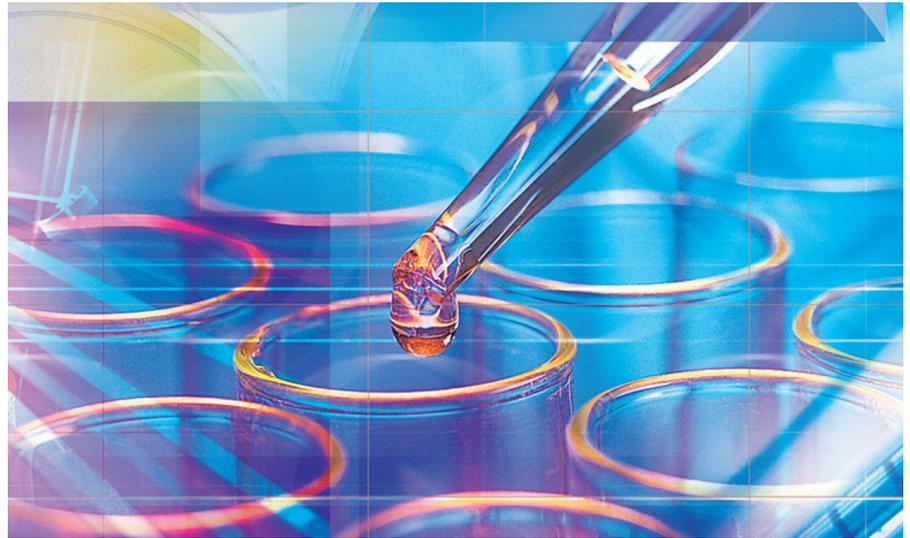


## Ulnar Nerve Transposition with BioDDryflex to Prevent Post-operative Peri-neural Scarring

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### BACKGROUND

Cubital tunnel syndrome is the second most common entrapment neuropathy after carpal tunnel syndrome. Surgical options for the treatment of ulnar nerve entrapment at the elbow include simple decompression, subcutaneous transposition, submuscular transposition, and partial medial epicondylectomy. There are several causes for failure of transposition surgery, of which, perineural scarring is the most common. In recurrent cases of ulnar nerve entrapment, it is difficult to diagnose scarring and to quantify it preoperatively. In addition, revision decompression is technically challenging. Any measures that can be taken to reduce scarring after a transposition may lead to fewer failures and recurrences. Although meticulous surgical technique is important, the patient's biology and scar forming capacity is not controllable by the surgeon. Therefore, using an adhesion barrier may prevent perineural scarring and lead to better clinical outcomes.

### HISTORY

A 15-year-old right hand dominant female presented complaining of daily numbness and tingling of her right small and ring fingers. She had undergone ulnar nerve decompression 9 months earlier for similar symptoms. Her symptoms resolved for 3 months post-operatively, but then recurred. Nerve conduction studies were normal.

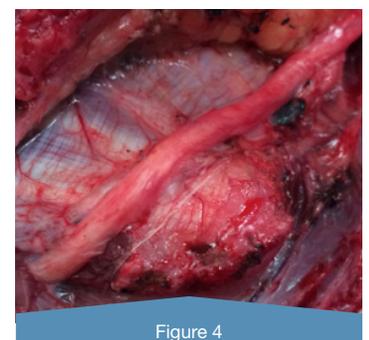
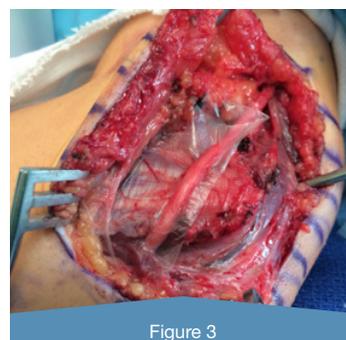
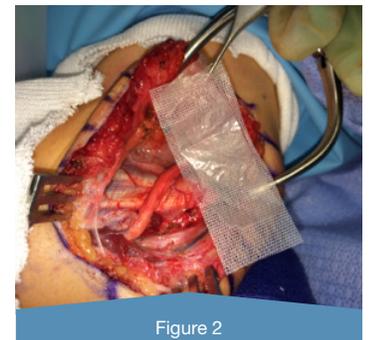
### FINDINGS AND TREATMENT

On examination, she was able to oppose her thumb and flex and extend her thumb interphalangeal (IP) joint. She was able to abduct and adduct her fingers. There was no atrophy present. Sensation was intact to first dorsal web space and volar tip of her index finger, but was slightly decreased to the small finger compared to the contralateral side. She had a 2+ radial pulse.

Intra-operatively, scarring was noted over the ulnar nerve

at the cubital tunnel. A standard ulnar nerve anterior subcutaneous transposition was performed (Fig 1). A 2 cm x 6 cm BioDDryFlex (Fig 2) was applied over the nerve to prevent recurrent scar formation (Fig 3). BioDDryflex has great handling characteristics and can be applied over the nerve, but upon contact, it adheres to soft tissues so it will not peel away from the tissues (Fig 4).

The patient is currently 9 months post-op and has had complete resolution of her symptoms without evidence of recurrence.



## DISCUSSION

This case highlights the complication of perineural fibrosis after an ulnar nerve decompression or transposition. The patient had a prior cubital tunnel decompression with recurrence of symptoms. At the time of revision, scarring was noted compressing the nerve. The nerve was released and transposed anteriorly with the application of BioDDryFlex over the nerve to prevent recurrent scarring. With at least 9 months of follow up, the patient is now symptom free.

Over the course of 1 year, we have used BioDDryFlex in over 15 anterior, subcutaneous ulnar nerve transpositions. None of the patients had a reaction to the material. There were no infections. All patients have had successful clinical outcomes with no evidence of recurrent ulnar nerve symptoms. None have required a revision surgery to re-explore the nerve.

## HANDLING CHARACTERISTICS AND SURGICAL TIPS

The handling characteristics of BioDDryFlex are favorable. It is packaged with a mesh over it. The BioDDryFlex is easily separable from the mesh and the packaging. It is recommended that two surgical pick-ups be used to keep the BioDDryFlex spread out. As soon as it touches the moist tissues, BioDDryFlex tends to become adherent to them. It is best to apply it once and avoid manipulation of BioDDryFlex as it can curl up and may be difficult to spread out and flatten out again once it has curled up.

## ANIMAL STUDY

Kim et al assessed the effect of wrapping human amniotic membrane around a repaired ulnar nerves for perineural adhesions in a rabbit model.<sup>6</sup> The Ulnar nerves from 10 white New Zealand rabbits were exposed bilaterally, transected, and repaired. The nerve repair site in one limb was wrapped with human amniotic membrane, while the contralateral side was left un-wrapped. Three months later, the same nerves were re-explored and removed using microsurgical techniques. The ulnar nerves wrapped with human amniotic membrane showed significantly less perineural adhesion and fibrosis than controls ( $P < 0.05$ ). No nerve healing problems were encountered. This study suggests that human amniotic membrane application can reduce fibrosis and adhesion around neurorrhaphy sites in this animal model.

## About Dr. Mirzayan

Raffy Mirzayan, M.D. is a Clinical Professor of Orthopaedic Surgery at the University of Southern California Keck School of Medicine. He is the founder and director of the Advanced Concepts in Sports Medicine course in Las Vegas. He is a member and serves on several committees of national orthopaedic societies, including AAOS, ASES, AOSSM, AANA, ISAKOS, and AOA.



His orthopaedic interests include athletic injuries of the knee, shoulder and elbow, including ligament repair and reconstruction, arthroscopy and cartilage restoration and repair.

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BioDDryFlex is regulated by the FDA under 21 CFR Part 1271 and Section 361 of the Public Health Service Act.

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