ASSOCIATION OF OCCLUSAL INTERFERENCES WITH OVER-ERUPTED POSTERIOR TEETH

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INTRODUCTION:

With increasing oral health care awareness partial dentulism is increasing day by day with greater numbers of unopposed teeth in the oral cavity. Over-eruption is a common consequence of unopposed posterior teeth. It may create occlusal interferences inhibiting the remaining occluding surfaces from achieving stable and harmonious contacts.¹ Interferences can cause damage to occlusion and neuromuscular system.

Over-eruption places the tooth in such a position that the force factors drastically change in initial contact and excursive movements.² Lateral excursive interferences may sometimes lead to cusp fracture.³ Posterior interferences are more harmful than anterior interferences.⁴ Greater force is generated when posterior teeth contact⁵ and interfere with smooth movement of the condyle in the glenoid fossa. The mandible modifies the habitual movement patterns⁶ and transfer the load to the musculature and temporomandibular joints.⁶,⁷

Occlusal interferences also create adverse lateral forces on restorative materials. The likelihood of unfavorable forces in a restorative situation is highly relevant when planning occlusal restorations.

Over-eruption and its effects are critical in treatment planning for partially dentulous patients. This study will be an attempt to provide a guide to the presence of occlusal interferences in over-erupted teeth and its association with it. This study may help in comprehending the impact of over eruption consequences, thereby assisting in management of such patients.

METHODOLOGY

Detail methodology relating to assessment of over-eruption of teeth has been already given in a previous published article in PODJ⁸.
RESULTS

Seventy two unopposed teeth in 52 subjects were measured for over-eruption. The age range of the subjects was between 18- 55 years with 23 males and 29 females. Majority comprised of first molars (n=39, 54%).

Table 1: Distribution of teeth according to number of occlusal interferences

<table>
<thead>
<tr>
<th>No of OI</th>
<th>Teeth with over-eruption</th>
<th>Teeth without over-eruption</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Value</td>
<td>Percentage</td>
<td>Value</td>
<td>Percentage</td>
</tr>
<tr>
<td>0</td>
<td>33</td>
<td>55.00</td>
<td>10</td>
<td>83.33</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>25.00</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>11.67</td>
<td>2</td>
<td>16.67</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>8.33</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100</td>
<td>12</td>
<td>100</td>
</tr>
</tbody>
</table>

Key:
- n = number
- OI = occlusal interferences

Table 2: Distribution of teeth according to type of occlusal interferences

<table>
<thead>
<tr>
<th>Type of OI</th>
<th>Teeth with over-eruption</th>
<th>Teeth without over-eruption</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCP</td>
<td>12</td>
<td>1</td>
<td>13</td>
<td>27.08</td>
</tr>
<tr>
<td>Protrusive</td>
<td>16</td>
<td>2</td>
<td>18</td>
<td>37.5</td>
</tr>
<tr>
<td>Working</td>
<td>8</td>
<td>1</td>
<td>9</td>
<td>18.75</td>
</tr>
<tr>
<td>Non working</td>
<td>7</td>
<td>1</td>
<td>8</td>
<td>16.67</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>5</td>
<td>48</td>
<td>100</td>
</tr>
</tbody>
</table>

Key:
- OI = occlusal interferences
- RCP = retruded contact position

Figure 1: Distribution of subjects according to presence of over-eruption and occlusal interferences

The range of extraction period of the antagonists was between 8 -180 months. Out of seventy two unopposed teeth, sixty (83.3%) were overerupted. Twenty seven over-erupted (45%) teeth had one or more occlusal interference while only two (16.7%) teeth without over-eruption

Table 3: Comparison of presence of over-eruption with the presence of occlusal interferences

<table>
<thead>
<tr>
<th>Teeth with over-eruption</th>
<th>Teeth without over-eruption</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>27</td>
<td>72</td>
<td>100</td>
</tr>
</tbody>
</table>

Key:
- n = number

Distribution of teeth according to the number and type of occlusal interferences is shown in Table 1 and Table 2 respectively.

Chi Square test was applied to determine the association of occlusal interferences with the presence and extent of over-eruption. Both were statistically not significant (Table 1 & 2).

DISCUSSION

Edentulism is gradually decreasing and more cases can be seen of partial dentulism with complex residual teeth positions. In Pakistan, the economic status is far from satisfactory and 22.3% of the population lies below poverty line. Therefore, a large component of the population does not seek dental treatment due to financial constraints. This leads to greater consequences of posterior tooth loss and one of them is over eruption which may create occlusal interferences.

This study had some limitations. This study was a cross sectional study. This means that in the current study, occlusal interferences as being the effect of over-eruption could not be established. The rate of over-eruption and its susceptibility in different age groups could not be
ascertained. In this respect, a longitudinal study would be able to determine the changes occurring chronologically following posterior tooth loss. It would also help to develop a direct casual relationship between the two factors. Convenience sampling was utilized thereby missing few patients with loss of posterior teeth. Occlusal interferences were assessed on the articulator which is an error prone procedure. The methodology was standardized by employing evidence based procedures to mount casts on the articulators. Semi-adjustable articulators have their own limitations like rigid environment and record of only end points of movements. These factors may have affected the quality of the results. Thickness of the articulating paper also plays a role in accuracy of marking occlusal contacts. Thicker materials lead to large sized markings and may create friction or resistance to closure. 8 microns thick articulating paper was utilized to negate the effects of thicker mediums.

On the whole, 46.15% of the subjects had one occlusal interference in one of their unopposed teeth. Comparing with Agerberg et al study who found 75 to 89% in the mouth as a whole, this limited space of analysis showed clinical significance. Distribution of occlusal interferences in unopposed posterior teeth was further low and accounted for 40.27%. Whereas in over-erupted teeth 45.0% had one or more occlusal interferences representing a major portion with this undesirable outcome.

The presence of occlusal interferences in unopposed teeth has been investigated by Craddock et al in 2004. The results of the present study are not consistent with the study of Craddock et al. On the whole 20.64 % sites presented with at least one interference. They reported higher number of interferences in RCP contrary to our study as we reported greater protrusive interferences. This may be attributed to difference in inclusion criteria of the sample. It is very difficult to obtain reliable data on over-eruption of antagonist teeth in the event of missing information about the participant ages at which their antagonist tooth was lost as well the lack of information regarding the duration for which the antagonist tooth remained unopposed. It is indeed very obvious that the pattern of over-eruption of an unopposed tooth in a young adolescent is very different from a person who is adult, old or the very old. This statement is supported by the findings of a Swedish study showing that molars that lost their antagonists when the persons were above the age of 26 showed less severe overeruption than those for whom the age at the loss of the antagonist tooth was unknown. This Swedish study reported no over-eruption in 18% and greater than or equal to 2 mm in 24% of molars that had been unopposed for more than 10 years. While Craddock et al generally agreeing to the comments made on their work by Carlsson & Killiard, the Swedish authors, in light of their research experience in the field recommended that a prosthodontic decision – making for unopposed teeth need to be made on an individual level rather than basing it on the continued emphasis of the general textbook warning for adverse consequences of not replacing lost posterior teeth.

The correlation between the presence of over eruption and the presence of occlusal interferences was not found to be statistically significant. This may be attributed to several factors, e.g. a small number of teeth without over eruption, patients who were fully adult, matured and sclerosed bone etc. This study also correlated the presence of occlusal interferences with the extent of over eruption. The presence of occlusal interferences did not increase with increasing degrees of over eruption. The correlation was not statistically significant. Craddock et al showed a weak statistical association between them whereas Craddock in 2008 showed that the presence of RCP contacts displayed a correlation with the extent of over-eruption of the unopposed tooth. The differences in result may again be attributed to difference in the methodologies for assessing the occlusal interferences. In this regard, the method used by Craddock et al might have estimated over-eruption of antagonist more precisely.

Statistical significance does not imply clinical significance and vice versa. Over all the results entail clinical significance. It is a vital aspect to be considered during restoration of both the unopposed teeth and the missing teeth. This high interfering contact renders a higher force with oblique forces leading to tooth mobility or direct occlusal trauma. Ratcliff et al showed a statistical association between lateral excursive interferences with cusp fracture endorsing its clinical significance. In this study, the frequency of occlusal interferences being quite high considering the over erupted teeth can't be ignored though statistical association has not been shown. Multiple occlusal interferences may complicate and increase the complexity of restoring these teeth. Unopposed teeth having RCP contact when prepared, may lead to condylar repositioning. This may compromise the occlusal harmony of the final restoration.

**CONCLUSION**

Within the limitations of this study, the conclusions are:

1. There is a high frequency of occlusal interferences with
the presence of over-erupted teeth.
2. There is no statistical association between presence of occlusal interferences and the presence and increasing severity of over eruption in unopposed posterior teeth.

REFERENCES