ARAMIS-T Trauma shoulder system

Trauma humeral prosthesis—Surgical technique

Table of contents

The prosthesis.....3

Generalities.....4

Surgical approaches.....5

Synopsis traumatic version.....6

Humeral preparation.....8

Assembly of the targeting instrument set 10

Heigth positionning of the stem.....11

Distal interlocking 12

References.....14

Note : Blue annotations are technical indications.

3S ORTHO is the manufacturer of this device. As such, and claiming no medical skills, it is not within its capabilities to recommend this surgical technique, nor any surgical technique, in this specific cases.
Each surgeon should determine the best surgical implantation for each patient and make the appropriate adjustments.
Read carefully the instruction of use.

The ARAMIS prosthesis for traumatology

A unique stem

Thank to its especially designed humeral stem, the ARAMIS prosthesis for traumatology can achieve effective treatment of 3 or 4 part fractures of the proximal end of the humerus. The ARAMIS shoulder prosthesis for traumatology can be declined in hemiarthroplasty or in anatomical or reverse prosthesis. The suture holes allows optimization of the reconstruction and consolidation of the tuberosities. The fixation can be with cement on the diaphyseal part or without cement (coated with an osteointegrable double-layer of titanium and hydroxyapatite), and locked or not with two locking screws.
Its instrumentation allows the choice between an anatomic or a reversed prosthesis to be decided intra operatively. The humeral stem can evolve from one to another.

The prosthesis ARAMIS for traumatology gathers all the benefits of the ARAMIS line :

Anatomical prosthesis

Adjustment of the humeral head with an eccentric cone or a centre cone allows an acute morphological restoration. The mismatch between the humeral head and the glenoid is optimized to ensure long-term fixation.

Reversed prosthesis

The CCD-angle (cervico-diaphyseal) of the reversed version, which was fixed at 155° by Pr. Paul Grammont, was decreased to 140°. This variation involves a benefic increase of the lever -arm of the deltoid, by a lateralization. Associated with the optimization of the glenosphere's position, it reduces significantly notch apparition.
The use of a long or a standard helical baseplate, allows an optimal fixation of the glenoid component into the scapulae. The plate fixation is completed by 2 to 4 cancellous thread screws. The screws have an osteointegrable coating of titanium and hydroxyapatite which gives a supplementary holding.

An ergonomic instrument set

The position of the implant can be precisely set by an ergonomic and compact instrumentalization (an only ancillary case). It allows both the delto-pectoral and superolateral approach.

Height adjustment

The stem anterior part presents graduations which allow a proper height adjustment.

Anatomical reconstruction

Metaphyseal holes and osteointegrable double coating allows a lasting anatomical reconstruction.

Generalities and surgical approaches

Indications

- 3 or 4 part displaced fractures, with or without dislocation of the head
- Failure of the osteosynthesis of a glenohumeral fracture
- Fracture of the humeral head on more than 40% of the articular surface
- Inveterate dislocation of the humeral head associated or not with a fracture of the upper end of the humerus
- Fracture of the upper end of the humerus associated with a rupture of the rotator cuff in the elderly
- Any other recent traumatism or sequela of a traumatism in the elderly or in a patient with osteoporotic bone

Pre-operative planning

- Use templates to define component size and positioning
- Use a contralateral shoulder imaging if needed

Fig. 1

Patient installation

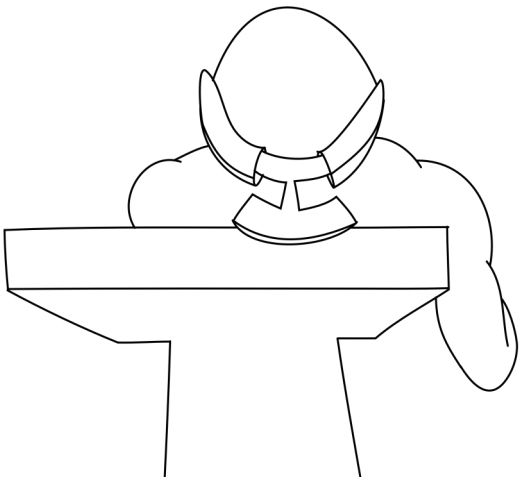


Fig. 2

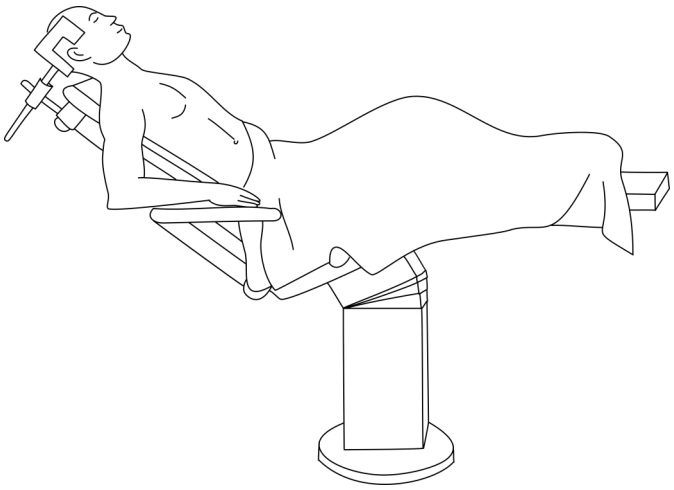


Fig. 3

The patient is sufficiently lateralized on the table :

- To release the posterior shoulder face
- And to put the arm retropulsion

Surgical approach

Deltopectoral approach

Please refer to the ARAMIS surgical technique (ref EAI TOEN V3-01-2018).
This surgical approach allows hemiarthroplasty or arthroplasty of a total anatomic or reversed shoulder prosthesis.

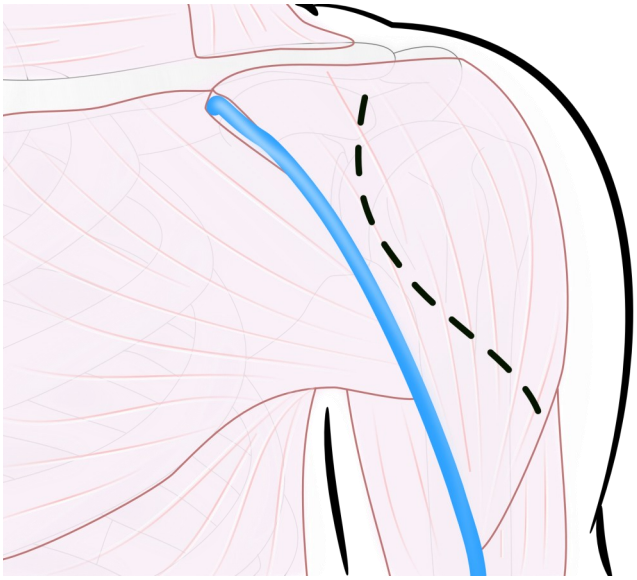


Fig. 4

Superolateral approach

Please refer to the ARAMIS surgical technique (ref EAI TOEN V3-02-2020).
This approach will be preferred for a reverse total shoulder prosthesis.

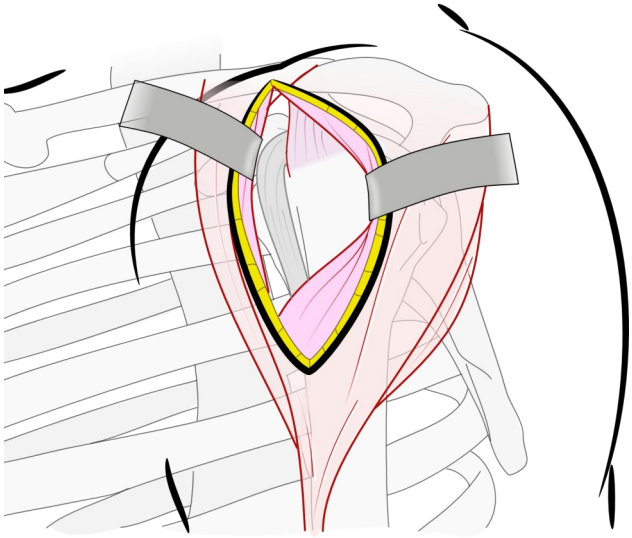


Fig. 5

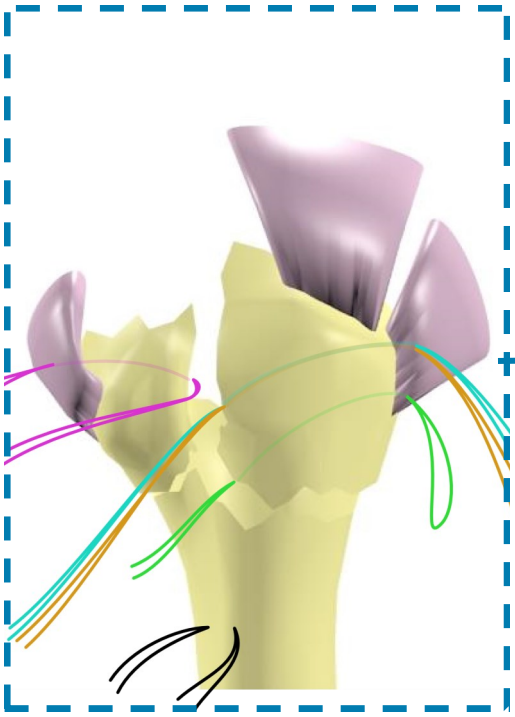
Exposure

In order to visualized the deep-structure, remove the haematoma.
The coracoacromial ligament provides a visual cue of the humeral length and must be preserved.
Set a *suture* on the bicipital tendon, and identify the two tuberosities (lesser tubercle or greater tuberosity). *Increase the separation between tuberosities throughout the rotator interval.* Extract the humeral head and measure it (either with a calliper or by measure comparison with the trial implant).

Fig. 6

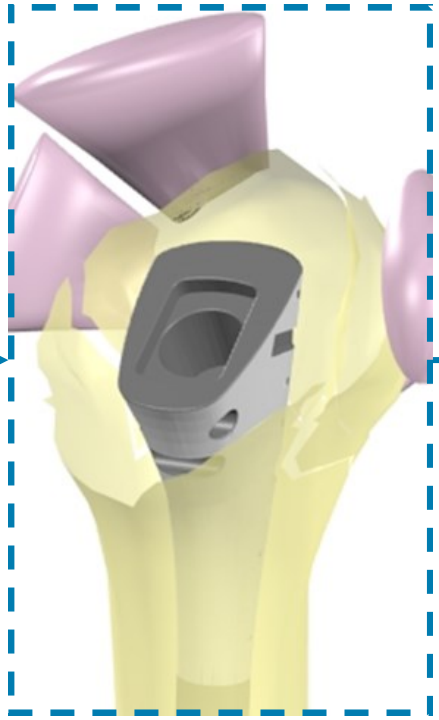
Synopsis traumatic version

HUMERAL PREPARATION



Tuberosities identification

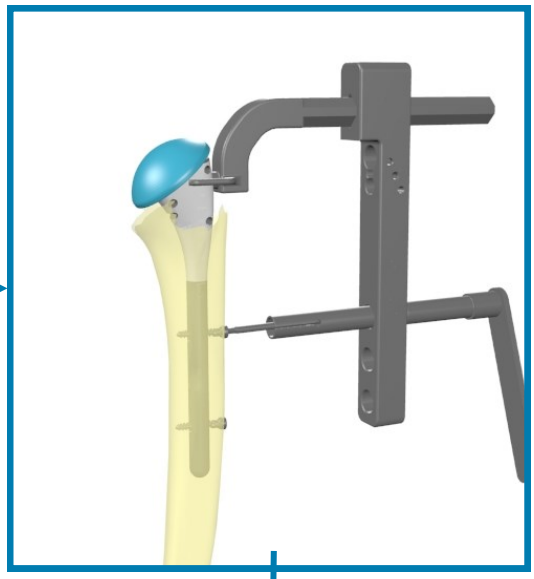
Diaphysis calibration



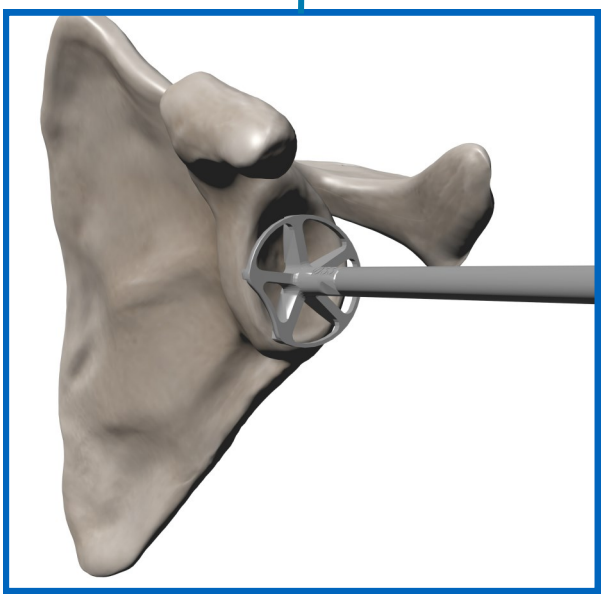
Implantation of the humeral stem

Synopsis traumatic version

HUMERAL PREPARATION (OPTIONAL)



Interlocking of the humeral stem



Glenoid preparation

GLENOID PREPARATION (please refer to ARAMIS surgical technique)

Humeral preparation

Tuberosities identification

- *Tuberosities are identified and mobilised through the bone-tendon junction with big diameter resorbable sutures (Around the greater tuberosity, at its superior end, through the periarticular muscle at its inferior end, through the teres minor and in the subscapularis tendon (lesser tuberosity)).*

- *Two holes are drilled with a small diameter drill, on the diaphysis part, on the anterolateral surface, approximately 1 cm bellow the bicipital groove. One or two suture loops can be attached to those holes and will later on allows the vertical mooring of tuberosities (shroud).*

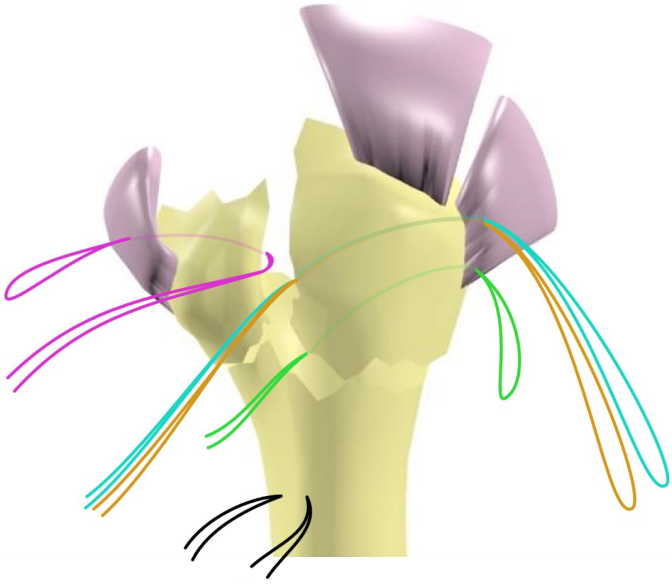


Fig. 7

- Calibration by increasing the diameter of the

Choice of the correct size of the

reamer (Fig. 2).

- The size of the last reamer defines the maximal size of the humeral stem.

Fig. 8

Setting

- The

type of fixation of the humeral stem must be decided during this step.
There are three possibilities:

1. *Freestanding humeral stem.*
2. Locking of the humeral stem with one or two fixation screws
3. Stabilisation of the stem with diaphyseal cement.

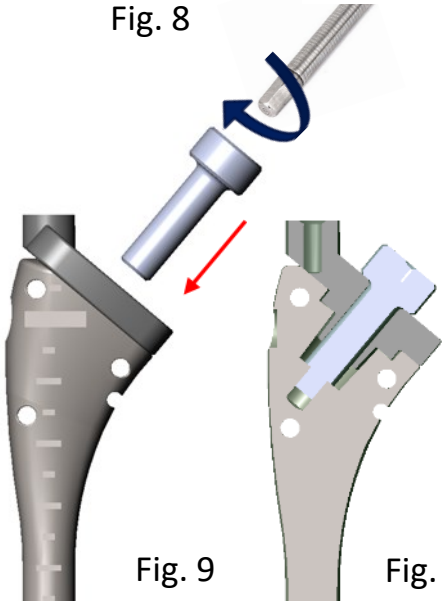


Fig. 9

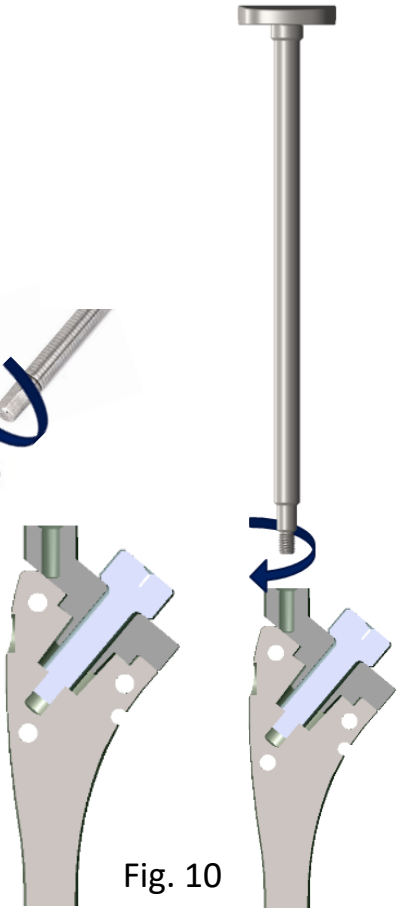


Fig. 10

Non-locked stem option (Self-stabilized or diaphyseal cemented stem)

- Position the stem on the stem connector holder as shonw in Fig. 9 and 10.
- For use with with cementing of the distal portion, position the obturator plugs in the locking holes to prevent cement from entering these locations.

Lower the stem into the humeral canal.

Adjust the retroversion.
A 20° retroversion is conventionally recommended.

Graduations (alternating large/small) are placed every 5 mm and serve as a guide when lowering the stem (Fig. 11).

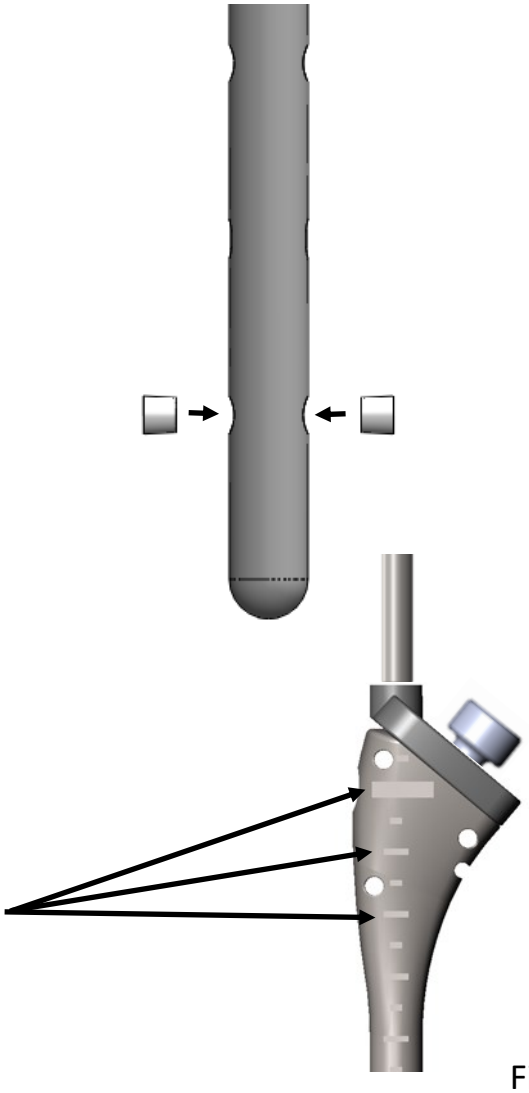


Fig. 11

Note :

After a cephalotuberosity fracture, the height level are often missing.

This is why it is very difficult to adjust the position of the stem. The position is critical and determines the functional result of the implant.
In case of total reversed prosthesis, the surgeon can compensate a low implantation with a thicker polyethylene insert. Nevertheless, a good height positioning promotes a good positioning and consolidation of tuberosities.

- In some cases, the humeral calcar is preserved and can be used as an insertion benchmark. (Fig. 6).

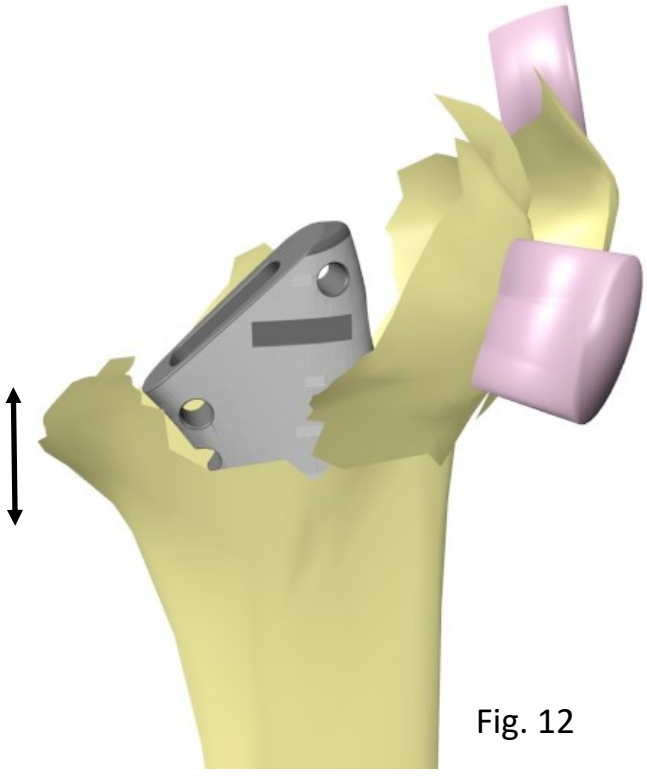


Fig. 12

Assembly of the targeting instrument set

Option locked stem

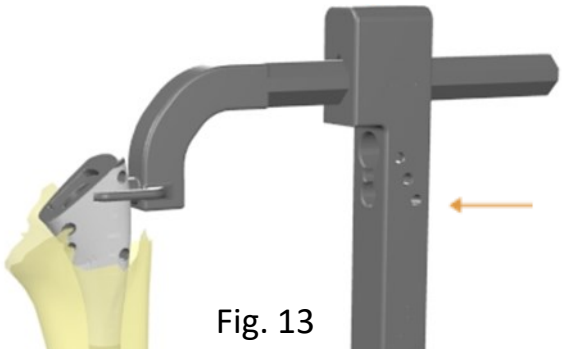


Fig. 13

Same targeting system

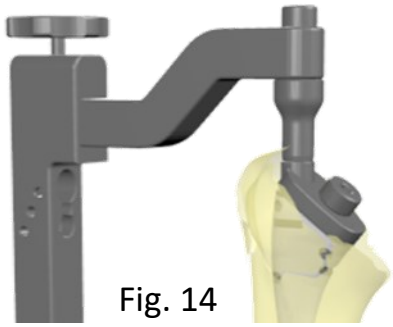


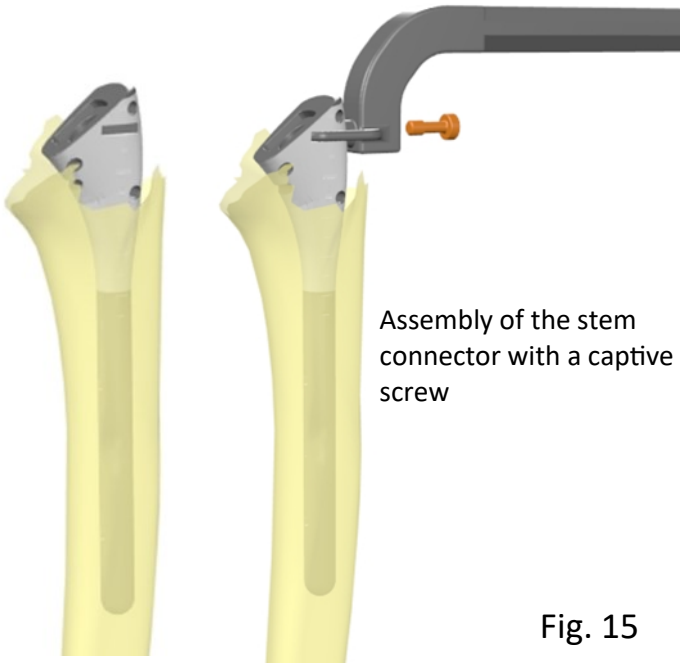
Fig. 14

Classical assembly on the external part

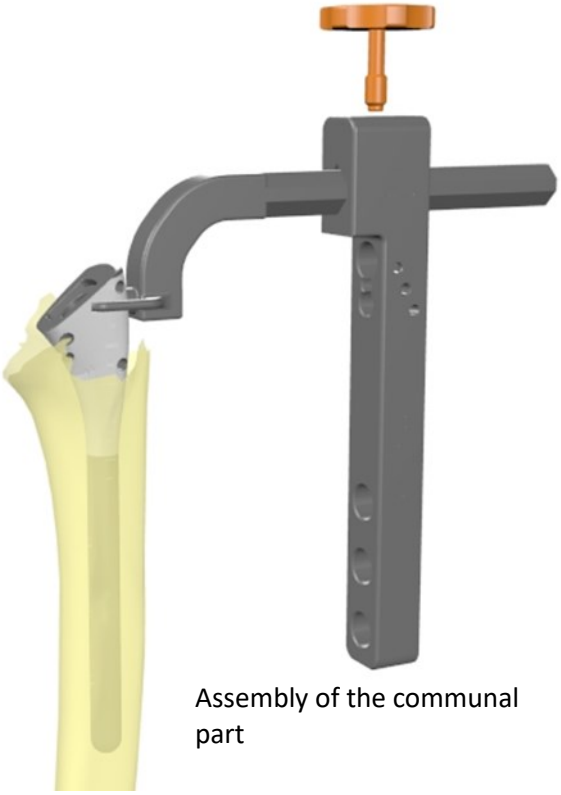
Upper assembly on the cone

There are two possibilities for the instrument set used to lock the stem:

Targeting system assembled on the external part of the stem or on the upper-end (coupling on the conical junction) if the external metaphyseal part of the humerus prevents the classical assembly.



Assembly of the stem connector with a captive screw



Assembly of the communal part

Fig. 15

Height positioning of the stem

Introduce the humeral stem into the humerus with the selected connector (Fig. 10).

Setting of the humeral height

- *Depending on the remaining calcar, the internal end of the humeral diaphysis can be used to adjust the humeral height, making sure to respect the pre-operative plan*. The criterion of Murachovski can also be used (Fig. 16 and 17).

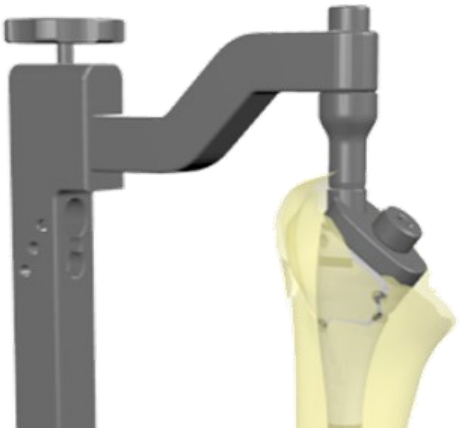


Fig. 16

Use of the criterion of Murachovski

- According to Murachovski, the summit of the humeral head is approximately at 56mm of the upper end of the tendon of the pectoralis major muscle. (Fig. 12). This value is relatively constant ((+/- 4mm). It corresponds to a distance « upper end of the stem-insertion of the tendon » of 45 mm (Fig. 11).

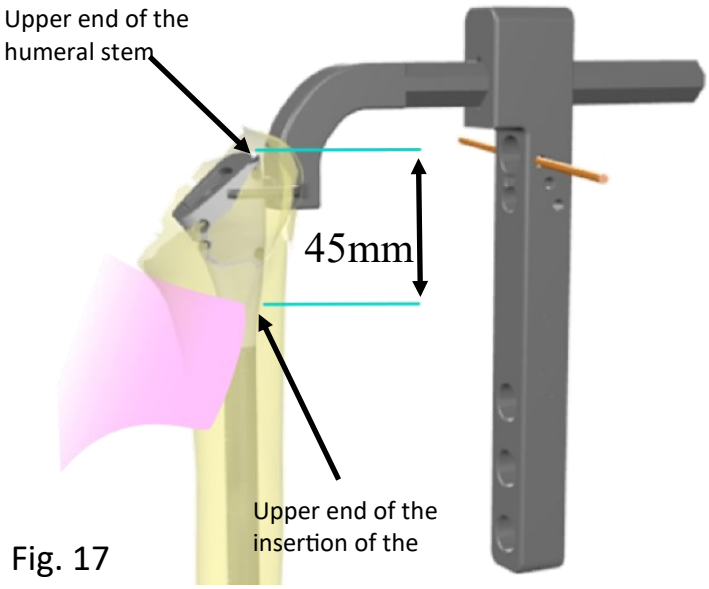


Fig. 17

- Once the stem is implanted, its adaptation to the humerus and its stability in rotation and in compression must be verified.

- If the stem is not stable enough, it must be cemented or locked on the distal part. In each case, the metaphyseal coated part will remain untouched to allow contact between the fragment and the hydroxyapatite osteointegrable coating.

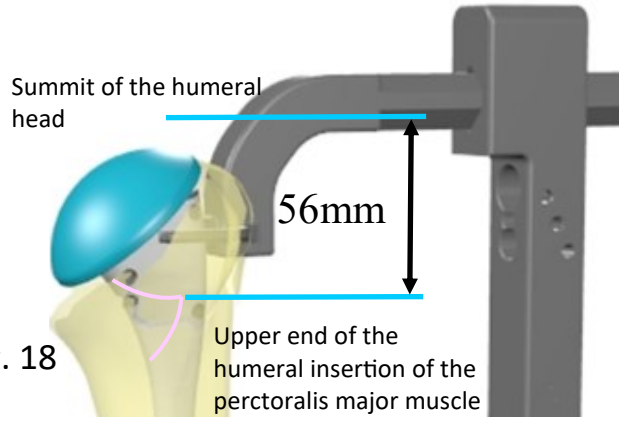


Fig. 18

Distal interlocking

Assembly of the K-wire

- Set the correct retroversion using the orientation rod. (Fig. 13)
- Using the guard tube and the K-wire guide in the intermediate hole, drill the Ø 2.5 mm K-wire through the second cortex.
- Leave the stabilizing pin in place.

Note :

At this stage, it is possible to make a scopic control in order to visualize the height position of the stem. The stabilization pin is used to temporarily fix the stem before locking it.

- The two types of assembly can both be used *(on the external part or on the upper cone) (Fig.19)*

If the locking instrumentation with external mounting is used, a test humeral head may be used to validate the height adjustment (Fig. 21). By reducing the joint thus stabilized by the temporary pin, it will be possible to visualize the correct restitution of the omo-humeral handlebars.

Omo-humeral arch

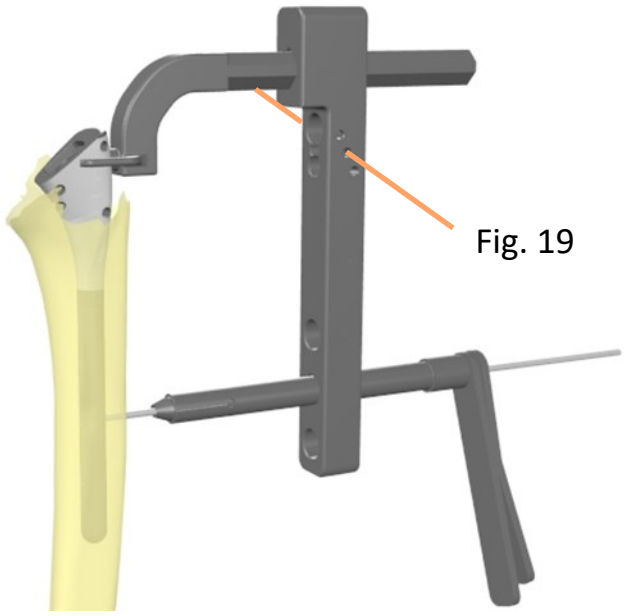
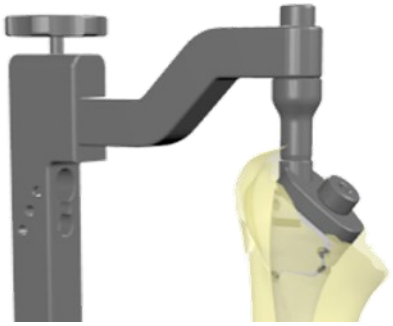


Fig. 19

Classical assembly on the external part



Upper assembly on the cone

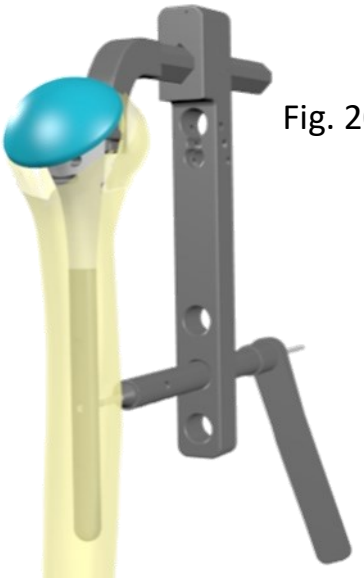


Fig. 20

Distal Interlocking

Note :

Once the height positioning has been validated, start the locking of the stem . It is advisable to start with the most proximal screw.

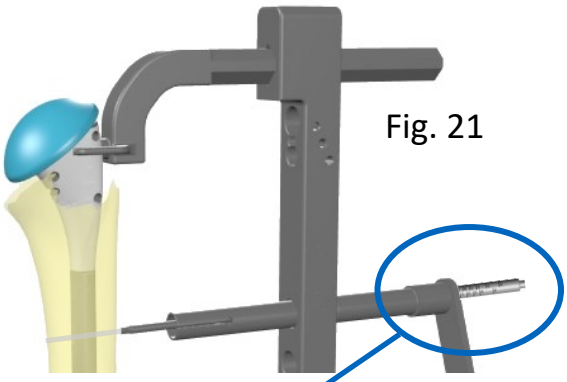
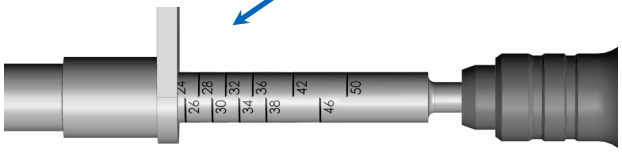


Fig. 21

Drilling and measuring the proximal screw

Proximal aim



- Using the soft tissue protection tube in the upper hole, drill with the 3.2 mm diameter of the graduated drill (Fig. 21).

- Graduated wick method :
- On contact with the 2nd cortex read the size of the screw on the graduation noting the first visible at the exit of the barrel.
- Choose a wire of this length + 4 mm. Drill the 2nd cortex. Leave the drill bit in place.

Screw length = L+4mm

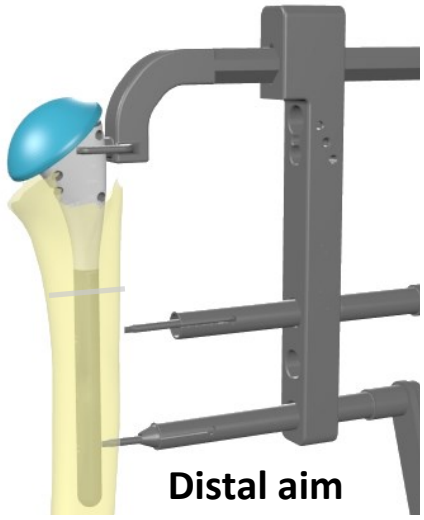


Fig. 22

Distal aim

Drilling and insertion of the 2nd screw

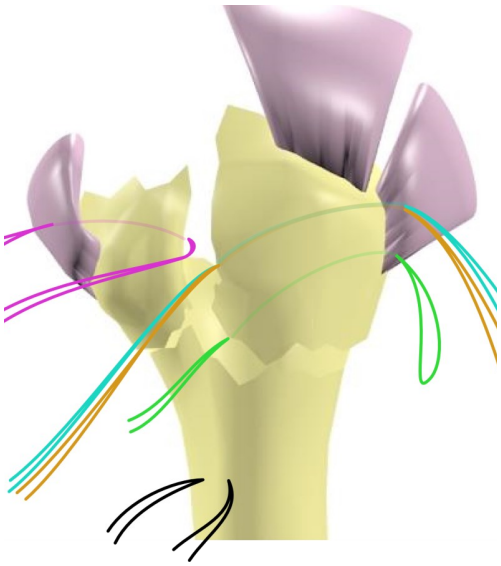
Proceed in the same way for the 2nd locking screw. Take the screw of the appropriate length and insert it using the screwdriver through the soft tissue protector.

Once the distal screw is in place, remove the drill from the proximal hole and insert the proximal screw.

Distal interlocking

At this stage refer to the general anatomical or reverse surgical technique of ARAMIS.

Once the definitive implants are in place, the synthesis of the tuberosities should be performed using the previously placed wires.



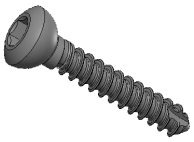
Instruments set references

ETA M032	Graduated drill Ø3.2
ETA AD01	Stem adaptor for nail ancillary
ETA RC00	Nail connector
ETA VF06	Attachment screw
ETA RT00	Stem connector
ETA VC04	M4 short screw
ETA SV00	Communal part
ETA T035	Screwdriver hexa. 3.5mm
ETA T001	Guard tube
ETA GB20	K-wire guide
ETA G0M0	Round guide
ETA IMPT	Stem impactor
ETA VS06	Captive M6 screw Locking screw M6
ETA T002	Screw guide

Products list reference

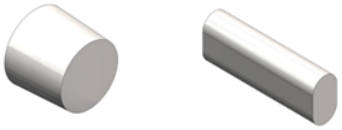
Cementless stem

ETI T008	Trauma humeral stem uncemented Ø8.5mm
ETI T010	Trauma humeral stem uncemented Ø10mm
ETI T011	Trauma humeral stem uncemented Ø11.5mm



Screw

ETI V420	Screw Ø4 L20mm
ETI V422	Screw Ø4 L22mm
ETI V424	Screw Ø4 L24mm
ETI V426	Screw Ø4 L26mm
ETI V428	Screw Ø4 L28mm
ETI V430	Screw Ø4 L30mm
ETI V432	Screw Ø4 L32mm
ETI V434	Screw Ø4 L34mm
ETI V436	Screw Ø4 L36mm
ETI V438	Screw Ø4 L38mm
ETI V442	Screw Ø4 L42mm
ETI V446	Screw Ø4 L46mm
ETI V450	Screw Ø4 L50mm



Plug

ETI PLUG	ETI PL01 - Obturator plug - conical ETI PL02 - Obturator plug - oblong

Les passerelles
24 avenue Joannès Masset
69009 LYON
Tél. : 04.37.24.07.45
Fax. : 04.72.74.90.41
www.3sortho.com
contact@3sortho.com

CE
1984

Class III Medical device // Indication : arthroplasty of the glenohumeral articulation

Read the surgical technique before use

Read carefully the instruction of use

Réf : ETI TOEN V1-10-2020