

# Soft Tissue Esthetic Profile of Nepalese Adults

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## ABSTRACT

**Introduction:** The soft tissue norms for any population sample aids in formulating a guideline for use in diagnosis, treatment planning and prognosis in orthodontic and orthognathic treatment.

**Objective:** The present study investigates the soft tissue facial profile (STFP) of Nepalese adults to develop a parameter for diagnostic tool in orthodontics.

**Materials and Method:** Acceptable profile photographs of one hundred Nepalese adult subjects having normal occlusion and orthognathic skeletal relation were evaluated using soft tissue reference points on forehead, upper lip and chin. Angular measurement was depicted.

**Result:** The mean GI-LS-Pog angle for Nepalese female was 163.36o, male was 161.97o and for combined subjects was 162.66o. The statistical analysis revealed no significant difference in mean STEP measurement between the gender groups.

**Conclusion:** The soft tissue esthetic profile (STEP) is a new simple norms developed as a diagnostic tool useful in orthodontic treatment for Nepalese adults; furthermore it may be appreciated in artistry, portrait photography and in evaluation of beauty peasant.

**Keywords:** Esthetics; facial profile; Nepalese; soft tissue.

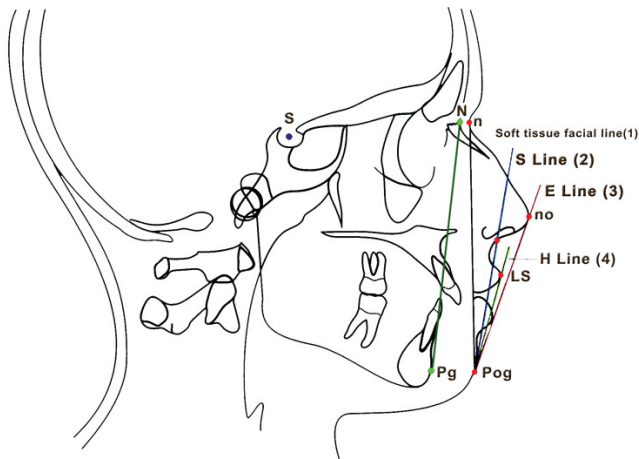
## INTRODUCTION

Enhancement of facial esthetics and improvement of oral functions are the major motivating factors for patients seeking orthodontic treatment. Contemporary orthodontics and Dentofacial orthopedics have come to imply not only the occlusal excellence, but also result in optimal facial harmony for the individual patients. In fact, the patients are more interested in improvement of facial profile, position of lips and the chin; they are little concerned with the bony changes as exhibited in the cephalogram.

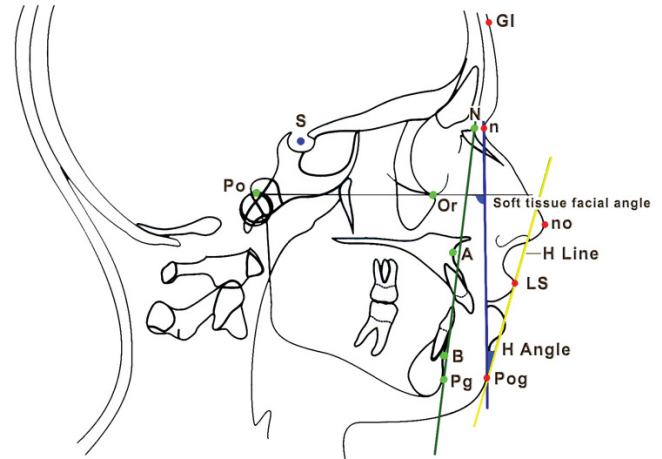
The soft tissue facial profile (STFP) of the patient can be evaluated on clinical examination, lateral cephalometric radiograph and profile photograph. A careful examination of the profile photograph

yields the same information on facial profile as obtained with the lateral cephalometric radiograph. Documentation of the facial photographs essentially involves recording of the clinical finding, confirmation of the clinical observations, and post-operative comparison.

The soft tissue veneer covering the facial skeleton and teeth varies so widely that the study of dentoskeletal pattern may be inadequate in evaluating the facial disharmony; thus the measurement of soft tissue parameter are of paramount importance in the practice of orthodontics. Position of teeth according to the accepted skeletal cephalometric criteria does not necessarily result in a satisfactory soft tissue profile. The overlying soft tissue integument may not be in a harmonious manner with the underlying skeletal structures. Thus the facial harmony should



**Figure 1: Commonly used soft tissue facial lines.**



**Figure 2: Holdaway's soft tissue facial analysis.**

not be judged by simply analyzing the dental occlusion and skeletal structures. Soft tissue facial assessment requires an independent appraisal in addition to the skeletal and dental analysis in order to deduce a comprehensive diagnosis and treatment planning of the face.

The soft tissue integument of the face is a dynamic entity whose response and behavior to orthodontic treatment is not reciprocated in a manner similar to that of the skeletal or dental structures. Soft tissue varies considerably in thickness, length, postural tone and expression; and its response to dental and skeletal correction is different in different individuals and at different times and age. Soft tissue facial growth follows independent curve to that of the hard tissues, which are age related and exhibit sexual dimorphism. And, there is significant ethnic and racial variation in facial structures and appearance.<sup>1</sup>

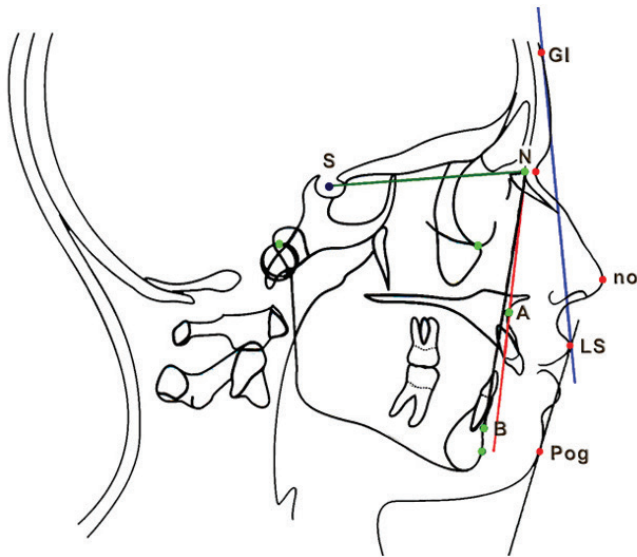
Basic objectives of the STFP analysis are to evaluate jaw proportions in antero-posterior plane of space; to evaluate vertical facial proportions and mandibular plane angle; and to evaluate incisor prominence and lip posture. The facial convexity or concavity resulting from the disproportionate jaws suggest skeletal malocclusion, and divergence of the face.<sup>2</sup> The steep mandibular plane angle suggest long anterior vertical facial dimension and anterior open bite, while flat mandibular plane angle is associated with short anterior facial height and deep bite. Detecting excessive incisor protrusion or retrusion can help to analyze the available dental arch space. Protruded teeth with separated and everted lips are evident in bimaxillary dentoalveolar protrusion. Besides, profile study can disclose facial horizontal thirds ratio, nasal prominence, nasolabial angle, lip

incompetence, lip thickness, chin prominence, and chin thickness.

Various methods of STFP analyses have been described by various researchers each having their own significance and applicability. Ricketts' esthetic plane or E- line draws a tangent to the soft tissue chin and the nose tip.<sup>3</sup> Steiner's S-line, drawn from the soft tissue pogonion to the mid-point of the S-shaped curve between sub-nasale and the nasal tip (Figure 1).<sup>4</sup> Holdaway's analysis introduced the concept of Harmony line or H-line which is drawn as a tangent to the chin and the upper lip (Figure 2).<sup>5,6</sup> Merrifield's profile line or Z-angle expresses the extent of lip protrusion in malocclusion.<sup>7</sup> Subtelny devised angular profile analysis, which gives an analysis of the convexity of the profile.<sup>8</sup> William Arnett et al depicted soft tissue cephalometric analysis (STCA), a comprehensive method to analyze integumental profile.<sup>9</sup> Swhwarz profile analysis determines the forward or backward shift of the lower jaw with reference to the facial plane.<sup>10</sup>

## MATERIALS AND METHOD

The materials used in the study consisted of right sided color profile photographs of one hundred Nepalese adults of age ranging from 17 to 32 years of equal female to male ratio. The subjects were selected according to the inclusion criteria established for the research. The samples possessed all permanent teeth, normal occlusion with Class I canine and molar relationships, normal overjet and overbite, absence of crowding and spacing in the dentitions. The skeletal pattern consisted of orthognathic maxillo-mandibular relationship with SNA, SNB and ANB angles within the normal range determined according to Steiner's



**Figure 3: Soft tissue esthetic profile (STEP) and Steiner's cephalometric analysis.**

cephalometric norms for Nepalese adults.<sup>11</sup> The facial profile was considered as acceptable when the samples possessed normal facial proportions without maxillary or mandibular discrepancy on researcher's observation.

Soft tissue esthetic profile (STEP) of the Nepalese adults was determined by depicting the angular measurement on profile photographs of the samples meeting the inclusion criteria. The reference points determined for measurement were glabella (Gl); the most prominent point on forehead, labrale superius (LS); superior border of the upper lip and soft tissue

pogonion (Pog); the most prominent point on the soft tissue chin (Figure 3). The angular facial profile measurement was taken by connecting two lines glabella (Gl) to labrale superius (LS) and labrale superius (LS) to soft tissue pogonion (Pog) using a cephalometric protractor (Ormco Co. USA) on the photograph.

Descriptive statistics of the measurement of STEP of the Nepalese subjects was calculated separately for female, male and combined samples. A statistical analysis using Student's t-test was performed to analyze the statistical difference between the measurement of Nepalese female and male samples.

## RESULT

The comparative soft tissue esthetic profile (STEP) angular measurement as measured with the reference points Glabella (Gl), labrale superius (LS) and soft tissue pogonion (Pog) and cephalometric measurements according to Steiner's analysis of the Nepalese adults is given in Table 1. The descriptive statistics of the STEP shows that the mean Gl-LS-Pog for female subjects was 163.36°, for male subjects was 161.97° and for combined female and male subjects was 162.66° (Table 2). The statistical analysis revealed that there is no significant difference between the mean STEP of Nepalese females with that of the males (Table3).

**Table 1: Comparative STEP and cephalometric measurements of Nepalese subjects.**

	Gl-LS-Pog	SNA	SNB	ANB
Female	163.36°	82.63°	80.07°	2.56°
Male	161.97°	82.23°	79.64°	2.61°
Combined	162.66°	82.43°	79.86°	2.59°

**Table 2: Descriptive statistics of STEP (Gl-LS-Pog) of Nepalese subjects.**

	Mean	SD	Range
Female	163.36°	4.85	23°
Male	161.97°	4.81	22°
Combined	162.66°	4.86	23°

**Table 3: t-test of significance for the difference between the STEP of Nepalese female and male subjects.**

	Female		Male		p-Value	Sig
	Mean	SD	Mean	SD		
Gl-LS-Pog	163.36	4.85	161.9	4.81	0.177823	NS

(NS: Not significant)

## DISCUSSION

Various researchers have described various methods<sup>3-10</sup> to analyze soft tissue facial profile (STFP) using various soft tissue reference points, however the author have opted glabella (Gl), labrale superius (LS) and soft tissue pogonion (Pog) as the most appropriate reference points that represent the face for the angular measurement of soft tissue esthetic profile (STEP). These landmarks are the most prominent and easily reproducible reference points on forehead, upper lip and chin on which the impact of orthodontic, dentofacial orthopedic and orthognathic treatment can be appreciated. Moreover, these structures make angular facial profile distinguished as convex or concave; that are even noticed by the patients showing their concern to orthodontists.

In the present study, the rigid inclusion criteria of normal occlusion and orthognathic skeletal relation with the selection of adult subjects having acceptable facial profile refer the analysis of soft tissue facial profile (STFP) to proposed soft tissue esthetic profile (STEP). The adult subjects have been chosen for the study as there will be cessation of facial growth and face form will have established with such age group.

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## CONCLUSION

The soft tissue esthetic profile (STEP) of the Nepalese adults was devised. The mean STEP of the Nepalese adults was found to be 162.66° with the range of 23°; with no statistical difference between the female and male subjects. The STEP angle below this range should be considered convex facial profile and above this range should be considered the concave profile for Nepalese adults.

The orthodontic treatment objectives are aimed at attainment of harmonious well balanced face and stable occlusion. Soft tissues of the face show great variations in thickness and presentation which may mask the underlying skeletal pattern. Thus soft tissue analyses like STEP can be an integral and significant component of the orthodontic diagnosis. The norms are however, only a guide; soft tissue analysis should be viewed with consideration to race, ethnicity, sex, age and individual pattern of the person. It should be noted that the functional normalcy and esthetic beauty lie within a range. Hence, a single point should not be considered a datum.

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