

Relationship Between Gingivitis and Anterior Teeth Irregularities Among 18 to 26 Years Age Group: A Hospital Based Study in Belgaum, Karnataka

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ABSTRACT

Aim: To study the relationship between gingivitis and irregular teeth in the anterior segments of dental arches.

Materials & Methods: The sample size of 120 subjects who satisfied the inclusion criteria was randomly selected for the study. These subjects were selected between the age group of 18 to 26 years and divided into two groups. The study group (cases) consists of 60 subjects with irregular teeth in the anterior segments of dental arch. The control group (controls) consists of 60 subjects with well-aligned teeth in the anterior segments of dental arches.

Results: The mean gingival index of cases & controls were 0.9513 and 0.5959 with standard deviations of 0.7014 and 0.4909 respectively. The t-value was 3.1093 with $p < 0.001$ which was highly significant.

Conclusion: The mean gingival index of study group was higher than the gingival score of the control group ($p < 0.001$).

KEY-WORDS

Dental irregularities, Gingivitis, Plaque.

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INTRODUCTION

“Dental plaque is defined clinically as a structured, resilient, yellow-grayish substance that adheres tenaciously to the intraoral hard surfaces, including removable and fixed restorations”(1). It is primarily composed of bacteria in a matrix of salivary glycoproteins and extracellular polysaccharides. It is clear from experimental and epidemiological studies that microbial plaque is a primary etiologic factor in gingivitis (2).

The preservation of gingival health depends largely on the correct form and position of teeth in the dental arch. It is generally stated that irregularly placed teeth are more likely to develop periodontal disease than teeth, which are in proper alignment.

Within the dental arches, poorly aligned teeth may complicate hygiene procedures, thus causing increased plaque accumulation and subsequent gingival inflammation. Clinically plaque accumulation and gingivitis is frequently seen in such arches. These observations have not however been unanimously verified scientifically(3-7).

The relationship between dental irregularities and inflammatory gingival disease is complex, with much apparently conflicting evidence. Various investigators have reported reduced gingival health around crowded and rotated teeth(8-10). However, contradicting results were reported by others(7, 11).

Therefore this study was designed with the aim of studying the relationship between gingivitis and irregular teeth in the anterior segments of dental arches. The specific objectives of the study were to describe gingival health of normally aligned teeth and irregularly placed teeth. Further on, the study ascertained the possible correlation between the gingival disease and irregularity in alignment of teeth.

MATERIALS AND METHODS

The study sample was selected from the outpatient department of K.L.E.S's Institute of Dental Sciences, Belgaum, Karnataka. The sample size of 120 subjects

who satisfied the inclusion criteria was randomly selected for the study. The aforementioned criteria included: Age – 18 to 26 years of age, irregularities in the anterior segment of dental arches (cases), Well aligned teeth in the anterior segments of dental arches (controls) and subjects with normal molar relationship (Angle's Class I occlusion). The exclusion criteria were based on the following information: History of Orthodontic treatment, periodontal treatment, systemic complications, tobacco consumption, mouth breathing, irregular menstrual cycle and if pregnant. These subjects were divided into two groups, i.e., group a: study group (Cases). Group b: control group (controls).

The study group (cases) consisted of 60 subjects with irregularly placed teeth in the anterior segments of dental arch. The control group consisted of 60 subjects with well-aligned teeth in the anterior segments of dental arches.

Collection of Data

This hospital based observational study consisted of an interview and examination. The interview was taken to confirm whether the patient can be included in the study or not, according to the selection criteria. The investigator (V C Reddy) carried out the examination and a trained recorder, well versed with the recording procedures, recorded the data. Intra-examiner consistency for the clinical examination was found to be good, Cohen's Kappa=0.86 (Landis and Koch, 1977)(12).

The presence of plaque and gingival inflammation in the anterior segments was recorded according to the Plaque Index (PI) (Silness & Loe, 1964) and Gingival Index (GI) (Loe & Silness, 1963). Irregularities in the anterior segments are assessed by the methods described in “Oral health surveys”, Basic Methods, WHO, 1997(13). The data was analyzed using Microsoft Excel. Students “t”-test was applied to compare the relationship between anterior irregularities and gingivitis.

To participate in the study all subjects were required

to sign an informed consent form. The Ethical Committee of K.L.E.S Institute of Dental Sciences approved the study.

RESULTS

Thirty-five males and 25 females were examined in cases, whereas, in controls 37 males and 23 females were examined. (Table1).

The mean (SD) GI of cases and controls were 0.95 (0.70) and 0.59 (0.49), respectively (t-value = 3.10, p<0.001). The mean (SD) PI of cases and controls were 0.88 (0.42) and 0.70 (0.41), respectively (t-value = 2.40, p<0.05) (Table 2, Fig 1).

Among the cases, the mean (SD) GI for maxillary irregularities if d” 2.5mm the mean (SD) GI was 0.96 (0.84) and if > 2.5 mm was 0.93 (0.37), respectively (t-value = 0.14, p>0.05). The mean (SD) PI for maxillary irregularities d” 2.5 mm and > 2.5 mm were 0.91 (0.46) and 0.98 (0.24), respectively (t-value = 0.66, p>0.05) (Table 3, Fig 2).

In cases, the mean (SD) GI for mandibular irregularities d” 2.5 mm was 0.52 (0.33) and > 2.5 mm were 1.35 (0.73), respectively (t-value = 5.53, p<0.001). The mean (SD) PI for mandibular irregularities d” 2.5mm and > 2.5mm were 0.71 (0.34) and 1.14 (0.32), respectively (t-value = 4.95, p<0.001) (Table 4, Fig 3).

Table 1: Distribution of sample according to sex

Cases			Controls		
Male	Female	Total	Male	Female	Total
35	25	60	37	23	60

Table 2: Mean Plaque index (PI) and Gingival index (GI) of cases & controls. “t” value for the significance difference

		Mean	SD	t-value	p-value
PI	Cases	0.8896	0.4247	2.4039	P<0.05Significant
	Controls	0.7044	0.4190		
GI	Cases	0.9153	0.7014	3.1093	P<0.001HS
	Controls	0.5959	0.4909		

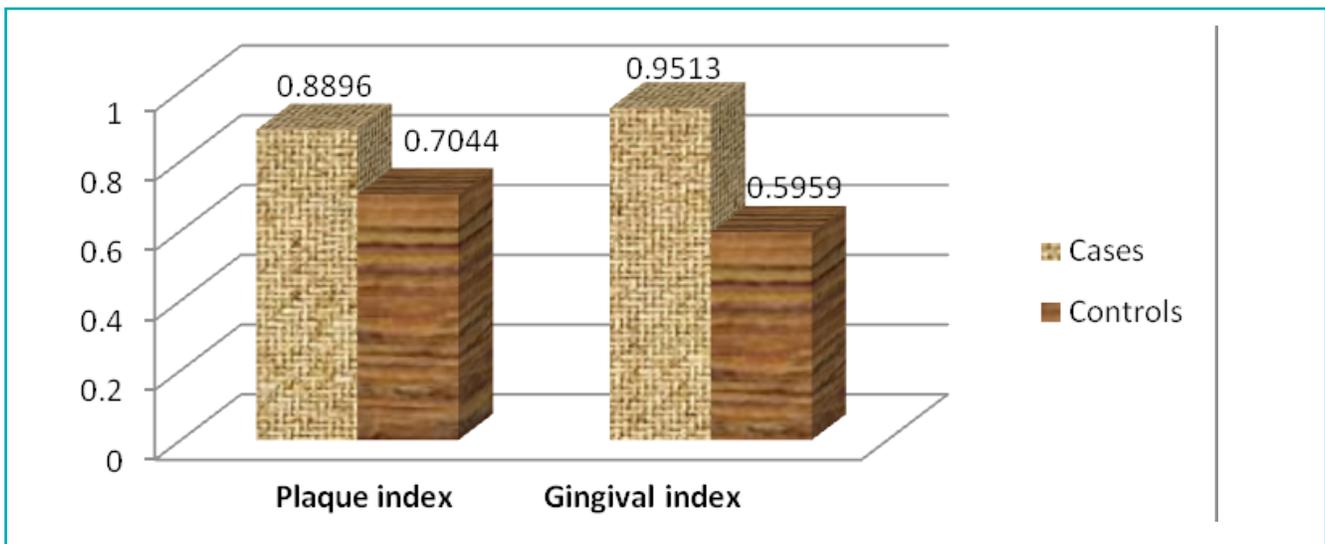


Figure 1 : Mean plaque index and gingival index of cases and controls

Table 3: Mean Plaque index (PI) and Gingival index (GI) for Maxillary irregularities. t-test for the significant difference between the cases

	Less than/equal to 2.5 mm		More than 2.5 mm		“t” value	“p” value
	Mean	SD	Mean	SD		
PI	0.9135	0.4617	0.9852	0.2437	0.6620	p>0.05 NS
GI	0.9609	0.8402	0.9333	0.3778	0.1425	p>0.05 NS

NS = Non significant.

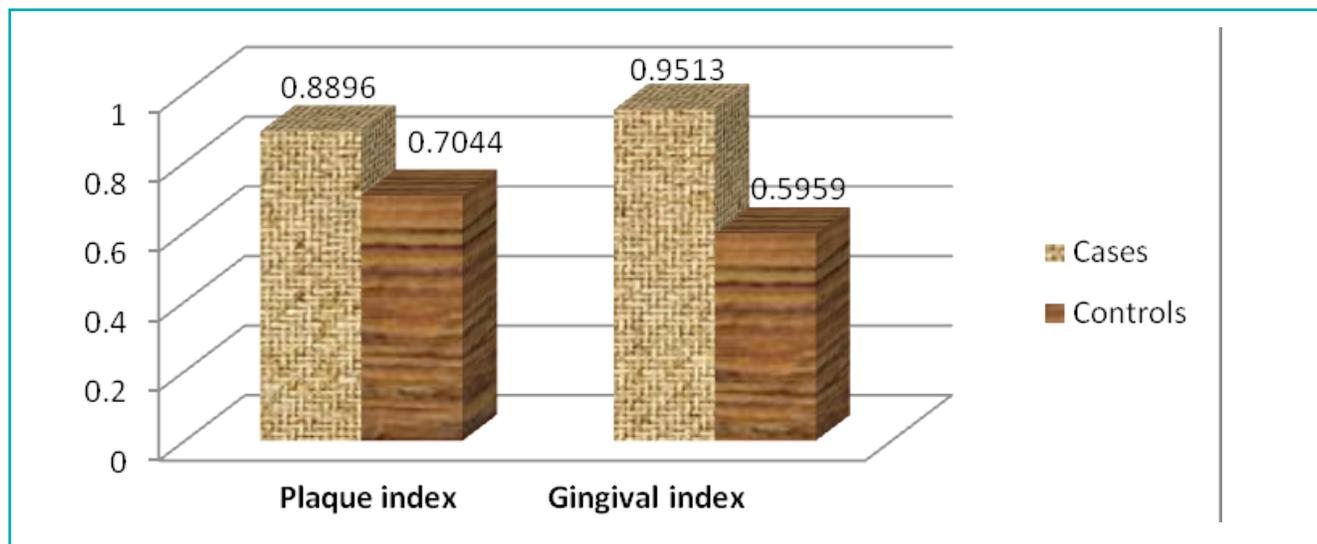


Figure 1 : Mean plaque index and gingival index of cases and controls

DISCUSSION

The present study demonstrated that a positive relationship existed gingivitis and irregularities in the anterior segments of dental arches. Highly statistically significant ($p < 0.001$) increase in GI scores were noticed in cases than controls. The results of this study corroborated well with some studies (3, 4, 5, 14) and were in contrast with others (11).

In the present study there was an increase in mean PI score in the subjects with irregularities (0.88) compared to the subjects without irregularities (0.70) in the anterior segments ($p < 0.05$). This finding is in agreement with some of the earlier studies (9, 15, 16). However, no such statistical significant mean difference was found by other researchers (5, 6). Among the study group (cases) the severity of irregularities and extent of plaque accumulation was not significant in the maxilla ($p > 0.05$). Similar results were reported by Behlfelt *et al* (17) and Elham SJA *et al* (11), where they

postulated that no correlation was found between degree of mal-alignment and amount of plaque. In mandible the PI scores increased with the severity of irregularities ($p < 0.001$). This concurs with the study by Addy and Griffiths (16), Helm S (10) where they reported poor oral hygiene in the mandible compared to maxilla.

Difficulty in maintaining oral hygiene can result in greater accumulation of dental plaque, which is considered a primary etiological agent in inflammatory periodontal disease. Improper proximal contacts lead to narrowing of embrasures and disruption of periodontal disease susceptible “col”. This leads to gingivitis, periodontitis and possibly pathologic tooth migration. This reflects a high degree of plaque accumulation and oral uncleanness with anterior irregularities. It is also possible that the irregularities may impede oral hygiene, which is in keeping with previous observations(1, 3, 4, 6).

Table 4: Mean Plaque index (PI) and Gingival index (GI) for Mandibular irregularities. t-test for the significant difference between the cases.

	Less than/equal to 2.5 mm		More than 2.5 mm		"t" value	"p" value
	Mean	SD	Mean	SD		
PI	0.7159	0.3465	1.1469	0.3273	4.9549	p<0.05 HS
GI	0.5235	0.3320	1.3515	0.7379	0.5387	p<0.05 HS

HS = Highly significant

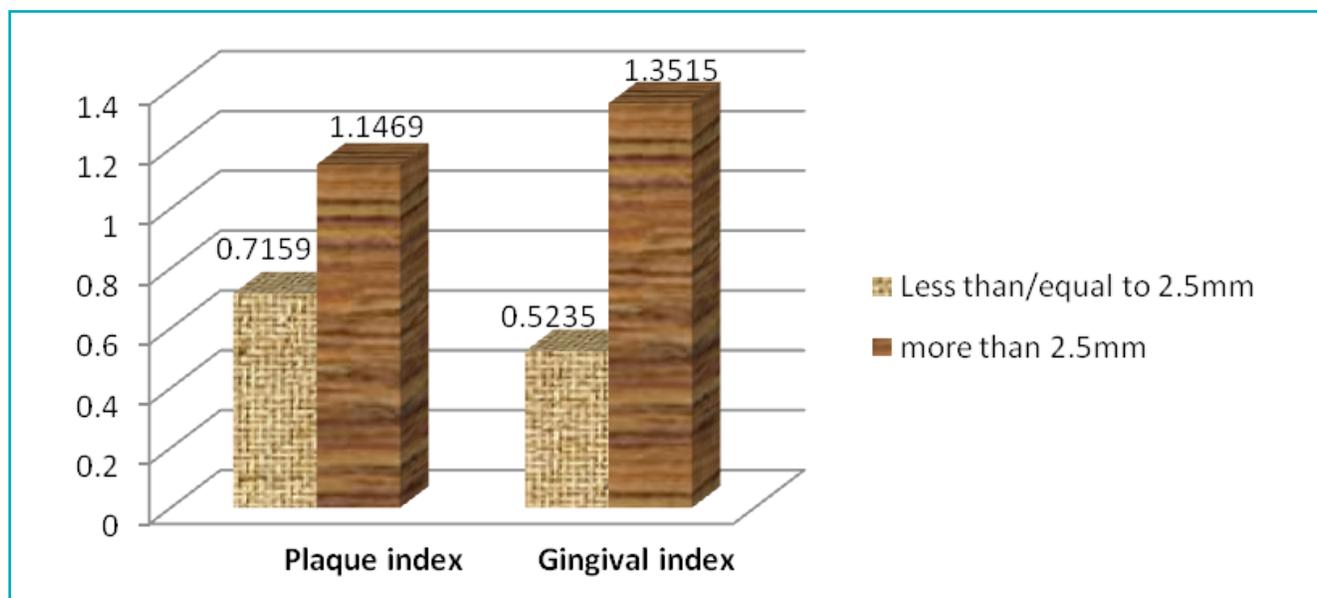


Figure 3 : Mean Plaque Index and Gingival Index for Mandibular Irregularities in the cases

Further studies based on similar variables but with larger samples are necessary to define the relationship between gingivitis and irregularities in the dental arches.

CONCLUSION

The main conclusions drawn from this study are:

- The mean GI score of study group (cases) was higher than the gingival score of the control group ($p < 0.001$). This indicates that the gingivitis is exacerbated in controls than cases.
- The mean PI score of the study group was higher than the plaque index score of control group ($p < 0.05$). This indicated that the cases had poor oral hygiene conditions when compared to controls.
- The severity of plaque accumulation did not increase significantly ($p > 0.05$) with the severity of irregularity in maxillary arch, among the cases.

However, it was noticed to be pronounced in the mandibular arch ($p < 0.001$).

- The severity of gingivitis did not increase significantly ($p > 0.05$) with the severity of irregularities in maxillary arch. But in the mandibular arch there is highly significant increase in gingival score ($p < 0.001$) with irregularities among the cases.

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