RESEARCH ARTICLE

EFFECTIVENESS OF ELONGATION LONGITUDINAUX AVEC DECOAPTION OSTEOARTICULAIRE IN CORRECTING FORWARD HEAD POSTURE

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ABSTRACT

Background: Forward head posture, is a deviation of spinal vertebrae from their respective places, which causes anterior translation at head and gives a poking chin with associated sign and symptoms. Conventional physical therapy and manual therapy techniques are effective in correction of forward head posture. **Objective**: To determine the effectiveness of Elongation Longitudinaux Avec Decoaption Ostéo Articulaire (ELDOA) in correcting forward head posture. **Methodology**: Single group Interrupted time series quasi experimental design was conducted in outpatient Department (OPD) of Islamabad Physiotherapy & Rehabilitation Centre Bahria Town, from August 20 to January 21 consisting of n=44 male and female participants of 30 to 40 years age. All participants received three sessions per week for 4-weeks after selection through convenience sampling technique. The assessments were done at baseline, 1st, 4th and 12th post treatment day. The assessment was done using tragus to wall distance and shoulder to wall distance via measuring tape for forward head posture, cervical range of motions (ROMs) with inclinometer and pain using Numeric Pain Rating Scale (NPRS). Data analysis was done via SPSS-22. Results: A total of n=21 male with the mean age of 35.96±3.22 years and 23 female with a mean age of 36.22±3.20 years were treated. The tragus to wall distance significantly improved ($p<0.05$) from 16.55±0.4 to 12.69 ±0.3 cm, 17.57±0.4 to 13.76±0.4 in sitting and standing respectively with ($p<.05$)and shoulder to wall distance improved from 13.65cm to 9.0 cm with ($p<.05$) at post 12th treatment day. The Pain and Cervical ROMs also showed statistically significant improvement after 12th session ($p<.05$). **Conclusion**: Elongation Longitudinaux Avec Decoaption Ostéo Articulaire (ELDOA) exercises were found to be effective in the correction of forward head posture.

Keywords: ELDOA, Forward Head Posture. Flexibility,Neck pain.

INTRODUCTION

Forward head posture (FHP) can occur because of many reasons, out of which, persistent abnormal neck posture outstands all other. The head being continuously sustained in a forward position that can cause musculoskeletal disorder.[2-3]

The upper cross syndrome that is present in FHP, muscular tightness is one of it's the common problem. The FHP is portrayed by hyperextension of the upper cervical (C1-C2) and flexion of lower C-spine (C3-C7). This abnormal position is most often kept up by patients in reaction to a wrong posture, causing a deep structural as well as functional influence on the different areas of body.

Therapeutic exercise i.e. stretching, strengthening and myofascial release improve the incorrect biomechanical patterns and position of cervical spine through targeting the sub occipital muscle.[4] Stretching exercises of shoulder and thoracic region Increase in the elasticity of the levator scapulae and scalene muscles that has been used as a basic intervention for forward head posture correction.[5-8] Moreover, Stretching exercises are recognized for enhancement in sports performance, injury prevention, restores and maintain range of motion.[9] Some researchers have proven stretches to bring a great improvement in posture, with enhancement in neck mobility and pain relief.[4, 10-11] Elongation Longitudinaux avec Decoaption Ostéo Articulaire (ELDOA) is an active form of decompression give space to target joint by putting tension on specific fascia chain[12] through body's own muscle contraction and reduce pain.[13] ELDOA facilitates local proprioception of the targeted segment, which improves orientation perception, thereby enhancing the capability to self-correct any postural discrepancy.[14] This general effect of ELDOA, person gets the awareness to self-correct abnormal posture.[15] In 2016, a study conducted by Clement indicated that ELDOA decreased physical tension and anxiety along with improvement in range of motion and flexibility.[16] Literature also supports that ELDOA is effective in improving pain, muscle length and functional status.[17]

Stabilization and strengthening exercises of different frequency and application methods are used to treat the issues associated with forward head posture. Muscular elasticity improvement is vital for posture correction. ELDOA has effectively dealt with lumbar issues through increase in

muscle elasticity. But, its effects on cervical region and its associated conditions are not clearly understood .This study is conducted to assess the effectiveness of ELDOA on cervical region. The study hypothesis was that the ELDOVA significantly improve the forward head posture. So the objective of study was to determine the effectiveness of Elongation Longitudinaux Avec Decoaption Ostéo Articulaire (ELDOA) on forward head posture.

METHODOLOGY

A single group interrupted time series quasi experimental study was conducted in Islamabad Physiotherapy & Rehabilitation Centre, after getting ethical approval from ethical research committee of Riphah College of Rehabilitation & Allied Health Sciences (Ref#00771) from August 2020 to January 2021. Participants were selected through non probability convenience sampling technique. The paired sample formula was used to calculate the sample size by using Numeric pain rating scale (NPRS)[16]value the power of study was 0.80 with adjusted 0.5 level of significance. The calculated sample size was n=44.

The both male and female participants aged between 30-40 years, having limited cervical range of motion (ROM) (Flexion: less than 80◦, Extension: less than 70◦, Rotation: less than 90◦ both sides., Lateral flexion: less than 20◦)[18], pain more than 3 on NPRS scale with FHP, and developing kyphosis that was ruled out by using acromion to wall test in which patient is unable to touch occiput and shoulder to wall > 5 cm. Participants having complaint of dizziness, had surgical history of spine or upper extremity , any upper extremity bony deformity, severe osteoporosis, cervical radiculopathy, any pathology/ infection in spine or upper limb, trauma of upper extremity, malignancy of upper extremity or thorax and obesity were excluded from the study. Data was collected from the participants after getting informed consent and measurements were taken on self-structured questionnaire i.e., included demographic, neck pain, cervical ranges, shoulder to wall distance, and tragus to wall distance (cm) in sitting and standing.

The ELDOA positions for cervical region were given three days/week for four weeks as shown in figure 1. The NPRS, inclinometer, tragus to wall distance and shoulder to wall distance were used as assessment tools. Assessments were done at baseline, 1st, 4th and 12th day post treatment as shown in Fig (2).

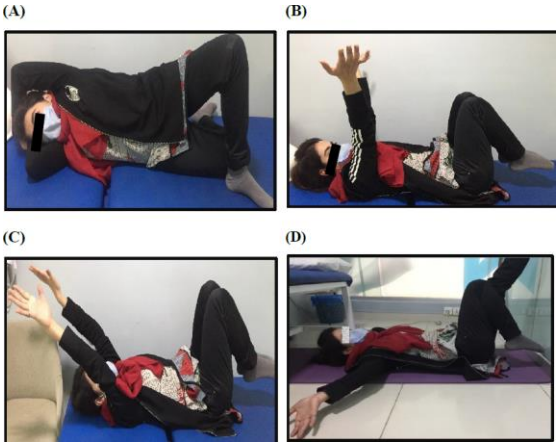

Figure 1: (A) Decoarctation of C0/C1/C2, (B) Decoarctation of C4/C5, (C) Decoarctation of C5/C6, (D) Decoarctation of C6/C7

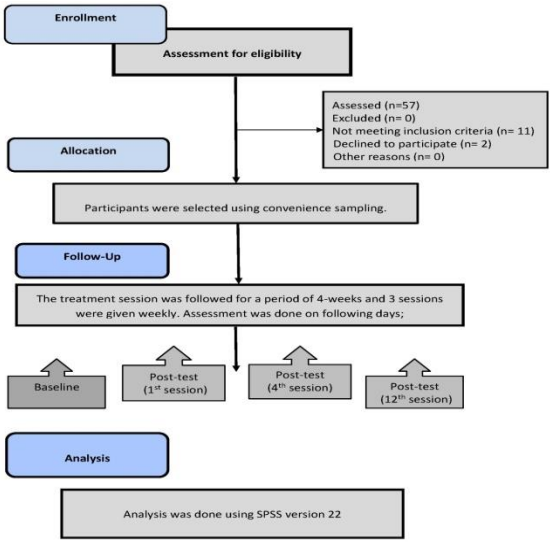

Figure 2: Flow chart

Cervical ROMs including flexion, extension, rotation of both sides and side flexion of both sides (right and left) were measured through inclinometer. Measuring Tape was used to record the tragus and wall distance in (cm) , with considering the normative value 10 to 1055 cm in females and male respectively. A systematic review conducted in 2018 supported TWT as a reliable, valid, and simple clinical indicator of FHP .[19] It has a reliability between 0.93 and 0.95. Distance between acromion and wall (normally, shoulders should touch the wall with a distance lesser than 5cm between wall and shoulder while in standing relaxed position) was measured[20-21] and recorded in sitting and standing position to assess developing of kyphosis and forward head posture. NPRS scale

was showed to the participant to mark the current pain intensity. This scale has high reliability (0.95-0.96) and validity (0.86-0.96).[20]

Hot pack was applied around the cervical region for 7 minutes following which the participants were explained a specific series of body movements. Four ELDOA positions were once showed to the participants and then they were asked to make those positions, once they made the positions, stopwatch was set to one minute for each position. Participants were continuously given verbal commands to correct the position and maintain it for 1 minute. This technique was applied thrice a week for four weeks; it took 20-25 minutes on each treatment day to complete the session.

A one-way repeated-measure analysis of variance (ANOVA) with post-hoc analysis was used for normally distributed variables and for non-normally distributed variables Friedman with Wilcoxon-signed rank test was used to measure the effects of ELDOA in FHP correction. Data analysis was done through SPSS version 22.

RESULTS

Out of total participants, 21 were male and 23 were female with a mean age of 35.96±3.22 and 36.22±3.20 respectively. The male and female participants' mean of body weight was 73.86±5.56 and 66.87±5.80 in Kilograms. Mean height in inches were 65.13±1.60 in male and 69.24±3.60 in female. BMI mean of study participants were 25.25±1.20 in male and 24.39±1.73 was in female.

To observe the continuous change in outcomes used repeated measures ANOVA with Greenhouse-Geisser and Friedman with Wilcoxon-signed rank test using Bonferroni correction. That determined cervical ranges were statistically significant different with large effect size between time points i.e., at baseline and 12th session. Post-hoc test using Bonferroni correction revealed that ELDOA caused statistically significant improvement in ranges from baseline to 12th session.

Table1. One- way ANOVA Analysis to measure ELDOA effect in FHP correction

Variable	Mean ±SD	F(df)	sig	np 2
TWT (sitting)(cm)				
Baseline Post 1st session Post-test (4th session) Post-test (12th session)	16.55±0.4 15.55±0.3 13.88±0.3 12.69±0.3	140.56(1.34,56)	0.00**	0.77
TWT (standing)(cm)				
Baseline Post 1st session Post-test (4th session) Post-test (12th session)	17.57±0.4 16.74±0.4 14.86±0.3 13.76±0.4	109.4 (1.33,56)	0.00**	0.72
Cervical right lateral flexion				
Baseline Post 1st session Post-test (4th session) Post-test (12th session)	16.54±0.3 18.94±0.5 23.68±0.6 25.87±0.8	114.48(1.47, 61)	0.001**	0.73
Cervical left lateral flexion				
Baseline Post 1st session Post-test (4th session) Post-test (12th session)	17.37±0.3 19.91±0.5 24.43±0.8 27.41±1.0	83.13(2.01, 84)	0.001**	0.66
Cervical flexion				
Baseline Post 1st session Post-test (4th session) Post-test (12th session)	47.48±2.2 51.12±1.9 55.29±1.8 58.29±1.7	33.01(1.63, 68)	0.000***	0.44

Statistical test=One- way repeated measure ANOVA, Level of significance: p<0.05 p<0.01**, p<0.001** p<0.000***,np^2= effect size (df) =F statistics (degree of freedom), TWT= Tragus to wall test.*

Similarly, tragus to wall distance (cm) in sitting was normally distributed so repeated measure ANOVA

was used. Repeated measure with Greenhouse-Geisser correction determined that mean of tragus to wall distance (cm) in sitting and standing was statistically significant from baseline to 12th session with large effect size. Post-hoc test using Bonferroni correction revealed that ELDOA caused statistically significant improvement in sitting and standing tragus to wall distance from baseline to each level of assessment ($p<0.05$).

Friedman and Wilcoxon signed rank statistical test indicated pain and shoulder to wall distance were having significant improvement in each level from baseline to 12th session ($p<0.05$).

Table 2. Friedman and Wilcoxon signed rank Analysis to measure ELDOA effect in FHP correction

Variable	MR	Median (IQR)	Z	sig
NPRS				
Baseline	6.86	7(2)	-4.2	0.000***
Post 1st session	5.73	6(3)	-5.1	
Post-test (4th session)	4.16	5(3.75)	-4.8	
Post-test (12th session)	3.14	3(4)	-5.5	
Cervical Extension (degree)				
Baseline	43.62	41.05(21.15)	-4.9	0.000***
Post 1st session	45.85	43.80(18.68)	-5.5	
Post-test (4th session)	50.58	50.40(19.03)	-5.5	
Post-test (12th session)	53.51	54.50(16.77)	-5.8	
Shoulder to wall distance (cm)				
Baseline	13.65	14(2.60)	-5.5	0.000***
Post 1st session	12.41	13(2.75)	-5.3	
Post-test (4th session)	10.41	10(3.45)	-5.1	
Post-test (12th session)	9.10	8(4.60)	-5.5	
Cervical Rotation Right side				
Baseline	41.49	42(11.75)	-5.3	0.000***
Post 1st session	45.82	44.35(10.75)	-5.8	
Post-test (4th session)	49.93	49.94(12.15)	-5.7	
Post-test (12th session)	52.22	50(12.6)	-5.8	
Cervical Rotation left side				
Baseline	44.75	44(15.9)	-4.8	0.000***
Post 1st session	47.26	45(12.6)	-5.8	
Post-test (4th session)	51.19	50.2(12.3)	-5.5	
Post-test (12th session)	53.59	52.8(12.7)	-5.8	

Statistical test= Friedman and Wilcoxon signed rank test, Level of significance: p<0.05 p<0.01**, p<0.001** p<0.000***,MR= Mean rank, IQR=Inter quartile range. Z value is reporting = Baseline to 1s, 1st to 4th, 4th to 12th & baseline to 12th session difference*

DISCUSSION

The aim of study was to determine the effectiveness of Elongation Longitudinaux Decoaption Osteo-Articulaire (ELDOA) on forward head posture. The null hypothesis of presents study was rejected which showed that ELDOA is effective in improving forward head posture.

The assessment measures were NPRS to assess the pain intensity, measuring tape to measure anterior translation of head through tragus to wall and shoulder to wall distance. Cervical ROMs were measured through inclinometer.

A study on n=30 female patients with prolapsed intervertebral disc pain was conducted to measure the effects of ELDOA alone and combined with core muscle strengthening in other group.[22] It is indicated 6 weeks ELDOA alone or in combination with core muscle strengthening treatment protocol found effective for pain management.[22] The results of the present study also showed that individuals were receiving 4-weeks ELDOA treatment program cause pain reduction. But the past study showed mean difference of 0.97 between visit 1 and 6th week. While the present study shows a mean difference of 3.73 from baseline to 12th session i.e. on the 4th week. This suggests that ELDOA brought earlier pain relief in cervical compared to lumbar region, which can be because of the fact that Prolapsed Intervertebral Disc (PIVD) is a more painful condition which can also require surgical

correction; whereas in present study forward head posture is studied which is a milder condition and can show brisk recovery after a treatment. So, it can be concluded that ELDOA brings fast relief in patients with mild conditions.

A Randomized controlled trial was conducted by Momena Shehzad et al. in 2020 with n=40 patients for 6 weeks, both male and female with the age of 30 to 70 years.[17] In the past study ELDOA reduced pain from 7 at baseline to 3 on NPRS at 6th week, while in the current study mean difference from 0 week to 4th week was 3.73, which suggests 4 weeks ELDOA is beneficial only for pain reduction in FHP patients.

Secondly, a previous study indicated the effects of ELDOA on muscle length and showing variation in ranges. The Piriformis muscle length was gained after intervention.[12, 17] These findings are also harmonious with present study results, as ELDOA effectively improved cervical ranges.

Fascia stretching improves level of functioning and reduce pain. In current study after the 4 week administration of ELDOA technique on cervical region pain was reduced. [22]

In a quasi-experimental study by Clement in 2016 reported that ELDOA improves flexibility, body posture and range of motion, while it decreases pain generally. Besides that, these exercises also decrease physically built tension and anxiety.[16] The results of this study are also constant with the findings of the current study that ELDOA has improved forward head posture by decreasing tragus to wall distance (pre-treatment it was 15.57 which reduced to 13.76) after administration of ELDOA, shoulder to wall distance also decreased from 13.65 to 9.10.The previous and current study support the effectiveness of general effects of ELDOA i.e. it improves postural discrepancies and flexibility through decoarctation.[16] The limitation of this study it has no control group and randomization that effect the generalizability of study results.

CONCLUSION

It is concluded that ELDOA exercises are effective in correction of forward head posture. This correction was made through reduction in cervical pain intensity, improving cervical ROM and reducing in tragus and shoulder to wall distance. It is recommended to more objectively measure the effectiveness of ELDOA in correcting forward head posture with strong experimental form of impact evaluation for both in short and long term

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