

## Original Research Article

# Relationship of chronic rhinosinusitis with dental malocclusion: a prospective study

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## ABSTRACT

**Background:** The purpose of this study was to find the effect of chronic rhinosinusitis on dental malocclusion. A malocclusion is defined as an irregularity of the teeth or a mal relationship of the dental arches beyond the range of what is accepted as normal. Malocclusion may not be life-threatening, but it is an important public health issue as it compromises the health of oral tissues and also can lead to psychological and social problems. There are numerous studies in the literature about prevalence of the dental malocclusion but there is no study regarding association of CRS and malocclusion. Several factors related to malocclusion, such as anterior crowding, midline malalignment, and facial asymmetry, have strong effects on the perception of facial aesthetics, which influence the psychological development and in turn, influence social acceptance and self-perception.

**Methods:** This was a prospective cross-sectional observational study was conducted from September 2015 to August 2017 and 57 patients with diagnosis of having chronic sinusitis, were evaluated for dental occlusion. Malocclusion is then classified by angle's classification.

**Results:** Most patients of chronic rhinosinusitis had dental malocclusion in grade II, followed by grade I, then grade III.

**Conclusions:** While treating the patients of CRS one must keep in mind that he may have class II malocclusion which may cause gum disease, poor oral hygiene, impaired speech, mastication and aesthetics of face and need orthodontics management as well.

**Keywords:** Dental malocclusion, Maxillary sinusitis, Angles classification, Chronic sinusitis

## INTRODUCTION

A malocclusion is defined as an irregularity of the teeth or a mal relationship of the dental arches beyond the range of what is accepted as normal.<sup>1</sup> Malocclusion may not be life-threatening, but it is an important public health issue as it compromises the health of oral tissues and also can lead to psychological and social problems.<sup>1</sup> There are numerous studies in the literature about prevalence of the

dental malocclusion but there is no study regarding association of CRS and malocclusion. Several factors related to malocclusion, such as anterior crowding, midline malalignment, and facial asymmetry, have strong effects on the perception of facial aesthetics, which influence the psychological development and in turn, influence social acceptance and self-perception.<sup>2</sup> Some studies found a significant correlation between lower self-esteem and malocclusion and the improvement of self-esteem as a result

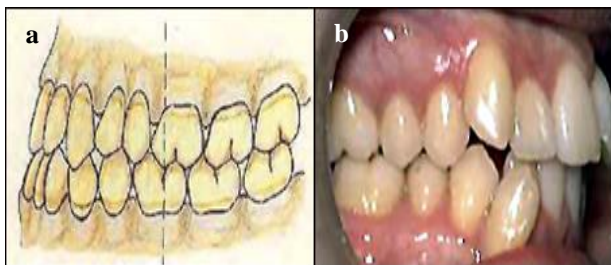
of orthodontic treatment.<sup>3-8</sup> Edward angle, who is considered the father of modern orthodontics, was the first to classify malocclusion. He based his classifications on the relative position of the permanent maxillary first molar. Angle believed that the anteroposterior dental base relationship could be assessed reliably from first permanent molar relationship, as its position remained constant following eruption. In case where the first molars were missing, canine relationship is used. Angle's classification system is based upon the relationship between the permanent maxillary and mandibular first molars.

**Table 1: Angle's classification.**

Grade	Classifications
<b>Grade I</b>	The maxillary first molar is slightly posterior to the mandibular first molar
<b>Grade II</b>	The maxillary first molar is even with or anterior to the mandibular first molar
<b>Grade III</b>	The maxillary first molar is more posterior to the mandibular first molar than normal

*Angle's classifications of malocclusion*

Class I (or neutroclusion) Figure 1 (a and b) - in this normal relationship, the maxillary first molar is slightly posterior to the mandibular first molar: the mesio buccal cusp of the maxillary first molar is directly in line with the buccal groove of the permanent mandibular first molar. The facial profile is termed mesognathic.



**Figure 1: (a) Normal occlusion and (b) normal occlusion.**

*Arch relationships*

*Molar*

Mesio-buccal (MB) cusp of the maxillary first occludes with the mesio-buccal groove of the mandibular first.

*Class II (or distocclusion) (Figure 2a)*

In this classification, the maxillary first molar is even with or anterior to the mandibular first molar: the buccal groove of the mandibular first molar is distal to the mesiobuccal cusp of the maxillary first molar. The facial profile is termed retrognathic.

*Class II, division 1 (Figure 2b)*

Occurs when the permanent first molars are in class II and the permanent maxillary central incisors are in their normal or slightly protruded position.

*Class II, division 2 (Figure 2c)*

Occurs when the permanent first molars are in class II and the permanent maxillary central incisors are retruded (pulled backward toward the oral cavity) and tilting lingually.

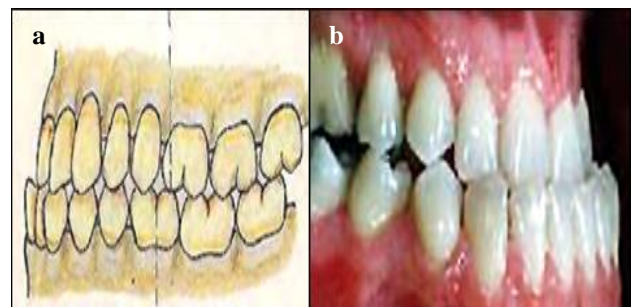


**Figure 2: (a) Class II malocclusion, (b) class II division 1, and (c) class II division 2.**

*Arch relationships*

*Molar*

MB cusp of the maxillary first occludes (by more than the width of a premolar) mesial to the MB groove of the mandibular first. Division 1, maxillary anterior protrude facially from the mandibular anterior, with deep overbite. Division 2, maxillary central incisors are either upright or retruded, and lateral incisors are either tipped labially or overlap the central incisors with deep overbite.



**Figure 3: (a) Class III malocclusion and (b) class III anterior bite.**

*Class III (or mesiocclusion) Figure 3 (a and b)*

In this classification, the maxillary first molar is more posterior to the mandibular first molar than normal: the buccal groove of the mandibular first molar is mesial to the mesiobuccal cusp of the maxillary first molar. The facial profile is termed prognathic.

The objective of the study was to assess relationship of chronic rhinosinusitis with dental malocclusion.

**METHODS**

This was a prospective cross-sectional observational study was conducted in ENT Department of Mahatma Gandhi Institute of Medical Sciences (MGIMS), Sevagram, India from September 2015 to August 2017 and 57 patients with diagnosis of having chronic sinusitis, were evaluated with CT PNS (coronal and axial views). Exclusion criteria were acute sinusitis, malignant disease, previous nasal or sinus surgery, either open or endoscopic, head trauma, dental infections. Each patient was evaluated for dental occlusion with the help of Department of Dentistry of the MGIMS, Sevagram. Malocclusion is then classified by angle’s classification.<sup>9</sup>

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional research committee of MGIMS, Sevagram and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study does not contain any studies with animals performed by any of the authors.

*Statistical analysis*

A master chart was created in Microsoft excel (2007) for the purpose of data analysis. The statistical software namely SPSS 22.0 version and GraphPad prism 6.0 version and  $p < 0.05$  is considered as level of significance.

**RESULTS**

In the present study, the most common type of dental malocclusion was class II which is found in 35 (61.40%) patients. The second most common type of dental malocclusion was class I which is found in 12 (21.05%) patients followed by class III which is seen in 10 (17.54%) patients (Table 2).

**Table 2: Distribution of patients according to dental malocclusion in CRS.**

Dental malocclusion	No. of patients	Percentage (%)
<b>Type I</b>	12	21.05
<b>Type II</b>	35	61.40
<b>Type III</b>	10	17.54
<b>Total</b>	57	100

**DISCUSSION**

In the present study, the most common type of dental malocclusion was class II which is found in 35 (61.40%) patients. The second most common type of dental malocclusion was class I which is found in 12 (21.05%) patients followed by class III which is seen in 10 (17.54%) patients. Interpretation of this study is that patients with chronic rhinosinusitis has increased incidence of type II dental malocclusion.

In the comparative study conducted by Cho et al, 99 adult patients were included. 52 controls (having septal deviation without CRS) and 47 patients with CRS.<sup>10</sup> This study demonstrate increase incidence of class II malocclusion in the CRS group with the control group ( $p=0.006$ ). The findings of present study correlate with findings of study conducted by Cho et al, which shows increase incidence of class II dental malocclusion in chronic rhinosinusitis patients.<sup>10</sup>

Normal dental occlusion is very important otherwise one may exert too much force on any particular teeth, which could damage the teeth in the short or long term. Dental malocclusions make it more difficult to practice good oral hygiene and as a result, the risk of tooth decay and gum disease increases. Poorly aligned teeth preclude comfortable jaw closing. This often brings about exaggerated wear on the teeth that come into strong contact with each other.

Because of malocclusion, certain patients develop the habit of breathing through their mouths. This can lead to snoring. Furthermore, mouth breathing promotes a proliferation of bacteria in the mouth, increasing the risk of gum disease. Dental malocclusion also leads to impaired speech and mastication, sometimes severely affect aesthetics of the face.<sup>11</sup>

**CONCLUSION**

This study concludes that there is increased incidence of class II dental malocclusion in chronic rhinosinusitis patients. While treating the patients of CRS one must keep in mind that he may have class II malocclusion which may cause gum disease, poor oral hygiene, impaired speech, mastication and aesthetics of face and need orthodontics management as well.

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