Comparison between myofascial release technique (MRT) and Transcutaneous electrical nerve stimulation (TENS) toward pain level in non-specific neck pain patients

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Abstract. Non-specific neck pain is neck pain that does not spread to upper limbs, pain located in the neck of the occipital area to the back shoulders. Non-specific neck pain is caused by several factors such as incorrect posture, anxiety, stress and excessive movement. The rigid and pain in the neck muscles also occurs headaches and migraines. The study aims to determine myofascial release technique (MRT) and Transcutaneous Electrical Nerve Stimulation (TENS) toward the pain level in the non-specific neck pain patients. The study was quasi experimental methods with one group pre-test and post-test design. The study was conducted in Anuntaloko Parigi Hospital on March until April 2017. The samples were 20 respondents who met the inclusion criteria. The result obtained different before and after intervention MRT was 23.2 with p=0.000. These results indicated significant decrease or change in the pain level. Meanwhile, independent t-test obtained the difference of probability before and after intervention was 0.286>0.05 which concluded there was no significant difference in the intervention MRT and TENS toward pain levels in the non-specific neck pain patients.

1. Introduction

The neck pain is most common and painful musculoskeletal condition which ranges from 6% to 22% and increased to 38% of elderly population in all high income countries [1,2]. The cervical range of motion (ROM) is usually related with neck pain and ROM impairment magnitude can be correlated to the pain level and self-rated functioning [3]. The neck pain is most significant health problems globally which ranked fourth leading cause of years lived with disability [4].

In 2010, neck pain affected 4.82% of world population and ranked second after back pain which disability contribution of 33.6 million people per year [5]. The non-specific neck pain incidence increased 10% to 20% of population per year which non-specific neck pain prevalence increased due to age and generally occurs in women aged between 22 years and 50 years. In Indonesia, 16.6% of adult population had suffered discomfort around neck and 0.6% of adult population claimed local discomfort in the neck to severe neck pain.

In addition, manual therapy techniques also have various types such as Myofascial Release technique that often applied and proven to solve problems and role in healing process. Some previous studies showed that Myofascial Release technique caused specific or non-specific neck pain which provided effective interventions and efficient treatment costs [6].
Myofascial Release technique (MRT) was first developed by John F. Barnes in 1970. This technique uses hand modality to mobilize soft tissue that aims to release adhesions in the Myofascial, making Myofascial relaxed, increased joint motion scope, reduced pain and improve soft-tissue flexibility [7].

Nitsure et al. (2014) found significant reduction in the pain according to Visual Analog Scale (VAS) and improvement in functional activities based on Northwick Park Questionnaire (NPQ) and Disabilities of Arm, Shoulder and Hand Questionnaire (DASH) in determined the effect of Myofascial Release technique on upper extremities and neck [8].

Transcutaneous Electrical Nerve Stimulation (TENS) modality is very good for reducing the pain. TENS is device that utilizes electrical energy that works to stimulating nerve fibres through the skin surface which can reduce the pain. The action mechanism is estimated through the gate control theory to stimulate endorphins hormone production with aims to reduce acute and chronic pain. The study aims to determine myofascial release technique (MRT) and Transcutaneous Electrical Nerve Stimulation (TENS) toward the pain level in the non-specific neck pain patients.

2. Methodology
The study was carried out in Anuntaloko Parigi Hospital, Central Sulawesi from March 2017 to April 2017. The study was used experimental design with on group pre-test and post-test design to determine differences of Myofascial Release Technique (MRT) and Transcutaneous Electrical Nerve Stimulation (TENS) toward pain level in non-specific neck pain patients.

The study population were all non-specific neck pain patients who had treatment at Anuntaloko Parigi Hospital. The samples were 20 patients who met the inclusion criteria and divided into two groups with 10 respondents for each groups.

The data was collected was carried out by measuring pain level using Visual Analogue Scale (VAS). The data was analysed with comparison test to determine in the pain level before and after 6 times intervention with paired t-test and independent t-test. The data was analysed with SPSS program.

3. Result and Discussion

3.1. Result
Table 1 shows that there were 6 respondents (60%) aged between 36 years and 45 years and 3 respondents (30%) aged between 46 years and 65 years in MRT group. In TENS group, there were 6 respondents (60%) were aged between 36 years and 45 years and 3 respondents (30%) aged between 46 years and 65 years. Meanwhile, there were 7 female respondents (70%) and 3 male respondents (30%) in both group, MRT and TENS groups.

| Respondent characteristic | MRT   | TENS  |
|---------------------------|-------|-------|
| Age (years)               |       |       |
| 26-35                     | 1     | 1     |
| 36-45                     | 6     | 6     |
| 46-65                     | 3     | 3     |
| Total                     | 10    | 10    |
| Gender                    |       |       |
| Male                      | 3     | 3     |
| Female                    | 7     | 7     |
| Total                     | 10    | 10    |

Table 1. Respondent characteristic distribution.
In MRT group, 7 respondents (70%) had medium pain and 3 respondents (30%) had light pain during pre-test. Meanwhile, 4 respondents (40%) had no pain and 5 respondents (50%) had light pain which showed increment in better pain level among non-specific neck pain in the post-test. In additions, there were 9 respondents (90%) had medium pain and only 1 respondent (10%) had light pain in the pre-test for TENS group. In post-test, 9 respondents (90%) had light pain and only 1 respondent (10%) had medium pain level among non-specific neck pain patients.

Table 2. Distribution of changes in pain level before and after intervention.

| Category       | MRT    |          | TENS    |          |
|----------------|--------|----------|---------|----------|
|                | Pre-test | Post-test | Pre-test | Post-test |
| No pain        | n      | %        | n       | %        | n      | %        |
| Light pain     | 3      | 30%      | 4       | 40%      | 0      | 0%       |
| Medium pain    | 7      | 70%      | 1       | 10%      | 9      | 90%      |
| Strong pain    | 0      | 0%       | 0       | 0%       | 0      | 0%       |

Table 3 shows that mean of MRT group during pre-test, 50.0 and decreased to 26.80 on the post-test. The paired t-test showed there were significant changes before and after being given MRT group. In TENS groups, pre-test had mean of 57.40 and decreased to 38.40 during post-test. There were significant changes between pre-test and post-test for TENS group. The independent t-test showed there was no significant different between MRT and TENS toward pain level among non-specific neck pain patients.

Table 3. Comparison of MRT and TENS toward changes in the pain level among non-specific neck pain patients.

| Group          | Mean±SD | Difference | P* | P** |
|----------------|---------|------------|----|-----|
| MRT            | Pre-test| 50.00±14.14| 23.2 | 0.000 | 0.286 |
|                | Post-test| 26.80±17.54|     |     |     |
| TENS           | Pre-test| 57.40±10.16| 19  | 0.000 |     |
|                | Post-test| 38.40±6.59 |     |     |     |

p* = paired t-test; p** = independent t-test

3.2. Discussion

The result found average age in the respondents were aged 36 years and 45 years which this age range is common found non-specific neck pain. This age range, usually there had been decline in physical capacity which elasticity and flexibility of muscle tissue had decreased. In additions, bad posture habits also influenced non-specific neck pain since poor posture and age can accelerate the degeneration process caused neck pain due to excessive distribution of load on the cervix. Besides, the result showed more women than men due men had physiological structure with more muscle mass. In additions, influence of hormone such as testosterone affected men body which easily build and strengthen muscle.

In additions, there was significant differences in the pain level on pre-test and post-test for MRT intervention. MRT intervention provided significant reduction in non-specific neck pain since MRT
can stretch or increased Myofascial structure which aims to restore fluid or lubricant quality from myofascial tissue, vasodilation of blood flow, tissue mobility and normal function. MRT play roles in providing stretch or elongation to muscle and myofascial structure with aims of removing adhesion, reducing pain with gate control theory, restoring lubricating fluid quality from myofascial tissue, tissue mobility and normal joint function.

Furthermore, there were significant differences in the pain level after given TENS intervention which TENS group provided significant reduction in non-specific neck pain. TENS was combination of small devices to provide mild electrical pulses to the nerves in the affected area. TENS functions were blocking pain impulses through stimulation of large nerve fibers and caused body released endorphins.

The independent t-test showed there was no significant different between MRT and TENS toward pain levels among non-specific neck pain patients. This result can be influenced by several factors included study limitations and therapy repetitions given to each sample. Besides, the physical activity also influence neck pain which increased muscle workload especially postural muscles in maintained consequent position.

4. Conclusion
In conclusion, there was difference in the pain level in non-specific neck pain patients after MRT intervention. In additions, TENS also helped in reduced non-specific neck pain. There was no significant difference of Myofascial Release technique and Transcutaneous Electrical Nerve Stimulation toward pain level among non-specific neck pain patients. This study is expected to be one of modality for reducing non-specific neck pain and development of further study.

References
[1] Tsakitzidis, G., Remmen, R., Dankaerts, W., & Royen, P. V. (2013). Non-specific neck pain and evidence-based practice. European Scientific Journal, 9(3).
[2] Woodman, J., Ballard, K., Hewitt, C., & MacPherson, H. (2018). Slef-efficacy and self-care-related outcomes following Alexander Technique lessons for people with chronic neck pain in the ATLAS randomised, controlled trial. European Journal of Integrative Medicine, 17(2018), 64-71.
[3] Rudolfsson, T., Björklund, M., Svedmark, A., Srinivasan, D., & Djupsjöbacka, M. (2017). Direction-specific impairments in cervical range of motion in women with chronic neck pain: influence of head posture and gravitationally induced torque. PLoS ONE, 12(1).
[4] de Campos, T. F., Maher, C.G., Steffens, D., Fuller, J.T., & Hancock, M.J. (2018). Exercise programs may be effective in preventing a new episode of neck pain: a systematic review and meta-analysis. Journal of Physiotherapy, 64(2018), 159-165.
[5] Oral, A., Sindel, D., & Ketenci, A. (2014). Evidence-based physical medicine and rehabilitation strategies for patients with cervical radiculopathy due to disc herniation. Turkish Journal of Physical Medicine and Rehabilitation, 60(1), 47-53.
[6] de-las-Peñas, F., Palomeque-del-Cerro, L., Rodríguez-Blanco, C., Gómez-Conesa, A., & Miangolarra-Page, J.C. (2007). Change in neck pain and active range of motion after a single thoracic spine manipulation in subjects presenting with mechanical neck pain: a case series. Journal of Manipulative and Physiological Therapeutics, 30(4), 312-320.
[7] Shah, S., & Bhalaria, A. (2012). Myofascial release. International Journal of Health Sciences and Research, 2(2).
[8] Nitsure, P., & Welling, A. (2017). Effect of gross myofascial release of upper limb and neck on pain and function in subjects with mechanical neck pain with upperlimb radiculopathy- a clinical trial. Journal of International Dental and Medical Research, 1(3), 8-16.