

Original Research

## Treatment of Chronic Post Surgical Pain Using Micro-current Point Stimulation Applied to C-Section Scars

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### Abstract:

**Background:** Direct Current (DC) micro-current point stimulation (MPS) is increasingly recognized as a therapy for chronic pain and stress management. However, there remains limited evidence as to the therapeutic value of MPS in chronic post surgical pain (CPSP) management related to C-Section scars.

**Objectives:** We aimed to determine the effect and magnitude that MPS has when applied to C-section scars and its effects on a wide variety of non-specific chronic post surgical pain syndromes.

**Study Design:** This was a cohort study analysis of treatment outcomes pre, post and 48-hour follow-up after Micro-current Point Stimulation (MPS) was applied to C-section scars on 47 patients with a history of non-specific CPSP pains. MPS was applied bi-laterally along the length of C-section scars. Evaluations entailed a baseline Visual Analogue Score (VAS) pain scale assessment, which was repeated after an electro-therapy treatment and 48 hours later. All 47 patients received one MPS Scar Release session.

**Results:** The VAS response of the 47 patient sample with chronic pain reflected a statistically significant reduction in mean post pain levels of 67.5% [ $p=0.000$ ], when compared to initial pain levels. When VAS was measured at the 48 hour follow-up, there was a further statistically significant reduction of 45.2% treatment [ $p=0.000$ ], for a total pain reduction of 82.2% [ $p=0.000$ ], when compared to initial pain levels.

**Conclusion:** The positive results in this study could have major implications for patients who have C-section scars and are suffering from chronic post surgical pain syndromes.

### Keywords

C-section scars; Micro-current point stimulation; Chronic Post Surgical Pain (CPSP)

## 1. Introduction

C-section is the most common surgical procedure performed in the US with 1.3 million such operations performed annually accounting for 32% of all births. [1, 2] During this medical procedure, a surgical incision is made through the abdomen. A C-section requires cutting through skin, connective tissue, muscles, the uterus, and adjusting the organs to deliver the baby. The trauma from childbirth can be minimal to severe. Typically, the recovery from a C-section is much slower than from a vaginal birth. [3]

C-section scars are linked to internal adhesion formation; the incidence of detection of adhesions after visceral surgery is almost universal (97%-100%). [4-6] Abdominal adhesions often lead to irregular bowel movements, [7] chronic abdominal pain, [8-10] digestive disorders, [11] endometriosis, [11-14] intestinal obstruction, [4] blocked circulation, [15-16] stagnant energy flows, [17, 18] and negatively influence the sympathetic nervous system, [19, 20] enteric nervous system, [21-23] and the fear reflex. [24, 25]

It is reported that C-section scars can cause the systemic centralization of pain, [8-10] as these are geographically located in the core of the body and reported in literature to negatively influence the psoas muscle [19] and spinal and skeletal alignment(s). [26-28]

C-sections may be a hidden cause for millions of women suffering from chronic pain, as the procedure has been reported to be linked to Chronic Post-Surgical Pain (CPSP), [8-10] back pain, [29] shoulder pain, [30] and neuropathic pain. [31]

DC Micro-current therapies which involve applying weak direct currents (80  $\mu$ A - <1 mA), are now being increasingly recognized for pain management and autonomic nervous system regulation. [32-37] DC Micro-current therapies below 1 milliamp ( $\geq 1.0$  ma) are reported to activate ATP, protein synthesis and increased metabolism [38], three key factors in cellular healing. Higher amplitude AC currents, ( $>1$ ma), inhibited these three key elements, [38] suggesting that low amplitude DC micro-current is more beneficial to cellular regeneration than the higher amplitude AC stimulation.

Sufficient evidence supports the application of DC micro-current for chronic pain and stress management [32-37], however, there is limited evidence in the literature to support the application of MPS to C-section scars for post surgical pain reduction. The purpose of this study was to assess the impact and longevity of MPS applied to C-section scars on the pain levels in a sample of N=47 chronic pain patients, after a single application.

## **2. Patients, Materials and Methods**

This study entailed the use of MPS in 47 female patients (mean age 44.19 years, SD 10.27) with chronic non-specific pains with a mean pain duration average of 8.63 years (SD 9.58) (Table 1) presenting to us for therapy of their problem. Location of the pain location sites are shown in Table 2. The sole inclusion criteria was: patients who were currently suffering from chronic pain for greater than 3 months after birth, with a recorded >4 VAS Pain Scale score and have visible C- section scar(s). The diagnoses of pain location or severity, sex, previous interventions or surgeries were not considered exclusion criteria. Informed consent was obtained to partake in treatment and the study assessments by all patients.

Patient pain scores were recorded immediate pre treatment and twice post treatment: immediately after application, and again 48 hours later. There were no controls in this study, as this was a cohort analysis, with the subjects acting as their own controls relating to pre, post and follow-up pain assessments.

MPS Scar release protocol is a patented process developed as a non-invasive alternative to currently invasively applied scar management techniques, such as corticosteroid injections, excisions, and neural therapies. The protocol entailed simultaneous application of two Dolphin Neurostim devices (Center for Pain & Stress Research Ltd, Ontario, Canada), on each side of the scar [33, 39]. This is an FDA-approved device which applies low frequency, concentrated, DC micro-current stimulation for the relief of chronic pain and stress. [40] Application time was 30 seconds per point at approximate one-quarter (1/4) inch intervals along the length of C-section scars.

It is reported in Neural Scar therapy that damaged scar tissue cells lose their normal membrane potential, leaving scar tissue positively poled. [41, 42] Therefore, the electro-polarity direction of DC micro-current application is important for this procedure. On one side of the scar, the first device is set to negative pole (-) and on the other side of scar, the second device is set to a positive-negative pole (+/-). The intent of this methodology is to force a negatively charged current back and forth through a positively charged (oriented) scar tissue. (Figure 1) For the purpose of this study, only C-section scars were treated. Scar Release Protocol was applied once to each patient for an average duration time of 30 minutes per patient.

The Visual Analogue Scale (generic one-dimensional pain questionnaire - VAS) was used to evaluate the patient's pain. The VAS is an 11-point scale from 0-10 with 0 being no pain and 10 being the most intense pain imaginable. [43-45] Patient verbally selects a value that is most in line with the intensity of the pain that they have experienced in the last 24 hours or is often reported as a rating

during a specific movement pattern or functional task. The VAS has good sensitivity and excellent test-retest reliability. [46]

**Table 1** MPS Applied to C-Sections N=47 Descriptive Statistics.

N=47	Minimum	Maximum	Mean	Std. Deviation
Age	23.00	65.00	44.1915	10.27584
Pain Duration (years)	.30	37.00	8.6343	9.58037
Initial pain (0-10)	1.00	10.00	6.0957	2.06850
Post MPS pain	.00	6.00	1.9787	1.53565
Follow-up pain	.00	3.00	1.0851	1.01788

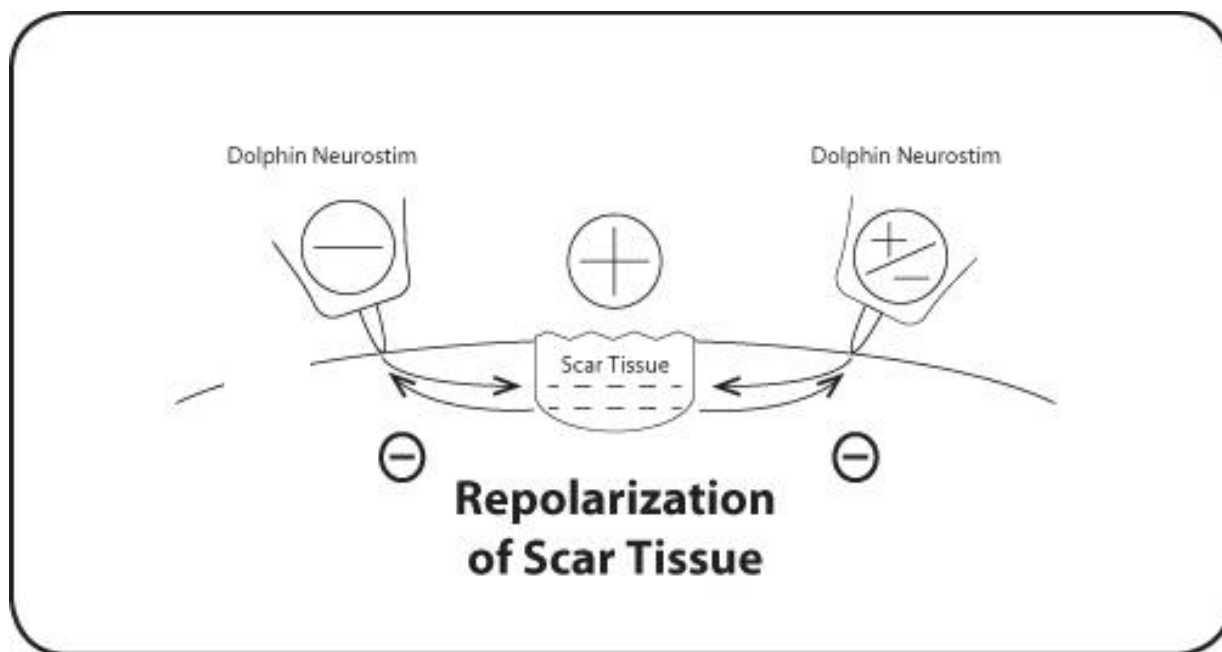
**Table 2** MPS Applied to C-Sections N=47 Pain Location.

C-Section Pain Location N=47	Total	Percentage
Back	13	27.3%
Shoulder-Scapula	9	18.9%
Neck	6	12.6%
Hips	5	10.5%
Abdomen	4	10.5%
Knees	3	6.3%
Headache	2	4.2%
Feet	2	4.2%
Pubic	2	4.2%
Fibromyalgia	1	2.1%
	N=47	100%

## 2.1 The Aim of this Cohort Preliminary Study was to Evaluate whether

Micro-current Point Stimulation, when applied to C- section scars

- 1) Can modulate or improve the VAS pain scale in patients suffering with chronic post surgical pain.
- 2) Is a valid alternative for the opioid pain management of chronic post surgical pain conditions.

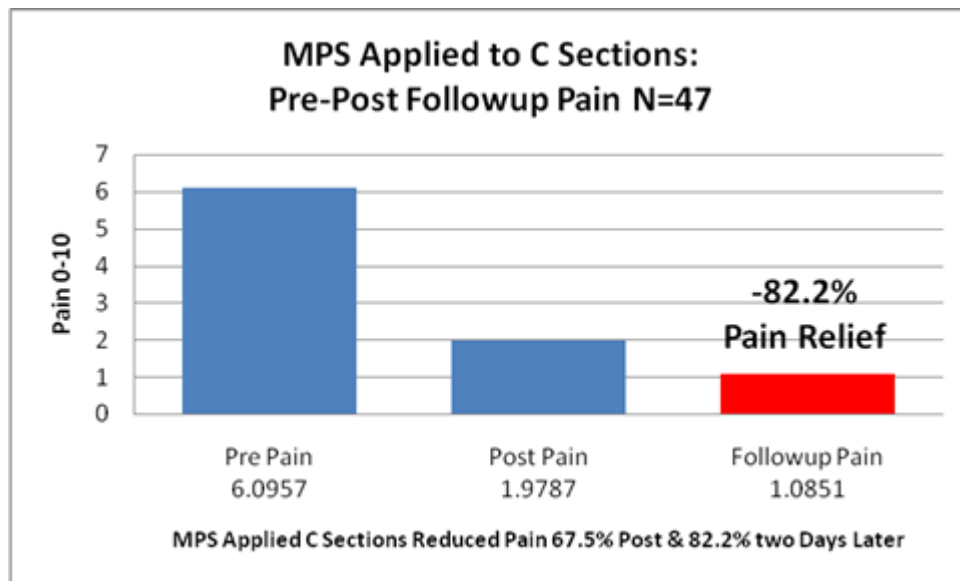


**Figure 1** Polarity and Direction of Current During Scar Application.

## 3. Results

### 3.1 Outcome Measures

The VAS response of the 47 patient sample with chronic pain reflected a statistically significant reduction in mean post pain levels of 4.117 points or 67.5% in mean pain levels post MPS application to C-Section scars, when compared to initial pain levels [95% CI (3.388, 4.8461);  $p=0.000$ ]. When VAS was measured at the 48 hour follow-up, there was a further statistically significant reduction of 0.8936 points or 45.2% in mean pain levels post treatment [95% CI (0.5612, 1.2260);  $p=0.000$ ], for a total pain reduction of 5.0106 points or 82.2% in mean pain levels post MPS treatment, when compared to initial pain levels [95% CI (4.3904, 5.6308);  $p=0.000$ ]. (Figure 2). There was no correlation between pain location and site of the C-Section scars (Tables 1 and 2).



**Figure 2** N=47 Pre-Post and follow-up pain outcomes.

#### 4. Discussion

C-section scars have the potential to negatively impact the body leading to sexual dysfunction, women’s health issues, and chronic post surgical pain even years after the surgery. The scar affects the fascia, structural and muscular components of the body and also interrupts the electrical, neurological, and energetic flow within the body. A scar alone can produce cellular imbalance at the local tissue site that can upregulate the nervous system causing or feeding the chronic pain cycle. [41, 42]

For many health care professionals, the underlying cause of chronic post surgical pain has been difficult to diagnose and therefore to impart proper treatment. Post-operative management of scar related pain continues to lag behind decades-old research, with few viable clinical options available currently for physicians to offer patients relief. [47]

The data from this study clearly shows that the application of MPS Scar Release Protocol to C-section scars had a marked improvement in CPSP outcomes when compared to baseline pain measurements. The improved outcomes were even more impressive given the patient sample for pain duration (mean 7.61 years) and the intensity (mean 6.33/10). Furthermore, there was continued pain reduction between post application and 48 hours later, suggesting that internal functional changes may have occurred that persisted despite no further therapy.

The considerable systemic influence of C-section scars on chronic post surgical pain within this data collection is illustrated by the fact that only 10% of the pain reported by patients was localized to the abdomen and area of the scar (Table 1), suggesting C-sections may be playing a larger catalyst role in the current chronic pain crisis throughout the USA than previously believed.

It is suggested in the literature that DC micro-current mimics human bio-cellular communications, enhancing autonomic nervous system regulation and the production of beta-endorphins, resulting in systemic, body-wide therapeutic benefits. [33, 36, 39, 48] These biochemical processes may provide a

plausible explanation for the improved pain modulation over time after MPS is applied, and is an area where future research is required. We have previously reported, in several published studies, reduction in pain and salivary cortisol with improvements in autonomic nervous system functionality in patients using MPS. [33, 36, 39]

At the cellular level it is theorized in literature that scar size, as measured by grey mean depth, may have a linear relationship with post surgical pain levels experienced by post-operative patients. It has been previously reported that MPS had reduced both cicatrix size and post operative pains in patients, [49] and it is possible the same mechanisms may be responsible for the reported pain reduction in this study.

Data reported in this paper adds further scientific evidence supporting a global view of the body in both diagnosis and treatment of CPSP, ushering in a new era of medicine. The impact of MPS scar release on distant post surgical pains, challenge the traditionally held pathophysiology concepts of pain management, which often connects symptoms to localized tissue trauma.

It is now imperative to holistically include the whole body in terms of both diagnosis and treatment of post surgical pain to in order to have a more functional approach to patient care. By applying this new philosophy, abdominal C-section scars may now be viewed as significant systemic contributors to post surgical pain dysfunction throughout the entire body.

## **5. Conclusions**

Chronic post surgical pain can limit quality of life, restrict work and social engagement, and is often blamed for the development of drug dependency of various forms. This study showed MPS therapy applied to C-section scars provided statistically significant reduction in initial post-surgical pain levels with a further reduction after a 48-hour follow-up.

These significant changes help validate the potential application of MPS to C-section scars as a viable option to treating patients with non-specific soft tissue chronic post-surgical pain. However, this single cohort analysis warrants a more long-term investigation with a larger treatment group to confirm these results and to assess their duration of effectiveness.

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Statistical analyses were done by 3rd party freelance statistician using SPSS software version 24, a widely used program for statistical analysis in social and medical science.

## **Author Contributions**

KA was the lead author and key contributor to the paper. Both KA and WT were the two therapists responsible for performing treatments and collecting data. RG is research consultant with a passion for science who overviewed and edited this paper.

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## **Competing Interests**

None of the authors have any commercial associations that create a conflict of interest in connection with the submitted manuscript. All authors received financial compensation as educational or research consultants from the sponsoring company that may create the appearance of a conflict of interest in connection with the submitted manuscript.

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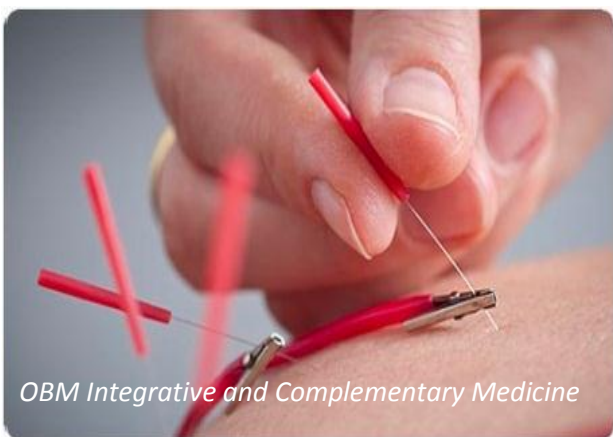
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