CEPHALOMETRIC FEATURES FOR MAXILLARY INCISORS
SAGITAL POSITION / INCLINATION IN CLASS II DIV 1

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ABSTRACT

One of the chief concerns of patients reporting for orthodontic treatment is unacceptable Maxillary Incisor position in sagittal plane on underlying Skeletal Class II1,2. The purpose of the this study was to find cephalometric features for Maxillary Incisor Sagital Position / Inclination in Class II div 1 cases on Skeletal Class II basis and to establish correlation among various parameters used to assess the Maxillary Incisor Sagital Position / Inclination. Study was conducted on 50 patients and following conclusions were drawn: 1) Statistically significant increased Maxillary Incisor sagital inclination and position as assessed by <UI-SN, <UI-PP, UI-NA (deg) and UI-NA (dist.) and as confirmed by statistically significant co-relation between above mentioned parameters and parameters used to assess skeletal class II (ANB, Wits) and 2) Statistically significant co-relation exists among various parameters used to assess Maxillary Incisor inclination & position i.e.<UI-SN, <UI-PP, UI-NA (deg) and UI-NA (dist.)

Key words: Maxillary Incisors Sagital Position / Inclination, <UI-SN, <UI-PP, UI-NA (deg) and UI-NA

INTRODUCTION

One of the chief concerns of patients reporting for orthodontic treatment is unacceptable/abnormal Maxillary Incisor position in sagittal plane on underlying Skeletal Class II. Planned Maxillary Incisor Position (PIP) is thus one of the requirements to achieve ideal orthodontic results. Most of the patient whose chief concern is unacceptable Maxillary Incisor Position / Inclination have Class II div 1 incisor relationship. Different cephalometric and non-cephalometric methods have been used to assess the maxillary Incisor Sagital Position / inclination in literature however among cephalometric methods few widely used are i.e. Upper Incisor to SN Plane angle (UI-SN Plane angle), Upper Incisor to Palatal Plane angle (UI-PP angle), Upper Incisor to NA line (UI-NA deg) and Upper Incisor to NA line distance (UI-NA).11,12

The purpose of the present study was to find cephalometric features for Maxillary Incisor Sagital Position /Inclination in Class II div 1 cases on Skeletal Class II basis using above mentioned angular and linear measurement and to establish correlation among various parameters used to assess the Maxillary Incisor Sagital Position / Inclination.

METHODOLOGY

The study was conducted on patients who reported at Faculty of Dentistry, The University of Lahore with the chief concern that their upper incisors are not at proper position. From this study group subjects with convex profile and Overjet> 4mm having age range of 14-25 years were selected while subjects having supernumerary or congenitally missing teeth, already undergoing with orthodontic treatment and Syndromes, were excluded. Sample was collected using the non-probability convenience sampling technique.

Photographs, Study Casts & Lateral Cephalogram were taken for each subject. Lateral Cephalogram was then traced and sagital pattern of the patient was
established from ANB angle (ANB>4°)\textsuperscript{13,14} and or wits value (1.5 mm).\textsuperscript{15} 50 patients (25 males & 25 females) fulfilling the selection criteria were included in the study. Maxillary Incisor Sagital Position / Inclination for the selected sample was assessed by Upper Incisor to SN Plane angle (UI-SN Plane angle; norm 102°±5), Upper Incisor to Palatal Plane angle (UI-PP angle; norm 108°±5), and Upper Incisor to NA line (UI-NA (deg); norm 4°±1.5) and Upper Incisor to NA line (UI-NA (dis); norm 25 mm)

**STATISTICAL METHOD**

SPSS 16.0 was used for statistical evaluation.

1. Mean, Standard Deviation, Variance, Minimum & Maximum value and Range were calculated for each variable for each subject.

2. Correlation coefficients (r) between the various methods used to assess Maxillary Incisor Sagital Position / Inclination was calculated using Pearson’s correlation.

**RESULTS**

The study was conducted on 50 subjects (25 females and 25 males) with mean age 17.92±4.20. Descriptive Statistics were calculated for each variable for each subject as shown in Table 1. All parameters used to assess Maxillary Incisor Sagital Position / Inclination are increased in Class II div1 cases on Skeletal Class II basis i.e. <UI-SN (102°±5) is 110.22±8.64, <UI-PP (108°±5) is 118.66±6.99, UI-NA deg (4°±1.5) is 5.86±3.55 and UI-NA dis. (25 mm) is 27.95±8.74

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**Fig 1: Class II Malocclusion Treatment**
Cephalometric Features for Maxillary Incisors Sagital position

A statistically significant relationship was found between the Parameters used to assess Skeletal Class II i.e. ANB angle & WITS Value and parameters used to assess the Maxillary Incisor Sagital Position /Inclination as shown in the Table 2.

It is also worth mentioning that statistically significant relationship exists between the Parameters used to assess the Maxillary Incisor Sagital Position /Inclination as shown in the Table 3.

**DISCUSSION**

Prevalence of Class II Malocclusions is just second to Class I Crowding. Treatment protocols and clinical resources frequently employed in the management of Class II malocclusion\(^{16,17}\) are as shown in flowchart 1.

Patients reporting for orthodontic treatment with underlying Skeletal Class II Malocclusion usually have a chief concern of prominent Maxillary Incisors. Proper assessment of Maxillary Incisor Inclination / Position in sagittal plane\(^{18}\) is pivotal along with other assessments for treatment selection, which can be assessed by various methods including lateral cephalometric analysis. Various cephalometric methods have been used to assess this. Aim of this study was thus to assess the Maxillary Incisor Sagital Position /Inclination and to determine its cephalometric features in Class II div 1 Incisor relationship on Skeletal Class II basis. This would definitely help in correcting the incisor relationship more effectively.

In this study all parameters used to assess Maxillary Incisor Sagital Position /Inclination were increased i.e. <UI-SN (102\(^\circ\)+5) is 110.22\(^\circ\)+8.64, <UI-PP (108\(^\circ\)+5) is 118.66\(^\circ\)+6.99, UI-NA deg (4\(^\circ\)+1.5) is 5.86\(^\circ\)+3.55 and UI-NA dis. (25 mm) is 27.95\(^\circ\)+8.74 as shown in Table I.

Thus in Class II div1 cases on Skeletal Class II basis there is significant component of increased maxillary incisors inclination and they are also positioned forward suggesting that treatment in such patients would need change in incisor inclination and there position as far as maxillary incisors are concerned. This also is confirmed by Statistically significant relationship found in this study between the Parameters used to assess Skeletal Class II i.e. ANB angle and WITS Value and parameters used to assess the Maxillary Incisor Sagital Position /Inclination as shown in the Table 2.

**TABLE 1: DESCRIPTIVE STATISTICS**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>12.00</td>
<td>30.00</td>
<td>17.92</td>
<td>4.20</td>
</tr>
<tr>
<td>ANB</td>
<td>5.00</td>
<td>12.00</td>
<td>6.30</td>
<td>1.92</td>
</tr>
<tr>
<td>WITS</td>
<td>2</td>
<td>11.00</td>
<td>3.46</td>
<td>1.90</td>
</tr>
<tr>
<td>UI-SN</td>
<td>90.00</td>
<td>131.00</td>
<td>110.22</td>
<td>8.64</td>
</tr>
<tr>
<td>UI-PP</td>
<td>97.00</td>
<td>135.00</td>
<td>118.66</td>
<td>6.99</td>
</tr>
<tr>
<td>UI-NA (deg)</td>
<td>8.00</td>
<td>20.00</td>
<td>5.86</td>
<td>3.55</td>
</tr>
<tr>
<td>UI-NA (dis)</td>
<td>8.00</td>
<td>53.00</td>
<td>27.95</td>
<td>8.74</td>
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</tbody>
</table>

**TABLE 2: COMPARISON BETWEEN SKELETAL CLASS II (ASSESSED BY ANB & WITS) AND PARAMETERS USED TO ASSESS MAXILLARY INCISOR SAGITAL POSITION / INCLINATION**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>t-value</th>
<th>df</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANB – UISN</td>
<td>-85.402</td>
<td>49</td>
<td>.000</td>
</tr>
<tr>
<td>ANB – UIPP</td>
<td>-112.694</td>
<td>49</td>
<td>.000</td>
</tr>
<tr>
<td>ANB &amp; UI-NA (deg)</td>
<td>.806</td>
<td>49</td>
<td>.004</td>
</tr>
<tr>
<td>ANB &amp; UI-NA (dis)</td>
<td>-17.368</td>
<td>49</td>
<td>.000</td>
</tr>
<tr>
<td>WITS – UISN</td>
<td>-88.071</td>
<td>49</td>
<td>.000</td>
</tr>
<tr>
<td>WITS &amp; UI-NA (deg)</td>
<td>-4.285</td>
<td>49</td>
<td>.000</td>
</tr>
<tr>
<td>WITS &amp; UI-NA (dis)</td>
<td>-115.864</td>
<td>49</td>
<td>.000</td>
</tr>
<tr>
<td>WITS – UIPP</td>
<td>-20.127</td>
<td>49</td>
<td>.000</td>
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</table>

**Paired Samples Test**

**TABLE 3: PEARSON CORRELATIONS**

<table>
<thead>
<tr>
<th>UI-PP</th>
<th>UI-NA (deg)</th>
<th>UI-NA (dis)</th>
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<tr>
<td>UISN</td>
<td>.874**</td>
<td>.669**</td>
</tr>
<tr>
<td>UI-PP</td>
<td>.609**</td>
<td>.789**</td>
</tr>
<tr>
<td>UI-NA (deg)</td>
<td>.778**</td>
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**Correlation is significant at the 0.01 level (2-tailed).**

Statistically significant relationship was found between the Parameters used to assess Skeletal Class II i.e. ANB angle, WITS Value and parameters used to assess the Maxillary Incisor Sagital Position /Inclination as shown in the Table 2.

It is also worth mentioning that statistically significant co-relation exists between different parameters used to assess the Maxillary Incisor Sagital Position /Inclination i.e. <UI-SN and <UI-PP (r= .874), <UI-SN and UI-NA deg (r=.669), <UI-SN and UI-NA dis.(r=.774), <UI-PP and <UI-NA deg.(r=.609), <UI-PP and UI-NA dis. (r= .789) & between UI-NA deg and UI-NA dis. (r=.778) as shown in the Table 3.
CONCLUSION

Following conclusions can be drawn from this study:

Statistically significant increased Maxillary Incisor sagittal inclination and position as assessed by $<\text{UI-SN}$, $<\text{UI-PP}$, UI-NA (deg) and UI-NA (dist.) in Class II div 1 on Skeletal Class II basis and as confirmed by statistically significant co-relation between parameters used to assess skeletal class II (ANB, Wits) and above mentioned parameters used to assess Maxillary Incisor position.

Statistically significant co-relation exists among various parameters used to assess Maxillary Incisor position i.e. $<\text{UI-SN}$, $<\text{UI-PP}$, UI-NA (deg) and UI-NA (dist.)

REFERENCES