

Avance® Nerve Graft Provides a Flexible, Off-the-Shelf Option for Nerve Repair Across the Joints

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Introduction

Peripheral nerve injury affects over 300,000 patients per year in the United States alone¹. Historically, surgeons seeking an off-the-shelf option for nerve repair have used hollow tube conduits comprised of synthetics or cross-linked collagen. One of the limitations of conduits is that they must maintain an open lumen; therefore, most tend to be appreciably more rigid or stiff than native nerve tissue. Due to this stiffness, conduits may inhibit movement or be at risk for extrusion when the injury is superficial to the skin or near the joints².

Avance® Nerve Graft is an allograft that offers an off-the-shelf option for bridging nerve discontinuities while maintaining the flexibility inherent to nerve tissue (Figure 1). Similar to autografts, Avance® provides the surgeon with desired handling and structural characteristics: pliability of soft tissue, an epineurium to suture the graft in place, and intact endoneurial tubes for the axons to grow through.

The case described here illustrates the flexibility of Avance® when used for reconstruction of a digital nerve. The gap spanned both the distal and proximal interphalangeal joints. The patient was a 43-year-old professional musician with a 25mm segmental digital nerve loss caused by a power saw injury.

Note that the following is only an example of a surgical technique for treatment of a digital nerve injury. The methods described here may be adapted by the surgeon to fit the specific case being treated.

Surgical Method

Nerve exposure and assessment

1. The injured nerve segment was exposed under 2.5x loupe magnification. The nerve was dissected so that the nerve stumps could be clearly identified and easily visualized.
2. Nerve stumps were trimmed to remove scar tissue and expose healthy, viable tissue (Figure 2).
3. The gap between nerve stumps was measured and determined to be approximately 25mm in length (Figure 3). The diameter of the nerve was approximately 2mm. Therefore, a nerve graft 2-3mm in diameter and 30mm in length was selected for tensionless repair.

Preparation of Avance®

4. The product was removed from the outer packaging, and the inner Tyvek® pouch was passed into the sterile field. In the sterile field, the product tray was removed from the inner Tyvek® pouch.

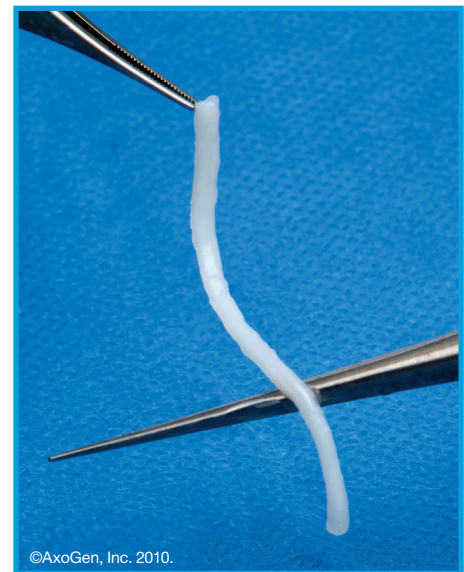


Figure 1: Avance® Nerve Graft. Avance® offers the flexibility that is similar to an autograft.



Figure 2: Exposure of Nerve Stumps. The nerve was exposed and then trimmed until healthy tissue could be visualized.



Figure 3: Measurement of Defect. The length of the gap and nerve diameter were measured in order to choose the most appropriate Avance® size. In this case, a 2-3mm diameter and 30mm length was selected.

5. Sterile room temperature saline was added to the rehydration reservoir of the product tray, and Avance® was thawed for 5-10 minutes according to the manufacturer's instructions for use (Figure 4).

Implantation of Avance®

6. The product was inter-positioned into the nerve gap and sutured in place using 8-0 nylon suture to create a tensionless repair. Two interrupted sutures were used on both the proximal and distal sides so that the graft was securely in place (Figure 5).
7. Visual inspection verified that the distal and proximal interphalangeal joints were able to undergo flexion and extension without obstruction, and that the tendons and soft tissues were able to glide.
8. The incision was closed with 4-0 nylon sutures. Extension beyond neutral was avoided during post-operative therapy.

Results

The flexibility of Avance® provided the following advantages:

- Minimal to no visual or palpable detection of the graft post-operatively after skin closure
- Ability to mobilize immediately after surgery
- Tissue gliding similar to normal physiologic levels
- Minimal risk of extrusion

At one year post-operation, the patient's 2-point discrimination was 8mm.

Conclusions

Avance® is an allograft tissue that provides an off-the-shelf option for bridging nerve gaps. It is decellularized and cleansed to preserve the tissue's extracellular matrix so that it provides scaffolding for support of the body's own regeneration process. In nerve injuries at the joints or superficial to the skin, Avance® provides flexibility and pliability similar to native nerve tissue. In this case, Avance® provided a preferred off-the-shelf option for bridging a nerve gap spanning the distal and proximal interphalangeal joints of the 5th digit.

References

1. National Hospital Discharge Survey, 2001.
2. Weber, et al., 2000. A randomized prospective study of polyglycolic acid conduits for digital nerve repair in humans. *Plast Reconstr Surg* 106(5): 1036-1045.



Figure 4: Preparation of Avance®. Avance® was thawed in room temperature saline for 5-10 minutes.



Figure 5: Implantation of Avance®. Avance® was implanted into the nerve gap spanning two joints of the 5th digit and secured in place using 8-0 nylon sutures. Flexion and extension of the joints were not obstructed.

For additional information on



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