Mandibular Anatomical Risk Factors for Bad Split During Sagittal Split Ramus Osteotomy

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Research Article

Abstract

Objective: This study aimed to assess the correlation between mandibular anatomy and the occurrence of bad splits in Sagittal split osteotomy (SSO).

Materials and Methods: Pre-surgical CBCT images of 10 patients with bad split (bad split group) and 40 patients without bad split (normal group) were evaluated. Anatomical parameters of the mandible related to the osteotomy line were measured. Conditional logistic regression and receiver operating characteristic (ROC) curve analyses were performed.

Results: Results showed that a shorter height from the lingula to the fusion of buccal and lingual cortices (HLBC; $p=0.009$) and thicker distance between outer surfaces of buccal and lingual cortical plates of ramus at the level of the lingula (BTRL; $p=0.028$) were significantly associated with the occurrence of a bad split. ROC analysis revealed an HLBC cut-off of 7.5 mm.

Conclusion: This study suggests that patients with a shorter height from the lingula to the fusion of buccal and lingual cortices less than 7.5 mm are at higher risk of bad splits during SSO. Surgeons should exercise caution in such cases to minimize complications.

Keywords: CBCT/ Bad split/ Mandibular anatomy/ Sagittal split ramus osteotomy

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Introduction

Sagittal split osteotomy (SSO) is one of the most commonly performed procedures in orthognathic surgery, used to correct dentofacial deformities, skeletal Class II and III discrepancies, mandibular asymmetries, and maxillofacial imbalances[1-3]. The technique has undergone several modifications to enhance condylar positioning and optimize bone segment contact in order to minimize postoperative complications[4-8]. Despite these advancements, complications following SSO continue to be reported[9-11], among the most notable being unfavorable fractures, often referred to as "bad splits".

The term "bad split" refers to an unintended or irregular fracture occurring in either the proximal or distal segment of the mandible during SSO [12]. The reported prevalence ranges from 0.9% to 20%, affecting the buccal or lingual cortical plates of the mandible, or even the condylar neck [13]. A rare variant of this complication is an isolated coronoid process

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fracture while the ramus remains intact[14]. This may result in serious postoperative issues, such as infection, sequestration of bone fragments, delayed healing, malunion or fibrous union at the osteotomy site, potentially leading to instability and mandibular dysfunction[10,11].

Previous studies have identified several potential contributors to bad splits during SSO, including patient age, the presence of impacted third molars, and surgeon experience[12,15,16]. Kriwalsky et al. and Veras et al. reported that older patients are more likely to experience bad splits, while Falter et al. noted that no such fractures occurred in individuals under 20 years old[12,13,17]. The role of impacted third molars remains debated. Posnick et al. found no increased risk when these teeth were removed at the time of surgery[18], whereas Reyneke et al. observed a higher incidence of bad splits in younger patients with impacted molars and recommended their extraction at least 6-9 months prior to SSO[19]. Surgeon experience has also been implicated. While Friscia et al. linked complications to surgeon expertise, Falter et al. found no significant reduction in bad splits over a 20-year period[17,20], suggesting that osteotomy design and surgical technique may play a more decisive role.

In addition to these factors, mandibular anatomy also appears to influence the risk of bad splits and should be considered in surgical planning, particularly with respect to the thickness and structural characteristics of the osteotomy site. Aarabi et al. reported that patients with shorter rami and a thinner buccolingual mandibular structure were more susceptible to bad splits during SSO[21]. Similarly, Wang et al. found that a short ramus and limited buccolingual thickness in the alveolar region distal to the second molar increased the risk of unfavorable fractures[22].

Previous studies have also indicated that medial osteotomies performed predominantly within cortical bone may contribute to bad splits[23-26]. Consequently, identifying the precise location of the fusion between the buccal and lingual cortical plates is essential for determining the safest osteotomy site and selecting the most appropriate surgical technique. However, few studies have systematically evaluated the relationship between anatomical parameters and the incidence of bad splits. Therefore, this study aimed to investigate the association between mandibular anatomical characteristics and the occurrence of bad splits in SSO using cone-beam computed tomography (CBCT) imaging.

Materials and Methods

Study Population

The authors designed a retrospective case-control study. The study was approved by the Ethics Committee of the Faculty of Dentistry and Faculty of Pharmacy, Mahidol University (CoA No.MU-DT/PY-IRB 2021/074.2308). The study population comprised Thai patients with skeletal deformities who underwent the modified Hunsuck and Epker technique for either SSO alone or in combination with maxillary osteotomy at the Oral and Maxillofacial Surgery Clinic, Faculty of Dentistry, Mahidol University, Bangkok, Thailand between January 2017 and November 2020.

Case selection

Inclusion criteria required patients to have pre-surgical CBCT images. Exclusion criteria included severe facial asymmetry, a history of trauma or pathological conditions, and any previous treatments that could affect the assessment of mandibular anatomy. Patients with CBCT images of poor quality were also excluded. Patients were categorized as “cases” if operative records documented the occurrence of a bad split during SSO, and as “controls” if no such complication was noted. Each case was individually matched to four control patients based on age at the time of surgery, sex, and surgeon experience. A total of 50 patients were included in the analysis, consisting of 10 cases and 40 matched controls.

Radiographic assessment

CBCT images were acquired using two systems: the KODAK 9500 3D CBCT system (Carestream Health, Rochester, New York, USA) with a field of view of 20.6 cm in diameter and 18 cm in height, and a voxel size of 0.3 mm; and the Veraview X800 (J. Morita Corp., Kyoto, Japan) with a field of view of 15 cm in diameter and 14 cm in height, and a voxel size of 0.32 mm. All CBCT images were exported as Digital Imaging and Communications in Medicine (DICOM) files for analysis using Dolphin Imaging software (Dolphin Imaging, Canoga Park, CA). CBCT images were evaluated by a single examiner who was calibrated through training on a set of 10 CBCT datasets. Notably, excellent inter- and intra-rater reliability was established for all parameter measurements prior to the study, with intraclass correlation coefficients (ICCs) exceeding 0.90. The imported datasets were then oriented to align the Frankfurt plane parallel to the horizontal plane. Three anatomical landmarks were identified as reference points for subsequent analysis: the most posterosuperior point of the lingula (L point), the most inferior point of the sigmoid notch (S point), and the most posterior extent of the contour of the mandibular second molar (M point) (Figure 1).

Assessment of anatomical parameters

To identify anatomical risk factors associated with bad splits, mandibular parameters related to the osteotomy line were systematically measured using CBCT images (Figure 2). At the L point, five parameters were assessed: in the coronal plane, the height from the lingula to the fusion of the buccal and lingual cortices (HLBC), the height from the lingula to the sigmoid notch (HLS), the cancellous bone thickness at the lingula level (CBTL), and the buccolingual thickness of the ramus, defined as the distance between the outer surfaces of the buccal and lingual cortical plates (BTRL); and in the axial plane, the anteroposterior width of the ramus (APWR). The distance from the sigmoid notch to the inferior border of the mandible (SIBM) was measured in the coronal plane at the S point. At the M point, also in the coronal plane, the mandibular height from the alveolar crest to the inferior border (ACIB) and the buccolingual thickness of the retromandibular area (BLR) were evaluated. Throughout the analysis, observers were permitted to adjust magnification, brightness, and contrast to optimize image visualization.

Statistical Analysis

Descriptive statistics were used to summarize demographic characteristics and anatomical parameters for each group. Multivariable conditional logistic regression analysis was performed to identify significant predictors of bad split occurrence, using a significance level of 5%. Receiver operating characteristic (ROC) curve analysis was subsequently conducted to determine optimal cut-off values for anatomical parameters associated with bad splits. Inter- and intra-rater reliability for each parameter measurement was assessed using an ICC. All statistical analyses were carried out using SPSS software (version 26.0; IBM Corp., Armonk, New York, USA).

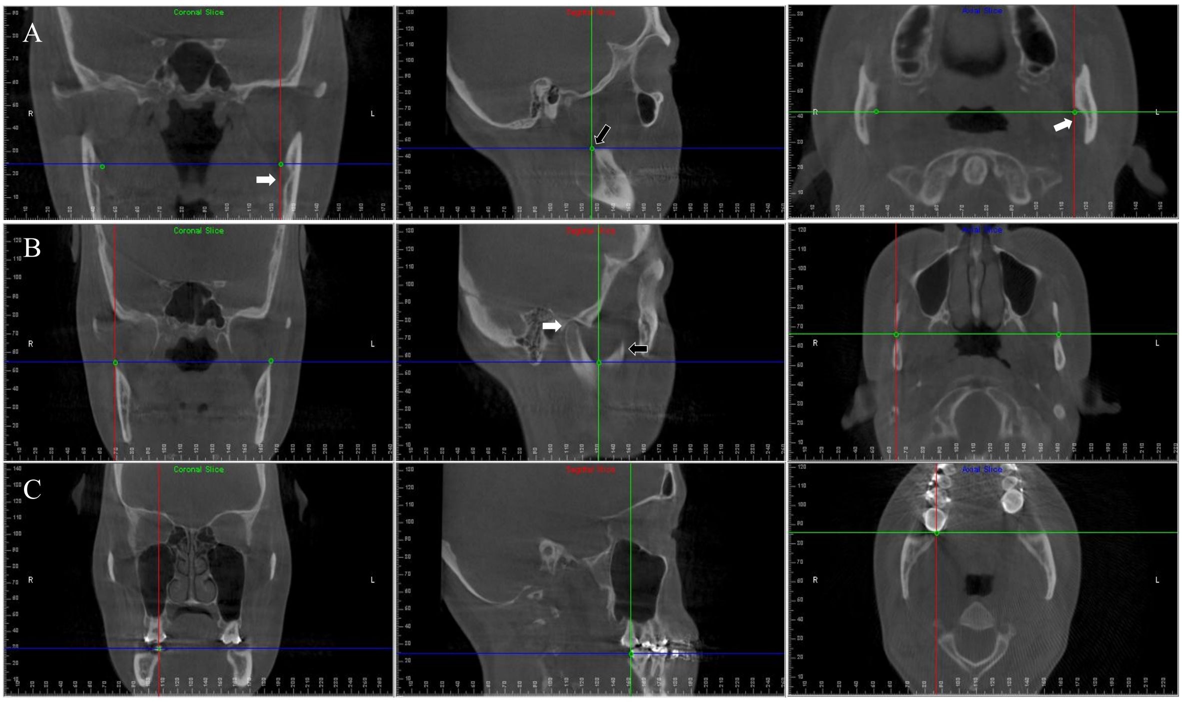

Figure 1 Anatomical reference points used for measurement: (A) The lingula (black arrow) is a small bony prominence on the medial surface of the mandibular ramus, located anterosuperior to the mandibular foramen (white arrow). The intersection of the reference lines marks the most posterosuperior point of the lingula (L point); (B) the sigmoid notch is a concavity on the superior border of the mandibular ramus, situated between the coronoid process (black arrow) and the condylar process (white arrow). The intersection of the lines identifies the most inferior point of the sigmoid notch (S point); (C) the intersection of the lines indicates the most posterior height of contour of the mandibular second molar (M point).

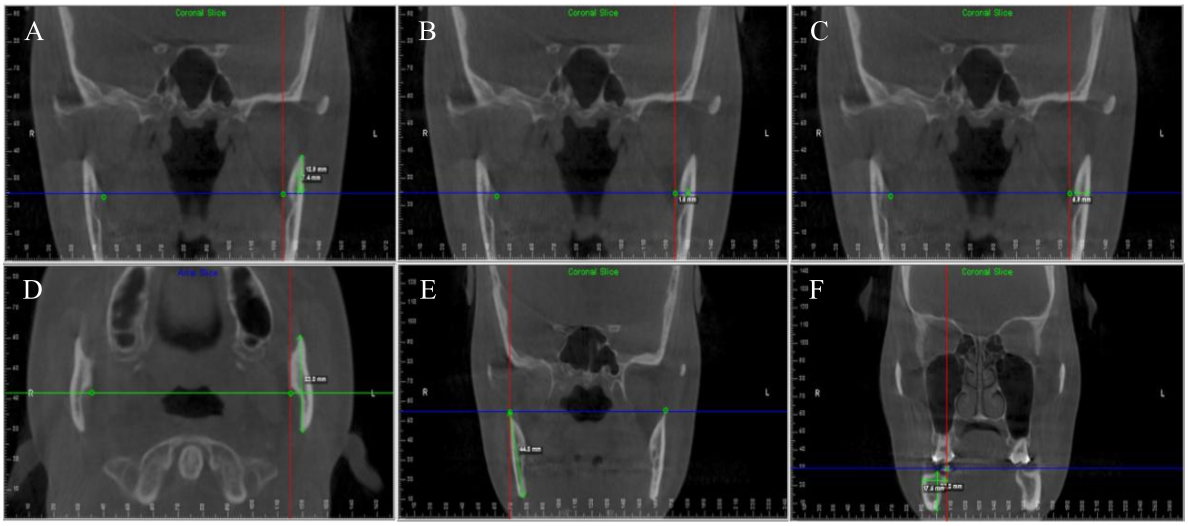

Figure 2 Mandibular anatomical parameters related to the osteotomy line were assessed at three reference points (L, S, and M). At the L point, four measurements were taken in the coronal plane: (A) the height from the lingula to the fusion of the buccal and lingual cortices (HLBC) and the height from the lingula to the sigmoid notch (HLS); (B) the cancellous bone thickness at the level of the lingula (CBTL); and (C) the buccolingual thickness at the same level (BTRL). One axial measurement was also recorded at the L point: (D) the anteroposterior width of the ramus (APWR), assessed in an axial slice at the most posterosuperior point of the lingula. At the S point, one parameter was measured in the coronal plane: (E) the distance from the sigmoid notch to the inferior border of the mandible (SIBM). Finally, at the M point, two parameters were evaluated in the coronal plane: (F) the vertical height of the mandible from the alveolar crest to the inferior border (ACIB) and the buccolingual thickness of the retromandibular area (BLR), measured at the most posterior height of contour of the mandibular second molar.

Results

A total of 50 patients (15 males and 35 females) who met the inclusion and exclusion criteria were included in the study. The study population comprised two groups: Group 1 (bad split group), consisting of 10 patients who experienced a bad split, and Group 2 (normal group), consisting of 40 matched patients without a bad split. The demographic characteristics and anatomical parameters of each group are summarized (Table 1). Notably, the intraclass correlation coefficient for inter- and intra-examiner reliability in the analyses of anatomic parameters were 0.967-0.994 and 0.950-0.996, respectively Table 2).

Multivariable conditional logistic regression analysis identified HLBC and BTRL as the only significant predictors of bad split occurrence during SSO (Table 3). Each 1 mm increase in HLBC was associated with a 64.1% reduction in the odds of a bad split (odds ratio [OR] = 0.359; p = 0.009), indicating that shorter HLBC values were significantly associated with increased risk of bad split. In contrast, greater BTRL thickness significantly increased the risk of bad splits by a factor of 5.93 (p = 0.028).

Receiver operating characteristic (ROC) curve analyses were subsequently performed for HLBC and BTRL to evaluate their discriminatory capacity. For HLBC, an optimal cut-off value of 7.5 mm yielded a sensitivity of 70.0%, specificity of 72.5%, and an area under the curve (AUC) of 0.77 (Figure 3). In contrast, no optimal cut-off value could be determined for BTRL, as its ROC curve closely approximated the diagonal reference line, suggesting poor discrimination between the bad split and normal groups (Figure 4).

Table 1 Demographic data of the subjects in the bad split group and normal group

Parameter	Bad split group (n=10)	Normal group (n=40)
Age (years)		
Mean ± SD	32.5 ± 9.42	28.5 ± 6.66
Range	21 – 47	19 – 46
Gender		
Male	3 (30%)	12 (30%)
Female	7 (70%)	28 (70%)
Surgeon experience		
0-5 years	4	16
More than 5 years	6	24
Pattern of bad split		
Fracture of the buccal plate	6	-
Fracture of the lingual plate	1 (bilateral)	-
Fracture of the condyle neck	3	-

SD, standard deviation

Table 2 Measurement of anatomic parameters of the mandible in the bad split and normal groups (n=50 sides from 50 patients)

Anatomic parameter	Mean±SD (mm) in bad split group (n=10)	Mean±SD (mm) in normal group (n=40)
HLBC	5.99 ± 3.20	9.21 ± 3.20
HLS	16.53 ± 3.81	17.50 ± 2.59
CBTL	1.93 ± 1.22	2.37 ± 1.10
BTRL	6.07 ± 1.28	6.16 ± 1.37
APWR	32.80 ± 3.11	31.41 ± 3.32
SIMB	50.37 ± 4.31	49.45 ± 6.55
ACIB	27.01 ± 2.62	27.00 ± 5.07
BLR	19.00 ± 2.18	19.73 ± 2.59

HLBC, height from lingula to fusion of buccal and lingual cortices; HLS, height from lingula to sigmoid notch; CBTL, cancellous bone thickness of ramus at the level of the lingula; BTRL, buccolingual thickness of ramus at the level of the lingula; APWR, anteroposterior width of ramus at the level of the lingula; SIMB, distance from sigmoid notch to inferior border of mandible; ACIB, height of mandible from alveolar crest to inferior border of mandible; BLR, buccolingual thickness of retromandibular area
SD, standard deviation

Table 3 Significant predictors of bad split occurrence identified by multivariable conditional logistic regression

	Adjusted odds ratio for bad split occurrence (95% CI)	p
HLBC	0.359 (0.167-0.774)	0.009*
BTRL	5.930 (1.209-29.097)	0.028*

HLBC, height from lingula to fusion of buccal and lingual cortices
BTRL, buccolingual thickness of ramus at the level of the lingula
*Significant difference at p<0.05

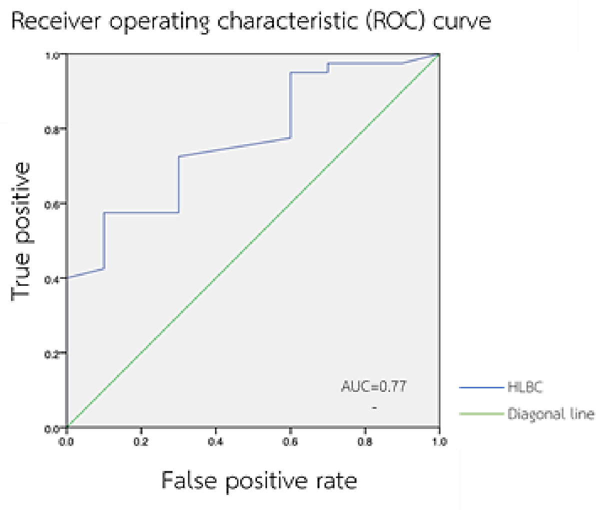

Figure 3 ROC curve of HLBC (height from lingula to the fusion of buccal and lingual cortices) for predicting bad split. The optimal cut-off point was 7.5 mm, corresponding to a sensitivity of 70.0% and a specificity of 72.5% and an area under the curve (AUC) of 0.77

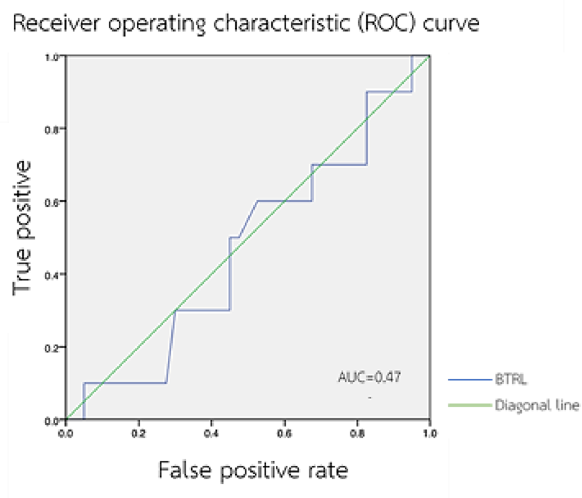

Figure 4 The ROC curve of BTRL (the buccolingual thickness of the ramus at the level of the lingula) for predicting bad split. The curve was close to the diagonal line.

Discussion

While SSO remains a reliable and effective surgical technique for correcting dentofacial deformities, it carries the risk of complications. Among these, bad splits are a common intraoperative challenge. Although often manageable, inadequate handling of bad splits can lead to long-term consequences, such as skeletal instability and relapse 14. Knowledge of anatomical risk factors allows surgeons to better estimate the likelihood, facilitating informed patient communication, preventive planning, and appropriate intraoperative responses.

Our study found that a shorter HLBC was associated with an increased likelihood of bad split occurrence. Multivariable conditional logistic regression indicated that each 1 mm increase in HLBC corresponded to a 64.1% decrease in the odds of a bad split. Previous studies have recommended placing the horizontal osteotomy near the tip of the lingula, as this region provides adequate bone width and a sufficient cancellous layer. Such positioning reduces the likelihood of splits occurring solely within the cortical bone, which is more difficult to separate and more prone to bad splits 26. Therefore, a decreased HLBC may increase the risk of placing the osteotomy in an area lacking medullary bone, thereby elevating the risk of a bad split.

Additionally, ROC curve analysis identified an HLBC value below 7.5 mm as being associated with an increased risk of bad splits. With an acceptable discriminative performance (AUC=0.77), this threshold may hold clinical relevance. Values below this cut-off could signal a heightened risk and should be considered during preoperative planning. In such cases, surgeons may consider modifying the osteotomy technique to mitigate this risk. For example, a lingual short split, in which the medial horizontal osteotomy is positioned inferior to the lingula, may help prevent fractures occurring exclusively within the cortical bone 27.

Regarding HLS and SIBM, which also represent the vertical dimension of the mandible similar to HLBC, our findings align with those of Telha et al., indicating that neither parameter was a significant predictor of bad split occurrence 28. While previous studies have reported a higher incidence of bad splits in populations with lower SIBM values 21, 22, those investigations did not include measurements of HLS or HLBC. It is hypothesized that HLBC correlates more directly with the horizontal osteotomy site and may serve as a more reliable indicator of cancellous bone presence in that region. Furthermore, given the comparable mean values of HLS and SIBM across both groups, their predictive value may be limited.

Previous studies have linked thinner BTRL to a higher risk of bad splits due to reduced structural integrity and increased susceptibility to fracture 21, 22. In contrast, our findings showed a significant association between thicker BTRL and bad split occurrence. This may be attributed to thicker cortical bone 13, as suggested by the larger difference between BTRL and CBTL values in the bad split group, or to unmeasured factors such as the proximity of the mandibular nerve 28, 29. However, its clinical reliability appeared limited due to the poor discriminative capacity of BTRL (AUC=0.470), which may have resulted from the small sample size and variability in BTRL values.

Among the remaining anatomical parameters, BLR, ACIB, and APWR were not identified as significant predictors of bad split occurrence in this study. Although previous research has suggested a link between reduced BLR values and increased risk of bad splits, this may reflect a biomechanical vulnerability similar to that associated with decreased BTRL 21, 22. However, the absence of data on key variables, such as cancellous bone thickness and mandibular nerve position, may have limited the ability to fully assess the predictive value of BLR. Further research that incorporates these factors is recommended to better understand their potential roles, especially for ACIB and APWR, which have been relatively understudied.

Patient age, the presence of third molars, and surgeon experience are commonly cited contributors to bad split occurrence 17, 21, 22, 30. To specifically identify anatomical risk factors, efforts were made to minimize confounding variables. By conducting the study within the Faculty of Dentistry, all treatments adhered to a standardized protocol, thereby reducing variability in surgical technique. Third molars were removed at least six months prior to SSO, ensuring no impacted mandibular third molars were present during surgery. Additionally, comprehensive patient records facilitated precise case selection. Each case with a bad split was matched to controls based on age at surgery, sex, and surgeon experience, effectively minimizing most potential confounding factors. However, the retrospective design limited access to certain potentially influential variables, such as mandibular morphology, bone density, and skeletal classification 31, 32. Moreover, the relatively low incidence of bad splits led to a small sample size and a limited number of matched pairs. Future research with larger cohorts is warranted to enhance statistical power and further explore additional predictors that remain inconclusive in the current literature.

Conclusion

This study demonstrates that a shorter height from the lingula to the fusion of the buccal and lingual cortices (HLBC) of less than 7.5 mm significantly increases the risk of bad splits during SSO. A comprehensive understanding of mandibular anatomy is crucial for surgeons to optimize treatment planning and execute the procedure with greater precision, thereby reducing the occurrence of this complication.

References

1. Ruiz LP, Lara JC. Facial nerve palsy following bilateral sagittal split ramus osteotomy for setback of the mandible. Int J Oral Maxillofac Surg. 2011;40(8):884-6.
2. Ow A, Cheung LK. Skeletal stability and complications of bilateral sagittal split osteotomies and mandibular distraction osteogenesis: an evidence-based review. J Oral Maxillofac Surg. 2009;67(11):2344-53.

3. Rai KK, Shivakumar HR, Sonar MD. Transient facial nerve palsy following bilateral sagittal split ramus osteotomy for setback of the mandible: a review of incidence and management. J Oral Maxillofac Surg. 2008;66(2):373-8.
4. Trauner R, Obwegeser H. The surgical correction of mandibular prognathism and retrognathia with consideration of genioplasty. I. Surgical procedures to correct mandibular prognathism and reshaping of the chin. Oral Surg Oral Med Oral Pathol. 1957;10(7):677-89;contd.
5. Trauner R, Obwegeser H. The surgical correction of mandibular prognathism and retrognathia with consideration of genioplasty. II. Operating methods for microgenia and distoclusion. Oral Surg Oral Med Oral Pathol. 1957;10(8):787-92; contd.
6. Dal Pont G. Retromolar osteotomy for the correction of prognathism. J Oral Surg Anesth Hosp Dent Serv. 1961;19:42-7.
7. Hunsuck EE. A modified intraoral sagittal splitting technic for correction of mandibular prognathism. J Oral Surg. 1968;26(4):250-3.
8. Bloomquist DS, Lee JJ. Mandibular orthognathic surgery. In: Miloro M, Ghali GE, Larsen PE, Waite PD, editors. Peterson's principles of oral and maxillofacial surgery. 3rd ed. Shelton, CT: PMPH-USA; 2011. p. 1317-64.
9. Sousa CS, Turrini RNT. Complications in orthognathic surgery: a comprehensive review. J Oral Maxillofac Surg Med Pathol. 2012; 24(2):67-74.
10. Mehra P, Castro V, Freitas RZ, Wolford LM. Complications of the mandibular sagittal split ramus osteotomy associated with the presence or absence of third molars. J Oral Maxillofac Surg. 2001;59(8):854-8.
11. O'Ryan F. Complications of orthognathic surgery. Oral Maxillofac Surg Clin North Am. 1990;2:593-613.
12. Veras RB, Kriwalsky MS, Hoffmann S, Maurer P, Schubert J. Functional and radiographic long-term results after bad split in orthognathic surgery. Int J Oral Maxillofac Surg. 2008; 37(7):606-11.
13. Kriwalsky MS, Maurer P, Veras RB, Eckert AW, Schubert J. Risk factors for a bad split during sagittal split osteotomy. Br J Oral Maxillofac Surg. 2008;46(3):177-9.
14. Teltzrow T, Kramer FJ, Schulze A, Baethge C, Brachvogel P. Perioperative complications following sagittal split osteotomy of the mandible. J Craniomaxillofac Surg. 2005; 33(5):307-13.
15. Jędrzejewski M, Smektała T, Sporniak-Tutak K, Olszewski R. Preoperative, intraoperative, and postoperative complications in orthognathic surgery: a systematic review. Clin Oral Investig. 2015;19(5):969-77.
16. Simpson W. Problems encountered in the sagittal split operation. Int J Oral Surg. 1981;10(2):81-6.
17. Falter B, Schepers S, Vrielinck L, Lambrichts I, Thijs H, Politis C. Occurrence of bad splits during sagittal split osteotomy. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2010;110(4):430-5.
18. Posnick JC, Choi E, Liu S. Occurrence of a 'bad' split and success of initial mandibular healing: a review of 524 sagittal ramus osteotomies in 262 patients. Int J Oral Maxillofac Surg. 2016; 45(10):1187-94.
19. Reyneke JP, Tsakiris P, Becker P. Age as a factor in the complication rate after removal of unerupted/impacted third molars at the time of mandibular sagittal split osteotomy. J Oral Maxillofac Surg. 2002;60(6):654-9.
20. Friscia M, Sbordone C, Petrocelli M, Vaira LA, Attanasi F, Cassandro FM, et al. Complications after orthognathic surgery: our experience on 423 cases. Oral Maxillofac Surg. 2017;21(2):171-7.

21. Aarabi M, Tabrizi R, Hekmat M, Shahidi S, Puzesh A. Relationship between mandibular anatomy and the occurrence of a bad split upon sagittal split osteotomy. J Oral Maxillofac Surg. 2014; 72(12):2508-13.
22. Wang T, Han JJ, Oh HK, Park HJ, Jung S, Park YJ, Kook MS. Evaluation of mandibular anatomy associated with bad splits in sagittal split ramus osteotomy of mandible. J Craniofac Surg. 2016;27(5):e500-4.
23. Guernsey LH, DeChamplain RW. Sequelae and complications of the intraoral sagittal osteotomy in the mandibular rami. Oral Surg Oral Med Oral Pathol. 1971;32(2):176-92.
24. Tom WK, Martone CH, Mintz SM. A study of mandibular ramus anatomy and its significance to sagittal split osteotomy. Int J Oral Maxillofac Surg. 1997;26(3):176-8.
25. Wolford LM, Bennett MA, Rafferty CG. Modification of the mandibular ramus sagittal split osteotomy. Oral Surg Oral Med Oral Pathol. 1987;64(2):146-55.
26. Scomparin L, Soares MQ, Rubira CM, Yaedu RY, Imada TS, Centurion BS, et al. CBCT location of the fusion between the buccal and lingual cortical in the mandibular ramus: importance to sagittal split osteotomy. Med Oral Patol Oral Cir Bucal. 2017;22(4):e500-e5.
27. Sant'Ana E, Souza DPE, Temprano AB, Shinohara EH, Faria PEP. Lingual Short Split: A Bilateral Sagittal Split Osteotomy Technique Modification. J Craniofac Surg. 2017;28(7):1852-4.
28. Telha W, Abotaleb B, Zhang J, Bi R, Zhu S, Jiang N. Correlation between mandibular anatomy and bad split occurrence during bilateral sagittal split osteotomy: a three-dimensional study. Clin Oral Investig. 2023;27(3):1035-42.
29. Jiang N, Wang M, Bi R, Wu G, Zhu S, Liu Y. Risk factors for bad splits during sagittal split ramus osteotomy: a retrospective study of 964 cases. Br J Oral Maxillofac Surg. 2021;59(6):678-82.
30. Mensink G, Verweij JP, Frank MD, Eelco Bergsma J, Richard van Merkesteyn JP. Bad split during bilateral sagittal split osteotomy of the mandible with separators: a retrospective study of 427 patients. Br J Oral Maxillofac Surg. 2013; 51(6):525-9.
31. Fujii Y, Hatori A, Horiuchi M, Sugiyama-Tamura T, Hamada H, Sugisaki R, et al. Computed tomography evaluation of risk factors for an undesirable buccal split during sagittal split ramus osteotomy. PLoS One. 2023;18(3):e0279850.
32. Noleto JW, Marchiori E, Da Silveira HM. Evaluation of mandibular ramus morphology using computed tomography in patients with mandibular prognathism and retrognathia: elevance to the sagittal split ramus osteotomy. J Oral Maxillofac Surg. 2010;68(8):1788-94.

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KDJ Khon Kaen University Dental Journal

ลักษณะสำคัญของกายวิภาคขากรรไกรล่างที่สัมพันธ์กับการแยกผิดแนวในการผ่าตัดขากรรไกรชนิดแซจิทัลสปลิทเรมัสออสทีโอโตมี

วีรยุทธ์ สุวรรณ์ทวีกุล[1] วรางคณา วีระวานิช[2] ธนัชพร ทองงาม[3] คณิน อรุณากูร[4,]*

บทความวิจัย

บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาผลของลักษณะทางกายวิภาคของขากรรไกรล่างที่มีต่ออุบัติการณ์ของการแยกผิดแนวในการผ่าตัดขากรรไกรชนิดแซจิทัลสปลิทเรมัสออสทีโอโตมี

วัสดุอุปกรณ์และวิธีการ: เก็บข้อมูลลักษณะทางกายวิภาคต่างๆ ของขากรรไกรล่างจากภาพรังสีส่วนตัดอาศัยคอมพิวเตอร์ลำรังสีรูปกรวยก่อนการรักษาของผู้ป่วยจำนวน 50 รายที่เคยได้รับการผ่าตัดขากรรไกรชนิดแซจิทัลสปลิทเรมัสออสทีโอโตมี ประกอบด้วยผู้ป่วย 10 รายที่พบว่าเกิดการแยกผิดแนว และผู้ป่วย 40 รายที่ไม่พบว่าเกิดการแยกผิดแนว วิเคราะห์ข้อมูลโดยใช้สถิติการถดถอยโลจิสติกแบบมีเงื่อนไข

ผล: พบว่าค่าความสูงจากลิงกูลาถึงจุดที่เชื่อมกันของกระดูกทึบด้านใกล้แก้มและด้านใกล้ลิ้นที่น้อยลงและความหนาของกระดูกเรมัสที่ตำแหน่งลิงกูลาที่หนามากขึ้นมีความสัมพันธ์กับอุบัติการณ์ของการแยกผิดแนว และผลการวิเคราะห์เส้นโค้งพบว่าความสูงจากลิงกูลาถึงจุดที่เชื่อมกันของกระดูกทึบด้านใกล้แก้มและด้านใกล้ลิ้นที่น้อยกว่า 7.5 มิลลิเมตรมีความสัมพันธ์อย่างมีนัยสำคัญต่อการเกิดการแยกผิดแนว

บทสรุป: ลักษณะทางกายวิภาคของขากรรไกรล่างข้างต้นมีความสัมพันธ์กับอุบัติการณ์ของการแยกผิดแนวในการผ่าตัดขากรรไกรชนิดแซจิทัลสปลิทเรมัสออสทีโอโตมี ทันตแพทย์จึงควรตระหนักถึงความเสี่ยงที่จะเกิดการแยกผิดแนวและให้การผ่าตัดอย่างระมัดระวังในผู้ป่วยที่มีลักษณะดังกล่าว

คำไขรหัส: ภาพรังสีส่วนตัดอาศัยคอมพิวเตอร์ลำรังสีรูปกรวย/ การแยกผิดแนว/ ลักษณะทางกายวิภาคของขากรรไกรล่าง/ การผ่าตัดขากรรไกรชนิดแซจิทัลสปลิทเรมัสออสทีโอโตมี

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