

# EVALUATION OF RELATIONSHIP BETWEEN ATTRITION AND SKELETAL MALOCCLUSION

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## ABSTRACT:

### AIM:

The aim of the study is to evaluate the relationship between attrition and skeletal malocclusion.

### MATERIALS AND METHOD:

Various casts and images were obtained from the department of prosthodontics of saveetha dental college to conduct this study. Direct patient examination was also done. 50 samples were included in the study with various skeletal malocclusion. The degree of attrition was categorized into 4 grades as given by smith and knight as tooth wear index.

### RESULTS:

Skeletal malocclusion is seen to have a relation with attrition rate. Class 2 skeletal malocclusion is found to have high degree of attrition in both anterior and posterior teeth.

### CONCLUSION:

From the study it is concluded that skeletal malocclusion is an important factor which causes attrition of the tooth thus it is necessary to identify skeletal malocclusion at a younger age and correct it.

## INTRODUCTION:

Many clinicians are interested in skeletal malocclusion and its relationship to the maxillary and mandibular arches.(1) More attention is towards the muscular forces and its relationship to dental arches. However, Dental anatomy and its function has been critically analyzed in many studies.

The latest concept of proper occlusion is connected to certain aspect of the teeth namely the mesiobuccal cusp of the maxillary first molar and mesiobuccal groove of the mandibular first molar, the mesial slope of maxillary canine and distal slope of mandibular canine and the incisal edges of the incisors. Mostly cuspal relationship of the maxillary and mandibular teeth is seen to play a major role in determining the occlusion.

Angles classification of occlusion is the gold standard classification. It was given by 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 maxillary first molar. According to Angle, the mesiobuccal cusp of the upper first molar lies on the buccal groove of the mandibular first molar. The teeth should all fit on a line of occlusion which, in the upper arch, is a smooth curve through the central fossa of the posterior teeth and cingulum of the canines and incisors, and in the lower arch, it is a smooth curve through the buccal cusps of the

posterior teeth and incisal edges of the anterior teeth. Any different from this resulted in malocclusion types. Right and left side can have different type of malocclusion.

**Class I: Neutroclusion** Here the molar relationship of the occlusion is normal or as described for the maxillary first molar, but the other teeth have problems like spacing, crowding, over or under eruption, etc.

**Class II: Distocclusion (retrognathism, overjet, overbite)** In this situation, the mesiobuccal cusp of the upper first molar is not aligned with the mesiobuccal groove of the lower first molar. Instead it is anterior to it. Usually the mesiobuccal cusp rests in between the first mandibular molars and second premolars. There are two subtypes:

**Class II Division 1:** The molar relationships are like that of Class II and the anterior teeth are protruded.

**Class II Division 2:** The molar relationships are Class II but the central are retroclined and the lateral teeth are seen overlapping the centrals.

**Class III: Mesioclusion (prognathism, Anterior crossbite, negative overjet, underbite)** In this case the upper molars are placed not in the mesiobuccal groove but posteriorly to it. The mesiobuccal cusp of the maxillary first molar lies posteriorly to the mesiobuccal groove of the mandibular first molar. Usually seen as when the lower front teeth are more prominent than the upper front teeth. In this case the patient very often has a large mandible or a short maxillary bone.

Angles class 1 is considered ideal by many dentists. D'amico proposed mutual protected occlusion, He stated that In this arrangement, centric relation coincides with the maximum intercuspal position. The six anterior maxillary teeth, together with the six anterior mandibular teeth, guide excursive movements of the mandible, and no posterior occlusal contacts occur during any lateral or protrusive excursions. Also, The relationship of the anterior teeth, or anterior guidance, is critical to the success of this occlusal scheme. In a mutually protected occlusion, the posterior teeth come into contact only at the very end of each chewing stroke, minimizing horizontal loading on the teeth. Concurrently, the posterior teeth act as stops for vertical closure when the mandible returns to its maximum intercuspal position. Posterior cusps should be sharp and should pass each other closely without contacting to maximize occlusal function.

Attrition, or wear of the occlusal surfaces of the teeth, may not only be physiologically normal, but necessary for function. Since occlusal wear must lead to reduction in tooth length, significant dimensional changes in facial morphology are inevitable unless mechanisms exist to compensate for attrition.(2) When dental attrition progresses the occlusal anatomy becomes obliterated and flat occlusal plans are developed. In severe cases there is a sloping form of occlusal surface in the posterior tooth where the occlusal surface slopes from buccal to lingual surface. The anteriors usually are in a downward and forward plane which changes to a horizontal and posterior plane.

The degree of attrition varies from person to person however people from sophisticated group relatively has less attrition compared to lower economical group. The latter group has increased wear of tooth because of their increased consumption of abrasive food, acidic food, the nature of cooking and the utensils they use poor oral hygiene and unawareness about the treatment to correct malocclusion.

However even people from the sophisticated group had problem with occlusion such as inadequate arch length to accommodate the teeth, crowding of teeth, even in people with normal occlusion the distal region to accommodate the third molar always found to be a problematic one.

A malocclusion is defined as the imperfect positioning of teeth when the jaws are closed.(3) It is the second most common dental problem to dental caries.(4,5) It is present in most of the adolescents and adults in india. (6) The prevalence is around 20-43% in chennai city. (7,8,9)

Malocclusion can be a contributing factor to sleep disordered breathing which may include snoring, upper airway resistance syndrome, and / or sleep apnea (apnea means without breath). Untreated damaging malocclusion can lead to occlusal trauma.(10) On the other hand, The treatment of malocclusion has been found to improve the self-perception and confidence. (11,12,13) it is important to analyze the factors which cause attrition and find a solution for it. One such factor is skeletal malocclusion,

Thus the evaluation of skeletal malocclusion and its relationship with attrition is done in this study.

## MATERIALS AND METHOD

Various casts and images were obtained from the department of prosthodontics of saveetha dental college to conduct this study. Direct patient examination was also done. 50 samples were included in the study with various skeletal malocclusion. The degree of attrition was categorized into 4 grades as given by smith and knight as tooth wear index.

Grade	Criteria
0	No loss of enamel surface characteristics
1	Loss of enamel surface characteristics
2	Buccal, lingual, and occlusal loss of enamel, exposing dentine for less than one-third of the surface Incisal loss of enamel Minimal dentine exposure
3	Buccal, lingual, and occlusal loss of enamel, exposing dentine for more than one-third of the surface Incisal loss of enamel Substantial loss of dentine
4	Buccal, lingual, and occlusal complete loss of enamel, pulp exposure, or exposure of secondary dentine

Table 1: Smith and knight tooth wear index. (2)



Figure 1: Skeletal malocclusion class 1.



Figure 2: Skeletal malocclusion class 2

**RESULTS:**

The study was conducted with n=50 in which 50% were class 1 type of malocclusion, 25% was class 2 type of malocclusion and 25% was class 3 type of malocclusion.

In the anterior teeth around 100% of class 1 malocclusion had no loss of enamel surface characteristics. In class 2 type of malocclusion around 20% had no loss of enamel surface characteristics, 40% loss of enamel surface characteristics and 20% had incisal loss of enamel with minimal dentine exposure. Class 3 type of malocclusion had 20% of no loss of enamel structure characteristics and around 60% had some loss of enamel surface characteristics.

In the posterior teeth, 50% of class 1 malocclusion had no loss of enamel surface characteristics and remaining 50% had some loss of enamel surface characteristics. 71.4% of Class 2 type of malocclusion had loss of enamel surface characteristics and 28.6% had buccal, lingual and occlusal loss of enamel exposing the dentin for less than one third of the surface.

Malocclusion	Grade 0	Grade 1	Grade 2
<b>Class 1</b>	50%	50%	Nil
<b>Class 2</b>	Nil	71.4%	28.6%
<b>Class 3</b>	40%	60%	Nil

Table 3: Posteriors

**DISCUSSION**

In this study we found out that class 2 malocclusion had more degree of attrition in the anterior and posterior teeth with many teeth with grade 1 attrition that is loss of enamel surface characteristics.

Begg et al in his study concluded that the teeth migrates mesially and occlusally as the attrition progresses.(14,15,16,17)He also stated that in a malocclusion of class 3 had more attrition in the posterior tooth. However he also demonstrated that the tooth are designed to resist attrition naturally and by the formation of secondary dentin.

In recent studies class 2 malocclusion had more attrition on the buccal cusp, cuspal slopes of lower posteriors and palatal cusps, cuspal slopes of upper posterior teeth. Class 2 situation has larger maxillary arch and smaller mandibular arch and hence during functional mandibular movements attrition could have happened because of skeletal discrepancies.

Similarly, Brodie et al in his study concluded that with mandibular movements the lingual aspect of maxillary tooth and in the buccal aspect of the mandibular tooth were frequently involved with higher attrition rates(18)

Leigh et al in their study in the eskimo population concluded that the maxillary tooth were more prone to attrition and also noted that as the attrition progresses and became severe, the occlusion changed from lingual to buccal side. (19)

Lysell also concluded that attrition progressed with age and the incisors had high degree of attrition and the third molars the least. Lenard et al concluded that attrition and skeletal malocclusion are related to arch length and arch size these are all important factor in determining the degree of attrition. Attrition is one of the most important cause of non-dental diseases. (20)

Thus it is important to determine the causes of dental attrition and must Treat it as early as possible.

**CONCLUSION**

Thus from the study it can be concluded that skeletal malocclusion and attrition go hand in hand. In this study skeletal malocclusion type 2 has high degree of attrition both in anterior and posterior tooth region. Thus more awareness must be created to correct the malocclusion as early as possible.

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