

Determination of Dental Midline in Camouflage Orthodontic Treatment of Facial Asymmetry: A Deprecatory Photographic and Cast Prediction

Rahul Roy^{1*} Debapratim Jana² Kanheya S. Prasad³ Swati S. Acharya⁴ Sanjeeb K Sahu⁵

¹PG Student, Department of Orthodontics, Institute of Dental Sciences, SOA University, Bhubaneswar, Odisha, India.

²PG Student, Department of Orthodontics, Institute of Dental Sciences, SOA University, Bhubaneswar, Odisha, India.

³PG Student, Department of Orthodontics, Institute of Dental Sciences, SOA University, Bhubaneswar, Odisha, India.

⁴Reader, Department of Orthodontics, Institute of Dental Sciences, SOA University, Bhubaneswar, Odisha, India.

⁵Professor and Head, Department of Orthodontics, Institute of Dental Sciences, SOA University, Bhubaneswar, Odisha, India.

ABSTRACT

Background: Facial asymmetry is one of the challenging problems in orthodontics. Dental midline location being one of the critical and key ingredient in such type of malocclusions. Patients with severe facial asymmetry are treated with combined orthognathic surgery and orthodontics to improve their occlusion and facial esthetics.

Aims & Objectives: The determination focuses on the appropriate diagnostic aids with landmarks to define location of dental midline, interaction between maxillary midline deviation with incisor crown angulation, long term outcome in facial asymmetry cases and improving esthetics to promote the patients' quality of life.

Materials & Methods: The significant parameters in set up models and extraoral smiling photographs are taken into consideration to define location of dental midline and accomplish necessary requirements for a successful treatment of facial asymmetry.

Results: A reliable method to check dental midline discrepancies in asymmetrical malocclusions with ideal overbite and overjet.

Discussion: In camouflage treatment for facial asymmetry its difficult to locate dental midline. So a guide can help us evaluate the dental midline in such type of malocclusions for a good outcome. Simultaneously its very important to even assess the mesiodistal inclination of the incisors for improving esthetics.

Keywords: Crown angulation, Dental midline, Facial asymmetry, Mesiodistal inclination.

INTRODUCTION

The location of dental midline relative to facial midline is stressed as an important parameter in diagnosis and treatment planning procedures. Arguably, the evaluation of a patient's frontal asymmetry is challenging and critical part of diagnosis this is the common perspective which a patient will be observing quite often¹. Deviation of

midline structures to the right or left is never considered to be normal. In facial asymmetry cases the dental midlines do not coincide with the facial soft tissue midline². This is mostly because of skeletal asymmetries in which the maxilla or the mandible are malpositioned relative to the facial skeleton. Asymmetric treatment mechanics may increase the treatment duration and often requires surgical intervention along with orthodontics.

Received: Oct. 17, 2016; Accepted: Dec. 2, 2016

*Correspondence Dr. Rahul Roy.

Department of Orthodontics, Institute of Dental Sciences, SOA University, Bhubaneswar, Odisha, India.

Email: Not Disclosed

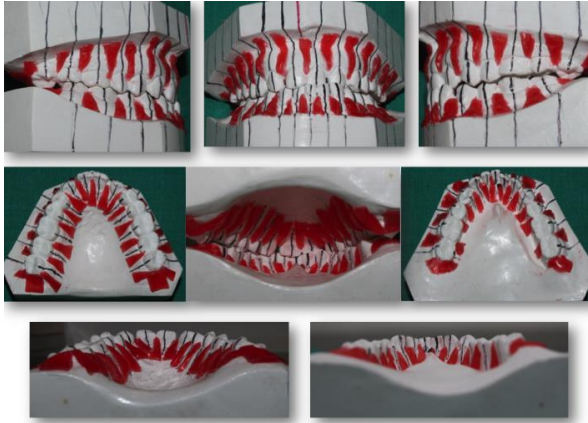


Fig 1: Set up Model for locating the Dental midline and interaction between maxillary midline deviation with incisor crown angulation in casts.

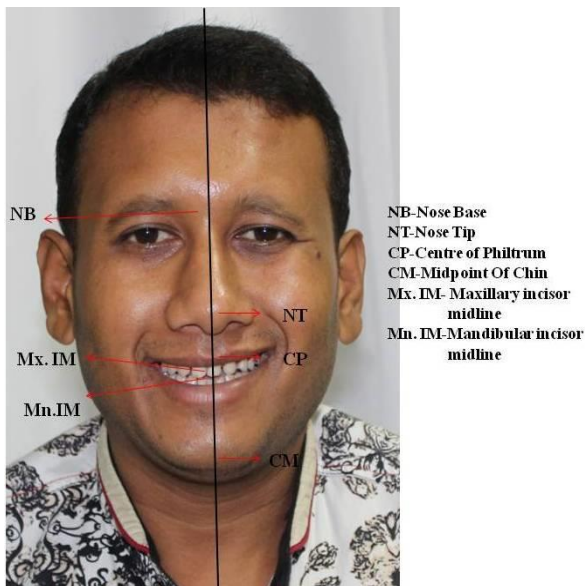


Fig 2: Photographic analysis for locating the Dental midline.



Fig 3: Photographic analysis for evaluating the mesiodistal inclination of maxillary incisor.

AIMS & OBJECTIVES

The location of dental midline along with degree and extent of dental midline deviation in facial asymmetry cases is often difficult to record. The degree of asymmetry that lies outside of the limits of acceptability is just based on subjective opinion as there are no absolute or accepted standards by which a judgement could be made. This innovative approach focuses on the appropriate diagnostic aids with landmarks to define location of dental midline, interaction between maxillary midline deviation with incisor crown angulation, long term outcome in facial asymmetry cases and improving esthetics to promote the patients' quality of life.

Materials & Methods

Initial planning of treatment is a must for facial asymmetrical cases with shift of dental midline. Patients with severe facial asymmetry are treated with combined orthognathic surgery and orthodontics to improve their occlusion and facial esthetics. The significant parameters in set up models and extraoral smiling photographs are taken into consideration to define location of dental midline and accomplish necessary requirements for a successful treatment of facial asymmetry. The dental casts show transverse dental compensation of maxillary and mandibular incisors and posteriors. A clear midline discrepancy exists between maxillary and mandibular arches. The red line indicates the dental midline and black lines indicate the long axis of teeth in maxilla and mandible. The interaction between maxillary midline deviation with incisor crown angulation in casts is well marked and requires a distal inclination of incisors during treatment(Fig 1).

Most of the patients evaluate their facial midline relative to soft tissue structures. Mostly a line connecting the corners of the mouth and centre of philtrum is a method of assessment by them. The centre of philtrum was suggested to be a reliable guide to the facial midline. Hence, location of dental midline can be defined as a line passing through the centre of philtrum, perpendicular to a line passing through left & right corners of mouth in reference to an extraoral frontal smiling photograph of a patient. Hence the dental midline could be ideally located in

facial asymmetry cases to improve facial esthetics.
(Fig 2)

The landmarks used here are:

1. Nose Base 2. Nose tip 3. Centre of Philtrum 4. Maxillary incisor Midline 5. Mandibular incisor midline 6. Midpoint of chin

The interaction between maxillary midline deviation and incisor crown angulation using these introral frontal photograph.(Fig 3)

The distance between the dental & facial midlines helps in correcting the midline in facial asymmetrical cases after a surgical correction of asymmetry is done.

RESULTS

A reliable method to check dental midline discrepancies in asymmetrical malocclusions with ideal overbite and overjet. It is recognized that changes in facial features other than the arrangement of the teeth may also affect dentofacial attractiveness. The present novel approach of generating landmarks, measuring the distance between the dental & facial midlines and locating the dental midline in facial asymmetry is to minimize possible confounding influences along with an ideal treatment outcome. In clinical terms, it is vital to know what size of dental to facial midline discrepancy is acceptable and unlikely to affect dentofacial aesthetics.

DISCUSSION

The severity and nature of facial asymmetry will dictate whether the discrepancy can be completely or partially solved by orthodontic treatment^{3,4}. In growing individuals, orthopaedic appliances along with orthodontics help, to correct the developing skeletal problems^{5,6,7}. Asymmetries of skeletal origin treated only with orthodontics might dictate certain compromises^{8,9,10}. Severe discrepancies may require a combination of surgery and orthodontic treatment^{11,12,13,14}.

One of the goals was to establish general guidelines for evaluating the location of dental midline to facial soft tissue midline in facial asymmetry cases. In ideal situation, facial midline landmarks are base of nose, nose tip, centre of

philtrum, maxillary incisor midline, mandibular incisor midline and mid point of chin which would be aligned with facial soft tissue midline and the goal post orthodontic treatment would be to match the dental midline with facial midline. Results from the analysis suggest the ideal location of maxillary dental midline in facial asymmetrical cases should be determined using the facial and dental landmarks seen in the extraoral frontal smiling photograph and casts. Simultaneously its very important to even assess the mesiodistal inclination of the incisors for improving esthetics. This was evaluated using dental casts where the long axis of each tooth (black lines) in maxilla and mandible were drawn and dental midline (single red line) was marked. Hence brackets should be bonded on the labial surfaces of incisor crowns with good angulations to control their inclinations.

Second order bends can be additionally given into rectangular wires in the incisor region , and anterior cross elastics can be given to prevent any side effects as required. Hence, dental midlines coincide with each other with a great favourable incisor mesiodistal inclinations to improve oral esthetics of the patient. In posteriors , the buccolingual inclinations can be maintained by torque control of rectangular wires.

CONCLUSION

Facial asymmetries need special consideration in diagnosis and treatment planning. Acceptability on the location of dental midline in such cases is challenging. Usually, a 2mm or greater deviation of dental midline is easily detectable but a proper analysis is needed to carry out a treatment plan. The extent to which treatment should be addressed in such type of asymmetrical cases with deviation of dental midline depends on magnitude of deviation, characteristics of individual, risks and costs associated with treatment options to correct detected deviations. This approach of predicting dental midline by photographic and cast analysis in facial asymmetrical cases helps to improve oral esthetics and quality of life.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Barker JH, Brown T, David DJ, Nugent MA. The treatment of facial disharmony and malocclusion by jaw surgery. Case reports. Aust Dent J 1991;36:183-205.
2. Sekiya T, Nakamura Y, Oikawa T, Ishii H, Hirashita A, Seto K. Elimination of transverse dental compensation is critical for treatment of patients with severe facial asymmetry. Am J Orthod Dentofacial Orthop 2010;137:552-62.
3. Bishara SE, Burkey PS, Kharouf JG. Dental and facial asymmetries: a review. Angle Orthod 1994;64:89-98.
4. Burstone CJ, Marcotte MR. Problem solving in orthodontics. Carol Stream, Ill: Quintessence; 2000. p. 150.
5. Pirttiniemi PM. Associations of mandibular and facial asymmetries-a review. Am J Orthod Dentofacial Orthop 1994; 106:191-200.
6. Jung SK, Kim TW. Treatment of unilateral posterior crossbite with facial asymmetry in a female patient with transverse discrepancy. Am J Orthod Dentofacial Orthop 2015;148:154-64.
7. Anhoury PS. Nonsurgical treatment of an adult with mandibular asymmetry and unilateral posterior crossbite. Am J Orthod Dentofacial Orthop 2009;135:118-26.
8. Beyer JW, Lindauer SJ. Evaluation of dental midline position. Semin Orthod 1998;4:146-52.
9. Arnett GW, Bergman RT. Facial keys to orthodontic diagnosis and treatment planning—part II. Am J Orthod Dentofacial Orthop 1993;103:395-411.
10. Johnston CD, Burden DJ, Stevenson MR. The influence of dental to facial midline discrepancies on dental attractiveness ratings. Eur J Orthod 1999;11:311-24.
11. Miller EL, Bodden WR Jr, Jamison HC. A study of the relationship of the dental midline to the facial median line. J Prosthet Dent 1979;41:657-60.
12. Proffit WR, Turvey TA. Dentofacial asymmetry. In: Proffit WR, White RP Jr, editors. Surgical-orthodontic treatment. St Louis: Mosby Year Book; 1991. p. 532-6.
13. Posnick JC. Craniofacial and maxillofacial surgery in children and young adults. Philadelphia: W. B. Saunders; 2000. p. 1068-70.
14. Jerrold L, Lowenstein J. The midline: diagnosis and treatment. Am J Orthod Dentofacial Orthop 1990;97:453-62.
15. Kokich VO Jr, Kiyak HA, Shapiro PA. Comparing the perception of dentists and lay people to altered dental esthetics. J Esthet Dent 1999;11:311-24.