

Effect Of Incisor Procumbency On Soft Tissue Nasolabial Angle – Do The Numeric Values Really Matter?

¹Dr. Pratik Gandhi, ²Dr. Kalpesh Patel, ³Dr. Hina Desai, ⁴Dr. Nikunj Patel, ⁵Dr. Milind Patel, ⁶Dr. Viral Harsora, ⁷Dr. Wasim Patel

Department Of Orthodontics Manubhai Patel Dental College, Vadodara, Gujrat, India

Abstract: The newer concept of orthodontic diagnosis and treatment is attainment of facial harmony as the main goal. To predict the changes in soft tissue profile over time has still remained a challenge. This article mainly describes the importance of soft tissues which is required for treatment planning in orthodontics. The aim of present study is to find out the relation between lower compartment of nasolabial angle and inclination of upper incisor. This study used the cephalometric radiographs of 82 subjects. All the patients were randomly selected from orthodontic department of Manubhai Patel Dental College. The nasolabial angle was constructed and divided in upper and lower compartment according to Scheideman. Both these compartment were compared with upper incisor inclination. No relationship found between lower compartment of nasolabial angle and upper incisor inclination. We cannot blindly depend on acute nasolabial angle as criteria to retract upper anterior to achieve lip fallback.

Keywords: Orthodontic Diagnosis, Nasolabial Angle.

1. INTRODUCTION

Edward Hartley Angle the father of modern orthodontics believed in ideal dental occlusion, ideal jaw relationship and temporomandibular joint in relation to dental occlusion, but newer concept for orthodontic treatment goals mainly depend on soft tissue paradigm. Angle suggested that the soft tissue would assume a harmonious position, only when the dentition was intact and arranged in an ideal and prime occlusion.

Tweed proposed the use of a hard tissue diagnostic and treatment planning with the assumption that an upright mandibular incisor over the basal bone was stable and esthetic¹. Reidel stated that the ultimate goal of orthodontics is magnificence, which includes ideal form, function and esthetics².

There are four main factors on which the soft tissue paradigm mainly depends; they are (1) functional occlusion, (2) soft tissue movement in relation to display of teeth, (3) soft tissue proportion and its adaptations, (4) equilibrium effects and ideal soft tissue proportions that define ideal hard tissue.

The newer concept of orthodontic diagnosis and treatment is attainment of facial harmony as the main goal. To predict the changes in soft tissue profile over time has still remained a challenge.

A frequently used soft tissue parameter in orthodontic diagnosis is the nasolabial angle, which is formed by two lines, namely, a columella tangent and an upper lip tangent.

The range of nasolabial angle in the Indian population as given by Dr. Jay P Fitzgerald is $96.1^{\circ} (+ 9.7^{\circ})^3$. Hellman designated that variations from normal occur in the soft tissue even in the presence of a normal occlusion⁴.

There are two main component of nasolabial angle, the upper and lower compartment. The upper compartment mainly depends on columella inclination and lower compartment is related to maxillary incisor inclination.

The aim of this study was to check the correlation between the nasolabial angle and the inclination of maxillary incisors.

2. MATERIAL AND METHODS

This study used the cephalometric radiographs of 82 subjects. All the patients were randomly selected from Orthodontics department of Manubhai Patel Dental College. The mean age of the sample was 22 years with a range from 20 years 6 months to 24 years 9 months. The selection criteria of the patients for this study was based on that the patient which never had gone under the orthognathic surgery or orthodontic treatment.

The cephalometric radiographs which were taken had the lips in relaxed neutral position allowing a more precise anatomy of the lip and were traced on 0.003 inch matte acetate tracing paper⁵. The nasolabial angle was formed by drawing a line tangent to the base of the nose and a line tangent to the upper lip.

To evaluate the inclination of upper incisor, S-N plane was drawn as a reference plane. According to Steiner the advantage of using these two midline points (S and N point) is that they are moved only a minimal amount whenever the head deviates from the true profile position and this plane remains true even if the head is rotated in the cephalostat⁶.

According to Scheideman et al a postural horizontal line was drawn through Sn which further divided the nasolabial angle into columella tangent to postural horizontal and upper lip tangent to postural horizontal. They argued that each of these angles should be assessed individually in as much as they very independently⁷.

After obtaining values for all selected patients statistical analysis to evaluate the correlation between incisor inclination and lower compartment of nasolabial angle has been carried out.

Table – I (Descriptive statistics)

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Nasolabial angle	82	55	115	93.32	12.136
Upper incisor inclination	82	84	137	116.74	9.723
Lower Compartment	82	45	96	69.6951	10.54759

Table – II (Pearson correlation test)

		Nasolabial angle	Lower Compartment
Upper incisor inclination	Pearson Correlation	-.229*	-.320**
	P-value	0.039	0.003
	N	82	82

3. RESULTS

The results are summarized in Tables I and II. The Pearson Correlation test has been done to check the correlation between the upper incisor inclination and the lower compartment of nasolabial angle.

According to table -1 the mean value and standard deviation for nasolabial angle is 93.32° with standard deviation of + 12.13°, for upper incisor inclination the mean value is 116.74° with standard deviation of + 9.72° and for lower compartment of nasolabial angle the mean value is 69.69° with standard deviation of 10.54°.

The result we have got that there is no correlation between the nasolabial angle and upper incisor inclination and between the upper incisor inclination and lower compartment of nasolabial angle. According to Pearson correlation test, when the upper incisor inclination increases the nasolabial angle and its lower compartment decrease in only 23 and 32 cases respectively, both this value are negative and statistically insignificant. The P-value for nasolabial angle and its lower compartment is 0.039 and 0.003 which is not significant.

4. DISCUSSION

The role of the soft tissue profile is crucial in the diagnosis and the treatment planning of the orthodontic patient. It is apparent that orthodontic treatment leads to certain changes in soft tissue profile, although its extent is variable. The changes in the soft tissue profile induced by orthognathic or plastic surgery are even more substantial and pronounced. Therefore, the soft tissue profile must be carefully examined before a deciding orthodontic treatment⁸⁻²⁴.

Review of the nasolabial angle is important for deciding the extraction pattern in orthodontic treatment. Many orthodontists believe that if the nasolabial angle is acute than extraction of 1st premolar is must and if the angle is less then extraction of 2nd premolar. But this approach for deciding extraction pattern is wrong according to this study. Soft tissue profile also plays an important role for deciding extraction pattern.

Holdaway stats that if the lip strain is more than lip thickness than lip will not follow during maxillary incisor retraction²⁵.

The nasolabial angle may vary from person to person; it could be average, small, or large. This angle, when measured alone provides inadequate information as it does not reveal the component which is responsible for the variability. It could either be the nose, the lip, or both. Hence it is essential to analyze each component of this angle to aid in the differential diagnosis of normal from its variation.

The soft tissue pelt is independent in their form, from the underlying facial skeleton. The literature supports independence of the soft tissue structures from underlying facial skeleton. In case of independence of the soft tissue exists, then the soft tissue coat has to be given due importance while planning out the orthodontic treatment for various dentofacial disharmonies.

5. CONCLUSION

In this study, we found that there is no correlation between upper incisor inclination and lower compartment of nasolabial angle. So we cannot blindly treat the patient who has upper incisor procline and acute nasolabial angle with extraction plan. An orthodontist should also consider structure of lip for treatment planning. Further studies should be carried out in order to evaluate more reliable relationship between nasolabial angle and upper incisor inclination.

REFERENCES

- [1] Tweed CH. Indications for the extraction of teeth in orthodontic procedure. AM J ORTHOD SURG 1944; 30:401-60.
- [2] Riedel RA. Esthetics and its relation to orthodontic therapy. Angle Orthod 1950; 20:168-78.
- [3] Jay fitzgerald. An evaluation of the nasolabial angle and the relative inclinations of the nose and upper lip. Am J Orthod Dentofacial Orthop 1992; 102:328-34.
- [4] Hellman M. Some facial features and their orthodontic implication. AM J ORTHOD ORAL SURG 1939; 25:927-51.
- [5] Hillesund E, Fjeld D, Zachrisson BU. Reliability of soft tissue profile in cephalometrics. AM J ORTHOD 1978; 74:537-50.
- [6] Steiner CC. Cephalometrics for you and me. AM J ORTHOD 1953; 39:729-755.
- [7] G.B. Scheideman, W.H. Bell, H.L. Legan, R.A. Finn, J.S. Reisch. Cephalometric analysis of dentofacial normal. AM J ORTHOD 1980; 78:404-420.
- [8] Waldo CM. Orthodontic research as a component part of a balanced longitudinal study of 100 children. INT J ORTHOD 1936; 22:659-73.

- [9] Pelton JW, Elasser WA. Studies of dentofacial morphology. IV. Profile changes among 6829 white individuals according to age and sex. *Angle Orthod* 1995; 25:199-207.
- [10] Subtenly JD. The soft tissue profile, growth and treatment changes. *Angle Orthod* 1961; 31:105-22.
- [11] Enlow DH. A morphologic analysis of facial growth. *AM J ORTHOD* 1996; 52:283-98.
- [12] Posen JM. A longitudinal study of the growth of the nose. *AM J ORTHOD* 1967; 53:746-56.
- [13] Chaconas SL. A statistical evaluation of nasal growth. *AM J ORTHOD* 1969; 56:403-14.
- [14] Chaconas SJ, Bartroff JD. Prediction of normal soft tissue facial changes. *Angle Orthod* 1975; 45:12-25.
- [15] Bishara SE, Peterson LC. Changes in facial dimensions and relationships between the ages of 5 and 25 years. *AM J ORTHOD* 1984; 85:238-51.
- [16] Bloom LA. Perioral profile changes in orthodontic treatment. *AM J ORTHOD* 1961; 47:371-80.
- [17] Rudee DA. Proportional profile changes concurrent with orthodontic therapy. *AM J ORTHOD* 1964; 50:421-34.
- [18] Hershy HG. Incisor tooth retraction and subsequent profile change in post-adolescent female patients. *AM J ORTHOD* 1972; 61:45-53.
- [19] Garner LD. Soft tissue changes concurrent with orthodontic tooth movement. *AM J ORTHOD* 1974; 66:367-75.
- [20] Jacob JD. Vertical lip changes from maxillary incisor retraction. *AM J ORTHOD* 1978; 74:396-404.
- [21] Rains MD, Nanda R. Soft tissue changes associated with maxillary incisor retraction. *AM J ORTHOD* 1982; 81:481-90.
- [22] Mansour S, Burstone C, Legan H. An evaluation of soft tissue changes resulting from Lefort I maxillary surgery. *AM J ORTHOD* 1983; 84:37-48.
- [23] Meng HP, Goorhuis J, Kapila S, Nanda DS. Growth changes in the nasal profile from 7 to 18 years of age. *AM J ORTHOD DENTOFAC ORTHOP* 1988; 94:317-26.
- [24] Singh RN. Cephalometric changes in the soft tissue chin after orthodontic treatment. *AM J ORTHOD DENTOFAC ORTHOP* 1990; 98:41-6.
- [25] Holdaway RA. A soft tissue cephalometric analysis and its use in orthodontic treatment planning. Part 1. *AM J Orthod* 1983; 84:1-28.