Nerve transfer

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Nerve transfer surgery is a procedure in which a healthy nerve is redirected to restore function to a nearby muscle or nerve that has been damaged. This technique is commonly used in cases of nerve injuries, often as a result of trauma or other medical conditions. Indications for nerve transfer surgery include:

Brachial Plexus Injury: Nerve transfers are frequently performed in cases of brachial plexus injuries, which can occur due to trauma, such as motorcycle accidents or falls. The brachial plexus is a network of nerves that control movement and sensation in the arm and hand. When these nerves are damaged, nerve transfer surgery may be considered to restore function.

Peripheral Nerve Injuries: Trauma, compression, or laceration can lead to injuries of peripheral nerves. Nerve transfers may be indicated when these injuries result in the loss of function or sensation in specific muscles or areas.

Facial Nerve Palsy: In cases of facial nerve palsy, where there is a loss of muscle function in the face (often due to conditions like Bell's palsy), nerve transfers can be considered to improve facial movement.

Traumatic Nerve Injuries: Nerve transfer surgery can be used to address traumatic injuries to nerves in various parts of the body, such as the upper and lower limbs.

Spinal Cord Injuries: While more complex, nerve transfers may be explored as a potential treatment for certain types of spinal cord injuries to restore motor function.

It's important to note that the success of nerve transfer surgery depends on various factors, including the type and extent of nerve injury, the timing of the surgery, and the patient's overall health. Not all nerve injuries are suitable for nerve transfer, and a thorough evaluation by a medical professional is necessary to determine the appropriateness of this surgical intervention for a particular case. The

field of nerve transfer surgery continues to evolve, and ongoing research is expanding its applications.

Nerve transfers are a technically feasible means of restoring the upper extremity function in tetraplegia in cases that may not be amenable to tendon transfers [1].

Nerve transfers are effective at restoring elbow, thumb, and finger extension in patients with a midcervical spinal cord injury, which occurs in the majority of patients with a peripheral type of palsy with muscle denervation in their upper limbs. Efforts should be made to perform operations in these patients within 12 months of injury [2].

It has been many years now since the introduction of nerve transfers for repair of traumatic brachial plexus lesions and more recently, we have seen its application in the field of obstetric brachial plexus palsy. These nerve transfers do not represent an alternative to anatomical repair by means of nerve grafting, but represent an additional possibility to increase the reconstructive options and improve the final results. This pushes the surgeon to decide: which function is to be restored by nerve grafting, which one by nerve transfer? What is the more reliable procedure? Does the age of the patient, the delay after the accident, or the type of accident influence this choice? If we add in the possibilities of palliative treatment, one can state that many therapeutic options are available today for brachial plexus reconstruction, and that no real consensus does exist. But some tendencies, some trends are apparent [3].

Systematic review

Of 1360 articles initially identified, 33 were included in a analysis, with 23 nerve transfer (399 patients), 6 nerve repair (99 patients), and 4 nerve transfer + proximal repair (117 patients) citations (mean preoperative interval, 6 ± 1.9 months). For shoulder abduction, no significant difference was found in the rates ratio (comparative probabilities of event occurrence) among the 3 methods to achieve a Medical Research Council (MRC) scale score of 3 or higher or a score of 4 or higher. For elbow flexion, the rates ratio for nerve transfer vs nerve repair to achieve an MRC scale score of 3 was 1.46 (P = .03); for nerve transfer vs nerve transfer + proximal repair to achieve an MRC scale score of 3 was 1.45 (P = .02) and an MRC scale score of 4 was 1.47 (P = .05). Therefore, for elbow flexion recovery, nerve transfer is somewhat more effective than nerve repair; however, no particular reconstruction strategy was found to be superior to recover shoulder abduction. When considering nerve reconstruction strategies, the findings do not support the sole use of nerve transfer in upper brachial plexus injury without operative exploration to provide a clear understanding of the pathoanatomy. Supraclavicular brachial plexus exploration plays an important role in developing individual surgical strategies, and nerve repair (when donor stumps are available) should remain the standard for treatment of upper brachial plexus injury except in isolated cases solely lacking elbow flexion [4].

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1)
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3)

Oberlin C, Durand S, Belheyar Z, Shafi M, David E, Asfazadourian H. Nerve transfers in brachial plexus palsies. Chir Main. 2009 Feb;28(1):1-9. doi: 10.1016/j.main.2008.11.010. Epub 2008 Dec 25. PubMed PMID: 19162520.
4)

Yang LJ, Chang KW, Chung KC. A systematic review of nerve transfer and nerve repair for the treatment of adult upper brachial plexus injury. Neurosurgery. 2012 Aug;71(2):417-29; discussion 429. doi: 10.1227/NEU.0b013e318257be98. Review. PubMed PMID: 22811085.

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