INTRODUCTION

Class III malocclusion is a significant problem that can be disturbing both socially and functionally. Many factors have been implicated in its etiology and a strong genetic background has been established in literature.\(^1,2\) The prevalence of class III malocclusion varies according to ethnicity; it is high among Asians of the far east (12%) and low in Caucasians (1-4%).\(^3-7\) Class III malocclusion is a complex entity and analysis of the various components show that it can result from numerous contributions i.e. maxillary deficiency, mandibular excess or both.\(^8\) Analysis of these various components can provide valuable insight into prevalence of class III malocclusion among various ethnic groups and can also help in better understanding of its etiology. Often in patients with such skeletal discrepancy, dentoalveolar compensation is seen in which the alveolar processes and teeth try to achieve balance with changing jaw position or size thus resulting in normal incisor position despite changes in sagittal jaw relationship.\(^9,10\) A better understanding of features and dental effects of class III malocclusion is thus necessary to establish as an additional base for effective treatment planning. The aim of this study was to assess individual characteristics of skeletal class III malocclusion and its associated dentoalveolar compensatory mechanisms in a sample of orthodontic patients visiting Khyber College of Dentistry, Peshawar.

MATERIALS AND METHODS

Pre-treatment lateral cephalometric radiographs of 45 patients were obtained from the Department of Orthodontics, Khyber College of Dentistry, Peshawar. The chronological ages of patients ranged from 12 to 32 years. The criteria for inclusion was an ANB angle of less than 0°. Cases of cleft palate and other cranio-facial syndromes were excluded from the study.

Each cephalogram was traced by one investigator and rechecked for accuracy. The films were traced
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on x-ray viewer with proper illumination. Four angular measurements i.e. Sella Nasion to point A (SNA), Sella Nasion to point B (SNB), Lower incisor to mandibular plane (IMPA) and Upper incisor to palatal plane (UI-PP) angles were taken in this study. The Steiner’s standard value for SNA 81º (S.D ± 2º) and SNB 78º (S.D ± 2º) was used to assess the skeletal position of maxilla and mandible. Tweed’s standard value for IMPA and Reidel’s standard value for upper incisor to palatal plane angle were used for the analysis of dentoalveolar compensation.

RESULTS

Out of the total of 45 patients 24(53%) were females and 21(47%) were males. Patients with maxillary retrusion with, an SNA of less than 81º, were 31% while patients with mandibular prognathism, value of SNB more than 78º, comprised 60% of the sample. It was found that 9% of patients were combination cases with both the maxilla and the mandible at fault (Figure 1). As regards to dentoalveolar compensation, it was found that 93% of the patients had UI to Palatal plane angle of more than 107º. Among this group, 60% presented with mandibular prognathism, 30% suffered from maxillary retrusion while 10% had combination of maxillary and mandibular discrepancies. Similarly lower incisors were compensated in 40% of the patients with a value of IMPA less than 90º. This was seen in 61% of the patients with mandibular prognathism and 39% with maxillary retrusion (Table 1).

DISCUSSION

As a result of the recent advancements in cephalometry it is now an established fact that there can be a variety of features at fault for class III malocclusion. In this study 31% of patients had maxillary retrusion. Similar finding has been reported in the international literature. Also 60% patients had mandibular prognathism while only 9% were combination cases. This is in contradiction with the study of Ellis and McNamara where they found combination cases to be the most common problem among class III adults. The higher prevalence of mandibular protrusion in the present study correlates with studies of Koodaryan et al. and Jacobson et al but differs from the study of Dietrich. No studies on features of class III malocclusion are available from Pakistan, however it has been postulated that some Asian ethnic groups show a tendency towards class III malocclusion and a strong genetic background especially for mandibular prognathism has often been reported in literature.

Dentoalveolar compensation was another component that was analyzed in this study. It is a known fact that incisal adaptation takes place with regard to growth changes in sagittal jaw relationships. According to the results, 93% cases showed compensation in the upper arch while in 40% of the cases, lower incisors compensated by lingual tipping. This is a significant finding since it shows that maxillary incisors compensated themselves secondary to mandibular protrusion even when maxilla was normally positioned. Also both upper and lower incisors compensated themselves to a greater degree in response to mandibular prognathism. This shows that skeletal position of mandible plays an important role in incisor inclination. These results are comparable to the studies of Ishikawara et al. Ceylan et al, Spalj et al, Staudt et al and Soliman et al. This high degree of compensation shows that in growing dentition, role of other functional influences especially of circum oral musculature with regards to nature’s attempt to correct the underlying skeletal discrepancy cannot be disregarded.

CONCLUSION

The most common feature of class III malocclusion was found to be a prognathic mandible with normally positioned maxilla. Also maxillary incisors compensated to the underlying skeletal problem to a far greater extent than mandibular incisors.

RECOMMENDATIONS

The study is the first of its kind in Khyber Pakhtunkhwa region of Pakistan. A more in depth

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Dentoalveolar compensation</th>
<th>Total Percentage</th>
<th>Mandibular Prognathism</th>
<th>Maxillary Retrusion</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Upper incisors</td>
<td>93%</td>
<td>60%</td>
<td>30%</td>
<td>10%</td>
</tr>
<tr>
<td>2.</td>
<td>Lower incisors</td>
<td>40%</td>
<td>61%</td>
<td>39%</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 1: Associated Dentoalveolar Compensation In Skeletal Class IIIi.
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research with a larger population size and specially keeping in view the genetic components of class III malocclusion is required for better identification and treatment planning of these patients.

REFERENCES