).*

Note. *Bone screws must be positioned according to the surgical technique.*

Note. *The SMR TT Augmented 360 Baseplate cannot be used with SMR Glenoid Plates and SMR Lateralized Connector with Screw.*

CONTRAINDICATIONS

Absolute contraindications include:

- local or systemic infection;
- septicaemia;
- persistent acute or chronic osteomyelitis;
- confirmed nerve lesion compromising shoulder joint function;
- deltoid muscle insufficiency.

Relative contraindications include:

- vascular or nerve diseases affecting the concerned limb
- poor bone stock (for example due to osteoporosis or extended previous revision surgery) compromising the stability of the implant;
- metabolic disorders which may impair fixation and stability of the implant;
- any concomitant disease and dependence that might affect the implanted prosthesis;
- metal hypersensitivity to implant materials.

In cases of bone tumors, use an appropriate system designed to treat cases requiring large bone resections (SMR Large Resections Stems). The use of primary or revision implants not designed and intended for use in cases of bone resection may result in a poor outcome and / or failure of the implant or implant fixation.

RISK FACTORS

The following risk factors may result in poor results with this prosthesis:

- overweight*;
- strenuous physical activities (active sports, heavy physical work);
- incorrect implant positioning;
- wrong size of components;
- muscle deficiencies;
- multiple joint disabilities;
- refusal to modify postoperative physical activities;
- patient history of infections or falls;
- systemic diseases and metabolic disorders;
- local or disseminated neoplastic diseases;
- drug therapies that adversely affect bone quality, healing, or resistance to infection
- drug use or alcoholism;
- marked osteoporosis or osteomalacia;
- patient's resistance to disease generally weakened (HIV, tumour, infections);
- severe deformity leading to impaired anchorage or improper positioning of implants;
- use in combinations with products, prosthesis or instruments of another manufacturer;
- errors of operative technique.

* *According to the definition of the World Health Organization (WHO), Body Mass Index (BMI) greater than or equal to 25 Kg/m².*

Introduction

PREOPERATIVE PLANNING

Standard X-rays are used to assist with planning of the operation. It is recommended to use a normal AP-view in internal and external rotation as well as an axillary view, Bernageau or Morrison view. It is recommended to use a CT-Scan in fractures cases and for planning the glenoid insertion.

If required, an MRI can be used for clear examination of the extent of the bone deficiency and to see the muscle/capsule quality.

In post-traumatic cases, such as in special cases of disabling shoulder, a neurological exam is helpful for decision making.

Templates are used in all osteoarthritic cases; they can also be used in fracture cases but often in a limited mode, depending on the type of fracture.

The X-ray templates provided for SMR have a 105% scale; digital templates are available as well.

ANAESTHESIA

Shoulder surgery is one of the areas in which an understanding of the surgery and participation by the anaesthesiologist is especially important for the outcome of the surgery. This applies to accurate preoperative evaluation of the patient as well as intra op techniques.

They should have a good understanding of positioning on the operating table and postoperative pain management.

Shoulder prosthetic replacement can be performed with regional (scalenus) anaesthesia combined with sedation and/or with general anaesthesia.

The modern technique of interscalenic block was introduced by Winnie in 1970 and soon became the standard for anaesthesia and postoperative pain management in shoulder surgery.

Requested surgical positioning (beach chair position) must be accurately followed by the anaesthetic staff to avoid hypotension and consecutive brain hypoperfusion.

Postoperative analgesia is important and can be performed by intravenous, single injection or “on demand” application of analgesics. Patient-controlled analgesia (PCA) is recommended.

POSITIONING

Shoulder arthroplasty is normally performed in a “beach-chair” position; the surgeon needs complete access to the shoulder joint. The arm is free or stabilized by arm-holders. The shoulder must be positioned off the edge of the table to afford unobstructed arm extension.

The patient’s head must be supported and stabilized in the neutral position. Nerve injury due to brachial plexus traction during positioning and surgery must be avoided.

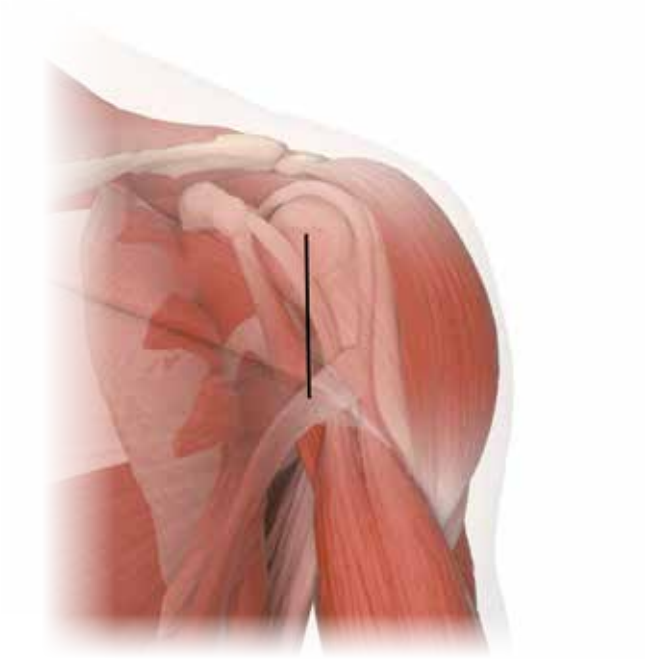
If possible, one assistant should stay behind the shoulder, the second on the opposite side of the patient, so that the surgeon has a complete anterior view of the shoulder and can move the joint without any obstacle.

ACCESS

We recommend two types of surgical approaches to the shoulder joint. As in every surgical procedure, the access depends not only on diagnosis and planned surgical treatment but also on the experience of the surgeon.

Ranges of glenohumeral motion are evaluated with the patient under anaesthesia to confirm the preoperative assessment and the extent of capsular release needed to restore the ROM postoperatively.

DELTO-PECTORAL APPROACH



Anterior vertical incision, starting 1 cm laterally of the coracoid bone, slanting towards the axillary's pouch.
If there is a metaphyseal fracture, slanting laterally towards the deltoid insertion at the humerus. The cephalic vein is retracted laterally with the deltoid muscle.The clavipectoral fascia is incised along the lateral edge of the conjoined tendon up to the coracoacromial ligament.

With the clavipectoral fascia incised, a retractor can easily be placed over the superolateral aspect of the humeral head to retract the deltoid. The conjoined tendon is retracted medially.
The musculocutaneous nerve penetrates the lateral coracobrachialis muscle 3 to 8 cm distally of the tip of the coracoid process. The position of the axillary nerve should be identified along the anterior surface of the subscapularis muscle, below the conjoined tendon. The axillary nerve crosses the inferolateral border of the subscapularis 3 to 5 mm medially of its musculotendinous junction and has an intimate anatomic relation with the inferior capsule of the shoulder joint.
The anterior humeral circumflex artery and veins are visualized, ligated and divided.
The subscapularis tendon is released, divided 1 cm medially to its attachment or with some bone chip of the lesser tuberosity. Separation of the subscapularis from the capsule and incision of the capsule is performed to the inferior border of the glenoid rim, protecting the axillary nerve with a blunt retractor. Release of the subscapularis and 360° capsular release.

Closure. *In fracture cases, accurate reconstruction of the minor and major tubercles by suture, bone anchors or cerclage is mandatory.*
If the long head of the biceps tendon is intact, reconstruct also the biceps groove to avoid impingement. Closure of delto-pectoral groove.

Glenoid Preparation

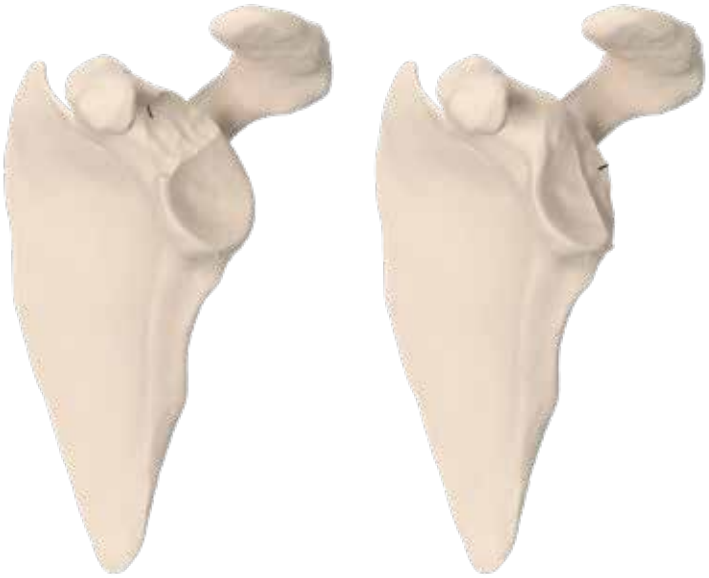


Figure 1

This technique only refers to the implant of the SMR TT Augmented 360 MB and must be considered an addendum to the main surgical technique of SMR System.

EXPOSURE OF THE GLENOID

Expose the glenoid with suitable retractors. The Fukuda retractor (not included in the 9013.3A.000 instrument set) keeps the proximal portion of the humerus outside of the joint area, while maintaining optimal exposure of the glenoid surface. Generally, the retractor is anchored to the rear of the glenoid neck rim in a delto-pectoral approach, or on the lower rim in a supero-lateral approach.

DETERMINATION OF THE GLENOID ANATOMY

In case of not excessively deformed glenoid, it's possible to trace two orthogonal lines along the main axes using an electric scalpel. This operation does not require any particular measurement as its only purpose is to determine more or less the centre of the glenoid and to help when positioning the implant.

In case of glenoid anatomical defects, a careful analysis is recommended to evaluate the following parameters: osteophytes, articular curvature, superior or posterior wear and the location, orientation and depth of the glenoid vault. It is strongly recommended to identify the direction of the maximum glenoid wear and to trace a small line with the electric scalpel *(Figure 1)*. This will serve as reference mark for positioning the provided instruments and the final implant.

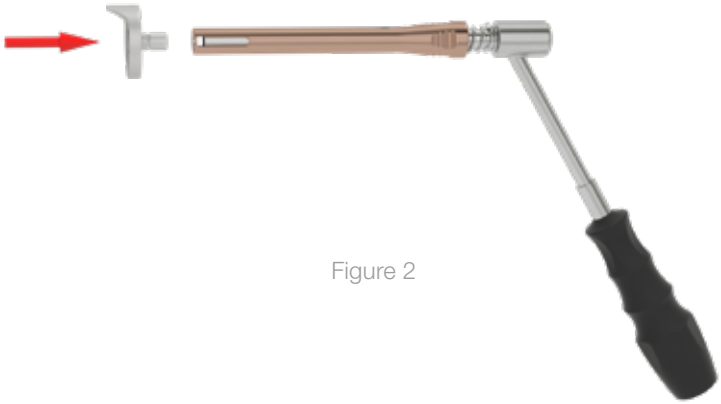


Figure 2

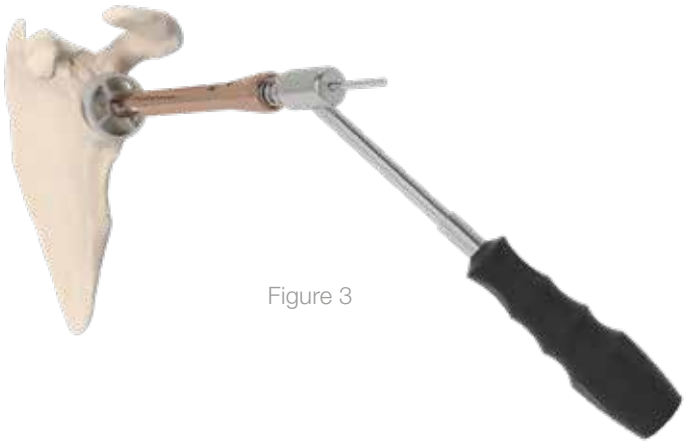


Figure 3

GLENOID PREPARATION

For the glenoid preparation use a 2.5 mm dia. guide K-wire (150 mm at least - not included in the instrument set). According to the clinical case, the surgeon may use the dedicated *K-wire positioning jigs jigs (B3A, A3N for 19°)* to decide the optimal metaglene position.

Note. *The instruments for implanting 19° wedged baseplates are contained into the 9013.3N.000 instrument set – on request only.*

Note. *K-wire positioning jigs can be also used as sizers, since they have the same diameter of the final implant.*

Four positioning jigs are available, showing different inclination: 0°, 7°, 15°. 19° positioning jig is also available in its dedicated instrument set (9013.3N.000). In case of glenoid wear or bone deficiency, surgeons can choose the angled jigs the most close to the defect to correct, in order to reach the correct inclination for the K-wire insertion. Please note that for a correct use of the angled reamer provided, this step requires the K-Wire to be positioned perpendicular to the paleo (not eroded) surface of the glenoid: remember the K-wire will determine the direction of the final implant.
To determine the final version of the glenoid component, performing a CT scan beforehand is highly recommended to evaluate any deformations on the articular surface caused by degenerative pathologies or trauma.
All corrections should be made at this stage as no corrections can be done when impacting the final implant.

Introduce the K-Wire with the proper inclination: connect the selected *K-wire positioning jigs (A3A)* to the *K-wire positioning handle (G38)* and position it onto the glenoid surface *(Figure 2-3)*.

Glenoid Preparation

Figure 4a

Figure 4b

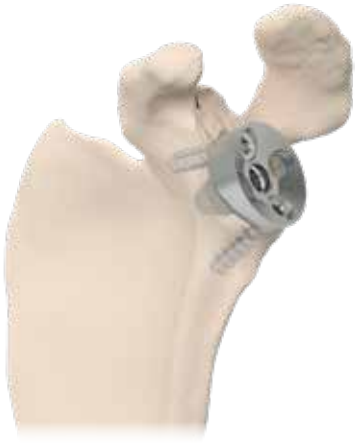


Figure 5

In some cases, according the glenoid anatomy, the screw placement of the final implant can result in a critical step. Surgeons can have a preview of the position of the screws by looking at the *K-wire positioning jigs (A3A)* "cross shape", that is aligned with the four holes on the final baseplate *(Figure 4a)*. This is NOT applicabile to 15°X and 19°X baseplates, since the "cross shape" of the jig is not aligned with the holes of these two implants *(Figure 4b)*.

WARNING. *It is strongly recommended to evaluate the placement of the screws during this surgical step: by knowing where the screws will be the surgeon can decide to position the jig (and the final implant coherently) in order to maximize the fixation in the scapula. If the clinical case allows it, it is recommended to place at least one screw superiorly (possibly toward the base of the coracoid) and a second screw in the inferior aspect of the glenoid (as shown in Figure 5).*

Avoid implant placements that can compromise both the superior and inferior screws placement.
Eventually it is possible correct the mark previously done with the electric scalpel and trace a new reference for the implant orientation.

Please note that the following paragraphs describe different surgical steps according to the TT Augmented 360 MB implant type:
Wedged 7° -15° -15°X -19° -19°X sizes > see page 13.
Lateralized (flat) +2 and +4 sizes > see page 17.

Note. *"X" version of 15° and 19° wedged implants is available -on request- to facilitate the screw positioning in case of supero-posterior defects. The glenoid preparation is the same as described for the regular full-wedged implants (from page 13).*

Glenoid Reaming for Full Wedged Augmented 360 MB

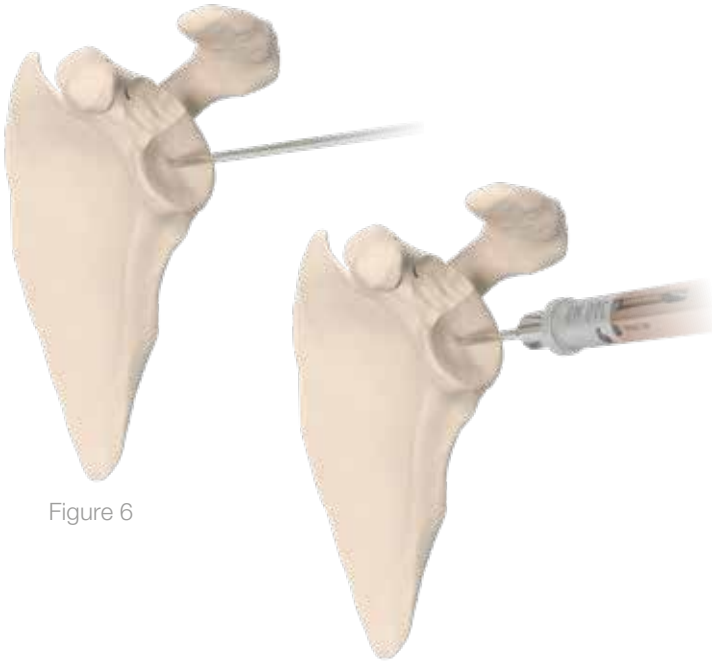


Figure 6

Figure 7

Figure 8a

Figure 8b

Figure 8c

GLENOID REAMING FOR FULL WEDGED AUGMENTED 360 MB

SMR TT Augmented 360 Metal Back is available in two different full wedged slopes, 7° and 15° plus an additional 19° wedge on request.

Note. *"X sizes" are only available for 15° and 19° wedges to facilitate the screw positioning in case of supero-posterior defects.*

The circular baseplate allows a dialable positioning aiming at maximizing the match with the glenoid defect.

To prepare the glenoid for correctly seating the chosen implant it is necessary to use the Angled Glenoid Reamer provided in the dedicated instrument set. Glenoid reaming is performed to achieve intimate contact between the bone and the spherical undersurface of the glenoid implant and to establish appropriate glenoid version.

Once the K-wire has been fixed *(Figure 6)* it is possible to proceed with the glenoid reaming phase. In case of hard/sclerotic glenoid bone surface, the *initial glenoid drill (D3A coupled with C3A)* can be optionally used to prepare the glenoid seat for the reaming *(Figure 7)*.

Then, assemble the instruments: the final tool is composed by the *Shaft for Angled Glenoid Reamer (F3A)*, a plastic *sleeve* of the chosen *slope (E3A or B3N for 19°)* and the *Angled Reamer (F3A or C3N)*.

First, select the proper *Angled Reamer* (7° or 15°, while the one for 19° is in a different set) with the help of the engraved marking and couple it onto the reamer shaft until it clicks on the shaft *(Figure 8a)*. Make sure the assembly is well coupled before proceeding.

Then select the proper *sleeve* (7°, 15° or 19°), always with the help of the color code described below. Slide it over the glenoid angled reamer shaft until it clicks in *(Figure 8b).*

Finally insert the shaft stopper *(Figure 8c)*.

Note. *Where needed, the instrumentation shows a colored mark to help the user to identify the correct instrument:*

7° > *Grey*

15° > *Orange*

*19°** > *Magenta*

* *On request only, instrument contained into the 9013.3N.000 instrument set.*

Note. *Please doublecheck the couplings of the whole assembly before proceeding with the glenoid reaming.*

Glenoid Reaming for Full Wedged Augmented 360 MB

Figure 9

Once the Angled Glenoid Reamer is correctly assembled with the selected components, couple it on a power tool thanks to the quick release connection.
Insert the cannulated Angled Reamer on the K-wire and rotate the plastic sleeve according to the glenoid defect. The *Angled Reamer sleeves (E3A or B3N for 19°)* present an engraved line on the distal part of the handle, present a marked line on the distal part of the handle, representing the direction of the maximum slope.

Note. *A secondary line is also marked on the diametrically opposite side of the sleeve to provide a further reference when orienting the sleeve.*

Orient the angled reamer according to the electro-scalpelled mark done in the previous surgical steps: once the proper orientation is reached, it is possible to proceed with the reaming of the glenoid surface *(Figure 9)*.

Attention must be paid during the reaming phase. It is highly suggested not to rotate the sleeve during the reaming as this will compromise the correct preparation of the seat for the final implant.

Please consider to use the *trial implant (G3A or D3N)* to check if the glenoid surface is properly reamed and prepared to seat the baseplate.

Note. *The reaming phase can eventually cancel the mark previously traced to identify the defect direction. It is recommended to trace it again using the electro scalpel following the line marked onto the sleeve. This mark will help during the following surgical steps and also in case a second reaming step is needed.*

Glenoid Reaming for Full Wedged Augmented 360 MB

Figure 10

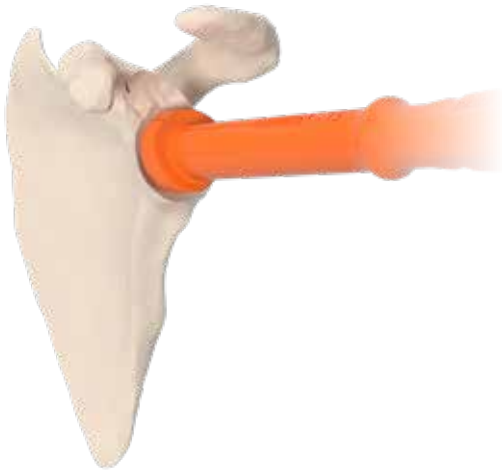


Figure 11

CENTRAL HOLE PREPARATION FOR FULL WEDGED AUGMENTED 360 MB

Once the glenoid surface is correctly reamed, it is possible to prepare the central hole for the TT peg.
SMR TT Augmented 360 MB can be coupled with Medium, Long and X-Long TT peg sizes (S-R only).

Select the shaft for *glenoid drill (N3A)* of proper length (among Medium, Long and X-Long) and assemble it with the stopper sleeve for *glenoid drill (O3A or E3N for 19° wedge)*. 7°, 15° or 19° can be easily identified according to the color code. Slide the sleeve over the shaft until it clicks in and finally insert the *shaft stopper ring (P3A)* *(Figure 10)*.

Note. *The slope (7°, 15° or 19°) of the stopper sleeve must be consistent with the slope of the previous sleeve used during the reaming phase.*

Slide the assembly onto the K-wire and orient the plastic sleeve with the electro-scalpelled mark done in the previous steps. Then drill the central hole until the stopper sleeve contacts the glenoid surface *(Figure 11)*. In this way the glenoid cavity is prepared according to the thickness and the inclination of the wedged baseplate.

Note. *The plastic sleeve will act as stopper by preventing over-drilling of the peg hole. The position of the stopper onto the glenoid shall reproduce the intended orientation of the final implant and must be consistent with the orientation of the sleeve used for the angled reaming phase.*

Glenoid Reaming for +2 and +4 Augmented 360 MB

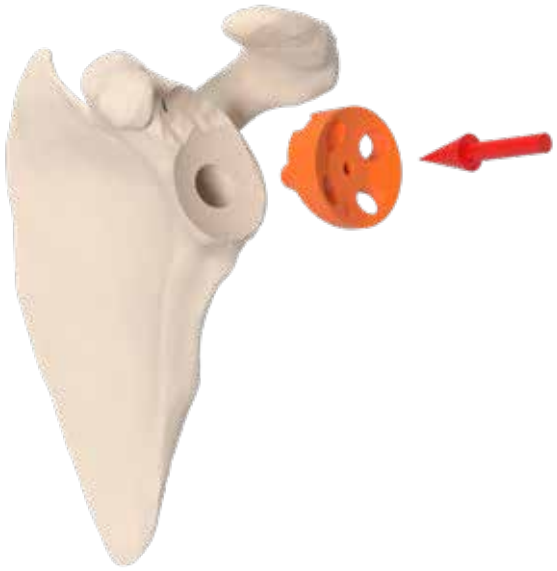


Figure 12

TRIAL IMPLANT FOR FULL WEDGED AUGMENTED 360 MB

Once the glenoid surface is prepared, it is possible to apply a *trial implant (G3A or D3N)* to verify the final implant seating and version *(Figure 12)*.
These plastic trials are colored according to the established color-code:

7° > Grey
15° > Orange
19° > Magenta

Please note the holes in the trial implant reproduce the screw holes of the final implant (regular sizes, 7°, 15° and 19°). For the 15°X and 19°X baseplate, the surgeon can refer to the "X" laser-marked onto the surface of the trial implant.

The final implant insertion is described at page 19.

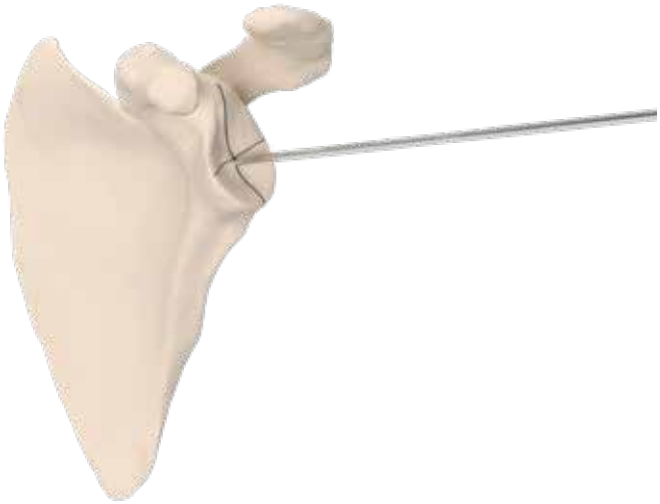


Figure 12

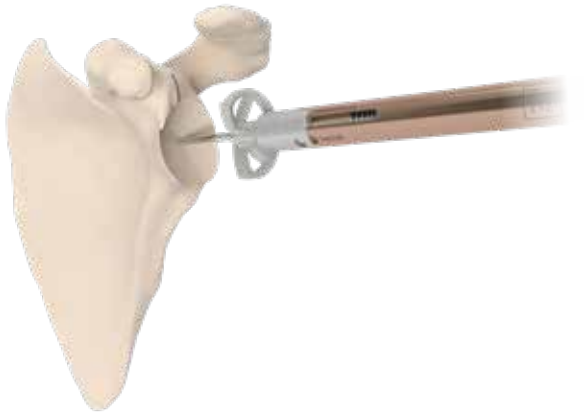


Figure 13

GLENOID REAMING FOR +2MM AND +4MM AUGMENTED 360 MB

SMR TT Augmented 360 Metal Back is also available with a flat baseplate and two different lateralizing offsets: +2 and +4mm.

Glenoid reaming is performed to achieve intimate contact between the bone and the spherical undersurface of the glenoid implant and to establish appropriate glenoid version.

Once the K-wire has been inserted *(Figure 13)*, connect the *Small size glenoid reamer (U34)* to the *reamer shaft (C34)* and ream the glenoid surface carefully *(Figure 14)*. The purpose of this operation is to prepare the glenoid to seat the final implant.

Glenoid Reaming for +2 and +4 Augmented 360 MB

Figure 15

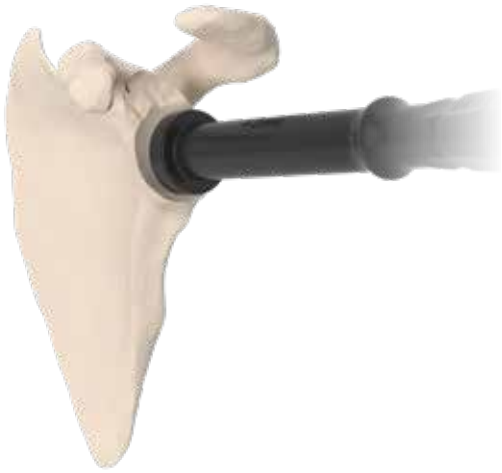


Figure 16

CENTRAL HOLE PREPARATION FOR +2MM AND +4MM AUGMENTED 360 MB

Once the glenoid surface is correctly reamed, it is possible to prepare the central hole for the TT peg.
SMR TT Augmented 360 MB can be coupled with Medium, Long and Extra-Long TT peg sizes (S-R only).

Select the *shaft for glenoid drill (N3A)* of proper length (among Medium, Long and X-Long) and assemble it with the stopper sleeve for glenoid drill (O3A, +2mm or +4mm, black-colored). Slide the sleeve over the shaft until it clicks in and finally insert the *shaft stopper ring (P3A)* *(Figure 15)*. Slide the assembly onto the K-wire and orient the plastic sleeve with the electro-scalpelled mark done in the previous steps and drill the central hole until the stopper sleeve contacts the glenoid surface *(Figure 16)*. In this way the glenoid cavity is prepared according to the thickness and of the flat lateralized baseplate.

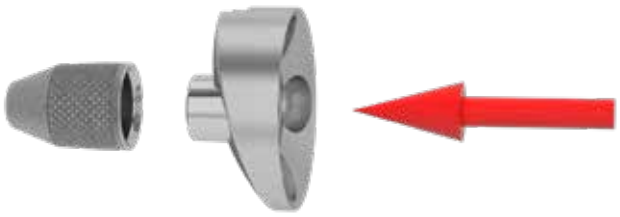


Figure 17

Figure 18

ASSEMBLING OF THE FINAL IMPLANT

Please note that the following steps are in common with Wedged (7° -15° -15°X -19° -19°X) and Lateralized (+2 and +4) 360 Augmented Metal Back.

Remove the TT Augmented 360 Metal Back baseplate and peg of the chosen size from the sterile packaging.
Apply the peg to the baseplate *(Figure 17)* and secure the connections using the *TT Augmented 360 Metal Back press (I3A and H3A)* and the *torque wrench (Figure 18)*.

Turn clockwise the torque wrench to achieve “one click” to confirm the proper tightening. Do not exceed recommended torque as excessive tightening may damage the instrument or implant.

If needed use the *Multi Purpose Handle (G18)* to hold the press and apply counter torque forces when turning the wrench.

WARNING. *Peg size must match the baseplate size as described in the warning label on the packaging.*

SMR TT Augmented 360 MB can be coupled only with Medium, Long and X-Long S-R TT Pegs:
1375.14.652 – Peg S-R Medium
1375.14.653 – Peg S-R Long
1375.14.654 – Peg S-R X-Long

Final Implant Insertion

Figure 19

Figure 20

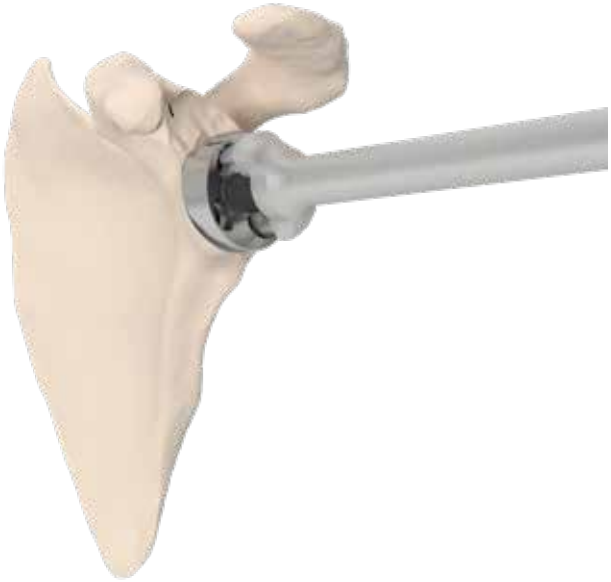


Figure 21

INSERTION OF FINAL TT AUGMENTED 360 METAL BACK

Screw the *S-R impactor guide* (*L38*, from the SMR Glenoid Set) to the final implant and apply the *impactor (K38) (Figures 19-20).*

Insert the glenoid prosthesis into the prepared glenoid by tapping it in with the impactor handle until there is complete contact with the glenoid surface *(Figure 21).*

Note. *The baseplate must be completely seated onto the prepared glenoid. Avoid gaps between the baseplate and glenoid surface.*

WARNING. *If implanting a wedged Metal Back, attention must be paid to the orientation of the final implant. The maximum slope of the wedge must match with the direction of the reaming used during the glenoid preparation phase. As for the previous steps, it is recommended to orient the lateral laser mark line on the final implant with the reference mark done with the electro-scalpel.*

Remove the impactor by pressing the release button and unscrew the impactor guide from the implanted TT Metal Back.

Final Implant Insertion

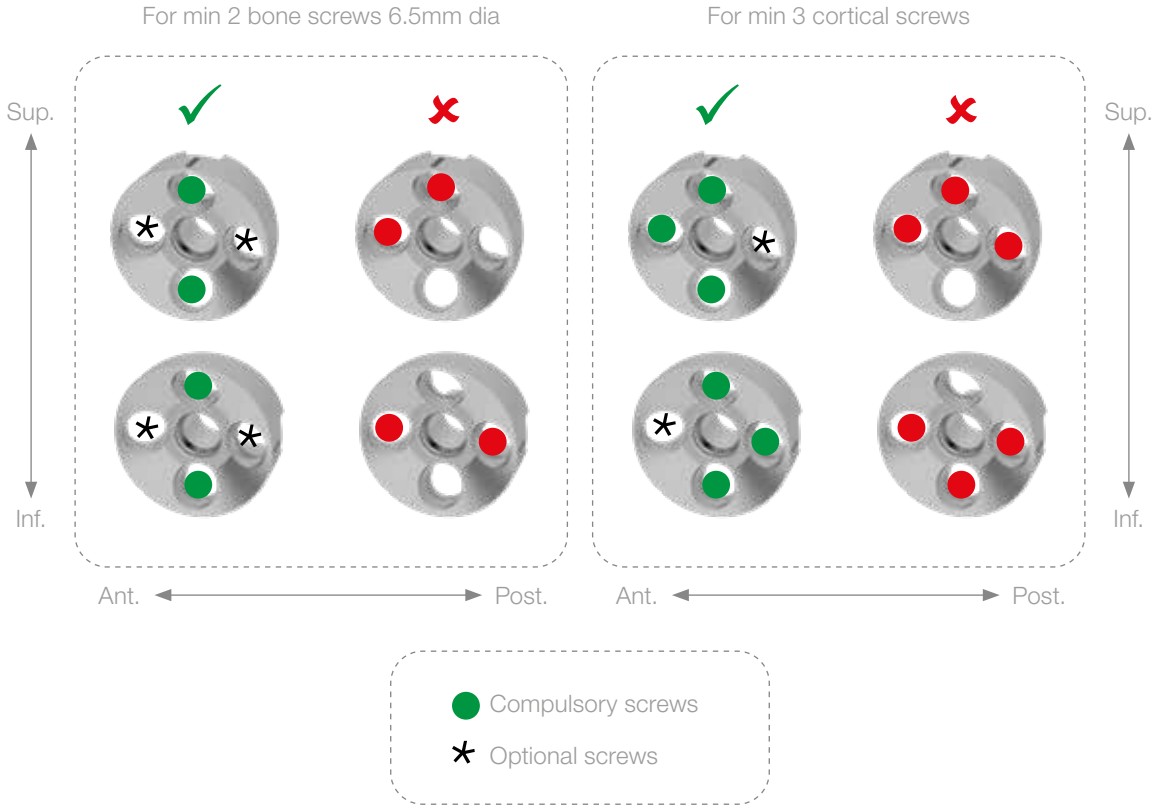


Figure 22

WARNING. *IMPLANTING 6.5mm BONE SCREWS*
At least two screws (min. length 25mm) must be implanted. It is mandatory to place these two screws diametrically opposite each other, along the inferior-superior axis. Eventually, a third screw can be implanted in the anterior/posterior holes if additional fixation is required (Figure 22 - bone screws).

WARNING. *IMPLANTING 4.5mm CORTICAL SCREWS*
At least three screws (min. length 26mm) must be implanted. It is mandatory to place two screws diametrically opposite each other, along the inferior-superior axis. The third screw can be implanted in the anterior/posterior holes, depending on anatomy and clinical case (Figure 22 - cortical screws).

WARNING. *IMPLANTING 5mm CORTICAL SCREWS*
At least three screws must be implanted. It is mandatory to place two screws diametrically opposite each other, along the inferior-superior axis, with a minimum length of 26mm. The third screw can be implanted in the anterior/posterior holes, depending on anatomy and clinical case, with a minimum length of 18mm (Figure 22 - cortical screws).

Final Implant Insertion

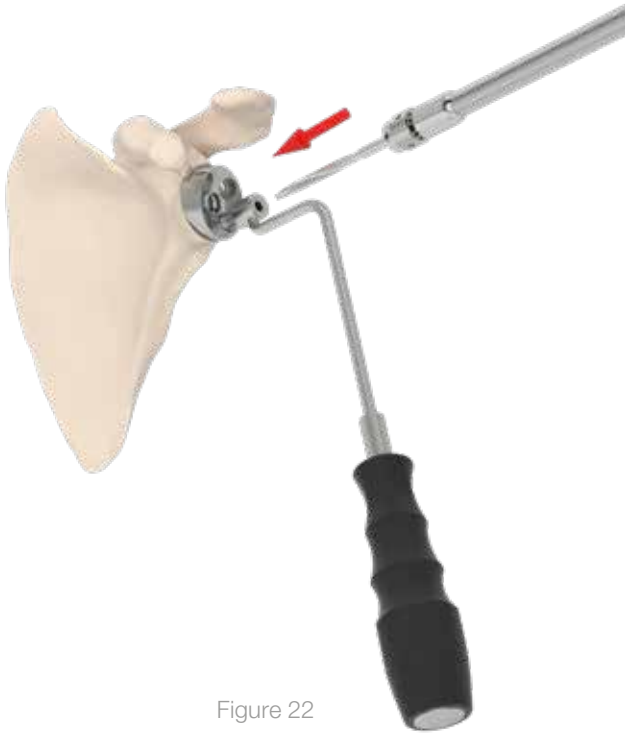


Figure 22

Figure 24

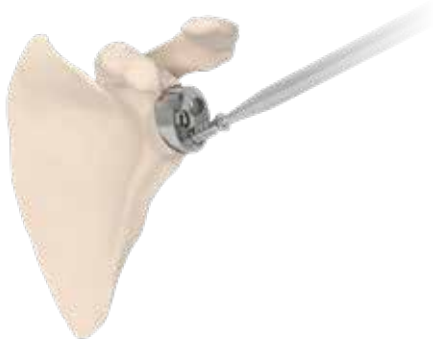


Figure 25

FINAL SCREWS INSERTION

Once the TT Augmented 360 Metal Back glenoid has been positioned, drill the sites for the fixation screw using the *flexible mandrel (V3A)* attached to the *helix drill* (*J3A* for 4,5mm cortical screws and *L3A* for 6,5mm screws) and the *drill guide* (*K3A* for 4,5mm cortical screws and *M3A* for 6,5mm screws) *(Figure 23)*.

WARNING. *It is important to avoid angling the drill guide and drill too close to the TT Peg to avoid any damage to the peg and to not compromise the final fixation.*

After having prepared the holes, it is possible to complete the seat by means of the *tap drill (Z3A)* *(Figure 24)*.

Finally insert and tighten the screws using the *screwdriver (X3A with W3A)* *(Figure 25)* at the same time in order to guarantee the best fit of the TT Augmented 360 Metal Back into the prepared glenoid.

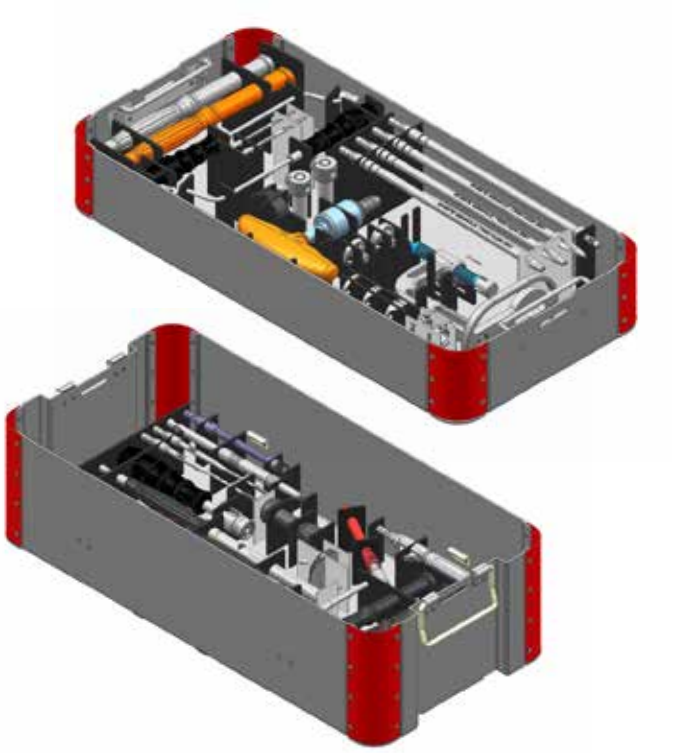
Once the TT Augmented 360 Metal Back has been inserted, proceed with the reverse implantation as described in the standard surgical technique of the SMR System.

Please note that all the sizes of the 360 Augmented MB are compatible only with S-R glenosphere connectors (code 1374.15.305) and that the combination with lateralized connectors is not allowed.

Note. *In case of revision of the TT Augmented 360 Metal Back, Augmented 360 MB Connector Extractor (Q3A) can be used in combination with the instruments of 9013.39.000 instrument set. Please refer to the surgical steps showed in the SMR TT Metal Back revision surgical technique.*

Instrument Set

9013.3A.000 TT Augmented 360 Metal Back Set



Ref.	CODE	DESCRIPTION	Qty.
A3A	9013.75.301	K-Wire Positioning Handle	1
B3A	9013.75.314	K-Wire Positioning Jig - 0°	1
B3A	9013.75.331	K-Wire Positioning Jig - 7°	1
B3A	9013.75.333	K-Wire Positioning Jig - 15°	1
C3A	9013.75.350	Reamers and Drills Shaft	1
D3A	9013.75.121	Initial Glenoid Drill	1
E3A	9013.75.365	Sleeve for Angled Glenoid Reamer - 7°	1
E3A	9013.75.367	Sleeve for Angled Glenoid Reamer - 15°	1
F3A	9013.75.355	Shaft for Angled Glenoid Reamer	1
F3A	9013.75.356	Angled Glenoid Reamer - 7° defects	1
F3A	9013.75.357	Angled Glenoid Reamer - 15° defects	1
G3A	9013.75.991	Trial Augmented 360 MB - 7°	1
G3A	9013.75.993	Trial Augmented 360 MB - 15°	1
H3A	9013.75.393	Augmented 360 MB Impaction Block	1
I3A	9013.75.394	Press	1
J3A	9084.20.087	Ø3.2mm Helix Drill	1
K3A	9013.75.403	Guide for Ø3.2mm Drill	1
L3A	9084.20.086	Ø3.5mm Helix Drill	1
M3A	9013.75.404	Guide for Ø3.5mm Drill	1
N3A	9013.75.345	Shaft for SMALL-R #MEDIUM Glenoid Drill	1
N3A	9013.75.346	Shaft for SMALL-R #LONG Glenoid Drill	1
N3A	9013.75.347	Shaft for SMALL-R #X-LONG Glenoid Drill	1
O3A	9013.75.375	Stopper Sleeve for Glenoid Drill - 7°	1
O3A	9013.75.377	Stopper Sleeve for Glenoid Drill - 15°	1
O3A	9013.75.379	+2mm Stopper Sleeve for Glenoid Drill	1
O3A	9013.75.380	+4mm Stopper Sleeve for Glenoid Drill	1
P3A	9013.75.348	Shaft Stopper Ring	2
Q3A	9013.75.399	Augmented 360 MB Connector Extractor	1
R3A	9013.75.395	SMALL-R Canulated Reamer	1
S3A	9013.75.385	Metal Back Impactor	1
T3A	9013.75.388	Small-R Impactor Guide	1
U3A	9013.75.160	Glenoid Reamer Small	1
V3A	9095.11.700	Flexible Mandrel	1
W3A	9095.11.253	Straight Handle with Zimmer Connection	1
X3A	9095.10.228	Screwdriver Shaft	1
Y3A	9095.11.301	Depth Gauge	1
Z3A	9013.75.485	Tap Drill for Cortical Screw	1
Z3A	9013.75.486	Tap Drill for Bone Screw	1
Γ3A	9013.75.150	Humeral Cover Small	1
Γ3A	9013.75.151	Humeral Cover Large	1
Δ3A	9013.75.142	Reverse Liner Pusher	1
	9013.3A.990	Instrument Tray	1

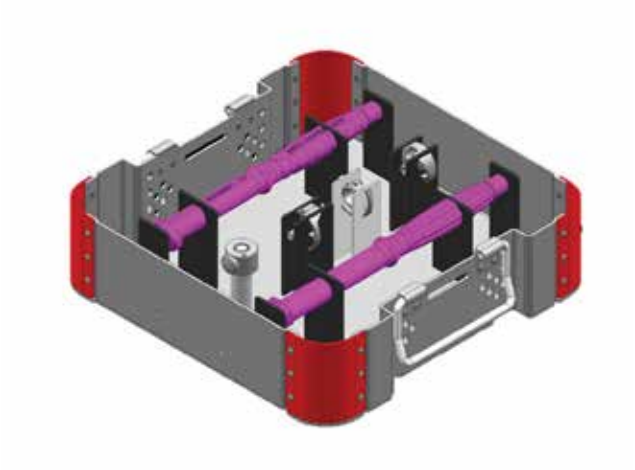
9095.11.750 Torque Wrench

CODE	DESCRIPTION
9095.11.750	Torque Wrench

SMR TT AUGMENTED 360 METAL BACK SURGICAL TECHNIQUE

Instrument Set

9013.3N.000 19° Wedge TT Augmented 360 MB Set



Ref.	CODE	DESCRIPTION	Qt.
A3N	9013.75.334	K-Wire Positioning Jig - 19°	1
B3N	9013.75.368	Sleeve for Angled Glenoid Reamer - 19°	1
C3N	9013.75.358	Angled Glenoid Reamer - 19° defects	1
D3N	9013.75.994	Trial Augmented 360 MB - 19°	1
E3N	9013.75.378	Stopper Sleeve for Glenoid Drill - 19°	1
F3N	9013.75.348	Shaft Stopper Ring	1
	9013.3N.990	Instrument Tray	1

Product Codes

TT AUGMENTED 360 BASEPLATE

Ti6Al4V	1375.15.507	TT Augmented 360 Baseplate Small-R – 7°	
	1375.15.515	TT Augmented 360 Baseplate Small-R – 15°	
	1375.15.519	TT Augmented 360 Baseplate Small-R – 19°	■
	1375.15.522	TT Augmented 360 Baseplate Small-R – +2mm	
	1375.15.524	TT Augmented 360 Baseplate Small-R - +4mm	
	1375.15.565	TT Augmented 360 Baseplate Small-R – 15°X	
	1375.15.569	TT Augmented 360 Baseplate Small-R – 19°X	■

TT GLENOID PEG

Ti6Al4V	1375.14.652	Peg S-R Medium
	1375.14.653	Peg S-R Long
	1375.14.654	Peg S-R X-Long

BONE SCREW

Ti6Al4V		DIA. 6.5 mm
	8420.15.020	L. 25mm
	8420.15.030	L. 30mm
	8420.15.040	L. 35mm
	8420.15.050	L. 40mm

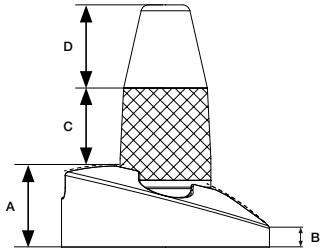
CORTICAL BONE SCREW (Flattened Head)

Ti6Al4V		DIA. 5mm	
	8432.15.018	L. 18mm	
	8432.15.020	L. 20mm	
	8432.15.022	L. 22mm	
	8432.15.024	L. 24mm	
	8432.15.026	L. 26mm	
	8432.15.028	L. 28mm	
	8432.15.030	L. 30mm	
	8432.15.032	L. 32mm	
	8432.15.034	L. 34mm	
	8432.15.036	L. 36mm	
	8432.15.038	L. 38mm	
	8432.15.040	L. 40mm	
	8432.15.042	L. 42mm	■
	8432.15.044	L. 44mm	■
	8432.15.046	L. 46mm	■
	8432.15.048	L. 48mm	■
	8432.15.050	L. 50mm	■
	8432.15.052	L. 52mm	■

■ Upon request

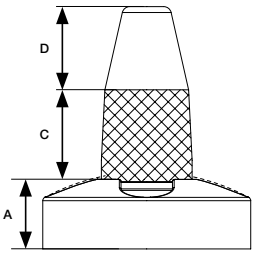
SMR TT AUGMENTED 360 METAL BACK SURGICAL TECHNIQUE

Product Dimensions



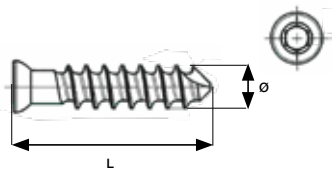
SMR TT AUGMENTED 360 MB - FULL WEDGED

			Medium TT Peg		Long TT Peg		X-Long TT Peg	
WEDGE	A [mm]	B [mm]	C [mm]	D [mm]	C [mm]	D [mm]	C [mm]	D [mm]
7°	7.95	2.7	10.1	7	13.1	11	16.1	13
15°	11	2.7	7.1	7	10.1	11	13.1	13
19°	12.6	2.7	5.5	7	8.5	11	11.5	13



SMR TT AUGMENTED 360 MB - FLAT

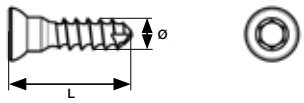
		Medium TT Peg		Long TT Peg		X-Long TT Peg	
THICKNESS	A [mm]	C [mm]	D [mm]	C [mm]	D [mm]	C [mm]	D [mm]
+2mm	7.5	10.6	7	13.6	11	16.6	13
+4mm	9.5	8.6	7	11.6	11	14.6	13



NOTE: Core diameter is 4mm

BONE SCREW

Ø (mm)	Length (mm)
6.5	20
6.5	25
6.5	30
6.5	35
6.5	40



NOTE: Core diameter is 3.2mm for Ø 5mm screws

CORTICAL BONE SCREW (Flattened Head)

Ø (mm)	Length (mm)
5	18
5	20
5	22
5	24
5	26
5	28
5	30
5	32
5	34

Ø (mm)	Length (mm)
5	36
5	38
5	40
5	42
5	44
5	46
5	48
5	50
5	52

■ Upon request

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