

DR REBECCA AYERS

Plastic, Reconstructive and Hand Surgeon

NERVE SURGERY & NERVE REPAIR

Nerves and Nerve injury

Nerves transmit sensory (feelings of touch, pressure or temperature) and motor (movement of muscles) impulses to & from the brain. Depending on the function of the nerve, damage will result in absent or reduced sensation, weakness and dry skin.

When a nerve is cut or damaged it will attempt to repair itself; the nerve fibres (axons) shrink back and 'rest' for about a month, then they begin to grow at about 1mm per day. Recovery is variable and always incomplete. Recovery is improved if the cut ends are brought together and repaired surgically.

If the nerve ends are not brought together the nerve fibres still attempt to grow and find the other end, however, often the result is a lump of nerve ends (a neuroma) that is tender to knocks or pressure and occasionally is uncomfortable all the time.

How long does a nerve take to regenerate?

This depends on the extent of injury to the nerve. A nerve that is bruised or traumatized, but is not cut should recover over 6-12 weeks. A nerve that is cut will grow at 1mm per day, plus a period of about 4 weeks or so. However some people notice continued improvement over many months.

Sensory nerves are more resilient than motor nerve and can recover sensation months or years after injury. Motor nerves need to be repaired within 12-18 months; after this time the muscle will no longer be activated by the nerve.

Before sensation returns, your limb is at risk of damage as it has no protective sensation; please be careful of your hands or feet, especially around hot or sharp objects.

How do I know the nerve is recovering?

As the nerve recovers the area the nerve supplies may feel quite unpleasant and tingly. This may be accompanied by an electric shock sensation at the level of the growing nerve fibres; the location of this sensation should move as the nerve heals and grows. Over time these feelings subside and the area should begin to feel more normal.

Is recovery following surgery complete?

Nerves never recover completely after they have been cut.

The degree of recovery depends on a number of factors: age (increasing age leads to decreasing efficacy), mechanism of injury (a cut is better than a crush), the time since the injury (quicker is better), the mechanism of repair (direct repair is best), the type of nerve, associated injuries and whether there is tension across the repair. Sometimes the recovering nerve may be trapped within scar tissue. Recovery is significantly reduced if this happens.

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Options for nerve repair / surgery

Immediate nerve repair

Direct nerve repair

- A microscope or magnifying glasses (loupes) are used to repair the cut nerve with sutures finer than a human hair

Nerve grafting

- Sometimes this is not possible to directly repair the nerve ends. For example if there is a piece of nerve missing or a delay in repair
- A length of nerve is taken from somewhere else in the body and placed as a graft. There is a scar and often a numb patch where the nerve graft is taken from. This is usually less bother than having a numb area on your hand.
- The repair is also performed using a microscope

Later surgery

Nerve Freeing (Neurolysis)

- Sometimes the nerve recovery is satisfactory but the nerve repair is trapped within scar tissue, causing tethering and discomfort on movement
- The nerve can be released from the scar tissue

Nerve grafting

- Sometimes the nerve fails to recover due to a neuroma or there is a persistent gap in the nerve
- The nerve ends are cut back until healthy ends are seen and a piece of nerve graft placed to facilitate normal nerve re-growth
- Nerve function (sensation and power) is initially worse and then should gradually improve – it is like beginning recovery all over again. Function will never return to normal but should be improved. Pain and discomfort at the site is usually better.

Nerve wrapping

- Sometimes a nerve is persistently tender. This is usually due to a neuroma
- Wrapping the nerve in a vein, fat or another substance provides padding around the nerve and improved symptoms

Nerve burying

- Sometime there are painful neuromas in smaller nerves of the hand. They are usually in locations that are not suitable for nerve repair eg amputated fingers
- The neuroma may be resected (cut away) and the nerve end buried deep in a muscle or bone. This prevents the nerve end from being knocked and should reduce the electric shock like pain.
- There is complete numbness in the area that the nerve supplies and this is permanent

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Possible complications

- Minimal or no improvement of symptoms
- Bleeding
- Infection
- Delayed wound healing
- Scarring : can be improved with massage and moisturizing cream
- Stiffness : completing hand exercises as directed will prevent this from occurring
- Complex regional pain syndrome : some people have hands that are very sensitive to surgery or trauma and become very painful, stiff and swollen following surgery. This is treated with special kinds of pain relief and physiotherapy
- Nerve graft complications
 - o Scar
 - o Numb area on arm or leg
 - o Painful lump at site of donor nerve requiring further surgery (rare)
- Nerve burying
 - o Total loss of nerve function
 - o Some residual discomfort