Deltoid flap for irreparable rotator cuff tear: indications, technique and results

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Introduction

Initially described by Takagishi (1) the deltoid flap has been widely used since the modification of the original technique by two French surgeons Apoil and Augereau (2).

The original Japanese technique consisted of taking the anterior and lateral part of the deltoid muscle while the French team described the elevation of only the anterior acromial part of the muscle. This lessens the morbidity of the sample and allows an easier closure of the donor site.

Even today the irreparable cuff tear in young patients remains a problem and subject to discussions. The choice goes from a simple arthroscopic debridement without repair, a full transposition of the tendinomuscular structure, a tendon transfer such as latissimus dorsi, a prosthetic tendon (3).

The deltoid flap is a local flap elevated using the same incision than a classic direct suture technique. This allows a late peroperative decision.

The authors had previously reported a good pain relief obtained but the final strength in this preliminary report was low and some patients with an intact preoperative active elevation had lost some mobility (4).

A clinical and radiological evaluation seemed to be accurate with a long-term follow-up (5).

Indications and contraindications

The deltoid flap should be considered as an alternative solution in front of a big irreparable rotator cuff tear using the conventional techniques of suturing. It should be reserved to patients in good health, less than 65 years with
irretractable pain after medical treatment and rehabilitation attempts for more than 6 months.

However, our recurrent and long-term review of patients has shown that the deltoid flap must not be used in cases of normal preoperative anterior active elevation (see below). Moreover, the patient must be warned not to expect a good final strength as it can be less than half of the normal side. This can be a problem in heavy workers who are not yet retired. Many studies have shown that a preoperative big loss of strength will not be corrected by the flap, and this precludes a return to heavy work in more than half of the cases.

Some results have shown that the deltoid flap is not a good indication in anterior tears involving the subscapularis tendon. Of course the deltoid muscle must be functional and paralysis of the axillary nerve is a contraindication.

Preoperative planning

The preoperative planning includes the complete clinical evaluation of the active and passive motion, and the elements of the Constant score such as quantified pain, strength, and activities of daily leaving.

It needs also a good imaging:
- The classical four normal X-rays in AP view (rotation 0°, lateral and medial rotation, and Lamy sagittal radiograph). We advise also to do a good measurement of the subacromial space with a double oblique view.
- MRI, arthro-MRI, or arthroscan are the good way of appreciation of the soft tissues lesions: number of tendons involved, degree of retraction, and quality of the muscles.

Surgical technique

The patient is placed in a beach chair position. The approach is superior with two variations:
- A superior and anterior approach, from the acromio-clavicular joint following the anterior edge of the anterior acromial part of the deltoid muscle. A fatty line is often seen between the clavicular and the acromial part of the deltoid muscle which makes the dissection of the future anterior edge of the flap easier (Fig. 1).
- The classic superior approach, following the bony anterior edge of the acromion. We advise to make the incision half a centimeter on the bone, in order to detach a periosteal flap in continuity with the acromio-coracoid ligament (6) (Fig. 2). This reinforces the future posterior edge of the deltoid flap. The splitting of the muscle starts at the anterolateral corner of the acromion for 3-4 cm long. A small trick is useful to avoid any risk for