

Evaluation of Gingival Issues Encountered by Adults Receiving Fixed Orthodontic Treatment in Dakshina Kannada Population: A Questionnaire Study

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Abstract:-

➤ *Background:*

Fixed orthodontic components used in orthodontic treatment can serve as a focal point for plaque and biofilm accumulation, leading to plaque-associated gingivitis. This occurs due to the intricate interaction between the host (patient) and the microbial environment surrounding these components. Alterations in gingival color, shape, size, texture, and contour should serve as warning signs for both the patient and the orthodontist, prompting them to take preventive measures against further progression. It's crucial to educate both the orthodontist and the patient about the potential complications linked to the gingival response during treatment.

➤ *Methods:*

This Questionnaire study sample size of 150 was performed to evaluate the gingival problems faced by the patients undergoing fixed orthodontic therapy in Dakshina kannada population .

➤ *Results:*

Most individuals undergoing orthodontic treatment were typically in the age range of 19 to 24 years old. There was a higher proportion of female participants compared to males, and the majority of them maintained good oral hygiene. Young adults demonstrated greater awareness and understanding of the treatment, which contributed to improved gingival health outcomes.

➤ *Conclusion:*

The responsibility for maintaining oral health predominantly rests with the patient, who must ensure adherence to proper, effective, and thorough oral hygiene routines. It's imperative for every orthodontic patient to receive encouragement and education regarding the gingival changes associated with orthodontic treatment and the importance of maintaining good oral hygiene practices.

Keywords:- Common Gingival Problems, Orthodontic Treatment, Patient Satisfaction.

I. INTRODUCTION

The effectiveness and ease of fixed orthodontic appliances makes it one of the most widely used techniques in orthodontic treatment.¹

The implantation of an orthodontic device in a patient's mouth is frequently linked to changes in the patient's oral hygiene practices and periodontal health, even if orthodontic therapy improves dental and skeletal disorders. Both mechanical treatments and orthodontic equipment have the potential to cause localized soft tissue reactions in the gingiva. Effective orthodontic treatment is made more difficult by the orthodontic appliances close closeness to the gingival sulcus, plaque buildup, and obstacles to good oral hygiene practices.²⁻⁴

Patients receiving fixed appliance therapy for orthodontics may develop a range of gingival-periodontal problems as a result of poor nutrition, poor oral hygiene practices, and increased dental plaque buildup around orthodontic bands and brackets.⁵⁻⁷

They make it difficult to practice proper oral hygiene, these fixed orthodontic equipment have a passive effect on the health of the periodontal tissue by causing plaque to build up.⁸the buildup of plaque surrounding the tooth-attached retentive components and the crucial periodontopathic bacteria colonization.⁹

Periodontal disease development and start rely on a dynamic balance between the host's immunological-inflammatory responses and the microbial assault.¹⁰

An important rise in oedema and inflammatory cells is the cause of chronic soft tissue inflammation may modify the microflora's composition and affect the subgingival ecology by establishing the right anaerobic environment.¹¹

Hence this Questionnaire study was undertaken to evaluate and to assess the gingival problems during fixed orthodontic treatment experienced by adult patients in Dakshina Kannada population.

➤ *Aim:*

To evaluate and assess the common gingival problems faced by patients undergoing fixed orthodontic treatment.

➤ *Objectives:*

- To assess gingival issues faced by adult patients during fixed orthodontic treatment.
- To examine and appraise the patient's oral hygiene regimen while receiving orthodontic treatment.

II. MATERIALS AND METHODS

➤ *Duration of Study:*

1 Month.

➤ *Study Design:*

A cross sectional questionnaire based study.

➤ *Place of Study:*

Online questionnaire forms were sent via emails, whatsapp groups of the selected participants to collect the relevant data after taking relevant permissions and consent from patients.

➤ *Inclusion Criteria:*

- Patients currently undergoing orthodontic treatment.
- Non surgically treated cases.
- Age group of 19 to 42 years.
- Only Fixed Orthodontic treatment cases.
- Good general health with no history of systemic disease.
- No alveolar bone loss visible on x-rays.
- No periodontal treatment within the last 6 months.
- No antibiotic therapy in the last 6 months.
- No medication known to cause gingival enlargement.

➤ *Exclusion Criteria:*

- Patients suffering from congenital abnormality, systemic illness, cysts, or crevices.
- Patient using any systemic medication that might interfere with the gingival problems.
- Patients who require chemoprophylaxis.
- Surgically treated cases.
- Patients treated with myofunctional appliances.
- Patients below age 19 or above age 42 years old.
- Removable Orthodontic appliance treatment cases.

➤ *Statistical Analysis:*

Descriptive analysis will be performed with the help of SPSS Software and mean and standard deviation will be recorded.

➤ *Sample Size Calculation:*

Recommended Sample size is: 150

The sample size (n) is calculated according to the formula: $n = \frac{[z^2 * p * (1-p) / e^2]}{[1 + (z^2 * p * (1-p) / (e^2 * N))]}$
 Where: z= 1.96 for a confidence level (a) of 95%, p= Proportion (expressed as a decimal), N= Population size, e= margin of error. z= 1.96, p=0.5, N=51, e=0.05 $n = \frac{[1.96^2 * 0.5 * (1-0.5) / 0.05^2]}{[1 + (1.96^2 * 0.5 * (1-0.5) / (0.05^2 * 52))]}$ n= 415.16/2.8325=148.523 n= 150

The Sample Size(with finite population correction)is equal to 150 Result from open Epi, version, 3 open Source Calculator—SS Propor.

III. METHODOLOGY

A Google form was developed to evaluate and assess the common gingival issues that patients receiving fixed orthodontic treatment encounter. The questionnaire was sent to the appropriate ethical clearance committees, together with a brief summary outlining the goals and objectives of the research. The questionnaire was distributed to the participants following approval from the Institutional Ethics Committee and the Scientific Advisory Committee.

Through emails, personal relationships and Whatsapp groups, the investigator made contact with the participants. Pertinent reminders were delivered to each patient every week. Additionally, prompt reminders were given. Every participant had the choice to withdraw from the study at any time, and participation was entirely voluntary.

The respondents to the questionnaire mainly comprised of patients undergoing orthodontic treatment at the time of the survey.

➤ *Questionnaire:*

There were many multiple-choice questions in the set. Following inquiries concerning age, gender, the following queries were posed.

Table 1: Questions Sent to Patients Participating in Questionnaire Study

Sl. no	Questions
1	How many times a day do you brush?
2	Do you experience spontaneous bleeding from your gums after brushing?
3	Do you experience swelling in your gums?
4	Do you experience itching of gums?
5	Do you experience food lodgement in your gums?
6	Do you experience pain in your gums?
7	Do you experience irritation in your gums?
8	Do you experience bad breath from your mouth?

9	Do you experience pain during chewing or eating?
10	Do you experience sensitivity in teeth?
11	Do you experience receding gums or longer appearing teeth?
12	On a scale of 1 to 5 how satisfied are you with your ongoing orthodontic treatment ?

IV. RESULTS

Majority of the participants belonged to the age group of 19 to 24, (94.2%) which represents the most common age of undergoing orthodontic treatment (Figure 1), followed by 25-30 age group (5.8%)

Most of participants were females (74.4%), with only a few male patients (25.6%) (Figure 2).

Most of participants brushes their teeth twice daily (66.7%) and the rest of the patients brushed once daily (32.1%). (Figure 3)

Most of participants do not experience spontaneous bleeding from gums after brushing (77.6%) and the next major group of patients experienced spontaneous bleeding sometimes (16.7%). (Figure 4)

Most of participants rarely experienced swelling in their gums (82.1%) and the next major group of patients experienced swelling in gums sometimes (17.9%). (Figure 5)

Most of participants did not experience itching of gums (94.9%) and a very few experienced it sometimes. (Figure 6)

Most of participants did not experience food lodgement in their gums (56.4%), followed by 24.4% participants had experienced food lodgement in their gums and the rest of the participants experienced it sometimes (19.2%). (Figure 7)

Most of participants did not experience pain in their gums (78.8%) and 14.1% maybe had pain in their gums and the rest 7.1% actually experienced pain in their gums. (Figure 8)

Most of participants did not experience irritation in their gums (80.8%), 12.1% participants maybe had irritation in their gums and the rest 7.1% had irritation in their gums. (Figure 9)

Most of participants did not experience bad breath from their mouth (64.7%) followed by 23.7% had sometimes experienced it and the rest 11.5% had always experienced bad breath from their mouth. (Figure 10)

In this study 73.1% participants did not experience any pain during chewing or eating, while a group of participants sometimes experienced it (19.9%) and 7.1% had actually experienced pain during chewing or eating. (Figure 11)

Most of participants in this study had sometimes experience sensitivity in teeth (39.7%) followed by 32.7% participants did not experience any sensitivity during orthodontic treatment and the rest 27.6% participants had actually experienced sensitivity. (Figure 12)

Most of participants in this study did not experience receding gums or longer appearing teeth (84.6%) followed by 8.3% participants sometimes have experienced receding gums or longer appearing teeth and the rest 7.1% of participants actually had experiences of receding gums or longer appearing teeth (Figure 13)

When asked about their satisfaction with ongoing Orthodontic treatment, on a scale from 1 to 5, most of the participants gave a rating of 4 (30.8%), followed by 28.2% gave a score of 3, then 24.4% gave a score of 5, 14.1% gave a score of 1 and the rest 2.6% gave a score of 2. (Figure 14).

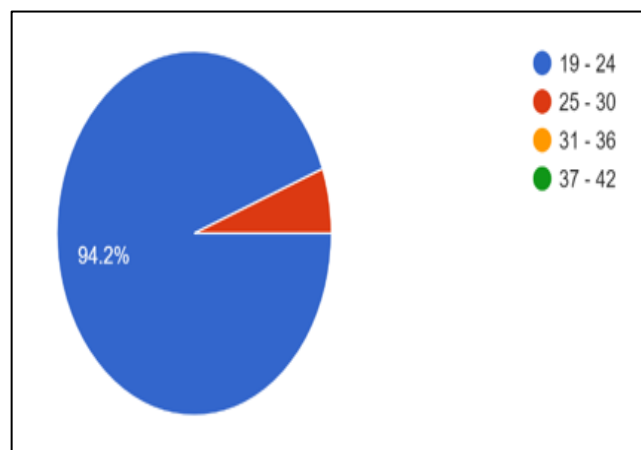


Fig 1: Age of the Participants

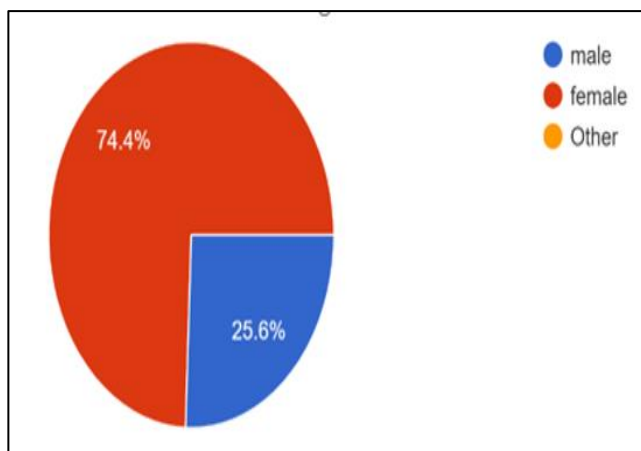


Fig 2: Sex of the Participants

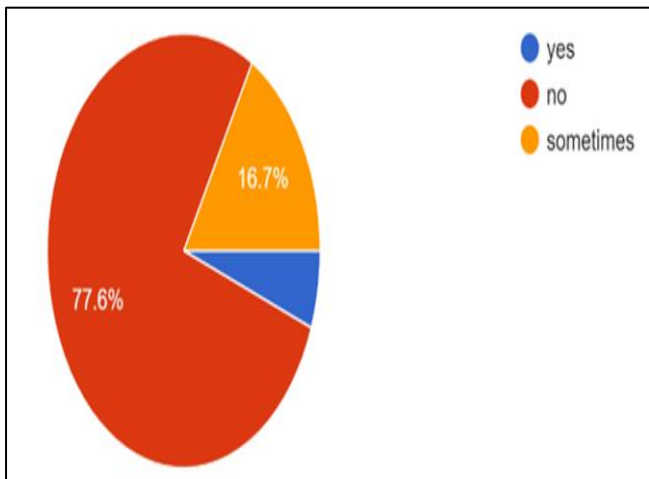


Fig 3: How Many Times a Day do You Brush?

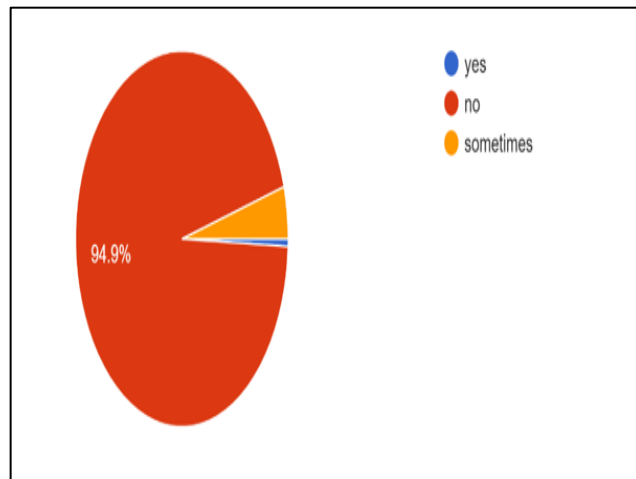


Fig 6: Do you Experience Itching of Gums?

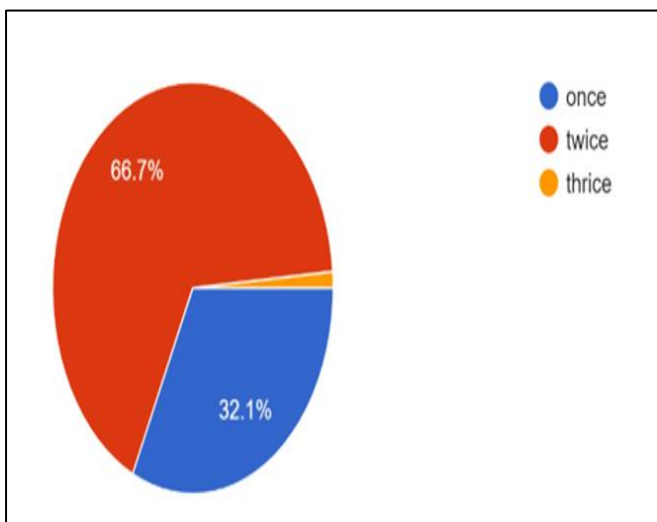


Fig 4: Do you Experience Spontaneous Bleeding from your Gums after Brushing?

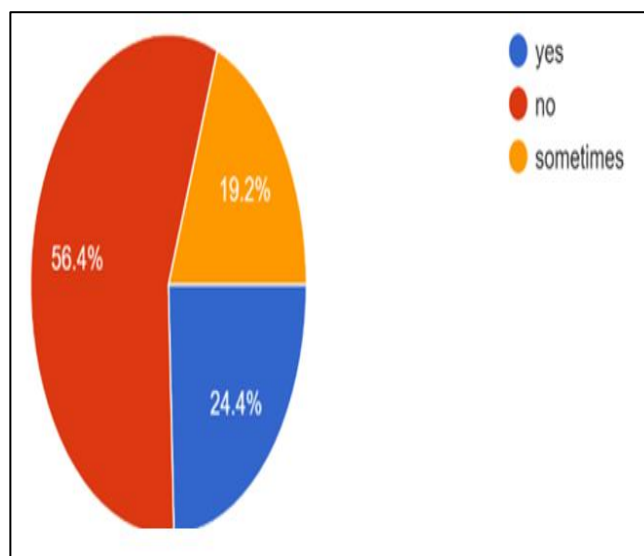


Fig 7: Do you Experience Food Lodgment in your Gums?

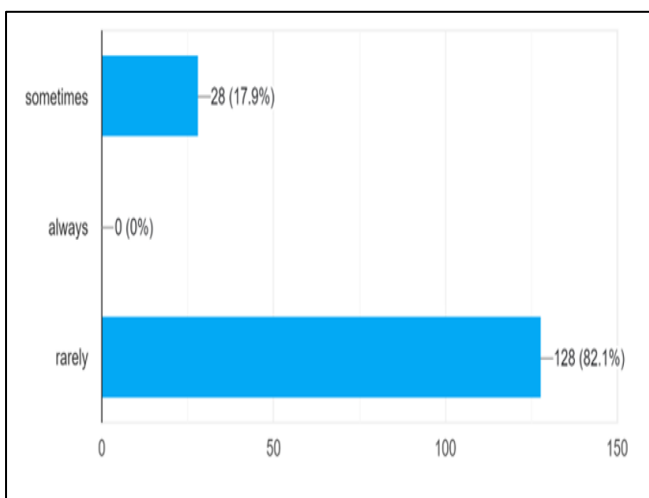


Fig 5: Do you Experience Swelling in your Gums?

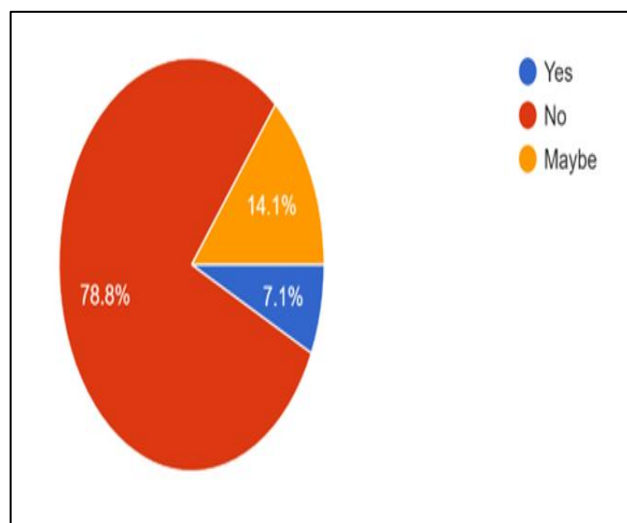


Fig 8: Do you Experience Pain in your Gums?

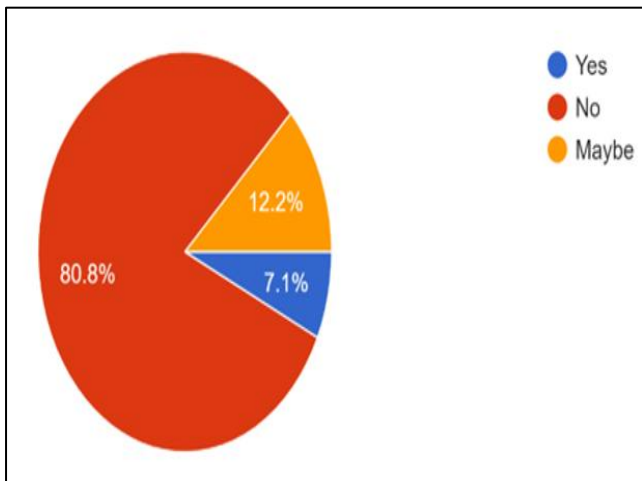


Fig 9: Do you Experience Irritation in your Gums?

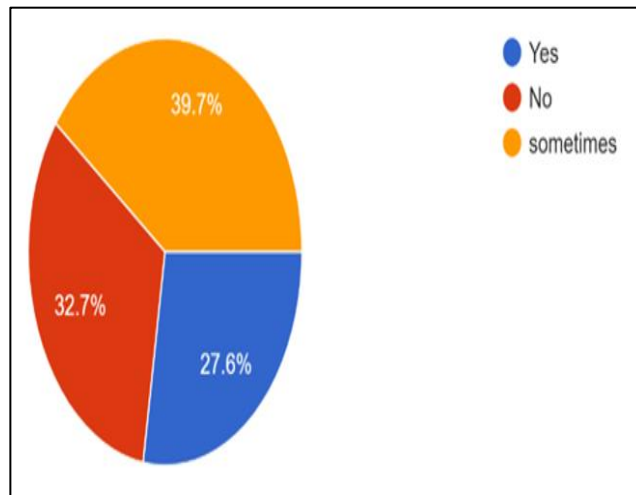


Fig 12: Do you Experience Sensitivity in Teeth?

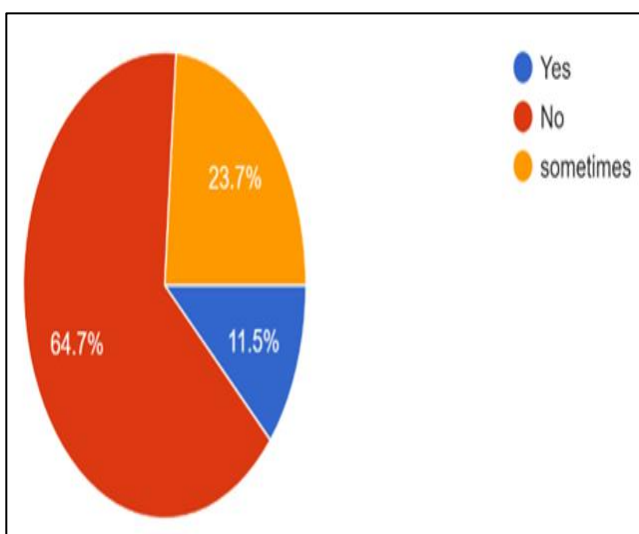


Fig 10: Do you Experience Bad Breath from your Mouth?

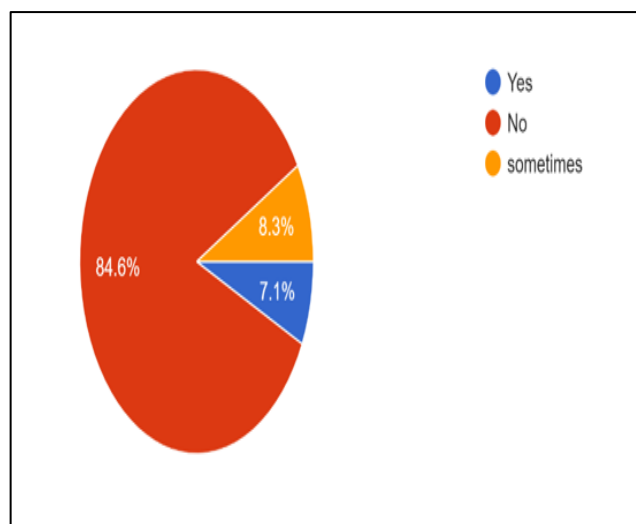


Fig 13: Do you Experience Receding Gums or Longer Appearing Teeth?

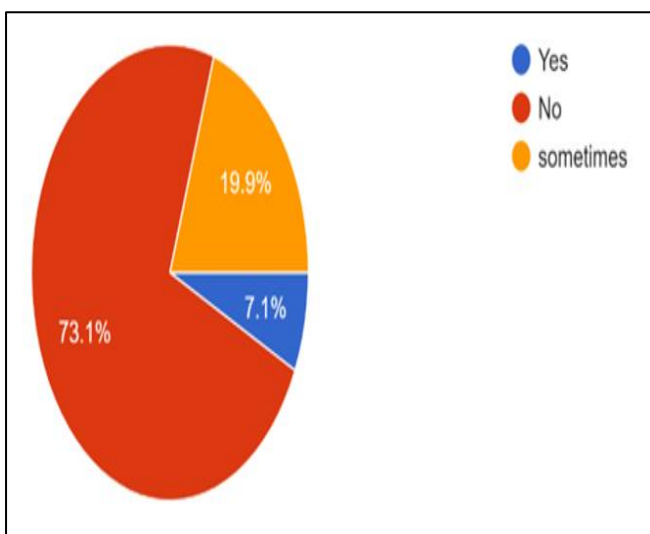


Fig 11: Do you Experience Pain during Chewing or Eating?

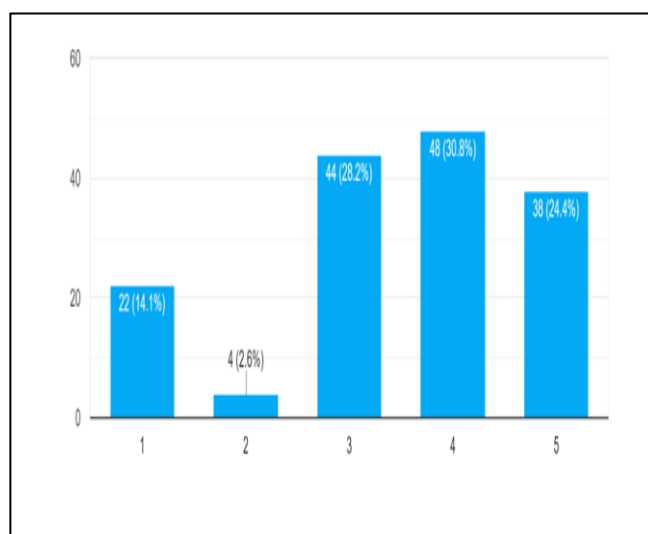


Fig 14: On a Scale of 1 to 5 how Satisfied are you with your Ongoing Orthodontic Treatment ?

V. DISCUSSION

An imbalance of the oral microbiota in the dento-gingival region and the host response, which causes gingival tissue inflammation in susceptible people, are the two main causes of gingivitis. The purpose of this study was to identify and analyze the most prevalent gingival issues that might develop while receiving fixed mechanotherapy for orthodontic treatment. This questionnaire-based study sought to measure the gingival-related issues that patients may have during fixed orthodontic treatments.¹²

This questionnaire based study aimed at gauging the gingival related problems that the patient might face during fixed orthodontic therapy and also enabled to assert and assess the oral hygiene protocols advocated by the patients undergoing braces treatment. It also made it possible to state and evaluate the oral hygiene practices that patients wearing braces recommended. Both mechanical treatments and orthodontic equipment have the potential to cause localized soft-tissue reactions in the gingiva. These effects can be beneficial, such as promoting tooth mobility, or harmful, such as gingival issues, which need to be avoided.¹³ Patients receiving orthodontic treatment answered a series of questionnaires.

At First, an estimate of the sample size was made using data from earlier research on the subject. Software for calculating sample sizes was used to determine the sample size. 150 people were thought to be in the sample. Then, using Google Forms, a questionnaire was created and distributed to age groups ranging from 19 to 42 through emails, Whatsapp groups, and personal connections. The Google forms themselves were used to record the participants permission. Following 156 participants completion of the Google questionnaire, the information was examined as a whole.

Most of the participants in This study Belongs to 19 to 24 years which corresponds to young adults. While majority of participants were Female which states that motivation to take up orthodontic treatment was more prevalent in females They compraised 74.1% of the participants while male were 25.9%. Participants in the study Had Better awareness towards oral hygiene habits during orthodontic treatment. They participants who brushed Twice daily were more (66.5%). Mostly the participants did not experience spontaneous bleeding from their gums after brushing(77.2%)While some experienced bleeding from their gums after brushing sometimes.

While most of the participants did not experience Swelling in their gums While some Experienced it Sometimes. Itching of gums during orthodontic treatment was not common By the participants in this study .Food lodgement during orthodontic treatment has been a major concern for the orthodontist and the patient taking orthodontic treatment Participants in our study However did not have much of food lodgement in their gums average of 55.7%.

Pain during orthodontic treatment in the gums Were less experienced by our orthodontic patients in this study. Most of the patient did not experience irritation in their gums, while some had experienced sometimes. Most of the patient in the study group Had a better oral hygiene Due to their brushing habits. Which further had less response to bad breath. Pain during chewing or mastication Was however Not more common during orthodontic treatment 72.8% and participant did experience pain during chewing or eating. 39.2% participants experienced Sensitivity in their teeth during orthodontic treatment. And majority of the participants in our study did not experience receding gums or long appearing teeth. On a Scale of one to five participants had a satisfactory response Towards orthodontic treatment With a rating of four being more prevalant. All these values and findings where Based on the collected response data From 156 participants.

Based on the responses from this study it is clear to some extent that orthodontic treatment do not poses serious problems to the gingiva ,adults patients undergoing orthodontic treatment had better awareness towards maintaining oral hygiene .the gingival problems which were previously mentioned as deleterious effects in orthodontic treatment where easily manageable with good oral hygiene and patient compliance towards orthodontic treatment .overall most of the patients undergoing orthodontic treatment showed satisfactory response towards the treatment.

VI. CONCLUSION

- The patient bears primary responsibility for maintaining oral health by adhering to appropriate, effective, and thorough oral hygiene procedures.
- Every orthodontic patient has to be encouraged and informed about the changes that orthodontic treatment and excellent oral hygiene habits bring about in the gingiva.
- young adults undergoing orthodontic treatment should be the focus of motivating activities and oral hygiene recommendations.

REFERENCES

- [1]. Guo L, Feng Y, Guo HG, Liu BW, Zhang Y. Consequences of orthodontic treatment in malocclusion patients: clinical and microbial effects in adults and children. *BMC oral health*. 2016 Dec;16:1-7.
- [2]. Zachrisson S, Zachrisson BU. Gingival condition associated with orthodontic treatment. *Angle Orthod* 1972;42:26-34.
- [3]. Boyd RL. Longitudinal evaluation of a system for self-monitoring plaque control effectiveness in orthodontic patients. *J Clin Periodontol* 1983;10:380-8.
- [4]. Willmot D. Orthodontic treatment and the compromised periodontal patient. *Eur J Dent* 2008;2:1-2.

- [5]. Patil S, Hedad IA, Jafer AA, Abutaleb GK, Arishi TM, Arishi SA, et al. Effectiveness of mobile phone applications in improving oral hygiene care and outcomes in orthodontic patients. *J Oral Bio Craniofac Res* 2021;11(1):26-32.
- [6]. Sangalli L, Savoldi F, Dalessandri D, Bonetti S, Gu M, Signoroni A, et al. Effects of remote digital monitoring on oral hygiene of orthodontic patients: a prospective study. *BMC Oral Health* 2021; 21(1):1-8.
- [7]. Scribante A, Gallo S, Bertino K, Meles S, Gandini P, Sfondrini MF. The effect of chairside verbal instructions matched with Instagram social media on oral hygiene of young orthodontic patients: a randomized clinical trial. *Applied Sci* 2021; 11(2):706.
- [8]. Pinto, A.S., Alves, L.S., do Zenkner, J.E., Zanatta, A. and Maltz, F.B. (2017) Gingival Enlargement in Orthodontic Patients: Effect of Treatment Duration. *American Journal of Orthodontics and Dentofacial Orthopedics*, 152, 477-482.
- [9]. Al-Anezi SA, Harradine NW. Quantifying plaque during orthodontic treatment. *Angle Orthod* 2012;82:748-53.
- [10]. Page RC, Offenbacher S, Schroeder HE, Seymour GJ, Kornman KS. Advances in the pathogenesis of periodontitis: summary of developments, clinical implications and future directions. *Periodontol* 2000;1997(14):216-48.
- [11]. de Oliveira Guaré, R., Costa, S.C., Baeder, F., de Souza Merli, L.A. and Dos Santos, M.T. (2010) Drug-induced gingival enlargement: biofilm control and surgical therapy with gallium-aluminum-arsenide (GaAlAs) diode laser-A 2-year follow-up. *Special Care in Dentistry*, 30, 46–52.
- [12]. Lindhe J, Ranney R, Lamster I, Charles A, Chung CP, Flemmig T, et al. Consensus Report: Chronic Periodontitis. *Ann Periodontol*. 1999;4:38. doi:10.1902/annals.1999.4.1.38.
- [13]. Krishnan V, Ambili R, Davidovitch Z, Murphy NC. Gingiva and Orthodontic Treatment. *Semin Orthod*. 2007;13(4):257–71. doi:10.1053/j.sodo.2007.08.007.