



Who Needs and Who Seeks Orthodontic Treatment – A Cross Sectional Study to Access Knowledge, Attitude among Undergraduate Dental Students

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Abstract: Aim: The study aimed to assess the knowledge, attitude and perception on orthodontic treatment among dental house surgeons in India. **Method:** A cross sectional study has been conducted and questionnaires were distributed through google forms (Google LLC) containing 15 questions in total. The filled questionnaires were collected and the statistical analysis (SPSS Statistics for Windows, version 25.0 {SPSS Inc., Chicago, USA}) was done using

descriptive method and chi – square test. **Result:** A total of 736 participants responded the survey. The percentage of knowledge on Preventive orthodontic part was 50.9%, Interceptive orthodontics was 62.5%, Corrective orthodontics was 65.2%. **Conclusion:** The survey outcomes suggest that the knowledge and attitude among dental house surgeons on orthodontic treatment still needed an emphasize more on the curriculum aspect and by doing so negligence of future clinical practice can be sought out.

Keywords: Awareness, Attitude, Orthodontic treatment, Dental students.

Introduction:

Orthodontics is the oldest specialty in dentistry which includes the correction of the malocclusions of the teeth as specified by Angle in 1907. In general, the orthodontics involves four categories which are the Preventive Interceptive orthodontics, Corrective orthodontics and the Surgical orthodontics¹. The Orthodontic treatment aims at influencing the position of teeth, leading to prevention and correction of malocclusion. The treatment planning varies significantly depending upon the age. The people who seek orthodontic treatment during late adolescence and growth period can be treated by growth modification appliances but the same cannot be applied to the adult patients. Also, the knowledge on oral health forms an essential part in health-related behavior². So the knowledge about orthodontic treatment to undergraduate dental students is becoming increasingly important in orthodontics. Hence, the aim of our study is to evaluate Knowledge and Attitude of undergraduate dental students towards orthodontic treatment.

Materials and methods:

A cross sectional study was conducted through Google forms (Google LLC) from the month of August until December 2022. A self-administered questionnaire consisting of 15 closed-ended questions based on empirical data was framed. The forms were circulated among the Dental house surgeons of India. Informed consents were obtained from the participants priorly. 736 students responded with completed forms. For the assessment, Knowledge level scoring system was used. 0-50% - Poor level of knowledge, 51-70% intermediate knowledge and 71-100% as good and high level knowledge. (IRB NUMB Ref: 201/IRB-IBSEC/SIST Dated 30th September 2021).

Statistical analysis:

Sample size with 95% confidence and 5% margin of error, was determined as 377 (web-based survey system.com and raosoft.in). Frequency distribution was generated for all variables of the nominal data. Data obtained were compiled systematically in Microsoft Excel Spreadsheet. Statistical analyses were performed using a personal computer in IBM corp. Statistical Package for Social Sciences software for windows; version 25.0. Data comparison was done by applying descriptive statistical tests.

Results:

PREVENTIVE ORTHODONTICS					
			Frequency (n)	Percentage (%)	Overall Knowledge Score
1.	Space maintainers are given for the lost primary 2nd molar after	8 - 11 years	n = 514	69.8%	Intermediate
		11 - 13 years	n = 140	11.1%	
		Not required	n = 82	19.0%	
2.	Which space maintainers are important to maintain esthetics and mastication in mixed dentition	Band and loop	n = 378	51.4%	Poor
		Distal shoe	n = 210	28.5%	
		Removable partial denture	n = 146	19.8%	
		None of the above	n = 2	0.3%	

3.	Mesiodens are to be extracted	As and when noticed	n = 466	63.3%	Intermediate
		Can be delayed till permanent dentition erupts	n = 182	24.7%	
		Not necessary to extract at all	n = 88	12.0%	

Table 1: Responses to various questions in Preventive orthodontics.

In Preventive Orthodontics, the first question assessed the knowledge regarding Space maintainers. 69.8% of the sample population opted that for the loss of primary 2nd molar Space maintainers are given after 8 - 11 years; whereas 19% responded that it should be given after 11 – 13 years and 11.1% responded that the space maintainers are not required in general after the loss of deciduous 2nd molar. The next question was to assess which type of space maintainers are given to maintain esthetics and mastication in mixed dentition. 19.8% of the sample population responded with removable partial dentures. 51.4% opted band and loop would be choice of space maintainers; 28.5% responded with Distal shoe space maintainers. In preventive part the final question was regarding the clinical management of mesiodens. 63.3% of the respondents opted that it should be done as when noticed; 24.7% responded it can be delayed till the permanent dentition erupts, whereas 12% responded it is unnecessary to extract the mesiodens. (Table 1)

Undergraduate Dental Students

INTERCEPTIVE ORTHODONTICS

			Frequency (n)	Percentage (%)	Overall Knowledge Score
1.	Correction of midline diastema should be done	As soon as it appears in mixed dentition	n = 114	15.5%	Intermediate
		After eruption of canine	n = 454	61.7%	
		Before canine eruption	n = 17	2.3%	
		After eruption of premolars	n = 151	20.5%	
2.	Correction of Oral habits should be done	1 year to 2 years	n = 163	22.1%	Poor
		2 years to 4 years	n = 329	44.7%	
		After 4 years	n = 193	26.2%	
		After 12 years	n = 51	6.9%	
3.	Tongue thrusting habit can be corrected by	Palatal crib	n = 598	81.3%	Intermediate
		Oral screen	n = 81	11.0%	
		Lip bumper	n = 57	7.7%	

4.	Tongue blade therapy can be a treatment of choice in	Developing anterior deep bite	n = 212	28.8%	Intermediate
		Developing posterior cross bite	n = 83	11.3%	
		Developing anterior cross bite	n = 441	59.9%	
5.	Serial extraction is most indicated in	Class I severe crowding	n = 481	65.4%	Intermediate
		Class I spacing	n = 14	1.9%	
		Class II division	n = 188	25.5%	
		Class III spacing	n = 53	7.2%	
6.	Serial extraction follows the extraction pattern of	Primary canine and Permanent canine	n = 52	7.1%	Good
		Primary canine and primary 1st molar	n = 596	81.0%	
		Primary 1st molar and Primary 2ndmolar	n = 88	12.0%	

Table 2: Responses to various questions in Interceptive orthodontics.

6 questions was asked to evaluate the interceptive part of orthodontics. The first question was regarding the clinical management of midline diastema. 61.7% responded that it should be done after eruption of canine, 20.5% opted that it can be done after the eruption of premolars, whereas 15.5% responded that correction should be done as soon as it appears in the mixed

dentition, and 2.3% responded with before the eruption of canine. Further on, the optimum time for the correction of Oral habits was evaluated. 26.2% responded that should be done after 4 years; whereas 44.7% had responded 2 to 4years of age, 26.2% after 4 years and 6.9% after 12 years. The next question was regarding the habit breaking appliance for Tongue thrusting habit. 81.3% responded palatal crib would be ideal choice, 11% opted for oral screen and 7.7% with the lip bumper.

Whereas for the treatment with Tongue blade therapy 59.9% responded that it is ideal choice of treatment in Developing anterior cross bite; whereas 28.8% depended on developing anterior deep bite, 11.3% for developing posterior cross bite. Interns were assessed about their knowledge on indications for serial extractions. 65.4% responded with Class I malocclusion with a severe crowding, whereas 1.9% with Class I spacing, 25.5% with Class III division and 7.2% with Class III spacing. Which extraction pattern should be followed in serial extraction was assessed finally in interceptive part. 7.1% responded that it follows the extraction pattern of Primary canine and permanent canine, 81.0% responded with Primary canine and primary 1st molar and 12.0% responded with primary 1st molar and primary 2nd molar. (Table 2)

Undergraduate Dental Students

CORRECTIVE ORTHODONTICS

			Frequency (n)	Percentage (%)	Overall Knowledge Score
1.	Treatment with Functional appliance is ideal during CVMI stage	CS 1-2	n = 108	14.7%	Good
		CS 3-4	n = 543	73.8%	
		CS 5-6	n = 85	11.5%	
2.	Growth modification appliances are ideal during	6 - 8 years of age	n = 104	14.1%	Intermediate
		7 - 9 years of age	n = 166	22.6%	
		9 - 12 years of age	n = 410	55.7%	
		15 years and above	n = 56	7.6%	
3.	Reverse pull headgear is ideal for correcting maxillary deficiency during	Primary dentition	n = 63	8.6%	Intermediate
		Early mixed dentition	n = 41	56.5%	
		Late mixed dentition	n = 199	27.0%	
		Permanent dentition	n = 58	7.9%	

4.	The appliance which best treats Class II division 1 malocclusion at the end of growth period is	Herbst appliance	n = 28	3.8%	Good
		Activator	n = 82	11.1%	
		Jasper Jumper	n = 65	8.8%	
		Both A and C	n = 561	76.2%	
5.	Anterior bite plane is ideal for the correction of deep bite during	Primary dentition	n = 85	11.5%	Poor
		Early mixed dentition	n = 284	38.6%	
		Early Permanent dentition	n = 367	49.9%	
6.	Mandibular setback surgery is the treatment for the correction of class III malocclusion after	Primary dentition	n = 107	14.5%	Intermediate
		Early mixed dentition	n = 40	5.4%	
		Late mixed dentition	n = 137	18.6%	
		Permanent dentition	n = 452	61.4%	

Table 3: Responses to various questions in Corrective orthodontics.

In Corrective orthodontics 6 questions was asked to evaluate their knowledge. 73.8% of the sample population responded that for the functional appliance CVMI stage 3-4 is ideal treatment time, 14.7% with CVMI stage 1-2 and 11.5% with CVMI stage 5-6. Also for the Growth modification appliances 55.7% responded that ideal treatment is during 9 - 12 years of

age, 22.6% at 7 - 9 years of age, 14.1% at 6 - 8 years of age and 7.6% responded for 15 years and above. Further on, questions regarding the choice of treatment for the correction of maxillary deficiency with reverse pull headgear was assessed. 56.5% responded with Early mixed dentition, 27.0% with Late mixed dentition. 8.6% with Primary dentition, 7.9% at Permanent dentition. For the correction of Class II malocclusion at early permanent dentition which of the fixed functional appliance would be an ideal choice of treatment was the question. 76.2% of the sample population responded that the Herbst and Jasper Jumper were the appliance of choice which best treats Class II division 1 malocclusion at the end of growth period. 11.1% with Activator 3.8% with Herbst appliance and 8.8% with Jasper Jumper.

For the correction of deep bite with Anterior bite plane, what is the ideal time was the next question. 49.9% responded with early permanent dentition; whereas 38.6% opted for early mixed dentition and 11.5% at Primary dentition. The ideal treatment time for mandibular setback surgery was the next question. 61.4% responded after Permanent dentition, 18.6% at Late mixed dentition, 14.5% at Primary dentition and 5.4% at Early mixed dentition (Table 3).

On an overall assessment, the percentage of knowledge on Preventive orthodontic part was 50.9%, Interceptive orthodontics was 62.5%, Corrective orthodontics was 65.2% (Figure 1).

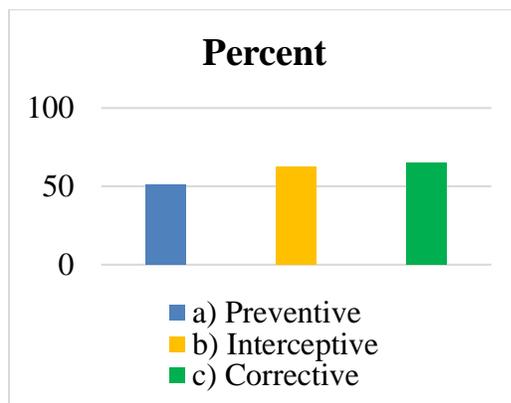


Figure 1: Overall Percentage responses of Preventive, Interceptive and Corrective orthodontic treatment questions.

Discussion:

The most significant observation among patients over 18 years of age are the appearance and social acceptance which is of greater concern than function. Previous studies done^{3,4,5,6} by various authors reported that majority of final year students and interns were knowledgeable about orthodontic treatment modalities.

In our present study, we evaluated the knowledge and awareness among house surgeons regarding the orthodontic treatment interventions. 15 questions were framed which were inclusive of preventive, interceptive and corrective orthodontics and circulated through Google forms all over the dental institutes of India.

In preventive orthodontic part, knowledge about space maintainers and management of mesiodens was assessed. In a clinical scenario when there is a loss of primary second molar, space maintainers are given at 8 – 11 years of age⁷, in this regards interns exhibited an intermediate knowledge (69.8%). Ideally, the clinical management for midline diastema starts only after the eruption of canine⁸, the interns possessed an intermediate knowledge (63.3%) regarding the same. Removable partial dentures, one of the important space maintainers are given to maintain the esthetics and mastication in mixed dentition⁹ and from the survey it showed that the respondents possessed a poor knowledge (19.8%).

In interceptive orthodontics, management of midline diastema, correction of oral habits and pattern of serial extraction was assessed. The correction of midline diastema should be done after the eruption of canine¹⁰ and the interns possessed an intermediate knowledge (61.7%). Ideally, Oral habits can be intercepted after 4 years¹¹, the participants possessed a poor knowledge score (26.2%). Regarding tongue thrusting habit, the ideal choice appliance is palatal crib¹² and a good knowledge (81.3%) was exhibited by the respondents. Concerning tongue blade therapy, it is an ideal choice of treatment in developing anterior cross bite¹³. An intermediate knowledge (59.9%) was seen among interns. Serial extractions are indicated in Class I severe crowding¹⁴, the respondents had an intermediate knowledge (65.4%). The extraction pattern involved in serial extraction is Primary canine and primary 1st molar¹⁴, in our survey we had a response of which exhibits good knowledge (81%).

Knowledge and awareness about Corrective orthodontics was assessed in our next section. Functional appliance, treatment timing with growth modification appliance, ideal time for

correcting maxillary deficiency with reverse pull headgear, appliance of choice for Class II division 1 malocclusion at end of growth period, ideal time for correcting deep bite with anterior bite plane and treatment timing for mandibular setback surgery for Class III malocclusion was part of the questionnaire.

Cervical vertebral stage 3- 4 is the ideal time for treatment with functional appliance¹⁵, house surgeons had a good knowledge (73.8%) regarding the same. The ideal age for growth modification is 9 to 12 years of age¹⁶, the survey reported that the interns possessed an intermediate knowledge (55.7%). The optimum time for correcting maxillary deficiency with reverse pull headgear is at early mixed dentition¹⁷, interns showed an intermediate knowledge 56.5% in regards to the same. The appliance of choice for Class II division 1 malocclusion at end of growth period are the Herbst and Jasper Jumper fixed functional appliance¹⁸, a good knowledge (76.2%) was exhibited among the respondents. Early permanent dentition is the ideal time for treatment with deep bite¹⁹, a poor knowledge (49.9%) was seen from the respondents. Furthermore, regarding the surgical correction of Class III malocclusion mandibular setback surgery will be done after the full eruption and completion of permanent dentition²⁰, the survey showed that the interns had an intermediate knowledge (61.4%).

Previous reports by Riya et al²¹, showed that 75% of the dental students who were having knowledge about orthodontic treatment were aware of dental esthetics, also, House surgeons had more positive attitude towards orthodontic treatment compared to first, second, third and final year students. Furthermore, survey on knowledge and perception of orthodontic treatment among dental undergraduates by Varghese et al²² showed that Final years and interns had maximum knowledge and perception towards orthodontic treatment.

On Contrary based on the response from the present survey, on an overall observation from the filled-in questionnaire that half of the subjects under evaluation lacked adequate knowledge on the preventive (50.9%), interceptive (62.5%) and corrective (65.2%) part of orthodontics. Therefore, from the study it can be emphasized that there is need for increased awareness regarding the orthodontic treatment modalities. Further on it will be helpful in weeding off misconception regarding the treatment plan and increase sentience.

Limitations of the study:

A comparative study between dental students, general dentists could have provided more insight into the impact of knowledge and awareness for undertaking orthodontic treatment.

Conclusion:

The data from the survey will be helpful to make a more definitive diagnosis and treatment planning in contemporary orthodontic treatment procedures.

On further recommendation, inclusion and elaboration of these subjects early on in the dental school curriculum will be useful for an efficient future clinical practice.

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