International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 01, 2020
ISSN: 1475-7192

Knowledge And Awareness About Anatomic Root Form Implants Among Undergraduate Dental Students- A Survey

[1]Kalyani. P, *[2]Dhanraj Ganapathy

Abstract:

Introducion:

Anatomic root form implants or the root analogue implants are implants which can be placed immediately after extraction. The characteristic feature of these implants is that they mimic the natural root anatomy and can be placed into the extraction socket immediately after extraction. Further, there aren't much bone augumentation procedures involved. The Anatomic root form implants are made of Zirconia, which is one of the most biocompatible materials ever used in dentistry

Aim:

The aim of this study is to determine the level of awareness about Anatomic root form implants among undergraduate dental students.

Materials and methods:

This is a questionnaire based survey. The questionnaire consisted of questions with multiple responses for each questions. The questions were framed based on the following :

Disadvantages of conventional implants, advantages of root form implants, design of root form implants, the process of making root form implants, etc,. The participants were undergraduate students (IV years and interns) of a city based dental college.

Results:

Around 40% of the respondents felt that the major disadvantage of conventional implant is that it being expensive and also its incongruous anatomy. 35% responded that the natural Anatomy was the main advantage of Anatomic root form implants.

Conclusion:

The respondents in this study were quite aware about some facts concerned with Anatomic root form implants. However, a clear idea about the process and placement of such implants needs to be created among the undergraduate students.

[1]*Undergraduate Student, Saveetha Dental College, Saveetha Institute of Medical And Technical Sciences, Chennai, India.*
[2]*Professor and Head, Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical And Technical Sciences, Chennai – 600077 Tamil Nadu, India*

Keywords: *Implants, root form, incongruence, extraction*

I. Introduction:

A dental implant can be defined as a prosthetic device made of alloplastic material implanted into the oral tissuesbeneath the mucosal and / or periosteal layer and / or within the bone to provide retention and support for a fixed or removable dental prosthesis. Over the years, the design of dental implants has evolved in many forms from subperiosteal design through blade implants, tranperiosteal implants, basket implants, vented implants, to the most recent root analogue implants and trabecular implants. The materials used for the fabrication of these implants have also changed from gold, platinum, lead, vitallium, until Dr. Per Ingvar Branemark introduced titanium screws as implant materials. A plethora of changes have occurred in the design of implant, surface treatment and also in the placement techniques.Recently, titanium implants were challenged by newly emerging issues as certain researchers have named titanium as the 'New allergen', inducing Type I and IV hypersensitivity reactions in some patients (1). This propelled bioscientists to the introduction of newer biocompatible implant materials in dentistry. In the recent times, the use of Zirconia as an implant materials is becoming increasingly common as they can be milled into the shape of natural root, can be placed immediately after extraction, excellent biocompatibility and bright tooth like colour (2).

The common implants currently used in dentistry are screw type titanium implants that are surface treated for improved osseointegration. However, these implants possess their own set of disadvantages like preformed sizes, necessity to maintain strict sterilisation protocols and most importantly the need for bone augmentation procedures and sinus lifts. Moreover, post extraction a healing period of at least 3 months before implant placement.

With the advent of newer technologies and patients seeking faster replacement options, a window period of 3 months post extraction is considered to be quite arduous by the patients. Hence, implants which can be placed immediately after extraction were developed. These are the Anatomic root form implants or the root analogue implants. The characteristic feature of these implants is that they mimic the natural root anatomy and can be placed into the extraction socket immediately after extraction. Further, there aren't much bone augumentation procedures involved. The Anatomic root form implants are made of Zirconia, which is one of the most biocompatible materials ever used in dentistry. The immediate placement of implants becomes possible with the use of CBCT scanners and CAD CAM milling. The rocedure of implant placement involves CBCT analysis of the tooth socket, CAD CAM designing and milling of Zirconia blocks. This technology has been proved to be accurate and these implants are quite successful. However, there aren't much clinical studies reporting the use of these implants. This can be attributed to the lack of knowledge among clinicians about such an option. Hence, the objective of our study was to survey the knowledge and awareness about Anatomic root form implants among the undergraduate dental students.

II. Materials and Methods:

This is a questionnaire based survey. The questionnaire consisted of questions with multiple responses for each questions. The questions were framed based on the following :

Disadvantages of conventional implants, advantages of root form implants, design of root form implants, the process of making root form implants, etc,. The participants were undergraduate students (IV years and interns) of a city based dental college. The participants were asked not to reveal their names. The printed versions of the questionnaires were distributed to the participants of this study and the responses were collected. There were a total of 100 participants in this study who all were volunteers.

The results were collected and statistical analysis was done.

III. Results:

The results revealed the following:

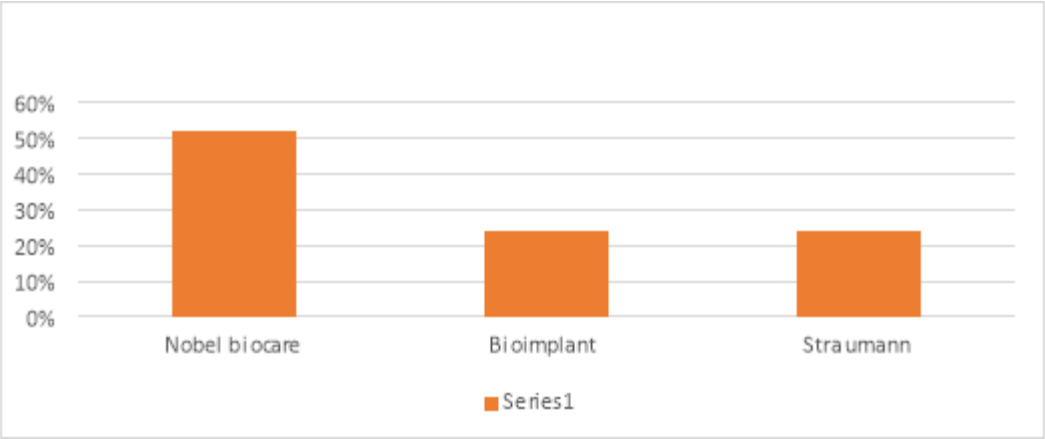

Chart 1 : Only manufacturer of Anatomic root form implants . The answer is Bioimplant. Only around 35% of the respondents were aware of such a manufacturer.

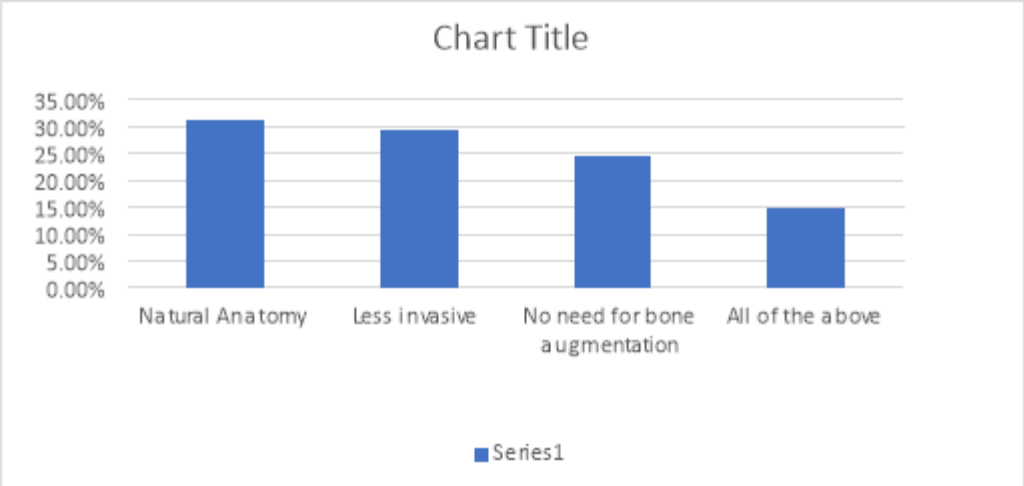

Chart 2: The advantages of Anatomic root form implants.

The most voted reason for the advantage of anatomic root form implant was the natural anatomy of these implants (45%). The next most common reson was that it being less invasive and absence of bone augumentation procedures with 44% and 43% respectively.

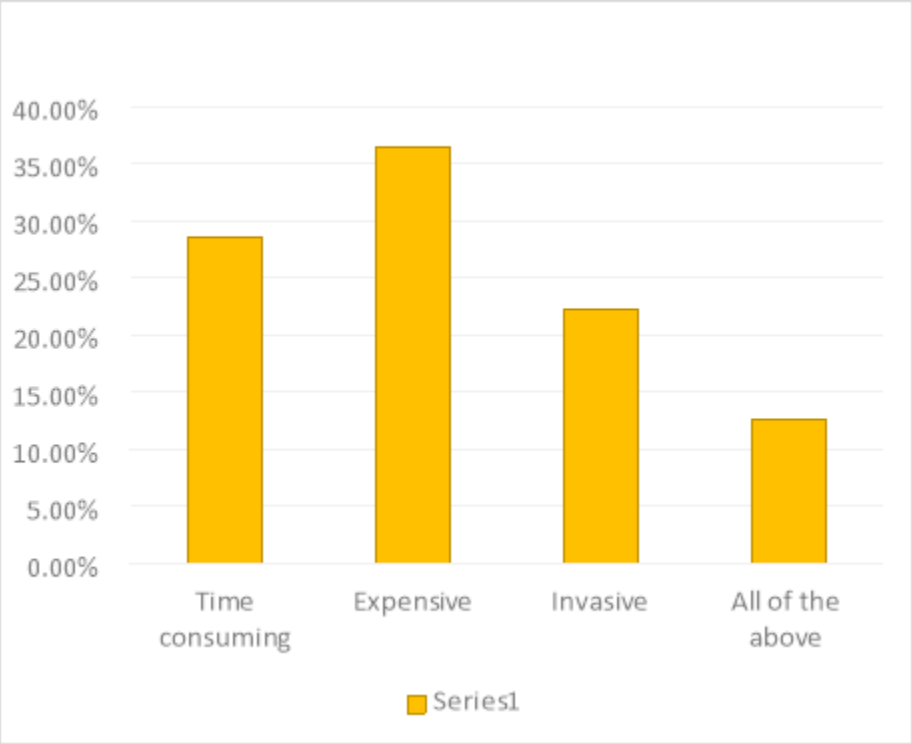

Chart 3: Disadvantages of conventional implants.

42% of the participants found the conventional implants quite expensive and considered it to be a disadvantage, while another 32% responded that the process assosciated with these implants was time consuming.

IV. Discussion:

Dentistry as a field has evolved enormously over the years. Initially, tooth replacements were just removable dentures or none. This was followed by the advent of implants, when the first implant was placed by Per Ingvar Branemark in a patient named Gosta Larson. Following this many different implant designs came into use at every point of time. Nowadays, the number of patients demanding replacements is quite high, in particular are those who want a permanent replacement soon after extraction. Currently, there are no fixed prosthesis that can be placed immediately after extraction and are also permanent. The current widely used options for a prosthesis immediately after extraction are the treatment partial dentures. However these are not permanent solutions. Thus, a revolutionary solution to this problem was found to be theantomic root form implants or the root analogue implants.

Before discussing in detail about Anatomic root form implants, it's a must that we know about why conventional implants cannot be placed immediately in the site of extraction.

This is because of the incongruence between the implant surface and osteoporosis site in case of conventional implants. Since these conventional implants are previously manufactured and are not customised for each tooth socket, their fit is also compromised. Hence, we need to wait for a complete healing period of the site of extraction so that sound bone formation takes place. This is eventually followed by again drilling of the bone and other bone augmentation procedures such as bone grafts, to eliminate the incongruency and to prevent

the down growth of connective tissue or epithelium between the implant and the socket (3). Biologically, great amount of resorption occurs during the first 6 months following the extraction of a tooth, unless an implant is placed or a socket argumentation procedure is performed. Moreover, early maintenance of the gingival form contributes to improved peri implant gingival aesthetics. Also there is psychological aspect in the placement of immediate implants, as many patients find it difficult to wait for 4 months for the extraction site to heal (4).

Many researches have proved that Anatomic root form implants definitely have an edge over the conventional implants in the following ways : Fewer surgical interventions required, lesser time consuming, preservation of alveolus at the extraction site, 3D implant positioning guide, better soft tissue health and aesthetics (5). However, there are also potential contraindications and disadvantages associated with these implants. The contraindications include Periapical infections, Anatomic limitations, insufficient bone wall, and insufficient Apical bone for primary stability. The disadvantages are the difficulties faced in the preparation of osteotomy site, achieving primary stability and added expense of bone grafting procedures in some instances. The clinical protocol for an immediate implant proceeds as follows: Antibiotic coverage, extraction, Apical implant extension, soft tissue coverage, and healing period (6). The extraction technique for immediate implant placement should be as atraumatic as possible. The level of compromise to the osteotomy site predicts the success of these implants. When the Pdl ligament of the tooth is intact, a Periotome series of microextraction instruments can be used to achieve an atraumatic extraction. But when the Pdl is absent, an alternate technique is followed. In this technique, a tooth – form implant drill is used to core out the root from the root canal periphery (7, 8). Following extraction a CBCT of the extraction socket is taken. The CBCT is then copied to a 3D reconstruction software where a virtual extraction of the residual roots are performed. These roots are then smoothened to resemble an implant and the data is fed to the milling machines which mill out the final implant (8). Ansari Moein et al., used a novel approach wherein the implants were fabricated using the Selective Laser Melting (SLM) technology. This technique is capable of building many complex 3 Dimensional objects by successive addition and melting of thin metal layers. The melting is carried out using a focused LASER beam (9).

The material of choice for Anatomic root form implants is Zirconia, which is highly radiopaque and one of the most biocompatible materials in dentistry. Zirconia used in implants is in the form of YTZP – Yttria Stabilized Tetragonal Zirconia Polycrystals, which undergo transformation toughening, increasing their fracture resistance (2). The Zirconia surface also has macroretention features and reduction in implant diameter next to the cortical bone. The implant is placed in the extraction socket or the prepared osteotomy site and stabilised by the application of finger pressure (10). The primary stability in case of immediate implants is achieved by placing implants that exceed the alveolar apex by 2-5 mm or by using implants of greater diameter (11-15).

The success rate of this implant is around 99. 5 % (16-20) and the first implants were placed by Kohl and Klaus in 2004, from which it is inferred that the implants have survived for 16 years. As the success rate is high and the advantages such as natural anatomy are also present in anatomic root form implants, they definitely have an edge over the conventional implants.

V. Conclusion:

The field of implantology is faster advancing and immediate implants are becoming increasingly popular. Ina decade or so, these implants can become the future of implantology. The respondents in this study were quite aware about some facts concerned with Anatomic root form implants. However, a clear idea about the process and placement of such implants needs to be created among the undergraduate students.

References:

1. Ahmad et al., Zirconia Implants: The New Arrival in the Armoury of Successful Aesthetic Implant Dentistry, Smile Dental Journal | Volume 7, Issue 2 – 2012.
2. D.R Prithviraj 1, K.M. Regish, Sharma Deeksha, D.P. Shruthi, Extraction and immediate placement of root analogue zirconia implants: an overview, J Clin Exp Dent. 2011;3(3):e240-5. .
3. Amod Patankar, Rajesh Kshirsagar, Swapna Patankar, Sudhir Pawar, Immediate, Non Submerged Root Analog Zirconia Implant in Single Rooted Tooth Replacement: Case Report with 2 years Follow Up , J. Maxillofac. Oral Surg. (2016) 15(Suppl 2):S270–S273
4. Monish Bhola, Anthony L. Neely, & Shilpa Kolhatkar, Immediate Implant Placement: Clinical Decisions, Advantages, and Disadvantage. Journal of Prosthodontics 17 (2008) 576–581.
5. IMMEDIATE IMPLANTS- A REVIEW Kale Rutuja P., Chacko Lisa., Rakhewar P. S and Shah Tanvi H, International Journal of Current Medical And Pharmaceutical Research, Vol. 3, Issue, 02, pp.1322-1328, February, 2017
6. Vadivel Kumar, Immediate implant placement, International Journal of Clinical Implant Dentistry, May – August 2009; 1(2), 5-9.
7. David, Maurice, Immediate Total Tooth Replacement, Compendium / March 2001.
8. Immediate, non-submerged, root-analogue direct laser metal sintering (DLMS) implants: a 1-year prospective study on 15 patients Francesco Guido Mangano &Michele De Franco & Alberto Caprioglio & Aldo Macchi & Adriano Piattelli & Carlo Mangano. Lasers Med Sci DOI 10.1007/s10103-013-1299-0.
9. Designing a novel dental root analogue implant using cone beam computed tomography and CAD/CAM technology, David Anssari Moin Bassam Hassan Peter Mercelis Daniel Wismeijer, Clin. Oral Imp. Res. 0, 2011 / 1–3.
10. The Re Implant@ System for Placement Immediate Implant JORG RUDOLF, Journal of Aestheitc dentistry , Volume 9, Number 4.
11. Custom-made, root-analogue direct laser metal forming implant: a case report Francesco Guido Mangano & Bruno Cirotti & Rachel Lilian Sammons & Carlo Mangan, Lasers Med Sci (2012) 27:1241–1245.
12. “One-Piece” Immediate-Load Post-Extraction Implant In Maxillary Central Incisor Abdulgani Azzaldeen, Chlorokostas Georges, Abu-Hussein Muhamad, IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 16, Issue 3 Ver. XIII (March. 2017), PP 78-83.

13. Immediate placement and functional loading of implants on canine with fixed partial denture for a patient having canine protected occlusion: a case report Jun-Won Hong1 , DDS, MS, Seung-Geun Ahn1, DDS, PhD, Dae-Ho Leem2, DDS, PhD, Jae-Min Seo1*, DDS, MS, J Adv Prosthodont 2012;4:52-6.
14. Immediate Placement Of Anatomically Shaped Dental Implants Gary W. Coatoam, DDS, MS Angelo Mariotti, DDS, PhD, Journal of Oral Implantology, Vol. 26, No. 3, 2000.
15. Joseph Olivia, Ovoid Zirconia Implants: Anatomic Design for Premolar Replacement, The International Journal of Periodontics & Restorative Dentistry, Volume 28, Number 6, 2008.
16. Nizar A Ahmed et al., Immediate Implant Placement in a Periapical Lesion, Journal of Clinical and Diagnostic Research. 2017 Mar, Vol-11(3): ZD26-ZD28.
17. Abraham H. M., Philip J.M., Jain AR, Venkatakrishnan C. J. The effect of implant and abutment diameter on peri-implant bone stress: A three dimensional finite element analysis. J Oral Res Rev [serial online] 2016 [cited 2019 Mar 15]; 8: 49-52.
18. Christopher SD, Savitha A N. One piece implant in reduced edentulous space closure: A report of two cases. Contemp Clin Dent 2013;4:563-5
19. James D, Chakravarthy A, Muthusekhar MR (2017) Technology Assisted Reconstructive Surgery - A Case Report. Dent Implants Dentures 2: 117. Doi: 10.4172/2572-4835.1000117
20. Rajaraman, Vaishnavi; Dhanraj. M; Jain, Ashish. R, Knowledge, awareness, and practice about post-implant prescription of analgesics A survey among clinicians in Chennai . Drug Invention Today, 2018, Vol 10, Issue 4.