A Bony Landmark ‘RAI Triangle’ to Prevent ‘Misplaced and Misdirected’ Medial Cut in SSRO

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Abstract ‘Rai triangle’, a new anatomic landmark on the medial surface of the ramus of the mandible which when identified and taken into consideration, may have a definite advantage. This is especially in terms of performing the medial horizontal cut which is an important and integral part of the sagittal split ramus osteotomy so as to avoid a bad split. The objective of this article is to propose an easily identifiable bony land mark, which is closely related to lingula of mandible that may ease the procedure of osteotomy and avoid bad splits.

Keywords Rai triangle · SSRO · Medial cut

Introduction

Sagittal split ramus osteotomy of the mandible is a versatile and reliable operation—used to advance or set back the mandible [1]. This could be the procedure which defined the evolution of the specialty of oral surgery, the art, to the specialty of oral and maxillofacial surgery, the science. Basic design of the sagittal ramus split surgical procedure evolved very quickly. The elimination of the problems encountered has taken longer. Some of these problems are yet to be satisfactorily resolved [2].

Structural identification of small triangular bony landmark—Rai triangle (Fig. 1a, b) on medial mandibular ramus may give optimal advantage in carrying out medial osteotomy cut, the sensitive part of the sagittal split osteotomy procedure. Until today the author of the article has used this simple has used this simple bony landmark as guide to horizontal cut in over 100 sagittal split osteotomies, for both advancement and setback procedures, and has not noted any adverse splits on the medial side of the mandible with this maneuver, or any increase in post-operative lip paraesthesia.

Technical Note

Surgical access for the sagittal split osteotomy is performed in a standard manner. The temporalis muscle insertion is detached to at the level of the sigmoid notch. Soft tissue retraction was done on the anterior ramus. A periosteal elevator is then inserted sub-periosteally on the medial aspect of the ramus, above the foramen. Once the inferior alveolar nerve is identified at the lingula, proper suctioning of blood field is carried out for better visualization. Then the medial aspect of the ramus is carefully visualized to appreciate the bony landmark—Rai triangle at the vicinity of neurovascular bundle which will always be noted upon retraction of medial flap. The triangle is formed mainly by the small outward projecting bone from the medial ramus, lingula. Base of the triangle will be towards the anterior border of ramus formed by mandibular ridge and tip pointing towards the posterior border. Its superior and inferior arm is formed by elevation of lingula on medial surface of ramus merging in coronoid process and mylohyoid ridge respectively. An imaginary line which divides the triangle into superior and inferior

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Fig. 1 a Illustrating *Rai triangle* at the medial aspect of ramus of a dry mandible. *Inner picture* highlighting the *Rai triangle* (outlined). **b** Linear description of *Rai triangle* and imaginary line bisecting the *Rai triangle*; shaded area showing lower compartment and nonshaded area upper compartment of the triangle

compartment is always perpendicular to the posterior border of ramus which is independent of R-OP angle (Fig. 2). R-OP angle is defined as the angle between the ramus (medial side) of the mandible and the occlusal plane. The upper compartment of the triangle is considered to be the safe region as this is well above the

Fig. 2 Placing and directing the bur cut taking the *Rai triangle* as guide; one can note the bur cut within the triangular upper compartment sparing the lower compartment and directing along the line bisecting the triangle

neurovascular bundle which helps in placing the osteotomy cut safely without damaging the nerve (Fig. 3a, b). One more important factor to be noted is the upper compartment coincides with the bicortices region of ramus from where the cortices start fusing rendering paucity of medullary space. So the placement of the cut should be within the confines of upper compartment of Rai triangle and the angle of the bur or saw should follow the line dividing the Rai triangle or its tip. The cut is then carried to the lingual fossa to complete the medial osteotomy.

In cases where the tip of the lingula or the triangle is not well defined then the superior compartment is taken as guide to place and the medial cut along the required R-OP angle modification (A 10–15° inferior positioning of the bur as related to the occlusal plane is when the R-OP angle is less than 70°) [3]. When used with R-OP angle modification it further enhances its accuracy. We have used this bony landmark as a guide to medial cut in all appropriate instances without encountering any of the above mentioned complications.

Though we have postulated the safety of Rai triangle in placing medial cut of SSRO, it is humbly suggested and hoped that more studies are undertaken to know the anatomic peculiarity (Fig. 3a) and technical importance of this triangle. Repeated cadaveric studies carried out in 50 dry mandibles in our institution have consistently reproduced this critical bony land mark.

Fig. 3 **a** Intraoperative view of Rai triangle. **b** Placement of medial cut

References

1. Witherow H, Offord D, Eliahoo J, Stewart A (2006) Postoperative fractures of the lingual plate after bilateral sagittal split osteotomies. *Br J Oral Maxillofac Surg* 44(4):296–300
2. Wyatt WM (1997) Sagittal ramus split osteotomy: literature review and suggested modification of technique. *Br J Oral Maxillofac Surg* 35(2):137–141
3. Carleton AS, Schow SR, Peterson LJ (1986) Prevention of the misdirected sagittal split. *J Oral Maxillofac Surg* 44(1):81–82