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Original Research Article

Steiner Analysis of Cephalometric in Orthognathic Surgery Patients of Department Oral and Maxillofacial Surgery Hasan Sadikin General Hospital Bandung of Period April 2017 – April 2022

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Abstract

Objective: Orthognathic surgery is surgery on abnormalities of dentofacial that occur in the maxilla, mandible, or both. Determine measurement of the type of dentoskeletal abnormality in malocclusion using cephalometric analysis. Steiner analysis is used because it is considered that the *Sela tursica-nasion-point A* (SNA) angle, *Sela tursica-nasion-point B* (SNB) used to describe the relationship between the maxilla and the mandible

Material and Methods: The study involved 30 patients who underwent orthognathic surgery between April 2017 and April 2022 at Hasan Sadikin Hospital Bandung. Attention was carried out using cephalometric radiography and analyzed using the stainer method by observing angles also observing patient characteristics such as gender and age, average angle of SNA, SNB, ANB, diagnosis, number of corrected jaws and type of orthognathic surgery.

Results: The results of this study showed that orthognathic surgery patients were more male (63.3%), most aged between 19 - 20 years (40%), diagnosis of grade III malocclusion (96.7%), double jaw correction action (90%), bilateral sagittal split osteotomy (93%), osteotomy le fort I (96.7%), chinplasty (16.7%), mean angle SNA (83.8), angle SNB (90.6), angle ANB (-6.8). **Conclusion:** The results showed that more patients underwent orthognathic surgery with class III malocclusion and underwent orthognathic surgery on the maxilla and mandible simultaneously

Keywords: Orthognathic surgery, cephalometry, Steiner analysis, malocclusion

Introduction

Orthognathic surgery is surgery for dentofacial abnormalities that occur in the maxilla, mandible or both. This disorder can occur congenitally and during growth and development or also due to trauma. Orthognathic surgery is performed to correct dentofacial deformities which involves pre-surgical orthodontics with fixed appliances to align and level the dental arches, then surgery to reposition the jaws to produce a more harmonious facial framework. The most commonly used orthognathic surgical technique is bilateral sagittal split osteotomy (*BSSO*) combined with Le Fort 1 osteotomy, this technique aims to correct jaw abnormalities and restore its aesthetic function,

cases that can be treated using this technique are correction of mandibular retrognathism and prognathism and closure open bite. 1, 2 Malocclusion is one of the conditions indicating a dentoskeletal abnormality that interferes with mastication, swallowing, speaking and facial harmony. 3, 4 The prevalence of malocclusion in Indonesia reaches 80% and becomes a problem after caries and periodontal disease. 5

The form of measurement to determine the type of dentoskeletal abnormalities in malocclusion uses cephalometric measurements. 6 Commonly used cephalometric analyzes are Downs, Sassouni, Rickets, Tweed and Steiner analysis. The stainer cephalometric analysis method is considered a modern cephalometric analysis because it provides measurements with pattern associations and provides specific guidelines for the use of cephalometric measurements in treatment planning. Steiner analysis is used because it is considered that the SNA angle, the SNB used is considered stable to describe the relationship between the maxilla and mandible7.

RSUP Dr. Hasan Sadikin Bandung is a national referral center equipped with specialist and sub-specialty services including oral and maxillofacial surgeons who perform orthognathic surgery. This study aims to look at the characteristics of orthognathic surgery patients using Steiner's cephalometric analysis.

Material and Methods

This type of research was cross-sectional with an observational analysis approach involving 30 patients who underwent orthognathic surgery between April 2017 and April 2022 at Hasan Sadikin General Hospital, Bandung. Calculations were performed using cephalometric radiography and analyzed using the stainer method by observing the angle as well as observing patient characteristics such as gender and age, average SNA angle, SNB, ANB, diagnosis, number of jaws corrected and type of orthognathic surgery.

Table 1: Patient characteristics by age

Characteristic	Frequency	Propose (%)
Gender		
Man	19	63,3 %
Women	11	36,7 %

Table 2: Patient characteristics by sex

Characteristic	Frequency	Propose (%)
17	1	3,3 %
18	1	3,3 %
19	6	20,0 %
20	6	20,0 %
21	1	3,3 %
22	2	6,7 %
23	2	6,7 %
24	2	6,7 %
26	2	6,7 %
28	3	10,0 %
30	3	10,0 %
31	1	3,3 %

Table 3: Malocclusion Type

Characteristic	Frequency	Propose (%)
Class I malocclusion	0	0 %
Class II malocclusion		3,3 %
Class III malocclusion	29	96,7 %

Table 4: Corrected number of jaws

Characteristic	Frequency	Propose (%)
Single jaw	3	10 %
Double Jaw	27	90 %

Table 5: Types of orthognathic surgery

Characteristic	Frequency	Propose (%)
Osteotomy Le Fort 1	28	93 %
BSSO	29	96.7 %
Chinplasty	5	16.7 %

Table 6: Steiner's cephalometric analysis

Characteristic	Mean
> *SNA*	83.8
> *SNB*	90.6
> *ANB*	-6.8

Results

The results showed that the characteristics of orthognathic surgery patients were more in males as many as 19 people (63.3%), the most age was between 19 - 20 years (40%), the diagnosis of class III malocclusion (96.7%), double jaw correction (90%), bilateral sagittal splint osteotomy (93%), osteotomy le fort I (96.7%), chinplasty (16.7%), mean SNA angle (83.8), SNB angle (90.6), ANB angle (-6.8).

Discussion

Number of patients who underwent orthognathic surgery at the Hasan Sadikin General Hospital has more men than women.[8] orthognathic patients in Brazil[9] also showed a predominance of males, but female patients also underwent more orthognathic surgery, namely in Boston[10], South Korea[11] and Sweden.[12] Patients who underwent orthognathic surgery were more in the age range between 16-20 years.[8,13, 9] The type of malocclusion that underwent orthognathic surgery was class III malocclusion with disharmony in the mandible.[8]

The type of action performed was mostly BSSO[10] and followed by *osteotomy le fort 1* and there were some patients who had chinplasty done, this was done in patients with maxillary and mandibular involvement to get optimal results.[8,9] Patients who underwent orthognathic treatment in Boston were more many actions are performed on the maxilla compared to the mandible[10] and single jaws are performed more frequently than on double jaws.[12]

The results of cephalometric measurements showed that more patients had class III malocclusions with an average > SNA 83.8, > SNB 90.6 and <ANB-6.8, this happened because the majority in Indonesia have a protrusive bimaxillary facial profile. Patients who underwent orthognathic in Turkey had >SNA in men $81.6^{o} \pm 4.6^{o}$ and women was $80.5^{o} \pm 3.3^{o}$. [14] This happened because Turkey has a Caucasian race with an

average angle <SNA, <SNB is smaller than race mongoloids and negroids.

Conclusion

The results showed that patients who underwent orthognathic surgery at Hasan Sadikin General Hospital Bandung in April 2017-April 2022 had more class III malocclusions and underwent orthognathic surgery on the maxilla and mandible simultaneously.

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References

1. Bertin H, Huon J-F, Praud M, Fauvel F, Salagnac J-M, Perrin J-P, et al. Bilateral sagittal split osteotomy training on mandibular 3-dimensional printed models for maxillofacial surgical residents. British Journal of Oral and Maxillofacial Surgery. 2020;58(8):953-8.
2. Paunonen J, Helminen M, Peltomäki T. Long-term stability of mandibular advancement with bilateral sagittal split osteotomy. Journal of Cranio-Maxillofacial Surgery. 2018;46(9):1421-6.
3. Chen Y-J, Yao C-C, Chang Z-C, Lai H-H, Yeh K-J, Kok S-H. Characterization of facial asymmetry in skeletal Class III malocclusion and its implications for treatment. International Journal of Oral and Maxillofacial Surgery. 2019;48(12):1533-41.
4. Eslami S, Faber J, Fateh A, Sheikholaemmeh F, Grassia V, Jamilian A. Treatment decision in adult patients with class III malocclusion: surgery versus orthodontics. Progress in orthodontics. 2018;19(1):1-6.
5. Jazaldi F, Soegiharto BM, Hutabarat AD, Soedarsono N, Auerkari EI. Runx2 rs59983488 polymorphism in class II malocclusion in the Indonesian subpopulation. Dental Journal (Majalah Kedokteran Gigi). 2021;54(4):216-20.
6. Ahsan T. Comparison of Soft Tissue Cephalometric Parameters Distinguishing Skeletal Class I, II and III Malocclusion. JPDA. 2020;29(01).
7. Proffit WR, Fields HW, Larson B, Sarver DM. Contemporary orthodontics-e-book: Elsevier Health Sciences; 2018.
8. Nafisa AS, Yuza AT, Sadputranto SA. Frekuensi kelainan dento skeletal dengan penanganan bedah ortognatik dan osteodistraksi di RSUP Dr. Hasan Sadikin Bandung tahun 2012-2017. Padjadjaran Journal of Dental Researchers and Students. 2018;2(2):130-6.
9. Castro V, do Prado CJ, Neto AIT, Zanetta-Barbosa D. Assessment of the epidemiological profile of patients with dentofacial deformities who underwent orthognathic surgery. Journal of Craniofacial Surgery. 2013;24(3):e271-e5.
10. Peacock ZS, Lee CC, Klein KP, Kaban LB. Orthognathic surgery in patients over 40 years of age: indications and special considerations. Journal of Oral and Maxillofacial Surgery. 2014;72(10):1995-2004.
11. Jung M-H. Age, extraction rate and jaw surgery rate in Korean orthodontic clinics and small dental hospitals. The Korean Journal of Orthodontics. 2012;42(2):80-6.
12. Andrup M, Elenius J, Ramirez E, Sjöström M. Indications and frequency of orthognathic surgery in Sweden-a questionnaire survey. Int J Oral Dent Health. 2015;1:019.
13. Hutomo DI, Astuti IA, Sumaji B. Orthognathic surgery case overview in patients with class III dentoskeletal Angle classification. Padjadjaran Journal of Dentistry. 2013;25(2).
14. Gateno J, Xia JJ, Teichgraeber JF. New 3-dimensional cephalometric analysis for orthognathic surgery. Journal of oral and maxillofacial surgery. 2011;69(3):606-22.