LIP ASYMMETRY IN ORTHODONTIC PATIENTS DURING SMILING

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ABSTRACT

An asymmetry in the smile can be due to an asymmetric smile curtain or a transverse cant of the maxillary occlusal plane. Although the commissures move up and laterally in smiling, studies have shown a difference in the amount and direction of movement between the right and left sides. The aim of this study was to determine the frequency of upper lip asymmetry in orthodontics patients while smiling. A total of 174 Pakistani national patients, aged 18-50 years, irrespective of their skeletal class or gender were assessed. An upper lip cant was considered to be present when a clinically evident difference existed between the amount of tooth structure and gingiva seen on the right and left sides during smiling. Of 174 total patients included, 74 were male and 100 were female. Mean age was 20 ± 2.7 for this sample. 6.75% of the males while 7.0% of the females had an asymmetric upper lip. There was no statistically significant difference between males and females. Results showed that there is a need for greater attention to be given to the asymmetrical smile during treatment planning.

Key Words: Orthodontics, lip asymmetry, smile, treatment planning.

INTRODUCTION

Smile is one of the most important expressions contributing to facial attractiveness. An attractive or pleasing smile enhances the acceptance of an individual in the society by improving their interpersonal relationships. With patients becoming increasingly conscious of a beautiful smile, smile esthetics has become the primary objective of orthodontic treatment. Modern orthodontics deals not only with the traditional dental and skeletal aspects, but also the soft tissue characteristics as a priority. The most important esthetic goal in orthodontics is to achieve a balanced smile, which can be best described as an appropriate positioning of teeth and gingival scaffold within the dynamic display zone. Smile analysis is part of a facial analysis and allows dentists to recognize positive and negative elements in each patient’s smile.

Improving facial esthetics has gained more popularity with the advent of the soft tissue paradigm and is a main goal in the treatment of orthodontic patients. The mouth is an important feature in facial attractiveness, and a facial smiling profile assessment is an integral part of a complete orthodontic diagnosis.

An asymmetry in the smile can be due to an asymmetric smile curtain or a transverse cant of the maxillary occlusal plane. Transverse canting can be due to different amounts of tooth eruption on the right and left sides or skeletal asymmetry of the mandible, resulting in compensatory canting of the maxilla. In an asymmetric smile curtain, there is a difference in the relative positioning of the corners of the mouth in the vertical plane. It can be assessed by the parallelism of the commissural and pupillary lines. Although the commissures move up and laterally in smiling, studies have shown a difference in the amount and direction of movement between the right and left sides. A large differential elevation of the upper lip in an asymmetrical smile may be due to a deficiency of muscular tonus on one side of the face.

Myofunctional exercises have been recommended to help overcome this deficiency and restore smile symmetry. Other treatment options for smile asymmetry are; unilateral intrusion with mini-implants, differential Lefort I impaction and differential sagittal split osteotomy. It is estimated that 8.7% of normal adults have asymmetric smiles. It is poorly documented in static photographic images and is documented best in digital video clips.
The objective of this study was to determine the frequency of upper lip asymmetry in orthodontic patients while smiling.

**METHODOLOGY**

This cross-sectional descriptive study was conducted in the Department of Orthodontics, Khyber College of Dentistry, Peshawar from June 2015 to September 2015. Approval of the hospital ethical committee was taken. The purpose, procedures, risk and benefits of the study were explained to the patients. An informed consent and their willingness to participate in the study was ensured. They were assured of maintaining confidentiality of their personal and other data collected from their records. A sample size of 174 was calculated using WHO calculator. Confidence interval was 95%; margin of error 5%; type I error 0.05 and prevalence of 8.7 ± 6% for lip canting.

The sampling was done according to following criteria:

**Inclusion criteria**
1. Any Skeletal class
2. Both genders
3. Pakistani nationals assessed on basis of NIC
4. 18-50 years of age
5. Cooperative patients

**Exclusion criteria**
1. Previous orthodontic treatment
2. Temporomandibular disorder
3. Muscular disease
4. Missing teeth
5. Trauma or any disease that could affect craniofacial growth and development.

Evaluation was done for clinically evident upper lip canting. Each subject was healthy, without any clinically evident facial asymmetry in repose. They were first asked to bite on a tongue depressor to evaluate parallelism of the occlusal plane with the interpupillary line and those with an occlusal plane cant were eliminated. The remaining subjects were evaluated for upper lip canting. An upper lip cant was considered to be present when a clinically evident difference existed between the amount of tooth structure and gingiva seen on the right and left sides during smiling.

Ten patients with lip canting were examined by two examiners and inter-observer reliability were determined. The agreement was assessed by weighted kappa statistics. Kappa was (0.89 ± 0.05) for lip canting.

The collected data was analyzed using SPSS version 17.0. Percentages and frequencies were calculated for categorical variables like lip cant, gender etc. Mean and standard deviation was calculated for numerical variables like age. Chi-square test was applied for gender wise comparison at a significance level of P < 0.05.

**RESULTS**

Of 174 total patients included 74 were male and 100 were female. The male to female ratio was 1:0.74. Mean age was 20 ± 2.7 for this sample. The common age group was 21-25 years (33.3%). The detail of age distribution is given in Table 1. 6.7% of the males and 7.0% of the females had an asymmetric upper lip. There was no statistically significance between males and females. P-value was above the critical level. The details are given in Table 2.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-20</td>
<td>44</td>
<td>25.28</td>
</tr>
<tr>
<td>21-25</td>
<td>58</td>
<td>33.33</td>
</tr>
<tr>
<td>26-30</td>
<td>33</td>
<td>18.06</td>
</tr>
<tr>
<td>31-35</td>
<td>24</td>
<td>13.09</td>
</tr>
<tr>
<td>36-40</td>
<td>10</td>
<td>5.74</td>
</tr>
<tr>
<td>41-45</td>
<td>5</td>
<td>4.50</td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**TABLE 1: AGE DISTRIBUTION OF PATIENTS**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Lip asymmetry</th>
<th>Total</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Male</td>
<td>5</td>
<td>6.75</td>
<td>74</td>
</tr>
<tr>
<td>Female</td>
<td>7</td>
<td>7.0</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>6.89</td>
<td>174</td>
</tr>
</tbody>
</table>

*Significance level < 0.05

**DISCUSSION**

The lips form the frame of a smile, defining the esthetic zone. They are muscular structures so they should be assessed both at rest and in function. In function, the lips can produce two types of smiles. A posed smile is voluntary and is fairly reproducible. It may not be linked with emotion. A spontaneous smile is an involuntary smile, often linked with emotion and involving larger facial movements, including squinting of the eyes, aring of the nostrils, and maximum elevation of the lips.

The gingival tissues form the soft-tissue framework around every tooth and is an important component of a smile. Healthy gingival tissues have a free gingiva...
that extends from the free gingival margin coronally to the gingival groove apically. It is keratinized and has coral pink dull surface. One to three millimeters of gingival show is considered youthful, especially in females. In a symmetric smile, the gingival show on both sides should be the same amount.\textsuperscript{13}

Several studies have highlighted the fact that facial asymmetry is a common human characteristic.\textsuperscript{14,15} However, subtle asymmetries are most often not noticed by the causal observer and may not even be noticed by the subject. Moreover, even when an asymmetry is obvious, it may be accepted by the person and may even be overlooked by those who frequently interact with them, either because facial asymmetry is such a common occurrence or because they have grown accustomed to the person’s appearance.

The mean age in this sample was 20 ± 2.7 years. A possible reason for this may be that most patients in our community present for fixed orthodontic treatment in the late teens. Another reason for this is that the study age above was above 18 years, taken to ensure adequate growth completion of lips and other soft tissues.

Females are more in number than males in our sample. A possible reason may be a greater concern of females about their appearance. Tang et al\textsuperscript{16} identified four main factors based on how adult female patients ranked statements. Factor 1, patients who focus on their self-perception of their appearance; factor 2, patients who are concerned about the esthetics and function of their teeth; factor 3, patients who are easily influenced by others; factor 4, patients who want to improve their self-perception of their appearance. The remaining patients who had other views did not match any of the above four groups. He found that most females chose factor 1 over the others.

In our current study 6.75% of males have and 7.0% of females had an asymmetric upper lip. There was no statistically significance between males and females. Benson\textsuperscript{17} carried out a study in which two hundred and ten students between the ages of 21 and 44 years were examined. Subjects determined to have an occlusal plane cant were eliminated from the study. Repeated smiles were then evaluated in the remaining subjects to check for upper lip asymmetry. They reported that fifteen subjects were observed to have occlusal plane cants and were eliminated from the study. Of the remaining 195 subjects, 17 (8.7%) were found to have an asymmetrical smile secondary to canting of the upper lip. The results of their study therefore, corroborate the results of our study.

REFERENCES

CONTRIBUTIONS BY AUTHORS
1. Muhammad Adil Khan: Paper writing
2. Ghulam Rasool: Supervisor
3. Umar Hussain: Statistical analysis
4. Faizan Ul Hassan: Data collection