

A Comparison of Two Methods of Strengthening Exercises with and Without Massage on Alleviation of the Chronic Neck Pain

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Abstract: Neck pain is known as second most common musculoskeletal disorder after low back pain. Although the effect of exercise and massage on reducing pain is clear, but the effect of therapeutic exercise combined with manual therapy has been minimally researched. Therefore the aim of this study was to compare the effect of exercise therapy and the combination of exercise and massage chronic neck pain. Ninety symptomatic volunteered female randomly assigned into 3 groups (Control, Exercise, Combination of exercise and massage therapy). The exercise group went through neck and shoulder's strengthening exercises and the combined group received 10 minutes of Yumieho massage along with strengthening exercises for 6 weeks. Neck pain was measured using VAS before and after the interventions. Data were analyzed using paired-sample t-test and independent-sample t-test ($\alpha=0.05$). Except for the control group, there was significant pain reduction in both experimental groups. The combined group also significantly showed more reduction in neck pain than exercise group. According to the results of this study, exercise is effective in reducing the neck pain; however, using exercise together with Yumeiho massage is even more effective and can lead to better outcomes. Therefore, we believe the combined method (using exercise along with Yumeiho meassage) as an effective method in reducing chronic neck pain in females.

Key words: Strengthening exercise % Yumeiho massage % Chronic neck pain

INTRODUCTION

Musculoskeletal disorders are the most prevalent complication which can force an individual to go through physical treatments. This complication can cause health problems and force the individuals to leave their job due to pain and disease [1]. Occupational musculoskeletal disorders are significantly more common in some professions and jobs [2,3]. In some occupations which individuals are supposed to perform repetitive actions or in professions in which people must do hard tasks or have a lot of activities, the rate of these disorders are higher. (e. g. nurses, physiotherapists, chiropractitioners and dentists).

One of the most common musculoskeletal disorders is neck pain [4 -6]. The prevalence of this pain has increased during recent decades and presently, is known as the second most common musculoskeletal disorder after low back pain and is more common in females [1,7]. In one research the prevalence of neck pain has been

reported 11 and 14% in employees of England and Canada, respectively [8]. The etiology and the mechanism of the chronic neck pain could be several factors. Physical stress can cause microtraumatic injuries in soft tissues and mental stress can cause the muscle's tension to increase. Normally muscles and ligaments bear most of the exerted loads on the area. But during of muscle fatigue or exhaustion or when muscles are under too much pressure they can't play their role perfectly and the tension affects the structure of other inactive structures [9].

During recent decades some researchers have recommended therapeutic exercises as a way to control and prevent neck pain [7, 8, 10-12]. Anderson *et al.* [7] has shown that performing strengthening exercises three times a week and twenty minutes in each session for ten weeks can have a positive effect on pain reduction [7]. Their research on women employees suffering from neck pain (Specified pain in trapezius muscle region) showed that strengthening exercises in comparison with general exercises had more effect on reducing neck pain [7].

Blangsted *et al.* [10] in Stockholm also investigated the effect of special strengthening neck exercises in comparison with general exercises on 594 staff member who were working with computer and concluded that strengthening exercises have a better effect on reducing the pain and improving the working ability scale [10].

In previous studies, the applied exercises for reducing the neck pain have a wider diversity. In most researches only strengthening exercises have been applied and in spite of a long history of applying manual treatments like massage, a little research has been carried on regarding massage (specially Yumieho massage) as a way to reduce pain [13-17]. As in previous studies there is a lack of researches concerning the combination of the strengthening exercises and massage therapy, the need for such investigation is justified. Therefore, the aim of the present study was to investigate the effect of two methods of strengthening exercises alone and strengthening exercises along with Yumieho massage on chronic neck pain level in female hospital employees.

MATERIALS AND METHODS

Ninety symptomatic volunteered females (hospital employees) randomly assigned into 3 groups (Control group n=30, Exercise group n=30 and Exercise along with Yumieho massage n=30). The Yumieho massage consists of massage, pressure and rubbing on special areas with setting maneuvers, in order to release adhesions, muscle contractures and spasms, regaining joint mobility and balance. The inclusion criteria was having chronic neck pain (pain which had lasted at list for three months), willing to participate in the study and the exclusion criteria was any record of neck surgery, neck or arm fractures, pregnancy in the time of study, neck rheumatoid arthritis, whiplash injuries to the neck, symptoms of any nerve root pressure in the form of numbness in fingers, acute neck pain, pain and movement restrictions in the shoulders, neck discopathy or unwillingness to participate in the study.

After describing the procedure and objective of the study, subjects signed the consent forms which said they were willingly volunteered to participate in the research. The extent of subjects' neck pain was measured by VAS before the intervention programs. Therefore, all the individuals were asked to determine a number from 0 to 10 to show the quality of pain in a way that 0 meant no pain and by choosing 10, they conveyed a feeling of intolerable pain. Control group received no treatment program. Exercise group (strengthening exercise) received

strengthening exercises for neck and shoulder. Considering the individual differences in terms of muscle power, strengthening exercises were established according to subject's measured strength. One maximum repetition (1RM) were measured in shoulder's exercises as the maximum weight that an individual could once lift, then shoulder exercises with weight began by 50% of this maximum and continued considering the overload principle. The exercises were performed in 10-15 repetitions. To strengthen neck muscles Head weighting exercises were also applied. Firstly the subject was asked to lie down in a supine position and flex her head and neck forward to the end range. If she was able to perform this action, then she was ask to perform it again with head weighting band were tied to her brow and if there were difficulty in flexion of the head with weight, strengthening exercises began without weight and the weight were added gradually during weeks of training. These exercises carried on for 6 weeks and 3 times per week and 20-30 minutes per session under close supervision of physiotherapist. Third group (Strengthening exercises along with massage) received strengthening exercises plus Yumieho massage for 10 minutes. The applied massage techniques included 8-10 techniques [18].

As the subjects were hospital employees, it was not possible to arrange a group exercise for second and third group. Therefore, the individuals were allowed to refer to physiotherapy department of the Hospital, in their free times usually between 11 am to 2 pm or from 7 to 8 AM in order to perform their exercise under the supervision of a physiotherapist.

After checking the normality of data with 1-sample K-S test, the comparison of between-groups and within-groups differences, were performed using independent and dependent t-test, respectively. In order to compare the differences between three groups, the One-Way ANOVA was used followed by Tukey post-hoc test. All statistical analyses were performed using the statistical package of SPSS for Windows (version 16). The probability value (alpha) of statistical significance was set at P#05.

RESULTS

Descriptive results of the subjects are shown in Table 1. The pain degrees of groups in pre-test and post-test is also included in Table 2. The t-test result showed that the severity of the pain in both exercise and exercise with massage groups had been ecreased (Table 3).

Table 1: Demographic characteristics of subjects

Groups	Age (year) (M±SD)	Height (cm) (M±SD)	Weight (kg) (M±SD)
Exercise	34±6.13	161±5.42	65±7.46
Exercise with massage	34±5.82	162±5.45	66±4.96
Control	34±4.86	159±25.4	67.5±3.68

Table 2: Neck pain in pretest and post test

	Exercise (M±SD)	Massage with exercise (M±SD)	Control (M±SD)
Pre test	6.80±1.92	7.93±1.19	6.98±1.42
Post test	3.70±1.35	2.63±1.45	6.90±1.36

Table 3: T-test comparison of pre-test and post-test in experimental groups

Experimental group	Mean differences	t	P value
Exercise	3	8.44	0.01
Exercise with massage	5	18.84	0.01

A significant difference in reduction of pain was observed between two experimental groups in such a way that the exercise and massage group showed significant ($t(68) = 1.15, p = 0.002$) more reduction in neck pain after the intervention ($M = 6.80, SD = 1.92$) comparing to the pain scale before the intervention ($M = 3.70, SD = 1.35$).

DISCUSSION

As a result of this study, in comparison with the control group, significant reduction in neck pain was observed in both experimental groups. The results also indicated that although the exercise program had a positive effect on reducing of the pain, this effect is greater when the exercise is combined with massage.

The significant reduction of neck pain in exercise group concurs with the research outcome of some previous studies [7, 8, 12, 14, 19]. In previous studies it's been determined that the neck muscles' strength declines by neck pain [12, 20-22]. The muscle strength decrement may caused by the inhibitive effect of pain and changes in muscle structures [12]. Muscles' weakness especially in deep muscles could affects the spinal posture condition and leads to postural disorders which itself can increase pain and the pain itself can again cause muscles' weakness and as a result musculoskeletal disorders might result. Therefore, strengthening of the weak muscle has been introduced as a possible slousion. It has been shown that neck's deep muscles activity such as Longus coli and Longus capitis in patients with neck pain are disrupted [21]. Deep muscles function parallel to superficial muscles activity is necessary in order to provide stability in neck area. It's been determined that

patient suffering from chronic neck pain, have difficulty maintaining the right sitting posture and after a while a tendency toward forward head posture develops in them [22].

Neck and shoulder strengthening exercises with objective of enhancing the strength of deep and superficial neck muscles and shoulder muscles can be very effective in breaking the pain's cycle [23]. In previous studies, it has been determined that strengthening exercises increase the muscle strength [21, 24-26]. Dynamic exercises in a rehabilitative program have a significant effect on pain reduction in individuals suffering from neck or back pain as in most of the daily activities and sports, high muscles strength and tolerance are needed [23]. Both deep and superficial muscle have important role in the stability of the vertebra and its ideal function, Therefore, strengthening these muscles could have a positive effect on the stability and appropriate function of the spinal column [23]. This is achievable through improved blood circulation and muscle glycogen intake better muscle nutrition and therefore muscle endurance and also increases muscle unit recruitment [23]. Strengthening exercises lead to enhancing the protein metabolism which in fact causes a recovering the painful muscle. Moreover, the more a muscle gets stronger the better it can withstand the pressure and stress [7].

On the basis of our results, the pain's severity in the group which received massage additional to strengthening exercises presented more reduction. This can be attributed to the effect of both strengthening exercises and also Yomieho massage. Probably, a more reduction of pain in this group can be attributed to exclusive massage's effects [13, 15, 16, 27]. Most of the people who are suffering from chronic neck pain have actually pain in the trapezius muscle region which could be caused by muscle spasm. A daily hyper activation of this muscle's motor units, can disrupts the biochemical properties of the muscles and ultimately leads pain [1, 14].

This kind of pain can be easily reduced by massage [28]. Massaging this area can relax and reduce muscle's strain due to mechanical stress [28]. Massage is effective on whole body relaxation, tissue's healing and pain alleviation and increase the blood circulation and increases the Serotonin neurotransmitter which controls the pain [29]. Deep massage can also cause histamine release and vasodilation by stimulating the nerves' endings [29]. Although massage doesn't improve the muscles' strength directly, but as it reduces exhaustion, in theoretical point of view, it increases a possibility of muscle's activation and, therefore, improves its strength and endurance indirectly [29]. We can relate the anti-pain effects of massage to the gateway theory [30]. On the basis of this theory massage causes stimulation of larger motor neurons which inhibits pain pathways to the central nervous system [29].

Considering the above mentioned basic theories on the effects of massage, we can probably attribute the more reduction of neck pain in our combined group to the Yumieho massage effect and therefore, we recommend it as a way to alleviate the chronic neck pain to individuals with the same characteristics as similar as to the present study subjects.

CONCLUSION

What Is Already Known on this Topic: The earlier studies suggest an association between exposures to exercise and decreased of neck pain. Also previous studies indicate that massage therapy has a positive effect on reducing of pain as a whole and in neck region.

What this Study Adds: Combining the exercises with massage applied on the neck region has even more effects on reducing the level of pain to the exercise or massage method when they are applied singularly.

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