Surgical Technique

Shoulder Prosthesis

Aequalis-Reversed

TORNIER
SURGICAL IMPLANTS

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Aequalis-Reversed shoulder prothesis

BIOMECHANICS

The Aequalis-Reversed design is based on the principle of kinematic balancing of the shoulder based on a model initiated by Professor Grammont.

Biomechanics of the Aequalis-Reversed prosthesis is based on the following:

- Medialization of the center of rotation inside the glenoid bone surface.
- Distalization of the humerus, resulting in retensioning of the deltoid muscle and any rotator cuff muscles that are still competent (in case of massive rotator cuff tear).

This increases the length of the deltoid lever arm and therefore, the deltoid power. When an Aequalis-Reversed Prosthesis is implanted, the deltoid is the only muscle that acts on active elevation.
Furthermore, moving the center of rotation of the joint medially results in a greater muscle volume contributing to elevation. At last, the high congruence between the glenoid sphere and the humeral insert component stabilizes the humerus. The humerus is firmly held by the glenoid sphere, and contact is maintained by the tension of the deltoid.

INDICATIONS

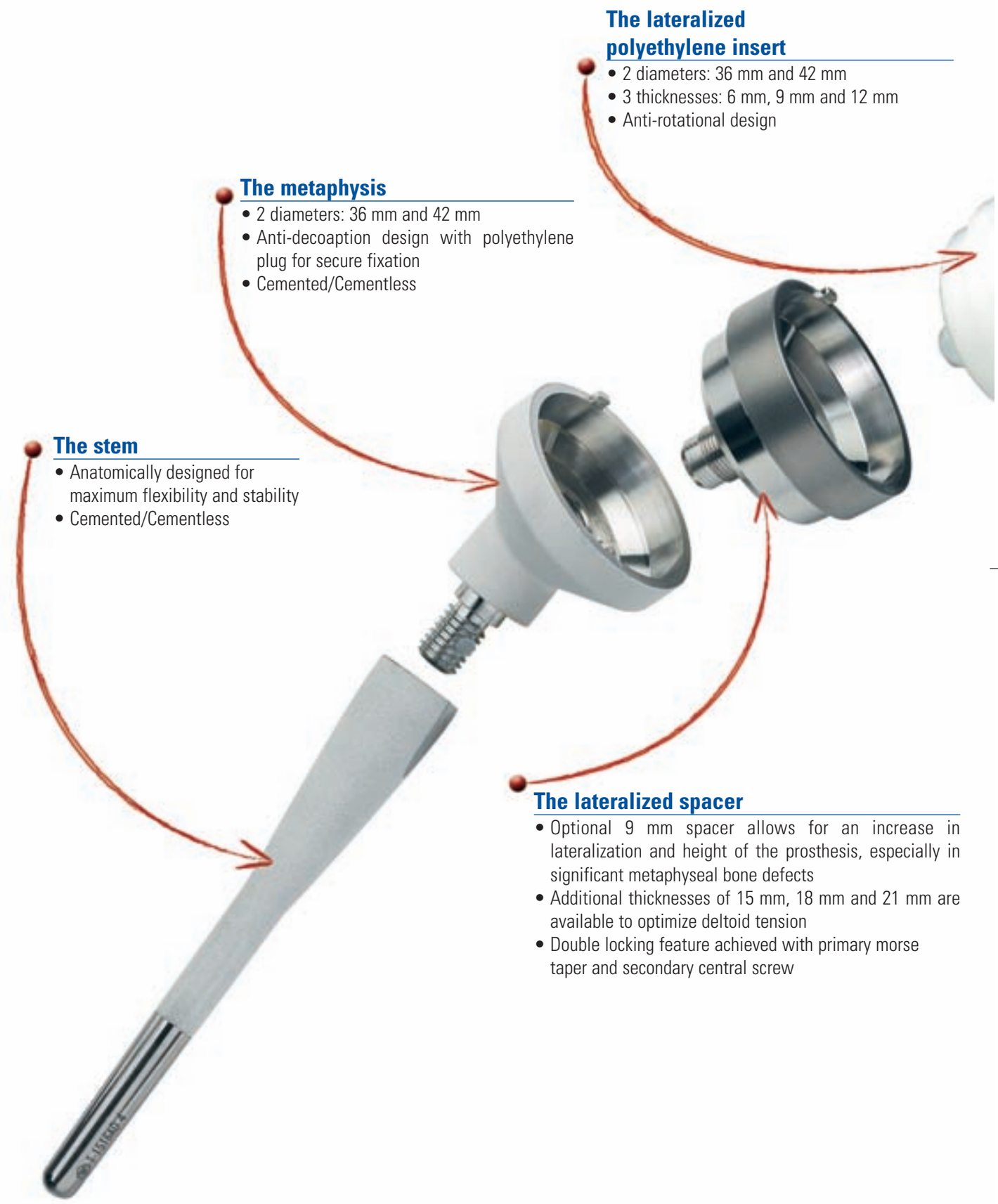
The Aequalis-Reversed prosthesis is indicated for patients with a functional deltoid muscle as a total shoulder replacement for the relief of pain and significant disability following arthropathy associated to massive and irreparable rotator cuff-tear. This device is also indicated for the prosthetic revisions with massive and irreparable rotator cuff-tear.

CONTRAINDICATIONS

The Aequalis-Reversed prosthesis is not recommended for use in the following situations:

- Non functionnal deltoid or external rotator muscles
- Massive glenoid or humeral bone deficiency, which appears to be insufficient to support the implant and/or the cement fixation

The Aequalis-Reversed



The lateralized polyethylene insert

- 2 diameters: 36 mm and 42 mm
- 3 thicknesses: 6 mm, 9 mm and 12 mm
- Anti-rotational design

The metaphysis

- 2 diameters: 36 mm and 42 mm
- Anti-decoaption design with polyethylene plug for secure fixation
- Cemented/Cementless

The stem

- Anatomically designed for maximum flexibility and stability
- Cemented/Cementless

The lateralized spacer

- Optional 9 mm spacer allows for an increase in lateralization and height of the prosthesis, especially in significant metaphyseal bone defects
- Additional thicknesses of 15 mm, 18 mm and 21 mm are available to optimize deltoid tension
- Double locking feature achieved with primary morse taper and secondary central screw

The glenoid base plate

- 29 mm diameter press-fit design for primary fixation and stability
- Designed for optimal fixation with 15 mm central peg
- 4 Ti alloy peripheral variable angle screws for added fixation and stability

The glenoid sphere

- 2 diameters: 36 mm and 42 mm
- Taper lock
- Recessed locking screw for secure fixation

The central peg

- To facilitate initial primary fixation, preparation of the central hole of the glenoid is accomplished by drilling with the 7.9 mm drill bit which allows for a press-fit of the 8 mm (15 mm length) central peg
- The HA coated and grooved surface finish optimize bone ongrowth and bone adhesion to the base plate

The threaded ring

Threaded rings have been designed in the superior and inferior holes of the glenoid baseplate to allow free angulation of the screws within a certain range, and locking of the screws in the desired position :

- superior screw : range of angulation is 0° to 30° superior towards the base of the coracoid process and +/-15° in the transverse plane.
- inferior screw : range of angulation is 0° to 30° inferior towards the lateral scapula spine and +/-15° in the transverse plane.

The multidirectional screws

- 4.5 mm self-tapping locking head design
- Allows for proper orientation of the screw and then secures the angle for optimal fixation

Anterior/posterior hemispherical head screws

- 4.5 mm self-tapping screws for added fixation of the baseplate
- Variable angles (+/-15°) for enhanced cortical fixation

Surgical technique

PRE-OPERATIVE PLANNING

- Pre-operative planning is performed utilizing x-ray templates on the frontal and sagittal views. Appropriate implant size and positioning are then determined.

- The use of a CT scan or MRI is recommended to determine the orientation of the glenoid and the quality of its bone stock.

- Scans are also useful to determine the length of the humeral stem and diameter of the metaphysis, which in turn determines the size of the glenoid sphere.

PATIENT POSITIONING

- Beach chair position with the shoulder positioned sufficiently lateral to allow full arm extension.
- The patient is vertically inclined depending on the chosen surgical approach.

PREPARATION OF THE HUMERUS

HUMERAL EXPOSURE

• Delto-pectoral approach

An incision is made from the tip of the coracoid along the delto-pectoral groove, slightly lateral to the axillary fold.
The pectoralis major is identified. The deltoid and cephalic veins are retracted laterally to open the delto-pectoral groove.

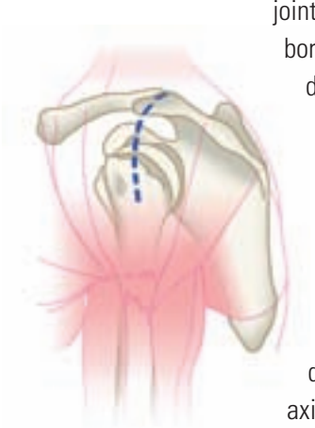
The coracoid process is identified. A Hohmann retractor is positioned behind the coracoid. Care should be taken to preserve the origin and insertion of the deltoid.

The clavi-pectoral fascia is incised at the external border of the coraco-brachialis. The axillary nerve is then identified before opening the subscapularis. As the arm is externally rotated, a conservative anterior and inferior capsule release from the humerus to the glenoid may be performed.

With adequate releases, the humeral head is then dislocated into the delto-pectoral interval by abduction of the arm and progressive external rotation and extension. In cases of severe restriction of external rotation (0° or less), it is recommended to release more of the upper pectoralis insertion.

• Supero-lateral approach

The incision is made from the acromio-clavicular joint along the anterior border of the acromion downward approximately 4 cm.



The deltoid is split in line with its fibers. Extra care should be taken to avoid any damage to the axillary nerve, which is located approximately 4 cm distal to the acromion.

The anterior part of the deltoid and the coracoacromial ligament are then detached carefully from their acromial insertion up to the acromio-clavicular joint.

The humeral head appears at the anterior border of the acromion. The subscapularis bursa is now released.

The humeral head is dislocated by placing the arm in flexion and external rotation. To optimize the exposure, the anterior border and the rest of the superior cuff can be resected. In some cases, the rest of the subscapularis tendon may be resected.

IDENTIFICATION OF THE HUMERAL ENTRY POINT

- The humeral head is generally deformed and the usual anatomic reference points may not be present.
- The humeral entry point is located at the diaphyseal axis at the highest point of the humeral head. This is determined after examination of the sagittal and frontal x-rays (in case of humeral head deformity).
- The entry point is marked with the starter awl (*Fig. 1).*
- If necessary, the entry point can also be enlarged with an osteotome before inserting the starter awl down the diaphyseal axis.

Fig 1

HUMERAL HEAD RESECTION

- The shaft of the monobloc cutting guide is inserted into the medullary canal at the entry point previously determined. It is driven down until contact between the ring and the humeral head occurs.
- To define the prosthetic retroversion, a retroversion rod is positioned into one of the axis holes permitting a choice of retroversion between 0° and 20° (R for right arm and L for left arm) (*Fig. 2).*
- **The cutting guide is turned until the retroversion rod is aligned with the patient's forearm.**

Fig 2

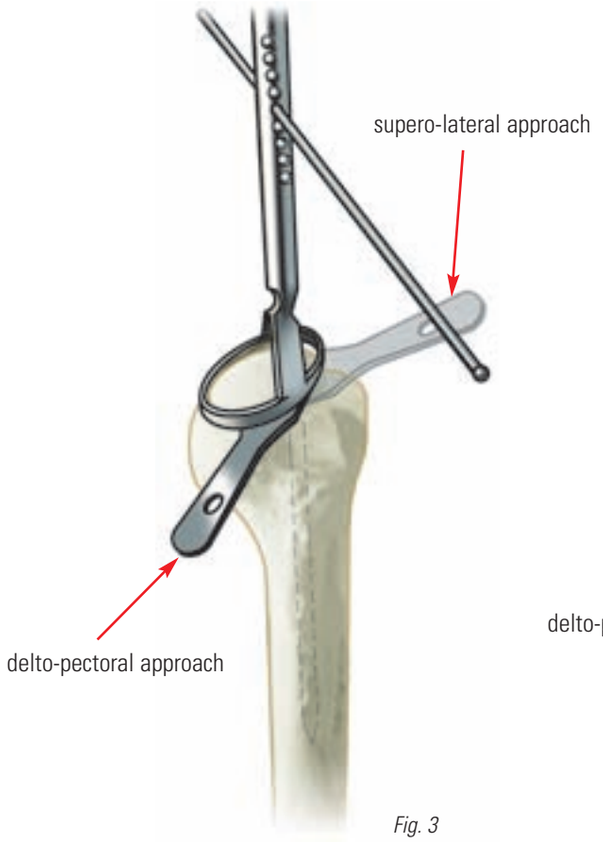


Fig. 3

- Once the retroversion has been determined, the head is then resected with an oscillating saw following the orientation of the cutting guide (*Fig. 3).*
- The cut is completed after removing the cutting guide assembly (*Fig. 4).*

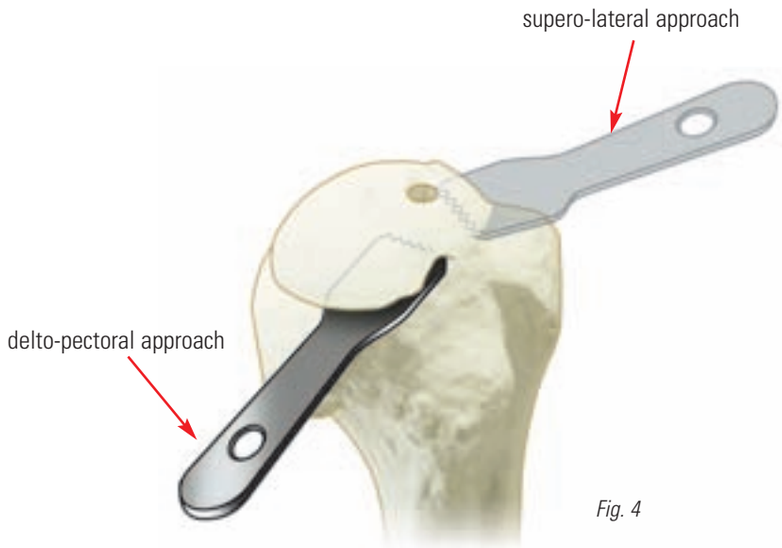


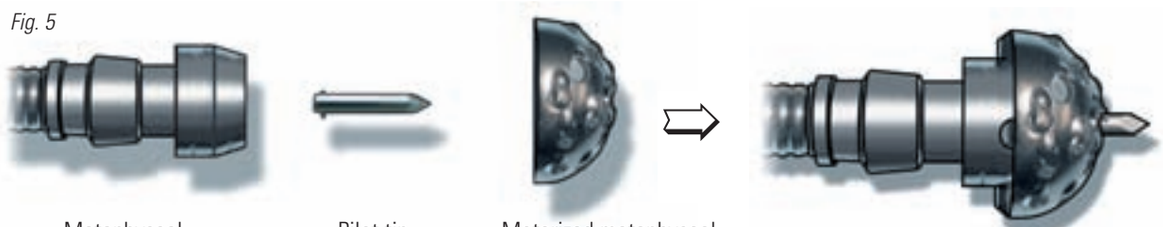
Fig. 4

METAPHYSEAL REAMING

- The appropriate size is determined pre-operatively and confirmed intra-operatively in accordance with the size of the humerus.
- The metaphyseal component is available in two diameters 36 mm and 42 mm.

- The motorized metaphyseal reamer of the selected size is assembled.
- The corresponding pilot tip is inserted into the reamer holder (*Fig. 5).*
- The assembly is then quick-connected to the metaphyseal reamer holder (*Fig. 6).*

Fig. 5



Metaphyseal reamer holder | Pilot tip | Motorized metaphyseal reamer

Fig. 6

- The selection of the metaphyseal diameter is essential, as it will determine the size of all subsequent instruments.

- Caution: The Aequalis-Reversed prosthesis is not designed to accommodate components of different sizes. All diameters must match.

- The pilot tip is positioned in the center of the humeral cut and the metaphyseal region is reamed (*Fig. 7).*

Fig. 7

- Reaming is complete when the depth of the reamer head is at the level of the cut surface (*Fig. 8).*

Fig. 8

- The metaphyseal reamer is then finalized with use of the manual rasp of the same diameter to shape the metaphysis to that of the implant (*Fig. 9).*

Fig. 9

- The rasp is inserted and turned until the depth of the rasp head is to that of the cut surface (*Fig. 10).*

Fig. 10

METAPHYSEAL AND DIAPHYSEAL REAMING

- The appropriate size metaphyseal reamer is then assembled on the T-handle and inserted up to the level of the height landmark on the shaft of the reamer (*Fig. 11 and Fig. 12).*

Fig. 11

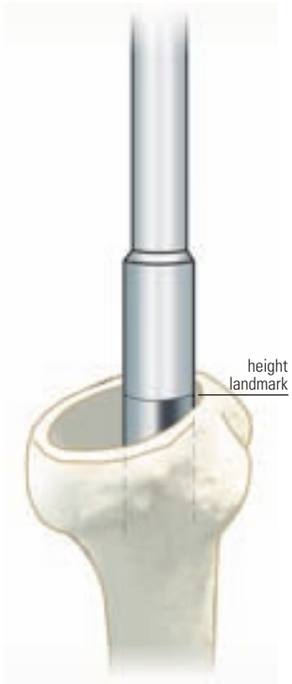


Fig. 12

- This reaming shapes the metaphysis to receive the conical portion of the metaphyseal cup.

- The diaphysis is manually reamed progressively using cylindrical reamers of increasing diameter 6.5 mm, 9 mm, 12 mm and 15 mm respectively. The reamer should be inserted up to the height landmark of the desired implant length: 100 mm, 150 mm, 180 mm and 210 mm respectively (*Fig. 13 and Fig. 14).*

- Reaming is complete when the reamer comes in contact with the diaphyseal cortical bone. Additional reaming should be avoided to prevent fracturing of the humerus.

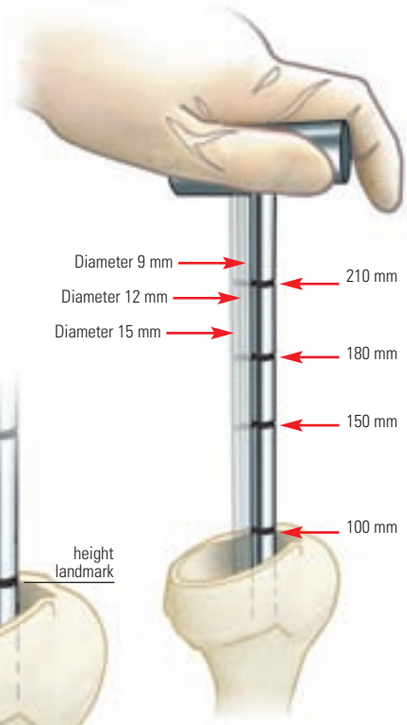


Fig. 13

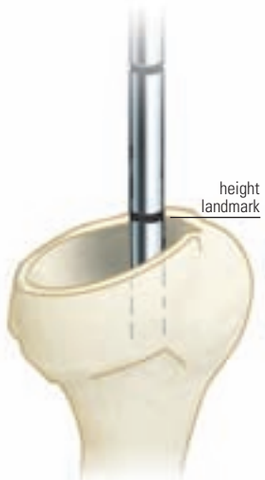


Fig. 14

- The last reamer used determines the final implant diameter and length.

POSITIONING OF THE HUMERAL TRIAL

- Assemble the selected diaphyseal and metaphyseal trial components (*Fig. 15).*

Fig. 15

The trial assembly is then attached to the humeral impactor/extractor handle and inserted into the reamed medullary canal (*Fig. 16).*

Fig. 16

- The retroversion rod is then inserted into the hole of the humeral impactor/extractor handle at the previously determined retroversion angle (0° to 20°) (*Fig. 17).*

Fig. 17

- Positioning of the trial assembly is then verified.

- The trial assembly is impacted if necessary to ensure that it seats to the proper depth within the metaphyseal part.

- Once seated, retroversion is checked and the impactor/extractor handle is removed from the trial stem with the 4.5 mm screwdriver (*Fig. 18).*

Fig. 18

- The cut protector is positioned into the trial metaphysis to protect it during glenoid preparation (*Fig. 19).*

Fig. 19

GLENOID PREPARATION

GLENOID EXPOSURE

- A partial capsulotomy and resection of the remaining glenoid labrum are performed to expose the glenoid.
- A Kolbel retractor is positioned at the inferior border of the glenoid. It is seated on the scapula pillar for the supero-lateral approach or at the posterior part of the glenoid on the delto-pectoral approach.
- Additional retractors are positioned anterior and posterior to the glenoid for the supero-lateral approach and superior and inferior for the delto-pectoral approach.
- Once the initial exposure is achieved, an additional capsulotomy is performed if necessary.
- Glenoid osteophytes are removed to further reveal the anatomical shape.

GLENOID CENTRAL HOLE DRILLING

- The central hole drill guide is assembled to the drill guide handle.
- The drill guide, that is the same diameter as the 36 mm glenoid sphere, is properly positioned by referencing the inferior and anterior glenoid edge.
- Mark the central hole with a bovie and remove the guide to confirm central hole orientation prior to drilling. When evaluating central hole location and angle of entry for eroded glenoids, take into account changed version from native glenoid version. Hole orientation and angle of entry may need to be adjusted to compensate for wear.
- According to the pre-operative CT scan or MRI, the central hole should be located inferiorly and slightly posteriorly from the anatomical center (*Fig. 20).*
- The central hole is then drilled with the 6 mm diameter drill bit (*Fig. 21).*

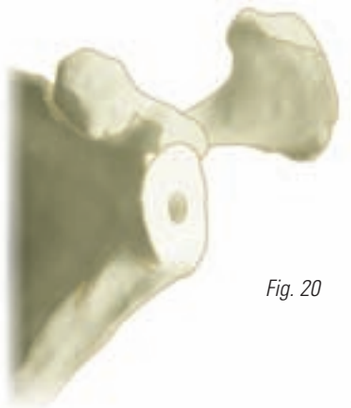


Fig. 20

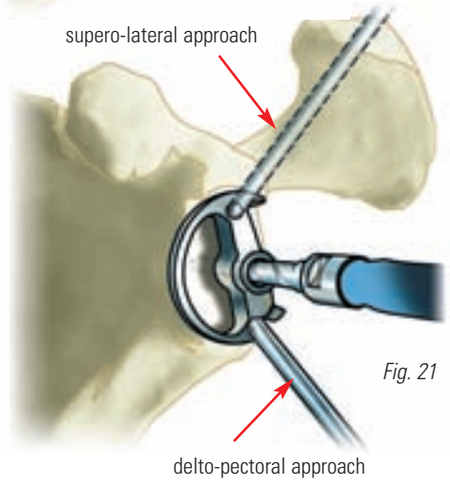


Fig. 21

GLENOID REAMING

- The glenoid surface is prepared to optimize contact with the implant baseplate by reaming and creating a peripheral groove for the glenoid sphere.
- Reaming is initiated by accurately placing the pilot tip into the glenoid central hole.
  It is recommended to start the reamer before contacting the glenoid surface.
- As with the humeral side, two different diameters of glenoid reamers are available (36 mm or 42 mm).
  Note: Both sides must match in size.
- If insertion of the reamer is difficult, remove or reposition retractors for greater exposure (*Fig. 22).*
- After reaming, the glenoid surface should be flat and smooth. There should be no irregular edges on the reamed surface that would prevent proper seating of the glenoid sphere to the baseplate.

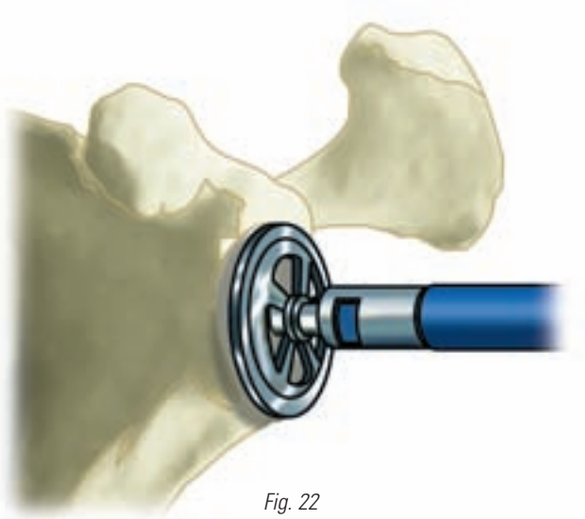


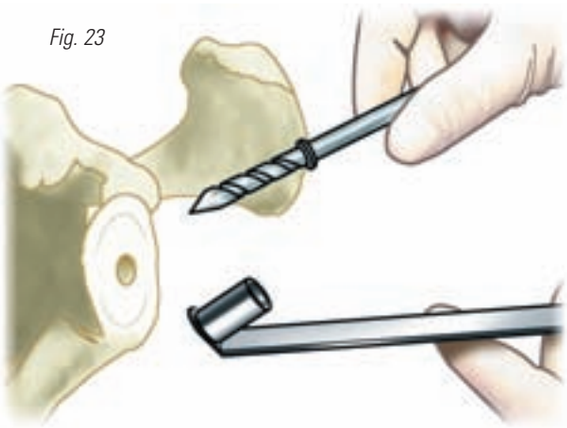
Fig. 22

- Preserve as much bone as possible during the procedure to support good primary fixation.

FINAL SIZING OF THE GLENOID CENTRAL HOLE

- The glenoid central hole must be enlarged to receive the central peg (8 mm in diameter) of the baseplate. The central hole is re-drilled to a final diameter of 7.9 mm by inserting the 7.9 mm drill bit through its drill guide perpendicular to the glenoid surface (*Fig. 23 and Fig. 24).*

Fig. 23



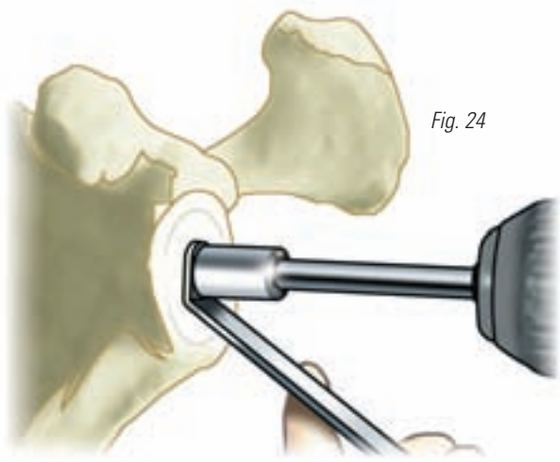


Fig. 24

POSITIONING OF THE GLENOID BASEPLATE

- The glenoid baseplate is attached to the baseplate impactor through its central hole using a screw in the impactor central shaft.

- Care should be taken to ensure that the two pegs on the impactor seat properly into their respective holes on the implant baseplate (*Fig. 25).*

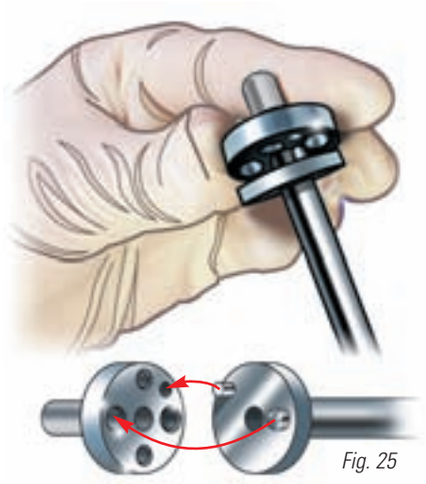


Fig. 25

- Note: There is no baseplate trial.

- The central peg of the glenoid baseplate is then impacted into the previously drilled 7.5 mm diameter hole (*Fig. 26).*

- Note: Care should be taken to correctly orient the superior inferior position of the impactor before impacting the baseplate.

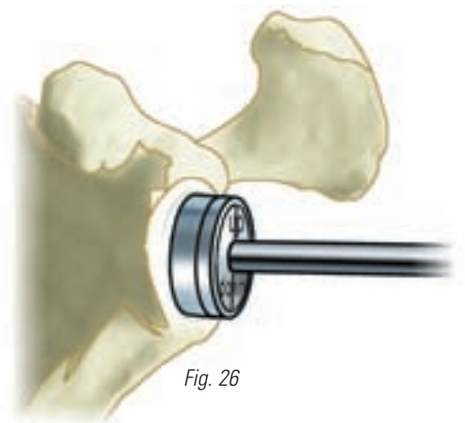


Fig. 26

- Once impacted, the baseplate should seat fully on the glenoid. If not, impact until fully seated.

- The baseplate impactor is then removed.

SCREW FIXATION OF THE GLENOID BASEPLATE

- The glenoid baseplate is fixed to the glenoid with four 4.5 mm diameter self-tapping screws (*Fig. 27).*

  There are two types:
  - 2 hemispherical head screws
  - 2 multidirectional locking head screws

Anterior & Posterior head screws

- The two anterior and posterior screws are self-tapping and are of a hemispherical head design. Each screw can be oriented in any direction within a 30° arc.

- To optimize fixation, it is recommended to achieve a trans-cortical fixation.

Inferior & Superior head screws

- The two inferior and superior screws are self-locking and can be oriented within a deflection range of:
  the inferior screw:
  - 30° inferiorly and +/- 15° in the transverse plane
  the superior screw:
  - 30° superiorly and +/- 15° in the transverse plane

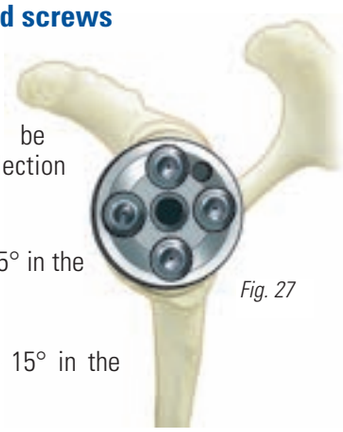


Fig. 27

- To optimize fixation, it is recommended to achieve:
  - Cortical fixation
  - Fixation in the cortical bone of the scapula pillar or coracoid process

BASEPLATE FIXATION - ANTERIOR AND POSTERIOR SCREWS

- The anterior and posterior screws are positioned first to optimize compression of the baseplate.
- The 3mm drill bit is placed through the A/P drill guide: this guide allows for a deflection of 15° in any axis in order to achieve good cortical fixation (*Fig. 28).*

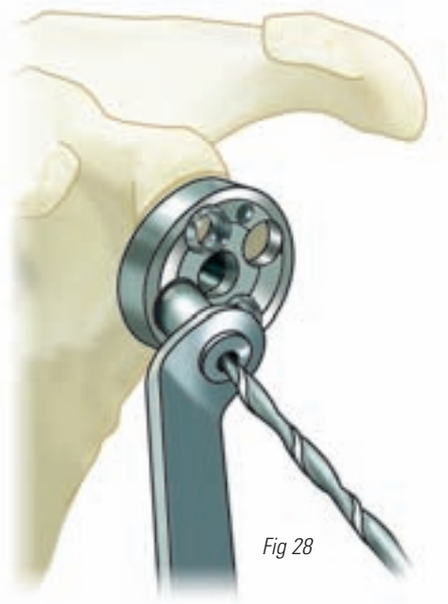


Fig 28

The anterior hole is drilled at a trajectory that is superior and towards the middle of the baseplate.

- The drill guide is removed and the screw length is measured with a depth gauge.
- The anterior screw is introduced and tightened within several turns of fully tight with the 4.5 mm screwdriver (*Fig. 29).*
- Note: To avoid the risk of any rocking motion, do not fully tighten the screw at this time.

Fig 29

- The posterior screw is placed next in the same manner as the anterior one.
- The posterior hole is drilled at a trajectory that is inferior and towards the middle of the baseplate. This orientation should allow for adequate cortical bone fixation.
- Alternate final tightening of the two screws until fully tightened (*Fig. 30).*

Fig 30

BASEPLATE FIXATION - INFERIOR AND SUPERIOR SCREWS

- Fixation of the glenoid baseplate continues next with implantation of the inferior and superior screws.
- The inferior screw is positioned into the pillar of the scapula.

- The scapular pillar is generally situated downwards in the vertical axis of the glenoid at an angle of approximately 20°.

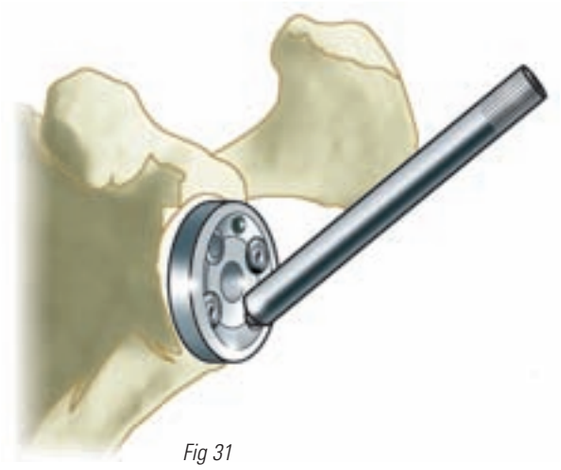


Fig 31

- The 3 mm drill guide is positioned into the inferior threaded hole of the baseplate (*Fig. 31).*

- The direction of the drill axis is chosen by free orientation of the drill guide.

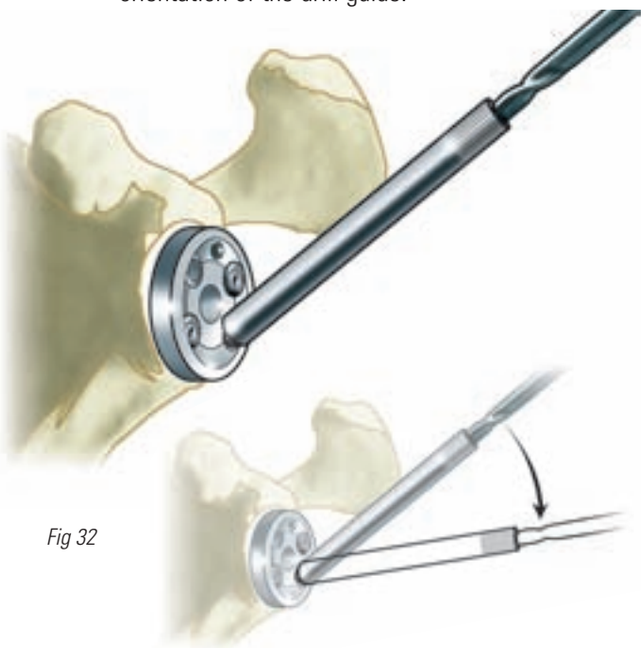


Fig 32

- The 3 mm drill bit is passed through the guide and the hole is drilled trans-cortically (*Fig. 32).*

- Note: In the event of poor screw fixation, the orientation of the drill guide should be changed and the hole drilled again into more sufficient bone stock.

- Remove the drill guide and determine the screw length with the depth gauge.

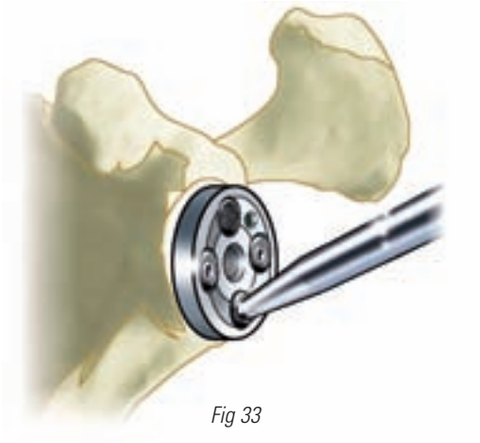


Fig 33

- The screw is introduced into the inferior hole and fully tightened with the 4.5 mm screwdriver (*Fig. 33).*

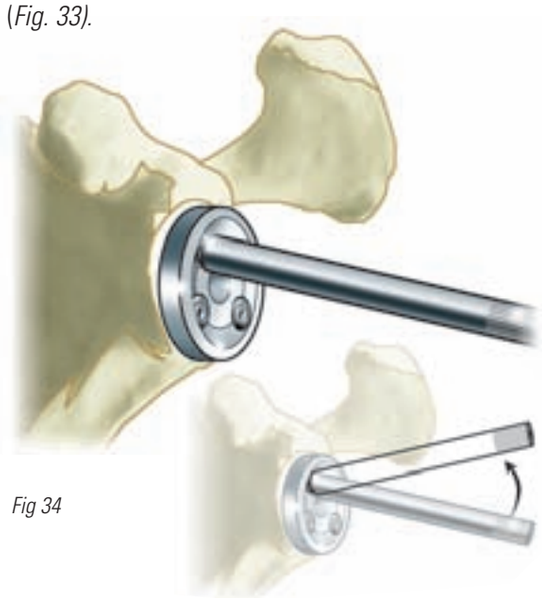


Fig 34

- Finally, the superior screw is placed next in the same manner as the the inferior screw.

- The superior screw is positioned into the base of the coracoid process (*Fig. 34).*

- The coracoid is generally situated superiorly in the vertical axis of the glenoid at an angle of approximately 20° and anteriorly in the transverse axis of the glenoid at an angle of approximately 10°.

- Note: In the event of poor screw fixation, the orientation of the drill guide should be changed and the hole drilled again into more sufficient bone stock.

ATTACHMENT AND POSITIONING OF THE FINAL GLENOID SPHERE

- The size of the glenoid sphere is identical to the metaphyseal size determined during humeral preparation. There are two diameters 36 mm and 42 mm.

- Note: If desired, a trial glenoid sphere of the same diameter as the metaphyseal cup can be screwed into the central hole of the baseplate.

- Insert the central screw through the glenoid sphere and into the central hole of the baseplate (*Fig. 35).*

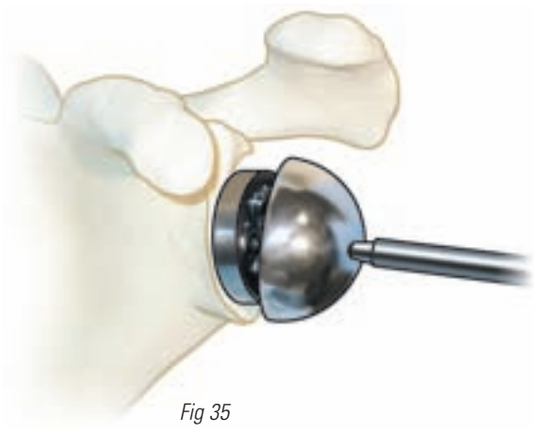


Fig 35

- The glenoid sphere is then impacted with the glenoid sphere impactor onto the glenoid baseplate to engage the taper lock (*Fig. 36).*

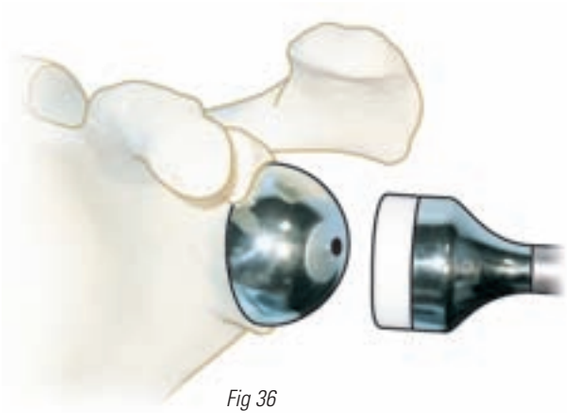


Fig 36

- The fixation of the assembly is visually checked to ensure that no soft tissue is present between the baseplate and the glenoid sphere.

- Once fully impacted, secure the assembly by tightening clockwise the glenoid sphere screw with the 3.5 mm diameter screwdriver (*Fig. 37).*

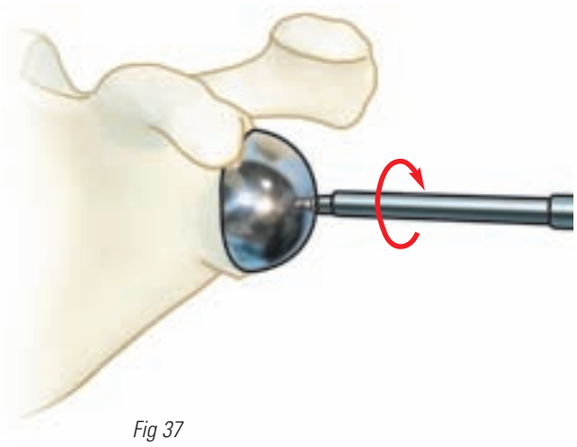


Fig 37

- In some cases it may be necessary to remove the humeral trial to avoid metallic contact that could damage the glenoid sphere.

SELECTION OF THE HUMERAL INSERT

- Remove the cut protector from the trial stem with the trial insert clamp.
- The trial insert of the desired thickness is inserted into the metaphyseal cup in preparation for the trial reduction.
- 3 thicknesses are available: 6 mm, 9 mm and 12 mm (*Fig. 38).*

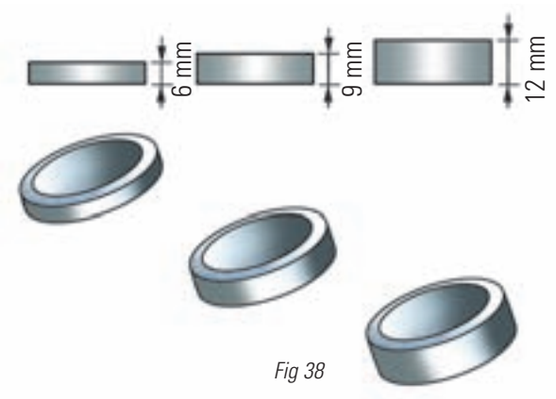


Fig 38

- The impactor handle and its spherical end are screwed together.
- The trial insert is then positioned and impacted (*Fig. 39).*

Fig 39

- In case of severe bone defects or inadequate deltoid tension, a 9 mm lateralized spacer can be added to the metaphysis. This will increase the combined lateralized thickness to either 15 mm, 18 mm or 21 mm respectively.
- The humeral trial component is then reduced to articulate with the glenoid sphere to check deltoid tension, stability and range of motion.
- If the deltoid tension is still not adequate with the thickest insert (12 mm), the 9 mm lateralized spacer is secured to the metaphysis. Trial reduction is again performed beginning with the thinnest insert (6 mm).
- If muscles are overly tensioned, additional resection of the metaphysis may be considered in order to reposition the component at a more distal level in the humerus.

ASSEMBLY OF THE AEQUALIS-REVERSED PROSTHESIS

ASSEMBLY OF THE FINAL HUMERAL IMPLANT

- Should a lateralized spacer be employed, it must first be assembled to the final metaphyseal implant with the impaction support and glenoid sphere impactor (*Fig. 40).*

- Note: If this option is chosen after implantation of the metaphysis, impact the spacer into the metaphyseal cup while supporting the patient's arm firmly.

- After impaction, the central screw is inserted and fully tightened with the 4.5 mm screwdriver (*Fig. 41).*

Fig 40

Fig 41

- A supplemental anti-rotation polyethylene plug within the threads of the metaphyseal stem prevents the components from possible dissociation (*Fig. 42).*

Fig 42

- The final metaphyseal component (assembled with a spacer if necessary) is screwed to the impactor (*Fig. 43).*

Fig 43

- The final implant stem is then secured to the metaphyseal cup implant with the 14 mm wrench (Fig. 44).

Fig 44

INSERTION OF THE FINAL IMPLANT

- The humeral canal is irrigated and dried.
- In case of cemented stem, a cement restrictor is then inserted. Next, the cement is injected into the medullary canal using a standard cementing technique.
- The final implant is inserted into the canal utilizing the extractor/impactor handle. The retroversion is verified by reinsertion of the retroversion rod into the shaft of the impactor/extractor (*Fig. 45).*

Fig 45

- We recommend, if a lateralized spacer is implanted, that after unscrewing the impactor/extractor, confirm that the central screw is still maximally tightened with the 4.5 mm screwdriver.
- Use the 4.5 mm screwdriver to disengage the impactor from the metaphysis.
- Note: If the trial humeral component is unstable, it is recommended to use a cement body and a cement humeral stem.
- If desired, deltoid tension can be checked again with a trial insert.
- The metaphyseal component is thoroughly cleaned and dried (*Fig. 46).*

Fig 46

- The selected polyethylene insert is then positioned by aligning the inserts orientation notch with the metaphyseal pin. Final fixation is achieved by impacting the insert into the cup with the spherical impactor (*Fig. 47).*

Fig 47

REDUCTION, TRIAL AND CLOSURE

Reduction

The prosthesis is then reduced and stability checked.

Peri-operative function

Pull the arm at the distal humerus away from the body after reduction to ensure that there is no pistoning effect. A complete separation of the humeral insert from the glenoid sphere while pulling indicates inadequate tensioning of the deltoid.

Abduction of the arm is performed to check that there is no impingement and that anterior elevation and abduction has been restored.

External rotation with the elbow at the side checks for mobility and risk of subluxation.

Internal rotation with the elbow at the side and in abduction (the forearm has to be parallel to the thorax) is performed.

Adduct the arm to check that there is no impingement between the scapula pillar and the humeral implant.

After reduction, the conjoined tendon should show sufficient muscular tension (similar to the deltoid).

Closure

In the supero-lateral approach, the deltoid is reattached to the acromion with a trans-osseous suture.

In the delto-pectoral approach, a full or partial reinsertion of the subscapularis is performed if possible.

Post-operative care

COMPLICATIONS

Post-operative stiffness :

In case of significant pre-operative stiffness, it may be difficult to regain post-operative mobility.
A surgical arthrolysis in conjunction with a capsulotomy may be required with the removal of soft tissue adhesions and removal of the tuberosities.
Postoperatively, the arm is usually immobilized in a shoulder abduction splint for 3 to 6 weeks (in 60 degrees abduction).
Passive elevation above the splint in the scapular plane is started immediately.

Prosthesis instability

The main causes are:

- Improper humeral cut
- Massive humeral bone deficiency

Such cases are the consequence of insufficient deltoid tension.

In case of early post-operative dislocation, a closed reduction under local anesthesia is performed. If the prosthesis is in good position, then immobilization for 6 weeks normally restores stability.

With recurrent instability, a revision is needed to check the humeral version and increase (if necessary) the humeral lateralization utilizing a thicker insert and/or lateralized spacer.

Scapula notch

Impingement between the scapula pillar and the humeral implant can lead to bone erosion of the scapula. This notch usually does not impact function or mobility but may compromise fixation. X-ray follow-ups are recommended.

Absence of active external rotation

In the absence of the Teres Minor and Infraspinatus due to cuff tear or fatty infiltration there may be loss of active external and internal rotation. At the time of surgery, a latissimus dorsi transfer alone or with pectoralis major transfer to the greater tuberosity may be considered.

REHABILITATION

Post-operative rehabilitation

The arm is placed in a brace with the elbow close to the body in neutral or internal rotation.
An abduction cushion can be used especially in cases of deltoid detachment or if the supero-lateral approach was performed.
Rehabilitation is performed with passive pendular motion exercices five times per day at 5 minutes per session.
Aquatic therapy can begin as soon as healing has occurred.

Arm motion to be avoided

Abduction/external rotation or abduction/internal rotation.
Note: active motion in the arm is restricted in daily activity as only elbow, wrist and finger motion is allowed.

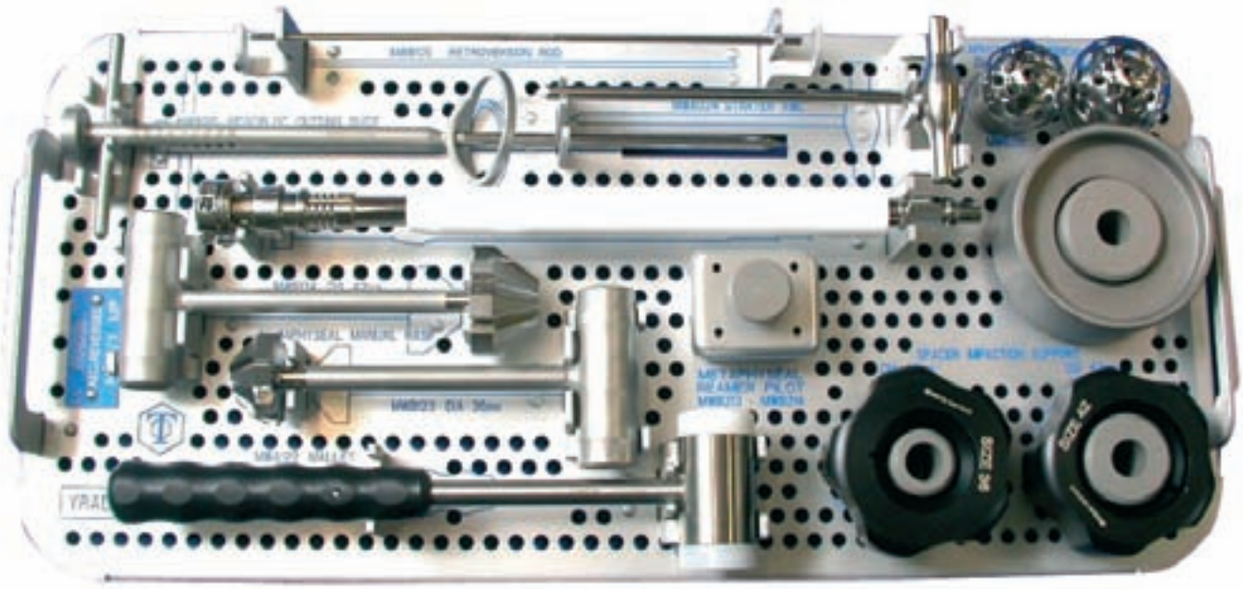
6 weeks post-op

Strengthening of the Deltoid muscle and external rotators at 6 weeks post-op can be initiated with isometric exercise against resistance.

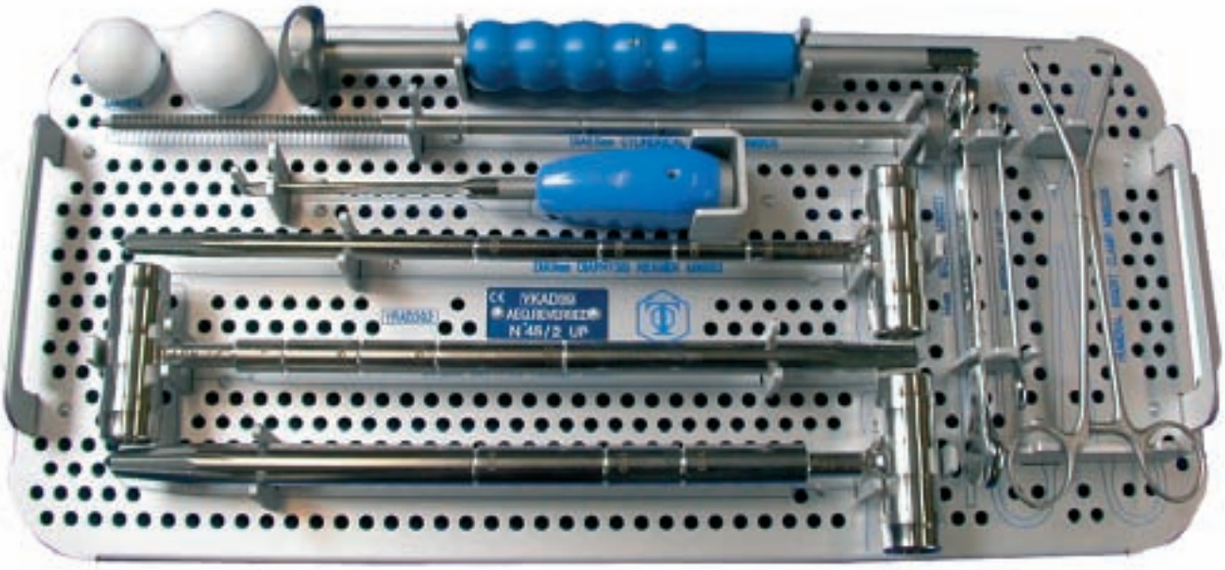
Strengthening of the external rotators with the elbow at the level of the arm can be initiated by isometric exercise against resistance.

Provided that deltoid attachment has not been disrupted, normal active elevation is generally rapidly recovered.

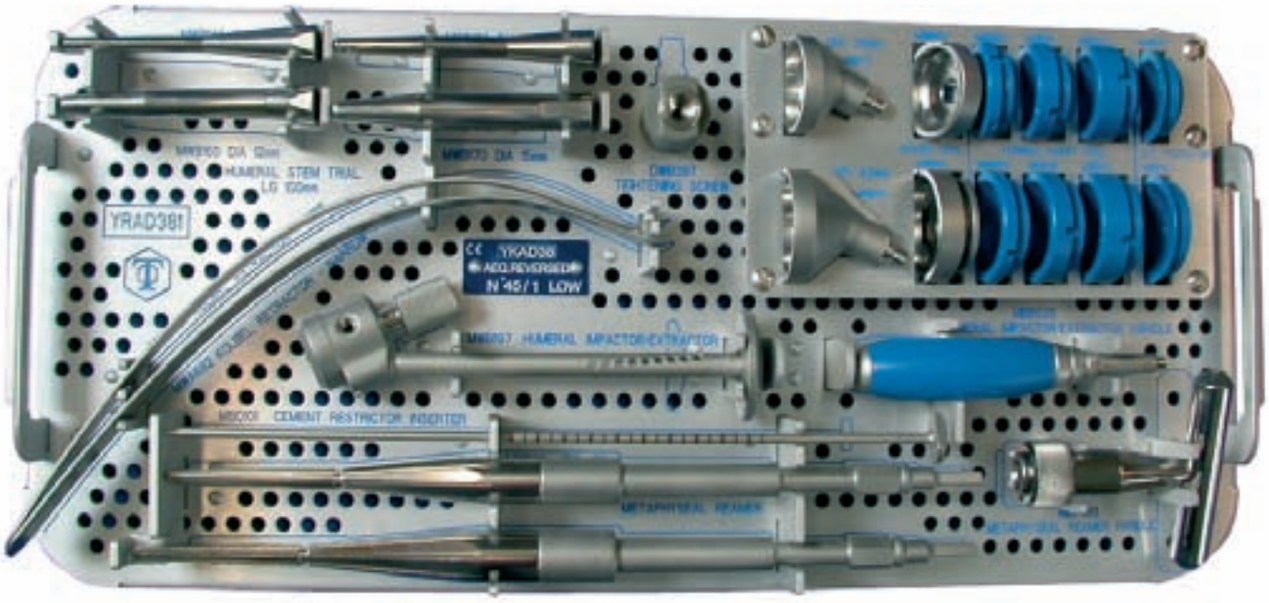
HUMERAL INSTRUMENTATION Ref. YKAD38/2



HUMERAL INSTRUMENTATION Ref. YKAD39/2 or YKAD59/2



HUMERAL INSTRUMENTATION Ref. YKAD38/1



HUMERAL INSTRUMENTATION Ref. YKAD38 and YKAD39 or YKAD59

Starter awl
Ref. MWA024

Monobloc cutting guide
Ref. MWB215

Retroversion rod
Ref. MWB105

Cylindrical broach, 6.5 mm
Ref. MWB106

Diaphyseal reamer
Ø 9 mm Ref. MWB113
Ø 12 mm Ref. MWB114
Ø 15 mm Ref. MWB115

Distal metaphyseal reamer
Ø 36 mm Ref. MWB118
Ø 42 mm Ref. MWB119

Metaphyseal reamer holder
Ref. MWB212

Metaphyseal spherical reamer
Ø 36 mm Ref. MWB210
Ø 42 mm Ref. MWB211

Metaphyseal reamer pilot
Ø 36 mm Ref. MWB213
Ø 42 mm Ref. MWB214

Metaphyseal reamer handle
Ref. MDF361

Metaphyseal manual rasp
Ø 36 mm Ref. MWB123
Ø 42 mm Ref. MWB124

Mallet
Ref. MWA122

Spacer impaction support base
Ref. MWB199

Spacer impaction support
Ø 36 mm Ref. MWB135
Ø 42 mm Ref. MWB200

Kolbel retractor
Large Ref. MWA681
Narrow Ref. MWA682

Osteotome
Ref. MWA101

Humeral trial

Ø L.	100 mm	150 mm*	180 mm*	210 mm*
6.5 mm	MWB140	MWB141	MWB142	MWB143
9 mm	MWB150	MWB151	MWB152	MWB153
12 mm	MWB160	MWB161	MWB162	MWB163
15 mm	MWB170	MWB171	MWB172	

* Upon request only

Metaphyseal trial
Ø 36 mm Ref. MWB175
Ø 42 mm Ref. MWB176

Insert trial

Ø H.	6 mm	9 mm	12 mm
36 mm	MWB180	MWB181	MWB182
42 mm	MWB185	MWB186	MWB187

Insert clamp
Ref. MWB206

Spacer trial, 9 mm
Ø 36 mm Ref. MWB190
Ø 42 mm Ref. MWB191

Tightening screw for spacer, 9 mm
Ref. DWB937

Cut protector
Ø 36 mm Ref. MWB192
Ø 42 mm Ref. MWB193

Humeral impactor/extractor
Ref. MWB197
(includes tightening screw Ref. MWB201)

Insert impactor
Ø 36 mm Ref. MWB134
Ø 42 mm Ref. MWB203

Insert impaction handle
Ref. MWB207

Adaptor impactor
Ref. MWB247

Wrench, 8 mm
Ref. MKL010

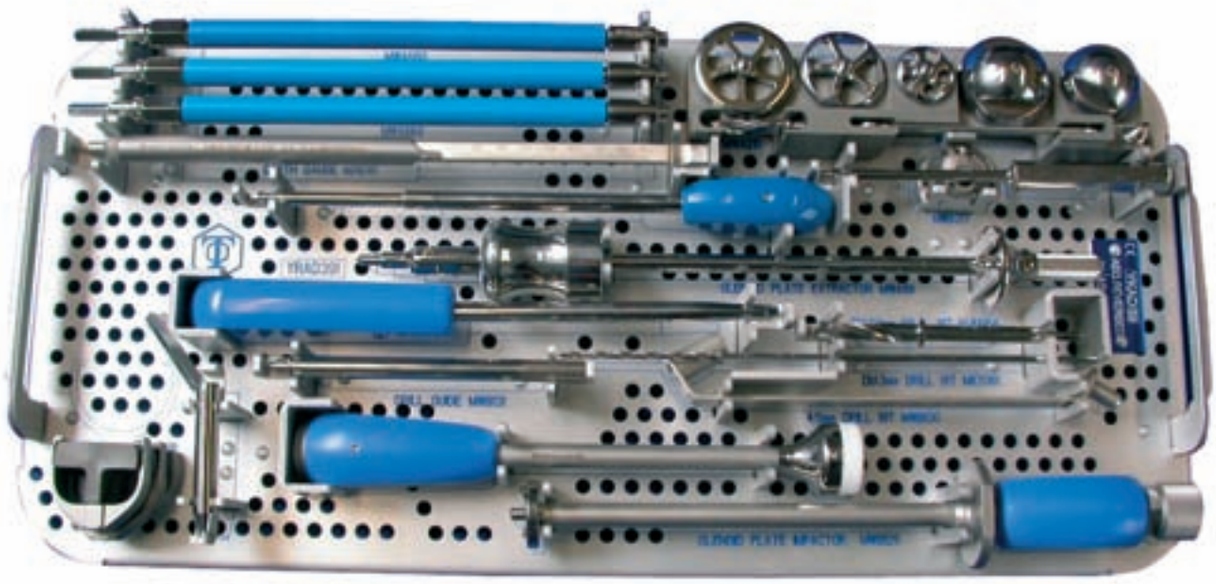
Wrench, 14 mm
Ref. MWB127

Union screw wrench
Ref. MWB251

Cement restrictor inserter
Ref. MBO101

Humeral impactor/extractor handle
Ref. MDE025

GLENOID INSTRUMENTATION Ref. YKAD39/2 or YKAD59/2



GLENOID INSTRUMENTATION Ref. YKAD39/2 or YKAD59/2

Drill bit, 7.9 mm
Ref. MJU054

Base plate impactor
Ref. MWB129

Drill bit, 3 mm
Ref. MKY061

Drill guide, 4.5 mm
Ref. MWB130

Drill guide for multidirectional and locking screw
Ref. MWB223

Drill guide handle
Ref. MWA210

Drill bit, 6 mm
Ref. MWA215

Glenoid central hole drill guide
Ref. MWB217

Wrench, 4 mm
Ref. MWA214

Depth gauge
Ref. MAI010

Glenoid sphere trial
Ø 36 mm Ref. MWB194
Ø 42 mm Ref. MWB195

Glenoid sphere impactor
Ref. MWB208

Hexagonal screwdriver, 3.5 mm
Ref. MWB133

Hexagonal screwdriver, 4.5 mm
Ref. MWA119

Drill bit and reamer holder
Ref. MWA660

Glenoid reamer
Ø 36 mm Ref. MWB128
Ø 42 mm Ref. MWB198

Glenoid reamer
Ref. MWA260 or MWA261

Glenoid plate extractor
Ref. MWA118

Glenoid plate extractor adaptor
Ref. MDE072

Glenoid sphere extractor
Ø 36 mm Ref. MWB216
Ø 42 mm Ref. MWB218

Aequalis-Reversed Hemi-Adaptor Technique

HOW AND WHEN TO USE IT

Summary

The Aequalis Reversed Hemi-Adaptor implants may be used to convert a Reversed humeral stem with metaphysis into a modified hemi-arthroplasty.

Rationale

If it is found that the glenoid bone stock is insufficient to support a solidly fixed baseplate with screws, due to either poor (osteopenic) quality bone or intraoperative glenoid fracture, a variety of bone grafting techniques can be employed.
By reconstructing the glenoid architecture, thus rebuilding bone stock, the surgeon may return months later to convert the hemi-adaptor back to a Reversed prosthesis.
To convert to a Reversed system, a simple exchange of humeral implants coupled with the implantation of the baseplate, screws, and glenoid sphere construct would be all that is needed.

If the surgeon chooses not to graft the glenoid and return later, then the procedure simply turns into a pain relief procedure with limited or no shoulder function improvement. The goal of restoring center of rotation and patient kinematics, as in a standard hemi-arthroplasty, is no longer important when employing the hemi-adaptor. The patient does not have an adequate rotator cuff
to move his/her arm before the procedure, so a change in shoulder landscape will not positively or negatively impact his/her ability to move the arm, only provide pain relief.

INDICATIONS

- When during the primary surgery the glenoid bone stock appears to be insufficient to bear the reversed glenoid components or when glenoid bone fracture occurs intraoperatively, the hemi-prosthesis adaptor and the union screw can be adapted to the humeral components in order to transform the Aequalis-Reversed prosthesis into a non reversed hemi-prosthesis.

- When in case of revision of an Aequalis-Reversed prosthesis, the glenoid bone stock appears to be insufficient to implant again a baseplate and a sphere of Aequalis-Reversed range, the use of the hemi-prosthesis adaptor and the union screw allows for the transformation of the Aequalis-Reversed prosthesis into a non reversed hemi-prosthesis in order to avoid the revision of the humeral component.

PREPARATION OF THE METAPHYSEAL COMPONENT

- If necessary, the PE is removed with an osteotome.

FIXING THE ADAPTOR/METAPHYSIS UNION SCREW

- The adaptor/metaphysis union screw is screwed into the threaded hole of the cup by hand and tightened fully with the union screw wrench.

Make sure to tighten the screw with the wrench with as much force as possible to avoid micromotion.

IMPLANTATION OF THE ADAPTOR

- The internal cup of the metaphyseal component is thoroughly cleaned and dry
- The adaptor is then positioned over the adaptor/metaphysis union screw into the metaphyseal component and impacted into the metaphysis with the adaptor impactor screwed to the insert impaction handle.
- After impaction, hand check the adaptor to ensure it is well fixed into the metaphysis. A small gap (less than 1 mm) will remain between the adaptor and metaphysis.

- Two sizes are available (diam 36 mm & 42 mm).
- The hemi-adaptor size must be the same size as the metaphyseal component.

IMPLANTATION OF THE HUMERAL HEAD

- A larger over-sized head is recommended to provide continuous and stable glenohumeral contact and fill of the joint. Once the appropriate head diameter and thickness is selected, the cone taper of the adaptor/metaphysis union screw is thoroughly dried and cleaned.
- The Aequalis head of the chosen diameter and offset is then impacted onto the cone taper of the union screw with the glenoid sphere impactor.

IMPLANTS

Cemented humeral stems

Ø \ L.	100 mm	150 mm*	180 mm*	210 mm*
6,5 mm	DWB940	DWB941	DWB942	DWB943
9 mm	DWB945	DWB946	DWB947	DWB948
12 mm	DWB950	DWB951	DWB952	DWB953
15 mm	DWB955	DWB956	DWB957	

* Upon request only

Cementless humeral stems (HA coating)

Ø \ L.	100 mm	150 mm*	180 mm*	210 mm*
6,5 mm	DWB966	DWB967	DWB968	DWB969
9 mm	DWB971	DWB972	DWB973	DWB974
12 mm	DWB976	DWB977	DWB978	DWB979
15 mm	DWB981	DWB982	DWB983	

* Upon request only

Cemented humeral metaphysis

Ø	Ref.
36 mm	DWB960
42 mm	DWB961

Cementless humeral metaphysis

(HA coating)

Ø	Ref.
36 mm	DWB986
42 mm	DWB987

Humeral spacer

Ø	Height	Ref.
36 mm	+ 9 mm	DWB931
42 mm	+ 9 mm	DWB932
includes tightening screw		
	+ 9 mm	DWB937

Humeral lateralized insert

Ø	Height	Ref.
36 mm	+ 6 mm	DWB993
36 mm	+ 9 mm	DWB994
36 mm	+ 12 mm	DWB995
42 mm	+ 6 mm	DWB996
42 mm	+ 9 mm	DWB997
42 mm	+ 12 mm	DWB998

Glenoid base plate bone screws

Hemispherical head screws Ø 4.5 mm		Multidirectional and locking head screws Ø 4.5 mm	
Length	Ref.	Length	Ref.
18 mm	VDV218	20 mm	DWD120
23 mm	VDV223	26 mm	DWD126
26 mm	VDV226	32 mm	DWD132
32 mm	VDV232	38 mm	DWD138
38 mm	VDV238	44 mm	DWD144
45 mm	VDV245	50 mm	DWD150

Glenoid sphere

Ø	Ref.
36 mm	DWB935
42 mm	DWB936

Glenoid press-fit base plate

DWD001

Adaptor/metaphysis union screw

Ref.
DWB990

Adaptor

Ø	Ref.
36 mm	DWB 991
42 mm	DWB 992

Aequalis Head

	Ref.
50 x 19 mm	DWB 251
52 x 23 mm	DWB 253

REF. UDRT 06.1

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