STABILISATION OF DISPLACED LATERAL END CLAVICLE FRACTURES- A NEW TECHNIQUE AND OUR RESULTS

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Introduction
Fractures (#) of the distal clavicle are challenging to treat surgically due to the poor quality of the lateral bony fragment, long union times and increased stresses due to concomitant rupture of the coracoclavicular ligaments (CCL). New anatomical locking plates seem to fail frequently, Hook plates offer a stronger solution allowing bony union but limit shoulder movements and require removal. Some surgeons prefer to excise the lateral fragment primarily and perform a Weaver Dunn procedure or other reconstruction of the CCL.

Objective
We assess the early results of a new technique of combining locking plate fixation with endobutton reconstruction of the CCL through the looking plate.

Patients and Methods
Ten consecutive patients (mean age 47; range 27-77) have been fixed using this technique from three surgeons at two hospitals. Five # were Neer Grade 2a and 5 were 2b (Fig. 1). Six patients had primary fixation of acute # with. One had fixation 17 days previously with a locking plate but no endobutton which had subsequently failed. Three patients had fixation after non-union with conservative treatment (after 6 months, 15 months and 7 years from initial injury). The three latter patients also required iliac crest autograft. Patients have been followed up for between 3-6 months with clinical assessment, X-rays and Disabilities of the Arm, Shoulder and Hand (DASH) scores.

Discussion
Perceived Benefits over existing techniques
• No need to bridge the ACJ
• Improved final ROM = function
• No need for implant removal
• Mechanically sound:
  • High union rates compared with lateral clavicle plates alone
  • Quicker rehab.
• Withstood 2 patients falling onto shoulder post-op
• Biological bony fixation
• Low profile plates
• ACL endobutton stronger than tightropes
• Maintaining length of clavicle + essentially unaffacted ACJ would restore shoulder biomechanics better than distal clavicle excision + Weaver Dunn/Surgilgl. May lead to higher long term function.

Potential Drawbacks
• Do CC ligaments undergo biological healing or could this account for the coracoid endobutton complete cut out seen in 1 patient (and a partial cutout in another (epileptic)?)
  • If endobutton fails after # union then ACJ still has AP stability but would superior-inferior forces be great enough to cause ACJ arthritis? If so then this may require later excision + Weaver Dunn anyway! Longer follow-up may show this.
  • Endobutton not specifically designed for screw hole in plate so could be prominent: future designs could address this.
  • Potential for coracoid #. Endobutton cut-outs may represent a partial #
  • Potential for damage to brachial plexus and subclavian/axillary vessels as undersurface of coracoid not directly visualized.

Conclusions
This technique provides a stable fixation and demonstrates promising early results in all of our acute #. It may also be a strong enough construct to treat non-unions. Refinements in technique and implant design may further improve outcomes. The technique appears to offer advantages over hook plates and over excision + Weaver Dunn procedures for acute fractures although longer term follow-up and comparative studies are warranted.

References

Fig. 1. Neer 2b #

Fig. 2. United non-union at 1 year

Fig. 3. United # despite post-op seizures and fall

Fig. 4. Partial coracoid endobutton cut-out at 8 weeks

Fig. 5. ACJ screw