



## Original Research Article

## The hereditary pattern of gummy smile- A cross sectional study

Priyanka Jayaram<sup>1,\*</sup>, Vaisakh R<sup>1</sup>, Sonu Thomson P<sup>1</sup>, Sajna M P<sup>1</sup>, Varsha V<sup>1</sup><sup>1</sup>Dept. of Orthodontics and Dentofacial Orthodontics, Royal Dental College, Palakkad, Kerala, India

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## ABSTRACT

When there is an exposure of gingival tissue of more than 2 mm while smiling is said to be gummy smile. There are various etiological factors that cause a gummy smile and there could be a relationship with heredity as an etiology for gummy smile.

**Aim:** To evaluate the relationship between gummy smile and heredity.

**Materials and Methods:** A sample of 100 patients of age between 10 to 25 years were selected based on the presence of a gummy smile of more than 2mm and the gummy smile was measured. Frontal photographs of patients with gummy smile of more than 2 mm were taken. Similarly, both the parents were also photographed. A detailed history of gummy smile running in the family for last two generations was recorded. The patients were then divided into two groups, namely, Group A (patients with gummy smile having a familial background) and Group B (patients with gummy smile not having a familial background).

**Results:** From the study 48% of the patients had gummy smile with a familial etiology and 52% of the patients had gummy smile without familial etiology which indicates heredity is not a significant etiological factor for gummy smile.

**Conclusion:** Eventhough a small percentage of patients did show a familial tendency of gummy smile, the majority of 52% of the subjects with gummy smile had no hereditary etiology, suggesting that the gummy smile did not exhibit hereditary pattern.

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## 1. Introduction

Malocclusion is a manifestation of genetic and environmental interaction on the development of the orofacial region. It is important to consider genetic factors to understand the cause of existing problems, which influences the outcome of treatment. Many genetic studies revealed that genetic factors have more influence on occlusal traits, arch width, length, tooth size, shape, growth and development. MSX1, MSX2, HOX, distal-less genes, OTX, gooseoid gene and PTHR are some of the genes that plays a key role in the craniofacial development.<sup>1</sup>

An attractive or pleasing smile clearly enhances the acceptance of an individual in our society by improving the initial impression in interpersonal relationships. Differently

from what some orthodontists consider, smile harmony is determined not only by the shape, position and color of teeth, but also by the gingival tissue.<sup>2</sup> When there is an exposure of gingival tissue of more than 2 mm while smiling is said to be gummy smile. There are various etiological factors that cause a gummy smile such as excess vertical maxillary growth, short upper lip, hyperactive levator muscles of upper lip, passive eruption of upper anteriors and gingival hyperplasia.

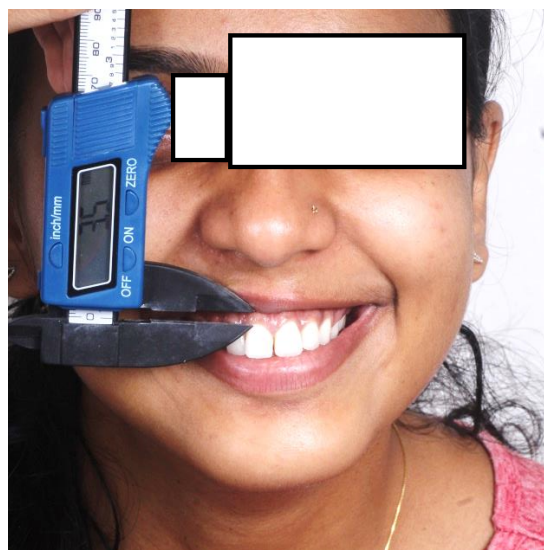
There could be a relationship with heredity as an etiology for gummy smile, but till date not many studies have been performed to understand this relationship. Thus the purpose of this study is to evaluate the relationship between gummy smile and heredity.

\* Corresponding author.

E-mail address: [priyankajayabds@gmail.com](mailto:priyankajayabds@gmail.com) (P. Jayaram).

## 2. Materials and Methods

A sample of hundred patients of age between 10 to 25 years were selected. The selection was based on the presence of a gummy smile of more than 2mm. To measure the gummy smile, the gingival border of upper incisor to upper lip stomion was measured in millimeters using a caliper (Figure 1). Frontal photographs of patients with gummy smile of more than 2mm were taken using the digital camera (Canon 1100) and Tameron 90 mm lens and the focal length and zoom were standardized. Similarly, both the parents were also photographed. A detailed history of gummy smile running in the family for last two generations was recorded. The patients were then divided into two groups, namely, Group A (patients with gummy smile having a familial background) and Group B (patients with gummy smile not having a familial background).



**Fig. 1:** Gummy smile measurement

### 2.1. Inclusion/Exclusion criteria

The selected subjects did not undergo surgical or orthodontic treatment (i.e, gingival surgery or extraction of teeth). They had upper and lower natural anterior teeth present and without caries, extreme occlusal wear, restorations, extrusion, obvious deformities, or tooth mobility. Subjects with a history of congenital anomalies, lip trauma, or facial surgery were excluded.

## 3. Results

The study was conducted to assess the relationship of gummy smile and inheritance pattern. The data was coded and entered in a Microsoft Excel format and analysed using SPSS statistical software. The qualitative data was measured with proportions and checked with 95% confidence level. From the study 48% of the patients had gummy smile with a familial etiology and 52% of the patients had gummy smile without familial etiology which indicates heredity is not a significant etiological factor for gummy smile.(Table 1)

**Table 1:**

Group	Frequency	Percentage
A	48	48
B	52	52
Total	100	100

## 4. Discussion

Scientific knowledge and artistic sense is required to understand that smile aesthetics is customized and determined by teeth and gingival display in a frame called lip, which has its size determined by power and size of muscles that are fixed to a rigid bone wall.<sup>3</sup> The amount of gingival exposure is fundamentally important for a pleasant smile, but most people consider excessive gingival exposure

during smile tagged 'gummy smile' as an unpleasant and unaesthetic smile. A normal gingival display between the inferior border of the upper lip and the gingival margin of the maxillary anterior teeth during a posed smile is 1-2mm. Although, in Western and Asian societies, it has been suggested that no more than 2 mm of the maxillary gingiva should be visible when a person smiles, there has been no scientific evidence to support this view in the African communities, particularly in the Nigerian population. The concept of beauty is known to be unique to each individual, and is established based on values related to gender, race, education and personal experiences.

The etiologic factors may occur alone or in combination. These include: skeletal problems (dental and bone); gingival disorders (passive eruption and gingival hyperplasia); muscle problems (upper lip length and muscular hyperactivity) and also the heredity.

The smile appearance is determined mainly by the activity of labii superioris, nasal alar elevator, zygomaticus minor and zygomaticus major muscles. These muscles determine the amount of lip elevation that occurs during the smile.<sup>2</sup> Age also influences the gingival display. The amount of gingiva displayed is inversely proportional to increasing age. Therefore, a young person will display more gingiva whereas an older individual will show less.

Tjan and Miller<sup>3</sup> divided the smile into three types according to the smile line: a high smile line completely revealing the maxillary incisors and a continuous band of the gingiva; an average smile line, revealing 75 to 100% of the maxillary incisors; and a low smile line, revealing less than 75% of the maxillary incisors. It has been found that low smile lines are a predominantly male characteristic (2:1 M:F) and a high smile line is a predominantly female characteristic.

Marcelo Tomas Oliveira et al.<sup>2</sup> found out that the etiologies of gummy smile were multifactorial and showed that excessive vertical maxillary grow up, excessive labial contraction, shorter upper lip, gingival excess and extrusion of the anterior teeth were the reasons for gummy smile. Sheldon Peck<sup>4</sup> found that vertical maxillary excess and muscular ability to raise the upperlip are the etiological factors that cause gummy smile.

Riyad Al-Hababeh et al.<sup>5</sup> reported that gingival display during smiling presented significant differences between gender groups in the maxillary anterior region, with females displaying more gingivae compared to males. Deepak et al.<sup>6</sup> in their study found out that there was no relevant familial relationship with gummy smile. The most common cause for gummy smile in patients above 15 years of age was dentoalveolar extrusion and vertical maxillary excess. The other causes like lip length, hyperactive upper lip and altered passive eruption were less relevant.

In history not many studies have been done regarding the relationship between heredity and gummy smile. In this study, we found out that out of 100 patients only 48 patients have familial relationship with gummy smile. Here the qualitative data is expressed with proportion and checked with 95% confidence level. From the study 48% of the patients had gummy smile with a familial etiology and 52% of the patients had gummy smile without familial etiology which indicates heredity is not a significant etiological factor for gummy smile. It has to be crosschecked and confirmed with further studies.

## 5. Conclusion

The purpose of the study was to find out the relationship between the gummy smile and inheritance. A sample of patients were selected which was based on the presence of a gummy smile of more than 2mm. Both the parents were also photographed. A detailed history of gummy smile running in the family for last two generations was recorded. The data was coded and entered in a Microsoft Excel format and analysed using SPSS statistical software. The qualitative data was measured with proportions and checked with 95%

confidence level. The overall results indicated that there was no relevant familial relationship with gummy smile.

## 6. Source of Funding

None.

## 7. Conflict of Interest

None.

## References

1. Varma GRR, Harsha B, Palla S, Sravan SPA, Raju J, Rajavardhan K. Genetics in an orthodontic perspective. *J Adv Clin Res Insights*. 2019;6(3):86–90. doi:10.15713/ins.jcri.267.
2. Pereira JR, Furtado A, Ghizoni JS, Molina GO, Oliveira MT. Gummy smile: A contemporary and multidisciplinary overview. *Dent Hypotheses*. 2013;4:55. doi:10.4103/2155-8213.113014.
3. Tjan AHL, Miller GD, The JGP. Some esthetic factors in a smile. *J Prosthetic Dent*. 1984;51:24–8. doi:10.1016/s0022-3913(84)80097-9.
4. Peck S. The gingiva; smile line. *The Angle Orthodontist*. 1992;62(2).
5. Al-Hababeh R, Al-Shammout R, Al-Jabrah O, Al-Omari F. The effect of gender on tooth and gingival display in the anterior region at rest and during smiling. *Eur J Esthet Dent*. 2009;4(4):382–95.
6. Deepak PR. Gummy smile, it's inheritance pattern and etiology. Dissertation submitted to the Kerala University of Health Sciences, Thrissur, Kerala; 2016.

## Author biography

**Priyanka Jayaram**, PG Student

**Vaisakh R**, Assistant Professor

**Sonu Thomson P**, Assistant Professor

**Sajna M P**, PG Student

**Varsha V**, PG Student

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