

# Bibliographic review of postoperative redislocation in Latarjet and Eden Hybinette surgeries in epileptic patients with anterior shoulder instability

## Abstract

Anterior shoulder instability associated with significant glenoid bone loss is an important pathology in patients suffering from epilepsy. There are different surgical options for these patients with variable outcomes regarding recurrence of instability. The objective of this bibliographic review is to examine the available literature on postoperative redislocation using the Eden-Hybinette and Latarjet techniques in these patients. A search for the terminology was performed in PubMed. Between the two surgical techniques, higher recurrence rates are reported in Latarjet, which may be associated with conjoined tendon avulsions in the bone graft during seizures. More complications (osteoarthritis, bone graft fractures, and surgical re-intervention) also occurred in Latarjet versus Eden Hybinette. Possibly, the iliac crest graft surgical approach may be more beneficial for the treatment of recurrent anterior shoulder instability in epileptic patients. Future research is necessary in this topic to establish whether the Eden Hybinette technique is the best therapeutic choice for these patients.

**Level of evidence:** Level V, bibliographic review

**Keywords:** anterior shoulder instability, anterior glenohumeral dislocation, epilepsy, bone graft procedure, Eden Hybinette, latarjet, redislocation

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## Introduction

The glenohumeral joint has a wide range of motion, making it very susceptible to dislocations.<sup>1,2</sup> Shoulder instability is defined as the inability of its soft tissues and bone structures of providing satisfactory restrictions to keep the humeral head centered on the glenoid.<sup>3,4</sup> In the United States, the incidence rate of shoulder dislocations varies between 23.9 and 26.9 per 100,000 person-years.<sup>5</sup> One of the causes of recurrent anterior shoulder dislocation is epilepsy, due to muscle contractures during seizures.<sup>6</sup> The incidence of shoulder dislocation during a seizure is approximately 0.6%, although this can be underestimated.<sup>7</sup> In these patients, recurrent instability occurs shortly after the first dislocation.<sup>8</sup> The etiology of this recurrence could be associated with significant bone loss of the glenoid process since seizures predispose this damage through repetitive high-contact trauma between the two bones.<sup>9,10</sup>

Therapeutic options for anterior glenohumeral instability with glenoid bone loss in these patients vary, using soft tissue surgeries to bone augmentation strategies such as the Latarjet and Eden-Hybinette technique.<sup>11</sup> The postoperative recurrence rate in the epileptic population is higher than in the non-epileptic population (69% vs. 10%),<sup>12</sup> which has been associated with poor adherence to anticonvulsant therapy and bone loss in the joint.<sup>13</sup> Regarding the type of surgical technique used, there are few studies in this regard that compare post-surgical results, recurrence of dislocations and complications. As a hypothesis between the two procedures using bone grafts, greater recurrence episodes are proposed in Latarjet on Eden-Hybinette due to the transfer of the conjoined tendon inserted in the bone graft in Latarjet, which could cause an avulsion due to muscle contracture during the seizures. Therefore, the objective of this bibliographic review is to examine the available literature on postoperative redislocation using the Eden-Hybinette and Latarjet

techniques, performed in epileptic patients with recurrent anterior shoulder instability associated with glenoid bone deficiency.

## Surgical techniques

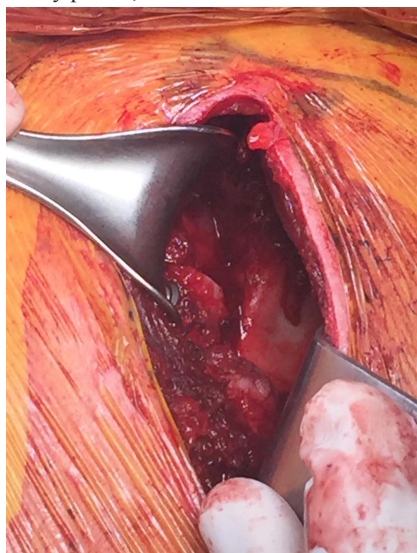
**Latarjet technique:** With the patient in a beach chair position, a 5 to 7 cm incision is made from the coracoid to the upper part of the axillary fold. Dissection is performed until visualization of the coracoid. The coracoclavicular ligaments, the coracoacromial ligament and insertion of the pectoralis minor tendon are identified. The coracoacromial ligament and the pectoralis minor tendon are cut from their coracoid's origin. A medial to lateral osteotomy of the coracoid is performed with a 90° oscillating saw, in an area approximately 22 to 25 mm from the tip to its base (Figure 1a), preserving the blood supply to the graft and taking care not to injure the coracoclavicular ligaments.



**Figure 1a** Intraoperative photograph of coracoid process after osteotomy.

A shoulder arthrotomy is performed exposing the glenoid region with the defect, which is prepared for the placement of the bone graft. For glenoid exposure, the subscapularis muscle is identified, and a longitudinal incision of its fibers is made, developing a plane between the muscle and the anterior glenohumeral capsule. An L-shaped capsulotomy is performed, marking its superomedial corner with a high-resistance suture to facilitate subsequent capsulorrhaphy. The remaining anteroinferior glenoid labrum is resected, and it is proceeded to ream the glenoid anterior bone region, to leave a bloody surface to receive the bone graft.

The graft is placed in the glenoid anterior articular region, increasing the contact surface. Two Kirschner nails can be placed as provisional fixation of the graft; at this time, the articular surface is reviewed and later a final fixation is made with two cancellous screws, partial thread, and washers for good compression (Figure 1b). The screws should be used perpendicular to the longitudinal axis of the graft and parallel to the glenoid surface. Subsequently, the position of the graft and its stability are verified again. Capsular repair is performed, and the subscapularis incision is repaired. The wound is irrigated, closed by planes, and covered with sterile dressings.<sup>14</sup>

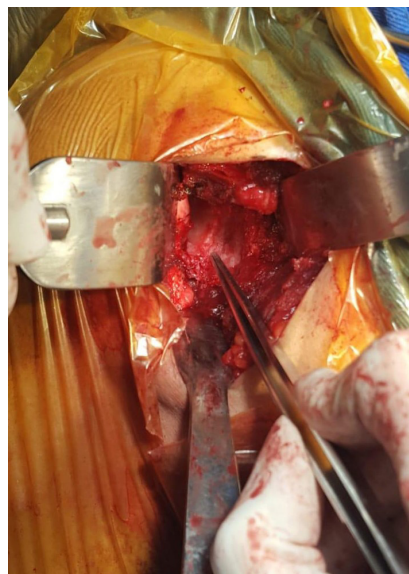


**Figure 1b** Intraoperative photograph of the fixation of coracoid graft on the glenoid.

**Eden Hybinette technique:** In the first phase, with the patient supine, a 5 cm oblique incision is made, 2 cm lateral to the anterior superior iliac spine, protecting the lateral femoral cutaneous nerve. It is dissected in planes and the iliac crest is exposed with retractors. An oscillating saw and osteotome are used to extract the tricortical wedge from the iliac crest of the size that coincides with the glenoid bone defect, generally 3 cm x 2 cm x 5cm. A new defect is covered with bone wax and closed with a myofasciocutaneous flap, verifying distant perfusion. The graft is kept sterile until it is placed.

In the second phase, with the patient in a beach chair position, a deltopectoral approach is performed with an incision from the coracoid process to the anterior axillary fold. It is dissected in planes, affecting the fibers of the subscapularis muscle, or performing a tenotomy until reaching the articular capsule. The humeral neck capsule is released, and an inverted L-shaped capsulotomy is performed. It is dissected subperiostally and the anterior glenoid and its bone defect are exposed with retractors (Figure 2a). After this, the previously obtained iliac crest graft is inserted and fixed with 2 or 3 cortical screws with washers (Figure 2b). Adequate stability of the graft is verified.

Capsulotomy, ligamentorrhaphy, and reinsertion of the subscapularis tendon or suture of its muscle fibers are performed. The wound is washed, closed by planes, and covered with sterile dressings.<sup>15</sup>



**Figure 2a** Intraoperative photograph of the anterior glenoid region with severe bone stock loss.



**Figure 2b** Intraoperative photograph of iliac crest bone graft in glenoid region.

## Methodology

A review of the literature was carried out through PubMed. For the bibliographic search on coracoid transfer, the following terms were used: [(Latarjet complications) AND (epilepsy OR epileptic patients)], finding 3 related articles, of which 2 were selected for discussion, 1 was discarded due to induced seizures secondary to tramadol abuse. Likewise, to search about iliac crest graft surgery, the subsequent strategies were used: [(Eden Hybinette OR bone-buttress complications) AND (epilepsy OR epileptic patients)], finding 2 studies, 1 was chosen for discussion, and the other one was discarded for being duplicate of initial search. Additionally, the following search was performed: [(Latarjet complications) AND (seizure)], where 5 related articles were found, 3 had already been selected, 1 was discarded because it excluded patients with seizures and 1 was not selected by title and content. Another search was: [(Eden Hybinette

OR bone-buttress complications) AND (seizure)], finding 2 articles, 1 was repeated within the articles to be reviewed and 1 was discarded by language and content. No date or language filters were used. The selected articles were analyzed in detail to review complications, mainly episodes of postoperative redislocation, associated with Eden-Hybinette and Latarjet surgeries in epileptic patients with recurrent anterior shoulder instability associated with glenoid bone stock deficit.

## Literature review

Complete management of recurrent anterior shoulder instability in patients with epilepsy should be based on adequate seizure control, evaluation of bone loss, and the specific procedure to treat the injury.<sup>11</sup> The recommended initial indication for shoulder dislocation is conservative management with a reduction in the emergency department or under sedation; however, given the recurrence, they are considered candidates for surgical repair.<sup>16,17</sup> It is relevant to select the longest surgical strategy as well as the lowest recurrence rate of dislocation and complications in these patients, due to the difficulty of controlling their seizure rate. Various surgical techniques have been reported for this type of joint instability in epileptics; however, few studies have compared the effectiveness of bone augmentation surgeries: Latarjet and Eden-Hybinette.<sup>11,18</sup>

In the study carried out by Raiss et al.<sup>19</sup> in 2012, the results of Latarjet surgery in 12 epileptic patients with recurrent anterior dislocation of the shoulder (14 shoulders) with a mean age of 31 years were presented. An average follow-up of 8.3 years was performed. There were 7 complications in 7 shoulders (50%), with recurrence of dislocations in 6 patients (43%); all of these associated with a seizure. The average age of recurrence of instability was 24.3 years (20 to 32) versus 35.6 (25 to 55) in patients without recurrences; however, with a  $p=0.072$ , not statistically significant. This may be related to lifestyles and poor adherence of anticonvulsant drugs in younger patients. The approximate time between surgery and the episode of redislocation was 26 months (14 to 48). One of these dislocations occurred in combination with a coracoid fracture. The remaining complication was a fracture of the coracoid tip discovered radiographically at 6 months, with no apparent additional trauma. In these two patients with associated fracture, rupture or displacement of the previously fixed osteosynthesis material was evident. Due to this high recurrent dislocation rate in patients with epilepsy, the authors concluded that the Latarjet procedure should only be performed in a selected group of patients in whom seizures are under adequate control.

Of the patients with postoperative recurrences, 5 were taken to revision surgeries under the Eden Hybinette technique. New dislocations, after surgeries using iliac crest bone grafting, occurred in 2 patients (2 shoulders) at 3 and 4 postoperative years, respectively. Given this recurrence, bone support procedures were again performed, and their shoulders remained stable 3.5 and 13 years after the revision. On the other hand, in the postoperative follow-up of the Latarjet, changes in osteoarthritis of the glenohumeral joint were evident in 8 shoulders (57%) versus in 5 shoulders (36%) before surgery.<sup>19</sup>

Furthermore, in a retrospective case-control study published by Erşen et al.<sup>20</sup> in 2017, the purpose was to evaluate the functional and radiographic results of the Latarjet technique in epileptic versus non-epileptic patients with anterior shoulder dislocations. Of the 54 shoulders of non-epileptic patients included in the study, one presented redislocation postoperatively. As for in patients with epilepsy, one of the 11 shoulders (9%), had recurrence of instability. This complication occurred during seizures that the patient suffered

before 6 postoperative weeks, with subsequent breakdown of the osteosynthesis material, which required a revision surgical procedure with the Eden Hybinette technique. Thus, the recurrence rate of dislocation was higher in epileptic patients with a statistically significant  $p$  ( $p=0.008$ ) after coracoid transfer.<sup>20</sup>

In 1995, Hutchinson et al.<sup>21</sup> reported their surgical results of bone supports at the glenoid level in patients with epilepsy. They presented a case series of 15 surgeries in 13 patients with an average age of 29 years at the time of the surgical procedure. All patients were treated with a bone graft for the anterior glenoid, outside the femoral head allograft or iliac crest autograft.<sup>22</sup> After a control of 32 months on average, they reported good clinical results in terms of Constant score<sup>23</sup> (average of 91 points) without new episodes of dislocation, although 8 patients continued to have seizures. Additionally, no arthritic changes of the shoulder joint were detected in the postoperative follow-up images.<sup>24</sup>

## Considerations

Anterior glenohumeral instability associated with glenoid bone loss in epileptic patients is a reason for consultation in the orthopedic emergency area. The indicated treatment for these recurrences in most cases is surgical. Although the literature on this pathology in patients with epilepsy is limited and, predominantly from descriptive studies based on experience, important therapeutic aspects can be highlighted from this review. Specifically, among the Eden Hybinette and Latarjet surgical techniques, it can be considered that in coracoid transfer there are high recurrence rates of anterior glenohumeral instability in epileptic patients, as well as greater complications such as: osteoarthritis, bone graft fractures and the requirement for surgical reoperation when compared to iliac crest bone graft surgery. Latarjet redislocation may be predisposed by the myotendinous insertion of the joint tendon into the bone graft, which could lead to avulsion of the conjoined tendon due to muscle contractures during seizures. This suggests that the Eden Hybinette surgical approach may be more beneficial for the treatment of recurrent anterior shoulder instability in this group of patients. It is relevant to carry out future research with a greater number of patients involved to define the best therapeutic option for these lesions in epileptic patients and thus, establish whether the Eden Hybinette technique is the most appropriate choice.

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## Conflicts of interest

None.

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