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EFFECTS OF ORO-MYOFUNCTIONAL THERAPY ALONG WITH BREATHING RETRAINING ON SEVERITY AND QUALITY OF SLEEP IN PATIENTS WITH MILD TO MODERATE OBSTRUCTIVE SLEEP APNOEA (OSA)

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Abstract: **Obstructive Sleep Apnea Syndrome (OSA) is a respiratory sleep disorder characterized by partial or complete recurrent episodes of upper airway collapse that occur during night. The upper airway is compliant tube and therefore is subjected to collapse. The aim and objective of the study is to find out the effects of Oro-Myofunctional Therapy and Breathing Retraining on snoring, daytime sleepiness, and Quality of Sleep in patients with Obstructive Sleep Apnoea (OSA) by using Berlin Questionnaire and Pittsburg Sleep Quality Index (PSQI). There was a significant difference between the pre- therapy and post-therapy scores when evaluated with Berlin Questionnaire – A statistically significant improvement was obtained in Group B which received Oro-Myofunctional Therapy along with Breathing Retraining for OSA (Unpaired 't' value – 4.007 'p' value-<0.002) and PSQI - B with (Unpaired 't' value -4.69 'p' value-<0.001). The study concludes that the group which received both Oro-Myofunctional Therapy along with Breathing Retraining showed significant improvement when compared to the other group which received Oro-Myofunctional therapy alone.**

Keywords: **Obstructive Sleep Apnoea (OSA), Berlin Questionnaire, Pittsburg Sleep Quality Index (PSQI), Oro-Myofunctional Therapy, Breathing Retraining.**

I. INTRODUCTION

Sleep apnoea syndrome (SAS), a common disorder, is characterized by repetitive episodes of cessation of breathing during sleep which results in hypoxemia and sleep disruption. SAS is classified into two categories according to the pathophysiologic mechanisms that cause apnoea, Obstructive Sleep Apnoea Syndrome (OSAS) and Central Sleep Apnoea Syndrome (CSAS) [1]. Obstructive Sleep Apnea Syndrome (OSA) is a respiratory sleep disorder characterized by partial or complete recurrent episodes of upper airway collapse that occur during night [2]. Central Sleep Apnea Syndrome is defined as cessation in airflow of 10 or more seconds in the absence of any inspiratory effort [3].

The literature states that the prevalence of OSAS in the general population is approximately 13% for men and 6% for women and adult population varies between 9% and 38% [4]. According to recent studies, about 1 billion people worldwide are impacted, which has raised serious concerns among the public in the 30–60 age range. Male sex is an independent risk factor for OSAS, with an estimated male-to-female prevalence of 1.5: [5].

The pharynx can be divided into 4 segments: 1) the nasopharynx, from nasal turbinate to superior part of soft palate, 2) the retropalatal pharynx, from hard palate to caudal margin of the soft palate, 3) the retroglossal segment, from caudal margin of soft palate to tip of epiglottis, and 4) the hypopharynx, from epiglottis to pharynx. The retropalatal and retroglossal pharynx is often together referred as Oropharyngeal segments [6]. The upper airway is compliant tube and therefore is subjected to collapse. Most of the OSA patients have upper airway obstruction at either level of soft palate or tongue [7]. The pathophysiology of OSA is complex and multifactorial [7].

The predisposing and aggravating factors of OSA includes, obesity, smoking, increased upper airway length, narrow pharynx, volume of tongue, length of soft palate, abnormal positioning of maxilla and mandible and associated neuromuscular insults could leads to the intermittent hypoxemia and the sleep fragmentation (with the activation of sympathetic tone) which affects the patient quality of life and performance [7,8]. Continuous positive airway pressure, or CPAP, is the most widely used treatment for OSA. It is administered through a nasal mask each night while you sleep to keep your upper airway open. However, over time, the interest in alternative treatments has increased, especially because acceptance of CPAP by the patients is often low [9]. Although, between 17% and 85% of patients with OSA have been reported to be not comply with CPAP therapy, mainly due to mask discomfort and cutaneous allergies.

Thus, alternative approaches have been investigated during the last decades, including the myofunctional therapy of the upper airways [8]. Recently, oral, and oropharyngeal structures have been the focus of isotonic and isometric exercises as part of orofacial myofunctional therapy (OMT), a therapeutic option for OSA, with the aim of increasing muscle tone, endurance, and coordinated movements of pharyngeal and parapharyngeal muscles [10]. Individuals with OSAHS tend to have minimal or poorly coordinated upper airway muscle dilation during inhalation. The upper airway muscles and breathing are “neurologically and functionally linked.” BRE includes exercises to improve the strength and function of the inspiratory muscles, particularly the diaphragm [11]. As there is less evidence to show the effect of Oro Myofunctional Therapy along with the Breathing Retraining Exercises in OSA. This study comprehensively focuses to reduce daytime sleepiness and snoring and to increase the quality of sleep in patients with mild to moderate Obstructive sleep apnea.

II. MATERIALS AND METHODOLOGY

STUDY DESIGN: The study was pre and post-test experimental study design.

STUDY SETTING: The study was conducted at K.G Physiotherapy and Rehabilitation centre Saravanampatti, Coimbatore, under the supervision of my guide.

STUDY DURATION: The study was conducted over a period of 3 months. A total of 30-40 minutes, 1 session/day, 5 times/week.

STUDY SAMPLING: 20 subjects who fulfilled the predetermined inclusion criteria were selected and divided into 2 groups by simple random sampling method. Each group consists of 10 subjects. Group are named as A and B. Where, Group received Oro-Myofunctional Therapy and received Oro-Myofunctional Therapy and Breathing Retraining.

SELECTION CRITERIA: The inclusion criteria include the patients who had diagnosed with mild to moderate OSA by certified pulmonologist and with berlin questionnaire with the symptoms of snoring and daytime sleepiness. Both the genders were included with the age group of 20-40 years. The exclusion criteria include the patient with severe OSA, severe nasal obstructions, primary pulmonary pathology, craniofacial malformations, facial traumas, neoplasm, BMI greater than 30, smokers and alcoholism, neuromuscular disease, and recent strokes.

PROCEDURE: Participants were selected and divided into two equal groups. About 25 participants were registered and only 20 among them were selected based on the inclusion criteria. They were randomly allocated into 2 groups, 10 participants in Group A and 10 participants in group B. Group A received Oro-Myofunctional Therapy and Group B received Oro-Myofunctional Therapy and Breathing Retraining.

GROUP A: ORO-MYOFUNCTIONAL THERAPY:


Fig 1


Fig 2


Fig 3


Fig 4


Fig 5


Fig 6


Fig 7


Fig 8

GROUP B: BREATHING RETRAINING ALONG WITH ORO-MYOFUNCTIONAL THERAPY:


Fig 9


Fig N

Fig 1- Pushing the tongue against hard palate.

Fig 2 and Fig 3- Lateral tongue slides without resistance.

Fig 4 and Fig 5- Lateral tongue slides with resistance.

Fig 6- Tongue stretches downwards

Fig 7- Tongue stretches upwards

Fig 8- Tongue stretches laterally

Fig 9- Inhalation through the nose

Fig N- Exhalation through the mouth

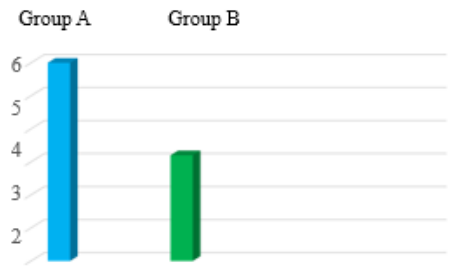
All these set of exercises was done 1 session per day with 15 repetitions for about 30-40 minutes per day and 5 sessions per week.

III. DATA ANALYSIS AND INTERPRETATION

COMPARISION OF POST MEAN SCORES OF BERLIN QUESTIONNAIRE BETWEEN GROUP A AND GROUP B

BERLIN QUESTIONNAIRE	POST TEST MEAN (GROUP A)	POST TEST MEAN (GROUP B)	SD	TABLE 't' VALUE	CALCULATED 't' VALUE
	6	3.2	1.562	2.101	4.007

TABLE 1



GRAPH 1

COMPARISION OF POST MEAN SCORES OF PITTS BURG SLEEP QUALITY INDEX (PSQI) BETWEEN GROUP A AND GROUP B

PITTS BURG SLEEP QUALITY INDEX	POST TEST MEAN (GROUP A)	POST TEST MEAN (GROUP B)	SD	TABLE 't' VALUE	CALCULATED 't' VALUE
	16.2	13.1	2.671	2.593	4.69

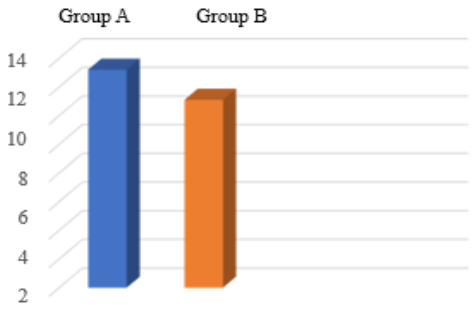


TABLE 2 **GRAPH 2**

IV. DISCUSSION

The purpose of the study is to find out the effects of Oro-Myo Functional Therapy along with Breathing Retraining in patients with mild to moderate Obstructive Sleep Apnea. Most of the studies have suggested that there is a reduced severity of symptoms who underwent only Oro-Myo Functional Therapy (Oropharyngeal exercises). But there are not many studies which is based on the effect of Oro-Myofunctional therapy along with Breathing Retraining to reduce the severity of symptoms and to improve the Quality of sleep in patients with OSA.

Table 1 and Graph 1 shows there was a significant difference between the post-test mean scores when evaluated with Berlin Questionnaire between Group A and Group B. A statistically significant improvement was obtained in Group B which received Oro-Myofunctional Therapy along with Breathing Retraining for mild to moderate OSA (Unpaired 't' value = -3.01, 'p' value is <0.05).

Table 2 and Graph 2 shows there was a significant difference between the post-test mean scores when evaluated with Pitts burg Sleep Quality Index (PSQI) between Group A and Group B. A statistically significant improvement was obtained in Group B which received Oro-Myofunctional Therapy along with Breathing Retraining for mild to moderate OSA (Unpaired 't' value =4.69, 'p' value is <0.001).

There is proof of the concept that muscle training while awake will reduce upper airway collapsibility during sleep in patients with OSAS. Tongue muscle training during the daytime reduced snoring.

The first exercise protocol for the reduction of obstructive sleep apnoea syndrome (OSAS) severity, **Guimarães et al,** used the scientific reports available about the pathogenesis of OSA and the empirical foundations of speech therapy. According to the authors, the oropharyngeal exercises target soft palate elevation that recruits several upper airway muscles such as the tensor and levator veli palatini, as well as muscle fibres of the palatopharyngeal and palatoglossus muscles, tongue repositioning, and training of mandibular elevation to avoid mouth opening.

During sleep, the tongue may fall backward, obstructing the airway. Tongue strengthening exercises increase the tongue's stability and resting tone, which keeps it from reverting.

One of the main symptoms of OSA is snoring, which is brought on by the upper airway's relaxed tissues vibrating. By strengthening the muscles that support the tongue and soft palate, oropharyngeal exercises lessen the frequency and severity of snoring. Regular exercise reduced snoring frequency by 59% and snoring intensity by 45%, according to research.

The oropharyngeal exercises along with breathing retraining had reduces mouth breathing and increases the nasal breathing which has an effect to improve the sleep quality and reducing daytime sleepiness.

V. CONCLUSION

The limitations and recommendation of this study includes, the sample size of the study is small, Only the age group of 20-40 years was concentrated, there is a lack of long term follow up. Evidence from a larger sample is needed with long term follow up and Further research should incorporate more outcome measures.

The conclusion of the study is that both the groups showed significant improvement but the group which received Oro-Myo Functional Therapy along with Breathing Retraining showed better improvement when compared to the other group which received Oro-Myo Functional Therapy alone, according to the results of Berlin Questionnaire and Pittsburg Sleep Quality Index (PSQI).

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