

Clinical Summary

Reconstruction of Chronic Acromioclavicular Dislocation with Subacromial Hook Plate and Reinforced Collagen Implant: A Surgical Technique with Histological Evaluation

Authors: Gregory Colbath, Emily German, Wolfgang Schwartzman, Jeremy Mercuri, PhD, Amit Momaya, M.D, Spero Karas, Stephan Pill, Cooper Stone

Journal: Journal of Orthopaedic Experience & Innovation



Aim:

To describe a novel surgical technique combining a subacromial hook plate with a reinforced collagen implant (BioBrace®) for the reconstruction of chronic acromioclavicular (AC) joint dislocation, and to evaluate the histological integration of the implant postoperatively.

Diagnosis & Clinical History

Patient: 52-year-old male with a chronic Grade 5 AC joint separation following a traumatic workplace injury.

Symptoms: Persistent pain, deformity, and functional limitations despite conservative management.

Imaging: X-rays and MRI confirmed AC and coracoclavicular (CC) ligament disruption with superior displacement of the distal clavicle.

Surgical Technique

- AC joint exposed via transverse incision; osteophytes removed
- A 5x250 mm BioBrace® implant was soaked in whole blood and looped anatomically around the clavicle and coracoid to mimic CC ligaments
- Implant was secured with sutures and reinforced with a 5-hole subacromial hook plate
- BioBrace® was also used to reconstruct the AC capsule
- A portion of the implant was marked for later histological analysis
- Hook plate was removed from the patient 3 months after initial placement

Results

- Clinical
 - » IVAS pain score: 0 at 3 weeks post plate removal
 - » SANE score: 95% at 3 months, 97% at 9 months
 - » Full ROM and return to work by 6 months
 - » No complications or implant related issues
- Histology:
 - » BioBrace® explanted at 3 months showed cellular infiltration within and around the implant. New cells and tissues were noted infiltration the BioBrace and the implant was actively being remodeled

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Key Takeaways:

- This is the first human case with histologic evaluation of BioBrace® in AC joint reconstruction.
- The combined use of a hook plate and BioBrace® provided mechanical stability and biological support for ligament healing.
- Histological findings confirmed favorable tissue integration and remodeling of the implant.

The technique may offer a promising alternative to traditional nonabsorbable augmentation methods, with potential for broader application pending further studies.

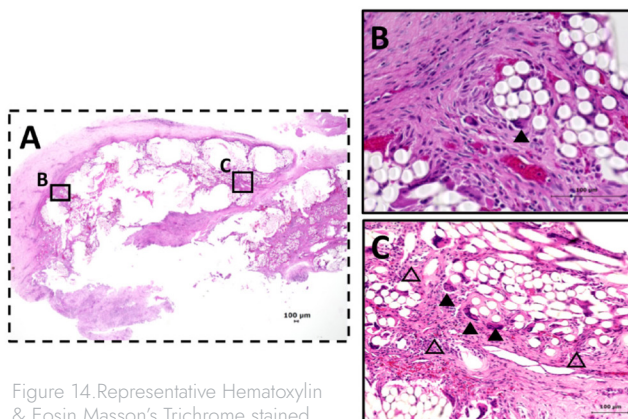


Figure 14. Representative Hematoxylin & Eosin Masson's Trichrome stained histology of the A) entire cross-section of the BioBrace implant (white circular fiber cross-sections) and B-C) magnified regions of the implant demonstrating extracellular matrix (light purple) and cell nuclei (dark purple / black) around and within the implant. (Filled triangles = foreign body giant cells, Open triangles = inflammatory cells and fibroblast infiltration, Bright red staining = red blood cells) (scale bars = 100 µm).

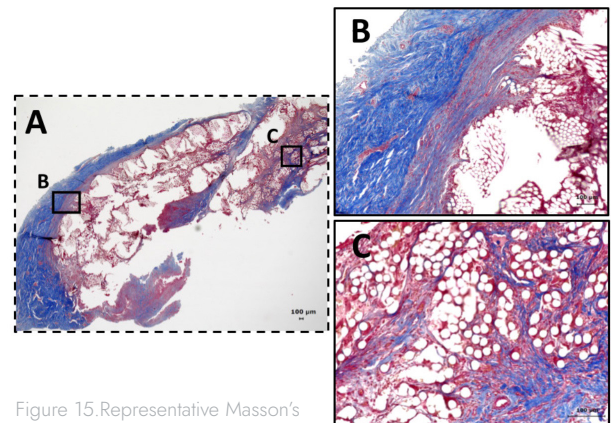


Figure 15. Representative Masson's Trichrome stained histology of the A) entire cross-section of the BioBrace implant (white circular fiber cross-sections) and B-C) magnified regions of the implant demonstrating collagenous (blue) and non-collagenous (red) extracellular matrix deposition around and within the implant. (scale bars = 100 µm).

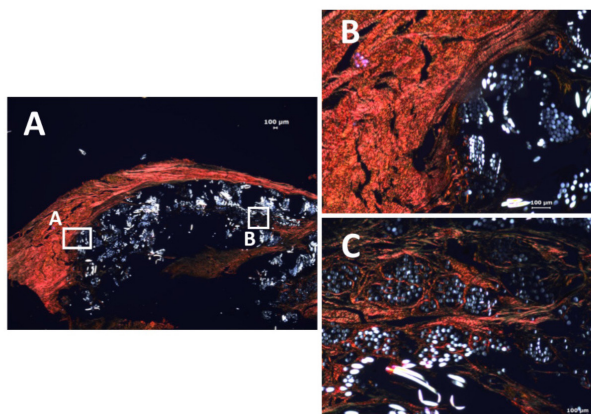


Figure 16. Representative Picrosirius Red stained histology of the A) entire cross-section of the BioBrace implant (white circular fiber cross-sections) and B-C) magnified regions of the implant confirming collagen fiber (red) deposition around and within the implant. (scale bars = 100 µm).

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