IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 24, Issue 5 Ser. 6 (May. 2025), PP 59-64
www.iosrjournals.org

Identifying The Constraints Limiting Lay Persons, Dental Students And Dental Surgeons With Malocclusion To Seek Orthodontic Treatment

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Abstract:
Background: *Epidemiological data is crucial for understanding malocclusion prevalence and planning appropriate orthodontic treatments. Malocclusion, an irregularity or misalignment of teeth, is a significant public health issue. The World Health Organization emphasizes regular epidemiological surveys for screening and resource planning. The number of patients requiring orthodontic treatment has increased significantly in recent years, but some constraints still prevent them from undergoing such treatments. This study aims to identify these constraints to improve patient knowledge and treatment acceptance.*
Materials and Methods: *A total of 300 subjects were selected according to DHC of IOTN and divided into three groups: Laypersons, Dental Students and Dental Surgeons (100 subjects in each group: 50 males, 50 females). A questionnaire was developed using focus groups and clinician interviews to identify 13 constraint factors limiting access to orthodontic treatment. Participants were asked to mark the most prominent constraint.*
Results: *The study revealed that appearance satisfaction, appliance visibility, and treatment duration were the top reasons for not seeking treatment, with similar constraints across genders.*
Conclusion: *The study findings suggest, Lay person, Dental students and Dental surgeons had specific constraints, which orthodontists should consider when advising patients for the orthodontic treatment.*
Key Word: *Orthodontic treatment constraints, Laypersons, Dental students, Dental surgeons, Questionnaire study, Malocclusion*

Date of Submission: 19-05-2025 Date of Acceptance: 29-05-2025

I. Introduction

Malocclusion is an irregularity or malalignment of the teeth or a mal-relationship of the dental arches beyond what is accepted as normal. Although malocclusion is not life-threatening, it is considered to be a public health problem because of its high prevalence. World Health Organization (WHO), states the importance of periodic epidemiological surveys. The epidemiological data on the necessity of orthodontic treatment helps in screening out disease as well as planning for resources and formulating treatment modalities. In the last few years, there has been a notable rise in the number of patients needing orthodontic treatment. However, patients also confront various obstacles that prevent them from receiving orthodontic care. These constraint factors might vary depending on factors such as age, gender, socioeconomic status and profession. Efforts have been made in the present study to identify such constraint factors that have an impact on treatment acceptance which can be useful in making patients' orthodontic choices better by means of providing them with knowledge of the treatment needs and also about different treatment modalities.

II. Material And Methods

This prospective observational study was carried out on Lay persons, Dental students and Dental surgeons in the Department of Orthodontics and Dentofacial Orthopedics, College of Dental Sciences and Research Centre, Ahmedabad, Gujarat, India from February 2023 to February 2025. A total 300 adult subjects (both male and females) of age between 18-35 years were for in this study.

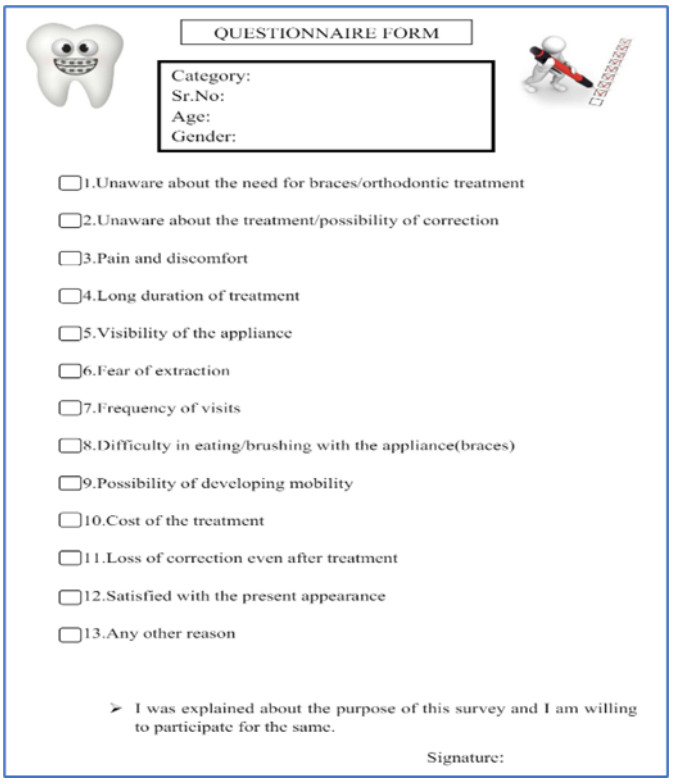
Study Design: Prospective observational study

Study Location: Department of Orthodontics and Dentofacial Orthopedics, College of Dental Sciences and Research Centre, Ahmedabad, Gujarat, India

Study Duration: February 2023 to February 2025

Sample size: 300 (100 in each group; Male: Female= 50:50)

Sample size calculation: In the present study, a total of 410 subjects were examined and divided into three groups namely i) Laypersons (n=124) ii) Dental students (n=139), and iii) Dental surgeons (n=147) by a single examiner out of which 300 subjects, 100 subjects from each group (50 males, 50 females) were selected.



Subjects & selection method: 300 out of 410 subjects were selected according to the DHC of IOTN[2] which belonged to Grade 3 and above. A questionnaire was developed using a focus group from face-to-face interviews with clinicians, followed by plotting a format of 13 different constraint factors in the questionnaire form (Figure 1). The subjects were divided into different groups as follow:
Group i) Laypersons (n=100; Male: Female= 1:1)
Group ii) Dental students (n=100; Male: Female= 1:1)
Group iii) Dental surgeons (n=100; Male: Female= 1:1)

Inclusion criteria:
1. All the subjects in each group should belong to the age group of 18- 35 years.
2. No previous history of orthodontic treatment.
3. Dental Health Component (DHC) of IOTN should be Grade 3 and above.

Procedure methodology

As discussed in the selection criteria, once 300 out of 410 subjects were selected according to the DHC of IOTN[2] by a single examiner, a questionnaire was developed using a focus group from face-to-face interviews with clinicians. This was followed by finally plotting all the constraint factors and a format of 13 different constraint factors for all three groups of subjects with their age and gender information in the questionnaire form {Fig1}. All the subjects in the selected group were requested to mark only the most prominent constraint factor

limiting them to seek an orthodontic treatment. All the subjects who were selected and participated in the study were explained about the purpose of the study and consent for the same was taken.

Statistical analysis

The responses from the questionnaire form for all three groups were recorded and categorized as per group and gender. All the data were tabulated to identify the distribution of constraint factors in all three groups, overall and gender-wise. A statistical analysis was performed using the chi-square test to compare and analyse the most prominent constraint factor in all three groups, overall and gender-wise.

III. Result

The study presents the distribution of constraint factors among Laypersons, Dental students, and Dental surgeons, comparing the total number of male and female subjects (Table 1 & 2). The calculated chi-square values indicate that there is no statistically significant difference between males and females within each group, which is in concordance with findings of study done by Kim Y[3].

This study also compared male subjects' opinions on constraint factors among three groups. The chi-square value was statistically significant at a p value of 0.01, indicating a clear difference in opinion between Laypersons vs. Dental students and Laypersons vs. Dental surgeons. However, the chi-square value was insignificant between Dental students and Surgeons, suggesting a similar opinion. (Table 4)

Table 5 compares female subjects' opinions on constraint factors using chi-square values. The chi-square value between laypersons and dental students was highly significant at p value 0.001, indicating a significant difference in opinion. However, when comparing Laypersons and Dental surgeons, the chi-square value was significant at p value 0.01. Interestingly, when comparing Dental students with Dental surgeons, the chi-square value was relatively low at a p value of 0.05.

Table 6 displays the chi-square value distribution in male and female subjects from three groups. The high p value of 0.001 indicates a significant difference in opinion between males and females in all group.

Sr. No.	1	2	3	4	5	6	7	8	9	10	11	12	13
CONSTRAINTS	Visibility of the appliance	Long duration of treatment	Satisfied with the present appearance	Fear of extraction	Unaware about the need for braces/ orthodontic treatment	Possibility of developing mobility	Cost of the treatment	Frequency of visits	Difficulty in eating /brushing with the appliance (braces)	Loss of correction even after treatment	Unaware about the treatment/possibility of correction	Pain and discomfort	Any other reason
LAY PERSONS (n= 100)	**32**	26	10	8	7	5	5	3	3	1	0	0	0
DENTAL STUDENTS (n= 100)	19	7	**50**	4	0	2	0	0	4	8	0	5	1
DENTAL SURGEONS (n= 100)	16	23	**40**	3	0	2	0	2	5	7	0	3	0

Table 1: Choice Of Constraint Factors In 3 Groups

		LAYPERSONS		DENTAL STUDENTS		DENTAL SURGEONS	
Sr. No.	CONSTRAINTS	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
1	Unaware about the need for braces/orthodontic treatment	6	1	0	0	0	0
2	Unaware about the treatment/possibility of correction	0	0	0	0	0	0
3	Pain and discomfort	0	0	3	2	2	1
4	Long duration of treatment	**13**	13	7	0	8	15
5	Visibility of the appliance	10	**22**	9	10	10	6
6	Fear of extraction	6	2	2	2	0	2
7	Frequency of visits	0	3	0	0	1	1
8	Difficulty in eating/brushing with the appliance (braces)	1	2	2	2	2	3
9	Possibility of developing mobility	3	2	0	2	1	1
10	Cost of the treatment	3	2	0	0	0	0
11	Loss of correction even after treatment	1	0	3	3	7	0
12	Satisfied with the present appearance	7	3	**22**	**28**	**19**	**21**
13	Any other reason	0	0	0	1	0	0

Table 2: Genderwise Distribution Of Constraint Factors In Three Groups

Group	Group	X^2	P Value
Laypersons Males	Lay Persons Females	16.4	0.173 (N.S.)
Dental Students Males	Dental Students Females	11.47	0.489 (N.S.)
Dental Surgeons Males	Dental Surgeons Females	12.76	0.386 (N.S.)
Df=12	**Probability Level**	**Chi-Square Value**	
	0.05 (*)	21.03	
	0.01 (**)	26.22	
	0.001(***)	32.91	

Table 3: Chi-Square Distribution Of Constraints In Male And Female Subjects Of Similar Categories

Group	Group	X^2	P Value
Laypersons Males	Dental Students Males	**29.61**	**<0.0031****
Laypersons Males	Dental Surgeons Males	**30.56**	**0.00229****
Dental Students Males	Dental Surgeons Males	**4.87**	**0.962(N.S.)**
Df=12	**Probability Level**	**Chi-Square Value**	
	0.05 (*)	**21.03**	
	0.01 (**)	**26.22**	
	0.001(***)	**32.91**	

Table 4: Chi-Square Distribution Of Constraints In Male Subjects Of Different Categories

Group	Group	Group	X^2	P Value
Laypersons Males	Dental Students Males	Dental Surgeons Males	**48.17**	**0.0024*****
Lay Persons Females	Dental Students Females	Dental Surgeons Females	**48.17**	**<0.00001*****
Df=24	**Probability Level**	**Chi-Square Value**		
	0.05 (*)	36.42		
	0.01 (**)	42.98		
	0.001(***)	51.18		

Table 5: Chi-Square Distribution Of Constraints In Female Subjects Of Different Categories

Group	Group	X^2	P Value
Lay Persons Females	Dental Students Females	49.66	<0.00001***
Lay Persons Females	Dental Surgeons Females	28.32	0.0049**
Dental Students Females	Dental Surgeons Females	22.87	0.0288*
Df=12	**Probability Level**	**Chi-Square Value**	
	0.05 (*)	21.03	
	0.01 (**)	26.22	
	0.001(***)	32.91	

Table 6: Chi-Square Distribution Of Constraints In Male And Female Subjects Of Different Categories

IV. Discussion

Over the past few years, the number of patients requiring orthodontic treatment has been increased significantly. However, the patients confront various obstacles which limits them from undergoing the orthodontic treatment. Therefore, this study was aimed to identify the constraints to improve patient knowledge and treatment acceptance for orthodontic treatment.

The study shows the constraint factors for 3 groups i.e. laypersons, dental students and dental surgeons. Visibility of the appliance was the most common constraint factor amongst laypersons, followed by the Long duration of treatment, followed by Satisfied with the present appearance. In contrast, for dental students and dental surgeons, the most common constraint factor was Satisfied with the present appearance followed by Visibility of the appliance and Loss of correction even after treatment are for dental students while the Long duration of the treatment and Visibility of the appliance are for dental surgeons. (Table 1)

The study also gives collective information for each constraint factor for the three groups for both males and females. It was observed that all three groups gave similar weightage to the factor Unaware about the treatment/possibility of correction. The second closest weightage of opinion found for all three groups was Difficulty in eating/brushing with the appliance. (Table 2)

- For Laypersons, Visibility of the appliance showed the maximum difference between males and females in which, females (n= 22) were more concerned about the same constraint factor than males (n=10).
- For Dental students, the maximum difference between males and females was found for the constraint factor Long duration of the treatment in which, males were more concerned (n=7) than females (n=0).
- For Dental surgeons, the maximum difference found for males and females was for the constraint factors Long duration of the treatment in which females were more concerned (n=15 vs. 8 males) and Loss of correction even after treatment for which males were more concerned (n=7 vs. 0 female).

The study has compared male and female subjects' opinions on constraint factors among three groups individually with chi square value.

Zubair H. Awaisi et al[4] did a questionnaire study in 250 participants of the age group of 18-45 years to find out the common barriers towards orthodontic treatment and concluded that one of the major constrains towards orthodontic treatment were long duration which is in agreement with our study in case of lay persons and dental surgeons. Other major constraints were long duration in case of females due to marriage age, extraction need and orthognatic surgery need.

Rastogi S et al[5] studied to assess awareness and social perceptions of orthodontic treatment in adults and concluded that adult population is aware about orthodontic treatment needs and time constraint being the major reason for not availing the treatment followed by that social acceptance, cost of the treatment and awareness. This shows partial similarity with our study where both social appearance/ visibility of the appliance and time/ long duration of treatment were the major constraints although social appearance being the most predominant factor in our study.

Kahlon et al[6] analysed the reasons for opting/ deterring orthodontic treatment in amritsar population and concluded that lack of time (28%), fear of pain (26%), laziness for treatment (23%), for not giving up food habits (18%) and fear of extraction (18%) were the prime reasons for not opting orthodontic treatment. This study is contextually related to the current study although there are certain variations in methodology.

Kim Y[3] studied to estimate the overall frequencies of positive perception towards orthodontic treatment among adults categorized according to age, sex, and area of living, and to identify barriers or negative perceptions preventing them from receiving orthodontic treatment and concluded that the rate of positive perception towards orthodontic treatment was 48.5% within the total sampled population. Compared to participants in their 20s (63.2%), those in their 40s and 50s had a lower percentage of interest in treatment (46.2% and 45.1%, respectively). The main reasons for not receiving orthodontic treatment were fees and long duration of time in almost all age groups. These findings do not corresponds to the current study.

Digumarthi UK[11] in a cross sectional study, identifying prime factors influencing the reluctance expressed toward orthodontic treatment among a tribal population of Andhra Pradesh found that the prime factors were difficulty of access to orthodontic treatment and the apprehension regarding expense which are not in accordance with the present study attributed to demographic differences.

The result in this study is in concordance with the result of the previous studies done by Zubair et al[4], Patrícia et al[7], Rastogi S et al[5] and Kahlon et al[6] which showed long duration of the treatment as the major constraint factor amongst adult lay persons. However, it contradicts with the studies done by Sandeep AB et al[8], Gaurav Agarwal et al[9], Singh P[10], Yoonji Kim[3] and Digumarthi UK where cost of the treatment (finance) was the major constraint in lay persons.

These results of present study suggests that the future of orthodontic care lies in providing the information regarding orthodontic treatment need and developing patient-centered solutions that directly address these barriers. Aesthetic brackets or aligner therapy can be a promising alternative by offering comfortable and customizable treatment options that align with the lifestyle and aesthetic expectations of modern patients. By minimizing the visibility of the appliance, aesthetic bracket or clear aligners can help overcome psychological and social inhibitions, thereby enhancing patient acceptance and compliance.

V. Conclusion

The study revealed that individuals from different backgrounds—Lay persons, Dental students, and Dental surgeons—face distinct constraints that influence their decision to seek orthodontic treatment. Aesthetic concerns, particularly the visibility of the appliance, emerged as a significant constraint for laypersons, while satisfaction with current dental appearance was the most common factor among dental professionals and students. Similarly, across both male and female groups, concerns about appliance visibility and contentment with current appearance were predominant.

Orthodontists should incorporate advanced modalities while considering different concerns of diverse patient groups. An empathetic approach, coupled with innovations can significantly improve access to orthodontic care and a more positive perception of treatment.

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