

Comparison of mean upper lip length in individuals with competent lips, lips apart and incompetent lips

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Abstract

Introduction: Lips competency is considered as an important feature in facial attractiveness and short upper lips are considered as one of the etiological agents behind lips incompetency. Therefore, this study was aimed to evaluate the mean of upper lip length difference in individuals with competent, apart and incompetent lips at clinically rest position.

Material and Methods: Total of 66 (n=22 each group) Class I and vertically normal angle individuals between age range of 12-19 years were included for their upper lip length retrospectively. Individuals were divided into three main groups based on inter labial gap at lips repose. Group 1- Competent Lips (inter labial gap =0mm), Group 2- Lips Apart (inter labial gap >0mm ≤4mm), Group 3- Incompetent Lips (inter labial gap >4mm). Upper lip lengths were assessed as mean and standard deviations. For the comparison of mean upper lip lengths among three groups, ANOVA test was applied. Difference of upper lip length between genders was calculated by applying Independent Sample t Test.

Results: Mean values of upper lip length for group 1, 2 and 3 were 20.04mm ±2.8, 18.81mm ±2.0 and 19.00 mm±2.6 respectively. The mean upper lip length for males was 19.61mm ±2.6 and for females was 19.07mm ±2.4. P value for difference of upper lip length among all three groups combined was 0.228, which was insignificant and p value for the difference of upper lip length between genders was 0.404 which was also statistically insignificant (p< 0.05 was considered as significant).

Conclusions: This study showed statistically insignificant difference of upper lip length among individuals with various lip positions at repose and also statistically insignificant difference of upper lip lengths between genders.

Keywords: Orthodontics; lip competency; inter labial gap

Introduction

Improvement of facial appearance is usually the major objective of orthodontic treatment. There are

numerous studies on the factors related to facial attractiveness and difference of perception between laypersons and orthodontists. Most of the studies have pointed out the importance of lips competency as one of the factors in facial attractiveness.¹ Therefore, identifying lips position in repose and the etiological agents behind lips incompetency have a significant role in orthodontic patients' management.

Clinically, competent lips are defined as when the lips are closed without significant muscular activity at rest position. For individuals having incompetent lips, significant activity of the lower lip and

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unusual movement of the tongue is needed in order to close the lips². While the terms potentially competent, lips apart or pseudo-incompetent are used to describe the lips posture when there is a limited gap between the upper and lower lips. The upper limit for lips apart is 4mm for all ethnicities, above that lips separation at repose is categorized as incompetent lips.³

Regarding the etiology of incompetent lips, variety of factors can be responsible for the increased inter labial gap, such as raised overjet, anterior open bite, excessive facial height and reduced upper lip length.⁴

Previous studies had evaluated the relationship between the various factors like overjet, overbite, upper incisor inclinations, ANB angle and incompetent lips⁵⁻⁷. But till date none of the studies have evaluated the difference of upper lip length by keeping these factors as a constant, in individuals with various lip positions like competent, incompetent and with lips apart on clinical examination at lips repose.

As number of approaches like clinical examination, facial photographs, cephalometric radiographs, electromyographic activity, pressure-distribution sensor and infrared spectroscopy have been employed in previous literature to evaluate the lips sealing ability². Each of these methods has their own advantages, purposes and limitations. Till date, clinical examination for evaluation of craniofacial features like lip length and competence is considered as a routine protocol.

Therefore, this study was aimed to evaluate the mean difference of upper lip length in individuals with various lip positions at rest like competent, apart and incompetent on clinical examination.

Material and Methods

The approval of this study was granted by Ethics Review Committee of Margalla Institute of Health Sciences, Rawalpindi.

It was a cross-sectional observational study for which individuals were selected based on the convenient sampling technique.

Inclusion criteria was individuals of age range 12-19 years of both genders and with full dentition present till permanent first molars.

Individuals were further selected based on skeletal Class I relationship (ANB 0-4 degrees) and vertically normal angle based on MMA (21-29 degrees) and SNMP (28-36 degrees).

Individuals with history of any orthodontic treatment, orthognathic surgery, anomalies of craniofacial region, with history of any cosmetic lip lengthening procedure, rhinoplasty or with parafunctional habits like bruxism were excluded from the study.

Data was collected retrospectively. Initial records of all those patients who had presented for their Orthodontic treatment at Orthodontics Department of Margalla Institute of Health Sciences, between January 2014 and January 2020 were evaluated. Data about inter labial gap and upper lip length of patients who were skeletally Class I and vertically normal angle at pretreatment stage was collected.

Data was then was divided into three groups based on inter labial gap at rest position³.

Group 1- Competent Lips (inter labial gap =0mm)

Group 2- Lips Apart (inter labial gap >0mm ≤4mm)

Group 3- Incompetent Lips (inter labial gap >4mm)

Data of total 66 patients (n=22 each group) was included, 26 males and 40 females. Mean age was 14.39 ± 2.6 years.

Data was analyzed using Statistical Package for Social Sciences (SPSS Version 21.0). Quantitative variables were assessed as mean and standard deviation and the groups were then compared by 1-way analysis of variance (ANOVA). Difference of upper lip length between genders was calculated by

Independent Sample t Test. P value < 0.05 was considered as significant.

Results

Mean lengths of upper lip for various lip positions at repose are mentioned in table 1.

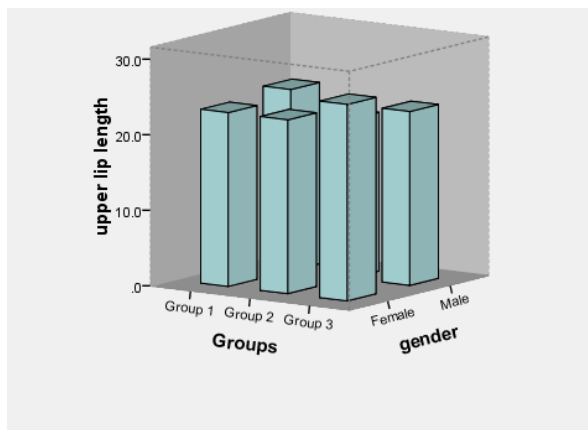
Table1: Mean upper lip length for all three groups.

Group	Mean Upper Lip Length	Standard Deviation
1	20.04mm	2.8
2	18.81mm	2.0
3	19.00mm	2.5

Group1: Competent lips, Group2: Lips apart, Group3: Incompetent lips.

P value for the difference of upper lip lengths among all three groups combined was 0.228, which was insignificant ($p < 0.05$ was considered as significant).

Mean upper lip lengths for both genders, group wise are shown in graph 1.



Graph 1: Mean upper lip length(mm) in relation to gender

After measuring the difference of mean upper lip lengths between males and females, Independent Samples t Test was applied, p value was 0.404 which was statistically insignificant.

Discussion

Evaluating lips competency plays a significant role in orthodontic diagnosis and treatment planning and incompetent lips are considered as a pathology. This if left untreated, can lead to various complications like development of an anterior open bite and gingival inflammation around incisors.⁹ According to current available literature number of researchers have evaluated the multifactorial etiology behind lip incompetency. In a study by Leonardo et al¹⁰, correlation was evaluated between competent and incompetent lips with dentofacial morphology. According to their results, in the subjects with incompetent lips class II skeletal relationships, raised lower anterior facial height and retro-positioned pogonion was observed.

While in a study by Hamdany A, lip length between different skeletal classes of malocclusion was compared. Class I subjects had higher values of upper lip length compared to Class II and Class III. The difference was significant between Class I, III and II, III.¹¹ Hassan et al observed skeletal and dental characteristics of subjects with incompetent lips on lateral cephalogram. Results showed significantly larger interlabial gap, shorter and thinner upper lips and shorter lower lips.¹²

While all of these studies had compared the lips incompetency with different dentofacial features, none of them have evaluated the difference of upper lip length between various competency groups on clinical examination. None of these studies was done on Pakistani population as well. Unfortunately, there is a paucity of information on this research question in the literature, hence this study was aimed to assess whether upper lip length differs in individuals with various lip positions at repose, while keeping sagittal and vertical skeletal pattern as constant. According to the results of this study it does differs, but not statistically significant.

Results of this study also gave the average upper lip lengths in individuals with different lip competencies at repose in Pakistani population.

Regarding the sexual dimorphism related to upper lip length, a study conducted by Siekwe et al¹³ on Nigerian Population showed significant differences. Zhuang et al¹⁴ assessed the sexual dimorphism of facial anthropometric features, their results also showed the statistically significant differences of lip length between both genders. While a study by Gonçalves et al¹⁵ showed no sexual dimorphism on upper lip length. This study also showed statistically insignificant differences of upper lip length between males and females.

Limitation of the present study is its cross-sectional nature. But the findings of it, may serve as a reference for the future ones, where a longitudinal research can be conducted to evaluate the lip growth in individuals with incompetent lips.

As this study was concerned with upper lip length in various lip positions at repose and vertical pattern was kept constant, so it may not act as confounder. Hence, future studies should be aimed for the comparison of lip length and high vertical pattern in reference to the incompetent lips.

Conclusions

Mean length of upper lip in individuals with competent lips was 20.04mm \pm 2.8, lips apart was 18.81mm \pm 2.0 and individuals with incompetent lips was 19.00mm \pm 2.6 respectively.

This study showed the difference of upper lip length among individuals with various lip positions at repose, but differences were statistically insignificant.

Mean upper lip length for males was 19.61mm \pm 2.6 and for females was 19.07mm \pm 2.4.

Difference of upper lip lengths between genders were statistically insignificant according to this study.

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