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Does Body Composition Influence the Balance in Asymptomatic Individuals?: A Single Blinded Cross-Sectional Study

Ramu Khadka*, Vencita Priyanka Aranha, Vevita Priya Aranha***, Asir John Samuel****

Abstract

Aim: To establish the relationship between body composition and balance in asymptomatic individuals. *Study Design:* Cross sectional study. *Study Setting:* Tertiary care teaching hospital. *Method*: A Sample of 56 students comprising of 36 male and 20 female were recruited for the cross-sectional correctional study. All required anthropometric measures were recorded and BMI, waist-to-hip ratio (WHR) and percentage of body fat (PBF) were estimated from them. Their association with functional reach test (FRT) as balance measure was determined using Spearman's rank correlation coefficient. *Result:* There is no association of FRT with BMI (ρ=-0.13; p=0.36) and PBF (ρ=- 0.072,-0.13; p>0.05) while moderate to good degree of association with WHR (ρ=0.54; p<0.001). *Result:* Body composition does not have any influence over balance. Increasing central obesity component increases stability among asymptomatic individuals.

Keywords: Body Composition; Correlation; Cross-Sectional Study; Stability; Students.

Introduction

Balance is defined as an ability to maintain the line of gravity (vertical line from center of gravity) of a body within the base of support with minimal postural sway [1]. Sway is the horizontal movement of the center of gravity even when a person is standing still. A certain amount of sway is essential and inevitable due to small perturbations within the body (e.g., breathing, shifting body weight for one foot to the other or from forefoot to rear foot) or from external sources (e.g., air currents, floor vibration). An increase in sway is not necessarily an indicator of poorer balance so much as it is an indicator of decreased neuromuscular control [2]. In the case of an individual standing quietly upright, the limit of stability is defined as the amount of postural sway at which balance is lost and corrective action is required. Maintaining balance requires coordination of input from multiple sensory systems including the vestibular, somatosensory, and visual systems [3].

There always exists a controversy whether the body composition affects balance of the individual or not. Dutil M et al performed a study to find the impact of obesity on balance control in community dwelling older women. They showed that obesity clearly affects the postural control in older women and they concluded that obesity has a negative impact on the capacity of older women [3]. Osman et al reported that BMI has impact on postural control during both BLS and ULS [4]. Sarkar et al conducted a study to know the effects of obesity on the balance and gait parameters like step width and foor angle (degree of toe out) in young adults. Fifty subjects of both the genders were taken. 30 were taken as a control group (non-obese, BMI < 25) and 30 were taken as experimental group (obese, BMI>30). Functional reach test was used for balance testing and the footprint method was used for gait parameters measurements. They concluded that obesity has negative impact on balance of an individual [5].

Andrea et al reported that there were no differences on performance based balance measures among different weight groups [6]. Greve and Alonso concluded that high BMI requires more

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displacements to maintain postural balance [7].

As far as to our knowledge, there is one literature demonstrating the relationship between balance and BMI in India. However, it was done in small sample size. Hence, we intend to do a study with proper sample estimated by sample size calculation and to explore further relationship between Body composition and balance among asymptomatic individuals.

Methodology

The study protocol was approved by the research and institution ethics committee. The study was done in accordance with the ethical guidelines of Helsinki declaration. A pilot study of 10 samples was done prior to the study to find out procedural difficulties. The data obtained was used for sample size estimation. A total of 56 students were selected for taking data of which 36 were male participants and 20 were female participants. A detailed explanation of the aim and objective of the study, and method of the study was given. All the queries of the participants were answered and consent was taken from them prior to the measurement of the required data.

The weights of the participants were taken from the weighing machine and height was taken from wall mounted stadiometer by using standard protocol. From height and weight, BMI of each participant was calculated by using the standard formula, BMI = Weight (in Kg)/ Height^2 (in meter^2)

The hip and waist circumference were measured by using measuring tape with participant in standing position with normal base of support. The procedure followed was in accordance with the guidelines given by ACSM. The waist circumference was taken from the narrowest waist level i.e. at the mid-point between the lowest rib and the top of the hip bone (iliac crest). The hip circumference was taken from the widest part of the buttocks. The waist girth was divided by the hip girth and the waist-hip ratio (WHR) was found out.

The static balance was measured using functional reach test as described by Duncan et al [8]. The participants were instructed to stand next to, but not touching, a wall and position the arm that is closer to the wall at 90 degrees of shoulder flexion with a closed fist. The starting position at the 3rd metacarpal head was recorded on the measuring tape mounted horizontally on the wall. The participants were instructed to "Reach as far as you can forward without taking a step". The final location of the 3rd metacarpal is recorded. Scores are determined by assessing the difference between the start and end position is the reach distance, measured in centimeters. Four trials are done and the average of the last three was noted. A 15 seconds rest break was allowed between the trials.

The skin fold measurement was taken by using Syndex® skin fold caliper, Figure 1. For male participants, 3 distinct points namely triceps skinfold, chest skinfold and subscapularis skinfold thickness were measured in relaxed position. For each skinfold point, 3 measurements were taken and only average of the three was entered in the data sheet. Similarly for females three skinfold thickness points were defined, namely triceps skinfold, abdominal skinfold, and supra iliac skinfold. The measurements were taken using standard methods prescribed by American College of Sports Medicine (ACSM). As with male participants, for female participants also 3 readings were taken for each skinfold point and average of three readings were entered in the data sheet.

From the obtained skin fold thickness Body Density was calculated by using the formulae:

For Males

Body Density = 1.1125025 - 0.0013125 × (Sum of thickness of three sites) + 0.0000055 × (Sum of thickness of three sites) ^{2} - 0.000244 × AGE

For Females

Body Density = 1.089733 - 0.0009245 × (Sum of thickness of three sites) + 0.00000025 × (Sum of thickness of three sites) ^{2} - 0.0000979 × AGE.

From the Body Density, the percentage of body fat (PBF) was calculated as, PBF = (457/BD) – 414.2

Data Analysis

The data were analyzed using the software, SPSS version 20. Gaussian distribution of the collected data was established using Kolmogorov-Smirnov test. The height and weight were found to be follow normal distribution hence they were expressed in terms of (mean ± SD). Since the other collected data didn't follow the normal distribution, they were expressed in terms of median (IQR) and non-parametric test was used for the statistical comparison. Demographic characteristics of the collected data were expressed as median and interquartile range. The relation between body composition and balance was compared using Spearman's rank correlation coefficient. To minimize the type I error, $P < 0.05$ was defined as significant.

Results

The demographic characteristic of the asymptotic individuals recruited are displayed in Table 1. Table 2 shows the correlation between the body composition and FRT. According to Portney and Watkin's Criteria [9], there exists negative, little or no significant relationship between BMI and PBF with FRT while moderate correlation between WHR and FRT.

Table 1: Demographic characteristics of the asymptotic individuals recruited

Demographic parameter	Mean/median N=56
Age (years)	22 (21,23)
Height (cm)	164.8 ± 9
Weight (kg)	60.9 ± 9
BMI (Kg/m^2)	22.3 (20.3, 23.9)
WHR	0.86 (0.78, 0.87)
PBF (%) male	10.1 (8.5, 12.7)
PBF (%) female	28.6 (23.8, 31.3)
FRT (cm)	29.2 (23.5, 33.0)

Abbreviations: BMI – Body Mass Index; WHR – Waist Hip Ratio; PBF – Percentage of body fat

Table 2: Correlation of functional reach test (FRT), balance test with the anthropometric parameters

Anthropometric Parameters	FRT (ρ)	p value
BMI	- 0.13	0.36
WHR	0.54	<0.001
PBF (male)	- 0.072	0.56
PBF (female)	- 0.13	0.31

Abbreviations: BMI – Body Mass Index; WHR – Waist Hip Ratio; PBF – Percentage of body fat

Discussion

The study revealed that body composition does not affect the balance of asymptomatic individual. In this study, it has been attempted to find out what is the exact influence of body composition on balance. This study hypothesized that balanced would be different among the individuals of different body composition.

The subjects taken in this study were within the normal BMI range except for 7 female subjects who were obese. When establishing the relationship between BMI and FRT, it was found that there is little negative or no correlation between BMI and FRT. The reason for this might be because that the maximum subjects in the study were within the normal BMI range.

PBF of both males and females were within normal range except for 8 female subjects in which they had just average or risk level of fat percentage. When the relationship between body fat percentage and the balance was established, there existed no relation between them (Portney and Watkin's Criteria) [9]. Hence the fact that body fat percentage doesn't have any influence over the balance is evident.

The comparison of the WHR (which represents the Central Obesity) with FRT showed moderate to good degree of relationship between them (according

to Portney & Watkin's Criteria) [9].

The chief reason for this might be that when the central obesity increases, the center of gravity (COG) of the body tends to lower down thus giving more stability to the subjects and hence more positive influence over the balance.

Conclusion

Body composition does not have any influence over balance among the asymptomatic individuals.

Acknowledgment

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To Find out the Incidence of Tennis Elbow in Professional Tabla Players: An Observational Study

Satyadeep Gupta*, Sanjai Kumar, Sumit Raghav***, Arvind Shukla******

Abstract

Objective: The study was done to find out the incidence of Tennis Elbow in Professional Tabla Players. *Method:* The study was of an observational design, with 50 subjects; all subjects were selected according to inclusion & exclusion criteria and carried out at Swarsangam school of music ,Saraswati music academy, Shri Sai music academy Moradabad and Cultural department of Swami Vivekanand Subharti University, Meerut (Uttar Pradesh) . All the subjects were assessed before and after plying the tabla for pain, swelling, tenderness and redness by using the VAS and other scales which were mentioned in questionnaire respectively. The collected data was analyzed by using SPSS software. Chi^2-test was used to find out the incidence of reoccurrence of above said symptoms in the subjects and to analyze the significance of p-values. *Results:* It was predicted in the research before collecting data that there can be high incidence of tennis elbow in professional tabla players as there is over use of wrist extensors during playing tabla. Inflammation at common extensor origin can take place due to it. But the result show only 48% incidence of tennis elbow. So it can be assumed that tabla players are not much susceptible to tennis elbow. The results showed that there was significant difference in pain, swelling, tenderness and redness with their VAS score.

Keywords: Tennis Elbow; VAS (Visual Analog Scale).

Introduction

It is defined as a pathologic condition of the wrist extensor muscles at their origin on the lateral humeral epicondyle. The tendinous origin of the extensor carpi radialis brevis (ECRB) is the area of most pathologic change [1].

It is characterized as pain on the lateral side of the elbow and posterior aspect of forearm, sometimes referred to the wrist and into dorsum of the hand that is aggravated with movements of the wrist or by contraction of the extensor muscles of the wrist [2].

Point tenderness is present over lateral epicondyle and reduction in grip strength is also associated with tennis elbow (Pienimake et al 2002). According to Greenfield and Webster (2002) there are 15 diagnostic tests but the most commonly used tests are pain on resisted extension of the wrist and tenderness to palpation over the lateral epicondyle at the insertion of ECRB [3].

Cyriax in 1936 found many pathologic processes described but concluded that the origin of the ECRB was major site of pathologic condition because of a partial tendon tear.

The condition occurs in middle age with incidence of the condition peaking between the age of 35-50 years and with a duration of an average episode of between 6 months and 2 years (Assendelft et al 1996, Ernst 1992, Katarinicic et al 1992) It is affects the dominant arm most commonly with epidemiological studies showing a prevalence of 1% in men and 4% in women (Verhaar et al 1993, Noteboom et al 1994) [4].

Musicians often first experiences tendonitis as a sharp pain located in one spot in the wrist, elbow or base of the thumb. It is characterized by a burning pain, sometimes only when the affected part is moved in a certain way, or in more severe cases, continues. Unlike simpler muscle strains, it tends to persists for

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long period of time. It not taken care of right away, it can develop into a major problem involving months of intense pain and perhaps a total in ability to play [5].

Aims and Objective

To find out the incidence of Tennis Elbow in professional tabla Players.

Materials and Method

Visual Analogue Scale

The visual analog scale is one of the most basic pain measurement tools. It consists of a 10 cm line. The clinician can measure the place on the line and convert into it a score between 0 to 10 where 0 is no pain and 10 is bad as it could be [6].

Hypothesis

Experimental Hypothesis

There is higher incidence of tennis elbow in professional tabla players.

Null Hypothesis

There is no incidence of tennis elbow in professional tabla players.

Limitation of Study

Sample size of the study is very low.

Variables

Dependent Variable: VAS

This study is an observational study.

Sample selection: Convenient sample of 50 subjects, according to the inclusion and exclusion criteria, randomly assigned into one group include in the study. This study was conducted in Swarsangam school of music, Saraswati music academy, Shri Sai music academy Moradabad and Cultural department of Swami Vivekanand Subharti University, Meerut (Uttar Pradesh).

Inclusion Criteria

Professional tabla players who give at least twice a week stage program of minimum two hours or players who have routine of playing tabla of minimum one hour constant.

Exclusion Criteria

Players suffering from any previous injury to upper limb.

Tools used in study

Questionnaire form

Visual Analogue Scale

Stationary (pen, paper)

Stop watch

Procedure

The subjects are found by snow ball method. Their interview was taken by research fellow. Subjects for research purpose were selected using inclusion and exclusion criteria. According to the VAS, Tennis Elbow Test and questionnaire, the data of the pain, swelling, tenderness and redness, before and after playing the tabla then the data of reoccurrence was collected and table of selected variants was prepared and sorting of data was done. Then the data was analyzed by using SPSS and the value of chi^2 test was collected and the significance of p-value was checked and results were prepared.

Data Analysis

All analysis was obtained using SPSS version 13.0 (For window 7). Demo graphic data of the patients including sign and symptoms were summarized. The dependent variable for the statistical analysis was VAS. A base line data was taken and analyze. The **chi^2-test** was used. A level of **0.05** was used to determine the statistical significance.

Result

Table 1:

	PS		PE		PW		PF	
	FREQ	%	**FREQ**	%	**FREQ**	%	**FREQ**	%
NO	45	90.0	43	86.0	22	44.0	29	58.0
YES	5	10.0	7	14.0	28	56.0	21	42.0
Total	50	100.0	50	100.0	50	100.0	50	100.0

χ^2- VALUE = 34.79, P- VALUE = < 0.0001

The result of Table 1 and Graph 1 shows that 10.0%, 14.0%, 56.0% and 42.0% subjects had the pain at shoulder, elbow, wrist and fingers respectively after playing tabla. According to these values the Chi-Square value is 34.79 and P- value is <0.0001.

Table 2:

	SS		SE		SW		SF	
	FREQ	%	FREQ	%	FREQ	%	FREQ	%
NO	50	100.0	49	98.0	48	96.0	39	78.0
YES	0	0.0	1	2.0	2	4.0	11	22.0
Total	50	100.0	50	100.0	50	100.0	50	100.0

χ^2- VALUE = 23.65, P- VALUE = < 0.0001

Table 3:

	TS		TE		TW		TF	
	FREQ	%	FREQ	%	FREQ	%	FREQ	%
NO	49	98.0	48	96.0	46	92.0	43	86.0
YES	1	2.0	2	4.0	4	8.0	7	14.0
Total	50	100.0	50	100.0	50	100.0	50	100.0

χ^2- VALUE = 6.45, P- VALUE = 0.0916

Table 4:

	RS		RE		RW		RF	
	FREQ	%	FREQ	%	FREQ	%	FREQ	%
NO	50	100.0	48	96.0	46	92.0	19	38.0
YES	0	0.0	2	4.0	4	8.0	31	62.0
Total	50	100.0	50	100.0	50	100.0	50	100.0

χ^2- VALUE = 84.72, P- VALUE = < 0.0001

Fig. 1:

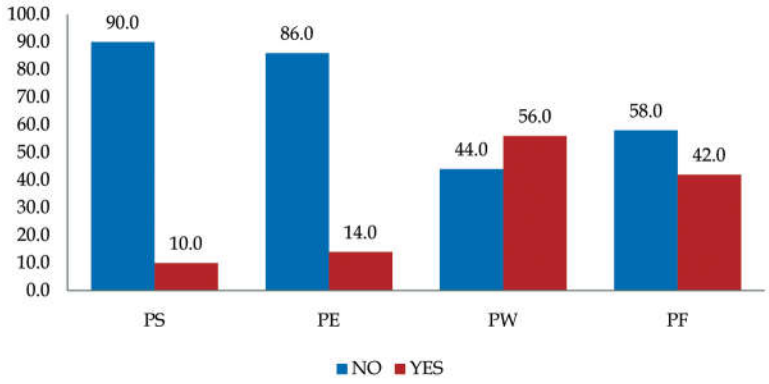
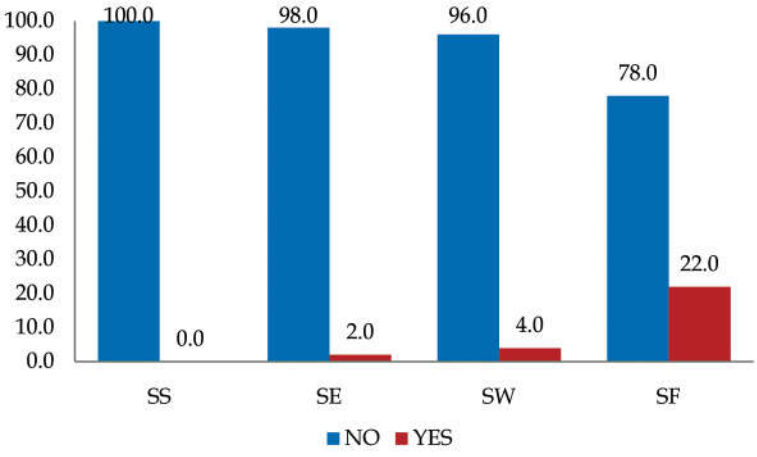


Fig. 2:



The result of Table 2 and Graph 2 shows that 0.0%, 2.0%, 4.0% and 22.0% subjects had the swelling at shoulder, elbow, wrist and fingers respectively after playing tabla. According to these values the Chi-Square value is 23.65 and P- value is <0.0001.

The result of Table 3 and Graph 3 shows that 2.0%, 4.0%, 8.0% and 14.0% subjects had the tenderness at shoulder, elbow, wrist and fingers respectively after playing tabla. According to these values the Chi-Square value is 6.45 and P- value is 0.0916.

The result of Table 4 and Graph 4 shows that 0.0%, 4.0%, 8.0% and 62.0% subjects had the redness at shoulder, elbow, wrist and fingers respectively after playing tabla. According to these values the Chi-Square value is 84.72 and P- value is <0.0001.

Fig. 3:

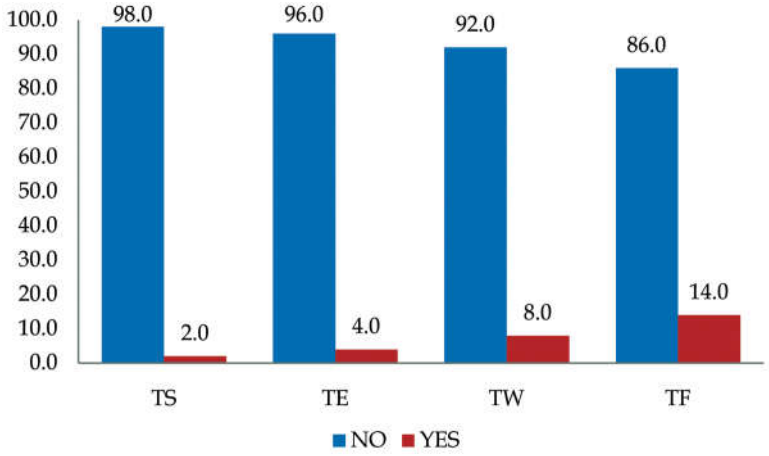
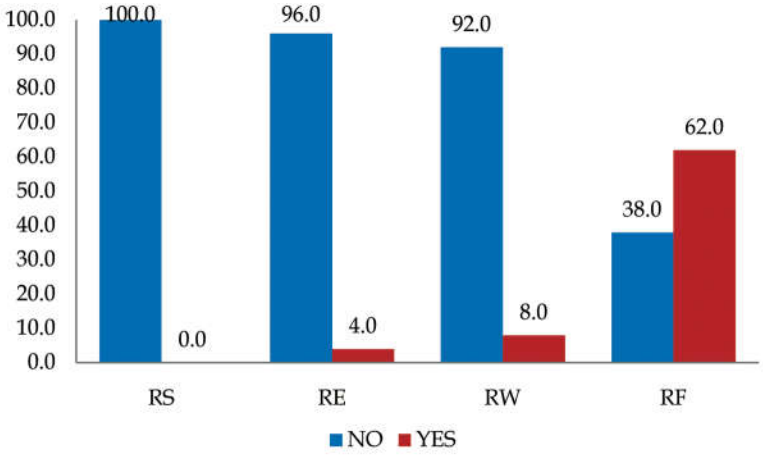


Fig. 4:



Discussion

The result of Table 1 and Graph 1 shows that 10.0%, 14.0%, 56.0% and 42.0% subjects had the pain at shoulder, elbow, wrist and fingers respectively after playing tabla. According to these values the Chi-Square value is 34.79 and P- value is <0.0001.

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During playing tabla, the repetitive percussion movements of fingers on the tabla is responsible for it. It also leads to redness in the fingers and the results show 62.0% occurrence of the same. If pain in fingers is neglected and repetitive striking is continued, it can lead to swelling and tenderness. The result show

22.0% and 14.0% occurrence respectively. It can be due to wrong playing pattern also.

Wrist joint is most susceptible joint to pain as the results show 56.0% occurrence of it. Continuous movements of the wrist during tabla playing is responsible for that. Repeated stress can cause swelling, redness and tenderness to the wrist joint. The incidence of their occurrence are 4.0% , 8.0% and 8.0% respectively in research result.

Result show 14.0% and 10.0% occurrence of pain at elbow and shoulder joint respectively. The reason behind that can be sustained position for a long time or wrong playing pattern. There is no evidence of swelling and redness at shoulder joint while there is 2.0% and 4.0% swelling and redness is present at elbow joint after playing table. There is 4.0% and 2.0% occurrence of tenderness on elbow and shoulder joint respectively according to the result. This can be due to over stress

Intensity of pain is not very high commonly. Most of the cases have reported score of 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 on the VAS. Their occurrence 26%, 6.0%, 14.0%, 16.0%, 4.0%, 18.0%, 6.0%, 6.0%, 2.0% and 2.0% respectively which indicates unbearable or very high intensity pain is less common among professional tabla players.

Recurrence of pain is common in 48% subjects which indicates repetitive stress on upper limb structures in professional tabla players.

It was predicted in the research before collecting data that there can be high incidence of tennis elbow in professional tabla players as there is over use of wrist extensors during playing tabla. Inflammation at common extensor origin can take place due to it. But the result show only 48% incidence of tennis elbow. So it can be assumed that tabla players are not much susceptible to tennis elbow.

Conclusion

There is very less incidence of tennis elbow in professional tabla players. Wrist and fingers pain as well as redness in fingers are the common complaints among professional tabla players.

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A Study to Compare the Effect of Ischemic Compression Technique and Deep Transverse Friction Massage on Upper Trapezius Trigger Point

Neha Chanchal*, Shefali Pushp, Avikirna Pandey***, Danish Nouman***, Raj Kumar Meena******

Abstract

Objective: The purpose of this study was to compare the effect of Ischemic Compression and Deep Transverse Friction Massage on trigger points in upper trapezius muscle in students. *Methods:* Thirty participants both male and female with myofascial trigger points in upper trapezius muscle were randomly divided into three groups: group A (n=12) received Ischemic compression, group B (n=12) received Deep Transverse Friction Massage and group C (n=12) received active range of motion exercises in all directions. The outcome measures were Neck Disability Index (NDI), Numerical Pain Rating Scale (NPRS) & Range of Motion (ROM) of lateral flexion. The participants were assessed pre-treatment i.e. at the first day of treatment and after the 4 weeks of the treatment i.e. at the last day of the treatment. *Result:* The result showed a statistically significant improvement ($p<0.05$) in all assessment parameters in pre to post treatment in all groups. But there were no statistically significant improvement showed between the experimental groups in NDI (0.316), NPRS (0.221) & ROM (1.000) in trigger points on upper trapezius muscle. *Conclusion:* This study demonstrated that both Ischemic Compression and Deep Transverse Friction Massage were equally effective in reducing the functional disability and pain & also in improving the range of motion in trigger points on upper trapezius muscle.

Keywords: Myofascial Trigger Points; Ischemic Compression; Deep Transverse Friction Massage.

Introduction

Musculoskeletal disorders are the main cause of disability in the working age population and are among the leading cause of disability in the other age groups [1]. Mechanical neck pain affects 45% male and 54% female of general population at sometime in their life and can result severe disability. Fernandes-de-las-penas et al; found a relationship between the presence of myofascial trigger points and the cervical impairment [2].

A myofascial trigger point is a hyperirritable spots, located within a taut band of skeletal muscle that is painful on compression or on stretch and that can give rise to a typical motor and sensory component. Motor aspect included disturbed motor function, muscle weakness, muscle stiffness and restricted range of motion. Sensory aspect include local tenderness, referral of pain and peripheral and central sensitization.

Manual therapy is one of the basic treatment option in the management of myofascial trigger points. Myofascial trigger points are treated with manual techniques, spray and stretch. There have been few studies investigating non-invasive treatments for upper trapezius muscle. Trigger points can be treated alone or in combination with electrical muscle stimulation, hot packs, cervical range of motion exercises, ischemic compression, spray and stretch, TENS, sustain stretching, soft tissue mobilization and cervical manipulation [3].

The upper trapezius plays an important role in the mobility and stability of neck. The symptoms seen in people with MTrp could be explained by the energy crisis theory (Simons et al;1999). According to this theory, a sustained contractile activity of sarcomeres increases the metabolic demands and squeezes the rich capillaries network that supply the nutritional

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and oxygen needs of that region and decreased blood flow in the muscle at the site of trigger point. The combination of increased metabolic demand and impaired metabolic supply produces a local energy crisis. The local hypoxia and tissue energy crisis stimulates production of vasoreactive substances which will sensitize local nociceptors causing pain. In the presence of MTrp muscle could undergo early fatigue and put excessive stress on other stabilizing structures [4].

Methods

Study Approach

The participants assessed on the basis of inclusion criteria as trigger point in upper trapezius muscle on dominant side were requested to participate in study. The purpose of study was explained and consent form was taken from each participant. All the participants were assessed using a similar assessment performa and assigned randomly to either of the group.

Inclusion Criteria

1. Age between 19-28 years [5].
2. Both genders male and female.
3. Minimum intensity of pain was 3 out of 10 on Numerical Pain Rating Scale (NPRS) [6].
4. Mechanical neck pain more than 2 weeks [7].
5. On the basis of 5 diagnostic criteria for trigger point given by Simon and Gerwin [7].
6. Unilateral dominant side upper trapezius [8].

Exclusion criteria

1. present with fibromyalgia syndrome.
2. History of any trauma like whiplash injury.
3. History of any cervical spine surgery.
4. Diagnosis of cervical radiculapathy or myelopathy.
5. Presence of any tumors.
6. Presence of recent fracture sites.
7. Neck pain cause by other pathological entities like rheumatoid arthritis, ankylosing spondylitis etc.
8. Any skin disorders.

Study Design

It was an experimental design where participants were randomly allocated into 3 groups:- Group – A and Group – B were experimental groups & Group – C was control group.

Type of Sample:- Random Sampling

Sample Size

The total number of participants were n=42 (both male and female) out of which 6 participant didn't complete the treatment so the participants which completed the treatment were 36 i.e. 12 in each group.

Setting of the Study

Jyoti Rao Phule Subharti College of Physiotherapy, Swami Vivekananda Subharti University, Meerut, Uttar-Pradesh (U.P), India.

Description of Data Collection Tools

Dependent Variables

- Universal Goniometer.
- Neck Disability Index (NDI).
- Numerical Pain Rating Scale (NPRS).

Tool Used in the Study

- Stationary (pen, paper).
- Hand sanitizer.
- Marker.
- Couch.
- Towel.

Treatment Procedure

Ethical approval was obtained from the board of studies of Jyoti Rao Phule Subharti College of Physiotherapy, Swami Vivekananda Subharti University, Meerut, Uttar-Pradesh (U.P), India.

The trigger point was assessed by 2 ways, one is through palpation which was located in the upper trapezius approximately midway between the 7thcervical vertebrae and the acromion and another by 5 diagnostic criteria given by Simons & Gerwin. Once trigger point located, the skin was marked with an ''X".

A basic treatment line were given to all the participants in each group before starting the treatment to relax the muscle i.e. Moist heat pack on cervical region for 10 – 12 min.

Group A (Ischemic Compression)

Therapist Position- Standing behind the Patient

In Ischemic Compression technique, the patient lie in supine position with the cervical spine in lateral flexion in opposite direction. The therapist applied gentle, gradually increasing pressure on the TrP until the finger encounters a definite increase in tissue resistance (engages the barrier). At that point patient feel the discomfort or pain, this pressure is maintained until the discomfort and /or pain eased or therapist senses relief of tension under the palpating finger. The palpating finger increases pressure enough to encounter the new barrier or until the discomfort appeared again. The duration of treatment 90 seconds/cycle for 10 minutes i.e. (total 5 cycles of 90 seconds).

Group B (Deep Transverse Friction Massage)

Therapist Position- Standing behind the Patient

In Deep Transverse Friction Massage (cyriax), the patient's position was supported sitting with leg on stool, hands on the pillow and back supported on the back rest. This technique was executed in neutral position. The therapist palpated the right spot and placed the middle finger crossed over the index finger and applied friction massage for. The massage was applied slowly with a slight pressure across the fibers. The movement between the patient skin and the physiotherapist fingers should move as one unit. The total duration of treatment 10 minutes with frequent intervals in between.

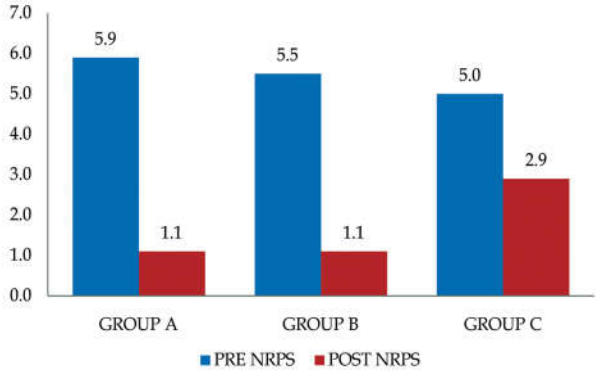
Group C (Active Rom)

Therapist Position- Sitting in front of the Patient

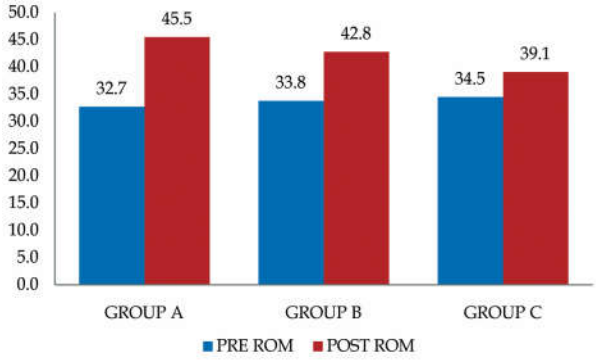
The patient position was supported sitting on chair, patients performed the active range of motion exercises in all direction i.e. flexion, extension, lateral flexion- right and left, rotation- right and left, 3 sets of 10 repetitions in all direction.

Result

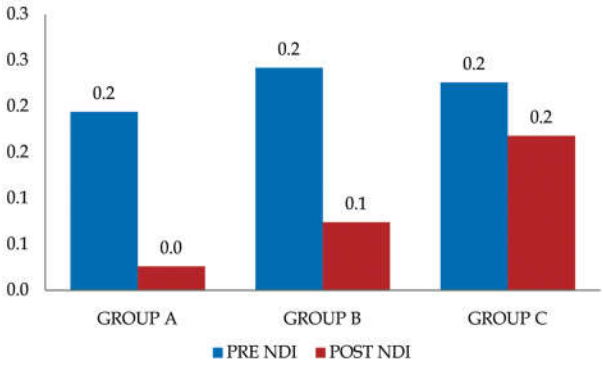
The study compared the efficacy of Ischemic Compression & Deep Transverse Friction Massage to decrease the pain and functional disability & improve the ROM in patient with MTrPs. The result revealed a significant difference in p-value of pre to post reading of NDI for group A, B & C (0.000, 0.000 & 0.013) respectively, NRPS for group A, B & C (0.000, 0.000 & 0.001) respectively & ROM for group A, B & C (0.001, 0.004 & 0.006) respectively in all groups. But there is no significant difference found in p-value of post NDI (0.316), NRPS (1.000) & ROM (0.221) between the group A & group B.



Graph 1: The bar chart of average pre & post NPRS scores in three groups



Graph 2: The bar chart of average pre & post ROM scores in three groups



Graph 3: The bar chart of average pre & post NDI scores in three groups

Discussion

The purpose of this study is to find out the comparison between the Ischemic Compression and the Deep Transverse Friction Massage in the subject

with trigger point in upper trapezius muscle. This study demonstrated that ischemic compression and deep transverse friction massage were equally effective to reduce disability, improving range and reducing pain.

The Graph 1 shows an average pre to post NPRS scores for group A, group B & group C. There are other studies that have previously analyzed the effectiveness of the Ischemic Compression technique in the management of MTrPs. Hong et al; 1993 and Simons et al; 2002 reported that the Ischemic Compression give best results in decreasing pain and equalized the length of sarcomere in the involved MTrP. On the other hand Hou et al; 2002 suggested that pain relief from pressure treatment may result from reactive hyperemia in the MTrP region. He also found that a higher pressure applied for 90sec produced the most significant pain relief. Another author Fryer and Hodgson et al; 2005 have demonstrated that the ischemic compression technique is better than sham-myofascial technique in reducing tenderness on latent MTrPs in upper trapezius muscle due to a change in tissue sensitivity rather than any unintentional release of pressure by the practitioner [9].

Hong et al; 1993 hypothesized that Deep Transverse Friction Massage may offer a useful transverse mobilization to the taut band. The another author Stasinopoulos et al; 2004 give a review of Cyriax physiotherapy for tennis elbow and explain theoretically that application of DTF leads to immediate pain relief and increase in strength and mobility. Pain relief during and after DTF may be due to modulation of the nociceptive impulses at the level of the spinal cord the ''gate control theory''. The centripetal projection into the dorsal horn of the spinal cord from the nociceptive receptor system is inhibited by the concurrent activity of the mechanoreceptors located in the same tissues. According to Cyriax and Cyriax et al; 1983 DTF also leads to increased destruction of pain provoking metabolites, such as Lewis's substances. This metabolite, if present in too high concentration, causes ischemia and pain. It has also been suggested that a10 minute DTF treatment of a localized area may give rise to lasting peripheral disturbance of nerve tissue, with local anaesthetic effect. Another mechanism is through diffuse noxious inhibitory controls, a pain suppression mechanism that releases endogenous opiates which diminish the intensity of the pain transmitted to higher centre. In addition, the application of DTF can produce therapeutic movement by breaking down the strong cross links or adhesions that have been formed between the mutual collagen fibres and the adhesions, between repairing connective tissue and surrounding tissues to soften the scar tissue and mobilized the cross links. Finally it produces vasodilatation and increased blood flow to the area which facilitate the removal of chemical irritant and increase the transportation of endogenons opiates, resulting in a decrease in pain [10].

The Graph 2 shows an average pre to post ROM scores for group A, group B & group C. Although Simons et al; 1999 hypothesized that TPs can induce restricted ROM in the tissues and lack of mobility. Fernandez-Perez et al; 2012found that the number of active TPs in the neck and shoulder muscles in subjects with whiplash-associated disorders was associated with a reduction of cervical ROM in both direction which was improved significantly after treatment with IC. Another study done on soleus TPs with a treatment of pressure release did by Grieve et al; 2011 found that significant improvement in dorsiflexion. Same technique were also used by Sarrafzadeh et al; 2012 & Cagnie et al; 2013 on upper trapezius muscle and found that increase active cervical lateral flexion after the IC treatment. Nagrale et al; 2010 explain three possible reason for the increased ROM after IC i.e. Manual pressure on the contraction knot of the TP causes lengthening of the sarcomere. Decrease of abnormal tension of the taut band and general pain reduction may also contribute to an increased ROM [11].

The Graph 3 shows an average pre to post NDI scores for group A, group B & group C. Few researcher found that ischemic compression and deep transverse friction massage are able to reduce neck disability in trigger points. Cagnie et al; 2013 has demonstrated that a 4 weeks IC treatment resulted in a significant improvement in general neck and shoulder complaints, pain sensitivity, mobility, and muscle strength. At 6-month follow-up, there was a further decrease in general pain, but no change in NDI scores. A possible cause for low NDI score could be the maximum study population present with mild complaints [11]. Another author Hains et al; examined the ischemic compression on shoulder trigger points and found that IC is effective in decreasing functional disability in the shoulder joints.

Most of the study have done on bilaterally on upper trapezius but few of the study says predominantly trigger points developed on dominant side. Hayle and marras et al; 2011 did a study to know the development of MTrPS in upper trapezius, dominant side in computer workers. They explained few reason i.e. location of TPs primarily on medially to spine which put the trapezius into greater risk to develop

fatigue and failure. Unequal loading about a single muscle during low level stress exertion is the another cause to develop TPs which is due to low threshold motor units termed "Cinderella" fibers & location of the motor end plate region (innervated zone) of muscle. They also emphasized the duration of working environment i.e. one hour in which neck, upper posture and vision are compromised which further predispose the TPs development. Lastly they gave importance to modification, not only on ergonomic advice for postural correction but also on micro breaks, task variety and psychological well being program for managing the TPs developments [12].

The result of present study shows a statistically significant improvement that Ischemic Compression and Deep Transverse Friction Massage are equally effective to reduce pain and disability and improve the ROM as compared to the control group. One of the author Fernandez de las penas et al; 2005 which also done the study on MTrPs in upper trapezius, has concluded that transverse mobilization and pressure treatment is effective in reducing tenderness and pain on MTrPs in upper trapezius muscle [13].

Conclusion

A 4 week intervention of Ischemic Compression and Deep Transverse Friction Massage has showed that both the techniques are equally effective in reducing pain and functional disability and improve the ROM in comparison with the control group on trigger points in upper trapezius muscle.

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A Comparative Study on the Effects of Two Different Positions of Intermittent Cervical Traction in Cervical Radiculopathy

Anshika Singh*, Sumit Raghav*, Sanjai Kumar**

Abstract

Objective: The study was done to find out the difference between the effects of two different positions of intermittent cervical traction in cervical radiculopathy. *Method:* The study was of an experimental design, with 30 subjects, 14 were female, 16 were male, and all subjects were assigned into two groups, 15 subjects in each, according to criteria (inclusion & exclusion) and carried out at physiotherapy OPD of CSS Hospital and Jai Physiotherapy and Dental Clinic, SF- 06, Ansal Galleria, Meerut. In both groups, disability & pain were assessed by using the NDI & VAS score respectively. The collected data were of men and standard deviation of NDI & VAS score and has been analyzed using SPSS software. Paired T-test was used to find the difference between two groups. *Results:* The results showed that there was significant difference in pain and disability with their NDI and VAS score (p=0.000).

Keywords: CR (Cervical Radiculopathy); NDI (Neck Disability Index) & VAS (Visual Analog Scale).

Introduction

Cervical radiculopathy is a common clinical diagnosis classified as a disorder of nerve root and is a pathologic process which has been defined as pain in the distribution of a specific cervical nerve root [1].

Cervical radiculopathy from degenerative disorders can be defined as pain in a radicular pattern in one or both upper extremities related to compression and/or irritation of one or more cervical nerve roots [2].

Degenerative disorders and natural cervical Radiculopathy are neurological conditions characterized by dysfunction of a cervical spinal nerve, the roots of the nerve or both. It usually presents with pain in the neck and one arm, with a combination of sensory loss, loss of motor function, or reflex changes in the affected nerve-root distribution [3].

The average annual incidence of cervical radiculopathy is 83.2/100,000 persons, while the average prevalence is 3.5/1000 persons. Individuals are most commonly affected in the 5th and 6th decades of life [4].

The most common cause of cervical radiculopathy (in70 to 75 percent of cases) is foraminal encroachment of the spinal nerve due to a combination of factors, including decreased disc height and degenerative changes of the uncovertebral joints anteriorly and zygapophyseal joints posteriorly (i.e., cervical spondylosis) [5].

The most severe injuries and greatest wear and tear occur between C4 and C7. The nerve roots passing through the intervertebral foramina in these areas are C5, C6 and C7. Uncovertebral articulations (also known as joints of Luschka) are present in the C3-7 spinal segments, located on the posterolateral border of the intervertebral disc and in the anteromedial portion of the intervertebral foramen[6]. These articulations are not true synovial joints, but can hypertrophy associated with disc degeneration, and result in narrowing of the intervertebral foramen. This foraminal narrowing is a common cause of cervical radiculopathy [7].

Aims and Objective

To compare the effectiveness of two different positions of intermittent cervical traction t**o** reducing pain and disability in patients with cervical radiculopathy.

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Materials and Method

Visual Analogue Scale

The visual analog scale is one of the most basic pain measurement tools. It consists of a 10 cm line. The clinician can measure the place on the line and convert into it a score between 0 to 10 where 0 is no pain and 10 is bad as it could be [8].

Neck Disability Index

The NDI has become a standard instrument for measuring self-rated disability due to neck pain and is used by clinicians and researchers alike.

Each of the 10 items is scored from 0 - 5. The maximum score is therefore 50. The obtained score can be multiplied by 2 to produce a percentage score. Occasionally, a respondent will not complete one question or another. The average of all other items is then added to the completed items.

The original report provided scoring intervals for interpretation, as follows:

0 - 4 = no disability

5 - 14 = mild

15 - 24 = moderate

25 - 34 = severe

Above 34 = complete.

It is recommended that the NDI be used at baseline and for every 2 weeks thereafter within the treatment program to measure progress. As noted above, at least a 5-point change is required to be clinically meaningful. Patients often do not score the items as zero, once they are in treatment. In other words, it is common to find that patients will continue to score between 5 - 15 despite having made excellent recovery (i.e., they may be back to work). The practitioner should avoid the trap of "treating till zero", as this is not supportable based on current evidence [9].

Hypothesis

Experimental Hypothesis

There is significant difference between two different positions of intermittent cervical traction to reduce pain and disability in patients with Cervical Radiculopathy.

Null Hypothesis

There is no significant difference between two different positions of intermittent cervical traction to reduce pain and disability in patients with Cervical Radiculopathy.

Limitation of study

Small sample size

The duration of study is so small.

Research is done only among a particular age group. It could have taken on large groups.

Only pain and disability recovery was considered.

Variables

Dependent Variables

VAS score and NDI score

This study is an experimental design in nature, a comparative study.

Sample Selection

Convenient sample of 30 subjects, according to the inclusion and exclusion criteria, randomly assigned into two groups include in the study. This study was conducted in physiotherapy OPD of CSS Hospital Subharti University and Jai Physiotherapy and Dental Clinic, SF-06, Ansal Galleria, Meerut.

Inclusion Criteria

1. Age 35-55 year
2. Gender both male and female
3. History of pain less than 2 months
4. Neck disability index more than 10%
5. VAS score for neck pain more than 3.
6. Subjects suffering from Degenerative disorder of cervical spine.
7. Foraminal compression test, Jackson compression test positive.

Exclusion Criteria

1. Age not above 55 year
2. History of any trauma to cervical spine
3. Rheumatoid arthritis
4. Sign of spinal cord compression
5. Vertigo/Dizziness
6. Ankylosing spondylitis
7. Tumors
8. Vertibrobasilar insufficiency symptoms

9. Any pathology around shoulder region such as Periarthritis, Bursitis, Tendinitis.
10. Cervicogenic Headache
11. Congenital and Acquired deformity i.e Torticolis, Scoliosis, Kyphosis
12. Whiplash Injury

Tools Used in Study

1. Couch
2. Towel
3. Consent form
4. Cervical traction machine
5. Stationary (pen, paper & pencil)

Protocol

After getting their informed consent the subjects were randomly assigned into two groups. Both of two groups i.e. group A and group B have 15 patients in each.

Group A: Intermittent cervical traction in supine lying position along with moist heat pack.

Group B: Intermittent cervical traction in sitting position along with moist heat pack.

It was given to the patient with duration of *15 minutes/day for 6 days in a week. Moist heat pack was given to the both group of patient for 10 minutes* (before intermittent cervical traction) to reduce pain and disability and to improve tissue extensibility. The protocol included treatment of total three weeks, with six days per week management. The patients included in both group who were encouraged to complete the home exercise program such as isometric exercise of neck flexors, neck extensors and lateral flexors along with hot water fomentation once a day over a 3 weeks period.

Data Analysis

All analysis was obtained using SPSS version 13.0(For window 7). Demo graphic data of the patients including age and gender were summarized. The dependent variables for the statistical analysis were VAS and NDI. A base line data was taken at the beginning of the study (pre test values) and after the completion of the treatment (post test values) to analyze the difference between the two treatment groups; independent t-test was used. A level of 0.05 was used to determine the statistical significance.

Result

A sample of size 30 (15 in group A & 15 in group B) was studied individually for VAS and NDI score at base line 1st and 21st day respectively. Table 1 presents the Mean & S.D. and standard error of Mean of group A and group B for Pre VAS score and Post VAS score. Table 2 presents the Mean & S.D. and standard error of Mean of group A and group B for Pre NDI score and Post NDI score. Table 3 presents the Mean, Standard Deviation for the difference (1st-21st Day).

The Paired 't' test was applied to find the significant difference between Pre and Post VAS and NDI score in group A and group B respectively, which shows a significant difference in both the groups separately at 5% level of significance (P<.05).

The average difference from 1st to 21st day in VAS and NDI score shown in Table 3, for both groups which shows that group A, (Intermittent Cervical Traction in Supine Lying position) reduce pain and disability higher in comparison to group B (Intermittent Cervical Traction in Sitting position).

Table 1: Mean, standard deviation & S.E.M. for VAS scores in Group A & Group B

S. No.	Time Periods	Group A (Mean±S.D.)	S.E.M.	Group B (Mean±S.D.)	S.E.M.
1	At 1st Day	5.253±1.0141	.2618	5±.9258	.2390
2	At 21st Day	2±.7559	.1951	2.467±.7432	.1918

Table 2: Mean, standard deviation & S.E.M. for N.D.I score in Group A & Group B

S. No.	Time Periods	Group A (Mean±S.D.)	S.E.M.	Group B (Mean±S.D.)	S.E.M.
1	**At 1st Day**	**.26±.0875**	**.0226**	**.256±.0718**	**.0185**
2	**At 21st Day**	**.0827±.0446**	**.0115**	**.076±.0241**	**.0062**

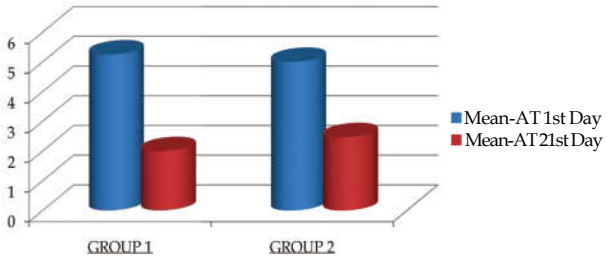
Table 3: Mean, standard deviation for the difference (1st – 21stday) VAS score & N.D.I. score in Group A & Group B

S. No.	Time- Difference	Group A (Mean± S.D.)(Difference)	Group B (Mean± S.D.) (Difference)
1	(1-21)Day VAT Score	3.253±.2582	2.533±.1826
2	(1-21)Day N.D.I. Score	.1773±.0645	.18±.0641

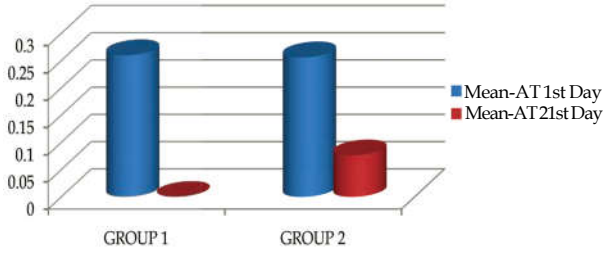
Table 4: Comparasion b/w (1st – 21stdays) in VAS scores & N.D.I. scores (by paired "T" test) in Group A & Group B

S. No.	Type of Scores	Group A	Group B
1	VAT Score	.0000 (P<.05), Significant	.0000 (P<.05) ,Significant
2	N.D.I. Score	.0000 (P<.05), Significant	.0000 (P<.05), Significant

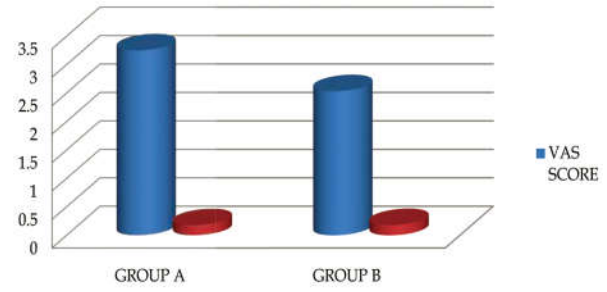
*p<.05 shows a significant difference at α=.05 level of significance



Graph 1: The Bar Chart of average values of VAS scores at 1st & 21st day in two groups



Graph 2: The Bar Chart of average values of NDI scores at 1st & 21st day in two groups



Graph 3: The Bar Chart of average difference b/w (1st-21st day) for VAS score & N.D.I. score in two groups

Discussion

The findings of this study indicated that subjects in both the groups had significant decrease in pain and disability. However, out of the two groups, the group receiving Intermittent cervical traction in supine lying position had shown more improvement in both pain and disability. The data showed that with the use of three weeks protocol there was a significant difference between post treatment values of VAS score (p=0.000) and NDI Score (p=0.000) taken on 21st day between group A and group B but more improvement was seen in the group A. A few researchers have done work where they have attempted to improve pain by giving cervical traction in supine lying position.

An article given by deets D, hand KL and Hopp SS supports the result of my study. In this article, 8 subjects were studied to determine the position which provided the greatest amount of posterior intervertebral separation during cervical traction treatment. Measurement of posterior intervertebral separation taken from lateral roentgenograms of C4-C7 vertebrae revealed greater separation in supine lying position. The result suggested that the supine lying position was more beneficial in treatment of cervical spine with traction [10]. The investigators concluded that the increased separation in supine lying position was related to the patients increased comfort and relaxation.

Fater DC, Kernozek TW did study was performed for the purpose of comparing the magnitude of cervical vertebrae separation during cervical traction in supine and seated positions using home traction units. A repeated measures design with two within-subject factors (type of traction and time) was used. Seventeen asymptomatic volunteers received cervical traction in seated and supine position. Subjects received 5 minutes of static traction in sitting or supine using a force of 13.6 kg while in 15 degrees of neck flexion. A lateral radiograph of the cervical spine was taken before traction force was applied and after five minutes of static traction. Anterior and posterior distances between the inferior border of C2 and the superior border of C7 were measured by a radiologist. After supine traction there were significant increases

(p=0.001) in posterior cervical vertebrae separation compared to any changes after seated traction. There were no significant changes in anterior vertebral separation during either supine or seated traction positions (p=0.769). Supine cervical traction may be more effective for increasing posterior vertebral separation than seated cervical traction [11].

It is likely that patients with CR would be benefitted with intermittent cervical traction along with moist heat pack. This approach reduces pain and disability; improve function which makes it a reasonable therapeutic option for clinicians in treating individuals with CR.

Conclusion

The study shows that the parameters utilized for the technique maneuvers were effective for improving pain and disability. Study supports experimental hypothesis H1.The significant difference was present between two types of therapies for VAS score as well as NDI score.

After seeing the data and graph, group A shows more significant improvement to reduce pain and disability. Therefore, Intermittent Cervical Traction in Supine Lying position may be incorporated into the treatment regimen of the patient undergoing physiotherapy for the pain and disability in cervical region of spine.

Study conclude that the difference from 1st to 21st day in VAS and NDI which is shown in (Table 3) for both groups/therapies which shows that group A i.e. Intermittent Cervical Traction in Supine Lying position reduced pain and disability higher in comparison to Intermittent Cervical Traction in Sitting position.

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Physiotherapy Management of Dyspneic Patients with the History of Asthma: A Case Series

Dipali P. Rana*, Shivani S. Bhatt**

Abstract

Resolving the symptom and improving quality of life is the prime goal of pulmonary rehabilitation. The present study aims to determine the effect of Nebulization with NaCl, Active Cycle of Breathing Technique (ACBT) and Chest Mobility Exercise (CME) in Asthma. The two subjects included in the study were apparently healthy, young, dyspneic asthmatic female with the complaint of dyspnea on walking for more than 10 minutes at normal pace. The commonly used outcome measures were selected for the assessment; 6 Minute Walk Test (6MWT), Peak Expiratory Flow Rate (PEFR) and Chest expansion (CE). All parameters showed improvement by the end of intervention program. Considering Minimum Clinically Important Difference (MCID) and normative values, high variability was noted between the subjects, however, clinically, both subjects demonstrated improved values on all three outcome measures. Paired t-test was used for data analysis. Because of low sample size, none of outcome measures showed statistical significant difference in pre and post intervention score. Extended study with larger sample size would assist in drawing conclusion which can be generalized to large population.

Keywords: ACBT; Asthma; PEFR; 6MWT; Chest Mobility; Nebulization.

Introduction

Asthma is a disease characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person (WHO,2010). Clinical presentation of asthma shows bronchospasm, rapid rise in respiratory rate and use of accessory muscle with prolonged expiratory phase manifested by audible wheezes and rhonchi [1]. These features of the disease lead to dyspnea, usually expressed as 'feeling of breathlessness' by the patient. There are multiple triggering factors for asthma attack. Physical exertion is one of the commonest triggering factors for dyspnea in individuals with asthma.

The aim of the study was to determine the effect of Nebulization with Normal Saline for loosening up of the accumulated lung secretions, followed by ACBT as a chest clearance technique and CME to increase chest expansion in two dyspneic subjects with history of asthma. To our knowledge none of the studies had worked on these three areas of pulmonary rehabilitation in asthma. In asthmatic subjects, with continuous non-productive coughing, there is risk of narrowing of airway and can precipitate bronchospasm [1]. The enrolled subjects had the same complaint but with inefficient expectoration of lung secretions. The auscultation findings revealed retained secretions in the lungs. In such cases, hydration or aerosol therapy for the airway will be effective in chest clearance [1]. ACBT facilitates in expectorating lung secretion [2,3]. And helps in controlling severity of dyspnea (Pawadshetty, Munde, Sureshkumar, & Pawadshetty, 2016). CME were also incorporated in the program with the aim to improve chest excursion and ultimately ventilation.

The two subjects included in the study were apparently healthy, young, asthmatic female with the complaint of dyspnea on walking for more than 10 minutes at normal pace (Point 3 dyspnea on 11 point Borg's scale). Considering the clinical features of the condition and presenting symptoms, the commonly used outcome measures were selected for the assessment; 6MWT[4](Butland, Pang, Gross,

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Woodcock, & Geddes,1982) (Jenkins,2007), PEFR(Tierney et al.,2004) (Santanello, Zhang, Seidenberg, Reiss, & Barber,1999) and CE [5,6].

Methodology

The case series was conducted on two young, non-smoker female dyspnoeic subjects with the history of Asthma. The age of the subject1 and 2 was 22 and 21 years. Both subjects complaint of dyspnea, interfering with moderate intensity ADLs. Both subjects were diagnosed case of Asthma. Auscultation finding confirmed respiratory secretion in both lungs. Both subjects had complaint of coughing but could not expectorate the secretions. The commonest aggravating factor for dyspnea was cold and physical exertion. None had acute exacerbation in last 1 month or any other associated conditions which may limit them from participation. Written consent was obtained from the subject after detailed description of the intervention program.

At baseline, 6MWT, PEFR (Using Peak Flow meter: PFM) and CE (Using standard measure tape/ cloth tape) were measured. The 6MWT was performed as per American Thoracic Society guidelines [7]. Both subjects finished the test completely without demonstrating any features for test termination in-between. European Union (EU) scale peak flow meter (PFM) was used to assess PEFR. CE was measured at 3 levels; a. Axilla level(AL), Nipple level(NL) (4th intercostals space) and Xiphoid process level(XPL).

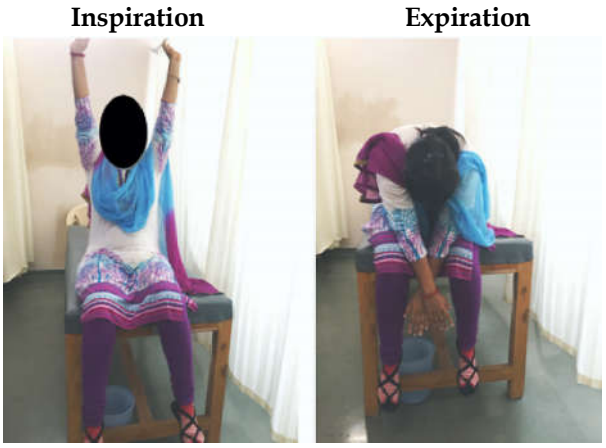
After this, the intervention program was delivered which included 3 weeks of supervised treatment and 1 month of maintenance home-program. The supervised treatment was delivered for 5 days/week for 3 weeks. It included;

1. Nebulization with 4 ml Normal saline (0.9% NaCl) for hydration of the respiratory tract and loosening of the accumulated secretions. It usually took 10 minutes for 4 ml NaCl to get nebulized.
2. ACBT as a chest clearance technique as per ACBT guidelines [8].
3. Three CME for improving lung expansion. [1] (Figure: 1,2,3)

For the remaining two days of the week when supervised intervention was not delivered, subjects were asked to continue ACBT and CME as home-program.

Post-treatment; 6MWT, PEFR and CE were reassessed. After that subjects were asked to continue ACBT and CME at home for 1 month as a part of maintenance home-program. Follow up assessment was taken after a month.

Fig. 1:



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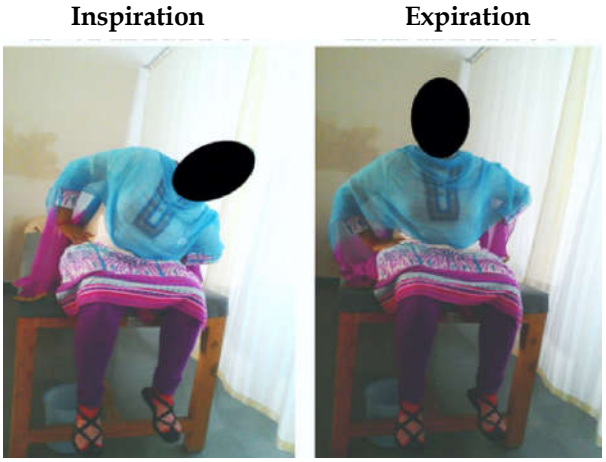

Fig. 3:

Subject 1:

Subject1 was a known case of Asthma from last 8 years. The subject had positive family history. The subject showed sedentary life style. On auscultation the air entry was found to be bilaterally reduced with

added lung sound (crackles) in both lower lobes. The subject was overweight with BMI of 26.64 (Height=155cm, Weight=64kg).

Subject 2:

Subject 2 was a known case of Asthma from last 7 years. The subject was falling in Obese category with BMI 33.06 (Height=165cm, Weight=90kg) and sedentary life-style. On auscultation the air entry was bilaterally reduced with rhonchi in bilateral lower lobes.

The graphical representation of the result is shown in the Figure 4, 5, 6.

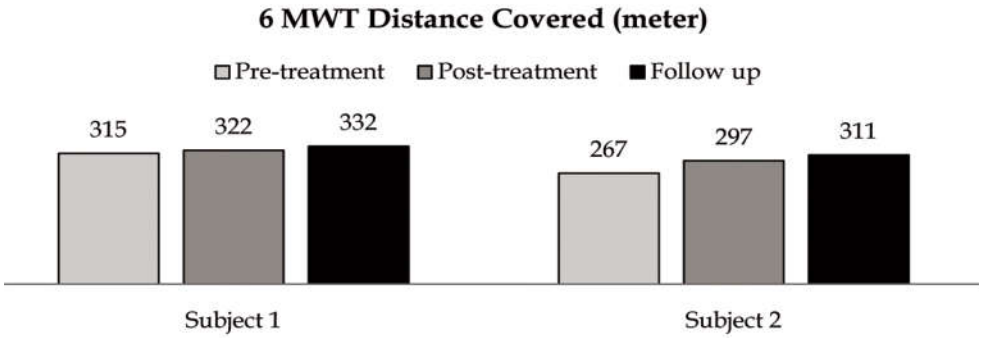

Fig. 4: Pre, post and follow up 6MWT distance covered by subject1 and 2

Post-intervention, no subject had reached MCID value for 6MWT, 6MWT MCID: 54 m (Wise & Brown, 2005) (Rehab measures: 6 minute walk test,2010)

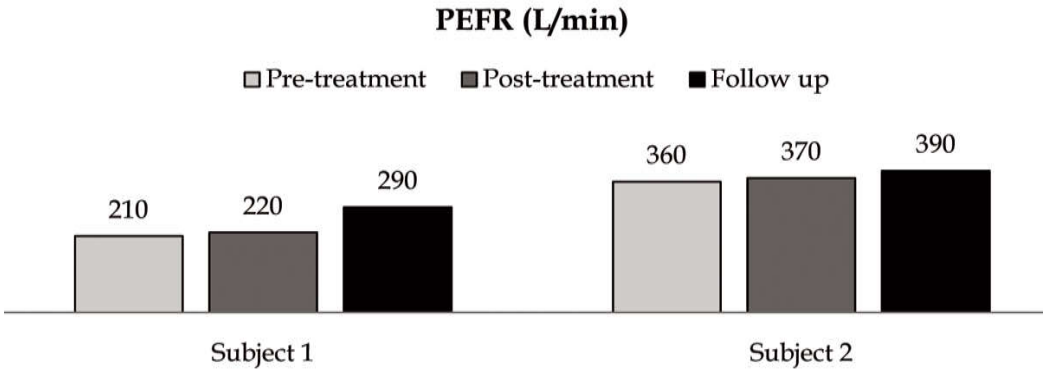

Fig. 5: Pre, post and follow up PEFR score of subject1 and 2

Post-intervention, subject1 had achieved MCID value for PEFR
PEFR MCID: 18.79L/min (Santanello, Zhang, Seidenberg, Reiss, & Barber,1999)

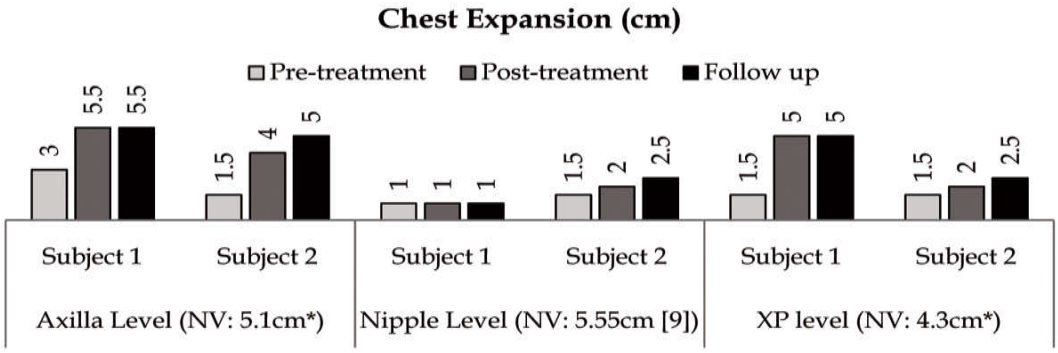

Fig. 6: Pre, post and follow up CE score

NV =Normal value; * = (Moll & Wright,1972)
Post-intervention, the CE was normalized at AL in both subjects. At NL, none showed considerable improvement. At XPL, subject1 showed normal value of CE.

Paired t-test was used to determine the statistical significance of the obtained improvement. As the sample size was limited, the difference in pre and post values did not show statistical significant difference. However, clinically, both subjects demonstrated improved values on all three outcome measures. Extended study with larger sample size would assist in drawing conclusion which can be generalized to large population.

Discussion

The case report is conducted on two female subjects (Age: 22 and 21 years) with the complaint of dyspnea on walking for more than 10 minutes at normal pace. Both subjects were diagnosed case of Asthma from last around 7 years. The study was conducted in the winter, auscultation finding revealed presence of added lung sound in bilateral lungs. But subject was unable to expectorate it out. The aim of the study was to determine the effect of; 1.Nebulized Normal Saline, 2.ACBT and 3.CME on dyspnoeic subject with the history of asthma.

Walking for more than 10 minutes at normal pace used to induce dyspnea in the subjects. Considering this fact, walk test was selected as one of the outcome measures. In 12 Minute Walk Test (12MWT), there is initial burst rise in the speed but later person walks at constant speed. Hence, shorter distance walk test would be a better alternative compared to 12MWT (Butland, Pang, Gross, Woodcock, & Geddes,1982). Moreover, 6MWT has established reliability and validity as a tool to measure of person's disability and could sense improvement following pulmonary rehabilitation (Jenkins,2007).

At baseline, the distance covered in 6MWT by subject1 and 2 were 315 and 267 meter respectively. The normal values of 6MWT calculated based on gender, age and body built was 581m and 549m for subject1 and 2 respectively (Enright & Sherrill,1998). At baseline, the measured 6MWT value for subject1 and 2 were 46% and 51% lower than desired value. The second outcome measure was PEFR, it is commonly used quantitative measure of lung function (Tierney et al.,2004). European Union (EU) scale PFM was used to measure PEFR of the subjects.[10] PEFR score of subject1 and 2 came to 210 and 360L/min respectively at baseline. The calculated age and height specific PEFR value should be 335 and 360L/min for subject1 and 2 (Salvi et al., 2014). Subject1 shows 37% reduction in PEFR compared to predicted value. However, subject2 showed desired value of PEFR at baseline. The third outcome measure used was CE. CE measurements are used to evaluate a patient's baseline status, treatment effectiveness, and progression of disease with regards to chest wall mobility and respiratory muscle function (Adedoyin & Adeleke, 2012) [9]. The normal value for chest expansion for upper, middle and lower chest are 5.1cm [9],5.55cm (Moll & Wright,1972) and 4.3cm [9] respectively. Both subjects showed much lower than normal value of CE.

As a part of treatment, 4 ml nebulised NaCl (0.9w/v) was given to patient in relaxed sitting position (Gallon,1996). The use of hypertonic saline enhances chest clearance [1]. Face mask was used for the delivery of nebulised content as it more preferable over mouthpiece (Steventon & Wilson,1981). It usually took 10 minutes for 4 ml NaCl to get nebulised. Loosened up secretions are to be expelled out with a chest clearance technique. ACBT and Autogenic drainage (AD) are equally effective in clearing secretions [2,3].

However, ACBT shows more improvement in PEFR and to reduce severity of dyspnea compared to AD (Pawadshetty, Munde, Sureshkumar, & Pawadshetty, 2016). Considering this fact, ACBT was included in the intervention. As bilateral lung was being involve, the ACBT was performed in upright position [8]. Three chest expansion exercises targeting entire chest was also included.

Subject1 showed 7m and 17m improvement and subject2 showed 30m and 44m improvement in post-treatment and follow up score of 6MWT. The MCID for 6MWT is 54m (Wise & Brown, 2005) (Rehab measures: 6minute walk test, 2010). None of the subjects reached MCID value. The MCID for PEFR is 18.79L/min (Santanello, Zhang, Seidenberg, Reiss, & Barber,1999).

Subject1 showed 10L/min and 80L/min improvement and subject2 showed 10L/min and 30L/min improvement from baseline in post-treatment and follow up score. None of the subjects reached MCID in post-treatment PEFR score. But after 1 month, the follow up data showed tremendous improvement in subject1. CE does not have established MCID; however the improvement can be compared with desired normal values. Post-intervention, the CE was normalized at AL in both subjects. At NL, none showed considerable improvement. At XPL, subject1 had improved to normal value of CE.

The improvement was noted following intervention in all areas of assessment. Extended study with larger sample size would help in overcoming confounding factors and drawing a conclusion.

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Standard journal article

[1] Flink H, Tegelberg Å, Thörn M, Lagerlöf F. Effect of oral iron supplementation on unstimulated salivary flow rate: A randomized, double-blind, placebo-controlled trial. J Oral Pathol Med 2006; 35: 540-7.

[2] Twetman S, Axelsson S, Dahlgren H, Holm AK, Källestål C, Lagerlöf F, et al. Caries-preventive effect of fluoride toothpaste: A systematic review. Acta Odontol Scand 2003; 61: 347-55.

Article in supplement or special issue

[3] Fleischer W, Reimer K. Povidone iodine antisepsis. State of the art. Dermatology 1997; 195 Suppl 2: 3-9.

Corporate (collective) author

[4] American Academy of Periodontology. Sonic and ultrasonic scalers in periodontics. J Periodontol 2000; 71: 1792-801.

Unpublished article

[5] Garoushi S, Lassila LV, Tezvergil A, Vallittu PK. Static and fatigue compression test for particulate filler composite resin with fiber-reinforced composite substructure. Dent Mater 2006.

Personal author(s)

[6] Hosmer D, Lemeshow S. Applied logistic regression, 2nd edn. New York: Wiley-Interscience; 2000.

Chapter in book

[7] Nauntofte B, Tenovuo J, Lagerlöf F. Secretion and composition of saliva. In: Fejerskov O, Kidd EAM,

editors. Dental caries: The disease and its clinical management. Oxford: Blackwell Munksgaard; 2003. p. 7-27.

No author given

[8] World Health Organization. Oral health surveys - basic methods, 4th edn. Geneva: World Health Organization; 1997.

Reference from electronic media

[9] National Statistics Online—Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/HSQ 20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

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