

Use of CHECKPOINT NEUROSHIELD™ Chitosan Membrane in revision open carpal tunnel surgery

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Case Presentation

A 54-year-old right hand dominant female with a history of bilateral endoscopic carpal tunnel releases eight years prior who presented with recurrent bilateral hand numbness, paresthesia, and pain. She endorses symptoms that awake her at night and worsening symptoms with repetitive or prolonged use of the hands. Her examination showed a well-healed incision over the volar wrist creases from her previous endoscopic carpal tunnel surgeries, a positive modified Durkan maneuver, and a positive Tinel's sign over the carpal tunnel. An updated electromyogram/nerve conduction study (EMG/NCS) was obtained demonstrating recurrent bilateral carpal tunnel syndrome, with levels similar to her EMG/NCS from eight years ago.

The patient's biggest difficulty at this time was an inability to perform activities of daily living without discomfort and bothersome nighttime symptoms.

Preoperative Plan

Extended open revision carpal tunnel release with biopsy of the nerve to rule out amyloidosis and protective wrap with CHECKPOINT NEUROSHIELD™ chitosan membrane.

Operative Findings and Approach

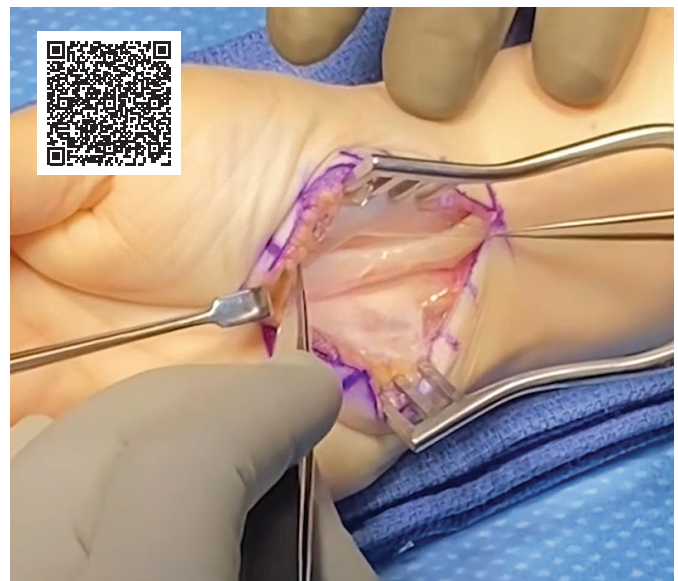
An extended open carpal tunnel approach was performed and the reconstituted transverse carpal ligament was incised longitudinally. The median nerve was neurolysed off the radial leaflet of the transverse carpal ligament and thick tenosynovium was bluntly dissected circumferentially from the median nerve. Distally the common digital branches and the recurrent motor branch were identified intact. Once we completed our neurolysis, a 40 x 30 mm NeuroShield was wrapped circumferentially around the nerve at the level of the carpal tunnel inlet and within the carpal tunnel. Prior to membrane fixation, the wrist was

taken through a passive range of flexion, extension, and circumduction to ensure no bunching or displacement of the membrane. After confirming that NeuroShield did not bunch or migrate post range of motion exercise, the membrane was sutured to itself using 9-0 Nylon sutures.

Follow-up

At two weeks post-operatively, the patient demonstrated improvement in her pre-operative carpal tunnel symptoms. She was taking over the counter medication for pain control and had full range of motion. We performed a transverse ultrasound of the carpal tunnel at this time and found the chitosan membrane in place around the median nerve.

At six weeks post-operatively, the patient was no longer requiring over the counter medication for pain relief, her incision was well-healed with no adverse reaction, and she



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was back to pre-surgical baseline activities. At this point, she wished to move forward with contralateral revision carpal tunnel with NeuroShield chitosan membrane.

Discussion

The NeuroShield chitosan membrane provides key benefits in revision nerve decompression surgery as an interface between nerves and surrounding tissue. As demonstrated in preclinical and clinical evidence, multiple properties of chitosan membranes are beneficial when treating peripheral nerve injuries, including, but not limited to, its anti-inflammatory properties, its ability to support tissue healing, its resorption profile, and, maybe most importantly in this case, its ability to inhibit fibroblast migration and proliferation. NeuroShield may aid in the prevention of adhesions and scar formation that could

necessitate a revision surgery and can also aid in revision surgeries as described in this case study to facilitate patient recovery and improve outcomes. This patient to date has had no complications or setbacks related to NeuroShield. It is an implant that is easy to use and may be beneficial for patients.



About the Author

Steven Niedermeier, MD, is a hand and upper extremity surgeon with North Texas Orthopedics.

CHECKPOINT NEUROSHIELD™ is indicated for the repair of peripheral nerve injuries in which there is no gap or where a gap closure can be achieved by flexion of the extremity. Checkpoint NeuroShield nerve membranes are designed exclusively for single use. Allergic reactions to implanted products containing chitosan are not yet known. However, since chitosan is derived from shellfish, individuals with known shellfish allergies should exercise caution in the use of any product containing chitosan. As with all procedures carried out on peripheral nerves, there is a risk of the nerve not regenerating. Please see Instructions for Use for complete product specifications, indications, contraindications, precautions, and warnings at CheckpointSurgical.com/ifu.

Note: Case reports are company funded and not peer reviewed.