The Efficacy of SCENAR Therapy for Myofascial Pain Syndrome

In Bo Han, MD, Ji Young Moon, MD, Ryoong Huh, MD, Hye Young Yoo, RN, Sang Sup Chung, MD
Department of Neurosurgery, Bundang CHA hospital, Pochon CHA University, Sungnam, Korea
Corresponding author Ryoong Huh, M.D.
Department of Neurosurgery, Pochon CHA University, College of Medicine, Bundang CHA Hospital, 351, Yatap-dong, Bundang-Gu, Sungnam, 463-712, Korea Tel: +82-31-780-5260
Fax: +82-31-780-5269 E-mail : hrnsd@hanmail.net
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ABSTRACT
Objectives: Myofascial pain syndrome (MPS) is a frequent cause of chronic musculoskeletal pain.
The purpose of this study is to verify the usefulness of SCENAR standing for Self-Controlled Energo-Neuro-Regulator in patients with MPS.
Materials and Methods: We retrospectively analyzed 340 patients from March 2006 to December 2006 in whom SCENAR therapy was performed for MPS. SCENAR therapy consisted in 10 sessions lasting 20 minutes. Therapeutic effects were evaluated before treatment, at 1 week, and at month after the end of treatment using a visual analogue scale (VAS) and we categorized treatments as effective or ineffective.
Results: The patients treated by SCENAR therapy showed significant improvement in the VAS. One week after the SCENAR therapy, 296 patients (87.2 %) had experienced effective pain relief, and these improvements were maintained at the 1 month follow-up evaluation.
Conclusion: SCENAR therapy is a safe and effective means of treating patients with MPS.
KEYWORDS: Myofascial pain syndrome • pain • SCENAR

INTRODUCTION
Myofascial pain syndrome (MPS) is a painful condition that is characterized by localized pain, muscle tenderness, decreased range of motion, mood and sleep problems. The pain in MPS most commonly occurs in the head, neck, shoulders, arms, legs and lower back. However, it can occur in any muscle group. It has been reported that a number of factors including poor posture over time, continuous pressure on the muscle, emotional stress, surgical incisions, repetitive motions and joint problems can trigger MPS. Numerous therapeutic approaches have been used with varying success rates to treat MPS.[4] The common treatments for MPS are pharmacological therapy, ultrasound therapy, transcutaneous electrical nerve stimulation (TENS), relaxation techniques, acupuncture, and stretching exercise. However, the efficacy of these treatments remains controversial.
SCENAR (ZAO, OKB RITM, Russia) standing for Self-Controlled Energo-Neuro-Regulator was first invented in Russia in mid 80s under space and military research program. This is the first time that SCENAR therapy is used in the treatment of musculoskeletal pain. The aim of this study was to investigate the short-term efficacy of SCENAR therapy in patients with MPS.

MATERIALS AND METHODS
From March 2006 to December 2006, 340 patients were treated by SCENAR therapy in our department of neurosurgery. MPS was diagnosed by the presence of multiple sore spots or trigger points in the muscles. Additional symptoms used to diagnose MPS included impaired range of

motion (ROM), mood disturbance, muscle tenderness, and sleep problems. The following patients were excluded from the study: 1) patients with clinical signs and symptoms of fibromyalgia; 2) patients aged below 18 or above 80 years; 3) patients with neurological deficits. Furthermore, we also excluded patients presenting contraindications for the SCENAR therapy, which compromised those having cardiac pacemaker. Institutional review board of the University of Pochon CHA approved this study. During the period of SCENAR therapy, none of the patients underwent any form of therapy excepted for the SCENAR therapy to check the effect of SCENAR therapy.

Method of SCENAR treatment
The SCENAR weighs approximately 208.5grams, is 180 mm in length and 60 mm width, with an electrical contact at one end and runs off a 4.5V battery (Fig. 1). The practitioner applies it onto patient's skin until the patient feels a tingling sensation. It would be slightly uncomfortable but not painful. The practitioner brushes the device over the patient's skin during treatment. The practitioner is looking for anomalies on the skin surface, which may be highlighted by redness, numbness, stickiness or a change in numerical display or sound (Fig. 2). Although these areas may not seem to directly relate to the obvious symptom, by treating these asymmetries, the healing process will commence. In most cases, the treatment lasted for approximately 20 minutes and required a minimum of 3 treatments. A course of treatment varied from individual according to such factors as the stage of the pathological process, the patient's age, state of health, and other relevant factors.

Testing procedure
Patients were clinically evaluated before treatment, after 1 week and 1 month following the end of treatment. Evaluation parameters included the following: 1) measurement of the subjective intensity of pain visual analogue scale (VAS); 2) evaluation of the myofascial trigger point characteristics through manual palpation; 3) evaluation of the ROM of the spine (cervical and lumbar) and shoulder.

RESULTS
340 patients (138 male, 202 female; ages 23-76 years; mean age 43.5 years) who met all enrollment criteria were included in this study (Table 1). The patients treated by SCENAR showed a significant improvement of performance in pain score (VAS) and in the evaluation of myofascial trigger point characteristics. A significant increase in the ROM was also achieved. One week after the end of the SCENAR therapy, 296 patients (87.2 %) had experienced effective pain relief, and these improvements persisted at 1 month pos-treatment (Table 2). The patients were classified into subgroups; low back pain subgroup and neck pain group including shoulder pain. The reduction in the pain intensity was achieved in 83.1% among the low back pain subgroup (n=95) and in 88.7% among the neck pain subgroup (n=245). The effect of SCENAR therapy in cases of neck pain was superior to that in cases of low back pain. No serious complications occurred during the treatment.

DISCUSSION
The results of the present study show the possible short-term therapeutic effects of SCENAR in the treatment of MPS. The use of SCENAR for musculoskeletal pain is new. There have been no studies investigating its mechanism of action. The SCENAR is a hand held, electric stimulation therapeutic medical device. The device sends out electrical impulses similar to neuro-impulses through the skin and measures the response. In respond to a SCENAR impulse, reflex biofeedback, which means the communication between the brain and the affected part, proceeds at real time and biological speed. It is able to instruct the brain and body to generate specific neuropeptides, the key biochemicals used by our body to heal itself. By continuously using

biofeedback, the SCENAR modifies each successive input signal to either amplify or dampen the form of the pathological signals that exist in the body.

The SCENAR is very different from other electrotherapy such as TENS. The feature of TENS impulse is asymmetrical biphasic square wave. TENS only stimulates A and B fibers and lack biofeedback capability. However, SCENAR device has a fixed and constant distance between cathode and anode (Fig. 1). The SCENAR impulse (Fig. 3) is high amplitude so it stimulates C-fibers, which make up about 85% of all nerves in the body. This explains the speed and effectiveness of SCENAR therapy. Moreover, SCENAR impulses contain numerous random features to prevent the body from adapting to the stimulation, compared to TENS.[1)j)5)6)]

The C-fibers react most readily to the electrical stimulation and are responsible for the production of neuropeptides and other regulatory peptides. The SCENAR catalyzes the process to produce regulatory peptides by stimulation of C-fibers in the body for it to use where necessary. It is these neuropeptides that are responsible for the healing process. As these peptides last up to several hours the healing process will continue even after treatment is over."' Pain is the most common complaint to be dealt with in the SCENAR therapy by block of transmission of the pain impulses in the nerve endings of the peripheral nerve fibers, pain focus suppression of brain cortex, and reduction of the edema around the nerve fibers leading to reduction of pressure effect.

It is very important to achieve a change in patient's condition and to find 'asymmetries' on the skin surface. As the SCENAR device is moved over the surface of the skin, there are five large diagnostic symptoms: stickiness, sensitivity alteration, skin alteration, sound alteration and change in numerical output display. When the device is moved over the skin, it can "stick" so that we cannot get it moving forward without applying force. It means there is a pathological nidus over there. "Sticking" area needs to be treated additionally for 2-3 minutes. Highly sensitive skin area also coincides with the projection of the pathological nidus and is optimal for SCENAR application. Skin reddening during the treatment indicates the increased functions in this area and is up for additional treatment. If a pale skin area stands out against the red background, it indicates the decreased functions in this area and is also up for additional treatment. Any change in tonal sound during SCENAR application indicates a pathological nidus. Skin area of the altered sound needs to be treated additionally for 2-3 minutes. By treating these asymmetries, the healing process would commence and the devices give real relief from pain.

CONCLUSION
The present study demonstrates that SCENAR therapy is a safe and effective method of treating patients with MPS. However, we should perform further research aimed at establishing the long-term effect of SCENAR therapy in the treatment of MPS.

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Table 1. Demographic and clinical features

Parameter	Myofascial pain syndrome
Total number	340
Mean age, y (range)	43.5 (23-76)
Sex (male : female)	138 : 202
Pain location (neck: low back)	245 (72.1%): 95 (27.9%)

Table 2. Outcome at one week after SCENAR **therapy**

Groups	Reduction of pain intensity (%)
All groups (n = 340)	296 (87.2%)
Low back pain subgroup (n = 95)	79(83.1%)
Neck pain subgroup (n = 245)	217(88.7%)

Figure Legends

Fig. 1. The photo of SCENAR (Self-Controlled-Energo-Neuro-Adaptive-Regulator) device; anterior part of the device (A) and posterior part (B). Posterior part of the SCENAR shows a fixed and constant distance between electrodes.

Fig. 2. The practitioner brushes the device over the patient's skin during treatment (A). Skin reddenint during the treatment indicates the increased functions in this area and is up for additional treatment (B).

Fig. 3. Comparison between the impulse of SCENAR (Self-Controlled-Energo-Neuro-

Adaptive-Regulator) and the impulse of transcutaneous electric nerve stimulation (TENS). SCENAR impulse (A) shows high amplitude, bipolar and spike shape and the impulse of TENS (B) reveals asymmetrical biphasic square wave.

High Amplitude

Bipolar

Short triangle

5 μs

SCENAR impulse (A)