

AN OVERVIEW OF DIAGNOSIS AND MANAGEMENT OF MALOCCLUSION: LITERATURE REVIEW

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ABSTRACT

Background: Malocclusion is defined as an improper closure (i.e. contact) of the upper (maxillary) and lower (mandibular) teeth. The resulting misalignment is mostly appropriated during jaw closure when the two dental arches approximate.

Objectives: The literature suggests that clinicians usually overlook malocclusion resulting in unfavorable consequences. It has been shown that occlusal integrity is an important predictor of successful restoration of dental function. Therefore, in this paper, we will review the proper literature discussing

Methodology: We conducted the literature search within the PubMed database using the keywords: “Occlusion” and “Malocclusion” and “Prevalence” and “Types” and “Treatment” with dates from 1990 to 2020.

Review: There are two main categories under which a broad classification of malocclusion can be obtained. This includes intra-arch malocclusion and inter-arch malocclusion. Corrective management of malocclusion is often preferred during the early years of life as it will entail a repair of appropriate occlusion within normal skeletal growth of the body. The management approach of malocclusion is highly dependent on the type of malocclusion.

Conclusion: In conclusion, dental occlusion is a complex and multifactorial condition that extends beyond the physical contact of the biting surface of teeth. The high prevalence of malocclusion requires proper screening by dentists to identify the disease at an early age as management at that young age is associated with favorable outcomes.

Key words: Occlusion; Malocclusion; Prevalence; Types; Treatment.

Introduction

Malocclusion is defined as an improper closure (i.e. contact) of the upper (maxillary) and lower (mandibular) teeth ¹⁻⁴. The resulting misalignment is mostly appropriated during jaw closure when the two dental arches approximate. This malocclusion could be observed during dynamic (i.e. movement) or static (i.e. rest) statuses of the dental arches. Oral health is a good indicator of better daily functioning well-being and overall better quality of life ⁵.

Psychological and social development on an individual level is highly determined by facial esthetics. An important component of the facial esthetic is teeth, which greatly influence an individual's smile ⁵. The presence of my occlusion or mal-alignment provides a less appealing effect on the smile and the face. Lower levels of self-confidence and self-esteem have been observed in individuals suffering from malocclusion. Recent studies suggest that malocclusion is a well-known variable that influences the

oral well-being of children. Malocclusion can precipitate the formation of plaque and calculus which further promote inflammation of the gums and periodontitis which leads to bad oral hygiene ⁶.

Several genetic and environmental factors have been thought to contribute directly to the high prevalence rate of malocclusion. Studies suggest that the prevalence of mal-alignment is much higher now when compared to historic data. The physical, social, and psychological effects of malocclusion need to be investigated further to understand the importance of malocclusion on people's life ⁷. Despite this, the literature suggests that clinicians usually overlook malocclusion resulting in unfavorable consequences ⁸. It has been shown that occlusal integrity is an important predictor of successful restoration of dental function. Therefore, in this paper, we will review the proper literature discussing the definition, types, presentation, and management of malocclusion.

Methodology:

We conducted the literature search within the PubMed database using the keywords: “Occlusion” and “Malocclusion” and “Prevalence” and “Types” and “Treatment” with dates from 1990 to 2020. We also used the Google Scholar database for additional literature searches. After reading the abstracts, we manually selected the relevant papers for this review. In regards to the inclusion criteria, the articles were selected based on the inclusion of one of the following topics; dental occlusion and malocclusion. Exclusion criteria were all other articles that did not have one of these topics as their primary endpoint.

Review:**Overview:**

Primary teeth eruption usually starts at six months of age. At that time, occlusion between the mandibular and maxillary teeth starts to occur. During that stage of development, the cheeks, tongue, and lips are usually responsible for holding the erupting teeth into position⁸. By two years of age, correct alignment and occlusion are usually achieved between the lower and upper primary teeth then by three years of age, complete development of root is usually achieved. After the completion of full teeth development, a space between some of the teeth (also known as a diastema) starts to develop approximately one year later. Diastema is observed in the anterior teeth and it is achieved by four years of age⁹. The primary function of the spacing is to allow adult teeth to erupt into their proper position and avoid crowding of the permanent teeth⁵. By approximately 11 years of age permanent premolars begin to erupt and they start to replace primary molars. Table 1 shows the general and local factors contributing to the etiology of malocclusion⁵.

General Factors	Local Factors
Heredity	Supernumerary teeth
Congenital	Improper dental restoration
Environmental	Anomalies of tooth size
Endocrine imbalance	Anomalies of tooth shape
Metabolic disturbances	Abnormal labial frenum
Infectious disease	Premature loss of deciduous teeth
Dietary problems	Prolonged retention of deciduous teeth
Abnormal sucking	Delayed eruption of permanent teeth
Thumb and finger sucking	Abnormal eruptive path
Tongue thrust and tongue sucking	Ankylosis
Lip and nail-biting	Dental caries

Table 1. General and local factors contributing to the etiology of malocclusion.

Types of malocclusion

There are two main categories under which a broad classification of malocclusion can be obtained. This includes intra-arch malocclusion and inter-arch malocclusion. Intra-arch malocclusion can be defined as variations in tooth location on an individual level¹⁰. These variations can affect other teeth groups resulting in a malocclusion that is contained within an arch.

It is possible that one tooth to set in an abnormal position concerning the neighboring teeth. This phenomenon is termed ‘individual tooth malposition’. Individual teeth malposition could present in an abnormal inclination, abnormal tipping, or abnormal displacements¹¹. When the root is seated in its normal position while the crown is abnormally tilted, the result is teeth inclination. While as if both the crown and the root are seated in an abnormal location with a similar tilt, the resulting condition is called abnormal displacements¹⁰. The aforementioned malocclusion conditions are categorized by an abnormal relationship of teeth of different arches. Such interarch malocclusions can present on the sagittal, vertical, or transverse planes of space.

Clinical presentation

In dentistry, malocclusion is not considered an uncommon finding. Despite being relatively widespread, it does not pose a serious threat to dental health and thus mostly does not require treatment¹⁰. In patients who present with craniofacial anomalies that include a severe form of malocclusion is often the one who be prioritized for treatment. Management for severe malocclusion includes orthodontic management, and/or orthognathic surgery. The therapeutic objective of orthodontic management is the achievement of stable, functional, and aesthetic teeth alignment^{12,13}. This could greatly enhance the patients’ oral and overall health and wellbeing^{14,15}. The symptomatic features of malocclusion could result from one of its consequences shown in table 2.

Consequence	Symptomatic features
Tooth decay (caries)	Mispositioned teeth could translate into poorer oral hygiene as it would be very difficult to maintain good oral hygiene. Children are most commonly affected.
Periodontal disease	mispositioned teeth result in difficulty cleaning teeth which results in poor plaque control.
Anterior teeth trauma	Teeth overjet predisposes to increased risk of trauma.
Masticatory function	Patients with anterior open bites find difficulty in chew food.

Speech impairment	A lisp could result if teeth are misaligned.
Tooth impaction	Could result in close teeth resorption.

Table 2. Symptoms of dental malocclusion.

Management:

Maintain a normal equilibrium between the different structures that make the dental unit (i.e. nerves, blood vessels, and good dental occlusion) is essential for the normal masticatory process¹⁶. Thus, any disruption of the dental positioning could lead to malocclusion and thereafter interruption of mastication.

Corrective management of malocclusion is often preferred during the early years of life as it will entail a repair of appropriate occlusion within normal skeletal growth of the body. The management approach of malocclusion is highly dependent on the type of malocclusion. Milder cases of malocclusion are often treated with orthodontics. In contrast, the severe case might require the introduction of fixed appliances^{17, 18}. Additionally, a more effective approach to the management of malocclusion includes the usage of both appliances and headgear. Although extraction therapy could be used in certain cases, its usage is not preferred as an early line of treatment^{5, 19}.

Conclusion:

In conclusion, dental occlusion is a complex and multifactorial condition that extends beyond the physical contact of the biting surface of teeth. The high prevalence of malocclusion requires proper screening by dentists to identify the disease at an early age as management at that young age is associated with favorable outcomes.

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