



## Myofascial Pain and Treatment

Effect of adjuvant frequency-specific microcurrents on pain and disability in patients treated with physical rehabilitation for neck and low back pain<sup>☆</sup>Gautam M. Shetty<sup>a,\*</sup>, Pallavi Rawat<sup>b</sup>, Anjali Sharma<sup>b</sup><sup>a</sup> QI Spine Clinic, Mumbai, India<sup>b</sup> QI Spine Clinic, Pune, India

## ARTICLE INFO

## Article history:

Received 6 November 2019

Received in revised form 14 April 2020

Accepted 19 July 2020

Available online xxx

## Keywords:

Frequency specific microcurrent therapy

Neck pain

Low back pain

Rehabilitation

Physical therapy

Spine

## ABSTRACT

**Objectives:** To evaluate the efficacy of adjuvant frequency-specific microcurrent (FSM) application on pain and disability in patients treated with physical rehabilitation for mechanical low back pain (LBP) and neck pain (NP). **Methods:** In this retrospective case-control study, pre- and post-treatment numerical pain rating scale (NPRS) score, Oswestry disability index (ODI), neck disability index (NDI) score, disability categories, and treatment outcome categories were compared between 213 patients in the FSM group (167 patients with LBP, 46 patients with NP) and 78 patients in the control group (61 patients with LBP, 17 patients with NP).

**Results:** In LBP patients, mean post-treatment NPRS score was significantly lower ( $p = 0.02$ ) and a significantly higher percentage of patients were in the  $\leq 3$  NPRS score ( $p = 0.02$ ), in the minimal disability ( $p = 0.01$ ), and the full success ( $p = 0.006$ ) categories post-treatment in the FSM group when compared to the control group. In NP patients, there was no significant difference in the post-treatment pain intensity, disability or treatment outcome when the 2 groups were compared.

**Conclusions:** The use of adjuvant FSM application in patients treated with physical rehabilitation for LBP significantly improved pain and disability when compared to patients in the control group. The application of FSM could be a useful adjuvant in the rehabilitation treatment of patients with low back pain.

© 2020

## 1. Introduction

Electrophysical modalities such as transcutaneous electrical nerve stimulation (TENS), interferential current stimulation, diadynamic current stimulation, and high-voltage electrical stimulation are used for pain management in patients with musculoskeletal conditions (Almeida et al., 2018; Rajfur et al., 2017; Gibson et al., 2019; Logan et al., 2017; White et al., 2017). However, the evidence is lacking in the literature about the efficacy of such modalities on acute or chronic low back pain (LBP) or neck pain (NP). A recent systematic review and meta-analysis reported inconclusive evidence of benefits of TENS in patients with low back pain patients due to the low quality of studies available in the literature (Resende et al., 2018). However, another systematic review which analyzed 700 patients, reported that although TENS does not improve symptoms of lower back pain, it may offer short-term improvement of functional disability (Wu et al., 2018).

Frequency-specific microcurrent (FSM) is an electrophysical modality used in pain management that delivers very low-intensity electric current to tissues within the microampere ( $\mu A$ ) range, approximately 1000 times lower than the current intensity used in TENS (McMakin, 2011, 2017). Microcurrent application is based on the principle that a current closer to the cellular current of the body can overcome electrical resistance of injured or inflamed tissue, restore cellular homeostasis, and facilitate tissue regeneration in contrast to TENS which primarily works by blocking the transmission of pain signals (McMakin, 2011, 2017). Although the mechanism of action of FSM is not yet clear, these microcurrents of physiological amperage when delivered to damaged or inflamed tissues is said to alter cell membrane function, reduce inflammation, and promote healing by maintaining intracellular  $Ca^{2+}$  homeostasis and upregulating ATP production (McMakin, 2011; Kwon et al., 2014; Fujiya et al., 2015; Lambert et al., 2002).

Although previous studies have reported the efficacy of microcurrent in improving muscle function in musculoskeletal conditions such as delayed onset muscle soreness, congenital muscular torticollis, spastic myocontracture in cerebral palsy, and age-related muscle weakness (Lambert et al., 2002; Curtis et al., 2010; Kim et al., 2009; Mäenpää et al., 2004; Kwon et al., 2017), literature is lacking on the effect of FSM application on pain and disability in patients with LBP or NP. Hence, this study aimed to determine the efficacy of adjuvant FSM application on pain and disability in patients treated with physical rehabilitation for LBP and NP. We hypothesized that the use

<sup>☆</sup> The authors certify that this study is original and has not been presented or published anywhere else before.

\* Corresponding author. QI India Healthcare, #6 Level 2 Phoenix Market City, LBS Road, Kamani, Kurla (West), Mumbai, 400070, India.

E-mail address: [gautam.shetty@qispine.com](mailto:gautam.shetty@qispine.com) (G.M. Shetty)