COMMON PERONEAL NERVE INJURIES: GUIDELINES FOR SURGICAL TREATMENT IN OUR EXPERIENCE

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Common peroneal nerve injuries (CPNI)

• The most common nerve injury of the lower limb
Causative mechanisms

- Knee dislocations
- Sharp injuries (knife, glass etc..)
- Fractures
- Iatrogenic
- Ankle sprains
- Gunshots
Clinical presentation

• Foot drop with steppage
Ankle foot orthosis
Foot drop

• Often uncomfortable
• It impairs plantar flexion
Dictus or Aider
when

no signs of spontaneous recovery
are detected

after 6 months from the traumatic event
Which procedure should be the preferred option?

- Tendon transfers
- Nerve surgery
Whenever possible, nerve repair should be the preferred option as it offers the following advantages:

- Recovery of all the CPN-innervated muscles with possibility to restore peroneal muscles (that provide eversion movements and better stability to the ankle) and toes extensors

- Sensory recovery in the CPN territory

- In case of neuropathic pain consequent to the injury, subsidence of pain
CPNI: our present guidelines

The choice of the surgical technique is depending on:

- Referral date
- Surgical findings
- Conditions related to the patient
Referral date

Traumatic event

Less than 1 year
- Exploration at the popliteal fossa, nerve repair and/or tendon transfer

More than 1 year
- Tendon transfer
Common peroneal nerve injuries in knee dislocations

• In more than 85% of cases, evidence of neuroma along the nerve
CPNI: findings at surgical exploration
CPNI with partial injury or nerve gap shorter than 6 cm

When exploration reveals an injury that allows split repair, direct suture or nerve graft shorter than 6 cm

Nerve repair

CPN injury due to knife stab at the knee level
Iatrogenic injury of the CPN consequent to schwannoma removal: the tumor was removed resecting the nerve.

A 3.5 cm gap between the two nerve stumps was measured.
Harvest of the sural nerve

Graft repair
CPNI with loss of anatomical continuity longer than 6 cm

Complete rupture or presence of a neuroma in continuity that must be resected

The gap between the two nerve stumps is long between 6 - 12 cm

CPN injury due to gunshot at the knee level
High failure after CPN microreconstruction longer than 6 cm

WHY?

- Anatomical site
- Connective tissue within the nerve
- Excessive length of the nerve

Force imbalance between the anterior and posterior compartments of the leg (Millesi, 1987)
Nerve repair with graft reconstruction
Nerve repair is associated with tendon transfer
POSTOPERATIVE MANAGEMENT

- Immobilization to prevent knee joint movements for 2 weeks in case of nerve repair only

- Immobilization of both knee and ankle joints, with foot at 90 degrees for 15 days in case of nerve repair associated with tendon transfer.

   Foot immobilization at 90 degrees is maintained for a period of 4 to 6 weeks (based on possible elongation of the Achilles tendon).

Physiotherapy
CPNI outcome (M3 >) correlated with causative mechanism

- knee d.
- sharp inj.
- crush fract.
- other
CPNI surgical outcome: functional recovery

• Excellent immediate recovery of gait thanks to the tendon transfer

• Tibialis anterior and peroneal muscles recover earlier than ECD

• EHP recovery is unpredictable, often unsuccessful for unknown reasons

Average time for postoperative recovery between 12 and 18 months
CPN injury that requires a reconstruction longer than 12-13 cm

• Occasional favorable outcome, unsatisfactory results in the vast majority of cases

• With a few exceptions, nerve repair is not considered an option

• **Tibialis tendon transfer** is the treatment choice
Restoration of functional foot dorsiflexion in long dating injuries

- In long dating CPNI, nerve repair is not performed and foot dorsiflexion is restored thanks to Tibialis tendon transfer.
CPNI occurring after ankle sprains

Complete CPN (M0 on all CPN innervated-muscles) after an ankle sprain

NO recovery

Indication for surgery (tibialis transfer)
Tibialis posterior tendon transfer

- Tibialis posterior tendon transfer aims to restore foot dorsiflexion

- In order to provide a successful outcome, the donor tendon has to score M5/M4 on neurological examination: tendon transfers imply a decrease of muscle strength at least equal to 1 score (e.g. from M4 to M3)
Tibialis transfer: surgical technique

- Identification of the tibialis posterior tendon
• Detachment from its original insertion
• Passage through the interosseous membrane
• If necessary, elongation of the Achilles tendon
• Subcutaneous tunnelling of the tendon on the dorsum of the foot and reinsection on the 3° cuneiform bone
Postoperative care

• Immobilization: 4 weeks
  (6 weeks in case of Achilles tendon elongation)
Surgical outcome

Excellent immediate recovery with no steppage at gait
Conclusions

• In CPNI, the choice for the type of surgical treatment depends on several factors (e.g. referral date, the type of nerve damage found at surgical exploration, the causative mechanism etc.)

• Nerve repair presents several advantages in comparison with tendon transfers and should be always performed whenever possible

• Failure of nerve repair can be minimized associating a tendon transfer as advocated by Millesi in the 80s
Thanks for Your attention