

## Original Research

### Assessment of esthetic outcome following rigid fixation of the sagittal split advanced genial segment

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#### ABSTRACT:

**Background:** Genioplasty has become an important surgical technique to achieve or restore facial balance in the correction of dentofacial deformity allowing improvement in the profile, equilibrium in the labiomental musculature, and even the nasolabial region of the face. The present study assessed esthetic outcome following rigid fixation of the sagittal split advanced genial segment. **Materials & Methods:** 20 patients of retrognathic mandible of both genders were assessed both clinically and radiographically by COGS soft/hard tissue analysis. Clinical and radiographic examination preoperative, immediate postoperative after 6 months postoperatively was carried out. Lateral cephalometric radiographs were taken. **Results:** Out of 20 patients, males were 8 and females were 12. The mean pre-operative and 6 months Ar-PTM was 31.61 and 31.66, PTM-Ar was 46.8 and 46.9, N-A-Pg was 9.25 and 3.52, N-A was -0.59 and -0.59, N-B was -5.94 and -5.91, N-Pg was -4.92 and -1.16, N-ANS was 50.36 and 50.56, ANS-Gn was 64.30 and 66.24, PNS-N was 49.25 and 49.42, MP-NP was 36.52 and 34.34, PNS-ANS was 52.38 and 52.48, Ar-Go was 43.62 and 45.24, Go-Pg was 66.20 and 74.45, B-Pg was 10.38 and 10.20 and Ar-Go-Gn was 122.24 and 122.52 respectively. The difference was significant ( $P < 0.05$ ). **Conclusion:** The new technique of sagittal genioplasty overcomes the disadvantages of conventional genioplasty.

**Key words:** Retrognathic mandible, Sagittal genioplasty, labiomental musculature

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#### INTRODUCTION

Genioplasty has become an important surgical technique to achieve or restore facial balance in the correction of dentofacial deformity allowing improvement in the profile, equilibrium in the labiomental musculature, and even the nasolabial region of the face.<sup>1</sup>The most frequently performed osteotomy for correction of the small and retruded chin is the horizontal sliding genioplasty, first described by Hofer in 1942. Converse in 1950, discussed the feasibility of bone grafts introduced.<sup>2</sup>Problems involving the size and shape of

the chin are most easily considered as either an excess or deficiency of the hard or soft tissues in one of three planes- antero-posterior, vertical or transverse and are presently treated using the following techniques: (i) Antero-posterior problems Antero-posterior excess is corrected by either a pushback genioplasty with or without a mentoplasty whereas deficiencies are improved by advancement genioplasty.<sup>3</sup>

Vertical excess is corrected by reduction genioplasty whilst deficiency is improved by augmentation genioplasty with bone or alloplastic material inserted between the bone cuts. Transverse problems

producing asymmetry of the chin with non-coincidental facial, chin and dental midlines can be corrected by a horizontal sliding genioplasty or the recently described “propeller” genioplasty.<sup>4</sup> Modern technology using three - dimensional computer-aided designing, computer-aided milling or machining and manufactured using Stereolithographic techniques virtual planning for orthognathic surgery has critical advantages compared to conventional treatment planning.<sup>5</sup> The present study assesses esthetic outcome following rigid fixation of the sagittal split advanced genial segment.

## MATERIALS & METHODS

The present study comprised of 20 patients of retrognathic mandible of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. All patients were assessed both clinically and radiographically by COGS soft/hard tissue analysis. Clinical and radiographic examination preoperative, immediate postoperative after 6 months postoperatively was carried out. Lateral cephalometric radiographs were taken. All the cases were operated under general anesthesia with naso-endotracheal intubation following aseptic technique. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

## RESULTS

**Table I Distribution of patients**

Total-20		
Gender	Male	Female
Number	8	12

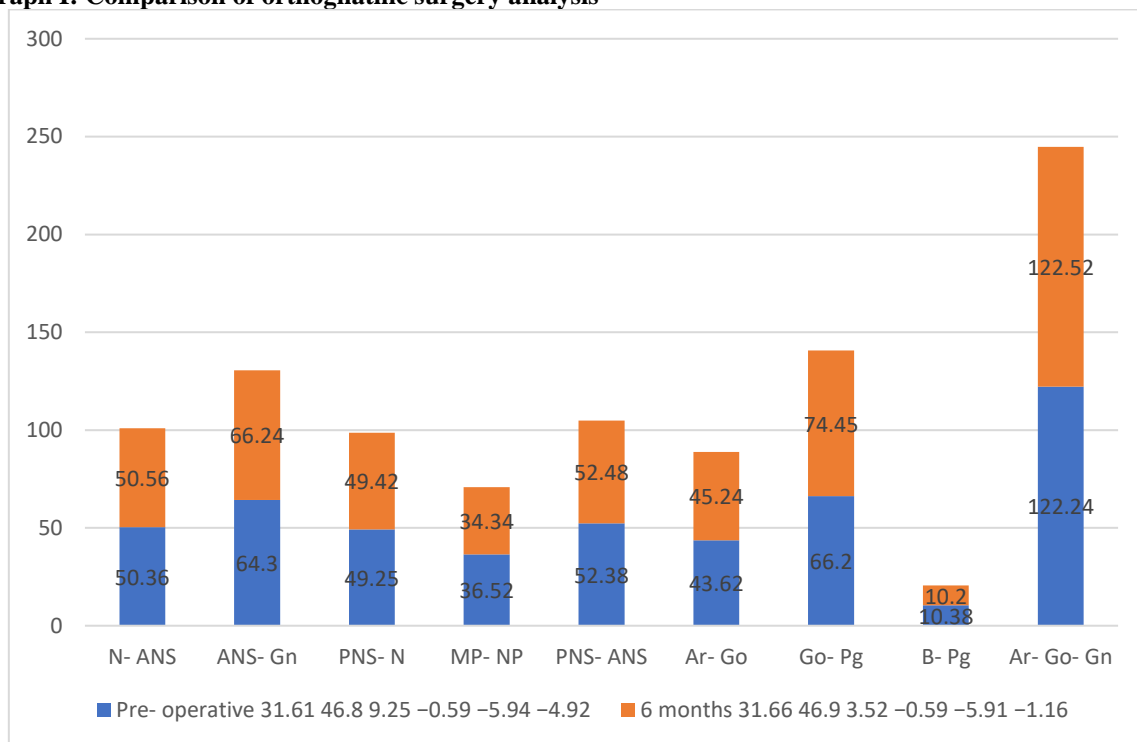
Table I shows that out of 20 patients, males were 8 and females were 12.

**Table II Comparison of orthognathic surgery analysis**

Parameters	Pre- operative	6 months	P value
Ar- PTM	31.61	31.66	0.91
PTM- Ar	46.8	46.9	0.90
N-A-Pg	9.25	3.52	0.01
N-A	-0.59	-0.59	1
N-B	-5.94	-5.91	1
N- Pg	-4.92	-1.16	0.05
N- ANS	50.36	50.56	0.94
ANS- Gn	64.30	66.24	0.82
PNS- N	49.25	49.42	0.84
MP- NP	36.52	34.34	0.97
PNS- ANS	52.38	52.48	0.95
Ar- Go	43.62	45.24	0.84
Go- Pg	66.20	74.45	0.05
B- Pg	10.38	10.20	0.90
Ar- Go- Gn	122.24	122.52	0.92

Table II, graph I shows that mean pre- operative and 6 months Ar- PTM was 31.61 and 31.66, PTM- Ar was 46.8 and 46.9, N-A-Pg was 9.25 and 3.52, N-A was -0.59 and -0.59, N-B was -5.94 and -5.91, N- Pg was -4.92 and -1.16, N- ANS was 50.36 and 50.56, ANS- Gn was 64.30 and 66.24, PNS- N was 49.25 and 49.42, MP- NP was 36.52 and 34.34, PNS- ANS was 52.38 and 52.48, Ar- Go was 43.62 and 45.24, Go- Pg was 66.20 and 74.45, B- Pg was 10.38 and 10.20 and Ar- Go- Gn was 122.24 and 122.52 respectively. The difference was significant ( $P < 0.05$ ).

**Graph I: Comparison of orthognathic surgery analysis**



**DISCUSSION**

The chin and associated soft tissues are important in facial esthetics and perioral function. Various techniques for augmenting the chin with both alloplastic materials and autogenous tissue have been described, including osteotomies.<sup>6</sup> The most frequently performed osteotomy for correction of the small and retruded chin is the horizontal sliding genioplasty, first described by Hofer in 1942.<sup>7</sup> Since then, the sliding osteotomy surgical technique has undergone numerous modifications including intraoral incisions and development of a reliable biologic basis. Further technical advances have included complex osteotomies to correct such conditions such as macrogenia and vertical deformities.<sup>8</sup> Last, internal rigid fixation has been used to provide secure segment stabilization and long-term predictable results. During this time, progress also occurred in the development and implementation of alloplastic materials for chin augmentation. Today, controversy remains between the methods with proponents of each technique citing ease of use, predictability, low morbidity, and excellence of results.<sup>9</sup> One of the main critiques of the sliding osteotomy is the hourglass esthetic deformity seen in the frontal view. This is caused by notching at the inferior border of the mandible and can be seen in up to 72.5% of the patients. The prejowl sulcus is also accentuated and can be quite unesthetic.<sup>10</sup> The present study assesses stability, esthetic outcome and complication following rigid fixation of the sagittal split advanced genial segment.

In present study, out of 20 patients, males were 8 and females were 12. Ekram et al<sup>11</sup> aimed to study the new

sagittal genioplasty technique and its efficacy to overcome the drawbacks of conventional genioplasty. This technique also aids in correcting mild-to-moderate breathing irregularities. A total of 10 patients included in this study. The comparative analysis of the displacement of the chin in vertical and horizontal directions following surgery was evaluated by measuring the difference between preoperative, immediate postoperative, 3 and 6 months postoperative on lateral cephalometric radiographs. The study of new sagittal chin advancement results showed an advantage over conventional technique in terms of esthetics outcome (no jowl), easy to perform without damaging the mental nerve, superior healing with less relapse, and better surface area contact.

We found that mean pre-operative and 6 months Ar-PTM was 31.61 and 31.66, PTM- Ar was 46.8 and 46.9, N-A-Pg was 9.25 and 3.52, N-A was -0.59 and -0.59, N-B was -5.94 and -5.91, N- Pg was -4.92 and -1.16, N- ANS was 50.36 and 50.56, ANS- Gn was 64.30 and 66.24, PNS- N was 49.25 and 49.42, MP- NP was 36.52 and 34.34, PNS- ANS was 52.38 and 52.48, Ar- Go was 43.62 and 45.24, Go- Pg was 66.20 and 74.45, B- Pgw was 10.38 and 10.20 and Ar-Go- Gn was 122.24 and 122.52 respectively. Jappati et al<sup>12</sup> overcome the disadvantages of older techniques such as step deformity, less bone contact and more chances of relapse. Type 1-Esthetic genioplasty: A curvilinear horizontal osteotomy can be performed at lower border as posteriorly as possible. After the osteotomy, the detached segment can be moved as per the requirement. Type 2-Functional genioplasty: A horizontal subapical cut was made through full

thickness of the mandible involving the labial and lingual cortex, then vertical cuts were made bicortically and two oblique cuts were made at the end of vertical cuts monocortically. This modification has various advantages such as more bone contact, no step deformity, less chance of relapse and also most effective treatment for sleep apnoea patients. Fariña et al<sup>13</sup> discussed “M-shaped” genioplasty, this new technique makes it possible to increase the vertical and sagittal deficiencies of the chin, avoiding the need for grafting or the use of interposition materials. Advancement of the genioplasty segment using the sliding horizontal osteotomy also has its drawback. It will result in notching at the inferior border of the mandible behind the chin segment. This can result in an external esthetic deformity that is visible and will accentuate the soft-tissue jowls. By sagittal splitting the anterior lateral border of the mandible the inferior gap.

### CONCLUSION

Authors found that the new technique of sagittal genioplasty overcomes the disadvantages of conventional genioplasty.

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