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Dry Needling Treatment in 38 Cases of Chronic Sleep Disturbance

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***Abstract*—**In the past 10 years, computers and cellphones have become one of the most important factors in our lives, and one which has a tremendously negative impact on our muscles. Muscle tension may be one of the causes of sleep disturbance. Tension in the shoulders and neck can affect blood circulation to the muscles. This research uses a dry needling treatment to reduce muscle tension in order to determine if the strain in the head and shoulders can influence sleep duration. All 38 patients taking part in the testing suffered from tinnitus and have been experiencing disturbed sleep for at least one to five years. Even after undergoing drug therapy treatments and traditional acupuncture therapies, their sleep disturbances have not shown any improvement. After five to 10 dry needling treatments, 24 of the patients reported an improvement in their sleep duration. Five patients considered themselves to be completely recovered, while 12 patients experienced no improvement. This study investigated these pathogenic and therapeutic problems. The standard treatment for sleep disturbances is drug-based therapy; the results of most standard treatments are unfortunately negative. The result of this clinical research has demonstrated that: The possible cause of sleep disturbance for a lot of patients is the result of tensions in the neck and shoulder muscles. Blood circulation to those muscles is also influenced by the duration of sleep. Hypertonic neck and shoulder muscles are considered to impact sleeping patterns and lead to disturbed sleep. Poor posture, often adopted while speaking on the phone, is one of the main causes of hypertonic neck and shoulder muscle problems. The dry needling treatment specifically focuses on the release of muscle tension.

***Keywords*—**Dry needling, sleep disturbance, sleep duration, muscle tension, trigger points.

I. Introduction

MUSCLE tension has been considered as an important factor resulting in disturbed sleeping patterns [1]. This study will focus on the muscles of the neck and shoulders. There is increased chance of having hypertonic muscles problems among different ages of the population [2]. The group of muscles is most frequently associated with reading, cellphone use, watching TV and playing computer games. A group of neck and shoulder muscles becomes the most involved muscle groups [3]. The research defined the following muscles as those most frequently used for playing computer games and watching TV:

1. Splenius capitis
2. Levator scapular
3. Scalene muscle group
4. Sternocleidomastoid
5. Rhomboid major
6. Rhomboid minor (deep)
7. Trapezius
8. Sternocleidomastoid (superficial)

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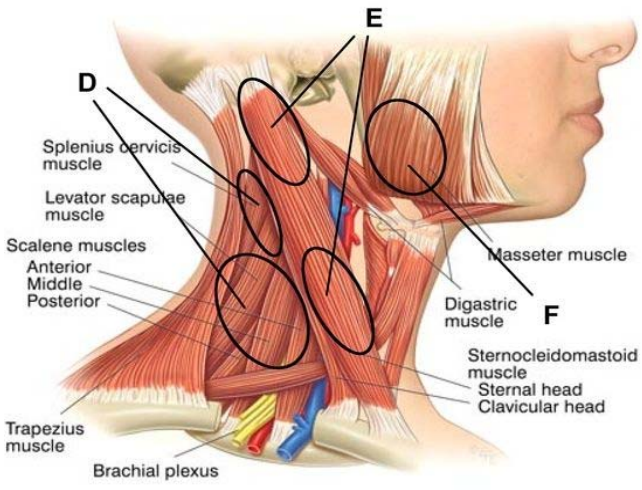

Fig. 1 Muscle group of neck and shoulders [4]

A trigger point, commonly known as a muscle knot, can be defined as a taut band of muscle fibers. It can be found through palpation, which involves feeling along the muscle fibers with the fingertips, using pressure to determine affected areas. The myofascial trigger point definition and palpation is using the palpation method of muscolino. The first step is finding the pain area. The second step is localizing the pain trigger area. The third step is pressing the possible points and trying to find the "twitching" reaction from the local muscles [5]. A trigger point is actually a small contracted area of muscle tissue, which is caused by muscle fibers that have become unaligned and are not integrated after being injured or torn. The small patch of muscle tissue cuts off its own blood supply, which causes a small metabolic crisis that, irritates the area even more. Fig. 2 shows some frequent trigger points on the neck and shoulder. The palpation procedure of finding the certain trigger points must contain a lot of discomfort –far more than most people believe is possible. The pain is a combination of pinching pain and muscle spasm [6]. This kind of feeling is called "twitching". The "twitching" sensation is the most important sign for finding the trigger point. The trigger point can be treated in many different ways. In our research, we choose a dry needling treatment, which is a technique used for treating trigger points. There is enough evidence and proof that the dry needling treatment has a positive effect on muscle tension and muscle motor control.

The dry needling technique is a suitable treatment for trigger point for persons with myofascial pain syndrome.

A myofascial trigger point is a contracted muscle knot with different groups of muscles, where the trigger point blocks the blood circulation and causes local inflammation. The pain of the trigger point actually comes from the local muscle fiber inflammation. Czech Republic-based neurologist and specialist in manual medicine, Professor Karel Lewit, first introduced dry needling for the treatment of trigger points in 1979. But back then he used an injection needle and not an acupuncture needle. It had the effect of releasing the pain [7], [8].

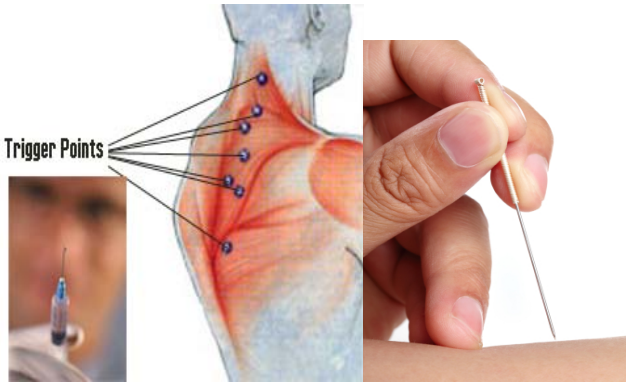

Fig. 2 Injection needle treatment and acupuncture needle treatment [9]

Dry needling treatments are performed differently on various patients. In this case, there is no standardized dry needling treatment. There is limited research into the study of dry needling treatment, and much focuses only on myofascial trigger points. One of the most important procedures of doing a dry needling treatment is to use the needles to break down the muscle tissues around the trigger point area. It involves a technique known as "fishing" that uses the tip of a needle to find the right spot to evoke a local twitch response (LTR) [10].

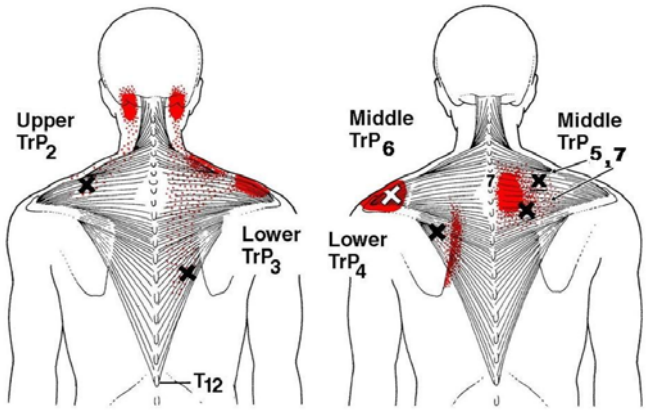

Fig. 3 Possible trigger points of muscle groups

Para-spinal muscles quite often have trigger points [11]. Tension in the para-spinal muscles can be caused by problems related to internal organs or hormones. Hypertonia is caused by the upper motor neuron, which is a protective reflection of our muscle system. But this defensive reflection can cause different patterns of muscle weakness and local muscle activity problems. In the end, the hypertonia can cause dysfunction of the local muscles to influence ADL activities [12], [13].

Hypertonia is a condition that is characterized by rigid muscles and a reduced capacity to stretch, which is the result of damage to motor nerve pathways in central nervous system. The symptoms of the "Spastic hypertonia" are muscle spasms, stiffening and shock-like-contractions, which are caused by lesions of the basal ganglia. This form of hypertonia is quite frequently seen in office workers. The fear of the pain caused movement can influence the range of motion of local joint and local nerve innervation. It happens quite often on the para-spinal muscles. One effective method to overcome this problem is dry needling treatment [14]. The big influence of para-spinal muscle tension on range of motion shows it is important to reduce the muscle tension of the para-spinal muscles.

II. Research Method

The 38 treatment cases are randomly selected under the same criteria and each of them have different treatment plan, but what they have in common is that they are all of them experienced sleeping disturbance for more than one year and up to five years. The duration of the treatments of the selected patients varies from five weeks to 15 weeks. In this research, the timing of the results assessment is in the fifth week of treatment. There is no gender and no age selection criteria. Patients were treated in different periods and not at same time. Patients are selected under the following criteria:

- The patient suffers from sleep disturbances for more than 12 months
- The patient is not taking sleep medication
- The patient has never had a dry needling treatment
- The patient is willing to undertake treatment constantly for five weeks without any disruption or break in the regime
- The patient does not have heart- or lung problems

A. Participants

- Two dry needling therapists (one with three years clinical experience and one with one year clinical experience)
- One physiotherapist for doing intake and collecting feedback
- Two nurses to care for and coordinate patients during the treatment of all 38 participants

B. Process

In the first step, the physiotherapist first had an intake session with the patient. During this session patient are asked to answer a series of questions. The results are checked by computer program called "IntraMed". This program determines whether the patient fits the criteria for the specific dry needling treatment.

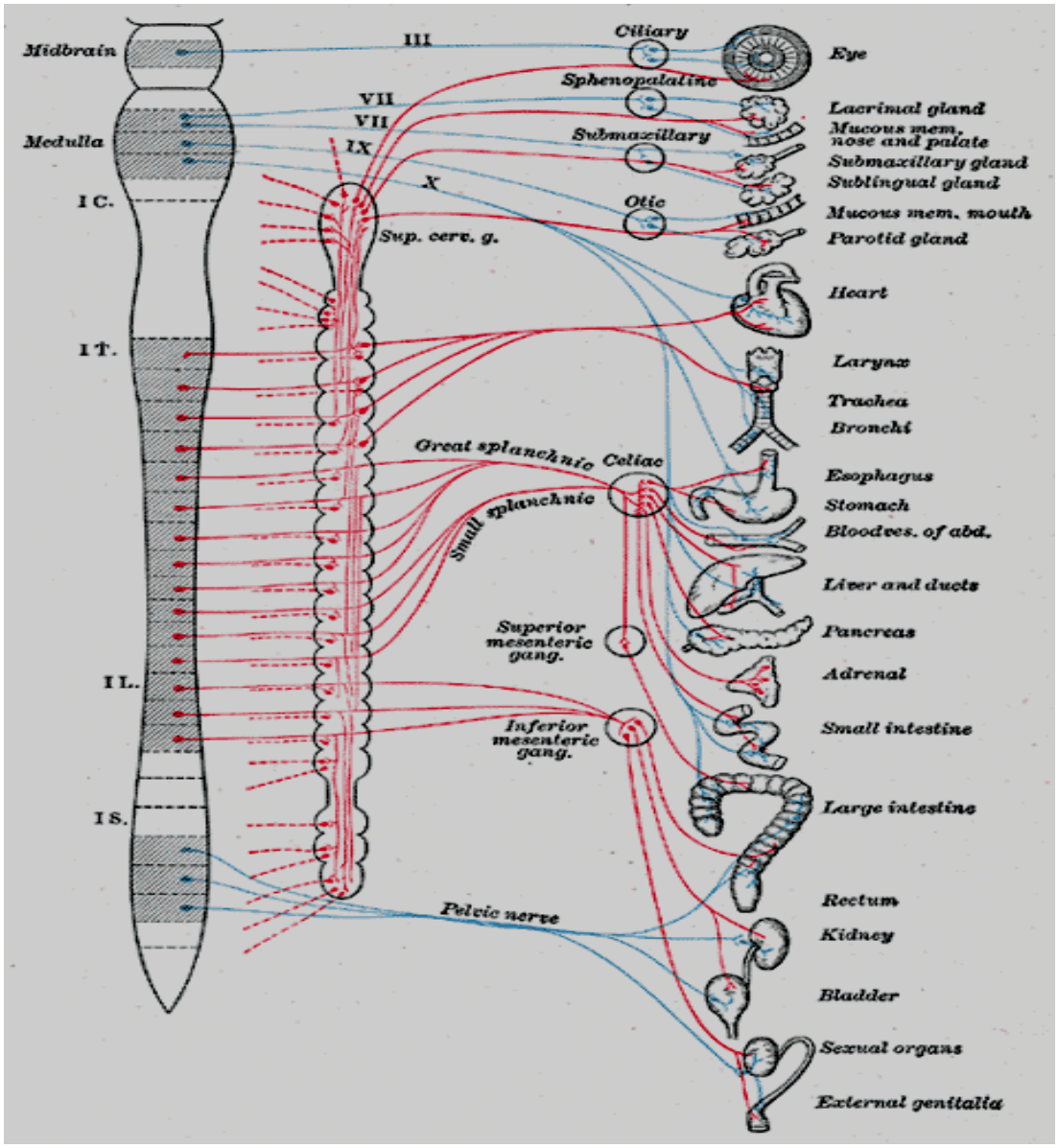

Fig. 4 Innervation of nerves passing under para-spinal muscles [13]

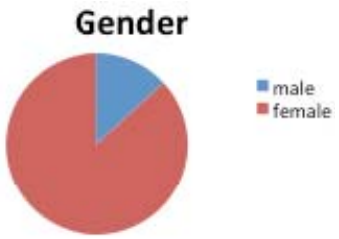

Fig. 5 Gender distribution of patients

During the treatment, the therapist applies a deep touch method to palpate the muscle to identify the trigger points [5]. The physiotherapist only palpates the muscle groups of the neck and shoulders. The physiotherapist records the trigger points in the "IntraMed" system, which can be viewed by the other dry needling therapist. Two dry needling therapists are working on different days. The patient will visit one of the dry needling therapists each week to undergo treatment. The dry needling therapist follows the diagnosis from the physiotherapist and administers the dry needling treatment each week.

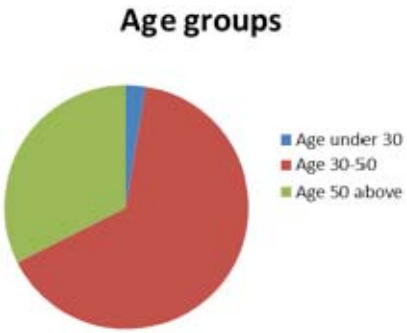

Fig. 6 Age group distribution of patients

The treatment protocol for conducting the dry needling treatment during the research is:

1. Using the "fishing" technique.
2. Using an oblique needling technique only for safety reasons.
3. Clear explanation and information about the pain and procedure of dry needling is given to the patient.
4. Patients must sign a consent form before proceeding with the dry needling treatment.
5. Starting from the second treatment, orally agree on how to proceed with the dry needling treatment.
6. Keep on analyzing the patient's attitude towards the treatment.

The treatment will be conducted regularly for a period of five weeks. The frequency of the treatment is one session per week. The patient can select the day that they want to attend for treatment. However, once a date is selected it cannot be changed and the patient's schedule is fixed.

C. Material

- Needles 0.25 mm*25 cm
- Needles 0.25 mm*40 cm
- Alcohol
- Cotton
- Gloves (for hygiene)
- Trolley working table

D. Measurement

The measurement tool in this research was a questionnaire, which contains two questions:

1. Has your sleep duration changed positively or negatively?
2. How many more hours of sleep do you have compared to before starting treatment?

If you cannot remember the exact amount of hours, please indicate the range as follows:

A: *Less than 5 hours*
B: *More than 5 hours but less than 8 hours*
C: *More than 8 hours*

The patient will fill out the questionnaire after the fifth week of the treatment. One therapist is in charge of helping patients to fill in the form and gain feedback from the patients about the treatment.

III. Result

The first question of questionnaire shows that 24 patients have shown improvement in the duration of their sleep. Four out of 24 patients reported sleeping longer than eight hours after treatment; they think they are completely recovered. Twelve patients did not record any improvement after five weeks of treatment. Two patients dropped out of the study and failed to complete the five weeks of treatment.

The results of the second question of questionnaire reveal that 24 patients have shown an improvement of around two hours in the duration of their sleep, while 10 out of those 24 recorded an improvement of more than three hours.

In total, the result shows that more than 65% of patients experienced a positive result after the fifth treatment of dry needling. More than 30% of patients have improved their sleep duration to more than eight hours.

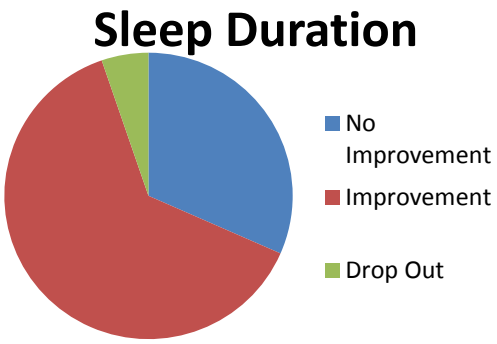

Fig. 7 Sleep duration

IV. Discussion

The results of the treatment cannot fully represent the real effect of the dry needling treatment due to the small size of the study group. Only the physiotherapist carries out the trigger point palpation during the assessment procedure and makes the diagnosis. There is no second physiotherapist to undertake the same pretreatment procedure and make a diagnosis, and therefore, there is no comparison on the first diagnosis.

The measurement tools depend too much on the patient's personal feelings. All the information supplied by the patient is subjective. The outcomes can be influenced by weather, patient mood and other personal factors.

The results of this research also found a possible relation between PSCMT (Para-spinal Cord Muscle Tension) and sleep disturbance. Therefore, a new hypothesis of the sleep disturbance was made according to the compression on the transverse process caused by paraspinal muscle group. The muscle tension of the paraspinal group can also influence the back muscle group, which can be a frequent cause of back pain or spasm. The muscle tension only can be relieved when a person is lying flat. The muscle tension is hard to reduce in the sitting or standing position.

Further consequences are that it has a possibility to influence the innervation of the sympathetic nerve. The innervation to organs may also decrease due to the compression on the spinous process. All body metabolisms are possibly influenced by this negative factor. If you take a closer look at the beginning section of the spinal cord, the cervical spine has the most unstable structure, which can place pressure on the local muscles and the local tissues.

V. Conclusion

Based on the results of the research, more than 60% of patients showed an improvement in sleep duration at the fifth week of treatment. Some 35% of patients reported an improvement in their sleeping patterns of more than three hours after receiving the weekly dry needling treatment. Dry needling treatment was shown to have a significantly positive influence on the duration of sleep on patients suffering from hypotonic tension of neck and shoulder muscle groups.

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