Awareness On Current Status of Orthodontic Implant Among Dental College Students

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Abstract

Orthodontic implants have become a reliable method in orthodontic practice for providing temporary additional anchorage and are useful to control skeletal anchorage in less compliant patients or in other cases where absolute anchorage is necessary. The advantages are easy insertion, decreased patient discomfort, low price, immediate loading, reduced diameter, versatility in the forces to be used, ease of cleaning, and ease of removal. This study was done as a questionnaire survey which was done in April 2021 and answered by the UG students of the Saveetha Dental College. Students who were involved in the survey included third years, final years and CRRI (Interns). The survey involved completion of a predesigned questionnaire containing 2 sections with a total of ten questions. Set-1 questions were about the demographic details like their Name, gender and the year of study. Questionnaire was sent through an online forum Survey planet only to students practicing in clinics (Third years, Final years and CRRI). From the results obtained it showed that 55% of them were third year students, 28% were 4th years and 17% were Interns. 62% of them were Females, 38% were Males. The year of study of students was in association with awareness of orthodontic implants, Orthodontic implants can contribute significantly to being more efficient than traditional anchorage methods besides making treatments more predictable.

Keywords: Skeletal anchorage, Versatility, Loading, Innovation

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INTRODUCTION

Implants are defined as the alloplastic devices which are surgically inserted into or onto the jaw bone. Implants may be classified based on location as Subperiosteal, Transosseous, Endosseous and based on the configuration as Root form implants & blade/plate implants. Implants can derive anchorage either directly or indirectly intraorally. Implants can be made up of either materials like Stainless steel, Cobalt-Chromium-Molybdenum, Titanium or Ceramic[1–5].

Orthodontic implants is one of the reliable methods in orthodontic practice that provides temporary additional anchorage which are used to control skeletal anchorage in less compliant patients or in cases where absolute anchorage is necessary. Mini implants which are made up of pure titanium are introduced to produce the desired tooth movement in any direction without any anchor loss. It is available in various diameters and lengths as 1.5mm, 2.0mm, 2.7mm and 7mm, 10mm, 12mm, 14mm, and 17mm respectively. Head of the mini implant is exposed to the oral environment for placement of the orthodontic archwire, Isthmus is the connection between the head and platform of the mini implant which helps in the attachment of any orthodontic accessory like elastics, nickel titanium coil spring etc to the implant head[6–8].

Platform is of three different heights such as 1mm, 2mm and 3mm for accommodating different soft-tissue thickness at different implant sites. The smooth surface improves peri implant wound healing and prevents slippage and displacement of an elastic or coil spring. Body of the implant is parallel, which is either of self drilling or self tapping type[9,10]. It has threads and grooves for better interlocking of the mini implant to the bone[11]. The purpose of this paper is to create an awareness among students on the current concepts of orthodontic implants. Our team has extensive knowledge and research experience that has translated into high quality publications [12–14][15–23]
Materials And Methods

This study was done as a questionnaire survey which was done in April 2021 and answered by the UG students of the Saveetha Dental College. Students who were involved in the survey included third years, final years and CRRI (Interns). The survey involved completion of a predesigned questionnaire containing 2 sections with a total of ten questions. Set-1 questions were about the demographic details like their Name, gender and the year of study. Questionnaire was sent through an online forum Survey planet only to students practicing in clinics (Third years, Final years and CRRI). Set-2 included questions about the advancement of orthodontic implant over braces, preference given for extra oral anchorage and orthodontic implant, complications of Implant placement, case selection, awareness on Micro implants, Mini implants, Mini screw anchorage system, Spider screw for skeletal anchorage, Modular Transitional implant, Bio-Resorbable implant anchor for orthodontic treatment, expensive implants and its disadvantages. Age, Gender and the responses were considered as Inclusion criteria. After applying inclusion criteria, data from 100 responses were collected and tabulated in an Excel sheet followed by statistical analysis done in SPSS by IBM. The statistical test used is Chi-square test. Association was done between the year of study and students awareness about the advancement of orthodontic implant over braces, preference given for extra oral anchorage and orthodontic implant, complications of Implant placement, case selection, awareness on Micro implants, Mini implants, Mini screw anchorage system, Spider screw for skeletal anchorage, Modular Transitional implant, Bio-Resorbable implant anchor for orthodontic treatment, expensive implants and its disadvantages.

The participants were asked to put the responses in the questionnaire on Survey planet. The completed questionnaires were carefully checked by the investigator.

Results And Discussion

From the results obtained it shows that 55% of them were third year students, 28% of them were 4th years and 17% of them were Interns who filled the survey(Figure - 1). Dr. Jeffrey.D et al., in his study, 91% of the orthodontists used mini screws in their clinical practice, which shows their awareness of orthodontic implants[24,25]. 62% of them were Females, 38% of them were Males who filled the survey(Figure - 2). 34% of them were females and 21% males studying 3rd years was the highest which showed a significant association of year of study of students with gender of responses received (p<0.05)(Figure - 3). 38% of the 3rd year were aware of orthodontic implants and 17% of 3rd year were not aware showed a significant association of year of study of students with awareness about Orthodontic Implants among students (p<0.05)(Figure - 4). 38% of the 3rd year were aware of Micro implants, Mini implants, Mini screw anchorage system, Spider screw for skeletal anchorage, Modular Transitional implant, Bio-Resorbable implant anchor for orthodontic treatment and 17% of 3rd year were not aware showed a significant association of year of study of students with awareness about Micro implants, Mini implants, Mini screw anchorage system, Spider screw for skeletal anchorage, Modular Transitional implant, Bio-Resorbable implant anchor for orthodontic treatment(p<0.05)(Figure - 5). 55% of the 3rd year thought Orthodontic Implants had disadvantages and 17% of Interns thought Orthodontic Implants had no disadvantages showed a significant association of year of study of students with awareness about disadvantages of Orthodontic Implants (p<0.05)(Figure - 6).Similar results were obtained, disadvantages of orthodontic implants were the need to administer a local anesthetic (58%), longer chairtime (25%), the potential need to manage acute pain (20%), and lack of training (20%)[24]. 38% of the 3rd year thought Micro Implants were expensive and 17% of Interns and 3rd years thought Micro Implants were not expensive showed a significant association of year of study of students with awareness about expenses of Micro Implants(p<0.05)(Figure - 7). 38% of the 3rd year preferred Extraoral anchorage and 28% of the 4th year students preferred Orthodontic Implant showed a significant association of year of study of students with preference of students for source of anchorage(p<0.05)(Figure - 8). 28% of the 4th year opted for Correction of canted occlusal plane, Molar intrusion, Molar mesialization, Molar distalization, Intrusion of incisors showed a significant association of year of study of students with their case selection for Orthodontic Implant placement (p<0.05)(Figure - 9).Kuroda et al.,[26]in their study mentioned the Micro implants, Mini implants, Mini screw anchorage system, Spider screw for skeletal anchorage, Modular Transitional implant, Bio-Resorbable implant anchor for orthodontic treatment. 38% of the 3rd years advised to wear a retainer with Implant showed a significant association of years of study of students with their opinion about wearing a retainer with Implant (p<0.05)(Figure - 10). 28% of the 4th year preferred Implants over braces and 34% of the 3rd years didn’t prefer Implants over braces showed a significant association of year of study of students with their preferences for Dental Implants over Braces (p<0.05)(Figure - 11). 21% of the 3rd year thought Orthodontic Implants were commonly used in clinics and 34% of the 3rd year thought Orthodontic Implants were not commonly used in clinics showed a significant association of year of study of students with their opinion about wearing a retainer with Implant (p<0.05)(Figure - 12)[27],[28]in their study mentioned the usage of orthodontic implant in Correction of canted occlusal plane, Molar intrusion, Molar mesialization, Molar
distalization, Intrusion of incisors[29]. Wilmes at al.[30] in his study advised wearing a retainer with Implant.

![Figure 1: Bar graph shows the percentage of responses received from the survey, where X-axis represents the Year of study and Y-axis represents the percentage of responses received. Out of which 55% of them were third year students, 28% of them were 4th years and 17% of them were Interns.]

![Figure 2: Bar graph shows the gender percentage of responses received from the survey, where X-axis represents Gender and Y-axis represents the percentage of responses received. Out of which 62% of them were Females, 38% of them were Males.]

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Figure 3: Bar graph shows the association between the year of study of students and gender of responses received where, X-axis represents the year of study of students and Y-axis represents the percentage of responses received. More responses were received from 34% females and 21% males studying 3rd years was the highest. Chi-square test was performed (Chi-square value - 44.899, p=0.000) which showed a statistically significant association of year of study of students with gender of responses received (p<0.05).

Figure 4: Bar graph shows the association between the year of study of students and awareness about Orthodontic Implants where, X-axis represents the year of study of students and Y-axis represents the percentage of responses received. 38% of the 3rd year were aware of orthodontic implants and 17% of 3rd year were not aware. Chi-square test was performed (Chi-square value - 16.758, p=0.000) which showed a statistically significant association of year of study of students with awareness about Orthodontic Implants among students (p<0.05).
Figure 5: Bar graph shows the association between the year of study of students and awareness about Micro implants, Mini implants, Mini screw anchorage system, Spider screw for skeletal anchorage, Modular Transitional implant, Bio-Resorbable implant anchor for orthodontic treatment where, X-axis represents the year of study of students and Y-axis represents the percentage of responses received. 38% of the 3rd year were aware of Micro implants, Mini implants, Mini screw anchorage system, Spider screw for skeletal anchorage, Modular Transitional implant, Bio-Resorbable implant anchor for orthodontic treatment and 17% of 3rd year were not aware. Chi-square test was performed (Chi-square value - 16.758, p=0.000) which showed a significant association of year of study of students with awareness about Micro implants, Mini implants, Mini screw anchorage system, Spider screw for skeletal anchorage, Modular Transitional implant, Bio-Resorbable implant anchor for orthodontic treatment (p<0.05).

Figure 6: Bar graph shows the association between the year of study of students and awareness about disadvantages of Orthodontic Implants where, X-axis represents the year of study of students and Y-axis represents the percentage of responses received. 55% of the 3rd year thought Orthodontic Implants had disadvantages and 17% of Interns thought Orthodontic Implants had no disadvantages. Chi-square test was performed (Chi-square value - 100.000, p=0.000) which showed a significant association of year of study of students with awareness about disadvantages of Orthodontic Implants (p<0.05).
Figure 7: Bar graph shows the association between the year of study of students and awareness about expenses of Micro Implants where, X-axis represents the year of study of students and Y-axis represents the percentage of responses received. 38% of the 3rd year thought Micro Implants were expensive and 17% of Interns and 3rd years thought Micro Implants were not expensive. Chi-square test was performed (Chi-square value - 47.658, p=0.000) which showed a significant association of year of study of students with awareness about expenses of Micro Implants (p<0.05).

Figure 8: Bar graph shows the association between the year of study of students and their preference for source of anchorage where, X-axis represents the year of study of students and Y-axis represents the percentage of responses received. 38% of the 3rd year prefer Extraoral anchorage and 28% of the 4th year students preferred Orthodontic Implant. Chi-square test was performed (Chi-square value - 50.147, p=0.000) which showed a significant association of year of study of students with preference of students for source of anchorage (p<0.05).
Figure 9: Bar graph shows the association between the year of study of students and their case selection for Orthodontic Implant placement where, X-axis represents the year of study of students and Y-axis represents the percentage of responses received. 28% of the 4th year opted for Correction of canted occlusal plane, Molar intrusion, Molar mesialization, Molar distalization, Intrusion of incisors. Chi-square test was performed (Chi-square value = 100.000, \( p=0.000 \)) which showed a significant association of year of study of students with their case selection for Orthodontic Implant placement \( (p<0.05) \).

Figure 10: Bar graph shows the association between the year of study of students and their opinion about wearing a retainer with Implant where, X-axis represents the year of study of students and Y-axis represents the percentage of responses received. 38% of the 3rd years advised to wear a retainer with Implant. Chi-square test was performed (Chi-square value = 16.758, \( p=0.000 \)) which showed a significant association of year of study of students with their opinion about wearing a retainer with Implant \( (p<0.05) \).
Figure 11: Bar graph shows the association between the year of study of students and their preferences for Dental Implants over Braces where, X-axis represents the year of study of students and Y-axis represents the percentage of responses received. 28% of the 4th year preferred Implants over braces and 34% of the 3rd years didn’t prefer Implants over braces. Chi-square test was performed (Chi-square value - 42.149, p=0.000) which showed a significant association of year of study of students with their preferences for Dental Implants over Braces (p<0.05).

Figure 12: Bar graph shows the association between the year of study of students and their opinion about how commonly Orthodontic Implants used in clinics where, X-axis represents the year of study of students and Y-axis represents the percentage of responses received. 21% of the 3rd year thought Orthodontic Implants were commonly used in clinics and 34% of the 3rd year thought Orthodontic Implants were not commonly used in clinics. Chi-square test was performed (Chi-square value - 44.899, p=0.000) which showed a significant association of year of study of students with their opinion about wearing a retainer with Implant (p<0.05).
Placement on the maxilla on the palatal side should be done between the interradicular space between the maxillary second premolar and first molar, 2mm to 8mm from the alveolar crest[31]. In Mandible it should be placed in the Interradicular space between the first and second molar. In alveolar mucosa, Horizontal incision is made in the alveolar mucosa along the mucogingival junction with a surgical blade, and the underlying bone is exposed by raising the mucoperiosteal flap. The implant is then covered with the flap and the wound is sutured.

Application of Implants in orthodontics are : Direct anchorage in which an endosseous implant is used as an anchorage site and Indirect anchorage in which implants are used for preserving anchorage. As a source of indirect anchorage : Orthodontic anchorage, Maxillary expansion, Maxillary protraction, Head gear like effects can be achieved. Dental anchorage produces space closure, Intrusion of Anterior teeth Posterior teeth, Distalization [32]. Advantages of orthodontic implants include easy insertion, decreased patient discomfort, low price, immediate loading, reduced diameter, versatility in the forces to be used, ease of cleaning, and ease of removal[33]

Complications of miniscrews are : During insertion, Trauma to periodontal ligament or dental root due to change in angle of insertion angle, Miniscrew slippage, Nerve involvement, Air Subcutaneous emphysema, Nasal and maxillary sinus perforation, Miniscrew vending, fracture and torsional stresses. Potential complications related to common implant procedures are : Lesions of some anatomic structures like nerves, vessels, dental roots, Inflammation around the implant site, Breakage of the screw within the bone during insertion or removal due to the use of screws with a small diameter[33,34]. However, a proper management of the screws is necessary to increase the success rate.

Conclusion
The study concludes that Undergraduate students (3rd year, final year and CRRI) were aware about the Orthodontic Implants. There was a significant association between the awareness about the Orthodontic Implants and year of study (p<0.05). Since orthodontic implant has become a better advancement in anchorage it should be used in every clinician's daily practice for obtaining best results.

Author’s contribution
All authors equally contributed to the study.

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