ABSTRACT

Introduction: The Angle method for the classification of malocclusion has been the gold standard in orthodontics for over 100 years, but many orthodontists find it difficult to apply this system for the cases which lie in between the Class I and II grey area.

Materials and methods: Five hundred pretreatment study casts were included and assessed with the proposed classification. In the modified classification ideal cusp-fossa occlusion is designated as zero (0). Any deviation from the ideal, i.e. 0 is graded in millimetres. A plus sign (+) designates Class II direction and a minus sign (−) designates Class III direction. The right side is evaluated first, followed by the left side.

Results: Of the 500 pretreatment study casts assessed 52.4% were definitive Class I, 23.6% were Class II, 2.6% were Class III and the ambiguous cases were 21%. These could be easily classified with our method of classification.

Conclusion: This improvised classification technique will help orthodontists in making classification of malocclusion accurate and simple.

Keywords: Malocclusion, Angle’s molar classification, Study cast, Ambiguous molar relation, Borderline cases.


INTRODUCTION

The classification of occlusion has been of interest to dentistry over a century. Arguably, Angle's classification is the most widely used and accepted occlusal classification system.¹

In 1998, Morton Katz discussed Angle’s classification of malocclusion and its importance and later proposed its modification. He said that classification is an essential communication tool between dental school Professor and student, between practitioners and between practitioner and insurance company or government bureaucracy. He pointed out that everyone should speak the same language and also that there was no difficulty classifying the extremes of a full Class II and a full Class III but, the grey area of Class I is subject to much confusion and inconsistency.

Secondly, classification has a significant effect on patient treatment. Once a patient is classified, the practitioner will tend to apply treatment mechanics appropriate to that classification. Even though model analysis, especially buccal interdigitation, is but a small part of the complete orthodontic diagnosis, the decision to use Class II or III mechanics invariably is strongly influenced by the perceived Angle classification of the patient.

Thirdly, if one of the goals in the treatment of a patient is to achieve Class I, there must be a mutual agreement among orthodontists as to what constitutes ideal occlusion, and Class I must be redefined to agree with the prototype standard. If every orthodontist has a different idea of what ideal buccal interdigitation means, then the specialty of orthodontics has no standardized method by which one can evaluate successful or unsuccessful treatment.²

A century ago Edward Angle published his ‘Classification of Malocclusion’ in 1899.³ As described by Angle, in Class I molar relation, the mesiobuccal cusp of upper first permanent molar occludes with mesiobuccal groove of the lower first permanent molar. The distobuccal cusp of upper first permanent molar occludes with the mesiobuccal groove of the lower first permanent molar in the Class II and, in a Class III molar relation, the lower first
permanent molar lies mesial to upper first permanent molar by a premolar width or a cuspal width.\(^3\)

The original classification had Class II as a full premolar-width distoclusion and Class III as a full premolar-width mesioclusion. Assuming an average premolar width of 7.5 mm, then Class I ranged from 7 mm mesioclusion to 7 mm distoclusion, for a total range of Class I of 14 mm. This range was far too wide, and so in 1907, Angle revised his definition, making Class II more than half a cusp distoclusion and Class III more than half a cusp mesioclusion.\(^2\) That modification reduced the range from 14 mm to a 7 mm range. However, 7 mm is still too wide a range to act as a treatment goal if an orthodontist has to treat with precision.\(^4\)

Criticism of Angle’s classification has come from several sources. First, there are those who have challenged Angle by developing their own classification systems, most notable of them being Dewey.\(^2,5-8\)

Graber and Swain\(^9\) pointed out that Angle’s classification failed to distinguish between malocclusions with analogs anteroposterior relationships, which require different treatment plans. Rinchuse and Rinchuse\(^10\) found Angle’s classification limited because it is a system of discrete classes. They further mentioned that Angle was not clear about the description and definition of his classes and his writings were equivocal, leading to the possibility of one class overlapping into another. Last the validity of the classification has been challenged because it only addresses the sagittal dental dimension and does not address the vertical and transverse dental dimensions; it also lacks a consideration of the face.\(^1\)

Angle never intended his classification to depict Class I as a treatment goal or ‘ideal,’ but as a range of abnormality between the extremes of full Class II and III.\(^2\) However, there is no continuum in the classification and nothing can fall in between. A researcher would have to define each category, i.e Class I, II, III.\(^3\)

Hence, the aim of the present study is to simplify and quantify the range of ambiguous molar relationship and to propose the modification in Angle’s classification to this effect.

**MATERIALS AND METHODS**

Pretreatment casts of all the patients who have been treated and are presently undergoing treatment in the Outpatient Department of Orthodontics were included in the study.

The inclusion criteria included casts with permanent dentition and casts in which all the permanent maxillary and mandibular teeth are present. The exclusion criteria included casts with mixed dentition, missing permanent molars, cleft palate, grossly destructed teeth, presence of prosthetic reconstruction and posterior crossbite.

The proposed modification designates ideal cusp-fossa occlusion (as described by Angle) as zero (0). Any deviation is from the ideal, i.e. 0 is graded in millimeters by using a vernier caliper. A plus sign (+) designates Class II direction and a minus sign (−) designates Class III direction. The right side is evaluated first, followed by the left side. Ideal occlusion on both right and left side is designated as ‘Class I (0, 0).’

For example, if a patient presents with ideal Class I on the right side, but a 2 mm Class II tendency on the left side, then the modified classification would read (0, +2). However, if another patient presents half a cusp Class II (cusp-to-cusp occlusion) on the right side and a full cusp Class II on the left side, then the modified classification would read (+4, +8). A third patient who is 1.5 mm Class II on the right and 3.5 mm Class III on the left side would be classified (+1.5, −3.5).

Using the above method of classification, each pretreatment patient cast was assessed and recorded. The study was also subjected to interobserver and intraobserver assessment.

The proposed study was presented before the Institutional Review Board Committee and ethical clearance was taken.

**Table 1: Total distribution of malocclusion**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Distribution of malocclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>263</td>
</tr>
<tr>
<td>Class II</td>
<td>119</td>
</tr>
<tr>
<td>Class III</td>
<td>13</td>
</tr>
<tr>
<td>Ambiguous</td>
<td>105</td>
</tr>
<tr>
<td>Total</td>
<td>500</td>
</tr>
</tbody>
</table>

Fig. 1: Total distribution of malocclusion
RESULTS

Table 1 and Figure 1 show in a sample size of 500 (182 males and 318 females) study casts there were 263 Class I, 119 Class II and 13 Class III which were definitive and 105 ambiguous cases which did not fall into any of the definitive category of Class I, II and III.

Figure 2 shows the distribution of males and females in Class I (M-96; F-168), Class II (M-41; F-77), Class III (M-6; F-7) and ambiguous (M-39; F-66).

Table 2 and Figure 3 show the 105 ambiguous classes in which 92 had a tendency toward a Class I and II, 2 toward Class III and 4 toward Class IV which is a Class II on one side and a Class III on another side.

Figures 4 to 7 refer to definitive Class I, II, III and an ambiguous Class IV.

Table 2: Ambiguous classes

<table>
<thead>
<tr>
<th>Tendency</th>
<th>No. of subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I and II</td>
<td>92</td>
</tr>
<tr>
<td>Class III</td>
<td>2</td>
</tr>
<tr>
<td>Class IV</td>
<td>4</td>
</tr>
</tbody>
</table>

Fig. 2: Distribution of males and females

Fig. 3: Ambiguous classes

Fig. 4: Class I (0, 0)

Fig. 5: Class II (7, 7)
Angle’s Molar Classification Revised

Fig. 6: Class III (−9, −4)

Fig. 7: Class IV (5, −3)

Fig. 8: Ambiguous Class I and II (3, 6)

Fig. 9: Ambiguous Class I and II (2, 1)
Figures 8 to 10 show the ambiguous casts having tendency for Class I and II.

The statistical error according to kappa statistics coefficient, kappa = 0.99, showed an almost perfect agreement in both the interobserver and intraobserver.

DISCUSSION

A convenient sample size of 500 study casts was included in the study as it was intended to be an observational research. This study can be taken as reference for similar research work.

Of the 500 study casts included, 52.4% were definitive Class I, 23.6% were Class II, 2.6% were Class III and the ambiguous cases which did not fall into any definitive category were 21%. One hundred and eighty-two males and 318 females pretreatment study casts were included in the study. Ninety-six males and 168 females had Class I, 41 males and 77 females had Class II, 6 males and 7 females had Class III and 39 males and 66 females had ambiguous molar classification. In the 105 ambiguous classes, 92 had a tendency toward Class I and II being the largest group, two had Class III tendency and 4 had Class IV tendency which is Class II on one side and Class III on another side. Class IV is a rare occurrence but yet it exists and there are no set norms for its classification. Hence, we proposed a modification of Angle’s system that is similar to what Mortan Katz had proposed but instead of using premolar derived classification we prefer using a molar derived classification as used by Angle. He emphasized using the maxillary first molars as reference teeth for determining the classification because they are the largest teeth and firmest in their attachment. They also have a key location in the arches. The first molar help to determine the dental and skeletal vertical proportions due to length of their crowns occupy normal position in the arches for more often than any other teeth because they are the first permanent teeth and less restrained in taking their position, it has the most consistent timing of eruption of all permanent teeth.

As seen in the results 21% of malocclusions fall into the indiscriminate category which requires a need to develop a new method of classification. Our proposed method of classification fulfills this need.

The modified classification designates ideal cusp-fossa occlusion (as described by Angle) as zero (0). Any deviation is from the ideal, i.e. 0 is graded in millimeters. A plus sign (+) designates Class II direction and a minus sign (−) designates Class III direction. The right side is evaluated first, followed by the left side.

Hence, the molar relation is quantified overcoming one of the drawbacks of Angle’s classification.

The advantages of our proposed classification are as follows:

- It classifies the ambiguous malocclusions which fall into a grey area and cannot be designated as a full cusp Class I, II or III.
- Establishes a treatment goal that is specific rather than a range.
- It quantifies the malocclusion accurately in millimeters and separately for each side.
- Allows the clinician to classify a Class III tendency on one side and Class II tendency on one side.

CONCLUSION

We hope that this improvised classification technique will help everyone in the profession of orthodontics in making classification of malocclusion accurate and simple and also help in teaching, research and treatment.

REFERENCES