

# Preference of Orthodontic Treatment versus Orthognathic Surgery in class III Malocclusion Cases: A Questionnaire Survey

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## ABSTRACT:

**Aim:** The purpose of our research was to evaluate the preference of treatment strategy amongst the orthodontists about class III malocclusion correction.

**Methodology:** A questionnaire survey for over a period of 1 year amongst 12 orthodontists working for over 2 years. They were asked about their preference of treatment strategies for carrying out correction of class III malocclusion cases. Their experience of relapses, patient satisfaction as well as difficulty in handling such cases was also recorded. Descriptive statistical analysis was carried out for assessing the data recorded with the help of SPSS 25.0.

**Results:** Orthodontists were of divided opinion regarding the treatment strategy for class III malocclusion. However, most of them were of the view that orthodontic treatment had more relapses as compared to orthognathic surgery combined with orthodontic therapy, which was statistically significant as well (p=0.035).

**Conclusion:** Most of the survey participants were of opinion that combined treatment with surgery first approach; will improve the facial profile of the patients drastically.

**Keywords** Angle class III, Orthognathic surgery, Orthodontics.

## INTRODUCTION

According to the British Standard Institute (BSI), the category III incisor relationship is defined jointly during which the lower incisor edge lies anterior to the cingulum plateau of the upper incisors, with reduced or reversed overjet.<sup>1</sup> In terms of angle classification, a category III malocclusion is one during which the lower molar is mesially positioned relative to the upper molar, with no specifications with relevance the road of occlusion.<sup>2</sup> The prevalence of angle class III malocclusion varies greatly among and within populations (from 1% to quite 10%). the best incidence is found among Asian people.<sup>3</sup> Chinese and Malaysian populations show relatively higher prevalence of angle class III malocclusion (15.69% and 16.59%, respectively), while Indian populations show a comparatively lower prevalence as compared to other races.<sup>4</sup> Class III patients usually have a concave facial profile; this can be thanks to the presence of either maxillary retrusion, mandibular protrusion or a mixture of both problems. Ellis and McNamara found that a mixture of maxillary retrusion and mandibular protrusion is that the commonest skeletal relationship (30%) found in school III patients, followed by maxillary retrusion and mandibular protrusion (19.5% and 19.1%), respectively.<sup>5</sup> Staudt & Killaridis (2009) found that 47.4% of sophistication III patients had a purely mandibular contribution (either in position or size), while 19.3% had a purely maxillary contribution (either detruded position or size discrepancy), and only 8.7% of the cases had involvement from both arches.<sup>6</sup> Baccetti, Reyes and McNamara noted gender differences amongst class III patients. They found that class III malocclusion was related to a big degree of sexual dimorphism in craniofacial parameters, especially from the age of thirteen onwards. Female subjects with class III malocclusion showed significant smaller linear dimensions in terms of the maxilla, mandible, and anterior facial heights as compared with male subjects pubertal periods.<sup>7</sup> Proff et al. found that mandibular length relative to anterior cranial base is increased in patients with class III skeletal growth patterns, while maxillary length isn't consistently affected in those patients.<sup>8</sup> Correction of skeletal Class III malocclusions is that the most frequent reason to hunt an orthognathic surgery consultation.<sup>9,10</sup> With increasing demand for improved facial esthetics and advances in surgical techniques, clinicians must remember of adjusting trends within the management of severe Class III malocclusion patients. Single-jaw surgeries are less invasive and more predictable than two-jaw surgeries.<sup>11,12</sup> However, for patients with severe Class III malocclusion one-jaw surgery alone is also insufficient to realize a harmonious profile or an optimal occlusion. For skeletal Class III treatment, the mix of two-jaw surgery with a further genioplasty has become a standard surgical operation.<sup>10,13-16</sup> Generally, orthognathic surgery is usually recommended to non-growing patients with larger dentoskeletal discrepancies, while dentoalveolar compensation or camouflage is suggested for milder discrepancies; however, the choice on which treatment should be chosen isn't always a straightforward task specially in borderline cases. Borderline cases see patients with mild to moderate skeletal problems which can be corrected by either orthodontic or surgical methods. Also, this important fact mustn't be overlooked that this decision primarily belongs to the patients. Cassidy defined "borderline cases" as those patients who were similar with relation to the characteristics on which the orthodontic/surgical decision looked as if it would be based. In practice, the treatment decision relies on the clinical examination and also the cephalometric

analysis by assessing the number of sagittal and vertical discrepancy, dentoalveolar compensations, and facial esthetics.<sup>17</sup> In 1983, Holdaway defined this angle as being formed by the soft tissue H line and the soft tissue facial plane (Na-Pog). Ideally, its value is 10° when facial convexity is normal. This angle quantifies the protrusion of the upper lip relative to soft tissue profile and is independent of the skeletal discrepancy of the bases (ANB angle). Consequently, it is perfect for characterizing the profile of borderline surgical skeletal class III, in whom esthetics and facial appearance might be of greater importance than occlusion or skeletal discrepancy. A study by Eslami et al. implies that a new borderline class III malocclusion patient with a Holdaway angle greater than 10.3° would be treated successfully by camouflage alone, while a new patient with a Holdaway angle of less than 10.3° should be treated by combined surgery. This study also showed that Wits appraisal greater than – 5.8 mm would be effectively corrected by camouflage and less than – 5.8 mm must be treated by surgery.

### **AIM OF THE STUDY**

The purpose of our research was to gauge the preference of treatment strategy amongst the orthodontists about class III malocclusion correction. The preference was undertaken between two prominent options which are- orthodontic correction and orthognathic surgery.

### **METHODOLOGY**

We conducted a survey for over a period of 1 year amongst 12 orthodontists who were practicing for over 5 years. From the above sample, 4 were female and rest were male orthodontists. They were given a questionnaire having an open-ended format, asking them about their preference of treatment strategies for carrying out correction of class III malocclusion cases. Their experience of relapses, patient satisfaction as well as difficulty in handling such cases was also recorded. Descriptive statistical analysis like frequency percentages, mean value was carried out with the help of SPSS 25.0. chi test was utilized to initiate a comparison between various variables.

### **RESULTS**

We observed that dental professionals were of divided opinion regarding the treatment strategy for class III malocclusion. However, most of them were of the view that orthodontic treatment had more relapses as compared to orthognathic surgery combined with orthodontic therapy, which was statistically significant as well ( $p=0.035$ ). As far as treatment duration was considered, orthognathic surgery could achieve a close to ideal class I occlusion in patients at a lesser time duration ( $p=0.0178$ ), also added advantages observed with surgical correction was reduced number of patient appointments as well as better patient compliance. (Table 2) however, supporters of orthodontic treatment, were of opinion that there less chance of post-operative complications, as well as cost of treatment was significantly less. Mostly Wit's appraisal technique was used in case of planning of orthognathic surgery as compared to camouflage treatment with the help of orthodontic treatment. ( $P=0.041$ )

**Table 1- Questionnaire utilized in the study**

Q. No.	Questions in the present research (orthognathic surgery v/s orthodontic treatment)
1	What is your preferred treatment strategy- orthognathic surgery or camouflage treatment with the help of orthodontic movements?
2	Which treatment strategy has the most relapse in your cases of class III malocclusion?
3	Which treatment strategy is most acceptable for the patients?
4	Which treatment you prefer for growing patients having class III malocclusion?
5	Which treatment can be done in a shorter duration to achieve an ideal class I occlusion in patient?
6	Which treatment strategy carry reduced number of appointments?
7	Compliance of patients affects which treatment strategy?
8	Where do you utilize Wit's appraisal technique in orthodontic treatment or orthognathic surgery?

**Table 2- Data recorded in the present study**

S. No.	Variables (mean $\pm$ SD)		Chi test (p value)
	Orthognathic surgery	Orthodontic treatment	
1	2.36 $\pm$ 1.44	2.32 $\pm$ 1.6	1.76
2	1.33 $\pm$ 0.55	1.4 $\pm$ 0.22	0.035
3	2.99 $\pm$ 2.03	2.77 $\pm$ 1.34	1.92
4	1.95 $\pm$ 1.3	1.88 $\pm$ 1.99	1.43
5	1.3 $\pm$ 0.21	1.42 $\pm$ 0.3	0.0178
6	1.033 $\pm$ 1.01	1.4 $\pm$ 0.32	0.011
7	1.73 $\pm$ 1.22	1.82 $\pm$ 1.66	0.024
8	1.62 $\pm$ 0.55	1.32 $\pm$ 1.9	0.041

## DISCUSSION

There are three main treatment options for skeletal class III malocclusion: growth modification, dentoalveolar compensation (orthodontic camouflage), and orthognathic surgery. Growth modification should be commenced before the pubertal growth spurt, after this spurt, only the latter two options are possible. In such cases, however, how should clinicians determine whether or not patients are suitable for surgery. Treatment choices depends upon a lot of factors like cephalometric analysis, age as well as malocclusion status of patients.<sup>18</sup> After pubertal growth spurt, ideally the growth modification procedure should be carried out<sup>19-23</sup>, after which only orthodontic camouflage or orthognathic surgery are possible. The severity of sophistication III malocclusion in adult cases would define whether the patient is suitable for surgery or treatment.<sup>24</sup> Kerr et al.<sup>25</sup> suggested that surgery should be performed in patients with ANB and incisor mandibular plane angles of but – 4° and 83°, respectively. Eisenhauer et al. also conducted a study to separate class III patients who are

going to be properly treated orthodontically from those who require orthognathic surgery.<sup>26</sup> They suggested a predictive model including Wits appraisal, SN, maxillary/ mandibular ratio, and lower gonial angle variables for correct classification of sophistication III malocclusion in adult cases. However, problem would arise when distinguishing between borderline surgical-orthodontic class III malocclusion cases. Rabie et al. evaluated borderline class III patients who had undergone camouflage treatment or orthognathic surgery and suggested that Holdaway angle are often a reliable guide in determining the treatment modality of these patients.<sup>27</sup> They further suggested that patients with a Holdaway angle greater than 12° is successfully treated by orthodontics alone while patients with Holdaway angles but 12° would require operation. during a very similar study conducted in 2011 by Benyahia et al. found a threshold or borderline value of seven.2°, thus suggesting that patients with Holdaway angles above this value could also be successfully treated by orthodontics without the necessity for orthognathic surgery.<sup>28</sup> Kerr et al. tried to determine cephalometric yardsticks to objectify the selection for treatment.<sup>25</sup> The important factors that differentiated the surgery and orthodontic patients in their study were the dimensions of the antero-posterior discrepancy, the inclination of the mandibular incisors, and also the looks of the soft tissue profile. In case of infants, future success of orthodontic treatment was presented by Ghiz et al. as an linear equation with four determining factors which could correctly classify 95.5% of the successfully treated infants but only 70% of the unsuccessfully treated infants.<sup>29</sup> During the same study, Eisenhauer showed that the Wits appraisal is that the foremost decisive parameter for choosing either surgery or orthodontic treatment for class III malocclusion adult patients.<sup>26</sup> Recently, Martinez also supported the view that Wits appraisal, lower incisor inclination, as well as inter-incisal angle were important factors of consideration in using orthodontic treatment or orthognathic surgery.<sup>30</sup>

## CONCLUSION

According to our study, orthodontists were of divided opinion of using either orthognathic surgery or just the orthodontic treatment. However, most of them were of opinion that combined treatment will improve the facial profile of the patients drastically.

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