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### Prevalence of forward head posture and protracted shoulders in mouth breathing children during day time and during sleep of age 8-12 years in Nashik-A cross sectional study

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#### ABSTRACT

##### Introduction

Mouth breathing (MB) leads to a mechanically incorrect form of respiration. Children with MB demonstrate difficulties in concentration, low scholarly yields, increased daytime sleeping, and a disturbed quality of life. The type of mouth breathing also affects these factors. There was a need to study mouth breathing, along with its types to determine its effect on posture of head and shoulders in this age group to plan corrective strategies in the area of child health which is why this study was taken up.

##### Aim

To find out the prevalence of forward head posture and protracted shoulders in mouth breathing children during day time and during sleep of age 8-12 years in Nashik, Maharashtra, India.

##### Methods

In this cross sectional study, 42 Children in the age group 8-12 years were screened with 'Clinical recognition of mouth breathing questionnaire'; 30 Mouth breathers and 12 Nasal breathers were identified. MB's were classified as MBD and MBS using 'Questionnaire for mouth breathing'. 12 children were identified as MBD and 18 as MBS. Head and shoulder posture of children was analysed in form of CVA and SH.

##### Results

MBS(60%) was more prevalent than MBD(40%). Out of MBS, 72.22% had FHP with prevalence of PS being 72.22%. In MBD 58.3% had FHP with prevalence of PS being 66.60%. Also, FHP and PS was more prevalent in children who were MBS.

##### Conclusion

Among mouth breathers, the prevalence of MBS is 60%, and that of MBD is 40%. The prevalence of FHP and PS is highest among children with MBS(72.22%). The prevalence of FHP was highest among the male children (72.77%) whereas shoulder position was most affected in female children at 75%.

**Keywords:** FHP-Forward head posture, PS-Protracted Shoulders, MBD-Mouth breather during daytime, MBS-Mouth breather during sleep, CVA-Craniovertebral angle, SH-shoulder angle

## INTRODUCTION

Mouth breathing is defined as using the mouth alone or the mouth and nose instead of the nose alone for respiration for longer than 6 months [1]. It is one of the most common conditions in children of age group 8-12 years. Children with MB demonstrate difficulties in concentration, low scholarly yields, increased daytime sleeping, and a disturbed quality of life. The type of mouth breathing also does influence a child's performance and subsequent quality of life. There is a need to study mouth breathing, along with its types to determine its effect on posture of head and shoulders in this age group to plan corrective strategies in the area of child health which is why this study was taken up. Rubens Rafael Et al(2008)have found out the Prevalence of mouth breathing among children to be 55% [2]. Mouth breathing comes in association with asthma and otitis media, but it may be associated with other diseases also [3].

Mouth breathing which happens during active craniofacial development of a child may lead to consequent anatomical changes which affect the airway directly.<sup>4</sup>According to Chambi-Rocha A et al (2018);There has been an increasing incidence of abnormal breathing (here-mouth breathing) which consequently leads to a hampered craniofacial development [5].

There are different types of mouth breathing namely MBD (Mouth breathing during daytime) and MBS (Mouth breathing during sleep) and this difference also does affect the postural alterations in childhood.

Previous studies on Mouth breathing by Rafael et al have demonstrated about mouth breathing, its prevalence [2] and the types of mouth breathing [3].

Maria Christina Thomé Pacheco et al (2014) gave a 'Clinical recognition of mouth breathing questionnaire' for identifying mouth breathing; further for classifying it as MBD or MBS. Also 'Questionnaire for mouth breathing' was used by Harutaka Yamaguchi et al (2015) in their study which gave a fair idea about the pattern of breathing.

The prevalence of MBD and MBS has not yet been found out which necessitated the need for doing this study.

Normal Physiological breathing is many times affected by problems in anatomical or functionality which leads to the respiratory cycle being initiated not only through the nose but also through the mouth. Compared to nasal breathing children (NBC), mouth breathing children (MBC) children are at greater risk for restless sleep, diaphoresis and enuresis in the night, and, in some cases, even sleep apnea. Mouth breathing especially during sleep leads to sleep disturbances and is likely to negatively impact academic performance [6, 7].

MB children many times also suffer from other systemic infections such as chronic gingivitis, periodontitis, candidiasis [8], dental erosion, and cavities [9]. Due to the difficulty of breathing and chewing simultaneously for extended periods, masticatory efficiency decreases which may lead to further nutritional issues [10]. The reduced quality of sleep manifests itself as sleep during daytime, irritability, and head aches subsequently leading to a negatively altered quality of life. Mouth breathing can adversely affect the functions of the respiratory systems and difficulties in concentration, low scholarly yields, increased daytime sleeping. Children who grow up with mouth breathing stimulus may have implications on physical and psychological aspects at adult age [12].

There was a felt need to find the potential population for intervention/preventive strategies addressing mouth breathing in the area of child health. Hence timely recognition of mouth breathing of whatever pattern is important to prevent/control consequences of MB into adulthood.

## METHODOLOGY

Study design: Cross sectional study

Study setting: Nashik

Duration of study-6months

Sample size: 30

Sampling technique: convenient sampling technique

### Method of data collection

The study was performed at Nashik, Maharashtra. In this cross sectional study, 42 Children in the age group 8-12 years were screened for mouth breathing based upon 'Clinical

recognition of mouth breathing questionnaire' which was based on clinicians assessment combined with parents report. Out the 42 children which were screened 30 Mouth breathers and 12 Nasal breathers were identified. As nasal congestion can induce mouth breathing and is one of the main symptoms of allergic rhinitis, we had excluded allergic rhinitis from our analyses [3]. On confirmation of mouth breathing of 30 subjects depending on the 'Clinical recognition of mouth breathing questionnaire'; MB's were further classified as MBD (mouth breathers during daytime) and MBS (mouth breather during sleep) using the 'Questionnaire for mouth breathing' used by Harutaka Yamaguchi et al in their study. 12 children were identified as Mouth breathers during day time and 18 were identified as Mouth breathers during sleep depending upon the parents report of the same. Analysis of FHP and PS was done using a software MB ruler to find the Craniovertebral angle (CVA) and Shoulder angle (SH) and was termed as PS i.e protracted shoulders.

Subjects were assessed for any kind of deviation of head posture using validity and

reliability authenticated computerized photogrammetry with emphasis on Craniovertebral segment. The photographs were digitally obtained from a digital camera (Nikon Coolpix, 13MP), Positioned 3.5 m from the subject, allowing the recording of the face and upper trunk in the sagittal plane (right and left views). The subject was kept standing, looking forward in a relaxed posture. Adhesive markers were placed on the following anatomical landmarks: spinous process of C7, tragus of the left and right ears, acromion process of right and left shoulder. The photographs were analyzed using MB- ruler software. The craniovertebral angle (CVA), that is the angle between the horizontal line passing through C7 and a line extending from the tragus of the ear to C7 was obtained. Also, the angle formed at the intersection of the line between the midpoint of the humerus and spinous process of C7 and the horizontal line through the midpoint of the humerus called as the Shoulder angle (SH) was obtained. The literature reports high reliability of this procedure (ICC = 0.88).

## STATISTICAL ANALYSIS

Table no -1 (this table shows number of mouth and nasal breathers amongst the sample)

Type of breathing	Number
Mouth breathing	30
Nasal breathing	12
total	42

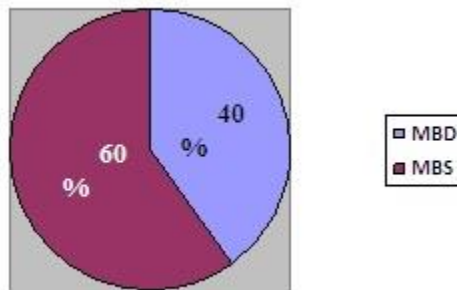


Figure 1-The pie diagram shows prevalence of MBD and MBS in mouth breathers.

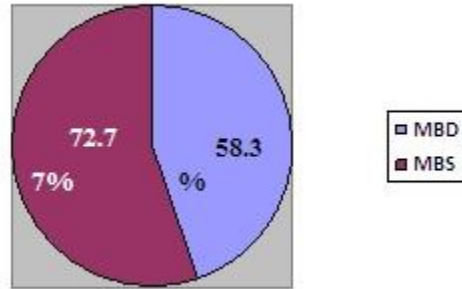


Figure 2- The pie diagram shows prevalence of FHP in MBD and MBS respectively.

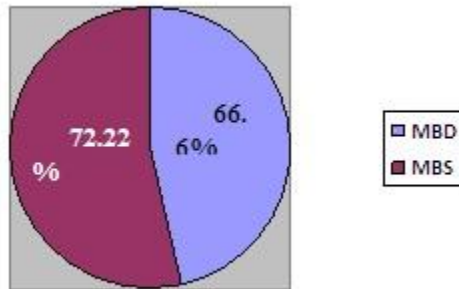


Figure 3- The pie diagram shows prevalence of PS in MBD AND MBS respectively

## DISCUSSION

In the present study, we assessed the prevalence of forward head posture and protracted shoulders in mouth breathing children depending upon different types of mouth breathing. To date, This study is the first to examine the prevalence of MBD and MBS in mouth breathing children in Nashik along with its effects on head and shoulder posture. Based on the results of our study out of mouth breathing during sleep population 72.22% children were found out to have FHP and 72.22% children were found out to have PS which is substantial. Out of mouth breathing during daytime population 58.3% children were found out to have FHP and 66.60% children were found out to have PS. Presence of forward head posture and protracted shoulders which is high in children with mouth breathing during sleep could be attributable to mouth breathing and that if problem of mouth breathing is addressed, further consequences can be minimized. Also the percentage of mouth breathing during sleep was 60% and that of mouth breathing during daytime was 40% which signifies mouth breathing during sleep to be more prevalent in types of mouth breathing. Considering the

increased prevalence of mouth breathers both during sleep as well as in daytime the need of awareness regarding mouth breathing is extremely important to prevent further consequences into adulthood.

Also it has been documented that forward head posture combined with flexion of the lower cervical spine and extension of the upper cervical spine with decreased cervical lordosis, is the first postural compensation adopted by mouth-breathing subjects in order to decrease airflow resistance [13, 14, 15]. Which makes the analysis of FHP in mouth breathers very crucial. Also, FHP was found out to be more prevalent in male children where as PS was more prevalent in female children the cause for this differentiation is not yet known. FHP and PS was more prevalent in children who were accustomed to the habit of mouth breathing during sleep and hence were identified as the potential population for intervention/preventive strategies addressing mouth breathing in the area of child health.

Hence to prevent further sequelae of events in relation to mouth breathing the awareness and preventive treatment is essential.

## CONCLUSIONS

Type of mouth breathing does affect the consequences due to mouth breathing in different ways; and may affect the quality of life of children with mouth breathing drastically. These findings

are of great clinical relevance because they show the Prevalence of forward head posture and protracted shoulders in Children with varied types of breathing and might be helpful in designing preventive/management strategies holistically in near future.

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