Sural Nerve Graft

Grafts are selected from nerves that are considered expendable, or much less important than the function being restored. Common examples of nerves that are used for grafts include the sural nerve in the leg, which provides sensation to the side of the foot, and the medial antebrachial cutaneous nerve, which provides sensation to the inner aspect of the arm. The sural nerve runs down the back of the leg from behind the knee to the outside of the foot. The procedure to take this nerve leaves a scar in the back of the patient's leg with numbness to the outside of the foot. The medial antebrachial cutaneous nerve is taken from the inner upper arm, and this procedure results in numbness to the inside portions of the arm, elbow and forearm.

A sural nerve graft is a surgical procedure used to repair or reconstruct damaged peripheral nerves. The sural nerve, located in the lower leg, is commonly used for this purpose due to its length and relative ease of access. Here's a detailed overview of the sural nerve graft procedure:

Indications for Sural Nerve Graft

Sural nerve grafts are typically indicated in cases where peripheral nerve damage cannot be directly repaired. This can include:

Traumatic Nerve Injuries: Severe lacerations or avulsions where the nerve ends cannot be sutured directly. Tumor Resections: Removal of benign or malignant tumors that involve or compress nerves. Chronic Compression Neuropathies: Conditions such as severe carpal tunnel syndrome or cubital tunnel syndrome where prolonged compression has caused significant nerve damage. Nerve Gaps: Situations where there is a significant gap between nerve ends that cannot be bridged by direct repair. Anatomy of the Sural Nerve The sural nerve is a sensory nerve that runs along the posterior aspect of the lower leg and foot. It provides sensation to the skin of the lateral foot and ankle. Its anatomical location and function make it a suitable donor nerve for grafting without causing significant sensory loss.

The initial experience shows the technical feasibility of reconstructing the optic nerve using an autograft, the possibility of axonal growth through the graft and, in the future, using this method for direct optic nerve reconstruction, as well as abypass method for damage to the optic nerve with various tumor diseases of the optic nerve, tumors of the chiasmatic-sellar localization, orbital injuries [1)]

Procedure for Sural Nerve Graft

Preoperative Preparation:

Patient evaluation and selection based on the need for nerve repair. Preoperative imaging and planning to assess the extent of nerve damage. Informed consent and discussion of potential risks

and benefits. Harvesting the Sural Nerve:

The patient is positioned to allow access to the posterior lower leg. An incision is made along the course of the sural nerve, typically from the lateral ankle to the mid-calf. The sural nerve is identified, dissected, and harvested. Care is taken to preserve the surrounding structures. The harvested nerve is measured to ensure it matches the length needed for the graft. Preparation of the Recipient Site:

The damaged nerve is exposed through an appropriate surgical approach. The nerve ends are prepared by trimming back to healthy tissue. The gap between the nerve ends is measured. Grafting the Sural Nerve:

The harvested sural nerve graft is positioned to bridge the gap between the nerve ends. Microsurgical techniques are used to suture the graft in place, ensuring alignment of the fascicles. The graft is secured without tension to promote healing. Closure and Recovery:

The surgical sites are closed in layers. Postoperative care includes immobilization of the affected area to prevent movement and protect the graft. Pain management, antibiotics, and wound care are provided. Postoperative Care and Rehabilitation Immobilization: The affected limb is often immobilized to prevent stress on the graft site. Physical Therapy: Rehabilitation begins gradually, focusing on maintaining range of motion and preventing joint stiffness. Sensory Re-education: Exercises and therapies aimed at retraining the brain to interpret sensory signals from the grafted nerve. Monitoring and Follow-up: Regular follow-up appointments to monitor healing and nerve regeneration. Outcomes and Prognosis Nerve Regeneration: Successful nerve grafts can restore function, but nerve regeneration is a slow process, often taking months to years. Functional Recovery: The extent of recovery depends on factors such as the length of the nerve gap, the patient's age, and overall health. Complications: Potential complications include infection, graft failure, and sensory loss at the donor site. Conclusion Sural nerve grafts are a valuable technique in the armamentarium of nerve repair and reconstruction. While the procedure is complex and requires specialized microsurgical skills, it offers hope for patients with severe nerve injuries by potentially restoring function and improving quality of life.

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Shkarubo AN, Ogurtsova AA, Yakupova ZF, Revishchin AV, Shishkina LV, Pronin IN, Chernov IV, Pavlova GV, Podoprigora AE, Shkarubo MA, Sinelnikov ME, Velichko AJ, Nikolenko VN. Experimental reconstruction of the optic nerve with a sural nerve graft: an in vivo experimental study. World Neurosurg. 2024 Jun 4:S1878-8750(24)00951-3. doi: 10.1016/j.wneu.2024.06.004. Epub ahead of print. PMID: 38843973.