THE IMPORTANCE OF PHYSIOTHERAPY INTERVENTION IN THE FUNCTIONAL REHABILITATION OF PATIENTS WITH CERVICAL POSTURAL SYNDROME

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Background & Purpose. Cervical postural syndrome is a very common uncomfortable and painful postural complaint characterized by a protruding chin and rounded shoulders. The aim of this study was to evaluate the effectiveness of physiotherapy intervention on intensity of neck pain and mobility of cervical spine for patients diagnosed with Cervical postural syndrome during a eight-weeks period.
Methods. This was a prospective longitudinal study conducted between December 2016 and August 2017. We evaluated 12 patients suffered from nonspecific neck pain for at least the previous 12 weeks at least 5 days a week and their between the ages of 18 and 45. All subjects received a specific exercise program (isometric neck exercises, stretching exercises of neck muscle, PNF, McKenzie technique, Yumeiho massage, trigger points therapy, postural correction exercises) and a standardized physiotherapy protocol (antalgic and anti inflammatory electrotherapy).
Outcome Measures. The outcome measures used both pre- and post-intervention were: 10-cm visual analog scale (VAS), which was used to assess for pain, mobility of cervical spine was assessed by the chin to sternum distance, chin to acromion distance and tragus to acromion distance, and the Northwick Park Pain Questionnaire (NPQ), which was used to assess for disability.
Results. The results of the study showed a significant decrease in pain felt by the subjects at the end of the study (the difference between baseline and final pain intensity average value was 4.33±0.10). In regards to the evolution of the cervical mobility, there was a significant difference in terms of the change in mobility for all the distances measured. Significant improvement in functional activities was also noted according to NPQ, in all domains.
Conclusions. The physiotherapy intervention may be effective treating patients with cervical postural syndrome, because it adopts simple, non-invasive, inexpensive and conservative procedures as treatment which will help reduce the limitations and discomfort caused by the pain, thereby improving the quality of life of these patients.
Key words: *cervical postural syndrome, neck pain, physiotherapy*

Introduction

Due to industrialization and technological development in all fields, applicability of electronic media such as computers, lap tops, mobile phones, television, gaming consoles, tablets and other postural alterations and their consequences are occurring in younger age.
Factors such as hours in front of the TV, sitting at the computer, improper posture of head during work can put a tremendous amount of strain through our back, neck and shoulders.
The cervical region is the area of the human body with the highest predisposition to pain[1].. About two thirds of the world population has been affected by neck pain, estimating that at some point in life 10% to 20% of the general population will experience cervical pain, for more than three months[2].

The prevalence of neck pain increases as one ages, reaching a peak in the range 50-59 years; it is most common in women around the fifth decade of life. At least 10% of affected people develop chronic neck pain. As high as 37% of those with neck pain will develop chronic neck pain for at least 6 months[3].

High level prevalence of cervical pain is associated with a high level of neck flexion as well as static and awkward postures during sitting[4]. A prolonged flexed posture can lead towards the soft tissue stress on the spine and as a result begins to develop muscle imbalances which then have an impact on the way are joints function leaving us more prone to injury.

When the posture or integrity of the cervical spine is compromised, it is easily susceptible to tension, strain, and fatigue. While this may not be a problem in the short term, long term exposure to poor posture can often lead to headaches, spinalgia, neck strain, and even degeneration of the bones, discs, and joints. Many symptoms, including pain, may be moderated or eliminated by improved posture[5].

Simple situations that result in the accumulation like mechanical stress, decreased muscle strength, office computer jobs, nonergonomic working environments, and long working hours leading to neck pain being more frequently seen in middle age[6].

Musculoskeletal balance good posture is essential for optimal functioning of the body and is a key to a healthy spine. The muscles of the body must be in balance to support an aligned spine, contracting and relaxing to maintain stability, working in synergy with the larger muscles that move the arms and legs to make body movement more efficient and less taxing on joints. Good posture is the state of muscular and skeletal balance which protects the supporting structures of the body against injury or progressive deformity irrespective of the attitude in which these structures are working or

Cervical postural syndrome is a very common uncomfortable and painful postural complaint characterized by a protruding chin and rounded shoulders. Office workers who work at a computer, secretarial or administrative staff, teachers and taxi drivers are most likely to suffer from this condition.

Cervical postural syndrome is a chronic condition that does not autocorrect because the dysfunction of proprioceptive system leads to the occurrence of a new body pattern considered by the postural system as ideal and maintaining it in time.

The pathological mechanisms of cervical postural syndrome associated with incorrect motor pattern such as those with psychological disorders, repeated gestures, some sports, or professions considered traumatic, lead in time to a specific attitude called the protrusion of the head.

The static postural overuse determine the anterior neck and chest muscles to become tight and shortened, the muscles that attach to the shoulder blades become weak and stretched and the anterior neck muscles are held in a permanently shortened position. This all results in a posture where the head is held forward over the chest, the shoulders are rounded and a hunch develops through the upper back. With the spine and muscles now held in this position, strain is put through the joints of the neck and upper back and can cause symptoms such as headaches and pain in the neck, upper back and shoulders.

A proper treatment for patients with neck pain is essential to ensure a speedy recovery. The success rate of treatment in patients varies and is largely dictated by patient compliance. Postural neck pains can be treated with long term exercises that include stretching exercises, positional release, isometric and iso-kinetic strengthening exercises and postural correction exercises.

The aim of this study was to evaluate the effectiveness of physiotherapy intervention

on intensity of neck pain and mobility of cervical spine for patients diagnosed with Cervical postural syndrome during a eight-weeks period.

Methods

This was a prospective longitudinal study conducted between December 2016 and August 2017. We evaluated 12 patients suffered from nonspecific neck pain for at least the previous 12 weeks at least 5 days a week and their between the ages of 18 and 45. The subjects with neck pain were recruited from Neuromotor Rehabilitation Center Sf.Maria, Craiova. Patients with a history of cervical trauma or post-operative conditions; those with inflammatory rheumatic disease histories, tumoral diseases, and severe osteodegenerative changes, were not included in this study.

Following the evaluation of the medical histories of the patients, musculoskeletal examinations were performed. The present level of pain was evaluated with a 10-cm visual analog scale (VAS). Mobility of cervical spine was assessed by the chin to sternum distance, chin to acromion distance and tragus to acromion distance. Northwick Park Neck Pain Questionnaire, which determines disability related to cervical pain, was administered to all patients. Measurements were taken at baseline and after the 2-month intervention period. The results obtained are expressed as means and standard deviation (SD).

Description of intervention

All subjects received a specific exercise program (isometric neck exercises, stretching exercises of neck muscle, PNF, McKenzie technique, Yumeiho massage, trigger points therapy, postural correction exercises) and a standardized physiotherapy protocol (antalgic and anti inflammatory electrotherapy).

The intervention program was conducted for two months, three times per week with sessions of 50 minutes, a total of 24 sessions, supervised always by the same physiotherapist.

The goals of therapy intervention included:

- Relieve pain and muscles tension
- Improvement Range of motion
- Restore muscle imbalance
- Retrain kinesthetic awareness and retrain control of normal alignment
- Teach the patients how to manage posture to prevent recurrences

Phase I interventions consisted heat modalities, massage and medication for relieve pain and muscle tension (ultrasound, TENS, interferential therapy for deep pain, hot packs, myofascial release and Yumeiho massage). At the end at this phase we introduced Muscle Relaxation Training to relieve postural stress and Conscious Relaxation Training for increasing patient awareness and control over tension in the muscles. Muscle Relaxation techniques included active neck and shoulder ROM exercises (neck extension, lateral flexion, rotation, protract, elevate, retract the scapulae and shoulder circumduction) for promoting circulation and maintaining flexibility. Manual cervical traction and cervical retraction exercises was perform to decrease a forward head posture

Additionally, the patients were thoroughly educated about both posture and activity modifications. Postural education is often implemented in an attempt to reduce abnormal mechanical stressors placed on the cervical spine.

The second Phase focusing on prolonged (1 minute), low-load cervical and upper quarter stretching and flexibility exercises for short Suboccipital, Scalene, SCMs, Upper trapesius, Levator scapula, Pectoralis minor and major muscles and isometric neck muscle strengthening exercises to train and strength muscle balance necessary for postural control of neck (prone axial extension, prone scapular adduction, resisted isometric cervical flexion, extension, rotation. In this phase of therapeutic program our patients also underwent 4 different types of McKenzie neck exercises: retraction and

extension with overpressure, retraction and lateral flexion with overpressure, both were done in sitting position and retraction and extension with traction and rotation, extension mobilization, this two exercises were given in supine lying. We also used PNF neck extension pattern. The postures of the subjects during the exercise programs progressed from sitting to prone on elbow. Resistance against rotation, extension, and lateral flexion was provided during the exercise in order to induce strong muscle contractions.

Once recruitment deficits of the deep cervical muscles have been adequately addressed, endurance and strength training were initiated. Both endurance and strength training may reduce neck pain. The deep cervical flexors play major roles in maintaining posture control and stability of the neck when it is in neutral or mid-range positions that commonly occur during functional daily activities. In addition to neck strengthening, exercises for the middle and lower trapezius as well as the rhomboids muscles were initiated.

For enhancing kinesthetic awareness for postural control we trained the patients to correct a forward head posture and protracted scapulae.

Results

All subjects were assigned to a single group. The effects of the 8-week of physiotherapy intervention on intensity of neck pain and mobility of cervical spine were analysed.

Participants were tested before (Pre-intervention) and following specific exercise program (Post- intervention) for severity of neck pain (VAS scale), mobility of cervical spine (chin to sternum distance, chin to acromion distance and tragus to acromion distance) and neck-related functional difficulties (Northwick Park Neck Pain Questionnaire). The results are expressed as means, standard deviations (SD) and percent values, and are presented in Table 1.and 2. The comparison of the evaluation parameters is shown in Table 2.

Table 1. Results achieved by the subjects before and after the specific exercises program

Parameters	**N**	**Pre-intervention**	**Post-intervention**
VAS	12	5.16±0.93	0.83±0.83
Chin - sternum distance	12	7.16±0.93	6.25±1.21
Chin - acromion distance	12	19.8±1.54	16.6 ±1.08
Tragus - acromion distance	12	15.75±1.35	13.08±1.31
NPNPQ	12	18.3±1.16	1.31±1.4

**Data presented as mean ± SD.*

From baseline to 2-months, pain intensity improved from 5.16 points (SD = 0.93) to 0.83 points (SD = 0.83, Table 1); this was a mean reduction in pain intensity from baseline of 83.87% (Table 2).

Table 2. Difference (mean ± SD and percent values) between the results achieved by the subjects in the first and second assessment

	Mean Difference T2/T1	**Std. deviation T2/T1**	**Mean Difference % T2 /T1**
VAS	4,33	0,10	83,87%
Chin - sternum distance	0,91	-0,79	12,79%
Chin - acromion distance	3,16	0,46	16,03%
Tragus - acromion distance	2,66	0,04	16,93%
NPNPQ	16,99	-0.2	53,09%

When the distance from the chin and the sternum of the subjects was measured in the erect position, the mean pre- and post-exercise distances were 7.16 ± 0.93cm and 6.25 ± 1.21 cm, respectively. The mean pre- and post-exercise distances between chin and acromion were 19.8 ± 1.54 cm and 16.6 ± 1.08 cm, respectively. The mean distances between tragus and acromion were 15.75 ± 1.35 cm and 13.8 ± 1.31 cm before and after the exercise, respectively (table.1). The final values for cervical mobility distances increased by 12.79% for cervical flexion, 16.03% for rotation and 16.93 for lateral flexion, when compared to baseline values (table. 2).

The Northwick Park Neck Pain Questionnaire (NPNPQ) was used for the initial examination and after specific intervention (eight weeks). The mean NPNPQ scores of patients with neck pain declined in a significant manner from a mean score of 18.3±1.16 (57.18%) to a mean score of 1.31±1.4 (4.09%) after the second assessment (table 2). A significant increase of 53.09% compared to baseline assessment scores could be noticed. At 8 weeks, his NPNPQ dropped to 4.09% representing a 95.91% improvement in function.

Discussions

The results of this study demonstrate that a specific exercise program associated with a standardized physiotherapy protocol (antalgic and anti inflammatory electrotherapy) leads to improvement in neck pain and mobility of cervical spine and level of disabilities after 8-week training period.

We used the VAS, cervical mobility distances and *NPNPQ* as standardized and validated outcome measures. Management consisted of isometric and stretching exercises of neck muscle, PNF and McKenzie technique, soft tissue mobilizations and postural re-education and antalgic and anti inflammatory electrotherapy.

After eight weeks of physiotherapy exercises protocol, subjects have achieved effective outcomes in relation to the intensity of their pain, the level of cervical movements and the degree of disability.

Reducing perceived pain and improving the mobility of the cervical spine segments are the two important objectives to be achieved through the rehabilitation program. In addition, previous studies have established a strong association between deep neck flexor weakness and neck pain, warranting strengthening of these muscles for those with neck pain and poor posture[7.8].

Many studies have suggested importance of cervical movements in the rehabilitation of the neck. Among the various causes of neck pain, mechanical dysfunction is the most common cause, and dysfunction of the intervertebral joints decreases the mobility of the cervical spine segments. Reduced joint mobility in the neck influences the adjacent joints as a compensatory action to produce the pathological movement chain of the entire

vertebra [9]. Tension headaches also have been reported to be inversely correlated with the ROM of the cervical vertebrae [10].

McKenzie's cervical exercises and proprioceptive neuromuscular facilitation have been used and are effective on cervical spine function, in maximizing muscle strength of deep neck flexors, and controlling the level of pain. In addition McKenzie technique associated with Yumeiho massage, and trigger points therapy was effective in correcting posture of the neck, and indirectly reduced stress and chronic myalgia previously experienced by the patients.

Several authors have studied the significance of head posture in subjects with neck pain with restricted range of motion in the cervical spine. In this study, cervical mobility was used as an outcome measure using different distances measured with a tape. Combined treatment resulted in greater improvement in, chin to acromion distance and tragus to acromion distance while the chin to sternum distance was not significantly different because our treatment based on improvement cervical extension and lateral flexion and rotation movements more then on anterior flexion due to the presence of the forward head posture.

The treatment protocol decreased self-reported pain, after intervention with some subjects achieving a median of 0 on the pain scale. Significant improvement in functional activities was also noted according to NPNPQ, in all domains. At 8-month, the neck pain index was reduced with 53.09%. The detectable change reported for these outcomes represented a clinically meaningful and true change, respectively, in patient status.

The previous study found the similar results. Zronek et al, (2016) examined the effects of **e**xercise programs based on strength and endurance combined with other conservative treatments and found a positive effect[11].

Physiotherapy interventions for chronic neck pain showing the strongest support for an effect on pain are strength and endurance training (supported by two trials by Stewart et al. and by Ylinen et al., treating patients with chronic non-specific neck pain) [12.13].

In regard to manual therapy, massage seems to have an effect on pain in patients with chronic non-specific neck pain, supported by Sherman et al.[14].

Conclusion

The goal of neck rehabilitation is to help the patient to return to the highest level of function, while improving the overall quality of life physically, emotionally, and socially. The focus of rehabilitation is on relieving pain, restoring normal joint mobility, strengthening of specific postural muscle groups, postural retraining. In addition it is essential to use measures that prevent people from bad postures that lead to neck pain.

Within 8 weeks of treatment, improvement was demonstrated in all outcome measures. At 8 weeks, the patient no longer reported functional limitation symptoms and participated fully in their anterior daily activities.

Based on the results of this study, it could be suggested that a specific exercises program associated with standardized physiotherapy methods and medication, (antalgic and anti-inflammatory electrotherapy, nonsteroid anti-inflammatory and muscle relaxing medicines) is effective in reducing neck pain intensity and disability and improving health-related quality of life for people with cervical postural syndrome.

The physiotherapy intervention may be effective treating patients with cervical postural syndrome, because it adopts simple, non-invasive, inexpensive and conservative procedures as treatment which will help reduce the limitations and discomfort caused by the pain, thereby

improving the quality of life of these patients.

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