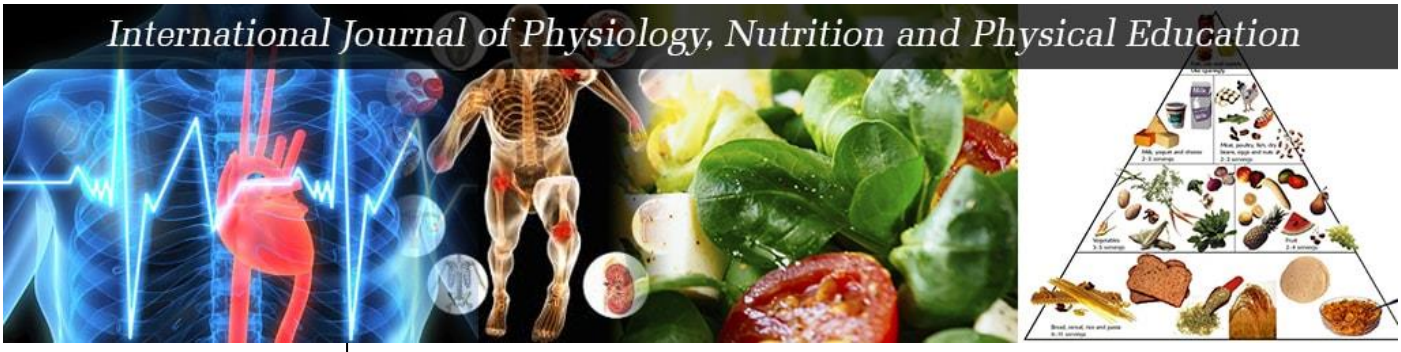

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Immediate effects of kinesio taping on upper trapezius muscle on subjects having text neck

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Abstract
Background: It is a known fact that, now-a-days smartphone use has increased rapidly and people are using smartphone for a long period of time. Students are more prone to use smartphones. Continuous use of smartphone leads to forward flexion of neck which results in "Text Neck."
Purpose: As kinesio tape (KT) is gaining popularity in management tool, the purpose of this study was identify the immediate effect of KT on bilateral Upper Trapezius muscle in students having Text Neck.
Methodology: 50 students (10 males and 40 females) with mean age 18-22 years (20.04±2.95) were assessed and students having Text Neck were selected. Their NPRS and NDI were taken pre and post application of KT. KT was applied over the bilateral Upper Trapezius muscle for three days. NPRS and NDI was taken on third day before removing the tape.
Result: Significant difference between pre and post NPRS and NDI score with p value of ($p<0.0001$) was found. Mean difference of neck pain on NPRS before taping was 5.54±0.95 and after taping was 1.32±0.81. And Mean difference of neck disability on NDI scale before application of KT was 32.52±3.49 and score after taping for three days was 9±1.86.
Conclusion: Application of KT for three days over bilateral Upper Trapezius muscle found to be beneficial in Text Neck students.

Keywords: Text neck, kinesio taping, trapezius, neck pain, rehabilitation

Introduction
Now-a-days, where the mobile technology has advanced so much, people are spending an increased amount of time on handheld devices, such as smart phones, computer tablets and e-readers. The end result is prolonged flexion of the neck when bent over these electronic devices resulting in a 'Text Neck'. The term "Text Neck" was coined by Dr. Dean L. Fishman, who is a US chiropractor. The term Text Neck is used to describe a repetitive stress injury or an overuse syndrome where a person has his/her head hung or flexed in a forward position and is bent down looking at his/her mobile or other electronic device for prolonged period of time. Symptoms of 'Text Neck' are tightness or stiffness across the shoulders, soreness in the neck, chronic headaches, change in the curvature of cervical spine along with changes in the supporting tendons, ligaments, musculature, and bony segments leading to postural change, pain in the neck, back, shoulder, arm, hands, fingers, wrists and elbows, may sometime leads to tingling and numbness of upper extremities. Frequent use of smartphone leads to a non-neutral neck posture for a long time which leads to development of musculoskeletal disorders as the neck is bent in a continuous forward flexion position [1]. When compared with angles of head and neck flexion using desktop and notebook computing, it was greater while using smartphone [2]. Neck is surrounded by various muscles to maintain its functional ability and mobility. Among this muscles, Scalene, Rhomboids, and Trapezius are the muscles which are affected. From which, Upper Trapezius is the most affected muscles [3]. Reports said that, over 90% of university students adopted a flexed neck posture, with protracted shoulders when they used their smartphones devices [4]. It was also found that those who use mobile/smartphones for searching the Internet and chatting had the highest complaint rate of neck pain and that those who used a smartphone for less than 2 hours each day had a lower complaint rate than the other groups. Kinesio Taping was originally developed in Japan by Kase and in recent years its use has become increasingly popular. Kinesio tape has become very popular in treatment of pain.

Kinesio tape is a thin, light and elastic material which does not restrict the joint movement. It is found to be effective in decreasing pain and muscular spasm, increasing the range of motion, improving local blood and lymph circulation, reducing edema, strengthen weakened muscles, control joint instability and postural alignment [5]. Application of Kinesio Taping on cervical myofascial pain syndrome reduces the pain and improves the disability [6]. Research done on effect of Kinesio Taping on neck and low back pain conclude that there is a positive outcome on pain perception and functional disability [7]. However, till date, there is no evidence that Kinesio-Taping (KT) is beneficial on Text Neck subjects. Hence the study needs to be carried out to find the effect of Kinesio-Taping (KT) in Text Neck subjects on pain using Numerical pain rating scale and functional ability using neck disability index.

Material and Method

Fifty participants (40 female and 10 male) having Text Neck assessed by a self-made questionnaire were included in the study. Mean age was (20.04±2.95) years. Students using smartphone for at least 2 hours in a day for more than 6 months complaining of neck pain during and after the use of Smartphone and having NDI score of minimum 30%-48% i.e. moderate disability were included in the study. Students giving any history of injury to neck and around shoulder or any musculoskeletal disorder related to neck were excluded. This was approved by ethical committee of V.S.P.M's College of Physiotherapy. The volunteered students were assessed and facilitatory tapping technique was applied bilaterally to the trapezius muscle for three days. Pre NDI and NPRS score were noted and post NDI and NPRS score were noted before removing tape.

Result

Table 1: Distribution of Age of participant

Mean age (in years)
20.04±2.95

Table 2: Mean values of Numerical Pain Rating Scale

Numerical Pain Rating Scale			
	Mean±SD	**t-value**	**p-value**
Pre-intervention	5.54±0.95	34.54	<0.0001
Post-intervention	1.32±0.81		

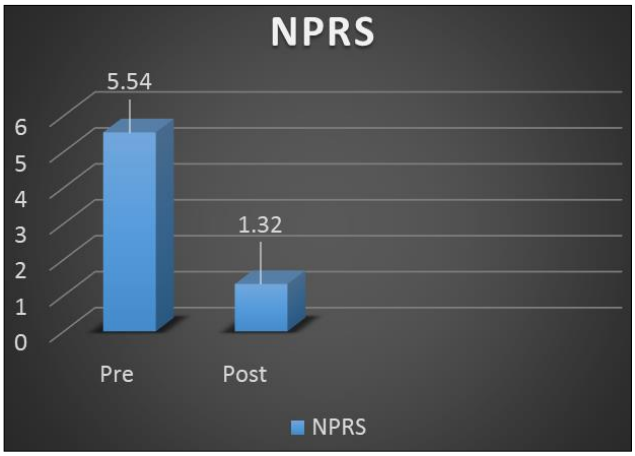

Fig 1: Graph showing Pain intensity using NPRS

Table 3: Mean values of Neck Disability Index

Neck Disability Index					
Pre-intervention		**Post-intervention**		**t-value**	**p-value**
Mean	**SD (±)**	**Mean**	**SD (±)**		
32.52	±3.49	9	±1.86	47.35	<0.0001

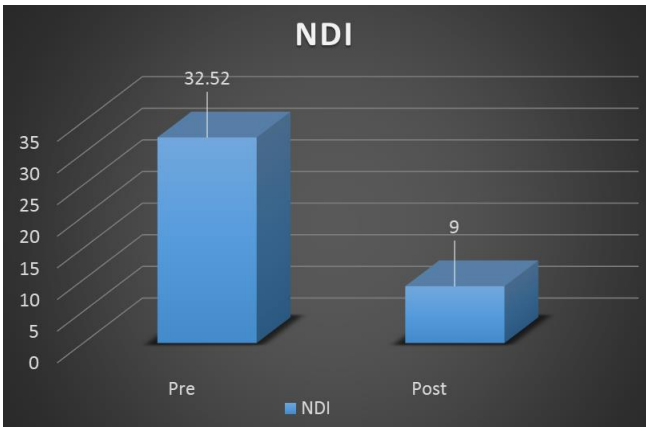

Fig 2: Graph Shows Neck Function Ability using NDI

Discussion

The present study focused on identifying the effectiveness of kinesio taping neck pain and functional disability by applying it on bilateral Upper Trapezius muscle on subjects having text neck. Kinesio tape was applied on bilateral Upper Trapezius from hair line to the acromioclavicular joint and was kept intact and removed after three days. Pre application kinesio tape and post application kinesio tape neck pain intensity using Numerical Pain Rating Scale and functional disability using Neck Disability Index scale was calculated. Study showed that there is highly significant difference on Neck Disability Score and Numerical Pain Rating Scale after the application of kinesio tape. When kinesio tape was applied and pain intensity was calculated the mean difference of neck pain on numerical pain rating scale before taping was 5.54 ± 0.95 and after taping was 1.32 ± 0.81. The proposed mechanism for the pain relieving effect of KT is through the stimulation of sensory pathways in the nervous system, thus increasing afferent feedback. This is hypothesized to diminish the input from nerve fibres conducting nociception due to the gate control theory. An additional theory is that KT application lifts the skin and directly reduces pressure on subcutaneous nociceptors [8]. When kinesio tape was applied on bilateral Upper Trapezius and functional ability was calculated the mean difference of neck disability on neck disability index scale before application of kinesio tape was 32.52 ± 3.49 and the score after three days of kinesio tape application was 9 ± 1.86. Seong-Yeol Kim Sung-Ja Koo found that Upper Trapezius is the most affected and fatigued muscle due to prolonged smartphone use under electromyogram. Smartphone use for more than 30 mins showed that pain increased with increased muscle fatigability [3].

The pressure and stretching effect of kinesio tape on the skin is believed to stimulate cutaneous mechanoreceptors, which in turn conveys information about joint position and movement, and therefore may enhance proprioception [10]. Won-gyu Yoo, 2012**,** found that effect of taping on Trapezius results in decreased muscle activity during computer work performed with Neck Retraction Taping. It also reduces the work load on

upper trapezius muscle and allow the subject to maintain the shoulder and neck in there neutral position. It is known that blood and lymph circulation may be enhanced at sites where kinesio tape was applied, thus muscular and myofascial function at those site was affected which help in reducing the tension over the muscles and helps in functional ability [11].

Conclusion

The results from our study highlights and suggests the benefits of application of Kinesio Tapping bilaterally on Upper Trapezius muscle for three days in Text Neck students. As growing digitization has caused many musculoskeletal problems in every age groups, the application of kinesio tapping will benefit for the treatment.

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