RESEARCH ARTICLE

INCISOR DISPLAY DURING SMILE: AGE & GENDER CORRELATIONS

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ARTICLE INFO	ABSTRACT
	Evaluating age and gender related change is important to determine the abnormality happening to the soft tissues, incisors display with increasing age and in different gender. When we are aware of the normal profile, soft tissue, and incisor display during smile then only we will be able to treat abnormal changes in smile and incisor display and bring back to its normal condition. The sample sizes of 90 subjects were selected from the Uttar Pradesh population between the age group of 15 and 45 years. They were divided into three age groups. Esthetics in orthodontics has been defined mainly in terms of profile enhancement, but if we ask a lay person or a patient, their answer will usually include something about creating beautiful smiles. The study concluded that the lip commissure height, both left and right followed the same pattern of the lip length where-in, they show an increase in length as the age increases. This was markedly seen in males than in their female counterparts and aging leads to a significant decrease in the maxillary central incisor display at smile.

INTRODUCTION

Smile is one of the most effective means by which people convey their emotions (Hulsey, 1970). It is rightfully considered a valuable tool of non-verbal social communication, a civilized form of human contact, and a sound criterion of facial attractiveness. Improving the balance and harmony is the main goal of orthodontic treatment. It also includes dental aesthetic planning, facial smile along with the coordination of macroethetics (the face), miniesthetics (the smile) and microesthetics (the dental esthetic component) for a complete approach to aesthetic planning (Drummond, 2016). The dental and facial changes occur throughout the life of an individual (Cosendey, 2012). Appropriate knowledge of age-related smile changes and general age-specific guidelines can help the orthodontist to maximize the dentofacial esthetics and obtain healthy, long-lasting results for patients of all age groups[4]. Esthetics in orthodontics has been defined mainly in terms of profile enhancement, but if we ask a lay person or a patient, their answer will usually include something about creating beautiful smiles (Bilal, 2016). Evaluating age and gender related change is important to determine the abnormality happening to the soft tissues, incisors display with increasing age and in different gender (Drummond, 2016). Therefore, it is necessary to consider facial appearance determined by soft tissue analysis as well as analysing normal facial profile and tooth exposures to study abnormality in facial profile and about tooth exposure depending on age (Van der Geld, 2008). When we are aware of the normal profile, soft tissue, and incisor display during smile then only we will be able to treat abnormal changes in smile and incisor display and bring back to its normal condition. There are two forms of smiles- the enjoyment, and the posed or social smile (Sarver, 2003). Posed smiles gained importance in dentistry and in orthodontics mainly because they are repeatable over time (Zachrisson, 1998). According to Sarver, the Smile arc is defined as the relationship of the curvature of the incisal edges of the maxillary incisors and canines to the curvature of the lower lip in the posed smile (Sarver, 2003). Ackermann introduced the smile mesh and describe the morphometric analysis of smile by highlighting the attributes of macro, micro and mini esthetics of smile. These attributes are smile arc, smile line, buccal corridors, incisor show, gum show, tooth size, tooth and gingival colour to name the few. This opened up a totally new dimension of orthodontic diagnosis (Ackerman, 2002). Orthodontic diagnosis has come a long way and now includes patient-driven aesthetic diagnosis and treatment planning along with its problem oriented approach. The re-emergence of the soft -tissue paradigm in clinical orthodontics has made smile analysis, a key element in diagnosis and treatment planning along with cephalometry and study models (Ackerman, 2002).

MATERIALS AND METHODS

This study was approved by the Institutional Research and Development Committee (IRDC) and Institutional Human

Ethical Committee (IHEC) of Saraswati Dental College, Lucknow. It was conducted in the Department of Orthodontics and Dentofacial Orthopedics, Saraswati Dental College, Lucknow. The sample sizes of 90 subjects were selected from the Uttar Pradesh population between the age group of 15 and 45 years.

They were divided into three age groups

- Group I - 15-24 years
- Group II - 25-34 years
- Group III - 35- 44 years.

The inclusion criteria are as follows

- All the participants presented with clinically healthy maxillary and mandibular incisors and good periodontal attachment and dental alignment.
- Anterior teeth with normal over jet and over bite
- No crowding or spacing
- No missing tooth/teeth.

The exclusion criteria were as follows

- Active orthodontic treatment or completed treatment in the past 5 years.
- Orthognathic surgery or facial plastic surgery.
- Periodontal surgery in the region of the incisor.
- Veneers or prosthetic crowns on the incisors, prosthetic or cosmetic increase in the crown length of the maxillary incisors.
- Severe periodontal disease affecting the incisors.
- Limitation in facial mobility.
- Severe dentofacial deformity.
- Missing teeth in the anterior region, fractured or worn incisors, or malocclusions that could affect the outcome of the study, such as a deep overbite, an increased overjet, and an anterior open bite and crossbites.

A Natural Head Position (NHP) was chosen for standardization of subjects. Nikon D3400, DSLR camera with 18-55 mm optical zoom was placed on a tripod approximately 90 cm from the subject. This distance of 90 cm was standardized by placing the chair in a marked fixed position and tripod stand also in a fixed marked position. The subjects were seated on a chair, and a sterilized metallic scale was given to the subject to hold with their hand below the chin during speech and smile. Magnification of the lens (micro lens) was set at 35X; the focal length was 5.3 and shutter speed 1/60 with ISO –A6400 as aperture was used to photographs. The lens was adjusted to be parallel to the occlusal plane. The subjects were instructed to maintain a Natural Head Position by looking forward straight into the lens of the camera. The subjects were instructed to hold the head in natural head position. The subjects were photographed with posed smiles (because posed smiles are the most repeatable) after seating them in a Natural Head Position. Pictures were taken in the same environment with the same natural lighting conditions by using Nikon D3400 DSLR Camera. Since all subjects do not have individually repeatable smiles, three smile images of each subject were taken and the most natural or representative smile for the application of the smile analysis were selected. The photographs were transferred

to the computer and were re-sized with Adobe Photoshop (version 7, Adobe systems, San Jose, CA, USA) following which measurements were taken with Digimizer software(version 5.3.4). The unit for measurement was calibrated in each photograph with the help of the same software.

Figure 1. Nikon D3400 and tripod stand used for taking the photographs

Figure 2. Set up inside the photographic room

The following measurements of the teeth and soft tissue were recorded:

- Upper lip length
- Right lip commissure height
- Left lip commissure height
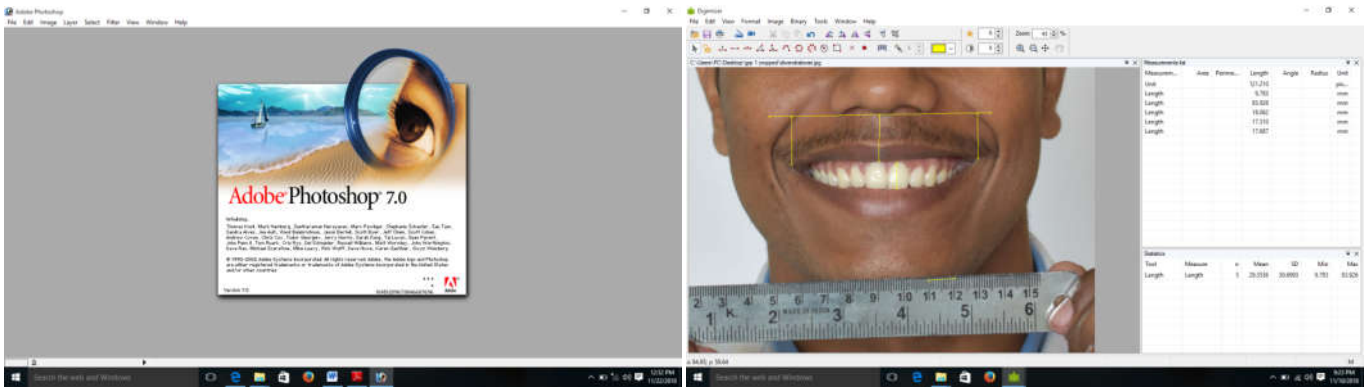- The greatest exposure of the maxillary central incisor in posed smile.
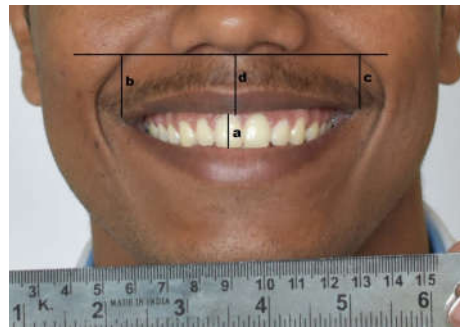
Figure 3. Softwares (Adobe Photoshop &Digimizer)

Figure 4. Measurements taken on a posed smile frame: (a) Incisal exposure (b) Right commissure length (c) Left commissure length (d) Lip length

RESULTS

Table 1. Comparison of CI-Photography between Male & Female

GENDER		Mean	SD	Mean Diff.	t-value	p-value
CI-Photography	Male	7.67	1.45	0.00	0.00	.998
	Female	7.67	1.60			

Table 2. Comparison of RLC-Photography between Male & Female

GENDER		Mean	SD	Mean Diff.	t-value	p-value
RLC-Photography	Male	18.74	2.97	2.62	3.92	<0.001
	Female	16.12	3.36			

Table 3. Comparison of LLC-Photography between Male & Female

GENDER		Mean	SD	Mean Diff.	t-value	p-value
LLC-Photography	Male	17.35	3.61	2.84	3.59	.001
	Female	14.51	3.90			

Table 4. Comparison of LL-Photography between Male & Female

GENDER		Mean	SD	Mean Diff.	t-value	p-value
LL-Photography	Male	17.12	2.45	2.36	4.79	<0.001
	Female	14.75	2.22			

DISCUSSION

In this study while comparing the photographs of upper central incisor between males and females, it was found that the mean value of central incisor among males was 7.67±1.45, while among the females was 7.67±1.60. No significant difference was found in central incisors – Photography values between males and females (p=0.998). Consistent with this study, Ackerman MB et al. established that there was no significant difference in amount of incisor exposure during posed smile when the gender was compared.

In the study by Drummond et al[2] they reported a gender dimorphism in incisor exposure starting at the age of 25years with men exhibiting less display than their women counterparts. As per the study conducted by Motta *et al.* (2010) display of upper incisors decline with age in both genders, but males showed less of their upper central incisor than females in Brazilian population. Al-Habahbeh *et al.* (2013) also pointed out decrease of maxillary central incisor tooth display with age. In the present study on comparing the photography of right lip commissure (RLC) height between males and female, it was found that the mean RLC among males was 18.74±2.97,

while among females was 16.12±3.36. Highly significant difference of p<0.001 was found in RLC. Confirmation of the above result was further stamped by Drummond *et al.* (2016) and Chetan *et al.* (2013), where they found a similar difference between male and female where it was greater in males. The gender dimorphism was very much significant when commissural height was taken into consideration. Dickens *et al.* (2002), found an increase in commissural height by 1.3 mm in males and 1.1 mm in females from 16 to 40 years, the report he had stated supports this present study even though they didn't specify about right lip commissure height and left lip commissure height. The commissural height at rest gradually increased with age in both sexes. According to Namratha *et al.* (2017) mean values for all age groups were greater for males as compared with females; however, there were no significant gender differences within the groups Namratha *et al.* (2017). On comparing the left lip commissure (LLC) height in the present study between male and female, it was found that the mean LLC among males was 17.35±3.61, while among females, it was 14.51±3.90. Highly significant difference was found in LLC – photography values between males and females. The result was in accordance with the study done by Drummond et al. (Drummond, 2016) and Chetan *et al.* (2013) and it was more in males. Further, Drummond *et al.* (2016), in their study stated that the difference in the gender was more significant when the age group was more than 25 years old. Dickens *et al.* (2002), reported an increase in commissural height by 1.3 mm in males and by 1.1 mm in females between 16 to 40 years. On comparing the lip length between male and female, it was found that the mean lip length among males was 17.12±2.45, while among females, it was 14.75±2.22. Highly significant difference was found in LL- photography values between males and females. Consistent with this study, Drummond *et al.* (2016) reported that there was a significant difference in the mean values of the lip length in males and females in all the age groups. They verified the occurrence of gender dimorphism and showed that lip length was short in females when compared to the males. Confirming the same is the study done by Chetan *et al.* (2013), concluding that in general lip length is more in males than in females. According to Namratha *et al.* (2017) the upper lip length at rest increased with age in both sexes from 16 to 39 years. An increase in resting upper lip length could be attributed to the loss of resting muscle tone, increased flaccidity, and redundancy with age.

Conclusion

- With increasing age, there is an increase in the upper lip length, particularly in men.
- The lip commissure height, both left and right followed the same pattern of the lip length where-in, they show an increase in length as the age increases. This was markedly seen in males than in their female counterparts.
- Aging leads to a significant decrease in the maxillary central incisor display at speech and smile.
- This difference in the display of central incisor was more significant in men showing a marked decreasein posed smile .
- The aging changes in the soft tissue were more identifiable from 25 years onwards.

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