OPEN ACCESS at journalijcir.com

Research Article ISSN: 2395 -5775

PREVALENCE OF MIDLINE SHIFT IN ORTHODONTIC PATIENTS

Jain.S[1], Jain.V[2] and Gupta. A[2]

Abstract

The aim of this prospective study was to provide the prevalence of midline shift , nose deviation ,chin deviation and functional deviation with respect to facial midline in routine orthodontic patients. Data were acquired from 300 patients who came to department of orthodontics, Government College of dentistry Indore. Out of 300 patients 166 were having Class I molar relation, 122 were of Class II molar relation and 12 were of Class III molar relation. The total prevalence of total midline shift was found to be 77%. Mandibular dental midline deviation from the facial midline are most commonly seen asymmetry traits. Class I patients were found to have maximum midline shift.

Key Words: Apical base midline ,Facial midline, Functional deviation, Prevalence

INTRODUCTION

Symmetry means similar arrangement in form and relationships of parts around a common axis of the body, whereas asymmetry means disproportion between two or more like parts. Any deviations from normal facial and dental proportions in homologous parts result in dentofacial asymmetry.[1] Slight facial asymmetry can be found in normal individuals, even in those with aesthetically attractive faces. This minor facial asymmetry is common, usually indiscernible and does not require any treatment.

The point at which 'normal' asymmetry becomes 'abnormal' cannot be easily defined and is often determined by the clinician's sense of balance and the patient's sense of imbalance.[2]

Severt and Profit found clinically apparent facial asymmetry in 1/3 of the dentofacial deformity population, lower third of face was affected more frequently than upper and middle third of face.[3]

Based on the craniofacial structures involved, facial asymmetry can be classified into dental, skeletal, and functional components.[4] Dental asymmetry may be due to a congenital missing tooth or teeth,early loss of deciduous teeth, tooth rotation, crowding, spacing, and habits such as thumb sucking etc. Skeletal asymmetry may involve malpositioning of maxilla and/or mandible relative to the facial skeleton, or it may affect a number of skeletal structures on one side of the face, as in hemi-facial microsomia, unilateral TMJ ankylosis,Unilateral fibro-osseus lesion involving alveolus,cleft lip and palate. Functional asymmetry may result from the lateral deflection of mandible due to presence of occlusal interferences which prevent proper intercuspation in the centric position or may be caused by a constricted maxillary arch or a local factor such as a malpositioned tooth.

There are six important midlines which must be determined- facial midline, skeletal midline, maxillary apical base midline, mandibular apical base midline, maxillary dental midline and mandibular dental midline. (fig 1)

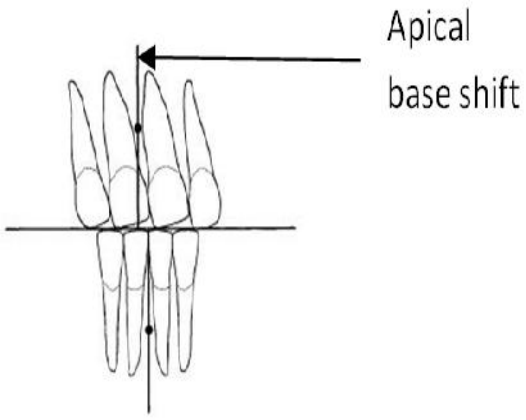

Fig1 shows coincident upper and lower dental midline and noncoincident upper and lower apical base

These upper and lower midline conditions may occur in different combinations in any patient. All combinations may occur with or without functional shift of mandible.

[1,2]Department of Orthodontics, GDC Indore, M.P ,India
Correpondence and Reprint Requests: Jain.S
Received: November 20 , 2015 | **Accepted:** December 12, 2015 | **Published Online:** December 28 , 2015

Conflict of interest: None declared | **Source of funding:** Nil

Facial or dental asymmetry can be diagnosed by thorough clinical and radiographic examination (OPG,PA cephalogram,Lateral cephalogram or by CBCT).The extent to which the maxillary midline deviates from the facial soft-tissue midline is commonly recorded, presumably because an objective will be for the two midlines and the mandibular midline to be coincident after orthodontic treatment. Facial landmarks, such as the nose, philtrum,and chin, often used as references for maxillary midline positioning.[5] Arnett and Bergman noted that the philtrum is usually a reliable midline structure and can, in most instances, be used as the basis for midline assessment.[6] Facial aesthetic evaluation is an important part of the orthodontic treatment-planning process. One of the primary goals of orthodontic treatment is the attainment of the best facial aesthetic appearance for a given patient.

The orthodontist must justify the burden of treatment when determining whether to correct or accept a maxillary midline deviation. Ultimately, the most important factor in that decision might be the degree to which the deviation negatively affects perceived dental and facial esthetics.

Accurate early diagnosis will enable the clinician to formulate proper treatment plan otherwise it may be get worsen during treatment. Without data on prevalence and severity it has not been possible to evaluate alternate causes for asymmetries and their predictability. So need of the present study is to find out the prevalence of midline shift in orthodontic patients.

AIMS AND OBJECTIVES

1. To find out the prevalence of midline shift i.e upper dental midline, lower dental midline, upper apical base, lower apical base with respect to facial midline in Orthodontic patients.
2. To find out the prevalence of nose deviation , chin deviation and functional deviation with respect to facial midline in Orthodontic patients

MATERIAL AND METHOD

Sample size calculation was done using formula $4pq/e^2$, here p is prevalence of midline shift which was taken from previous similar studies and e is precision level, set at 0.05. 370 patients were selected randomly coming to department of Orthodontics, College of dentistry, Indore. The inclusion criteria employed for selection of samples were-

1. Age group of 13- 30 years
2. No history of trauma
3. No major local/systemic problems which affects the growth and development of facial structures or body eg. Cleft lip and palate
4. No orthodontic or interceptive treatment carried out.

Out of total sample, 70 patients were not fulfilling the stated criteria so excluded from the study. The sampling frame comprised of approximate 300 patients (table 1) class III molar relation. Out of 300 patients 166 were having Class I molar relation, 122 were of Class II molar relation and 12 were of Class III molar relation. Ethical clearance was obtained from the Institutional ethical Board, while informed consent was also obtained from the subjects.

Table 1 Occlusal classifications of subjects

Malocclusion	n(300)
Class I	166
Class II	122
Class III	12

Each patient was examined for midline evaluation. During examination patient was instructed to look forward with back straight in sitting posture without using headrest. Midline evaluation form of each patient was filled by single investigator included in the study. All midlines were checked by taking philtrum as a guide. Evaluation includes upper dental midline, lower dental midline, upper apical base, lower apical base with respect to facial midline and also nose deviation and chin deviation with respect to facial midline. Apical base midline shift was checked by identifying the points of the centre of the roots of the upper and lower central incisors, this median point of the roots is called the apical base points. Perpendiculars are drawn to the occlusal plane from these points to evaluate the apical base midline discrepancy. Also functional deviation was a recorded in initial contact at centric occlusion. Each recording was checked twice by same investigator to eliminate intra-observer error.

RESULTS

On analyzing the data, it was found that 77% patients showed midline deviation in routine clinical examination. Out of total midline shift, 21 % patients showed upper dental midline shift , 43% patients showed lower dental midline shift which is nearly twice of upper dental midline shift. 13 % patients showed upper apical base midline shift , 23%

patients showed lower apical base midline shift which is nearly twice of upper apical base midline shift. 20 % patients showed nose deviation while 28 % showed chin deviation. 9 % patients showed functional deviation. Figure 2 shows representation of above data with the help of bar graph.

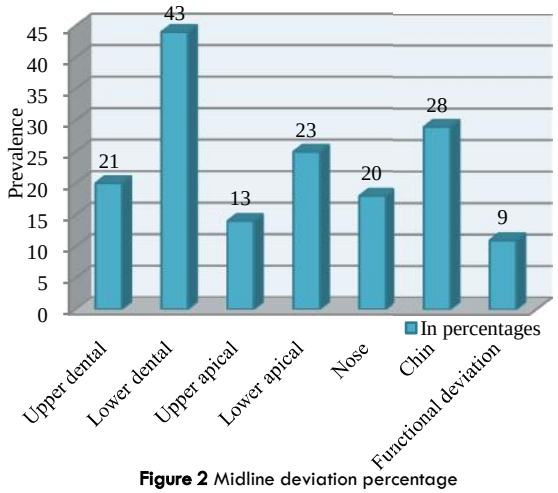

Figure 2 Midline deviation percentage

This study found functional deviation was most commonly present in class III malocclusion. (Table 2)

Table 2 Functional Deviation in different malocclusion

Malocclusion	Functional deviation
Class I	10.8% (18 out of 166)
Class II	7% (8 out of 122)
Class III	50% (6 out of 12)

Among all patients which had midline shift, maximum deviation of face (including skeletal, dental, functional, nose and chin deviation) was found in Class I patients. Figure 3 shows representation by pie diagram.

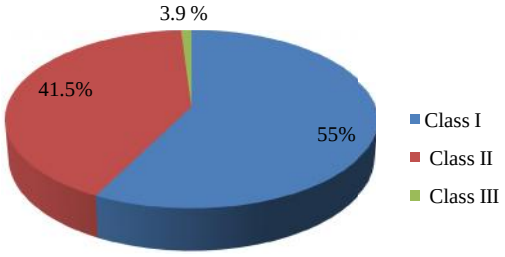

Figure 3 Midline deviation in different malocclusion groups

DISCUSSION

The clinical impact of coordinated facial, maxillary and mandibular midlines to a successful orthodontic result and good facial equilibrium cannot be denied.Therefore the clinical significance of this research was to highlight the importance of dento-facial asymmetry during orthodontic diagnosis and treatment planning. Evaluating asymmetries and their predictability without the data on prevalence would not be possible. Key results of this cross-sectional study showed that non-coincident dental midline was most commonly seen asymmetry trait, mandibular dental midline shift was more common in comparison to maxillary dental midline shift and functional deviation was the least commonly observed asymmetry trait but it was commonly seen in Class III malocclusion, apical base shift was more commonly seen in class I malocclusion.

Diagnosis of facial asymmetry at an early age will help the clinicians to intercept the developing asymmetry. Early diagnosis of mandibular asymmetry is important to prevent other deformities like canting of occlusal plane, posterior crossbites etc. Clinician can detect and differentiate the reason for different midline discrepancies at early stage in a patient. For instance, a patient showing dental midlines discrepancy may be having apical base (skeletal) midline discrepancy and an underlying skeletal problem which adds to the facial asymmetry and must be diagnosed accordingly to devise a proper treatment plan.

Also the type and severity of midline shifts is important as the treatment mechanics is based on the type of midline shifts.

Apical base measurement is very important for detecting skeletal asymmetries so as to impart correct treatment. When there is a true apical base discrepancy, the translatory mechanics are required whereas in non-surgical cases we do not decompensate dental compensations. i.e compensatory axial inclinations should be maintained.

Mandibular dental midline deviation from the facial midline was most commonly seen asymmetry traits in the present study similar to the findings of Sheats *et al* [7] and Nita Kumari Bhateja and Mubassar Fida[1] who also found maximum mandibular dental midline deviation from the facial midline among orthodontic patients.

Sheats *et al* also found lack of dental midline coincidence in 46%, maxillary midline deviation from the facial midline (39%), molar classification asymmetry (22%), maxillary occlusal asymmetry (20%), mandibular occlusal asymmetry (18%), facial asymmetry (6%), chin deviation (4%) and nose deviation (3%).Unlike present study both above mentioned studies did not evaluate the prevalence of

apical base shift , functional deviation and also the prevalence of midline shifts in different types of malocclusion.

Study by Borzabadi and Eslamipour[8] determine the prevalence of malocclusions and occlusal traits in an Urban Iranian population; they found non coincident dental midlines in 23.7% of their sample. In contrast, this study found non coincident dental midlines in 77% of the sample. This large difference in frequencies could be because their study was large population based where as our study was restricted on orthodontic patients.

Midline asymmetries require special attention in orthodontic diagnosis and treatment planning because orthodontists often treat patients with dental or facial midline shifts. Coincident midlines are an important component of functional occlusion and can be used as a clinical guide to establish ideal intercuspation.

CONCLUSION

The prevalence of total midline shift was found to be 77%. Out of total midline shift, maximum shift was found among Class I patients. Among all types of midline shifts, mandibular dental midline deviation from the facial midline was most commonly seen asymmetry trait. In different types of malocclusion, functional deviation was found maximum in Class III patients.

References

1. Nita Kumari Bhateja, Mubassar Fida, Attiya Shaikh Frequency Of Dentofacial Asymmetries: A Crosssectional Study On Orthodontic Patients J Ayub Med Coll Abbottabad 2014;26(2):129–33
2. Bishara Se, Burkey Ps, Kharouf Jg. Dental And Facial Asymmetries: A Review. Angle Orthod 1994;64:89–98.
3. Severt Tr, Proffit Wr. The Prevalence Of Facial Asymmetry In The Dentofacial Deformities Population At The University Of North Carolina. Int J Adult Orthodon Orthognath Surg 1997;12:171–6.
4. Chang Gung Facial Asymmetry: Etiology, Evaluation, And Management Med J Vol. 34 No. 4 July-August 2011
5. Jeffrey W Beyer And Steven J. Lindauer Evaluation Of Dental Midline Position (Semin Orthod 1998;4:146-152.)
6. Ar Nett Wg, Bergman Rt. Facial Keys To Orthodontic Diagnosis And Treatment Planning—Part II. Am J Orthod Dentofac Orthop 1990;103:395-411
7. Sheats RD, McGorray SP, Musmar Q, Wheeler TT, KingGJ. Prevalence of orthodontic asymmetries. Semin Orthod 1998;40:138–45.
8. Borzabadi-Farahani A, Eslamipour F. Malocclusion and occlusal traits in an Arban Iranian population. An epidemiological study of 11- to 14-yearold children. Eur J Orthod 2009;31:477–84

****