



Knowledge and Awareness of Early Age Orthodontic Treatment among Interns, General Dentists and Dental Practitioners

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ABSTRACT

Introduction: Malocclusion is one of the major oral health problems among children and young adults which lead to social stigma and psychological disorders. Several orthodontic problems can be treated at an earlier age so that it benefits the growing children.

Aim: The main aim of the study is to assess the knowledge and awareness of early age orthodontic interventions among interns, general dentists and dental practitioners.

Materials and method: This study is conducted by circulating a questionnaire consisting of 20 questions through the web. A total of 500 participants which includes 100 of interns, 100 of general dentists, 100 of Pedodontists, 100 of Non orthodontic postgraduates and 100 of Non orthodontic specialists.

Results: As per the results, Pedodontists shows the higher mean knowledge of 24.59 compared to other populations. It showed the statistically significant knowledge and attitude difference between the groups.

Conclusion: The study emphasizes the importance of providing knowledge to general dentists, Non orthodontic PG's and Non orthodontic specialists on earlier orthodontic intervention.

Key words: Early orthodontic treatment, Preventive and Interceptive orthodontics, Knowledge and awareness, Mixed dentition, Malocclusion.

HOW TO CITE THIS ARTICLE: Jyosthna A, Ponmani Karthikeyan, Prabavathi Kannan, et al. Knowledge and Awareness of Early Age Orthodontic Treatment among Interns, General Dentists and Dental Practitioners. J Res Med Dent Sci, 2024, 12(1):01-08.

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Received: 26-December-2023, Manuscript No. jrmds-24-124615;

Editor assigned: 29-December-2023, PreQC No. jrmds-24-124615(PQ);

Reviewed: 12-January-2024, QC No. jrmds-24-124615(Q);

Revised: 17-January-2024, Manuscript No. jrmds-24-124615(R);

Published: 23-January-2024

INTRODUCTION

Orthodontics is the study of the growth and development of the jaws and face particularly, and the body generally as influencing the position of the teeth; the study of action and reaction of internal and external influences on the development and the prevention and correction of arrested and perverted development [1]. The growth and development of the dentition and the jaw plays a vital role in intercepting and treating the malocclusion at an earlier age [2]. Orthodontists should have the knowledge about the timely development of the dentition and jaw

structures. Many Orthodontists fails to observe the developing problems at the earliest.

According to American Association of Orthodontists (AAO), Orthodontic evaluation can be done at the age of seven [3]. Early Orthodontic Treatment refers to the treatment which began prior to the eruption of permanent dentition. Hence the ultimate goal of this treatment is to intervene the developing skeletal problems [4, 5]. Even though, this treatment modality is being a controversial topic of interest, some physicians consider starting the treatment in the deciduous or early mixed dentition, some physicians start the treatment in the late mixed dentition. Part of the controversy revolves around whether or not, treatment should be initiated with primary mixed dentition or early mixed dentition as a two-step treatment, instead of Starting as a single-step treatment in the late mixed or permanent dentition. Orthodontists should attempt to

perform the proper evaluation, diagnosis and treatment during the mixed dentition period as if to prevent the situation becoming worsened and unfavorable prognosis.

Some orthodontists support early orthodontic treatment in certain types of malocclusions, like functional Cross bite, dental habits, severe crowding with increasing overjet, and Class III malocclusion with maxillary deficit. Rest chooses to initiate a single phase of treatment for some malocclusions, like Class II malocclusion at the late mixed dentition stage. According to orthodontists who support early correction of certain dental and skeletal abnormalities at the deciduous or early mixed dentition stages, has a number of advantages compared to the orthodontists, who doesn't support [6].

Simple Orthodontic intervention at the right age can regularize the normal growth pattern; henceforth severe skeletal deformities can be prevented. The favorable results are attained without extractions in future. The outcome of this treatment at early age will hold steady over time. Early intervention may enhance the child's emotional satisfaction, the growth potential accessible during this stage of development. Many of the dental practitioners fail to understand the value of early orthodontic intervention. Therefore, the aim of this article is to assess the knowledge and awareness of an early Orthodontic intervention among interns, general dentists and other dental professionals.

MATERIALS AND METHOD

This survey is a descriptive cross-sectional study, which is conducted in the Department of the Orthodontics and Dentofacial Orthopaedics, Sathyabama Dental College, Chennai in June 2023. The ethical approval was taken from the Institutional Review Board (269/IRB-IBSEC/SIST) at Sathyabama Dental College. This survey was done to assess the knowledge and awareness of early orthodontic treatment among Interns, General dentists, Pedodontists, Non-Orthodontist PG's and Non-Orthodontist Specialists. A computer-based questionnaire survey designed using google forms and disseminated among participants through various social media forums.

This survey comprises three parts, the first and second part contains a demographic details and

consent form that indicates the participant's willingness to participate in the survey. Third part has questions regarding knowledge and awareness. It consists of 12 multiple choice questions. Sample size required for this survey was estimated as 524, which was calculated using this formula $n=5pq/d^2$. To ensure questionnaire reliability based on test-retest reliability after this procedure, the research administered the questionnaire to 10 participants per group. Seven days after giving their first response, participants were asked to recomplete the questionnaire. The reliability coefficient was used for evaluating questionnaire reliability. Intraclass correlation coefficients were used to evaluate intrarater agreement. The inclusion criteria for all the groups are age above 18 years and willingness to participate in study and exclusion criteria is Orthodontists. The responses were collected and further coded and analyzed to assess the level of knowledge.

STATISTICAL ANALYSIS

Data collected was sorted and entered in MS excel sheet and analysed by using SPSS 22.0 version. Frequency statistics of each variable was performed and frequency distribution and percentage of each item of the questionnaire was calculated [Figure 1]. Mean and standard deviation of knowledge level score was derived [Table 1-Table 12]. Chi-square test of proportion was performed to analyse the significant difference between the parameters. All statistical tests were performed at 95% confidence intervals, keeping the mean difference significant at the 0.05 level.

RESULTS

This figure shows Pedodontist participants (22.3%) were more compared to other participants.

Table 1 shows that most of the participants preferred 7 to 9 years of age is the best suitable age for commencement of orthodontic treatment and is highest among the Pedodontist followed by the Non Orthodontic Specialists.

Table 2 shows that most of the participants preferred treating the malocclusion during the mixed dentition stage and is highest among the Pedodontists followed by the General dentists

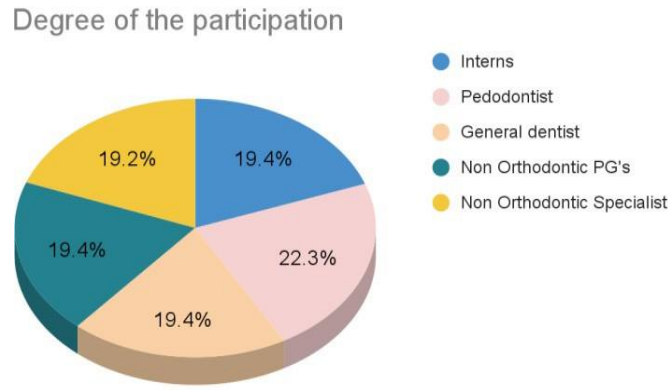


Figure 1: Graph based on the degree of the participation.

This figure shows Pedodontist participants (22.3%) were more compared to other participants.

Table 1: What is the suitable age for commencement of orthodontic treatment?

Degree	A) 4 to 6 years	B) 7 to 9 years	C) 10 to 12 years	D) 14 to 16 years	P value
A. Interns	35	35	33	14	0.077
B. General dentists	37	34	26	4	
C. Pedodontists	24	43	31	4	
D. Non Orthodontic PG's	32	30	31	9	
E. Non Orthodontic Specialists	21	40	36	5	
Total	149	182	157	36	

Chi-Square test done; P<0.005-Significant.

Table 2: Can malocclusion be treated during the mixed dentition stage?

Degree	A) Yes	B) No	C) Maybe	D) Don't know	P value
A. Interns	40	46	25	6	0.001
B. General dentists	64	13	20	4	
C. Pedodontists	71	7	21	3	
D. Non Orthodontist PG's	43	5	48	6	
E. Non Orthodontist Specialists	46	2	47	7	
Total	264	73	161	26	

Chi-Square test done; P<0.005-Significant.

Table 3: What are the interceptive treatments that you are aware of?

Degree	A) Serial extraction	B) Expansion	C) Space regainers	D) All of the above	P value
A. Interns	28	6	27	56	0.001
B. General dentists	14	5	16	66	
C. Pedodontists	6	4	9	83	
D. Non Orthodontic PG's	9	30	21	42	
E. Non Orthodontic Specialists	9	14	20	59	
Total	66	59	93	306	

Chi-Square test done; P<0.005-Significant.

Table 4: What is the suitable age for a palatal expander treatment?

Degree	A) 4 to 6 years	B) 7 to 8 years	C) 9 to 10 years	D) Don't know	P value
A. Interns	28	50	26	13	0.001
B. General dentists	14	62	21	4	
C. Pedodontists	8	68	24	2	
D. Non Orthodontic PG's	7	36	53	6	
E. Non Orthodontic Specialists	1	58	41	2	
Total	58	274	165	27	

Chi-Square test done; P<0.005-Significant.

Table 3 shows that most of the participants were aware about the interceptive treatments that are given and is highest among the Pedodontists followed by the General dentists.

Table-4 shows that most of the participants preferred 7 to 8 years of age is the best suitable age for palatal expander treatment and is highest among the Pedodontists followed by the General dentists and Non Orthodontic Specialists.

Table-5 shows that most of the participants preferred both extra oral headgear and functional appliances for the management of class II malocclusion for a 10 years old child and is highest among the Pedodontists followed by General dentists.

Table 6 shows that most of the participants preferred reverse pull headgear for the treatment of mandibular prognathism for an 8 years old child and is highest among the Pedodontists followed by the Non-Orthodontic Specialists and General dentists.

Table 7 shows that most of the participants preferred Adenotonsillar hypertrophy may

or possibly it might cause malocclusion and is highest among the General dentists followed by Non Orthodontic Specialists.

Table 8 shows that all the participants had a wide knowledge about the clinical features associated with skeletal class II malocclusion and is highest among the General dentists.

Table 9 shows that most of the participants had knowledge regarding the headgear which cannot be used as a treatment for a 6 years old child and is highest among the Pedodontists followed by General dentists.

Table 10 shows that most of the participants had a wide knowledge regarding pressure habits that causes malocclusion which indicates need for treatment and is highest among the Pedodontists followed by Non Orthodontic Specialists.

Table 11 shows that most of the participants preferred that treatment is not needed in a 9 years old child for spacing between the maxillary incisors and is highest among the Pedodontists followed by Non Orthodontic Specialists.

Table 5: How do you manage class II malocclusion for a 10 year old child when she walks into your clinic?

Degree	A) Extra oral headgear	B) Functional appliances	C) Both A and B	D) None of the above	P value
A. Interns	20	52	40	5	0.001
B. General dentists	13	18	59	11	
C. Pedodontists	24	13	62	3	
D. Non Orthodontic PG's	26	29	40	7	
E. Non Orthodontic Specialists	34	20	44	4	
Total	117	132	245	30	

Chi-Square test done; P<0.005-Significant.

Table 6: For an 8-year-old child with mandibular prognathism be treated with?

Degree	A) Reverse pull headgear	B) Fixed appliance	C) Inclined plane	D) None of the above	P value
A. Interns	42	32	20	23	0.011
B. General dentists	51	28	16	6	
C. Pedodontists	63	11	25	3	
D. Non Orthodontic PG's	47	36	13	6	
E. Non Orthodontic Specialists	54	34	9	5	
Total	257	141	83	43	

Chi-Square test done; P<0.005-Significant.

Table 7: Can adenotonsillarhypertrophy causes malocclusion?

Degree	A) Yes	B) No	C) Maybe	D) Don't know	P value
A. Interns	35	31	29	22	0.001
B. General dentists	21	15	43	22	
C. Pedodontists	52	8	34	8	
D. Non Orthodontic PG's	50	8	27	17	
E. Non Orthodontic Specialists	41	2	40	19	
Total	199	64	173	88	

Chi-Square test done; P<0.005-Significant.

Table 8: Class II skeletal malocclusion can be associated with?

Degree	A) Midface protrusion	B) Mandibular retrognathism	C) Increased length of the cranial base	D) All of the above	P value
A. Interns	34	28	19	36	0.001
B. General dentists	14	8	10	69	
C. Pedodontists	18	16	27	41	
D. Non Orthodontic PG's	27	13	22	40	
E. Non Orthodontic Specialists	18	24	12	48	
Total	111	89	90	234	

Chi-Square test done; P<0.005-Significant.

Table 9: Can headgear be used as a treatment plan for a 6 years old child?

Degree	A) Yes	B) No	C) Maybe	D) Don't know	P value
A. Interns	35	33	40	9	0.266
B. General dentists	14	40	37	10	
C. Pedodontists	26	43	20	13	
D. Non Orthodontic PG's	19	31	42	10	
E. Non Orthodontic Specialists	20	39	29	14	
Total	114	186	168	56	

Chi-Square test done; P<0.005-Significant.

Table 10: What are the early signs of a child which may indicate the need for treatment?

Degree	A) Asymmetrical bite pattern	B) Malaligned	C) Thumb sucking, tongue thrusting and other habits	D) None of the above	P value
A. Interns	36	39	29	13	0.001
B. General dentists	23	21	37	20	
C. Pedodontists	32	22	41	7	
D. Non Orthodontic PG's	25	25	13	39	
E. Non Orthodontic Specialists	25	29	40	8	
Total	141	136	160	87	

Chi-Square test done; P<0.005-Significant.

Table 11: A 9-year-old boy has a complaint of spacing between the maxillary incisors. Does he need early Orthodontic intervention?

Degree	A) Yes	B) No	C) Maybe	D) Don't know	P value
A. Interns	48	32	35	2	0.001
B. General dentists	23	41	30	7	
C. Pedodontists	10	46	39	7	
D. Non Orthodontic PG's	19	39	28	16	
E. Non Orthodontic Specialists	14	42	37	9	
Total	114	200	169	41	

Chi-Square test done; P<0.005-Significant.

Table 12: A 6-year-old female reports with a complaint of pain in maxillary deciduous 1st molar which is carious with 2/3rd of its root resorption. The tooth has to be extracted. What space maintainer do you recommend?

Degree	A) Band and loop	B) Distal shoe	C) Lingual arch	D) None of the above	P value
A. Interns	40	60	7	10	0.002
B. General dentists	65	13	17	6	
C. Pedodontists	66	10	15	11	
D. Non Orthodontic PG's	47	29	16	10	
E. Non Orthodontic Specialists	56	15	12	19	
Total	274	127	67	56	

Chi-Square test done; P<0.005-Significant.

Table 12 shows that most of the participants preferred the band and loop space maintainer which is highest among the Pedodontists followed by General dentists.

DISCUSSION

"You see it, you treat it" is the basic tenet of Early Orthodontic Treatment (EOT), a concept that

was suggested as part of the "catch them in the young" initiative. The goal of early orthodontic therapy is to stop the increasing problem, remove the source, guide facial development and jaw development, and provide appropriate space for future permanent teeth [7]. Several orthodontic abnormalities should be corrected at a young age to avoid the need for future sophisticated and expensive procedures. According to scientific evidence, posterior cross bites, mild to moderate Class III malocclusions, open bites, and arch length discrepancies can all benefit from simple but effective interceptive therapy.

In this study, Pedodontists were better educated about treating children at a young age (ages 7-9) than other dental practitioners. The AAO advises that children should get their initial oral examination by an orthodontic specialist no later than the age of 7, but no later than the first sign of a growing orthodontic problem. In addition to improving the child's quality of life by addressing psychosocial issues related to the malocclusion, research has shown that certain malocclusions can benefit from early intervention and can either help to shorten the duration of or even avoid the necessity of a more extensive and expensive treatment at a later stage.

In our present study, General practitioners and Pedodontists were well aware that malocclusion can be treated during the mixed dentition. A study by Diravidamani Kamatchi, et.al [8] shows early detection of some issues provides an opportunity to either enhance the occlusal correction or redirect skeletal growth. The main goal of treating orthodontic issues when a person has mixed dentition is to prevent or treat malocclusions that would otherwise get worse or cause skeletal abnormalities when they advance to permanent dentition.

Interceptive orthodontics has been defined as that phase of science that can recognize and eliminate potential irregularities and malposition of the developing dentofacial complex. Procedures undertaken in interceptive orthodontics are serial extraction, correction of developing cross cross bite, space regaining and muscle exercise [9]. In our study most of the participants were well aware about interceptive treatments. According to Nisha Kumari et.al and Natasha Saini et.al [10], the goal of interceptive treatment is to improve the severity of developing malocclusion in mixed dentition.

A palatal expander is a dental device that widens the upper jaw to create more space for teeth and to correct the cross bite. In this current study, Pedodontists, General dentists and Non-Orthodontic Specialists have a relatively higher knowledge about the palatal expander treatment in the early mixed dentition period. A study by Gaetano Ierardo, et.al [11], presented a case report on palatal expanders; he concluded that palatal expansion can be performed in a 7-year-old child as the jaw development occurs during the early mixed dentition period.

Class II malocclusion is one of the most prevalent orthodontic problems with either mandibular retrognathism or maxillary prognathism or combination of both. According to Timothy Shaughnessy, et al. [12] skeletal class II malocclusion can show changes in the maxillomandibular relations such as midface protrusions, increased length of the cranial base, mandibular retrognathism. As per our study Pedodontists and Non-Orthodontic Specialists are well known about the clinical features of skeletal class II malocclusion. Various appliances have been utilised over the years for class II treatment to promote mandibular growth by positioning the jaw in forward position like functional appliances e.g., Twin block, Activator, Bionator, etc [13]. Headgear is an extra oral orthopaedic appliance used to restrain the downward and forward growth of the maxilla [14]. In our current study, extra oral headgears and functional appliances were used to treat a 10-year-old child with class II malocclusion and were accepted by the majority of the Pedodontist and General dentist. A Case report by Shah AH, also states that class II division I malocclusion treatment was done using a cervical headgear [15].

Class III malocclusion is a growth-related dentofacial deformity characterized by maxillary retrognathism, mandibular prognathism, or a combination of both. Class III malocclusion has a complex etiology. However, the primary etiological cause is genetic. Race, habits and the environment are further considerations. For the management of developing Class III malocclusion, there are a number of treatment options available, including

Functional appliances like the removable mandibular retractor, Frankel appliance, and reverse twin block;

Orthopaedic appliances like chin caps and face mask;

Orthodontic appliances, such as a removable maxillary expansion plate or a fixed orthodontic appliance with expanded upper arch wire.

In our study, Pedodontists and Non-Orthodontic Specialists have a higher knowledge regarding the management of skeletal class III malocclusion. It is also stated in a case report by Heena Sarangal, et al. [16] that mandibular prognathism can be treated with reverse pull headgear at an early age to prevent surgery in future.

Adenotonsillarhyperplasia is the most prevalent cause of respiratory obstruction in children, and it includes a variety of abnormalities such as snoring and sleep obstructive apnea syndrome. Patients exhibit a wide range of clinical symptoms, including changes in normal respiratory patterns, dental arch curvature, chewing and deglutition [17]. In our study, the General dentist and Non-Orthodontic Specialist have agreed that adenotonsillarhypertrophy is one of the causative factors of malocclusion. According to Liping Zhang, et al [18], adenoid hypertrophy can lengthen the facial contour and lead to the development of a maxillofacial deformity. Furthermore, it can increase the lower height, steepness, and overall height of the mandible in children, which may increase the chance of malocclusion.

In our present study, Pedodontists preferred thumb sucking, tongue thrusting and other oral habits to be treated earlier. In another survey Rajesh J kamdar, et al [19], suggested if oral habits present beyond their normal developmental age can cause harmful effects to the dentition. Hence interns and other dental practitioners should have a thorough understanding about the diagnosis and natural developmental process to intervene the habits.

Ugly Duckling Stage (Broadbent phenomenon) in children is an autocorrecting disorder. It is a normal phase of dental development, commonly seen between the ages of 7 to 12, which is right before the full growth of a permanent set of teeth. During this time-frame, when the lasting maxillary focal incisors grow, they will in general spread laterally and broadly making spaces known as physiological median diastema between the teeth. A 9-year-old boy does not

need any orthodontic intervention as it is a mixed dentition period. Timely development of the dentition doesn't lead to any type of intervention, but if abnormalities are detected, early intervention is necessary for the children [20].

A space maintainer is a device used to maintain space created by the premature loss of a primary tooth or teeth until the eruption of a permanent successor. In our study, Pedodontists have a high awareness regarding space maintainers. It is also stated in a case report conducted [21], that band and loop space maintainer is the suitable choice for the management of premature space loss in young children.

CONCLUSION

The present study emphasizes that Pedodontists have a high level of awareness regarding the early orthodontic intervention. General dentists and Non-Orthodontic Specialists have relatively less knowledge compared to Pedodontists. Paediatric dentists raise the alarm by quickly detecting and correcting malocclusions. Interns and non-orthodontic postgraduates have limited awareness regarding early orthodontic intervention. Our study concludes to conduct various conferences and awareness programs to spread awareness about the functional appliances and interceptive procedures. It should be incorporated in the academics of undergraduates. Preventive schemes should be introduced in public health centres and private dental clinics. It might provide a great help in diagnosing and providing treatment as early as possible.

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