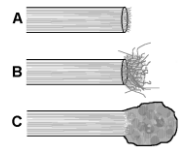


NERVE SURGERY

Nerves are similar to electrical cable and contain many fibres (axons). Some of these fibres are **sensory**, providing feeling in a defined area, and some are **motor**, activating muscles and sweat glands. Gaps between nerve endings can occur as a result of injuries that have not been repaired, or because sections of nerve have been removed.

When a nerve is cut, it attempts to regenerate. Fibres sprout out of the nerve at the near end (proximal) and grow across the gap towards the far end (distal) at about 1mm/day. Recovery is variable and always incomplete. The degree of recovery depends of many factors and is generally poor when surgical repair has not occurred. Under these circumstances, there is little return of feeling or power in the area supplied by the nerve. The fibres instead collect on the proximal end of the nerve as a lump called a **neuroma**. If the neuroma is superficial and if some of the nerve fibres have grown into scar tissue, the area can be very tender to knocks and pressure.



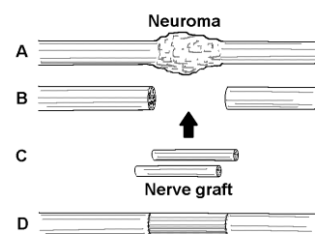
Nerve damage obviously causes loss of function due to reduced (hypoesthesia) or absent feeling (anaesthesia) in the area supplied as well as weakness (paresis) or loss of function (paralysis) in the muscles supplied. Less obviously but more commonly, function can be affected by tenderness due to neuroma formation, tethering of the nerve to scar or poor quality sensation that is “unpleasant” (dysaesthesia).

Nerve repair is performed whenever possible after a nerve is cut using an operating microscope (microsurgery). Results are generally superior to any other technique unless the repair is too tight. However, this is not possible if there has been a delay in treatment and/or if there is a large gap between the ends.

Nerve freeing (neurolysis) is appropriate when satisfactory function is present but pain occurs with movement and stretching of skin. It involves freeing the injured/repared section of nerve from surrounding scar tissue and is followed by exercises to prevent re-adhesion.

Nerve grafting is necessary to deal with a painful neuroma and/or poor function due to a gap in the nerve. A length is taken from another donor nerve and sewn into place in the recipient nerve

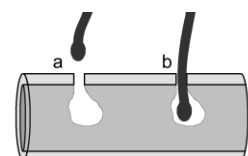
The problem with the technique is that it causes loss of feeling in the area supplied by the donor nerve and an additional scar. The end of the donor nerve will also inevitably form a neuroma. The end will be buried away from the skin but sometimes it becomes tender and a further minor operation may be needed to deal with this.



The choice of nerve donor depends on the size of nerve to be reconstructed, the length of the gap and the individual situation. A common choice is the sural nerve which supplies the outer side of the foot. For smaller nerves with short gaps, however, the posterior interosseous nerve on the back of the wrist can be used. This has the unique advantage of not resulting in any sensory loss at the donor site as it only supplies sensation to the wrist joint.

Nerve function may be initially worse after the any nerve graft operation. Recovery is very slow taking months or years. Function never returns to normal after the graft operation and it cannot be guaranteed that you will not form another **neuroma** at the graft site.

Nerve burial is a useful option for dealing with a painful neuroma, particularly in smaller nerves supplying areas that are not critical for function. Placing the neuroma deeply in soft tissues or bone can significantly improve comfort merely by removing them from points of contact and preventing them being knocked. It has the advantage of simplicity and avoidance of donor nerve problems. It, however, does not result in a return of any feeling in the area supplied by the nerve. Indeed, the operation often further reduces sensation in this area. However, in some circumstances, this can be advantageous; anaesthesia being better than dysaesthesia (see above).



Decision making in nerve surgery is difficult and requires discussion. There is often no perfect solution and a degree of compromise and realism is required by both patient and surgeon.