Comparative Effectiveness of Kinesio Taping and Ift in Upper Cross Syndrome- A Randomized Clinical Trial

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Abstract

Background: Upper cross syndrome refers to a particular configuration of overlapping overactive and underactive muscle groups in the neck, chest and shoulders. Typically, poor posture causes the syndrome, including the forward head posture, which occurs when people use electronic devices, read, and drive. The present study is intended to investigate the effect of kinesio taping on upper cross syndrome

Objectives: 1. To study the effectiveness of kinesio taping, Hot Moist Pack and exercises in upper cross syndrome, 2. To study the effectiveness of IFT, HMP and exercises in upper cross syndrome and 3. To compare the effectiveness of kinesio taping and IFT in upper cross syndrome.

Methodology: The study consisted of 2 groups. Group A was experimental group and Group B was conventional group. Both the groups received treatment protocol for 2 weeks. Sample size was 60 with 30 in each group.

Results: Visual analogue scale, cranio-vertebral angle and forward shoulder angle were used as outcome measures. Statistically significant results were found with VAS p=<0.0001, cranio-vertebral angle p=0.0632 and forward shoulder angle p=0.285

Conclusion: The study concluded that the use of kinesio taping is recommended in reducing pain and improving the neck angles in participants with upper cross syndrome as compared to conventional therapy.

Key Words: *Conventional Physiotherapy, IFT, kinesiotaping, upper cross syndrome*

Introduction

Crossed syndromes are characterized by alternating sides of inhibition and facilitation in the quadrants.The muscle imbalances are seen between the fronts and back of the body or sometimes in left and right side of body.

Upper cross syndrome (UCS) is also referred as proximal or shoulder crossed syndrome. According to Dr. Vladimir Janda, upper cross syndrome is characterized by tightness of the upper trapezius, levator scapulae on dorsal side crosses with tightness of pectoralis major and minor. Weakness of the deep cervical flexors ventrally crosses with weakness of middle and lower trapezius[1].

This pattern of imbalance creates joint dysfunction, particularly at the atlanto-occipital joint, C4-C5 segment, cervicothoracic joint, glenohumeral joint, and T4-T5 segment. Janda noted that these focal areas of stress within the spine correspond to transitional zones in which neighboring vertebrae change in morphology[2,3,4].

Specific postural changes are seen in UCS, including forward head posture, increased cervical lordosis and thoracic kyphosis, elevated and protracted shoulders, and rotation or abduction and winging of the scapulae[1].

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As these muscles helps maintaining spinal curvature in turn normal body posture. When these muscles undergoes imbalance gives rise to altered posture and signs and symptoms related to it. These kind of postural alterations are seen in all aged population.

Because of increased work stress and sedentary life style, the society is becoming more flexion-addicted attitude. In which people tend to frequently stoop forward. This is seen in office workers and students who tend to sit at a desk for prolonged periods, slouching forward to see the computer screen. Students carrying heavy backpacks also tend to lean forward. All these reasons in turn increase prevalence of UCS.

Poor posture leads to consequences such as, pain in the neck, mid-back muscle spasm/tightness, decreased range of motion, fatigue, arthritis due to uneven joint wear over time, increased risk for disc herniation, headaches, reduced performance which collectively reduces quality of life.

There are different treatment approaches available for UCS Out of which one of the successful treatment approach is physiotherapy.

Kinesio tex tape has been modified since its creation to mimic the qualities of skin. This tape has been designed to allow longitudinal stretch of 55-60 % of its resting length. This degree of stretch approximates the elastic qualities of human skin. The thickness of the kinesio tex tape is approximately the same as that of epidermis of the skin. This was intended to limit the body's perception of weight and avoid sensory stimulus. The composition of kinesio tex tape is polymer elastic strand wrapped by 100 % cotton fibers which absorbs moisture from skin. These tapes are latex free. The adhesive is 100 % acrylic and heat activated[5].

Kase et al have proposed several benefits, depending on the amount of stretch applied to the tape during application:

(1) To provide a positional stimulus through the skin,

(2) To align fascial tissues,

(3) To create more space by lifting fascia and soft tissue above area of pain/inflammation,

(4) To provide sensory stimulation to assist or limit motion, and

(5) To assist in the removal of edema by directing exudates toward a lymph duct.

Various therapeutic currents have been used for modulating clinical pain. Interferential current (IFC) is a medium frequency (3000–5100 Hz) alternating current with a beat frequency ranging from 0 to 250 Hz[6].

frequency current (about 100 Hz for TENS), IFC produces lower impedance on skin and subcutaneous tissue, therefore the theoretical penetration power should be deeper than that of TENS (6). Studies have demonstrated that IFC is effective in managing pain conditions such as migraine[7] and muscle soreness[8].

The analgesic effect of interferential therapy can be explained in part by Wednesky inhibition of Type C nociceptive fibres, although other mechanisms are certainly involved. 'Pain gate' theory, proposed by Malzack and Wall[9] and much modified subsequently[10] remains central to this explanation.

Methodology

It was an comparative study in the physiotherapy department of Krishna institute of medical sciences. Ethical permission was obtained from institutional ethical committee,KIMSDU,Karad.60 subjects were equally divided into 2 groups using lottery method. Subjects were selected according to inclusion and exclusion criteria. The inclusion criteria was as follows 1)Both male and female participants with clinical diagnosis of upper cross syndrome.2)Age group between 21 to 40 years .3)Participants willing to participate in the study.

The exclusion criteria was as follows.1) Degenerative condition of spine.2) Cervical rib.3) Thoracic outlet syndrome.4) Tumors or malignancies.5) Subjects with mental disorders.6) History of spinal surgery.7) Clinical conditions such as over sensitive skin, pregnancy, pacemakers etc. where IFT application is contraindicated.8) Any shoulder pathology causing limitation of movement

Written informed consent form was taken, and the whole study was explained to them. A detailed musculoskeletal evaluation was done to screen the subjects.

Study Design : Experimental study

Setting : Krishna Hospital, Physiotherapy Department

Study population : All participants were selected by Simple Random Sampling method. Participants were selected on the basis of inclusion and exclusion criteria. Selected participants were then randomly divided into 2 groups.

Procedure :

Both groups received respective training for 4 weeks.

Group A-

- Pectoralis major inhibitory technique: tonus-decreasing muscle application
- Middle and lower trapezius facilitation technique: tonus-increasing muscle application
- Deep neck flexors and serratus anterior strengthening

10 rep* 3 sets

Middle and lower trapezius strengthening 10 rep* 3 sets

- Stretching of pectoralis major and minor muscles

30 sec hold* 5 rep

- Hot Moist Pack for 15 mins

Group B-

- Hot moist pack 15 mins for upper back
- IFT 20 Mins for upper back
- Deep neck flexors and serratus anterior strengthening

10 rep* 3 sets

- Middle and lower trapezius strengthening 10 rep* 3 sets
- Stretching of pectoralis major and minor muscles 30 sec hold* 5 rep

Variables :

1) Visual analogue scale

2) Cranio-vertebral angle

3) Forward shoulder angle

Study size :

The study size was 60

Group A – 30

Group B – 30

Statistical analysis

Statistical analysis of the study was done manually as well as using the instat software so as to verify the results. The data was entered into an excel spread sheet, tabulated and participated to statistical analysis. Various statistical measures such as mean, standard deviation and tests of significance such as paired 't' test and unpaired 't' test were utilized for all the available scores in all the participants. Nominal data from patient's demographic data i.e. age, sex distribution were also analyzed. Intra group comparison of pre interventional and post interventional outcome measures was done using student paired 't' test whereas Unpaired 't' test was utilized to measure the difference between two groups (Intergroup comparison)

Results

1. VISUAL ANALOG SCALE

Table no. 1: Visual analog scale (VAS) score (in centimeters):Intra – group comparison (Paired 't' test)

Groups	Pre-interventional	Post-interventional	p Value	Inference
Group (A)	7.41 ± 1.48	2.97 ± 1.36	<0.0001	Statistically significant
Group (B)	7.48 ± 1.66	3.10 ± 1.31	<0.0001	Statistically significant

Table no. 2: Visual analog scale (VAS) score (in centimeters): Inter – groups comparison (Unpaired 't' test)

Groups	Pre-interventional	Post-interventional	p Value	Inference
Group (A)	7.48 ± 1.66	3.10 ± 1.31	0.88	Statistically significant pain reduction on inter-group comparison
Group (B)	7.41 ± 1.48	2.97 ± 1.36	0.75	

2. CRANIO-VERTEBRAL ANGLE

Table no. 3: Cranio-Vertebral Angle : Intra – group comparison (Paired 't' test)

Groups	Pre-interventional	Post-interventional	p Value	Inference
Group (A)	63.3 ± 10	36.95 ± 9.74	<0.0001	Statistically significant
Group (B)	57.15 ± 10.32	24 ± 6.07	<0.0001	Statistically significant

Table no. 4: Cranio-Vertebral AngleInter – groups comparison (Unpaired t test)

Groups	Pre-interventional	Post-interventional	p Value	Inference
Group (A)	63.3° ± 10°	36.95° ± 9.74°	0.0632	Statistically significant
Group (B)	57.15° ± 10.32°	24° ± 6.07°	1.15	

3. FORWARD SHOULDER ANGLE

Table no.5- Forward Shoulder AngleIntra – group comparison (Paired 't' test)

Groups	Pre- interventional	Post- interventional	p Value	Inference
Group A	41.55º ± 9.84º	71.7º ± 11.16º	<0.0001	Statistically significant
Group B	45.3º ± 11.97º	77.1º ± 12.37º	<0.0001	Statistically significant

Table no.6 -Forward Shoulder Angle: Inter – group comparison (Unpaired 't' test)

Groups	Pre-interventional	Post-interventional	p Value	Inference
Group (A)	41.55º ± 9.84º	71.7º ± 11.16º	0.285	Statistically significant improvement in ROM on inter-group comparison
Group (B)	45.3º ± 11.97º	77.1º ± 12.37º	0.155	

Discussion

The present clinical trial was conducted to compare the effectiveness of kinesio taping in Upper cross syndrome. Results of this study were focused on pain relief, improvement of cranio-vertebral angle and forward shoulder angle. It was noticed that there was improvement in all the above parameters in both groups.

A combination of pain assessment by visual analogue scale (VAS)[11]; cranio-vertebral angle and forward shoulder angle range of motion assessment outcome measures were used to assess the effectiveness of kinesio taping in Upper cross syndrome.

In this study, the age group of the participants was in between 21 to 40 years. Participants between this age group were prone for upper cross syndrome because of increased work stress and sedentary life style, the society is becoming more flexion-addicted attitude. In which people tend to frequently stoop forward. This is seen in office workers and students who tend to sit at a desk for prolonged periods, slouching forward to see the computer screen. Students carrying heavy backpacks also tend to lean forward. All these reasons in turn increase prevalence of UCS[12].

Sample size of present study consisted of 28 females and 32 males that are 46.66% females and 53.33% males. When the intragroup mean values of visual analogue scale (VAS) were analyzed it was found statistically significant in both groups pre to post intervention p=<0.0001. The adhesion of the K-Tape to the skin, and the resulting mechanical displacement caused by body movement, leads to stimulation of the mechanoreceptors in the skin. Like the nociceptive afferents, these proprioceptive afferents also run to the dorsal horn and inhibit the relaying of nociception[13,14,15]. Additionally strengthening and stretching exercises for affected muscles along with electrotherapy modalities might have helped in reducing pain by improving balance of short and weak muscles.

The results of this study found that there was significant improvement in cranio-vertebral angle p=0.0632 and forward shoulder angle p=0.285 within groups pre and post intervention. There was significant difference was seen on comparing the pre session and post session values between the groups. Possible reasoning for improvement in these angles could be in a tonus-increasing muscle application; the elastic stretch tape exerts tension via the restoring force in the direction of origin to the fixed base, and thus displaces the skin in the same direction. This brings about support of the muscle contraction. In a tonus-decreasing muscle application, the elastic stretch tape exerts tension in the direction of insertion to the fixed base and likewise displaces the skin in the same direction. This causes a reduction in muscle contraction[15].

Limitations:

1. Small sample size

2. Participants could not be followed up after the study.

3. Duration of the study was short.

Recommendations:

1. Studies with longer duration are recommended with longer follow-up period to assess long term benefits.

2. Study can be conducted with larger sample size.

3. This was a heterogeneous group with both male and female population, future studies could be done taking up a homogenous sample with either male or female participants separately.

Conclusion

In conclusion, the present experimental study provided evidence to support the use kineio tape in relieving pain, improving range of motion and improving the cranio-vertebral angle and forward shoulder angle in participants with Upper cross syndrome.

Source of Funding- Self

Conflict of Interest – Nil

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