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IDEAS AND INNOVATON

# Making Internal Neurolysis Safer – A Novel Technique

**Sandeep Mehrotra[1], Vikas Singh[2], Rakesh Kaundal[3], Vinod Kumar[4]**

Internal neurolysis is microsurgical excision of intraneural scar tissue. It is useful in restoration of function of injured peripheral nerve with intact axons. Intraneural scarring for which this simple technique is useful, is usually produced by acute contusion of peripheral nerves with subsequent edema, haemorrhage and fibrosis or by chronic irritation of nerve.[1] Since axons are surrounded by layered connective tissue (endo, peri and epineurium), the end result of nerve injury which does not severe the nerve or axon, is scarring of connective tissue surrounding the axons. This produces a physiological blockade to nerve conduction. Neurolysis is valuable in restoration of nerve function in such McKinnon type III – IV grade nerve injury.

Internal neurolysis combines epifascicular epineurectomy followed by interfascicular perineurectomy. In both steps fibrous tissue is removed, but there is risk of fascicular injury during dissection, especially when unaided by high magnification. As quoted by Mazal et al 2 in 2005, surgeons are still afraid to enter nerve trunks, mainly due to risk of fascicular injury and further deterioration of recovering nerve function.

We employ a very safe and simple surgical technique to aid internal neurolysis and reduce risk of fascicular injury. Isotonic saline is carefully injected intraneurally employing a 26 gauge needle on an insulin syringe. The subepineural injection causes hydro dissection and separates nerve fascicles atraumatically. The ease and extent of saline spread is also indicative of severity and extent of fibrosis with healthy nerve distending evenly and easily (Fig 1), while densely fibrotic segments either distend irregularly or fail to distend (Fig 2).

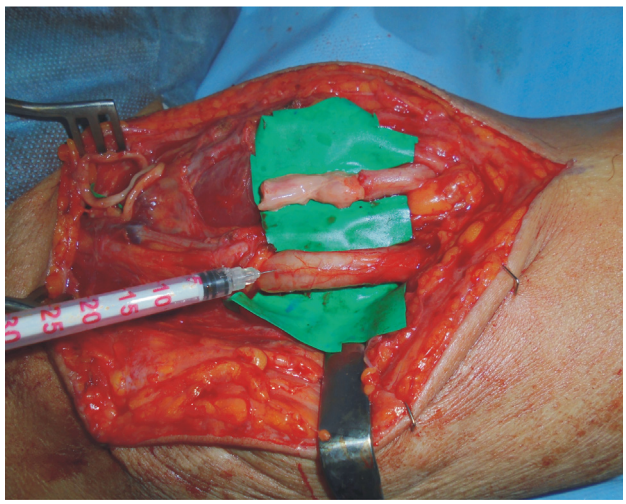

**Fig. 1** Healthy median nerve distending evenly after saline injection employing an insulin syringe and 26 G needle.

**Fig. 2** Fibrotic (unhealthy) ulnar nerve distending poorly and unevenly after saline injection. Nerve graft was eventually needed to replace the unsalvageable segment.

✉ Sandeep Mehrotra
smehrotra21@gmail.com

1 Consultant and HOD, Dept of Plastic Surgery
Army Hospital (Research & Referral)
New Delhi 110010, India

2 Asst Professor, Dept of Plastic Surgery
Army Hospital (Research & Referral)
New Delhi 110010, India

3 Sr Resident, Dept of Plastic Surgery
Army Hospital (Research & Referral)
New Delhi 110010, India

4 Jr Resident, Dept of Surgery
Army Hospital (Research & Referral)
New Delhi 110010, India

Thereafter we employ a disposable bayonet cataract knife for epineurotomy and epi/perineurectomy of the involved segment, aided by microscissors. The saline injection not only separates the fascicles but makes them prominent, thereby aiding neurolysis, while reducing surgical risk to the nerve. Fibrotic strands also get distinctly delineated from healthy nerve fibers and can be dissected with safety (Fig 3).

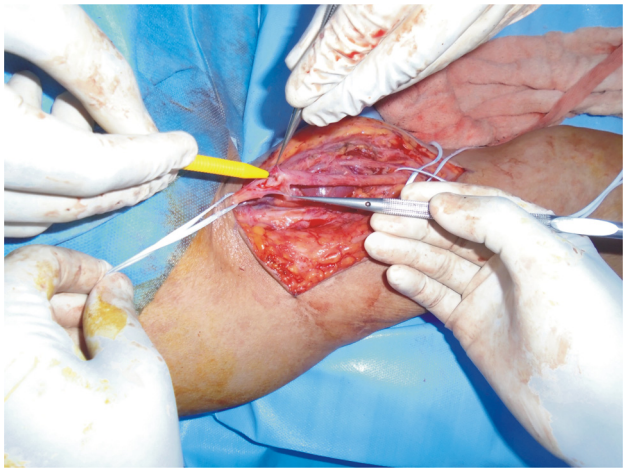

**Fig. 3** Epineurectomy with bayonet cataract knife after saline hydrodissection.

Studies on nerve blocks administered for regional anesthesia attest to the safety of intraneural injections.[3] Since surgical intraneural injection is done under vision employing a 26 gauge needle on a insulin syringe, any theoretical risk of injury to nerve fibers is minimized. We have been employing this technique for more than 10 years with safety. Few of our unpublished cases of neurolysis alone in nerve injuries have shown remarkable recovery. We would recommend this simple, safe and effective technique as an aid to not only ease but enhance the safety of internal neurolysis.

## References

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