

## *International Journal of Scientific Research and Reviews*

### **Knowledge, Attitude and Awareness on principles and practice in Orthodontics among general Dentists and non - orthodontic specialists with clinical experience**

**P. Rithika Raj<sup>1\*</sup>, Jenifer Romeo<sup>2</sup>, M.K. Karthikeyan<sup>3</sup>, Vinoth Kumar.R<sup>4</sup>, Rajvikram<sup>5</sup> and Rajakumar.P<sup>6</sup>**

Department of Orthodontics, Thai moogambigai dental college and hospital, Chennai-600107, India

[rithika.raj98@gmail.com](mailto:rithika.raj98@gmail.com), [jeniferromeo598@gmail.com](mailto:jeniferromeo598@gmail.com), [mkdental98@gmail.com](mailto:mkdental98@gmail.com),  
[vinothortho@gmail.com](mailto:vinothortho@gmail.com), [N\\_rajvikram@yahoo.com](mailto:N_rajvikram@yahoo.com), [rajscare@hotmail.com](mailto:rajscare@hotmail.com)

#### **ABSTRACT:**

The present study was carried to evaluate the knowledge, attitude and awareness on various principles and practices in orthodontic treatment among general dentists and non-orthodontic specialists and to assess the existing scenario. A cross-sectional online survey was carried out with the help of 20 questionnaires amongst 100 dental practitioners across the state, which was divided into Group I consisted of 71 dental practitioners with 1-2years of clinical experiences and Group II with 29 dental practitioners of more than 3years clinical experiences. Among participants with 1-2years of clinical experience only 43.66% responded on importance of extraction protocols whereas 56.4% were not sure on treatment protocols and 32% lack knowledge towards age related management of oral habits. More than 60% participants does not deny orthodontic treatment and showed positive attitude towards referral while 65% were aware of various skeletal malocclusion associated clinical features and its importance. There is definitely a need for clinically oriented undergraduate dental training with more emphasis on practice-based concepts of orthodontic treatment especially among 1-2years clinical experience group.

**KEYWORDS:** Attitude, Dental Education, Dental Training, General Dentist, Orthodontic Specialist

#### **\*Corresponding author:**

**P. Rithika Raj**

Intern, Thai moogambigai dental college and hospital,

Chennai- 600107

E Mail - [rithika.raj98@gmail.com](mailto:rithika.raj98@gmail.com), Phone no: 8778817474

## **INTRODUCTION:**

Malocclusion or improper alignment of tooth is one of the most common clinical condition often encountered in routine dental practice resulting in abnormal functional movements of the jaw associated with difficulty in mastication, swallowing, speech, and increased susceptibility to trauma or gingival diseases<sup>1,2</sup>. It is also evident that inappropriate position of the tooth in the jaw causes several oral diseases including dental caries, temporomandibular dysfunctions, fluorosis, gingival and periodontal pathologies<sup>3</sup>. Besides these, unaesthetic facial appearance as a result of malocclusion plays an important role on psychological impact of an individual by negatively influencing the quality of life resulting in social embarrassment, feeling of shame/shy, rejection and unpredictable psychological disorders<sup>4,5</sup>.

Malocclusion is a spectrum of disease caused by abnormal eruption of permanent or deciduous teeth in jaws characterized by deviation from the normal or ideal occlusion in which there is a molar relationship between the arches in any of the planes of spaces or presence of anomalies in tooth position beyond the normal limits as far as possible<sup>6,7</sup>. Orthodontics specialty often deals with diagnosis, prevention, and correction of mal-positioned teeth and jaws, and related abnormalities. Therefore, orthodontic therapy performed at a crucial time at a right phase has a significant role in prevention of tissue damage, aesthetic enhancement, functional or physiological improvement and psychosocial well-being of an individual<sup>8</sup>.

Several studies have shown lack of awareness towards prevalence, etiological factors and corrective measures of the routine conditions affecting the oral cavity including malocclusion among general population<sup>9-11</sup>. Thus, creating awareness and educating the patients/general public on various causes, associated factors, complications of malocclusion as well as benefits of orthodontic treatment remains one of the challenging task in routine dental practice that largely rely upon the general dentists who do not have a specialist knowledge in the field of orthodontics<sup>12,13</sup>. This can be achieved by multidisciplinary approach in which general dental experts and other non-orthodontic practitioners can take responsibility of educating their patients about importance of occlusion and orthodontic therapy then plan a proper orthodontic appointment<sup>14-16</sup>. Consequently, there is a need to evaluate the knowledge, and attitude levels of general dental practitioners and non-orthodontist specialists with respect to principles and practice in orthodontic management who play the role of orthodontic health educators by identifying the patient who needs to undergo a correction in dental occlusion or other orthodontic related treatments. Hence the present study was carried to evaluate the knowledge, attitude

and awareness on various principles and practices in orthodontic treatment among general dentists and non-orthodontic specialists and to assess the existing scenario.

## **METHODOLOGY:**

A cross-sectional questionnaire survey was conducted amongst the dental practitioners between 1 to 5 years of clinical experience across the state of Tamilnadu, India to assess their knowledge, attitude and awareness towards various principles and practices in orthodontic treatment. The study was conducted following the Helsinki declaration as revised in 2013. After obtaining the Ethical clearance, the required information was collected through published scientific articles pertaining to the study and self-administered structured questionnaires, comprising of 20 questions in English language was prepared and evaluated. The questionnaire had both combination of selected response to the certain questions and also few close ended questions (Yes / No/ don't know).

A total of 100 randomly selected dental practitioners between 1 to 5 years of clinical experience across Tamilnadu participated in this survey. Since this study was conducted during COVID-19 Pandemic lockdown period, online Google forms were generated and distributed through social media platforms. The internal consistency of the questionnaire was adequate (Cronbach's alpha = 0.729). All the participants were briefed about the purpose of the study and an informed consent was obtained before the survey through Google forms and assured that their participation was purely voluntary.

## **STATISTICAL EVALUATION:**

Non-probability, stratified sampling technique was employed that yielded information from 100 dental practitioners with 1-5 years of clinical experience were taken into this observational study having a cross-sectional design. Responses recorded among the selected population group were evaluated using SPSS software Version 22.0. In the final analysis, "yes" or correct responses were given a score of 1 and "no" or incorrect responses were given a score of 0; the scores were summed to obtain the overall scores among Dental practitioners under 5 year of experience.

## **RESULTS:**

On analysis of the given data the mean age of study population was observed as  $23.89 \pm 2.654$  years (mean  $\pm$  S.D) with 0.526 at 95% confidence level comprising of 44 (44%) male and 56 (56%) female participants. It was observed 69% (69 out of 100) of the study participants were undergraduates followed by 31% post graduates dental practitioners among which 71% were practitioners with 1-2 years

of clinical experience (71 out of 100) followed by 29% (29 out of 100) dental practitioners with 3-5 years of clinical experience respectively.

On assessment of knowledge towards principles and practices in orthodontics only 31 out of 71 (43.66%) with 1-2years experience responded on importance of extraction protocols whereas 40 out of 71 (56.4%) were not sure on treatment requiring extractions compared to 14 out of 29 (48.27%) with more than 3 years of experience. Majority were familiar with ideal age of orthodontic treatment and age associated factors despite 46 out of 100 (46%) were not well-known with recommended orthodontic treatment for patients with periodontal problem irrespective of clinical experiences. Assessment on oral habits demonstrated 53% had adequate knowledge towards thumb sucking, mouth breathing, facial characteristics and its management while 32% with 1-2years experience prefer wait and watch/ No treatment at the early phases of habit.

On evaluation of attitude practices towards principles and practices in orthodontics it was observed 34 out of 43 (79%) never assisted/performed an orthodontic treatment in 1-2years of clinical practice among which 41 out of 46 (89.13%) recommend orthodontic treatment only after eruption of all permanent teeth. More than 60% participants does not deny orthodontic treatment for patients with missing molars however only 13 out of 71 (18.3%) with 1-2years experience agree malocclusion can be treated during mixed dentition period and also reveal intrusion tooth movement was the most difficult one to accomplish.

On evaluation of awareness practices towards principles and practices in orthodontics 25 out of 28 (89.2%) and 25 out of 39 (64.1%) participants with 1-2years of experience were not aware of clinical examination of malocclusion and its relationship with systemic diseases respectively. Majority (65%) were aware of various skeletal malocclusion associated clinical features and agree that mini screws can replace molars for providing anchorage among which 43% of respondents prefer 6months to 1 year wearing of retainers following fixed appliance therapy.

**Table 1: Table showing the frequency responses and p-value of the study questionnaire**

Q no	question	options	1-2 years N (%)	3-5years N (%)	p value
1	Have you ever assisted/performed an orthodontic treatment in your clinical practice	YES	37 (40.47)	20 (16.53)	.122431
		NO	34 (30.53)	9 (12.47)	
2	Will you look for malocclusion on clinical examination when patient report with any other complaint	YES	43 (48.28)	25 (19.72)	.037455*
		NO	3 (2.84)	1 (1.16)	
		Maybe	25 (19.88)	3 (8.12)	
3	Is there any relationship between malocclusion and systemic diseases	YES	41 (38.34)	13 (15.66)	.463448
		NO	5 (4.97)	2 (2.03)	
		Maybe	25 (27.69)	14 (11.31)	
4	Orthodontic treatment always requires extraction	YES	7 (9.23)	6 (3.77)	.034070*
		NO	24 (23.43)	9 (9.57)	
		Maybe	40 (38.34)	14 (15.66)	
5	Do you ask your patients report for orthodontic treatment only after all permanent teeth have erupted?	YES	41 (32.66)	5 (13.34)	.00398*
		NO	14 (14.91)	7 (6.09)	
		Maybe	16 (23.43)	17 (9.57)	
6	Will you deny orthodontic treatment for patients with missing molars	YES	6 (8.52)	6 (3.48)	.151296
		NO	54 (53.25)	21 (21.75)	
		Maybe	11 (9.23)	2 (3.77)	
7	Are you aware that mini screws can replace molars for anchorage	YES	48 (46.86)	18 (19.14)	.59586
		NO	23 (24.14)	11 (9.86)	
8	Will you recommend orthodontic treatment for patients with periodontal problem	YES	11 (9.23)	2 (3.77)	.00010*
		NO	23 (32.66)	23 (13.34)	
		Maybe	37 (29.11)	4 (11.89)	
9	Can malocclusion be treated during mixed dentition period	YES	13 (24.14)	21 (9.86)	<.00001*
		NO	26 (22.72)	6 (9.28)	
		Maybe	32 (24.14)	2 (9.86)	
10	Are you aware of skeletal malocclusions when patients come to you with complaint of proclined teeth and incompetent lips	YES	66 (66.03)	27 (26.97)	.979327
		NO	5 (4.97)	2 (2.03)	
11	What is the right age to start orthodontic treatment?	9 to 13yrs	33 (34.79)	16 (14.21)	.871704
		12 to 15yrs	31 (29.82)	11 (12.18)	
		16 to 20yrs	4 (3.55)	1 (1.45)	
		20 to 25yrs	3 (2.84)	1 (1.16)	
12	What is the maximum age up to which orthodontic treatment can be carried out?	35 years	37 (33.37)	10 (13.63)	.03614*
		40 years	28 (28.40)	12 (11.60)	
		45 years	4 (4.26)	2 (1.74)	
		50 years	2 (4.97)	5 (2.03)	
13	In orthodontic treatment, rapid tooth movement will cause except	Devitalization of teeth	32 (29.11)	9 (11.89)	.111366
		Revitalization of roots	14 (12.07)	3 (4.93)	
		Loss of vitality of pulp	21 (23.43)	12 (9.57)	
		Ankylosis	4 (6.39)	5 (2.61)	

14	How long should the retainers be worn after fixed appliance therapy	6 months to 1 year	34 (30.53)	9 (12.47)	.456032
		Life long	3 (2.84)	1 (1.16)	
		Depends on the treatment	32 (35.50)	18 (14.50)	
		Not sure	2 (2.13)	1 (0.87)	
15	Ugly duckling stage is seen at the age of	6-7 years	35 (31.24)	9 (12.76)	.041646*
		9-10 years	26 (29.11)	15 (11.89)	
		10-12 years	8 (8.52)	4 (3.48)	
		12-14 years	2 (2.13)	1 (0.87)	
16	Clinical features of mouth breathing are	Pigeon face appearance	41 (37.63)	12 (15.37)	.234117
		Proclined mandibular anteriors	20 (19.88)	8 (8.12)	
		Shallow and flat maxillary arch	6 (8.52)	6 (3.48)	
		Retroclined maxillary anteriors	4 (4.97)	3 (2.03)	
17	Broad and short type of face is known as	Mesoprosopic	12 (12.78)	6 (5.22)	.482428
		Europrosopic	51 (48.28)	17 (19.72)	
		Leptoprosopic	4 (5.68)	4 (2.32)	
		None of the above	4 (4.26)	2 (1.74)	
18	A 11yr old boy complaints of spacing between maxillary incisors. The appropriate treatment is with	Hawley's appliance	27 (22.72)	5 (9.28)	.04897*
		Fixed appliance	8 (7.10)	2 (2.90)	
		Oral screen	4 (3.55)	1 (1.45)	
		No treatment	32 (37.63)	21 (15.37)	
19	The tooth movement most difficult to accomplish is	Tipping	13 (14.20)	7 (5.80)	.557929
		Bodily movement	6 (7.10)	4 (2.90)	
		Intrusion	45 (44.02)	17 (17.98)	
		Extrusion	7 (5.68)	1 (2.32)	
20	The appliance used to treat thumb sucking is	Crib appliance	59 (57.51)	22 (23.49)	.635862
		Frankel appliance	6 (5.68)	2 (2.32)	
		Bionator	4 (4.97)	3 (2.03)	
		Activator	2 (2.84)	2 (1.16)	

\*p<.05 significant level

## DISCUSSION:

The questionnaire based survey was conducted amongst the dental practitioners between 1 to 5 years of clinical experience to assess their knowledge, attitude and awareness towards various principles and practices in orthodontic treatment. The results of the present study revealed significant differences among general non-orthodontics practitioners between 1-2years and 3 to 5years of clinical experience towards orthodontic practices and principles in accordance with similar previous studies by Sastri et al <sup>9</sup>, Acharya et al <sup>10</sup>, Muhamad L et al <sup>11</sup>, Almutairi et al <sup>12</sup>: indicating the importance of clinical exposure towards orthodontic cases, specialty qualification, 3 years post-graduation training, population prevalence and subject specific knowledge based education in dentistry.

Malocclusion is the one of the most prevalent dental disease that interfere with facial profile, esthetics and function. Treatment and management of malocclusion at an appropriate stage plays an important role in enhancing the facial appearance and restoring the normal function as much as possible. Majority of the study participants were familiar with ideal age of orthodontic treatment, age associated factors and agree with statements by Pietila et al <sup>17</sup>, Grippaudo et al <sup>18</sup> and Fleming P <sup>19</sup> who revealed appropriate age for treating an orthodontic problem depends on the severity of the condition, its causes and the subject specific expertise of the dental practitioners.

Studies by Muhanad L et al <sup>11</sup>, Rastogi S et al <sup>20</sup> and Abdelkarim A et al <sup>21</sup> stated early treatment, interceptive orthodontics and early intervention were key components to reduce treatment duration and complications as seen with increase in age. In contrast, we observed only 18.3% agreed malocclusion can be treated during mixed dentition period among which 56.4% were not sure on treatment requiring extractions for aligning of the malposition teeth with 1-2years experience compared to 48.27% with more than 3 years of experience. However, Sastri MR et al (67.9%) <sup>9</sup>, Acharya A et al (55%) <sup>10</sup>, Muhanad L et al <sup>11</sup>, Alnusayri et al (71%) <sup>12</sup> Showed a better response rate than our study indicating the lack of knowledge among the study participants and need for clinically oriented undergraduate dental training with more emphasis on practice-based concepts of orthodontic treatment.

Various habits such as thumb sucking, mouth breathing, tongue thrusting and lip biting may lead to several occlusion related complications that may require extensive and complex surgeries if not treated at early stages. Sastri MR et al <sup>9</sup> and Kapoor et al <sup>15</sup> on assessment on knowledge on oral habits demonstrated statistically significant responses towards thumb sucking, mouth breathing, facial characteristics and its management similar to present study while contrasting results with Acharya A <sup>10</sup>, Muhanad et al <sup>11</sup> were attributed to difference in number of questions asked, higher participant's knowledge and scoring pattern followed in respective studies. We also observed 32% with 1-2years experience prefer wait and watch/ No treatment at the early phases of habit that may result in serious malocclusions. Tanaka et al <sup>22</sup>, Brkanović S et al <sup>23</sup> showed lack of training and counselling methods for elimination of oral habits among general dentists worsens the condition. Therefore, continuing dental education programs, up gradation of curriculum with modern concepts, interdisciplinary based training are the need of the hour to constantly update the treatment modalities among the general dentists.

On evaluation of attitude practices it was observed 79% never assisted/performed orthodontic treatment in 1-2years of clinical practice compared to 31% with more than 3years experience despite



60% participants in the present study does not deny orthodontic treatment, prefer referral and showed positive attitude towards orthodontic practices were in accordance to study by Sastri MR et al <sup>9</sup>, Acharya A et al <sup>10</sup>, Muhanad L et al <sup>11</sup>; iveda and Saravanan <sup>16</sup>, Brkanović S et al <sup>23</sup> that revealed an increase in the number of years of clinical experience and the number of patients who were treated along with guidance of specialists with aspect of orthodontic treatment directly or indirectly interfere with their attitude towards orthodontic practices.

Majority of positive responses were obtained for practice based questions on the various skeletal malocclusion associated clinical features, use of mini screws for anchorage, functional appliances and retainers among 3-5years group then 1-2years group. Sastri MR et al <sup>9</sup>, Niveda and Dinesh <sup>14</sup> and Nivedha and Saravanan <sup>16</sup> in their respective studies have shown higher positive responses and suggested that the specialties possess extended positive attitude toward the significance of the orthodontic therapy. Numerous studies have also confirmed that the influence of dentists strongly impacts patients' decision to undergo orthodontic treatment. It is therefore important that general dentists have a clear understanding of the oral health status and improvements likely to accrue from orthodontic treatment.

Among all participants, around 46% believe that orthodontic treatment can be done in patients with periodontal problems and associated systemic diseases while 54% did not similar to Sastri MR et al (42.3%, 57.7%) <sup>9</sup>, Acharya A et al (66.4%, 33.6%) <sup>10</sup>, Alshammery et al <sup>13</sup> showed that dentist irrespective of clinical experience are moderately aware about orthodontic treatment in periodontally compromised individuals. Studies have even shown that combination of orthodontic therapy with splints, implants provided stability and improved the underlying periodontitis disease state <sup>21-23</sup>. Thus, highlighting the need for more continuing dental education programs and modified undergraduate dental curriculum focusing on importance of orthodontic treatment for medically compromised patients.

## **CONCLUSION:**

Within the limitations of the study, it was concluded that significant difference in existing knowledge between clinical practitioners of 1-2years and more than 3 years of experience suggesting the lack of adequate familiarity and need for clinically oriented undergraduate dental training with more emphasis on practice based concepts of orthodontic treatment especially among 1-2years clinical experience group. Majority of positive responses were obtained for attitude and awareness practice based questions also revealed an increase in the number of years of clinical experience along with



guidance of specialists with aspect of orthodontic treatment directly influenced their attitude towards orthodontic practices.

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