



# When Should I Use More Than Open Reduction and Internal Fixation. Ideal Approach and Type of Implants

Márcio Aita, MD



Fig.: Collateral lateral ILA – Internal Ligament Augmentation with GMReis Ø3.5 x 8.5 mm Fastlock SA Knotless Tape Loaded Anchor with Open Eyelet.



Fig.: GMReis Elbow Floating dynamic external fixator for treatment of traumatic elbow instability.

## Introduction:

The first step is to determine the correct diagnosis and approach to assess subsequent measures necessary, to prevent secondary dislocation of the ulna-humerus joint or radial head (to check ligament lesions associated the bone-ligaments fragments). Elbow external fixator (dynamic) do not compromise the tendons, vessels and nerves and offer limited possibilities to grasp and stabilize the sagittal/coronal elbow dislocations. The key stone ulna-humerus stabilization is the proximal anatomy of the Ulna. Coronal process, Sublime tubercle, Olecranon facet, Supinator crest are the main elements. If is possible, conventional surgical approaches, ORIF (open reduction and internal fixation) methods, in our opinion, with: specific plates, knotless anchors, resistance wires, screw and external fixator are the best solution in these fractures.

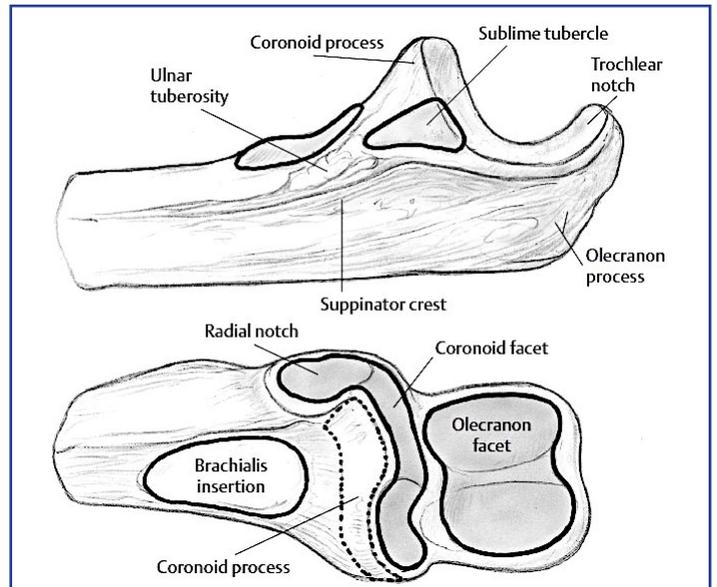


Fig.: GMReis Elbow Floating dynamic external fixator for treatment of traumatic elbow instability.

## Literature Review

Complex elbow instability is a challenging injury even for expert elbow surgeons. The preoperative radiographs should be carefully evaluated to recognize all lesions that may occur in complex elbow instabilities. Recognizing all the possible lesions is critical to achieve an optimal outcome.

A correct evaluation includes X-rays, CT (computadorized tomography) scan with 2D and 3D reconstruction and stability test under fluoroscopy.

The treatment is always surgical and is challenging, and outcomes are not predictable. The goals of treatment are: (1) to perform a stable osteosynthesis of all fractures, (2) to obtain concentric and stable reduction of the elbow, and (3) to allow early motion.

The proximal ulna must be anatomically reduced and fixed; the radial head must be repaired or replaced, and the coronoid fractures must be repaired or reconstructed. With respect of soft tissue lesions, the LUCL (Lateral Ulnar Collateral Ligament) must be reattached with suture anchors or transosseous suture. The next critical step is the intraoperative assessment of elbow stability.



If the elbow remains unstable, MCL (medial Collateral Ligament) repair and/or application of hinged external fixator must be considered. The most recent clinical and experimental studies have significantly expanded our knowledge of elbow instability and its management.

## External fixation is a good solution? Yes!

Ex fix can bring advantages to conventional methods of open reduction, mainly in what involves the concept of biomechanics, as well as the accuracy of joint reduction and respect for minimal aggression to adjacent tissues.

## What's the best indications?

Surgical treatment with ORIF (coronoid, radial head, olecranon), LCL repair, +/- MCL repair when:

- Acute complex elbow dislocations;
- Persistent instability after reduction;
- Elbow requires >50-60° to maintain reduction;
- Reduction cannot be performed closed;
- Often due to entrapped soft tissue or osteochondral fragments open reduction, capsular release and,
- Hinged external fixator indicated in chronic dislocation to protect the reconstruction and allow early range of motion The advantages that method is a indirect reduction and protection of the internal fixation to avoid new ligaments avulsion that are involves into instability of the elbow and is safe to promote early mobilization than compared with direct repair ou reinsertion with suture anchors or hiring cerclage around the main elements of the proximal ulna.

## Tips for Elbow Radial Collateral Ligament (RCL) Reconstruction with ILA and Elbow Floating dynamic Ex Fix:

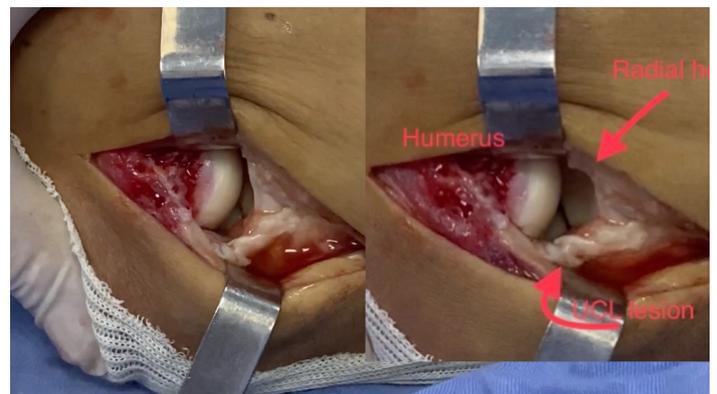
Kocher's or Kaplan's approaches provides a clearer view of the RCL (Ulnar and radial colateral portion, annular ligament), capitulum, radial head and supinator crest that affects the joint, even if compared to magnetic resonance imaging.

During lateral dissection of the RCL, the most difficult portion to access is the rotation center around the capitulum and isometric point into supinator crest, which will allow the reduction and correction of the positioning of the elbow joint. This approach also does not dissect the anterior capsule and interosseous posterior nerve, which allows proprioception and stabilization of the elbow joint.

In addition, tendons (Palmaris Longus or Flexor Carpi Radialis) are fixed with GMReis Ø3.5 x 8.5 mm Fastlock Knotless Anchors SA with Open Eyelet, to perform reconstruction and ILA – Internal Ligament Augmentation; promoting the

maintenance of elbow function with advantageous:

- Bone tunnel about 3.5mm into lateral condyle (one tunnel) and proximal ulna (two tunnels) around Supinator crest avoid iatrogenic fractures;
- Without implants or knot adjacent RCL (avoid pain around elbow lateral face);
- The best control to maintenance elbow joint articular faces congruence (avoid stiffness and impact around Capitulum/Olecranon/Radial head);
- Use GMReis Stitch Tape versus wire (high resistance system to maintain ligament reconstruction technique)



Figs.: Pre/intra operative aspects: RCL lesion - elbow varus instability.



Fig.: GMReis Ø3.5 x 8.5 mm Fastlock SA Knotless Tape Loaded Anchor with open eyelet.



Fig.: Intra operative aspects: GMReis Fastlock Anchor used to fix tendon graft into supinator crest.

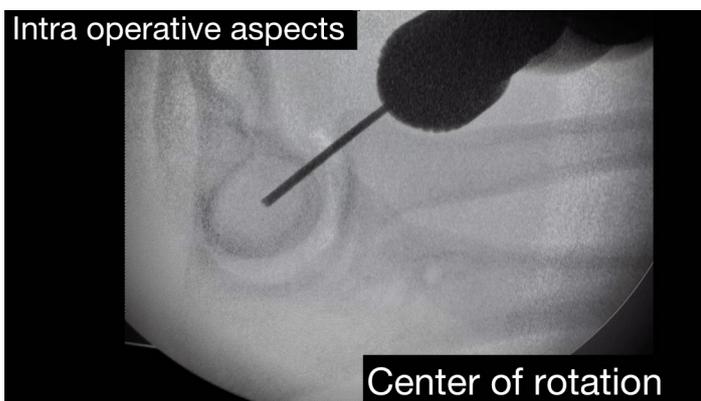


Fig.: Intra operative aspects: Install GMReis Elbow Floating Dynamic Ex Fix: Put guide wire into center of rotation.



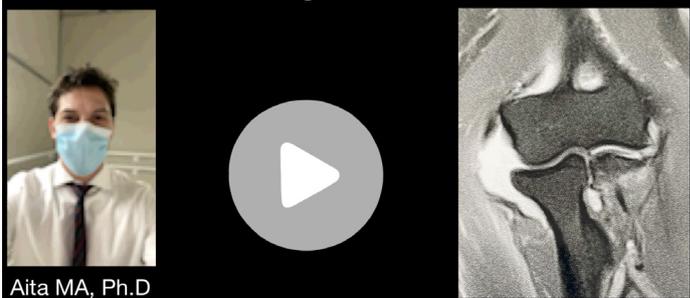
Fig.: Intra operative aspects: Install GMReis Elbow Floating Dynamic Ex Fix: Put Central body, bars, clamps and pins.

There is just proper level of evidence but the present author prefers and recommend to use ILA – Internal Ligament Augmentation with GMReis Fastlock Knotless Anchor, radial head and proximal ulna to maintain unstable:

- Posterior dislocation of radial head and/or,
- “Drop sign” - increased ulnohumeral distance (>4 mm) on a lateral view.

This is typically the case for very distal coronoid process fracture and also when post-ant instability of the elbow is evident while reducing and fixing the fracture:

## Elbow fracture-dislocation Radial collateral ligament reconstruction



Aita MA, Ph.D

Video: Elbow fracture-dislocation – radial Collateral Ligament reconstruction.

### Rehabilitation Protocol:

#### First week:

- Night: locking extension ex fix – sleep and,
- Day: free movement.

#### After 1 week:

- Elbow flexion/extension free movement - passive + active.

#### After 2 weeks:

- Proprioceptive with isometric exercises.

### EX FIX = DYNAMIC SPLINT: IMPROVE ROM

#### 4 to 8 weeks:

Postoperatively, progressive ROM and healing ligaments/ bones = can remove the Ex FIX. Daily activities can be resumed as soon as 2 weeks postoperatively. Sport and heavy work tasks usually require more than 3 months, according to the recovery of forearm/arm muscle strength and endurance.

### Summary

Although external fixation into Elbow complex instability is not yet achieved and is a challenging for all surgeons. Other methods for to treat that fractures are described but we suggested and recommend dynamic external fixation system to obtain stability and safe movement of the elbow joint. All procedures needs to be carefully evaluated taking into consideration local soft tissue, bone quality, personal expertise the surgeon and also general health conditions.

Marcio Aita, MD



Fig.: GMReis Elbow Floating dynamic external fixator for treatment of traumatic elbow instability.

## COMPONENTS OF THE FLOATING ELBOW FIXER

CODE	DESCRIPTION
222-04	Rod-to-Schanz Screw Clamp Medium
222-02	Rod-to-Schanz Screw Clamp Large
226-115	Elbow Connector
226-100	Movement Unit
222-37	Knurled Washer
222-08-150	External Fixation Carbon Rod Ø8.0 mm x 150.0 mm
222-08-200	External Fixation Carbon Rod Ø8.0 mm x 200.0 mm
222-11-150	External Fixation Carbon Rod Ø11.0 mm x 150.0 mm
222-11-200	External Fixation Carbon Rod Ø11.0 mm x 200.0 mm
222-11-250	External Fixation Carbon Rod Ø11.0 mm x 250.0 mm

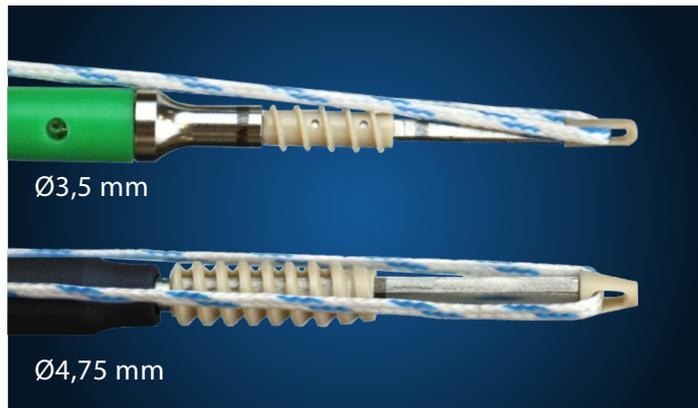


Fig.: GMReis Fastlock Knotless Tape Loaded Anchors.

## FASTLOCK IMPLANTS

CODE	DESCRIPTION
320-475191-PE5	Fastlock Knotless Tape Loaded PEEK Anchor Ø4.75 x 15.0/19.1 mm
320-351580-PE1	Fastlock Knotless Tape Loaded PEEK Anchor Ø3.5 x 10.1/15.8 mm

## FASTLOCK INSTRUMENTS

CODE	DESCRIPTION
320-110	Fastlock Drill Guide
320-110-34	Ø3.4 x 110 mm Drill Bit
320-FL-475	Ø4.75 mm Fastlock Tap
320-135	Ø1.3 mm K Wire
320-110-27-C	Ø2.7 x 110 mm Cannulated Drill Bit
320-110-27	Ø2.7 x 110 mm Drill Bit
320-FL-35	Ø3.5 mm Fastlock Tap

## References:

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3. Calderazzi F, Menozzi M, Nosenzo A, et al. Monteggia-like lesions: preliminary reports and mid-term results of a single center. Acta Biomed. 2020;91(4):e2020134. Published 2020 Nov 4. DOI: 10.23750/abm.v91i4.9864
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