TO STUDY THE UNDERSTANDING LEVEL OF CONVENTIONAL BREATHING CONTROL AND PRPRIOCEPTIVE FEEDBACK TECHNIQUE OF BREATHING CONTROL IN THE 4th YEAR B.P.Th STUDENTS BY USING THE OSCE STATION

An experimental study

[1]Barkha Srichand Dakhneja, [2]Dr. Bhagyashri Badve,

[1]Intern, [2]Assisstant Professor, Community Physiotherapy Department.
LSFPEF's College of Physiotherapy, Nigdi, Pune, India.

Abstract:
Background – Breathing control is to breathe with lower chest, using a diaphragmatic breathing pattern with relaxation of the upper chest. The respiratory control centre's (RCCs) in the brainstem are responsible for the generation of control of breathing. The Conventional breathing pattern and Proprioceptive feedback technique of breathing control have different methods which are taught to the students. To check which method is easier to understand an OSCE station which comprises of 3 stations viz Communication skills, Procedural Skills and Understanding technique, is used to assess the students.

Methodology – An experimental study was done in which 4th year B.P.Th students in and around PCMC, Pune was selected by Convenient sampling as per the inclusion criteria. Consent was taken from the colleges to allow us the inclusion of their students in our experiment. A didactic lecture was given on both Conventional breathing control and Proprioceptive feedback technique of breathing control. Another therapist then assessed the students understanding level of both the techniques by using the OSCE station and data was collected through that OSCE station. A statistical analysis was performed and results were obtained.

Result – 225 4th year B.P.Th students were included in this experimental study. It was observed that the Mean Value of Proprioceptive feedback technique of breathing control is more than that of Conventional Breathing control (7.72>6.37).

Conclusion - The study concludes that Proprioceptive feedback technique of Breathing Control is easier to understand than the Conventional Breathing Control technique among the 4th year B.P.Th students.

Keywords – Conventional breathing control, Proprioceptive feedback breathing control, OSCE station, Understanding level, 4th year B.P.Th students.

INTRODUCTION:

Breathing control is normal tidal breathing at a patient's own respiratory rate and volume. The person is encouraged to breathe with the lower chest, using a diaphragmatic breathing pattern, with relaxation of the upper chest and shoulders. It allows recovery from fatigue, oxygen desaturation or signs of bronchospasm and relieves breathlessness.[1] Breathing control may also be used to improve exercise capacity in breathless patients when walking up slopes, hills and stairs. Through educational sessions patients can learn how to control their breathing efforts to ensure maximum ventilation at minimum energy expenditure [2]

Breathlessness is a subjective awareness of shortness of breath. When the awareness of breathing is unpleasant or uncomfortable, the term dyspnea is used. It is the predominant symptom of both cardiac and respiratory disease. Dyspnea is multidimensional sensation thought to comprise distinct sensory qualities viz work/effort, air hunger/unsatisfied inspiration and tightness, that vary in intensity, degree of unpleasantness and subsequent emotional and behavioral impact. Each has discrete mechanism. Sensation of tightness arise from afferent output from airway receptors. Sensation of work/effort derive from combination of respiratory muscle afferent and sensory cortex assessing the magnitude of motor drive from the cortex. Sensation of air hunger is proposed to result from discrepancy between motor drive to breath (sensed by corollary discharge to sensory cortex) and afferent feedback from source within respiratory system.[1]

The origin of breathing occurs in respiratory control center's (RCCs) in the brainstem. The four main centers in the brainstem which regulate respiration are: Inspiratory center(medulla), Expiratory center(medulla), Pneumotaxic center (pons), Apneustic center(pons). The medullary centers provide output to the respiratory muscles, the centers contain two groups of respiratory neurons: Ventral respiratory group (VRG) controls and the Dorsal respiratory group (DRG) controls [1]

The RCCs are responsible for the generation and control of breathing. Output from the RCCs leads to depolarization and contraction of the effectors i.e the respiratory muscles. Several different types of sensors like the chemoreceptors, mechanoreceptors, irritant receptors and proprioceptors monitor effector activity and provide constant feedback which allows the RCCs to modify their output [1]

There are many receptors within joint, muscle and skin that continually convey information to the Central Nervous System. When the receptors are stimulated through movement or other forces, they act as transducers and convert this mechanical deformation into an electrical sensory impulse. This sensory impulse then passes on to the CNS, triggering the appropriate motor response.[3] Proprioception is defined as the sense of body's motion or position.[3]

Proprioception as an input system has a direct effect on program generator at the spinal level.[4]
Proprioceptive input can potentially influence multiple levels of CNS function, and all those levels can potentially modulate the intensity or importance of that information through many different mechanisms.[5] Proprioceptors are found in three anatomical locations: the stretch receptors, the tendon and the joint.

Stretch, quick stretch and maintained stretch are all sensory input systems that use the stretch receptors in the muscle and heighten the motor pool. Stretch information will be sent to higher centers for sensory integration and perception.[5]

The tendon receptors are specialized receptors located in both the proximal and the distal musculotendinous insertion. The principal role of the tendon is to monitor muscle tension exerted by the contraction of the muscles or by tension applied to the muscle itself. In conjunction with the stretch receptors, the tendon plays an important role in the mediation of proprioception.[5]

Joint Receptor Approximation mimics weight bearing and facilitates the postural extensor system. Therapist increases that load by adding pressure down through the joints in question, then an augmented intervention has been added to the therapeutic environment.[5]

An Objective Structural Clinical Examination (OSCE) is an approach to the assessment of clinical competence in which the components are assessed in a planned or structural way with the attention being paid to the objectivity of the examination which is basically an organization of multiple stations around which the students rotate and at which students perform and are assessed on specific task[6]. OSCE is a modern type of examination often used for the assessment in health care disciplines[7] OSCE is primarily used to assess focused clinical skills such as history taking, physical examination, diagnosis, communication and counselling. The OSCE is also used for licensure examinations and as a feedback tool in formative settings [8].

An OSCE usually comprises a circuit of short stations, in which each candidate is examined on a one-to-one basis with one or two impartial examiners and either real or stimulated patients. Candidates rotate through the stations, completing all the stations on their circuit. It is considered to be an improvement over traditional examination methods because the stations can be standardized enabling fairer peer comparison and complex procedures can be assessed without endangering patients' health. OSCE have had a powerful influence on doctor training and practice.

AIM:
To study the understanding level of conventional breathing control and proprioceptive feedback technique of breathing control in 4th year B.P.Th students by using the OSCE station.

OBJECTIVES:
1. 1. To find the understanding level of 4th year B.P.Th students regarding the conventional method of breathing control technique using the OSCE Station.
2. To find the understanding level of 4th year B.P.Th students regarding the proprioceptive feedback method of breathing control technique using the OSCE Station.

METHODOLOGY AND MATERIALS:
METHODOLOGY:
An experimental study was done on 4th year B.P.Th students in and around PCMC, Pune. Total 225 students were selected by conventional sampling. The study was completed in 6 months.

MATERIALS USED:
- Pen
- Paper
- OSCE station questionnaire

INCLUSION CRITERIA:
- 4th Year B.P. Th students

EXCLUSION CRITERIA:

- Non-co-operative and unwilling students of 4th year B.P. Th

OUTCOME MEASURES:

- OSCE (Objective Structural Clinical Examination) station scale for Conventional breathing control technique and Proprioceptive feedback of breathing control comprising of 3 stations:
    1. Station 1: Communication skills
    2. Station 2: Procedural skills
    3. Station 3: Understanding of technique

PROCEDURE:

- Ethical approval was taken from the ethical committee. A consent letter was taken from the colleges to allow us the inclusion of their students in our experimental project. A didactic lecture was given on both conventional method of breathing control and the proprioceptive feedback technique of breathing control.

- The conventional method of breathing control is taught as follows :

1. The student is told to be in relaxed sitting
2. The student has to breathe using the lower chest and keeping the upper chest relaxed.
3. The student has to breathe as normal tidal volume breathing.
4. Repeat this procedure 2-3 times.

- A half an hour gap was given to check their recall capacity. Then the new method of breathing control using the proprioceptive feedback mechanism is taught as follows:

1. The therapist places one hand on the abdomen.
2. The student is told to inspire using their diaphragm and keeping their upper chest and shoulders relaxed.
3. As you breathe in the therapist hand should rise and while inspiration the therapist counts till 2.
4. As you breathe out the therapist hand should be lowered and while expiration the therapist counts till 4.

- Again, a half an hour break was given to check their recall capacity. Then another therapist assesses the students understanding level of both the techniques using the OSCE station, to avoid bias. Data analysis was done with Z test by the data obtained from the OSCE station.

STATISTICAL ANALYSIS:

Z test was performed on marks obtained from Conventional Breathing Control technique and Proprioceptive Feedback technique of breathing control in all the 3 stations viz. Communication Skill, Procedural Skill and Understanding of the technique, to check the significance level of both the techniques.

Bar graphs were made to compare the mean of both the techniques to find out which technique is easier to understand.

Station 1: Communication Skills:

TECHNIQUE	MEAN ±SD	STANDARD ERROR	MEAN DIFFERENCE	STANDARD ERROR OF DIFFERENCE(SE)	Z VALUE
Conventional breathing control	7.93 ±0.24	0.018	0.006	0.08	0.75
Proprioceptive feedback technique of breathing control	7.94 ±0.22	0.017			

Table.1

Interpretation: The data has passed the normality test. Z test was performed on marks obtained in Conventional breathing control technique and the proprioceptive feedback technique of breathing control. Z value is more than SE, therefore the observed mean difference is highly significant.

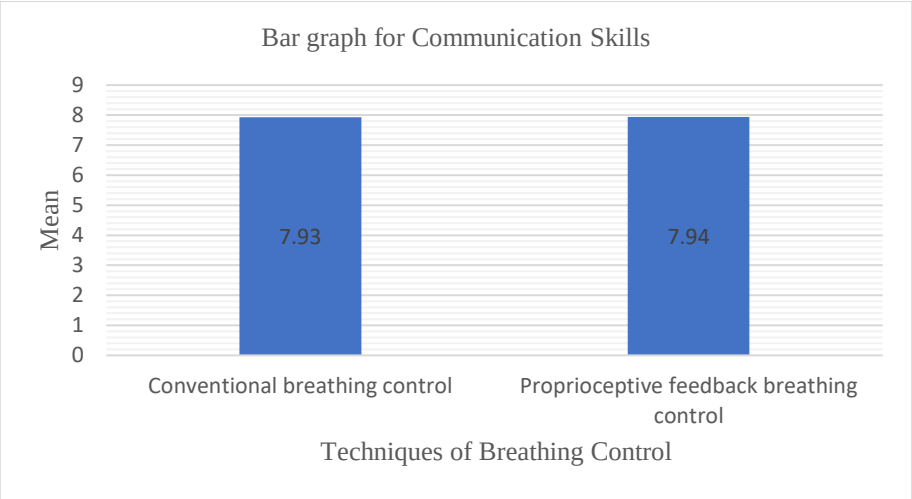

Fig.1

Interpretation: The bar graph shows that the mean value of proprioceptive feedback technique of breathing control is more than the mean value of conventional breathing control (7.94>7.93, mean difference-0.01). Hence the communication skills are better in proprioceptive feedback technique of breathing control.

Station 2: Procedural Skills:

TECHNIQUE	MEAN ±SD	STANDARD ERROR	MEAN DIFFERENCE	STANDARD ERROR OF DIFFERENCE(SE)	Z VALUE
Conventional breathing control	7.03 ±0.78	0.612	0.65	0.71	0.92
Proprioceptive feedback technique of breathing control	7.69 ±0.48	0.377			

Table.2

Interpretation: The data has passed the normality test. Z test was performed on marks obtained in Conventional breathing control technique and the proprioceptive feedback technique of breathing control. Z value is more than SE, therefore the observed mean difference is highly significant.

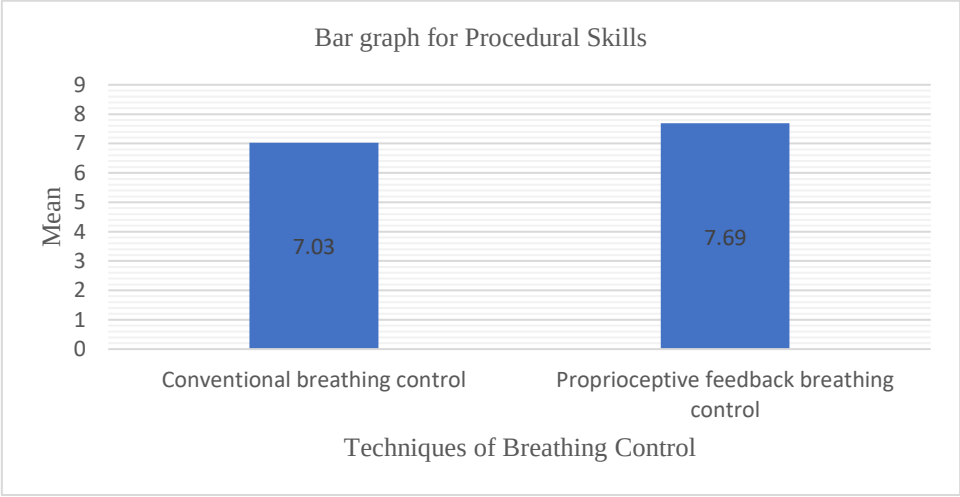

Fig.2

Interpretation: The bar graph shows that the mean value of proprioceptive feedback technique of breathing control is more than the mean value of conventional breathing control (7.69>7.03, mean difference- 0.66) Hence the proprioceptive feedback technique of breathing control is easier to perform.

Station 3: Understanding Skills:

TECHNIQUE	MEAN ±SD	STANDARD ERROR	MEAN DIFFERENCE	STANDARD ERROR OF DIFFERENCE(SE)	Z VALUE
Conventional breathing control	6.37 ±0.77	0.604	1.34	0.78	1.88
Proprioceptive feedback technique of breathing control	7.72 ±0.53	0.416			

Table.3

Interpretation: The data has passed the normality test. Z test was performed on marks obtained in Conventional breathing control technique and the proprioceptive feedback technique of breathing control. Z value is more than SE, therefore the observed mean difference is highly significant.

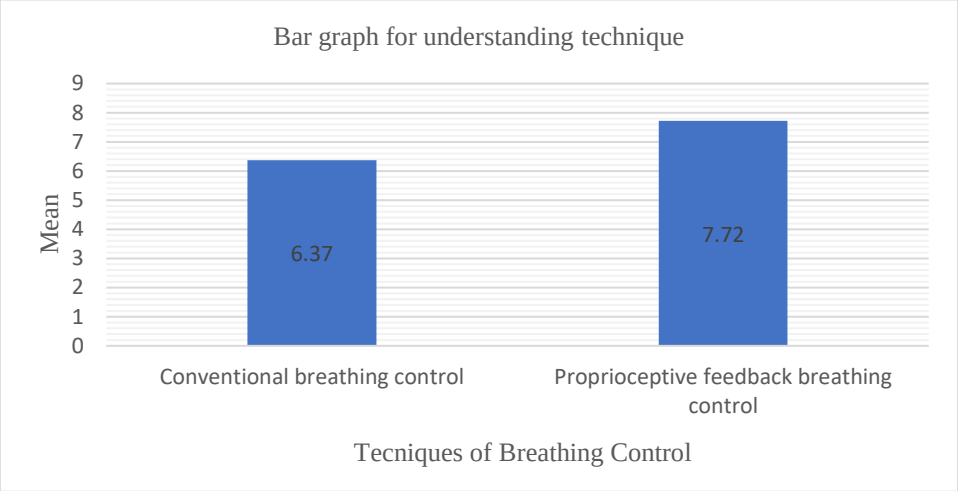

Fig.3

Interpretation: The bar graph shows that the mean value of proprioceptive feedback technique of breathing control is more than the mean value of conventional breathing control (7.72>6.37, mean difference- 1.35) Hence the proprioceptive feedback technique of breathing control is easier to understand.

Total OSCE score:

TECHNIQUE	MEAN ±SD	STANDARD ERROR	MEAN DIFFERENCE	STANDARD ERROR OF DIFFERENCE(SE)	Z VALUE
Conventional breathing control	21.34 ±0.95	0.746	2.02	0.96	2.11
Proprioceptive feedback technique of breathing control	23.36 ±0.79	0.620			

Table.4

Interpretation: The data has passed the normality test. Z test was performed on marks obtained in Conventional breathing control technique and the proprioceptive feedback technique of breathing control. Z value is more than SE, therefore the observed mean difference is highly significant.

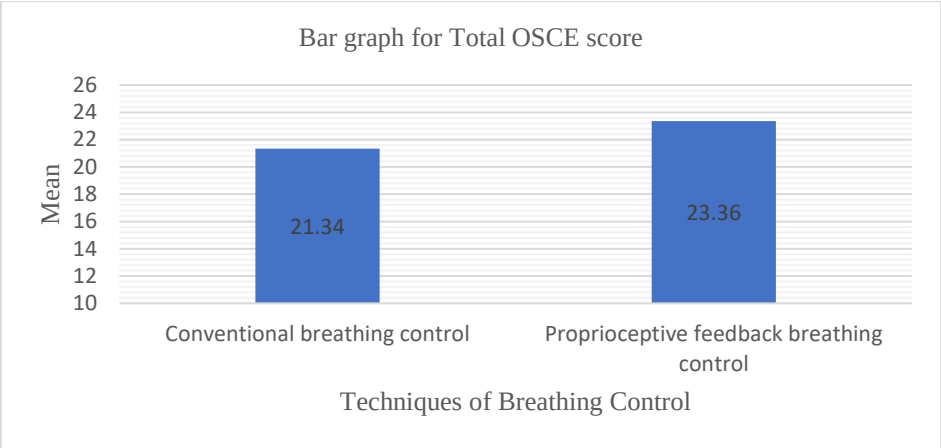

Fig.4

Interpretation: The bar graph shows that the mean value of proprioceptive feedback technique of breathing control is more than the mean value of conventional breathing control (23.36>21.34, mean difference-2.02) Hence the proprioceptive feedback technique of breathing control is easier to understand and perform.

RESULT:

- A total of 225 samples are taken in this study, which includes 4th year B.P.Th students. Two techniques of breathing control i.e conventional and proprioceptive feedback technique of breathing control were taught to the students and then they were assed based on the OSCE station.
- Based on statistical analysis,
- The data obtained from table1, 2, 3 and 4 it shows that both the techniques are understood by the students as the Z value is highly significant.
- In Fig.2, the histogram shows that the mean value of proprioceptive feedback technique of breathing control is more than the mean value of conventional breathing control (7.69>7.03, mean difference-0.66). Therefore, the proprioceptive feedback technique of breathing control is easier to perform.
- In Fig.3, the histogram shows that the mean value of proprioceptive feedback technique of breathing control is more than the mean value of conventional breathing control (7.72>6.37, mean difference-1.35). This shows that the proprioceptive feedback technique of breathing control is easier to understand.
- In Fig.4, the histogram shows that the mean value of proprioceptive feedback technique of breathing control is more than the mean value of conventional breathing control (23.36>21.34, mean difference- 2.02).
- Hence statistically the proprioceptive feedback technique of breathing control is easier to understand.

DISCUSSION:

The Breathing control is normal tidal volume breathing using the lower chest. It allows recovery from fatigue, oxygen desaturation or signs of bronchospasm, relieves breathlessness and improves exercise capacity. Through educational sessions patients can learn how to control their breathing efforts to ensure maximum ventilation at minimum energy expenditure.

In Conventional Breathing control technique, the student is told to be in a relaxed position and taught to breath as normal tidal volume breathing, in this the instructions are only given as breathe in and breathe out. So here there is only one auditory feedback received by the students.

In proprioceptive feedback technique the therapists' places one hand on the student's abdomen, while inspiration the hand raises up and the therapist counts till 2, while expiration the hand moves down and the therapist counts till 4.

So, in proprioceptive feedback technique as the hand is placed on abdomen the proprioceptors that are present within the skin and muscle over the abdomen are stimulated which provides constant feedback to the efferent activity i.e the respiratory muscles. The movement of the hand gives visual feedback to the students, also as the therapist counts it gives an auditory feedback to the students. It is seen that proprioceptive feedback provides a neural representation of body mechanics to the central nervous system, this suggests an additional role of proprioception during movement namely to allow the nervous system to identify the optimal mechanical patter of movement during performance of task. [19]

The continuous task related information provided through sound, in addition to visual feedback can improve not only performance but also learning. [20]

Also, a multimodal motor representation consisting of at least visual, auditory and proprioceptive components can be shaped subtly in more precise motor control and enhanced motor learning. [21]

These suggest that if proprioceptive, visual and auditory feedback are combined together it can enhance the motor learning.

Statistically it is seen that both the techniques are understood by the students but the proprioceptive feedback is easier to understand, as there are multiple feedbacks in the proprioceptive feedback technique which gives a better understanding of the technique to the students.

Hence proprioceptive feedback technique of breathing control is easier to understand than conventional breathing control which is assessed by the OSCE station among the 4th year B.P.Th students.

CONCLUSION:

The study concludes that Proprioceptive feedback technique of Breathing Control is easier to understand than the Conventional Breathing Control technique among the 4th year B.P.Th students.

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