Somatosensory Rehabilitation for Neuropathic Pain after Nerve Injury

A case series describing the treatment duration required for relieving mechanical allodynia in the hand

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BACKGROUND

Peripheral nerve injury (PNI) affects the upper limb in 80% of the cases[1].

Mechanical allodynia (MA), which is a painful sensation evoked by a mechanical stimulation that is normally not painful (e.g. light touch), is a prominent symptom that can be observed in patients with neuropathic pain (NP) following a peripheral nerve injury (PNI).

Therefore, MA is a challenge for the rehabilitation of upper limb sensorimotor performance.

The **Somatosensory Rehabilitation of Pain Method** (SRPM)[2] is a new non-pharmacological treatment of static mechanical allodynia (SMA) based on mechanical cutaneous tactile stimulation.

Recent studies have documented the efficacy of SRPM in diverse populations. Spicher et al[2] showed that SRPM can reduce SMA in patients with nerve injuries at heterogeneous anatomical regions.

A retrospective case series on SRPM showed a significant decrease of pain, for burn survivors with SMA at various anatomical regions[3].

Recently, a retrospective case series showed that the severity of SMA is reduced following SRPM in patients with complex regional pain syndrome in the upper limb[4].

OBJECTIVES

This study aims to evaluate:

1. The duration of treatment using SRPM that is required to relieve SMA at a specific anatomical region, that is the **hand** of patients with PNI
2. Whether the duration of treatment based on SRPM is correlated with the duration of NP symptoms, pain intensity and SMA severity at treatment initiation
3. The effect size of the treatment on pain intensity measurement

METHODS

Study design

Retrospective case series

Patients' selection

- Assessment of database of patients treated at Fribourg's Somatosensory Rehabilitation Centre (Switzerland), from 2004-2014
- 1161 patients were assessed and treated for (PNI) during this period
- 16 patients meet the inclusion criteria

Table 1: Patients' selection criteria

Inclusion criteria	Exclusion criteria	Treatment stopping criterion
• PNI affecting only one hand; • SMA (Pain ≥3/10 VAS with 15g pressure); • MPQ >19.	• Complex regional pain syndrome (CRPS); • SRPM treatment not completed by the patient.	• MA is resorbed (no pain evoked with 15g pressure).

PNI: peripheral nerve injury SMA: static mechanical allodynia MPQ: McGill Pain Questionnaire

Treatment

SRPM

1. Advice: Avoid cutaneous stimulations on the SMA territory
2. Distant Vibrotactile Stimulation:
   - Every day, 8x/day, 1 minute (or less long), with very soft texture (silk, fur, ...), or light vibration

Evaluations

1. Duration of painful symptoms (Pre-SRPM)
2. Static mechanical allodynia (SMA) severity: quantified using the Rainbow pain scale (Pre-SRPM)
3. Pain intensity as evaluated using the McGill Pain Questionnaire (version in the primary language of the patient) (Pre and post SRPM)
4. Duration of SRPM

RESULTS

Table 2: Duration of symptoms (Pre-SRPM) and duration of SRPM required to relieve MA

	Duration of NP symptoms (months)	Duration of SRPM (months)
Mean (SD)	24.1 (31.9)	5.5 (7.8)
Median (min; max)	15.5 (4.0; 135.0)	3.7 (1.3; 18.4)

Table 3: Correlation (Spearman) of SRPM treatment duration with symptoms duration, MPQ score and SMA severity at treatment initiation

Clinical measures at SRPM initiation	Correlation coefficient	p value
Symptoms duration	0.13	0.63
MPQ	0.55	0.03
SMA severity	0.43	0.10

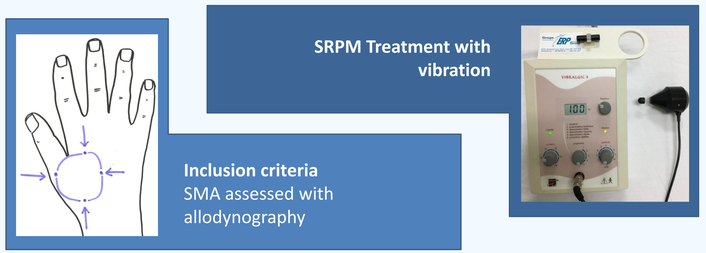
Table 4: Comparison and effect size of pain intensity (/100), for the initial and final assessments

	Initial mean (SD)	Final mean (SD)	P value (paired T-test)	Effect size (Cohen's d)
Pain intensity score (MPQ)	42.81 (17.83)	17.06 (10.64)	< .001	1.75

16 patients (12 females; 4 males) met the inclusion criteria (50.6 ±14.7 years)

15/16 (94%) of patients met the criteria for SRPM termination

1 patient stopped SRPM before resolution of SMA



DISCUSSION

After resorption of SMA, the affected territory always showed an underlying tactile hypoesthesia. As the SRPM recommends continuing the treatment to normalize tactile sensibility through adaptive neuroplasticity mechanisms, future studies should focus on that part of the treatment as well.

The duration of SRPM treatment required to resorb SMA tends to be related to SMA severity at the initiation of treatment. This correlation might reach significance if a larger sample size was used to provide more statistical power. Likewise, important parameters for rehabilitation should be assessed to see the improvement with SRPM: function, quality of life, dexterity, ...

CONCLUSION

This retrospective case series based on a sample of patients with SMA in the hand, indicates that **SPRM is an effective treatment to alleviate and clinically decrease SMA**.

The **duration of SRPM treatment** required to relieve SMA in the hand in patients with PNI is related to the **general pain intensity** at the initiation of the method.

REFERENCES

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