Research Article

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Comparison of Orthodontic Treatment and Orthognathic Surgery in Skeletal Class III Malocclusions

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ABSTRACT

Background: The aim of the study was to distinguish between surgical and nonsurgical subjects presenting with skeletal Class III malocclusions.

Materials & Methods: 40 patients of class III malocclusion were divided into 2 groups of 20 each. Group I patients were orthodontic group and group II patients underwent orthognathic surgery.

Results: S- N was 68.7 mm and 67.1 mm in group I and II respectively, PoOr-NBa was 29.89 and 29.12 degree in group I and II respectively, ML-NSL was 34.1 and 36.7 degree, NSAr was 121.9 and 121.5 degree, ArGoMe was 127.3 and 132.4 degree, Goupper was 51.4 and 52.7 degree, Golower was 75.2 and 80.1 degree, SNB was 80.3 and 83.5 degree and SNA was 80.5 and 79.4 degree respectively. The difference was significant (P< 0.05).

Conclusion: Orthodontic treatment resulted in better treatment outcome as compared to orthognathic surgery.

Keywords: Class III, Orthodontic treatment, Orthognathic surgery.

INTRODUCTION

Class III malocclusion is one of the most difficult anomalies to understand. Studies conducted to identify the etiological features of a Class III malocclusion showed that the deformity is not restricted to the jaws but involves the total craniofacial complex.[1] Most persons with Class III malocclusions show combinations of skeletal and dentoalveolar components. The factors contributing to the anomaly are complex. They may act synergistically or in isolation, or they may cancel each other out.[2]

Etiologic factors for Class III malocclusions include a wide spectrum of skeletal and dental compensation components.[3] The condition might be characterized by mandibular prognathism, maxillary retrognathism, retrusive mandibular dentition, protrusive maxillary dentition, and a combination of the above. Clinically, Class III malocclusion is in two forms: (a) "pseudo or functional Class III," due to an early interference with the muscular reflex of mandibular closure and (b) the "true Class III".[4] The etiology of Class III malocclusion is multifactorial, with genetic, ethnic, environmental, and habitual component. It was believed until 1970 that only the mandible is responsible for Class III malocclusion; however, almost 30–40% of patients exhibit some degree of maxillary deficiency.[5]

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Class III patients can be properly treated by orthodontic mechanotherapy alone and those who require orthognathic surgery.[6] Because not all of these patients are candidates for surgical correction, patient assessment and selection are essential in diagnosis and treatment planning.[7] The aim of the study was to distinguish between surgical and nonsurgical subjects presenting with skeletal Class III malocclusions.

MATERIALS & METHODS

The present study was conducted among 40 patients of class III malocclusion of both genders. All patients were informed regarding the study and their consent was obtained. Ethical clearance was obtained before starting the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 20 each. Group I patients were orthodontic group and group II patients underwent orthognathic surgery. In all patients, the lateral cephalograms were taken. Linear, proportional and angular measurements were made. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I: Distribution of patients.

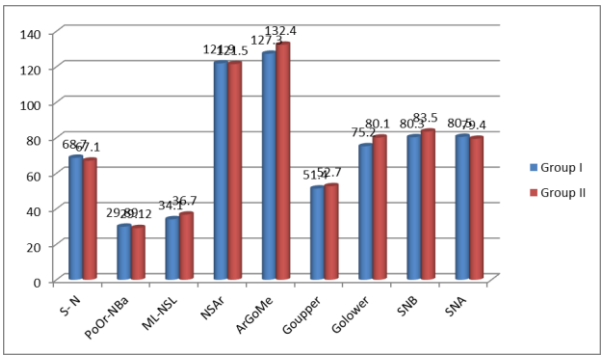
Gender	Group I	Group II
Method	Orthodontic	Orthognathic surgery
Number	20	20

Table I shows that group I patients were orthodontic group and group II patients were of orthognathic surgery.

Table II: Comparison of variables.

Variables	Group I	Group II	P value
S- N	68.7	67.1	0.19
PoOr-NBa	29.89	29.12	0.14
ML-NSL	34.1	36.7	0.03
NSAr	121.9	121.5	0.12
ArGoMe	127.3	132.4	0.05
Go_{upper}	51.4	52.7	0.05
Go_{lower}	75.2	80.1	0.01
SNB	80.3	83.5	0.04
SNA	80.5	79.4	0.02

Table II, graph I shows that S- N was 68.7 mm and 67.1 mm in group I and II respectively, PoOr-NBa was 29.89 and 29.12 degree in group I and II respectively, ML-NSL was 34.1 and 36.7 degree, NSAr was 121.9 and 121.5 degree, ArGoMe was 127.3 and 132.4 degree, Goupper was 51.4 and 52.7 degree, Golower was 75.2 and 80.1 degree, SNB was 80.3 and 83.5 degree and SNA was 80.5 and 79.4 degree respectively. The difference was significant (P< 0.05).



Graph I: Comparison of variables.

DISCUSSION

Different ethnic groups exhibit different prevalence rates of Class III, with different methods of classification being used.[8]The prevalence rate was reported to be around 1–3% in the Caucasians and around 13-14% among the Chinese and Japanese. In the Asian population the majority of patients exhibit midface deficiency. It has been reported that more than 60% of Class III malocclusion cases are due to skeletal discrepancies.[9] Final and definitive diagnosis of skeletal Class III malocclusion is based on the following: (a) Verification of the normal centric position with the habitual position. (b) Presence or absence of a familial predisposition. (c) Cephalometric parameters, including a decrease in SNA, negative ANB, mandibular protrusion, obtuse gonial angle, and great LAFH. (d) Incisor relationship.[10] The aim of the study was to distinguish between surgical and nonsurgical subjects presenting with skeletal Class III malocclusions.

In present study, group I patients were orthodontic group and group II patients were of orthognathic surgery. Stellzig-Eisenhauer et al[11] tested to separate Class III patients who can be properly treated orthodontically from those who require orthognathic surgery. A large sample size was a

necessary to obtain a sufficiently robust model. The cephalograms of 175 adult patients with Class III malocclusions were analyzed. The orthodontic group comprised 87 patients, and the surgery group, 88 patients. Twenty linear, proportional, and angular measurements were made. Stepwise discriminant analysis was applied to identify the dentoskeletal variables that best separate the groups. The discriminant function model was highly significant (P <0.01); 92% of the patients were correctly classified. The following variables were extracted: Wits appraisal, length of the anterior cranial base, maxillary/mandibular (M/M) ratio, and lower gonial angle. The resulting equation was: Individual score was -1.805+ 0.209, Wits + 0.044, SN+ 5.689, M/M ratio was 0.056, Golower. By means of discriminant analysis, correct classification of adult Class III malocclusion patients succeeded to a very high degree. Of all the variables, the Wits appraisal was the most decisive parameter.

We found that S- N was 68.7 mm and 67.1 mm in group I and II respectively, PoOr-NBa was 29.89 and 29.12 degree in group I and II respectively, ML-NSL was 34.1 and 36.7 degree, NSAr was 121.9 and 121.5 degree, ArGoMe was 127.3 and 132.4 degree, Goupper was 51.4 and 52.7 degree, Golower was 75.2 and 80.1 degree, SNB was 80.3 and 83.5 degree and SNA was 80.5 and 79.4 degree respectively. Kerr et al[12] considered these criteria alone to be insufficient for determining which treatment option to prescribe. Therefore, the authors tried to established cephalometric yardsticks that would make the treatment decision more objective. The results of their study indicated that the most important factors that differentiate the surgery and the nonsurgery patients are the size of the anteroposterior discrepancy, the inclination of the mandibular incisors, and the appearance of the soft tissue profile. In contrast, the vertical dimensions (eg, gonial angle or Y-axis) showed little influence on the treatment decision. Because a reduced overbite in adult Class III patients points to a poor orthodontic prognosis, the conclusion was drawn that an open bite tendency is a rare condition in this malocclusion group. On the basis of the overlaps of box-and-whisker plots, the following critical values were set up: ANB, 4°; M/M ratio, 0.84; mandibular incisor inclination, 83°; and Holdaway's angle, 3.5°.

CONCLUSION

Authors found that orthodontic treatment resulted in better treatment outcome as compared to orthognathic surgery.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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