



TENSION BAND SUTURE FIXATION OF SIMPLE OLECRANON FRACTURES AND OLECRANON OSTEOTOMIES.

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ABSTRACT

Introduction
Olecranon fractures are common fractures of the elbow that may require surgical management when there is fracture displacement and disruption of the extensor mechanism. Tension band wire technique has been traditionally used for the surgical management of simple olecranon fractures (displaced, transverse, non-comminuted). Tension band suture fixation represents a technique gaining popularity due to satisfactory outcomes and significantly lower re-operation rate compared to tension band wire fixation.

Aim
This study aims to present the latest evidence supporting the use of tension band suture fixation over the tension band wiring for simple olecranon fractures and olecranon osteotomies.

Material & Methods
Retrospective review of the literature suggests that traditional tension band wire fixation of simple olecranon fractures is associated with higher reoperation rate for removal of metalwork, due to skin irritation.

Results
Tension band suture fixation is reliable in providing union of simple olecranon fractures and olecranon osteotomies. There is no difference in biomechanical properties (ie. fixation strength) and lower reoperation rate (due to implant-related complications), in comparison with tension band wire fixation constructs.

Conclusions
Tension band suture fixation is a reliable, reproducible and safe fixation technique for simple olecranon fractures and olecranon osteotomies, with lower reoperation rates compared to conventional tension band wire fixation.

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INTRODUCTION

Olecranon fractures account for 0.9% of all fractures and 10% of all upper extremity fractures. Most fractures are simple transverse intra-articular fractures that occur from standing height falls; however, higher energy injuries may result in substantial articular comminution or be part of a more complex fracture dislocation pattern. Olecranon osteotomy performed for access to the distal humerus is a further reason where fixation of the olecranon might be necessary.

Surgical fixation of an olecranon fracture is indicated if there is extensor mechanism weakness, intra-articular displacement or instability of the ulnohumeral joint. Regardless of the mechanism, the goals of surgery are: (i) to achieve anatomic reduction of the greater sigmoid notch of the ulna; (ii) neutralize the displacing force of the triceps; (iii) permit early range of motion; and (iv) avoid complications or re-operation.

Commonly used techniques include tension band wire fixation, plate fixation and, more recently, intramedullary fixation. The most common complication associated with all olecranon fracture surgery is prominence of metalwork causing discomfort, wound breakdown and/or re-operation for removal of hardware. This has been reported to be as high as 75% for tension band wiring and 50% for plate fixation.

To try and address the problems related to prominent hardware and re-operation, tension band suture fixation of simple, transverse olecranon fractures and chevron osteotomies performed for distal humeral access has been suggested.

METHODS AND MATERIALS

Retrospective review of the literature suggests that traditional tension band wire fixation of simple olecranon fractures is associated with higher reoperation rate for removal of metalwork due to skin irritation.

There is currently no high-quality evidence comparing the clinical and cost effectiveness of the tension suture repair to the traditional tension band wiring currently offered for the internal fixation of displaced fractures of the olecranon. The Simple Olecranon Fracture Fixation Trial (SOFFT) is a randomized controlled trial with sufficient power and design rigour to provide this evidence for the subtype of Mayo grade IIA fractures.

RESULTS

Tension band suture fixation is reliable in providing union of simple olecranon fractures and olecranon osteotomies. There is no difference in biomechanical properties (ie. fixation strength) and lower reoperation rate (due to implant-related complications), in comparison with tension band wire fixation constructs.

J. Phadnis and A. C Watts utilizing a high strength, braided suture without kirschner wires showed that radiographic union was achieved in all patients at a mean of 6 weeks. No other instances of late articular displacement or gapping at the fracture site (apart from one case in osteoporotic bone with technical error that led to malunion - no need for reoperation.). No patients have required removal of their sutures or re-operation related to the olecranon fracture. There have been no wound-related complications.

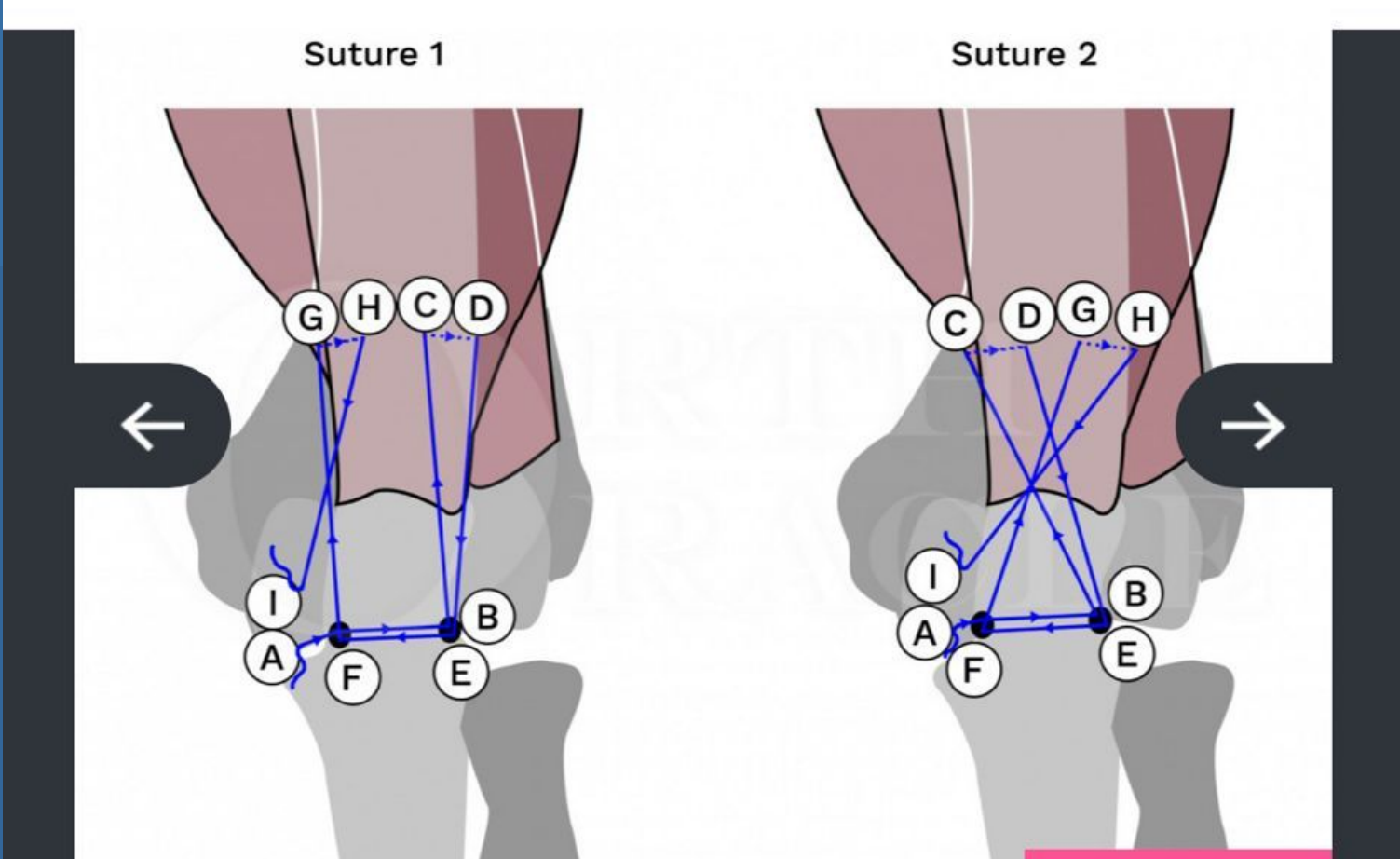


Figure 1. Technique of suture tension band.



Figure 3. Clinical image of the suture tension band.

INDICATIONS - CONTRAINDICATIONS

Indications:

- simple, transverse olecranon fractures
- chevron osteotomies performed for distal humeral access
- to augment plate fixation of comminuted proximal ulna fractures where there is a risk of proximal fragment 'escape' from the construct
- smaller avulsion fractures of the olecranon that are normally difficult to secure with metalwork and may have been treated by fragment excision and triceps advancement in the past
- paediatric olecranon fractures where placement of metalwork is even less desirable

Contraindications:

- fractures with significant articular comminution
- multi-fragmentary fractures
- fractures that extend distal to the greater sigmoid notch
- fractures with associated ulnohumeral instability, namely trans-olecranon fracture dislocations and Monteggia variants that affect the olecranon

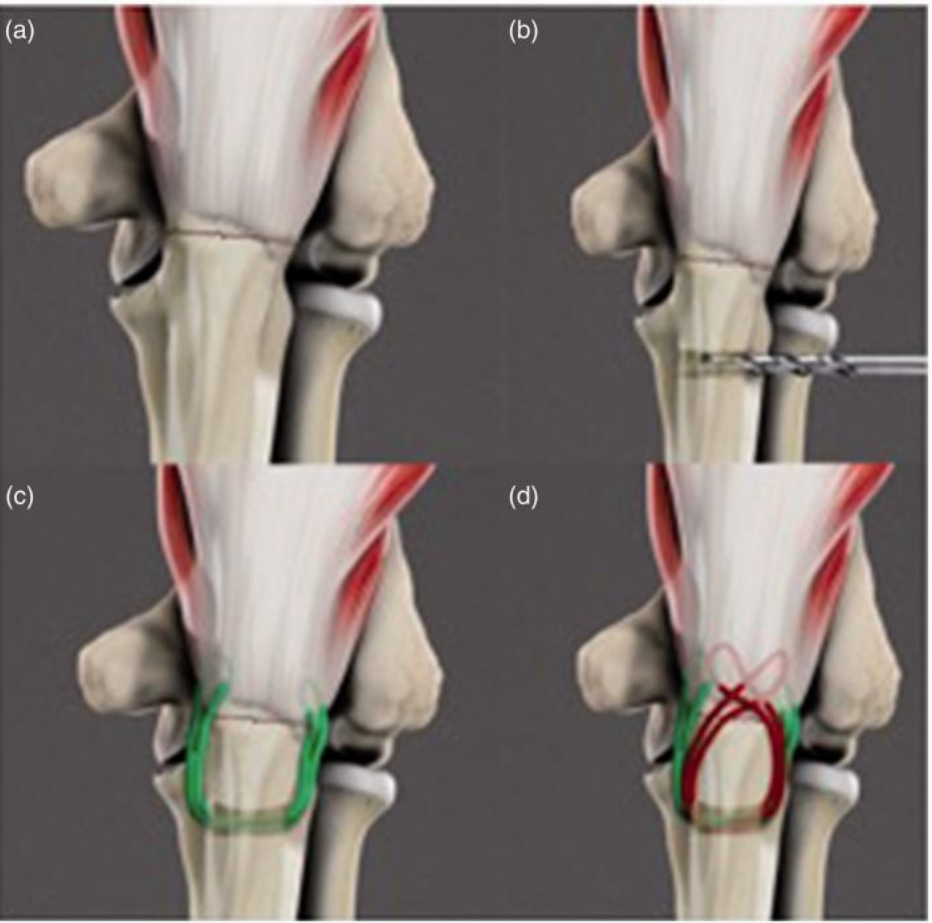


Figure 2. Tension band suture fixation - technique.

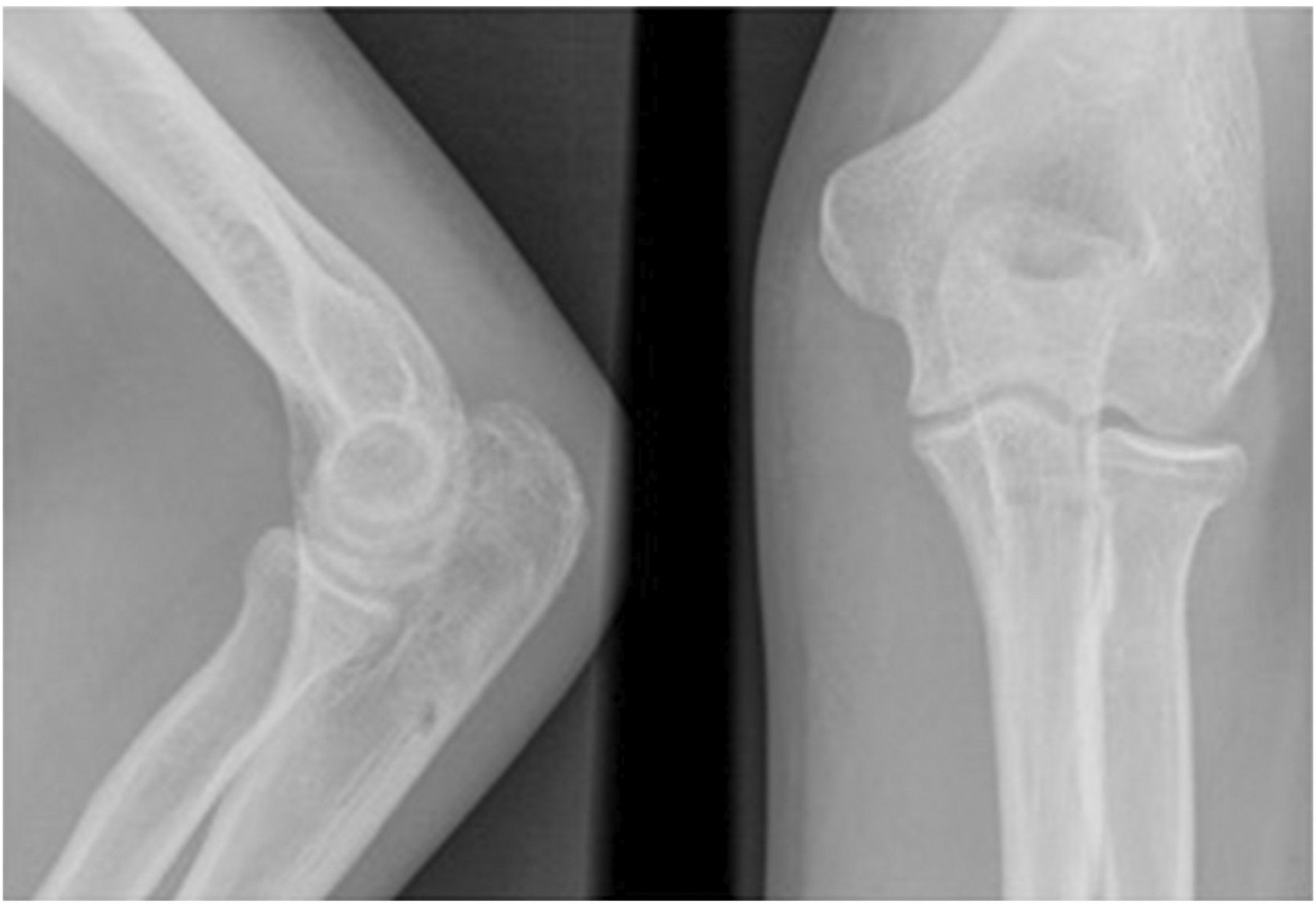


Figure 4. Post-op xray.

TECHNIQUE AND REHABILITATION

Surgical technique

2 sutures - the first creates a tensionable suture loop in the long axis of the ulna, replicating the action of intra-medullary kirschner wires whereas the second one provides a figure of eight tension band along the dorsal aspect of the ulna

Rehabilitation

- Immediate active range of motion is permitted with an emphasis on regaining full extension.
- Bulky dressing is reduced at 48 hours and the wound reviewed in clinic at 2 weeks.
- Heavy or repetitive lifting and axial loading on the arm is avoided for 6 weeks to minimize the triceps force.
- Radiographic and clinical review at 6 weeks to 8 weeks, after which the patient is usually discharged to the care of physiotherapy.

CONCLUSIONS

Tension band suture fixation is a reliable, reproducible and safe fixation technique for simple olecranon fractures and olecranon osteotomies, with lower reoperation rates compared to conventional tension band wire fixation.

REFERENCES

1. Tension band suture fixation for olecranon fractures, J. Phadnis, AC Watts, [Shoulder Elbow](#), 2017 Oct; 9(4): 299–303
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