

REPAIR OF NERVE DEFECTS. AN UPTODATE

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A nerve gap is defined as the distance between two ends of a severed nerve. This results from nerve retraction, loss of tissue from injury, or the necessary débridement of scarred nerve endings before repair. A tension-free direct nerve coaptation is the preferred method of repair, which can minimize axonal drop-off by using one repair site. With longer gaps between the ends of a peripheral nerve, primary repair causes excessive tension at the repair site.

When direct nerve repair cannot be effectively undertaken, certain methods must be used. There are several reconstructive options available, and the most appropriate depends on the length of the nerve gap and the size of the nerve.

Autogenous nerve grafting has long been considered the “gold standard” for repair of irreducible nerve gaps. Autogenous grafts act as immunogenically inert scaffolds, providing appropriate neurotrophic factors and viable Schwann cells (SCs) for axonal regeneration. Especially for long nerve gaps (>5 cm in length), autografts remain the most reliable choice.

Primary limitations of peripheral nerve autografts are: Longer and more complex surgical procedures, a limited supply and associated donor-site morbidity from additional incisions, loss of sensation, and possible painful neuromas.

Nerve conduits. We use resorbable bovine type I collagen conduits. Our indications are for reconstruction of smaller, noncritical nerve repair (<3-cm gaps) in small-caliber nerves.

With respect to processed, or decellularized nerve allografts, the advantage of these products is that they provide the extracellular matrix molecules, such as laminin and fibronectin, which support and enhance nerve regeneration. We have engineered our own processed nerve allograft. We apply the technique of Hudson. We use for it PBS (phosphate buffered saline) and Sodium Dodecyl Sulfate. It works well in reconstruction of digital nerves, sensitive nerves and distal peripheral mixed nerves. Defects in large-caliber (5 to 6 mm) nerves also require grafting in a cabled fashion. At the moment our indications for are gaps of 3 to 5 cm. We have observed too a significant improvement of the neuropathic pain in these patients.