The Prevalence of Skeletal Malocclusion in the Southern Aseer Region of Saudi Arabia

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Abstract  Objective: to study the prevalence of skeletal malocclusion (SMO) cases in the orthodontic and maxillofacial surgery unit of King Khalid university health center / Aseer central Hospital (KKUHC) in the southern Aseer region of Saudi Arabia (SSA) where no previous epidemiological data took place. Materials and methods: A retrospective chart review of all the cases visiting the orthodontic / maxillofacial surgery unit at KKUHC from September 2010 to August 2012 was reviewed. All the pertinent data were extracted and tabulated for investigation while incomplete records were eliminated. Results: A total of 364 completed charts were included in the study and all the pertinent data were extracted and tabulated. It was found that 42% of the cases had skeletal malocclusion (SMO) while 58% had dental maocclusion only. Class 3 SMO represented the majority of the cases scoring 49% of the records. The female to male ratio was 1:3.2, which is significantly lower than other recorded studies. Conclusion: SMO deformity was found to be a common presentation in the SSA health care center where class 3 comprised the majority unlike other areas in the country.

Keywords: prevalence, orthognathic, skeletal malocclusion, Saudi


1. Introduction

Malocclusion is an issue that can be disturbing to the patients. It can be either due to skeletal or dental relation discrepancy. The prevalence of skeletal malocclusion (SMO) varies among different population and ethnic backgrounds; nevertheless, the same cephalometric analysis norms are used for treatment planning, which might be deceiving [1]. Therefore, careful treatment planning is needed when managing facial deformities of patients from different regions around the world. The Southern Aseer region of Saudi Arabia (SSA) is a uniquely developing region where epidemiological studies have not been conducted in regard to maxillofacial deformities. As a result, most of such cases get transferred to larger cities for treatment. The aim of this study is to conduct an epidemiological pilot study pertinent to SMO and orthognathic facial deformities in the region in order to understand the actual presentation of this entity. Hence, to our knowledge, this is considered to be the first study that shed the light into this issue in the region.

2. Material and Methods

The completed records of patients followed at the Orthodontics / Maxillofacial division at KKUHC from September 2010 to August 2012 were collected and reviewed. A total of 364 medical charts were included of patients’ age from 14-36 years old. Clinical pictures and cephalometric superimposition measurements were analyzed and the data were extracted and tabulated to verify the prevalence SMO among all the patients visiting the KKUHC.

3. Results

Out of the 364 files, dental-origin malocclusion was found in 210 cases (58%) while skeletal-origin malocclusion (SMO) was found in 154 cases (42%). Out of the 154 SMO cases, it was found that 76 (49%) of them had class 3, of which, 26 presented with steep mandibular angle and 54 had normal mandible angle. Class 2 and class 1 comprised 39% (60 patients) and 12% (19 patients) of the cases respectively. (Figure 1 and Figure 2).

![Figure 1. The prevalence of Dental crowd and SMO cases in KKUHC](image-url)
The gender distribution showed that male patients comprised 77% (n = 118) where 58% of them had class 3 SMO (n = 68), while female patients comprised 22% (n = 36), 50% of which were found to have class 2 (n = 18) while 38.8% had class 3 (n = 14). Furthermore, it was found that the SMO cases are mainly planned for referral to larger cities in the country for treatment.

4. Discussion

The Southen Aseer region of Saudi Arabia is a region of significant development in education and health care. However, management of some subspecialized medical conditions such as maxillofacial deformities are still emerging. The aim of this study is to investigate the prevalence of SMO among patients visiting the orthodontics / oral maxillofacial surgery unit in KKUHC and to study if that incidence differs from other population in the Kingdom of Saudi Arabia and other countries. Our study showed that 42% of the patients visiting the KKUHC have SMO (orthognathic deformity), of which, most found to be males with class 3 skeletal malocclusion that differ from other studies in Saudi.

In the middle region of Saudi, Riyadh city, Alidress et al analyzed the records of 602 pretreatment orthodontics cases of patients with a mean age of 16 attending the orthodontics clinics at King Saud University [1]. It was found that the majority (51.7%) had class 1 SMO, while 40.2% were classified as having class 2 SMO. This is in accordance with other epidemiological studies took place in Riyadh [2,3]. Jones WB reported that class 1 SMO to be the dominant feature among cases seen at the Riyadh armed forces hospital in Saudi Arabia counting for 46.4% [2]. (Table 1).

<table>
<thead>
<tr>
<th>Study, Country</th>
<th>Class III %</th>
<th>Class II %</th>
<th>Class I %</th>
<th>Study period</th>
<th>Age (years)</th>
<th>F:M ratio</th>
<th>Number of subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>SALEH, Lebanon 1999</td>
<td>5%</td>
<td>19%</td>
<td>76%</td>
<td>-</td>
<td>(9-15)</td>
<td>1:1.15</td>
<td>851</td>
</tr>
<tr>
<td>ONG MA, Malaysia 2004</td>
<td>91.2%</td>
<td>5.90%</td>
<td>2.90%</td>
<td>10 years</td>
<td>(17-35)</td>
<td>1:0.8</td>
<td>34</td>
</tr>
<tr>
<td>AL-JASSER, Saudi 2005</td>
<td>8.14% (ANB)</td>
<td>35.5% (Wit's)</td>
<td>40.76%</td>
<td>-</td>
<td>(20-30)</td>
<td>1:1</td>
<td>60</td>
</tr>
<tr>
<td>CHEW MT, Singapore 2006</td>
<td>68%</td>
<td>24.50%</td>
<td>7.50%</td>
<td>3 years</td>
<td>(16-58)</td>
<td>1:0.77</td>
<td>212</td>
</tr>
<tr>
<td>OSHAGH ET AL, Iran 2010</td>
<td>12%</td>
<td>70%</td>
<td>18%</td>
<td>-</td>
<td>(6-14)</td>
<td>1:0.7</td>
<td>700</td>
</tr>
<tr>
<td>BOECK, Brazil 2011</td>
<td>47.30%</td>
<td>96.10%</td>
<td>6.40%</td>
<td>6 years</td>
<td>(23-59)</td>
<td>1:0.6</td>
<td>171</td>
</tr>
<tr>
<td>ALEDRESS, Saudi 2012</td>
<td>6.8% ANB</td>
<td>35.6% Wits</td>
<td>40.2% ANB</td>
<td>37.2% Wits</td>
<td>-</td>
<td>(11-48)</td>
<td>602</td>
</tr>
<tr>
<td>ALMASRI, Saudi 2014</td>
<td>49%</td>
<td>39%</td>
<td>12%</td>
<td>2 years</td>
<td>(14-36)</td>
<td>1:3:2</td>
<td>154</td>
</tr>
</tbody>
</table>

In a neighboring country, Lebanon, Saleh FK reported that class 1 was the most prevalent skeletal discrepancy in a Lebanese sample of school children comprising 76% [4]. It was found that 19% out of 851 schoolchildren who were included in this study were classified as class 2 SMO while only 5% as class 3. Oshagh M et al., presented the results in Iran (Shiraz university health center), where class 2 SMO was found to be more prevalent representing 70% of the cases [5].

In the far eastern part of Asia, several studies concerning the prevalence of SMO had been conducted. It was found that class 3 was the most prevalent type [6,7,8]. Interestingly, the results are almost the same in South America, Brazil, where class 3 SMO considered being more dominant [9,10].

The female to male ratio in our study was 1:3.2, which contradicts most of the other studies [6,7,9]. This result might not represent the actual score due to the conservative cultural background that dictates more of a homebound female lifestyle. Hence, it is expected that the ratio will change if a larger scale epidemiology study took place in the region. The former suggests that SMO has a different presentation in variable areas around the world, which dictates the need of special consideration in managing such abnormalities as the perception of “normal facial proportion” can differ accordingly [11].

5. Conclusion

This epidemiology pilot study is the first of which investigating the skeletal malocclusion in the Southern Aseer region of Saudi. It showed a higher incidence of class three SMO than other regions in Saudi which had class one and two to be more dominant. Such variabilities suggest careful considerations while planning for
maxillofacial surgeries as well as in using Caucasian lateral cephalometric norms for Saudis.

**Conflict of Interest**

The author declares that no conflict of interest existed.

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**References**


