

Effect of kinesiotaping vs bruegger`s exercise on forward head posture in Physiotherapy students of age group 18 to 25 years : A randomized clinical trial

Dr. Sanjana Anande^a, Dr. Riya Agrawal^b

^a Bachelor of physiotherapy, Dr. Ulhas patil college of physiotherapy ,Jalgoan,

^b Assistant professor ,Dr .Ulhas patil college of physiotherapy, Jalgoan

ABSTRACT

Background: Forward head posture (FHP) is characterized by excessive anterior positioning of the head relative to the vertical axis, leading to increased cervical curvature, muscle imbalances, and neck disability. The prevalence of FHP is notably high among physiotherapy students (70%) due to prolonged sitting and smartphone usage. This study aimed to determine the effect of kinesiotaping versus Bruegger's exercise on forward head posture in physiotherapy students aged 18 to 25 years.

Methods: A randomized clinical trial was conducted with 30 physiotherapy students (19 females, 11 males) aged 18-25 years, randomly allocated into two groups. Group A (n=15) received kinesiotaping applied from T1-T2 to C1-C2 region, while Group B (n=15) performed Bruegger's exercise with elastic resistance bands. Both interventions were administered for 4 weeks. Outcome measures included craniovertebral angle (CVA) assessed through photogrammetry and neck disability index (NDI). Data were analyzed using paired t-test for within-group comparison and unpaired t-test for between-group analysis.

Results: Both groups demonstrated significant improvements in CVA and NDI scores post-intervention ($p=0.001$). Group A showed CVA improvement from $45.53\pm 3.14^\circ$ to $49.60\pm 3.50^\circ$ and NDI reduction from 17.13 ± 5.88 to 14.13 ± 5.13 . Group B improved from $46.15\pm 2.19^\circ$ to $50.72\pm 3.02^\circ$ for CVA and 15.66 ± 3.79 to 13.33 ± 2.79 for NDI. However, no significant difference was observed between groups post-intervention ($p>0.05$).

Conclusion: Both kinesiotaping and Bruegger's exercise are equally effective interventions for improving forward head posture and reducing neck disability in physiotherapy students.

Keyword: kinesiotaping , brueggers exercise, posture, disability.

I.INTRODUCTION

Forward head posture is when the head is positioned excessively forward in relation to a vertical line .This posture leads to an increased curvature in the cervical spine,with the upper neck extending and the lower neck flexing . This adjustment in the upper cervical spine helps the body maintain balance and alignment in response to the forward head posture. Additionally rounded shoulder and thoracic kyphosis increased curvature of upper back can develop in later stages of forward head posture. ⁽¹⁾ Forward head posture could be causing weakness in the deep neck flexor , upper trapezius ,pectoralis major and levator scapulae, while the surrounding muscle may become tight and overworked. The discomfort in movement and radiating pain in the upper extremities could be due to muscle imbalance ,nerve compression and poor alignment of spine and shoulders ⁽²⁾

When the head is forward it can lead to decreased craniovertebral angle , which is the angle between the head and the neck . Some of the symptoms of forward head posture like chronic pain in the neck, shoulder and back , can occur due to the strain on the muscles from the head being in an unnatural position . TMJ dysfunction and teeth clenching can also result from the misalignment caused by forward head posture . ⁽³⁾

Additionally , issues like fatigue , headaches, numbness or tingling in the arms and hands , and muscle spasms can occur due to nerve compression or poor blood circulation resulting from the posture . ⁽³⁾

Prevalence of forward head posture is increasing ,especially among children and adolescents due to the extended use of mobile phones and laptop which often leads to poor neck posture . Physiotherapist work

involves prolonged standing position that can contribute to forward head posture. A study conducted by Shivani Goswami and Dr. Edrish Contractor there is an 70% of prevalence rate among physiotherapy students in Ahmedabad. Its concerning to see such a high percentage of students affected by this posture issue ⁽¹⁾

There are indeed many factors that could contribute to forward head posture, including age ,gender, in that female students are more were dominant by 60%, frequency of physical activity, occupation, computer and smart phone usage and various other lifestyle habits.⁽⁴⁾

Sitting in the wrong position can lead to muscle imbalance, causing pain, changes in the spin, rounded shoulders, biomechanical alteration a decrease in the number of sarcomeres and shortening of muscle contraction reduce the range of motion and ultimately affect the functional activity of the neck, for every 2.5cm of head movement forward the of around 4.5 muscle and affect balance. This extra load can shift the body's center of gravity forward, causing a disturbance in balance by altering the body's line of gravity and the base of support. ⁽⁵⁾

The craniovertebral angle is indeed a measurement used for diagnosis of forward head posture . It indicates the angle between the horizontal line and the line connecting the tragus of ear to the seventh cervical vertebra ⁽³⁾. Additionally neck disability index is the tool used to access the functional disability related to neck pain .⁽²⁾

Kinesiotape is one of the technique which is used for the treatment of forward head posture . It is a therapeutic tape that is used to support muscle and joint as well as facilitate the body natural healing process .Dr. Kenzo kase creator of kinesiotape ,proposed various mechanisms through which kinesiotape may exert its effects such as altered muscle function , effect on weakened muscle , improves circulation facilitate better blood flow and lymphatic drainage , pain relief through neurological suppression , repositioning of subluxed joint, relieving abnormal muscle tension affecting the function of fascia and muscle.⁽³⁾

Kinesiotape is its technique that involves applying to external element to enhance the performance of muscle and other tissue the unique future of kinesiotape is its thin and elastic design , allowing it to stretch significantly up to 40% to 60 % of its original length) this expectation elasticity sets it part from traditional taping materials , enabling a wider ROM while providing support to muscles and tissues .⁽⁶⁾

Studies have shown that applying kinesiotape in the direction from the muscles origin to its insertion can lead to increased muscle activity . While the exact physiological mechanism are not entirely understood , the theory is that this taping method may enhance motor neuron recruitment , potentially improving muscle function . This intriguing possibility has led to a growing interest in research studies aiming to wheather the cutaneous stimulation provided by kinesiotape could indeed enhance muscle strength . It's fascinating how such a simple intervention like applying external tape can have such significant implications for muscle performance and function.⁽⁷⁾

The Bruegger`s exercise is indeed used to address muscle imbalance , particularly in the context of posture. Developed by Dr. Alois bruegger, this exercise aims to promote better alignment and activation of the phasic muscles while encouraging proper relaxation of the tonic muscle. The tonic muscles in the upper body , like the neck extensors , pectoral muscles , upper trapezius and levator scapulae are responsible for action such as pulling the head forward , bringing the shoulders forward and up pulling the arm in and flexing the wrist and finger . On other hand the brueggers exercise involves using the antagonistic muscles , which are those that extend the thumb , fingers, wrist and extend and externally rotate the shoulder.⁽⁷⁾

II.NEED OF THE STUDY.

Prevalence of forward head posture is increasing ,especially ,among children and adolescence. it is seen that prevalence rate for forward head posture in physiotherapy student is 70% .⁽¹⁾ The study by Vlad Andrei Darabont highlights that physiotherapy students is essential after experiencing poor posture , such as being in forced or awkward positions (twisted bodies, curved spines, uneven weight distribution on the lower limbs), prolonged sitting with the neck flexed and repetitive , monotonous movements. These issues particularly affect the upper spine , shoulders and upper thorax⁽¹⁾.

To improve forward head posture , many techniques such mobilization , manipulation ,exercise therapy , and kinesiotape is used. Among this , kinesiotaping has a therapeutic effect that correct and treat musculoskeletal disorder and is based on natural healing process.Also with that it has other benefits like restoring muscle function and aiding in postural alignment. Its been shown to enhance function without limiting movement or exercise .⁽³⁾

Along with this brueggers`s exercise also has benefit especially when combined with an elastic resistance band , can be very effective in correcting posture .⁽²⁾

Comparative studies on kinesiotaping and brueggers exercise on forward head posture are limited hence present study intended to bridge the knowledge gap to indentify which treatment is better in terms of objectives outcome measure .

There is dearth in literature exists comparing the effectiveness of kinesiotaping and brueggers exercise on forward head posture .

Hence the need arises to evaluvate the effectiveness of kinesiotaping and brueggers exercise on forward head posture in Physiotherapy student on age group 18 to 25 years .

III.Material and Method

3.1 Participation , randomization, allocation:-

This experimental study was designed as a randomized clinical trial conducted at a tertiary care hospital in Jalgaon over a duration of six months. The sample size was calculated using the formula $n = 2Z_1^2S^2/d^2$, resulting in a minimum sample size of 15 participants per group ($n_1 = 15$ and $n_2 = 15$), totaling 30 participants. The target population included both male and female subjects in the age group of 18 to 25 years, selected through simple random sampling using a non-probability sampling design. Random allocation was performed using the envelope method, and the study employed single blinding. Participants willing to participate in the study were included if they were normal healthy individuals aged 18 to 25 years of both genders, with a craniovertebral angle less than 49° (8). Exclusion criteria comprised individuals with skin allergies, traumatic neck pain, those undergoing medical or physiotherapy treatment for the neck, neurological deficits, musculoskeletal deformities of the neck and shoulder, and history of neck surgery or trauma. The materials used in the study included pen, paper, consent forms, neck disability index questionnaire, elastic resistance bands, and a couch for assessment and treatment procedures.

3.2Intervention Procedure-

Ethical clearance was obtained from the Institutional Ethical Committee and Principal of Dr. Ulhas Patil College of Physiotherapy. After explaining the study purpose and procedure, participants were screened according to inclusion and exclusion criteria, and informed consent was obtained. Demographic data were collected, and participants were randomly allocated into two groups: Group A (n=15) received kinesiotaping, while Group B (n=15) received Bruegger's exercise. Forward head posture was evaluated using craniovertebral angle, and baseline Neck Disability Index scores were recorded. Pre-intervention and post-intervention outcomes were measured to evaluate the effectiveness of both interventions.

3.2.1 Procedure for kinesiотaping group:-

The tape used in this study is waterproof, porous, adhesive, 5 cm wide, and 0.5 mm thick. Patients in this group received Kinesio Taping while seated. The first layer was a Y-strip: the practitioner placed the un-split base directly over the spine in the mid-thoracic region and adhered it without tension. Subjects were instructed to tuck their chin to their chest while seated upright. The split ends of the Y-strip were stretched to 15-25% of the tape's resting length and applied along either side of the spine, covering the cervical muscles. This first strip extended from the T1-T2 thoracic region to the C1-C2 cervical region. The second layer consisted of an overlaying I-strip.⁽⁹⁾

Figure1 kinesiотaping application



3.2.2 Procedure for brueggers exercise group:-

The participant was seated in a high sitting position with an elastic resistance band wrapped around each hand, leaving the palms open. They were instructed to abduct and extend the thumb and fingers, followed by wrist extension and forearm supination. The participant was also guided to perform scapular retraction with the chin tucked in, shoulder external rotation, elbow extension, and shoulder abduction and extension. The intervention began with a 10-second hold, gradually increasing to 30 seconds with a 2-second increment in each session. The rest period was 30 seconds, with 4 sets of 12 repetitions.⁽¹⁰⁾



Figure 2 brueggers exercise

3.3 Outcome measure:-

3.3.1 Craniovertebral angle –

The photographic method was used for this measurement. A digital camera, positioned 1.5 meters away from the participants, was used to capture their images. To ensure consistent distance, spots were marked on the ground for both the participants to stand on and for the camera placement. Participants stood barefoot in a standing position, and photos were taken from their right side. The craniovertebral (CV) angle was then calculated by measuring the angle formed at the intersection of a line drawn from the tragus of the ear through the C7 spinous process and a horizontal line through C7.⁽³⁾

3.3.2. Neck disability index –

This scale consists of 10 components: 7 related to activities of daily living (ADL), 2 for pain, and 1 for concentration. Each item is rated on a scale from 0 to 5, and the total score is expressed as a percentage, with higher scores indicating greater disability. It has been proven to be a reliable and valid tool for assessing individuals with neck pain.⁽⁹⁾

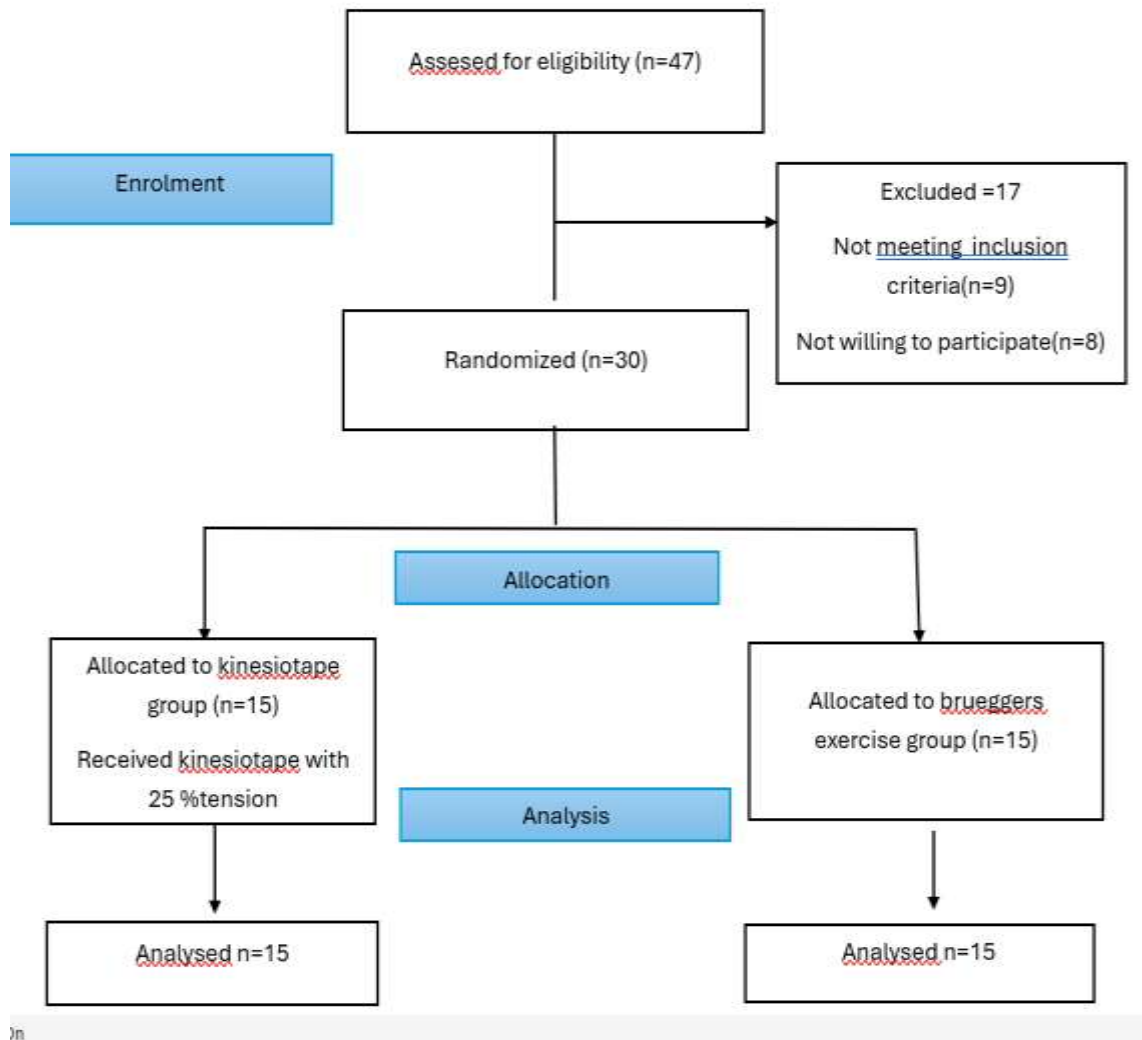


Figure 3 consort chart

3.4 Data Analysis:-

Statistical evaluation of the data for the current study was implemented manually and also by using MS Excel and minitab 17 so as to validate the results found. Signifiacnce equal was set at 5%. Excel spreadsheet was used to fill in the data, which was then calculated and tabulated for evaluation of the same. For the continuous data numerous mathematical calculations such as mean, standard deviation was employed and for categorical data, percentages were performed. The normality of the data distribution was verified with the Kolmogorov-smirnov test and it shows significant difference. To compare mean/distributions between groups Unpaired t test was used. Paired t test was used for within group comparison. The tests were administered before and after outcome measures.

IV. RESULTS AND DISCUSSION

4.1 Results of Descriptive Statics of Study Variables

The present study, “Effect of kinesiotope vs Bruegger’s exercise on forward head posture in physiotherapy students of age group 18 to 25 years; A randomized clinical trial’ included 30 participants, 15 of which are allocated to each group. Group A received kinesiotope and Group B received bruegger’s exercise. Both groups were compared on the basis of craniovertebral angle and neck disability index.

The study included 30 participants aged 18-25 years, with baseline characteristics showing homogeneity between groups. The mean age of Group A was 22.2 ± 1.26 years, while Group B had a mean age of 22.06 ± 1.38 years, with no statistically significant difference between groups ($p=0.78$). Gender distribution was relatively balanced, with Group A comprising 10 females and 5 males, and Group B consisting of 9 females and 6 males, yielding a total of 19 females and 11 males across both groups. These comparable baseline demographics indicate that the groups were well-matched for age and gender prior to intervention.

4.2 Craniovertebral angle :-

Forward head posture was assessed using the craniovertebral angle, with results analyzed through both within-group and between-group comparisons. Within-group analysis using paired t-tests revealed statistically significant improvements in both groups following intervention, with p-values of 0.001 for both Group 1 and Group 2, indicating that each intervention effectively improved craniovertebral angle measurements. Between-group analysis using an unpaired t-test compared post-intervention scores, which were 49.60 ± 3.51 degrees in Group 1 and 50.72 ± 3.03 degrees in Group 2. The p-value of 0.35 indicated no statistically significant difference between the groups post-intervention, suggesting that both interventions were equally effective in correcting forward head posture.

CVA	Test	Mean	S.D.	t value	P value
Group A	PRE	45.53	3.14	6.01	0.001
	POST	49.60	3.50		
Group B	PRE	46.15	2.19	6.95	0.001
	POST	50.72	3.02		

Table 1: within group analysis

CVA	Test	Mean	S.D.	t value	P value
POST TEST	Group A	49.60	3.51	0.94	0.35
	Group B	50.72	3.03		

Table .2: between group analysis

4.3 Neck disability index:-

Neck pain severity was evaluated using the Neck Disability Index, with results subjected to statistical analysis. Within-group analysis using paired t-tests demonstrated statistically significant improvements in both groups following intervention, with p-values of 0.001 for both Group 1 and Group 2, indicating that each intervention effectively reduced neck disability. Between-group analysis using an unpaired t-test compared post-intervention scores, which were 14.13 ± 5.13 in Group 1 and 13.33 ± 2.79 in Group 2. The p-value of 0.60 revealed no statistically significant difference between the groups post-intervention, suggesting that both interventions were equally effective in reducing neck pain and disability.

NDI	Test	Mean	S.D.	t value	P value
Group A	PRE	17.13	5.88	5.20	0.001
	POST	14.13	5.13		

Group B	PRE	15.66	3.79	4.18	0.001
	POST	13.33	2.79		

Table .3 within group analysis

NDI	Test	Mean	S.D.	t value	P value
POST TEST	Group A	14.13	5.13	0.53	0.60
	Group B	13.33	2.79		

Table 4 between group analysis

V. Discussion

The present randomized clinical trial was conducted to investigate the effects of kinesiotaping and Bruegger's exercise on forward head posture by using craniovertebral angle and neck disability index.

Participants included in the study were in the age group of 18 to 25 years. According to Vlad Andrei Darabont, physiotherapists have to address poor postures such as forced or vicious work positions (twisted body, curved spine, weight unevenly distributed on the lower limbs, etc.), sitting work positions for long periods with the neck in a flexed position, and stress on certain groups of muscles and joints caused by monotonous or repetitive movements ⁽¹⁾. The craniovertebral angle and neck disability index showed improvement in both Group A and Group B. These measures have demonstrated good to outstanding intra- and inter-rater reliability and test-retest reliability when used to assess forward head posture ⁽³⁾. In the current research, craniovertebral angle and neck disability index were used to compare the forward head angle and neck disability between the kinesiotaping group and Bruegger's exercise group. Results indicated a significant increase in forward head angle and decrease in neck disability in both the kinesiotaping group and Bruegger's exercise group after 4 weeks of intervention.

These findings align with previous research conducted by Dr. Radhika Raichura et al. in 2025, which showed that scapular stabilization exercises combined with kinesiotaping for 3 weeks provided significant effects in improving craniovertebral angle and reducing neck disability compared with scapular stabilization exercises alone in young adults with forward head posture ⁽¹¹⁾. However, research conducted by Peeyoosha Gurudut et al. in 2016 showed that while kinesiotaping appears to be effective in improving forward head posture, it did not prove to be superior to placebo kinesiotaping in treating forward head posture ⁽³⁾. Despite this, the present study's pre- and post-test scores show significant differences in the means, with an increase in the craniovertebral angle and a decrease in neck disability index scores, thereby indicating improvement in forward head posture. Kenzo Kase, the creator of Kinesio tape, proposed several mechanisms for the effects of Kinesio tape, which include: altered muscle function by the tape, effects on weakened muscles, improved circulation of blood and lymph by eliminating tissue fluid or bleeding beneath the skin, decreased pain through neurological suppression, repositioning of subluxed joints by relieving abnormal muscle tension, and helping to affect the function of fascia and muscle. ⁽³⁾ It was stated that the taping tension provided by neck retractor taping stimulates cutaneous mechanoreceptor effects and thus prevents and decreases forward head posture. Previous studies conducted in 2022 demonstrated that treatment with Bruegger's exercise has shown reduction in pain and improvement in functional status, cervical range of motion (CROM), and posture ⁽²⁾. The study conducted by Yip CH et al. in 2008 showed that a moderate negative correlation was identified, where craniovertebral angle is smaller among individuals having neck pain, leading to forward head posture ⁽¹²⁾. Additionally, a study conducted by Suh et al. on the effect of sitting mark exercise and Bruegger's exercise on pain, Cervical ROM, and NDI in patients with chronic cervical pain demonstrated that Bruegger's exercise was a more effective clinical approach for reducing pain and improving neck function and Cervical ROM ⁽¹³⁾. In this study, pre- and post-test scores showed significant differences in both groups, with an increase in craniovertebral angle and a decrease in neck disability index scores. Bruegger's exercise is indeed used to address muscle imbalance, particularly in the context of posture. Developed by Dr. Alois Bruegger, this

exercise aims to promote better alignment and activation of the phasic muscles while encouraging proper relaxation of the tonic muscles. The tonic muscles in the upper body, such as the neck extensors, pectoral muscles, upper trapezius, and levator scapulae, are responsible for actions such as pulling the head forward, bringing the shoulders forward and upward, pulling the arm inward, and flexing the wrist and fingers. On the other hand, Bruegger's exercise involves using the antagonistic muscles, which are those that extend the thumb, fingers, and wrist, and extend and externally rotate the shoulder⁽⁸⁾.

I. ACKNOWLEDGMENT

I sincerely thank my guide, Dr. Riya Agrawal and all our study participants for being active participants of the study programme, statisticians and all the authorities.

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