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Prevalence of Orthodontic Malocclusion

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DEDICATION

We dedicate this work to our teachers who have guided us even if it was by only one word and especially our supervisor who tried his best and whole-heartedly in teaching and guiding us Dr. Diyar Baker.

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1. Introduction

Malocclusion has been observed to have adverse effects on both physical and psychological well-being, as well as on social interactions. These effects extend to the longevity of dentition and overall oral health, thereby impacting the quality of life. (QoL)[1].
The presence of malocclusion or malalignment 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)[2].
Malocclusion can manifest in a wide range and varies from simple rotation of a tooth, its slight malposition in the arch, or a little diastema between teeth, to more severe forms of crowding, spacing, superior protrusion, retrusion or in combinations of several traits of tooth malposition and abnormal relations. Dental malalignments may be limited to or extended onto one or more teeth, within one arch, both the arches, and/or in improper relations of tooth and teeth of upper and lower arches. The deviations in tooth or teeth positions may be local or a consequence of architectural deviations of the underlying dentoalveolar structures, skeletal bases of the maxilla and mandible, and/or craniofacial structures. The imbalance in harmony of face and occlusion is reflected through soft tissue drape which follows skeletal and dental architecture[1].

Aim of the study

The primary objective of this study is to determine the prevalence of malocclusions among university students. Additionally, the study aims to investigate the factors influencing the decision-making process regarding orthodontic treatment among students.

Chapter One: Review of Literature

1.1 Orthodontics

Orthodontics is the branch of dentistry concerned with facial growth, Development of the dentition and occlusion, and the diagnosis, interception, and treatment of occlusal anomalies[3] .

1.2 Malocclusion

Malocclusion is a developmental condition where there is a deflection from the normal relation or alignment of the teeth to other teeth in the same arch and/or to the teeth in the opposing arch[4]**.**

1.2.1 Classification of etiological factors in malocclusion.

Several classifications of etiological factors contributing to malocclusion have been proposed:

- **White and Gardiner's Classification[5]**

A. Dental base abnormalities

1. Anteroposterior malrelationship.
2. Vertical malrelationship.
3. Lateral malrelationship.
4. Disproportion of size between teeth and basal bone.
5. Congenital abnormalities.

B. Pre eruption abnormalities:

1. Abnormalities in the position of developing tooth germ.
2. Missing teeth.
3. Supernumerary teeth and teeth in abnormal form.
4. Prolonged retention of deciduous tooth.

5. Large labial frenum.
6. Traumatic injury.

C. Post eruption abnormalities:

1- Muscular
   a) Active muscle force—swallowing.
   b) Rest position of musculature.
   c) Sucking habits.
   d) Abnormalities in the path of closure.
2- Premature loss of deciduous teeth.
3- Extraction of permanent teeth.

- **Graber's Classification[6]**

Graber classifies causes of malocclusion as general and local factors.

A. General Factors:

1. Hereditary.
2. Congenital.
3. Environmental.

a. Prenatal (Trauma, maternal diet, German measles, maternal metabolism).
b. Postnatal (Birth injury, cerebral palsy, TMJ injury).

4. Predisposing metabolic climate and disease.

a. Endocrine imbalance.
b. Metabolic disturbances.
c. Infectious diseases.

5. Dietary problems (Nutritional deficiency).
6. Abnormal pressure habits and functional aberrations:

a. Abnormal suckling.
b. Thumb and finger sucking.
c. Tongue thrust and tongue sucking.
d. Lip and nail-biting.
e. Speech defects.
f. Abnormal swallowing habits.
g. Respiratory abnormalities.
h. Tonsils and adenoids.
i. Psychogenic tics and bruxism.

7. Posture.
8. Trauma and accidents.

B- Local Factors:[6]

1. Anomalies of number: a. Supernumerary teeth.
b. Missing teeth.
2. Anomalies of tooth size.
3. Anomalies of tooth shape.
4. Abnormal labial frenum; mucosal barriers.
5. Premature loss.
6. Prolonged retention.
7. Delayed eruption of permanent teeth.
8. Abnormal eruptive path.
9. Ankylosis.
10. Dental caries.

1.2.2 Angle's classification and canine classification of malocclusions

Angle's classification was based on the premise that the first permanent molars erupted into a constant position within the facial skeleton, which could be used to assess the anteroposterior relationship of the arches[7].

Angle described three groups:

- Class I or neutrocclusion — the mesiobuccal cusp of the upper first Molar occludes with the mesiobuccal groove of the lower first molar[7].

Figure 1.1: Angle Class I occlusion **(Thilander et al,2018)** .

- Class II or distocclusion — the mesiobuccal cusp of the lower first molar occludes distal to the Class I position. This is also known as a postnormal relationship[7].

Figure 1.2: Angle Class II malocclusion **(Thilander et al, 2018)**.

- Class III or mesiocclusion — the mesiobuccal cusp of the lower first molar occludes mesial to the Class I position. This is also known as a prenormal relationship

Figure 1.3: Angle Class III malocclusion (Thilander et al,2018) .

Canine classifications:

The canine relationship also provides a useful anteroposterior occlusal classification[8].

- Class I—the maxillary permanent canine should occlude directly in the embrasure between mandibular canine and first premolar.
- Class II—the maxillary permanent canine occludes in front of the embrasure between mandibular canine and first premolar.
- Class III—the maxillary permanent canine occludes behind the embrasure between the mandibular canine and first premolar.

1.3 Types of malocclusions

1.3.1 Crowding of teeth

Crowding is one of the most frequent malocclusions. A disparity of tooth size and the volume of the alveolar ridge will result in crowding with either lingually or buccally displaced teeth or rotations of teeth.

Minor crowding of teeth is considered a normal condition; Particularly, minor crowding in the mandibular incisor region is found in almost all individuals[11].

Figure 1.3: crowding of maxillary and mandibular incisors **(Türkaslan and Ulusoy, 2009)**.

1.3.2 Spacing of teeth

Although spacing is considered normal and of positive prognostic value in deciduous dentition, permanent dentition space between the teeth is abnormal. The spacing between the teeth can be seen either at the localized area of the arch or the entire arch. Spacing between the two maxillary central incisors is termed as a median diastema. This gap is usual of normal growth pattern during the primary and mixed dentition period and is closed by the time of the Permanent maxillary canine eruption[13]**.**

Figure 1.4: Spacing between the maxillary central incisors, i.e. a median diastema (Thilander et al, 2018) .

1.3.3 Cross bite

A crossbite is a discrepancy in the buccolingual relationship of the upper and lower teeth[9].

Types of cross bite:

1. Anterior cross bite

An anterior crossbite is present when one or more of the upper incisors is in reverse overjet relative to the lower arch.

Figure 1.5: anterior cross bite) Andrade**,2014)**

2. Posterior crossbite[10]

Crossbite of the premolar and molar region involving one or two teeth or an entire buccal segment can be subdivided as follows:

- Unilateral buccal crossbite with no displacement.
- Unilateral buccal crossbite with displacement.
- Bilateral buccal crossbite.
- Unilateral lingual crossbite.
- Bilateral lingual crossbite (scissors bite).

Figure 1.6: mandibular buccal cross bite **(Cobourne and DiBiase, 2016)**.

1.3.4 Open bite

In an open bite, there is no intermaxillary tooth contact, either in the front or laterally from the dental arch. To qualify as an open bite, the overbite is reversed (<0 mm), and the teeth are assumed to be fully erupted[11].

Types of open bite

1. Anterior open bite (AOB): there is no vertical overlap of the incisors when the buccal segment teeth are in occlusion[10] .

Figure 1.7: Anterior open bite **(Singh,2009)**.

2. Posterior open bite (POB): defined as failure of contact between the posterior teeth when the teeth occlude in centric occlusion[12] .

Figure 1.8: Posterior open bite **(Wajid et al, 2018)**.

1.3.5 Supernumerary teeth

The presence of more teeth than normal is termed hyperdontia or supernumerary teeth. The most common supernumerary teeth are mesiodens which appear in the midline of the maxilla[13].

Figure 1.9: Erupted mesiodens causing poor aesthetics **(Kharbanda, 2020)**.

1.3.6 Missing teeth

Congenitally missing teeth are by far more common than supernumerary teeth and can occur in either of the jaws. The following are some of the commonly missing teeth in decreasing order of frequency, third molars, maxillary lateral incisors, mandibular second premolars, mandibular incisors, and maxillary second premolars[5] **.**

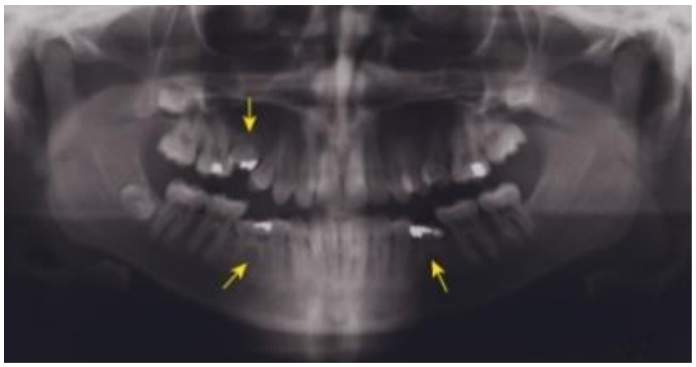

Figure 1.10: Panoramic of a patient congenitally missing an upper right second premolar and both lower second premolars. Primary second molars are retained and ankylosed (arrows) **(Staley and Reske, 2011)**.

1.3.7 Impacted teeth

An impacted tooth is a tooth that, for some reason, has been blocked from breaking through the gum. The third molar is the most commonly impacted tooth followed by the maxillary canine then the mandibular canine[9].

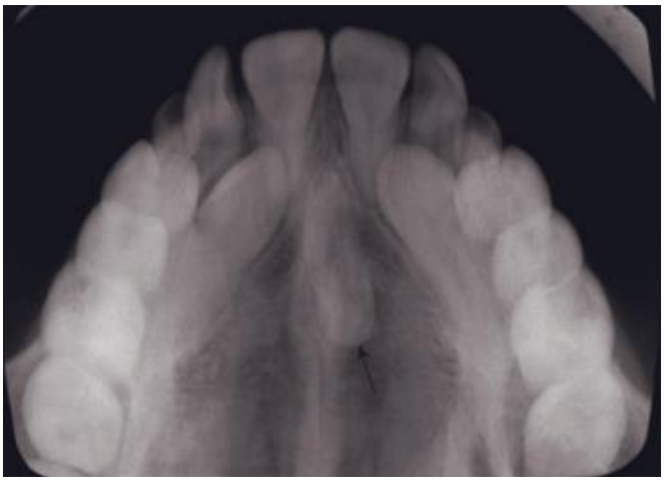

Figure 1.11: Occlusal View of two impacted canines and a resorbing supernumerary tooth located in the midline of the palate (arrow) (Staley and Reske,2011).

1.3.8 Midline discrepancy (Midline shift)

Midline discrepancies are the common problems encountered that pose both diagnostic and treatment difficulties. Midline discrepancy may be either skeletal or dental. Sometimes functional shifts of the mandible may contribute to the midline discrepancy.

Figure 1.12: Malalignment with crowding midline shift **(Singh, 2009)**.

1.3.9 Dental anomalies

- **Talon cusp:** it is a developmental anomaly consisting of a vertical ridge or cusp projecting labially or lingually from an anterior permanent or primary tooth)[14].

Figure 1.13: talon cusp in relation to permanent maxillary right lateral Incisor.

- **Peg lateral incisors;** are defined as underdeveloped, tapered incisors, and are the commonest form of microdontia**)[14]**.

Figure 1.14: Left lateral view showing peg lateral incisor.

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