Oral Presentation

ISMST22-0079

Targeted Sensory Reinnervation (TSR) and our experience with shock wave therapy for the treatment of microsurgical nerve sutures

Alexander Gardetto[1], *Gerfried Peternell*[2], *Wolfgang Schaden*[3]

[1] *Brixsana Private Clinic, Department for Plastic- Aesthetic and Reconstructive Surgery with Hand Surgery, Bressanone, Italy*

[2] *AUVA-Rehabiltation Center Tobelbad, Department for Exoprostheses, Tobelbad, Austria*

[3] *Ludwig Boltzmann Institute for Traumatology, The Research Center in Cooperation with AUVA, Vienna, Austria*

Introduction

The loss of the hand leads the patient to a significant reduction in personal and working quality of life and often inevitably to psychological consequences. Currently with myoelectric prostheses many of the normal activities of the hand can be recovered, with the exception of tactile sensitivity. Based on our successful experience with TSR (Targeted Sensory Reinnervation) operations performed at lower limb level, we decided to develop the same technique also at upper limb level.

Material & Method (please include the kind of device you are using)

The indications for this intervention are the treatment or prevention of neuropathic and phantom limb pain resistant to conservative therapies. Between October 2020 and February 2021, we performed the TSR technic on 3 patients. Two patients underwent elective hand amputation and TSR surgery at the same time. In one patient, TSR was performed secondarily after a frustrated replantation attempt. The technique involves neurorrhaphy of the median and ulnar nerves with the lateral and medial antebrachial cutaneous nerve respectively in order to reinnervate the skin of the amputation stump. In one patient, immediately after surgery, the coaptation sites were treated with ESWT to proof if the reinnervation time could be shortened. Postoperatively, EEG and nerve conduction tests were performed. All patients underwent a strict rehabilitation program.

Results

The pre-operative pain (especially neuropathic pain) improved significantly to completely postoperatively or did not occur at all. No phantom limb pain occurred in the electively amputated patients and in the patients who underwent secondary surgery, the pain has clearly subsided. A skin sensory map of the five fingers at the level of the amputation stump and the distinction between hot and cold were detected in all three. The reinnervation data were also tested with an EEG study.

Discussion

By redirecting the median and ulnar nerves to the medial and lateral cutaneous antebrachial nerves, the originally hand is reactivated as the transmitter of the pressure sensation from the prosthetic glove. As a result, the patients equipped with a special feed stream system, feel the hand authentically and the phantom limb pain is clearly to completely interrupted or, in the case of elective amputations, not caused at all. With intraoperative shock wave therapy, the sprouting of the nerve fibers could be accelerated significantly. However, we were also able to observe an increased formation of neuroma, which don't occur in the other patients without shock wave therapy. This fact opens up a wide field of discussion for us.

Technology: Focused Shockwave

Device and Company: MTS, Germany Orthogold 100

COI: No conflict of interest