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# COMPARISON BETWEEN THE IMMEDIATE EFFECTS OF KINESIO-TAPING OF DIFFERENT RESPIRATORY MUSCLES ON PULMONARY FUNCTIONS IN HEMIPLEGICS

Physiotherapy

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## ABSTRACT

**Background-** Globally, stroke is a major public health problem and is considered one of the most common cause of mortality and disability worldwide. There is alteration in tone of abdominal muscles which leads to reduction in intra-abdominal pressure generation causing mechanical disadvantage to the central tendon of the diaphragm leading to inefficiency of diaphragmatic contraction. This makes it very important to improve the patient's respiratory mechanics as it will further improve the functional performance during the rehabilitation.

**Methods and Results-** 30 stroke patients were enrolled in the study and were randomly divided into two groups- A (diaphragmatic taping group) and B (intercostals taping group). PFT was done for both groups pre and post intervention. The post intervention IC and FIVC significantly increased in the group A as well as in group B. Although there was no significant difference found between the two groups.

**Conclusion-** Facilitation technique of Kinesio-taping to Inspiratory muscles is a good tool to enhance & improve their functions of the in Hemiplegics.

## KEYWORDS

Stroke, Respiratory Muscle Taping, Respiratory Function

### Introduction

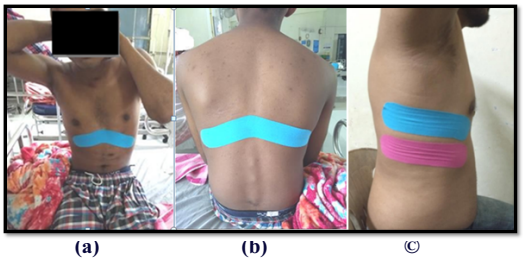
Globally, stroke is a major public health problem and is considered one of the most common cause of mortality and disability worldwide. [1] The World Health Organization defines stroke as rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting for more than 24 hours or leading to death with no apparent other cause than vascular origin.[2] It is one of the twelve health conditions with the highest burden of disease. [3] The most common & primary physical change in stroke patients is hemiplegia or hemi paresis, consequences of this may correspond to motor impairment characterized by total or partial loss of movement on the side contralateral to the brain lesion. [2] It can also be accompanied by sensory changes, including cognitive, visual, perceptual, language, postural and motor control affecting all bodily functions as well as changes in respiratory muscles [4, 5] Stroke is often associated with loss of postural control due to trunk muscles weakness. There is alteration in tone of abdominal muscles which leads to reduction in intra-abdominal pressure generation. This reduced intra abdominal pressure causes mechanical disadvantage to the central tendon of the diaphragm which leads to inefficiency of diaphragmatic contraction.[5] Teixeira-Salmela, Parreira et al found that there is decrease in strength of respiratory muscles and lower abdomen contribution during breathing in stroke patients. They also hypothesize that specific respiratory training can be helpful in improving the respiratory functions of stroke patients. [6] The effect of kinesiotape on muscle function depends on the technique of application. Taping from the insertion of the muscle to its origin inhibits the muscle function, whereas taping from the muscle origin to its insertion facilitates the muscle function. [7,8]

### Methods

A randomized controlled study with single blinding was conducted in the Pune city of Maharashtra. The duration for the study was one year. The samples were selected through the simple random sampling technique by using a computer generated random table. Sample size was calculated with 16 in each group. Both male and female between the age group of 50-80 were involved in the study, those having sub acute and chronic stroke with ACA, MCA affection without involvement of facial muscles. And all those with existing lung disease, peri-oral muscle weakness, recent thoracic or abdominal surgery, acute pulmonary disease or symptoms of acute pulmonary disease were excluded.

For both the interventions, patients were in sitting position. 'I' strip of kinesio-tape was used in both the groups. The patients were then asked to perform thoracic expansion exercise with end inspiratory hold followed by which, facilitation technique for diaphragm was done using the 'I' strip in group A and facilitation technique for intercostals muscle in group B.

**Figure 1:**



(a) (b) ©

**Figure 1 shows : (a)Anterior view of Diaphragm Taping, (b)Posterior view of Diaphragm Taping, (c)Side view of Intercoastal Muscle Taping**

### Data analysis and results

Statistical analysis was done using Statistical Package for the Social Sciences (SPSS) version 16, mean and standard deviation (SD) were calculated. Paired t-test was used for intra group analyses and unpaired t-test was used for inter group analyses. $p < 0.05$ was considered statistically significant.

**Table 1: p value for within group comparison by paired t test for both the groups**

| | Group | p Value | Significance |
|---|---|---|---|
| Pre-Post FIVC | Diaphragmatic taping | 0.0007 | Significant |
| | Intercostals taping | 0.040 | Significant |
| Pre-Post IC | Diaphragmatic taping | 0.0001 | Significant |
| | Intercostals taping | 0.0002 | Significant |

Table 1 shows that for both the groups the p value was significant for both FIVC and IC suggesting that post intervention the values of FIVC and IC increased.

**Table 2: p values for change in FIVC and IC for both the groups**

| | Group | Mean | Std.deviation | P value | Significance |
|---|---|---|---|---|---|
| Change_ | Diaphragmatic taping | 0.398 | 0.373 | 0.162 | Not significant |
| FIVC | Intercostals taping | 0.209 | 0.372 | | |
| Change_ | Diaphragmatic taping | 0.386 | 0.303 | 0.295 | Not significant |
| IC | Intercostals taping | 0.284 | 0.233 | | |

Table 2 shows that the p value is not significant for change in FIVC and change in IC for both the group.

## Discussion

Patients with stroke typically demonstrate asymmetry with most of the weight in sitting or standing shifted towards the stronger side. This shift causes alteration in chest wall excursion putting the respiratory muscles at a biomechanical disadvantage. The patients also demonstrate decreased lung volume, pulmonary perfusion and vital capacity. This reduced respiratory output is insufficient to meet the oxygen demands during altered movement patterns in hemiplegics. The result of all these changes is earlier fatigue and decreased endurance. Facilitation technique of Kinesiology taping, developed by Dr. Kenzo Kase in 1973 when applied to a muscle, is known to enhance its function. Kinesio-tape application activates the receptors in the skin and soft tissues which enhances the function of the part on which the tape is applied. In our study, we found that the post intervention inspiratory capacity significantly increased in the diaphragmatic taping group (p=0.0001) as well as in the intercostals taping group (p=0.0002). We also found that the value of forced inspiratory vital capacity post intervention improved significantly in the diaphragmatic taping group (p=0.0007) and in the intercostals taping group as well (p=0.040).

The intention of this study was also, to compare the effectiveness of taping of diaphragm and taping of the intercostal muscles on pulmonary functions in hemiplegics. When we compared the effectiveness between the two groups by assessing the IC, pre and post intervention, it was found that there is no significant difference between the two (p=0.295). This could imply that both the groups showed similar improvement in their Inspiratory Capacity. Comparison between effectiveness of the two taping groups on FIVC, also was found to be statistically insignificant (p=0.162), meaning that increase in the FIVC in both the groups was similar.

Diaphragm being the main inspiratory muscle, contributing to more than 70% of work done during inspiration, it was thought that facilitating it, would improve the inspiratory performance more than facilitating the intercostals would. However, the present results show that facilitating either of them will improve the IC & the FIVC significantly.

## Conclusion

Kinesio-taping of the diaphragm is effective in improving the pulmonary function (IC and FIVC) in hemiplegics. In hemiplegics, Kinesio-taping of the intercostals muscles helps in enhancing the pulmonary function (IC and FIVC). Facilitation technique of Kinesio taping is a good tool to enhance & improve the function of the Inspiratory muscles in Hemiplegics.

## List of abbreviations

IC - Inspiratory Capacity
FIVC - Forced Inspiratory Vital Capacity
PFT - Pulmonary Function Test
FIM - Functional Independence Measure
ACA - Anterior cerebral artery
MCA - Middle cerebral artery

## REFERENCES

1. Geyh S, Cieza A, Schouten J, et al. ICF core sets for stroke. Journal of Rehabilitation Medicine. 2004; 44:135-41.
2. Andrews AW & Bohannon RW. Distribution of muscle strength impairments following stroke. Clinical Rehabilitation. 2000; 14:79-87.
3. Rita Ocko & Maria do Ceu Costa, Respiratory Changes in Patients with Stroke Journal of Biomedical and Biopharmaceutical Research 2014; 141-150.
4. Lanini B, Bianchi R, Romagnoli I, Coli C. Chest wall kinematics in patients with hemiplegia. Am J Respir Crit Care Med 2003; 168: 109-113.
5. Butler JE, Drive to the human respiratory muscles, Respir Physiol Neubiol, 2007:159;115-26.
6. Teixeira-Salmela LF, Parreira VF, Britto RR, Brant TS. Respiratory pressures and thoracoabdominal motion in communith-dwelling chronic stroke survivors. Arch Phys Med Rehabil 2005; 86: 1974-1978.
7. Yasukawa A, Patel P et al. Pilot study investigating the effects of kinesio taping in an acute paediatric rehabilitation setting Am J occup ther,2006,60:104-110.
8. Lie YH, Chen SM et al. Motion tracking on shoulder tissues from ultrasonic image sequence for patients with lateral epicondylitis, 29th annual international conference of the IEEE EMBS cite international, France, August 2007, 23-26.