Rotator Cuff Repair with artificial reinforcement

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Principles

The principle is to secure the suture or reinsertion of a torn rotator cuff by a bridge made of a specially designed artificial tendon.

One side is fixed on the proximal muscle and the other side into the upper extremity of the humerus.

This bridge is resistant enough to protect the healing of the repair, to immediately lower and recenter the humeral head and to allow early mobilization.

The prognosis depends on the condition of the muscle still functional or degenerative. If the supra spinatus is totaly degenerated, one cannot reasonably expect a full recovery. But, in that case the artificial tendon which has shown a good fibroblastic invasion, is acting like a prosthesis to recenter the joint and re-establish good mechanical conditions for the deltoid.

Implants and fixations

The tendon has two parts :

- The flat proximal " muscular " portion, rectangular and porous.
- The distal " tendinous " portion, made of two cylindrical cords ended with leaders threads.

Two sizes are available :

- The **LARS CR 25** (ref L410205), which is made of 40 fibers : resistance 1 800 N.
- The **LARS CR 30** (ref L410305), which is made of 48 fibers : resistance 2 100 N.

The bony fixation is assured by titanium interference screws.

Surgical technique

The patient is sitting around 45°.
The arm is free to allow abduction - adduction.

Acute cases and small to moderate tears

The approach can be antero lateral or different according to the surgeon's preference.

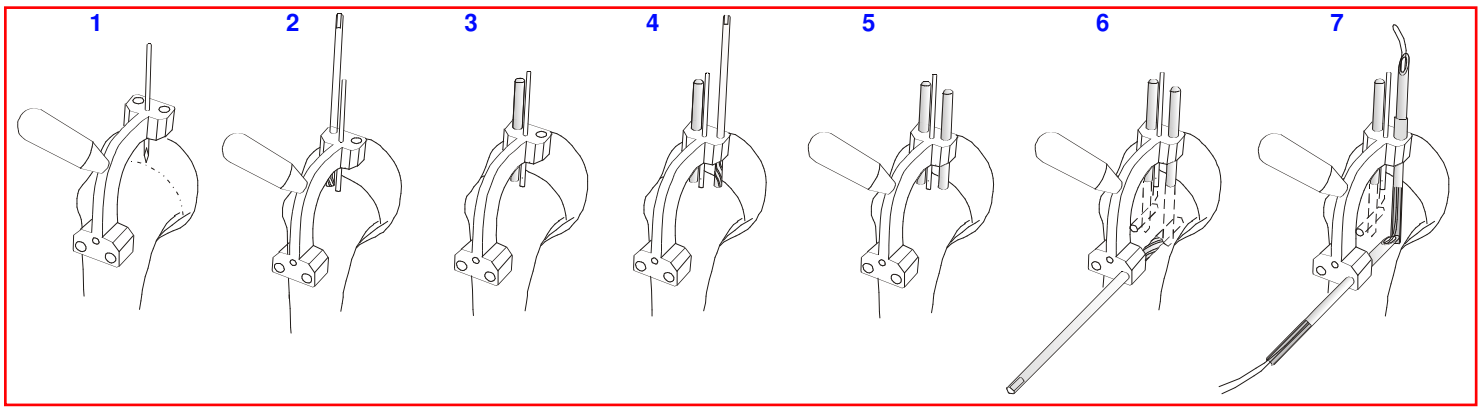
After acromioplasty, mobilization of the muscle's proximal part and freshening up of the margins of the rupture, the tear is sutured or reinserted into a bony groove according to classical procedure.

The rectangular part of the ligament, largely covers the lesion like a "patch" and is sutured all around its borders by thin but resistant, preferably non resorbable threads. Few stiches are also placed in the middle part of the patch.

The suture must be strong enough to mobilize and advance lateraly the proximal part with tension.

Distal fixation : there are two types.

- **Type 1 - using the LARS guide** according to the following drawings.



1 - Positioning of instrument and stabilisation with a K-wire.
2 - Drilling of first tunnel.
3 - Removing the drill bit. Setting up the guide.
4 - Drilling of second tunnel.
5 - Setting up the second guide.
6 - Drilling two tunnels in the bottom part.
7 - Passing wire loops through the two tunnels using wire loop passing canula.

Wire loops are passed through the passing tubes and after removal of the guide, the two "legs" of the synthetic tendon are pulled out of the tunnels . The tension is adjusted, with the arm momentarily in abduction if necessary, until it recenters the humeral head with no tension on the suture of the tear when the shoulder is placed in adduction .
The fixation is made with the canulated interference srews, driven into the lower tunnels by a K-wire.

- **Type 2.**

In some cases, the bone is too soft and fragile, specially if the required tension to recenter the head is important.

In that cases, it is preferable to drill the tunnels a bit lower where the cortical bone is harder. The extremity of the tendon's "legs" are cut, then pushed into the tunnels while the shoulder is in abduction.

The final tensioning is adjusted with 2 criterias : recenter the head and allow adduction.

Fixation with interference screws is performed. Beside a better bone density, the advantage of this type of distal fixation is that it increases the arm level of the "bridge".

Biomechanical studies have shown that the necessary force to elevate the arm in abduction is diminished by approximatelly 25 % compared to fixation type 1.

Post-op. care

- No immobilization in abduction is necessary.
- Passive motion starts at 3rd to 5th day.
- Assisted active mobilization starts at middle of second week.
- Full active abduction is generally obtained at 5 to 6 weeks.

- **Note : Old chronic cases and major tears**

In these cases, it is important for a better view and repair to have a larger approach .

It is therefor recommanded to have a postero lateral approach along the posterior edge of the acromion, following the spine of the spatula.

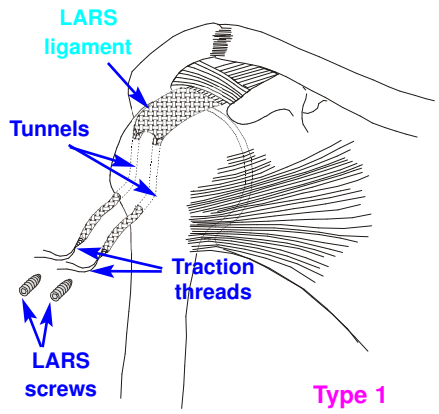
The posterior fibers of the deltoid are detached. An osteotomy of the spine is performed according to Grammont technique. The saw blade must be parallel to the sub-acromial surface. The acromion can be retracted forward, pivoting about the acromio-coracoid ligament which has to be ressected. The view is large and allows the dissection of the supra-spinatus and carefull repair and suture of the patch.

In extensive tears 2 synthetic patches may be used.

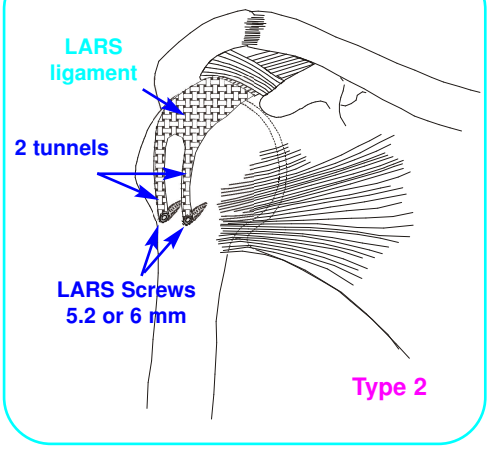
For these cases, a " type 2 " fixation is strongly recommanded.

The osteotomy is then refixed with 3 screws (diam 3 or 3.5 mm *) after lateral and anterior translation of the acromion.

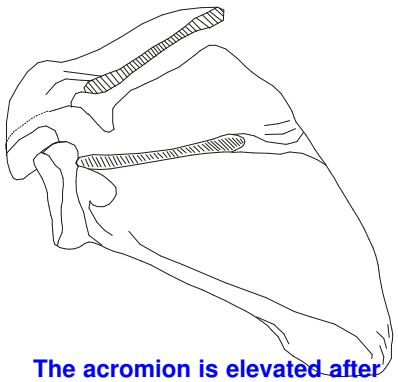
* Note : These screws are not included in LARS range.

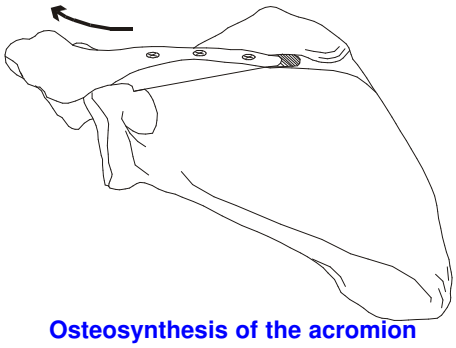


Type 1



Type 2


The acromion is elevated after osteotomy and gives a large view.


Osteosynthesis of the acromion after antero lateral translation.

LARS

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in compliance with the requirements
of the international standard
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