Original Article

Efficacy of Eight Week of Exercise Therapy for Neck Pain among General Dentists

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Abstract

Background and Aim: The prevalence of musculoskeletal complaints is high among dentists; however, only a few studies have focused on this topic. The aim of this study was to assess the efficacy of an exercise program for neck pain relief in dentists practicing in Tehran.

Materials and Methods: A questionnaire was administered among 46 dentists in Tehran matched by age, gender (all males) and neck pain complaints in the past six months. Subjects were randomly divided into two groups. The first group received exercise therapy while the second group was given no exercise. Pain was measured at two months after the intervention using the visual analog scale (VAS). Data were analyzed using t-test and $P<0.05$ was considered statistically significant.

Results: The t-test showed significant improvement of neck pain in the first group after the intervention ($p<0.05$).

Conclusion: The results showed that exercise therapy could be effective for treatment of neck pain. Therefore, regular exercise by dentists can prevent neck pain and other musculoskeletal disorders (MSDs).

Key Words: Exercise therapy, Neck pain, General dentists

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Introduction

Some occupations require specific body positions [1]. Evidence shows that the reason for more than half the absences from work is MSDs [2].

Sedentary work, angular changes of the spinal column in different sitting positions and insufficient breaks result in pain and discomfort. With regard to occupational health risks, dentists are prone to many physical conditions. Physical and mechanical risk factors such as an inappropriate or sedentary posture and repetition of a movement can cause MSDs Dental procedures require precise vision and high accuracy [3].

Evidence shows high rate of musculoskeletal complaints due to not adhering to ergonomic principles in dentistry [4,5]. Finsen and Christensen [6] and Freeston and Emery [7] showed that long-term flexure of the neck and abduction of the arm and elbow produce high muscular activity and cause pain [6, 7]. Alkesson et al, in 1997 evaluated the posture of dentists when working and stated that back muscles of the dentists are under high tension and head is in a flexed position for long periods of time [8]. The prevalence of neck, back, shoulder and wrist complaints among Iranian dentists has reported to be 65%, 60%, 38% and 31%, respectively [1].

Neck pain may be neuropathic or due to trauma, infection, inflammation (rheumatoid arthritis, osteoarthritis and ankylosing spondylitis), tumor or congenital causes. However, mechanical neck pain has a high prevalence. Also, risk of degenerative

changes, neck pain, radicular pain and need for surgery is common among dentists and some studies emphasize the high risk of cervical degenerative changes in dentists [9-11]. Dentists need to be in a static position in an abnormal posture for long periods of time when working. Such static loads cause greater damage than dynamic loads [12]. The prevalence of MSDs is high among dentists since they need to continuously repeat the same moves or stay in the same position for long periods of time while focusing and working in a confined environment. Bending over the patient's face to obtain a better vision for long periods of time is common among dentists, which exerts high load on the neck. The neck and chest are contracted to tolerate the weight of the head; in this position, the vertebral column can no longer protect the spine and cervical and thoracic muscles along the spine need to remain contracted to tolerate the weight of the head in a flexed position. The result would be neck pain.

This study aimed to assess the efficacy of eight weeks of exercise therapy for relief of neck pain in general dentists.

Materials and Methods

This randomized controlled clinical trial was registered in IRCT (IRCT2014102919750) and was conducted on 46 general dentists practicing in Tehran. Sample size was calculated using G-Power software. Subjects were between 25 and 35 years and all had at least two years of work experience and reported neck pain due to MSD for the past six months or more. Subjects were randomly divided into two groups of experimental and control (n=23) and signed written informed consent forms. In the pre-test, first the level of pain of both groups was measured using a VAS. Subjects expressed their level of pain on a ruler from 0 (no pain) to 10 (most severe pain possible). VAS has been used in many previous studies [2, 13-15]. It has very high validity and accuracy and its reliability has reported to be high as well with an intra-class correlation coefficient of 91% [16, 17].

A specific eight-week exercise program including home-based exercises (traction and strengthening exercises) was given to the experimental group and subjects were followed during the two-month period over the phone.

Arrangements were made with the assistants to remind dentists about the conduction of exercises. The dentists were contacted at the end of each week to make sure they were on track and regularly performed the exercises. At the end of each month, the researcher presented to each office to do a follow up.

The control group received no exercise program. After eight weeks, level of pain in the two groups was assessed in a post-test. Data were analyzed using SPSS version 19 software and descriptive and analytical statistics. Level of pain in the two groups was assessed and compared at pre-test and post-test using dependent t-test.

To compare the mean values between the two groups, independent t-test was used. Level of significance was set at P=0.05. For ethical purposes, at the end of the study, the exercise |program was also given to the control group.

Results

The mean and standard deviation (SD) values of age, height and weight were not significantly different between the two groups (Table 1). Table 2 shows the mean and SD of pain in the two groups at pre-test and post-test.

Comparison of the level of pain between the two groups at pre-test showed no significant difference ($p>0.05$). Independent t-test was used for comparison of the level of pain at post-test. The results of independent t-test are shown in Table 3. A significant difference was noted in the level of pain between the two groups at post-test (p=0.007), and two weeks of exercise was significantly effective in decreasing neck pain.

Table 1. The mean and SD of demographics in the two groups

Group	Age		Height		Weight	
	Mean	SD	Mean	SD	Mean	SD
Experimental	32/78	2/71	176	6	78/60	1/14
Control	32/13	2/86	176	4/08	77/30	7/62

Table 2. The mean and SD of pain in the two groups

Group	Pretest		Post-test	
	Mean	SD	Mean	SD
Experimental	2/43	1/72	1/78	1/08
Control	2/23	1/46	2/29	1/66

Table 3. Post-test comparison of the two groups

Group	Mean	SD	Mean difference	t	Sig.
Experimental	1/78	1/08	0/51	2/90	0/007
Control	2/29	1/66			

Discussion

The results showed that eight weeks of exercise therapy significantly decreased the neck pain of dentists. Ziaeiet al, Alipour et al, Anderson et al, and Akesson et al [1,8,18]. Stated that exercise was effective for decreasing the neck pain of dentists. Several studies have shown the positive effects of exercise on neck pain and stated that MSDs were less frequent in dentists who reported regular exercising. Abrishamkar et al. reported that most dentists do not routinely exercise and less than 50% of dentists in their study reported weekly exercise for more than two hours. Most of them did not even have short breaks during the day. In general, the prevalence of neck and shoulder pain in subjects with regular weekly exercise was 62.8%. This rate was 70.8% in the group with no weekly exercise. They stated that even occasional exercise decreased the symptoms by 15%. Finsen and Christensen [6] also discussed that long working time and constant muscle tension in the neck and shoulders increase the risk of MSDs.

Fatigue occurs in case of long working hours without adequate breaks and results in pain. They recommended decreasing the static activity of muscles and frequent change of body positions when working on patients in order to decrease the risk of MSDs in dentists, which is in line with our study. Wiser also recommended increasing the frequency of breaks and decreasing the work hours, which is in accordance with our study. Neck flexion, shoulder abduction, elbow abduction and hyper-activity of the arms are the main reasons for pain in the neck and shoulder. Long-term head flexion in dentists is the main cause of neck pain. Thus, a significant association exists between neck pain and posture. In other words, inappropriate posture when working is associated with serious occupational health risks in dentists. MSDs are among the occupational problems due to ergonomic factors.

The current results are in accordance with the findings of Ziaei et al. They showed that dentists who reported regular weekly exercise had fewer neck complaints than those not exercising at all. However, the type of exercise reported by these dentists was general exercise including walking, swimming and jugging (not exclusive exercises for specific muscles). In the study by Alipour et al, dentists who had regular exercise had less MSDs. Karbasi and Tarzjani in their study assessed the correlation of exercise and neck pain and reported less frequency of neck pain in those exercising. Nachemson [19] discussed that exercise strengthens the muscles and decreases pain.

Hayden et al. compared exercise therapy and routine care by general physicians and reported positive effects of exercise therapy at six weeks, six months and one year.

Dentists experience isometric contractions of neck muscles. Remaining in the same position for long periods of time results in fatigue and decreased resistance of muscles. If muscles are not given adequate time to return to their baseline state, pain occurs [8]. On the other hand, several studies reported acute and chronic pain originating from

the muscles [10, 13, 20-22]. Exercise strengthens the muscles and increases the blood flow and oxygen and nutrient supply to muscle cells and prevents MSDs. The efficacy of exercise therapy for pain relief has reported to be higher than some other methods [14, 15, 23]. Exercise stimulates the production of natural pain-inhibiting hormones, and by increasing the pain threshold it prevents or relieves pain [14, 19, 24-26].

Conclusion

Eight weeks of exercise therapy is effective to decrease neck pain in general dentists.

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