

Etiology and treatment of malocclusion: Overview

Rodinah M Sharaf, Hani.S.Jaha

Abstract:

Malocclusion of the teeth is a misalignment problem that can lead to serious oral health complications, since maybe the teeth won't be able to perform vital functions if they're misaligned. The aim of this review is summarize knowledge about etiology and background of this disease and treatments methods. We conducted a search using electronic databases; MEDLINE, EMBASE, and Cochrane Central Register of Controlled Trials (CENTRAL), through October, 2017. Search strategies used following MeSH terms in searching via these databases: "malocclusion", "abnormality of the teeth", "Management", "Treatment", "Pathogenesis", "Etiology". The therapy choice is mainly based on unscientific or instance reports rather than on scientific proof. Well-designed research studies for that reason appear needed to support scientific decision making. On the basis of this review, it is not advisable to perform occlusal or orthodontic therapy, especially if irreversible and costly, to manage or avoid postural imbalances of vertebrae curvatures. Considering that the effects of malocclusion have not been satisfactorily assessed, the benefits of orthodontic treatment should stay in question.

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Introduction:

Malocclusion is defined as an abnormality of the teeth or a malrelationship of the dental arches beyond the variety of exactly what is accepted as regular [1]. Although malocclusion is not life-threatening [2], it can be thought about as a public health trouble because of its high occurrence and prevention and therapy possibilities [3]. Malocclusions feature the 3rd highest prevalence among oral pathologies, 2nd just to dental caries and periodontal illness and consequently rank third amongst world-wide dental public health concerns [4].

Malocclusions are the result of orofacial flexibility to various etiological factors [4], which cause numerous implications such as psychosocial troubles related to impaired dentofacial visual appeals, disruptions of oral function, such as chewing, ingesting and speech and higher sensitivity to trauma and periodontal illness [1]. A number of researches have demonstrated its influence on quality-of-life [5]. Given that the general public corresponds excellent dental appearance with success in many pursuits and societal forces specify the standards for acceptable, regular and appealing physical appearance, a specific with malocclusion may develop a feeling of shame regarding their dental appearance and may really feel shy in social situations or lose occupation opportunities. There are numerous techniques that could be utilized to evaluate, explain and categorize occlusion. Considering that its growth in 1986, the dental aesthetic index (DAI) has proven to be simple and swiftly used [6]. A previous report has shown the high integrity and legitimacy of this index, which also compares positively with various other indices. It is a cross-cultural index that connects clinical and esthetic elements mathematically to create a single score. This index can be utilized for various communities and populations without requiring any type of modification.

Inning Accordance With World Health Organization (WHO), the primary oral illness should go through regular epidemiological surveys. The epidemiological information on orthodontic

treatment requirement is of passion for dental public health programs, medical therapy, screening for treatment priority, source planning and third party funding [4]. Evaluation of distribution of malocclusion in childhood could assist in initiatives to prevent such a disorder and its repercussions and make it possible to reduce the complexity of costly orthodontic treatment. Additionally, this expertise could aid to minimize or eliminate future therapy necessity.

Malocclusion of the teeth is a misalignment problem that can lead to serious oral health complications, since maybe the teeth won't be able to perform vital functions if they're misaligned. The aim of this review is summarize knowledge about etiology and background of this disease and treatments methods.

Methodology:

We conducted a search using electronic databases; MEDLINE, EMBASE, and Cochrane Central Register of Controlled Trials (CENTRAL), through October, 2017. Search strategies used following MeSH terms in searching via these databases: “malocclusion”, “abnormality of the teeth”, “Management”, “Treatment”, “Pathogenesis”, “Etiology”. Then we also searched the bibliographies of included studies for further relevant references to our review. Studies had to be relevant to our criteria which should be review, systematic reviews, or clinical studies. Restriction to only English language published articles with human subject were applied in our search strategies. Studies to be excludes were had incomplete data, or case reports.

Discussion:

· Etiology and factors in the etiology of malocclusion:

There have been numerous categories of etiology. Probably that of N. N. Bery [7] is the most complete and extensive. He separates his classification in three major divisions: (1) general, (2) proximal and (3) local. George R. Moore recommends that two divisions: (1) remote and (2) proximate, [8] are simpler and rather sufficient, with which recommendation I concur. Bery's category and discussion need to be a great comfort to the student who has been troubled by the formerly stated uncertainty. Bery approves practically every problem that contends any time been put forward as a reason for malocclusion, even to the timeless "large teeth of the father and small jaws of the mother," listing and explaining them in detail[13].

1. General causes

Under **general reasons** he provides six divisions:

1. **Dystrophic heredity**, that includes all familial attributes, Hapsburg jaw, etc., additionally including such symptoms as:

(a) **Achondroplasia**, i.e., reducing of the condyles and basilar sections of occipital bone and the in reverse propensity of the nasal section of face.

(b) **Cleidocranial dysostosis**; i.e., the forward displacement of the upper part of the face.

(c) **Craniofacial dysostosis**; i.e., early synostosis of skull bones and reduction of facial bones.

(d) Other severe and uncommon irregularities.

2. **Pathologic heredity**, under which he provides the genetic impacts of syphilis, tuberculosis and ethylic. He suggests that the visibility of supernumerary teeth, Hutchinson's teeth, erosion and cleft palate is because of syphilis, as is that teeth are congenitally missing[9].

3. **Congenital factors**: malformation because of intrauterine disruptions, either early or late, a lot of them originating in the first 6 weeks however carrying over from the embryonic stage to the fetal; unfavorable amniotic pressure or unusual presentations for delivery. Faulty cell metabolic process or actually defective germ cells or those without regular resistance would fall into this division.

4. **Endocrine disruptions**. Under this heading, Bery mentions that organized investigation and experimentation have proved that the endocrine secretions have a very definite impact on the advancement and preservation of the teeth and jaws. He cites countless authorities.³ He makes the factor that teeth and bone depend on standard al tissue for form and position and stability. For that reason, any type of modified metabolic process due to changes in endocrine function, throughout the developing period, will conflict materially with the expand the of the teeth and jaws. To such disturbances, he charges abnormal shapes of the jaws, irregular attacks, different degrees of malocclusion and predisposition to decays; additionally, uneven growth of the teeth, as shown by retarded eruption, total retention, aberrations, tortion, germination hypertrophy, hypotrophy in mass, full absence of solitary teeth or whole groups of them, supernumerary teeth and displacement of tooth germs. He then thinks about the endocrine glands individually.

5. **Malnutrition and malcalcification**. Bery mentions the work and point of views of Keith, Howe, Mellanby and Lennox to reveal that absence of appropriate minerals and vitamins is a source of malocclusion. All of this subject has been covered carefully many times.

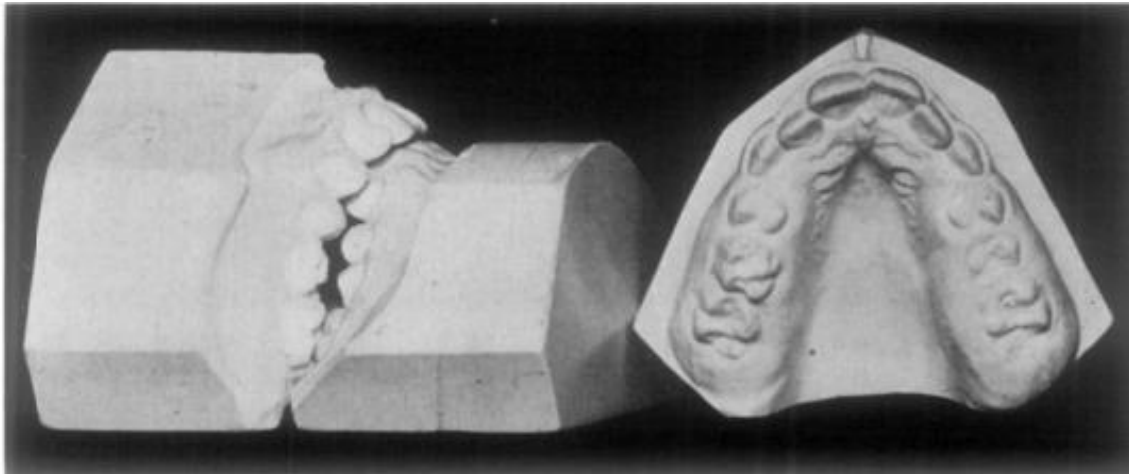


Figure 1. Example of malocclusion as a reason of malcalcification, shows where the excess ridges have been deposited but the trimming process has not taken place [13].

2. Proximal causes

Proximal reasons are reviewed under 7 divisions:

1. Habits, which are divided into sucking, biting and posture habits. A routine is a "constant practice developed by frequent repetition." Routines are regular symptoms of living tissue. Regular routines are connected with typical function. A destructive habit is an expression of a normal symptom failed. Such behaviors as sucking and biting are inherent in a human being and are required to his life and well-being. It is only when their extravagance is too much and uncommon that it is stuffed with disastrous consequences. Postural and pillowing habits should undoubtedly be related to a low quality of bone and other problems, if they become factors in malocclusion [10].

2. Mouth breathing and nasal lesions. These are listed second in Bery's classification and are stated without qualification to be a source of malocclusion. The acquainted device is described and discuss made from the numerous associated conditions. Till the look o f a paper by Howard on "Inherent Growth and Its Influence on Malocclusion," it was probably very little examined that at least several instances of malocclusion were associated with the mouth breathing habit. His

statement that of 159 mouth breathers examined, ninety-four showed regular jaws, standard al arches and typical occlusion was rather stunning to several of us. Full acknowledgment is provided to that the ordinary orthodontist sees, virtually specifically, dental abnormalities. The mouth breathers with regular occlusion do not come to the orthodontist's office. This could give the careful viewer an exaggerated idea of a few of the causes of malocclusion. Such ideas can, naturally, ideal be corrected by the research study of exact analytical product. No matter whether clinical experience remains in agreement with statistical results, the sensible orthodontist will certainly not quit the attempt to establish regular respiration as a part of his routine treatment.

3. Abnormal frenum labii. This is another common only listed cause. In my opinion, actual abnormality is rare.

4. Lack of muscular balance.

5. Temporomandibular articulation; displacements and effects of cicatrice contraction, etc.

6. Bony lesions, including harelip and cleft palate and effects of trauma.

7. Abnormal tongue.

3. Local causes

Under local causes, Bery offers two divisions, dental and maxillary.

1. Dental reasons. (a) Early loss of deciduous teeth. (b) Tardy loss of deciduous teeth. (c) Tardy eruption of irreversible teeth. (d) Early loss of permanent teeth. (e) Oversized teeth in undersized jaw or vice versa. (f) Anomalies in number, either as well couple of or way too many. (g) Caries.

2. Maxillary reasons. (a) Size of apical base. (b) A trophy from lack of use, which might end up being hereditary regarding the whole masticatory apparatus. (c) Maxillary malformation in any

kind of measurement. In the number of varying products consisted of and the broad area covered, this category leaves yet little to be desired. The objection remains that much of the issue included has never ever been actually proved from a scientific perspective as well as that these different factors, even the easiest of them, are so far from certain in their effects that a person can never ever state: such and such is an invariable cause of malocclusion.

· **Physical impact of malocclusion**

Pain is an usual symptom that could impact on lifestyle (QoL) [11]. The aetiology of orofacial pain is multifactorial, and while malocclusion in itself does not trigger orofacial discomfort, it can generate discomfort indirectly by leading to temporomandibular disorder (TMD), and dental, gingival and mucosal injury. Temporomandibular condition is a cumulative term used to describe a group of disorders which affect the muscles of mastication, the temporomandibular joint and occlusion [12]. The occurrence of TMD has been reported to be high, and ranges from 10% to 70% in the basic population [14], with a greater occurrence in older individuals. Various other researches have suggested that TMD is higher in the mixed and very early irreversible dentition than in the long-term and primary dentition [15]. It has been recommended that malocclusion might play a role as a contributing variable for the growth of TMD. Several reviews including primarily cross-sectional research studies as a whole and patient populations have recommended a weak, if any, association in between TMD and malocclusion. However, this does not imply a cause-and-effect relationship. Evidence from the few longitudinal researches which exist recommends that subjects with malocclusion over an extended period of time tend to have a higher frequency of TMD. Certain types of malocclusion, such as open bite, Class II malocclusion with a huge overjet and deep bite, and Class III malocclusion with posterior crossbite and lateral crossbite, could contribute to TMD in the long-term [16]. However, the evidence of the correlation between TMD and different

kinds of malocclusion is normally weak, although an independent crossbite seems a factor in some individuals [17]. One research reported that overjet and overbite had no relationship with TMD [18]. Just as the relationship between malocclusion and TMD is not validated, the relationship between orthodontic therapy and TMD is not confirmed, either. Moreover, there is no convincing proof that orthodontic therapy, by modifying occlusion influences TMD. One more way in which malocclusion can trigger discomfort is by boosting the likelihood of dental trauma. Injury to maxillary incisors is connected with falls, collisions, occlusal characteristics and adverse psychosocial settings, and has a projected prevalence as high as 34% among children. A number of cross-sectional and possible studies have reported that malocclusion is related to dental trauma, especially amongst kids with neglected Class II, department 1 malocclusions. Where maxillary incisors are proclined, especially top central incisors, there is a high danger of trauma. Several research studies have reported that incisor injury is correlated with boosted overjet amongst kids [20,36], and a meta-analysis of the relationship between overjet dimension and dental injury suggested that kids with an overjet greater than 3 mm were practically two times as much in danger of injury to the incisors as youngsters with an overjet of less than 3 mm. Nevertheless, a number of research studies have reported no substantial relationship in between dental trauma and overjet. A randomized regulated research suggested that very early modification of extending upper incisors might have some result on the incidence of trauma, yet the therapy needs to be carried out early, i.e. right after the eruption of the maxillary incisors. Malocclusion may likewise give rise to discomfort by triggering gingival and mucosal trauma. The relationship in between gingival inflammation and malocclusion is debatable. Although numerous cross-sectional researches have found that occlusal injury might be very important in the development of periodontal disease, it is now considered a cofactor that could accelerate the rate of advancement of an existing periodontal condition [18]. Patients with big overjets and deep overbites are more probable to experience

periodontal illness connected with incise contact [19]. In some cases of very deep overbite, straight injury to the gingiva from the incise sides of the mandibular incisors could result in palatal recession approximately the maxillary incisors. Likewise, in extreme Class II, department 2 malocclusions, retroclined maxillary incisors contacting with the gingiva of reduced incisors can result in limited recession of the labial gingiva of the mandibular incisors .A randomized regulated clinical test has shown that orthodontic treatment may decrease the incidence of trauma by modification of a raised overbite and overjet .

- **Accuracy of definition of treatment need**

Though there are premises for suspecting that certain dental characteristics might potentially hurt lasting dental health and psychological wellness, accurate meaning of need is difficult. To start with, malocclusion is not a disease but a variant from "ideal". Also "perfect" arrangements may in an evolutionary feeling be anachronistic since the rapid evolution of nutritional habits with the discovery of fire and intro of error gathering has out-stripped dental evolution. Historical studies show that in the primitive state, the dentition underwent a varying level of attrition which rapidly altered the form and interproximal relationships of the teeth [19]. There is also proof to suggest that the dentition unaltered by attrition is a lot more prone to caries and periodontal illness [20], and this may account partially for problems in identifying the relationships between dental health and numerous present day dental setups including suitable occlusions. Tight, also interproximal, get in touches with are considered preferable for periodontal health yet these are obviously absent for most of teeth within "regular" or orthodontically fixed occlusions , and it appears that unequal limited ridges are much less significance than the presence and extent of plaque . Second of all, because just a minority of malocclusions can be considered seriously handicapping [21], choices to provide and adept orthodontic treatment has to be arrived at by a process of negotiation

.Regardless of a lack of adequate information, it stays the obligation of the profession to provide advice on dental health issues on the basis of current ideas and teaching. With regard to reasoning of appearance, however, greater exchange of point of view is possible. It promises that dental experts, and particularly orthodontists, operate a rather more essential dental-aesthetic scale compared to culture generally [22], though there may be significant variant in between dentists in the degree to which these requirements will be imposed in suggestions of treatment for the individual kid. Exactly what does seem likely is that there will certainly be relatively couple of occasions where the dentist or orthodontist will certainly challenge the validation for therapy where this has already been suggested by a specific kid or parent. Thus, the visual implications of malocclusion though largely untouched must not be taken too lightly, for they provide possibly the most essential customer intention for seeking treatment [23]. As a matter of fact, there is some evidence to recommend that teens may favor straight teeth to healthy ones [24]. It is of some issue, as a result, that self and adult judgements of dental appearance can be inaccurate. On the other hand, there is an evident reduced understanding of certain anterior abnormalities. Ingervall.B and Hedegard [28],as an example, recorded a 67% objective frequency of maxillary incisor irregularity in a sample of 278 18- year-old men, yet self-reported frequency was only 24%. Precision of self-assumption might be also poorer for younger people. When 10-12-yearold children were asked to choose a photo showing teeth like their own foam a series of face illustrations representing different dental arrangements [25],just 13% with former crowding identified correctly, just 11.1% with spacing identified correctly and just 7.5% with maxillary outcropping determined appropriately.

Transversal malocclusion, e.g. independent posterior crossbite, generates unsymmetrical development of the mandible and unbalanced muscle task, whereas early treatment could correct

the skeletal defect, achieving symmetrical growth of jaw bones. For that reason, independent of the different descriptions provided of the high prevalence of crossbite in patients with modification of the spinal column curvature on the frontal plane, an interdisciplinary treatment approach to create proper conditions for regular occlusal advancement, ease facial asymmetry and stabilize head posture, started as early as feasible, has been suggested.

· **Disadvantages of treatment**

Among the reported negative aspects of treatment are the cost to family or State, the opportunity that the kid might find the experience stressful [26], which collaboration will not be sufficient to allow sufficient completion of therapy. Orthodontic therapy may produce not only brief term adverse change in both oral hygiene and gingival wellness [27], yet irreversible losses in gingival attachment and alveolar bone elevation. There has been some speculation that orthodontic treatment might predispose to mandibular dysfunction problems. However, since the nature of the condition has not been researched, incipient dysfunction could just as well be present in pretreatment people. This and the various other points discussed stay to be fully checked out.

Conclusion:

Malocclusion is the common oral disease, with the continuous changes of living quality, a certainly enhancing trend can be observed in people that need for orthodontic treatment

In such situations, the therapy choice is mainly based on unscientific or instance reports rather than on scientific proof. Well-designed research studies for that reason appear needed to support scientific decision making. On the basis of this review, it is not advisable to perform occlusal or orthodontic therapy, especially if irreversible and costly, to manage or avoid postural imbalances

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