

Chapter 53

Nerve Injury



Ross Feller

Describe the relationship between the digital artery and nerve at the level of the (1) palm and (2) middle phalanx?	In the palm, the artery lies superficial (volar) to the nerve, whereas at the level of the middle phalanx, this relationship is reversed
Name the different connective tissue layers of a nerve.	Epineurium, perineurium, endoneurium
Describe the different three main categories of nerve injury.	Neuropraxia—No structural/anatomic change to the nerve, best prognosis; Axonotmesis—Perineurium remains intact but axons within a fascicle rupture, prognosis based on degree of scarring within the fiber; Neurotmesis—Complete nerve rupture, requires repair or reconstruction

(continued)

R. Feller, MD
The Warren Alpert Medical School of Brown University,
Providence, RI, USA
e-mail: rjfell.ross@gmail.com

(continued)

What is the percentage of nerve stretch that leads to neuropraxia and axonotmesis?	The nerve can tolerated up to 10% of stretch, with 15% leading to neuropraxic injury and 20% or greater leading to axonotmesis
What is one reliable method for determining digital nerve continuity in the uncooperative child or the unconscious patient?	Water immersion testing: Presence of wrinkling or puckering of the finger within 4 min of submerging under water at 40 °C
What is the rate of growth of a peripheral nerve following repair?	One millimeter per day or 1 in. per month
What is one way to track recovery of an axonotmetic nerve injury using physical examination?	Presence of an advancing Tinel's sign along the path of the injured nerve
What is the most common nerve injury resulting from low-energy gunshot wounds? What is the significance of this in terms of treatment?	Neuropraxia, therefore most low energy gunshot wounds can be managed with observation and not acute exploration
What are the available techniques for direct end-to-end nerve repair? Which technique is mostly used presently and what is the main reason proponents advocate for this technique?	Epineural and grouped fascicular repair. Epineural repair is used most commonly, with advocates believing that the additional intraneural damage involved in manipulating individual fascicles can lead to more scarring and worse clinical results
What other techniques are available for nerve repair other than direct end-to-end suturing?	Adhesives (e.g., Tisseel, Evicel, and DuraSeal), conduits (e.g., Axogen, vein graft), nerve grafts (autograft, allograft, or vascularized nerve graft), end-to-side neurorraphy, nerve transfers

(continued)

What is the “rule of 18”?	The number of inches from the site of nerve injury to the supplied muscle plus the number of months from injury should be less than 18 inch. order for primary nerve repair to be considered. The basis of this principal lies in the fact that motor end plates will become refractory to reinnervation after about 18 months in the adult patient
---------------------------	---
