

Knowledge and implementation of dental implant impression techniques among dental practitioners in Bhopal city- A cross-sectional study

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Citation of this Article: Dr. Deepali Dongle, Dr. Shreyans Damade, Dr. Swapnil Parlani, Dr. Kirti Jajoo, Dr. Pushkar Dwivedi, Dr. Nimit Jain, “Knowledge and implementation of dental implant impression techniques among dental practitioners in Bhopal city- A cross-sectional study”, IJDSIR- August - 2021, Vol. – 4, Issue - 4, P. No. 01 – 07.

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Dental implant is surgically placed component that aids in various dental prosthesis such as denture, crown, bridge, etc. For success of dental implant, replication of the same in the form of impression is very crucial and with ongoing research and development in dental implant appropriate knowledge of impression making in dental implant is crucial.

Aim: The current study aim is to investigate knowledge and implementation of various impression techniques for dental implants among dental postgraduate students and private practitioners.

Material and methods: The study was conducted as a cross sectional survey, with self-administered questionnaire among the dental postgraduate students of dental institute as well as private dental practitioners. A total of 110 people including postgraduate students and

private practitioners responded out of 150. The responses were collected using Google Forms. Collected data was subjected to descriptive analysis.

Result: The awareness of participants regarding impression making in dental implant was found to be satisfactory; with more than 50% participants. The individual impression making related forte questions like splinting of components and choice of material for impression making were in tandem with the evidence based findings.

Conclusion: It was concluded that there was satisfactory level of knowledge regarding impression making in dental implant cases. Although, with recent advances in dental implant science like cortical implants, more emphasis should be given to practice perfect the dental implant impression making right at dental curricular level itself.

Keywords: dental implants, impression techniques, dental postgraduates, private practitioners, dental institute in India.

Introduction

By definition, dental implant is designed to be placed surgically within or on the mandibular or maxillary bone to provide resistance to displacement of a dental prosthesis.¹ Among any given population, people lose teeth for various reasons such as, decay, gum diseases, trauma, etc. And dental implant remains the most viable treatment modality in such cases. On the other hand, dental implant needs a multidisciplinary approach to achieve those optimum results.²

Success of dental implants pivots around the osseointegration and the passive fit of the prosthesis.³ Osseointegration is a multifactorial in nature including, soft tissue management, precision of surgical techniques and implant impression precision.⁴⁻⁶ The latter component of dental implant supported replacement has been one among many major reasons behind failure of dental

implant. According to glossary of prosthodontics term, dental impression can be defined as the negative imprint of an oral structure used to produce a positive replica of the structure which is used either for permanent record or production of dental restoration.⁷ In case of dental implant it is crucial that position of implant analogs in the master cast is similar to the position of the implant in patient's mouth.⁸ Also, the selection of proper impression tray, impression technique, type of impression material used and angulation of impression tray plays an important role in the success story of dental implant placement.⁹⁻¹² Impression techniques commonly employed in dental implant placement are open tray technique and closed tray technique. In Open tray technique (pick up technique) a customized impression tray is used with access for the impression coping in respective areas to accommodate. Impression is made using this tray, screw is loosened when impression material is set and tray will be removed from patient's mouth together with the impression coping remained within the impression. An implant analog is tightened to the impression coping with the same screw in place and cast is poured.¹³⁻¹⁴ Although, the open tray technique has its own disadvantages like more parts need to be controlled during tightening, rotational movement of impression coping and blindly attaching implant analog are few to mention.¹⁵ In patients with probability of gag, limited interarch space, close tray technique becomes more advisable.¹⁴ Closed tray technique involves use of single impression coping which is attached intraorally to the implant. Then this coping is fixed to the implant analog and repositioned into the impression with correct orientation. Evidence suggests that open tray technique is more superior and predictable compared to close tray technique.¹⁶

After due consideration towards the pros and cons of both the impression techniques used commonly in dental

implant placement, it is crucial to investigate the level of knowledge and practices associated with impression making among dental post graduate students and private dental practitioners.

Materials and methods

A Cross Sectional Questionnaire Study was conducted among dental post-graduate students of a dental institute and private dental practitioners of Bhopal city. Informed consent was obtained from all the participants prior to enrolling into the study.

Considering total population size (post-graduate students in institute and enrolled private dental practitioners) sample size of 150 was calculated with margin of error 3% and 95% confidence level. A self-administered questionnaire comprising of 5 questions on demographic details and 10 questions pertaining to the knowledge and practices about impression making in dental implant procedure was used. Questionnaire was subjected to pre-testing for validity and reliability. Content validity was found to be 0.89 and reliability with split half 0.84 and Cronbach's alpha score 0.92 was calculated. Owing to the ongoing Covid-19 pandemic traveling and social distancing restrictions, questionnaire was prepared in the form of Google Form and was mailed electronically to the study participants. After 3 days one more electronic follow-up was taken as reminder about the study questionnaire to be filled. Statistical analysis - collected data was subjected to Microsoft Excel 2019 for further analysis and presentation.

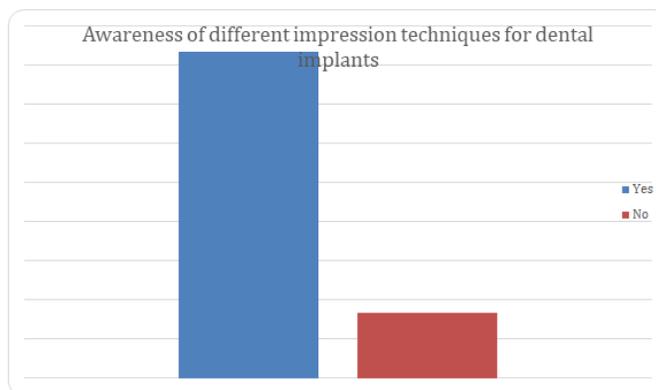
Results

Out of 150 dental post-graduate students and private dental practitioners contacted for study participation, 110 responded with their consent to be part of the current study and responses to the questionnaire asked. Around 62% study participants were belonging to age group of 25-35 years, 33.3% were in 35 – 45 years age group and only

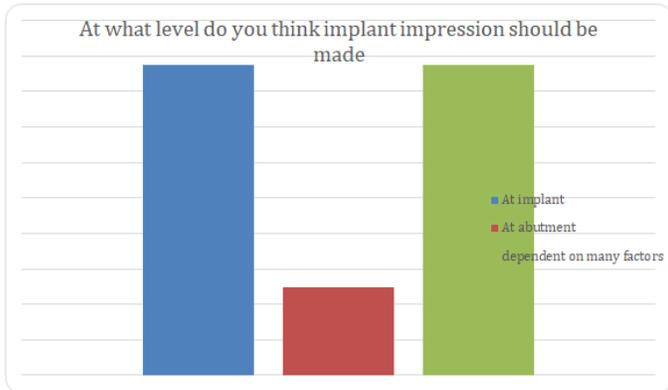
4.2% were above 45 years of age. Among the dental post-graduate students, 66.7% were in Prosthodontics, 10.4% Orthodontics, 6.3% Oral and Maxillofacial surgeon, 6.3% Periodontics, 6.3% Endodontics whereas 2% were in Oral Medicine-Radiology and Public Health Dentistry each, who were doing implant cases.

Out of total study participants, 79.2% were having less than 5 years of dental implant placement experience, with 20.8% participants who has been practicing dental implant for more than 5 years. 83.3% study participants were aware of different impression making techniques for dental implant placement. For the question at what level implant impression be made, 43.8% study participants opted for at implant level whereas another 43.8% chose to be dependent on various factors. Only 12.5% chose to make implant at abutment level. While doing open tray technique, 47.9% participants chose to splint the copings with GC pattern resin followed by composite resin (25%), acrylic resin (12.5%), non – splinting technique (10.4%) and 4.2% opted for splinting using impression plaster.

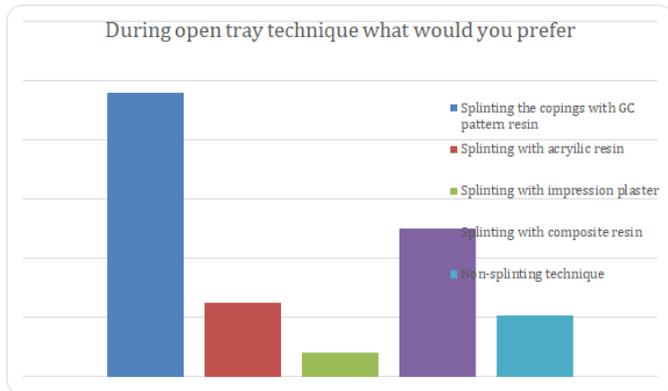
Graph 1



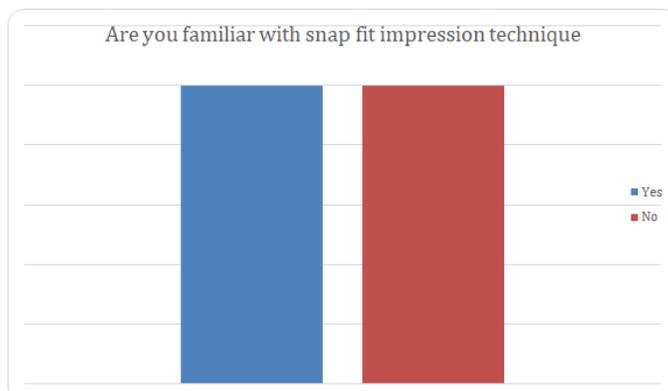
Graph 2



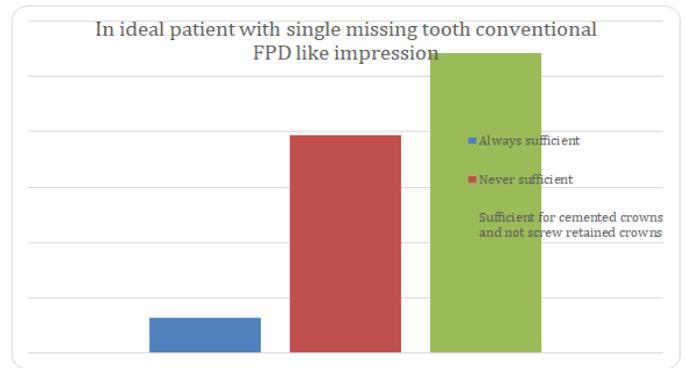
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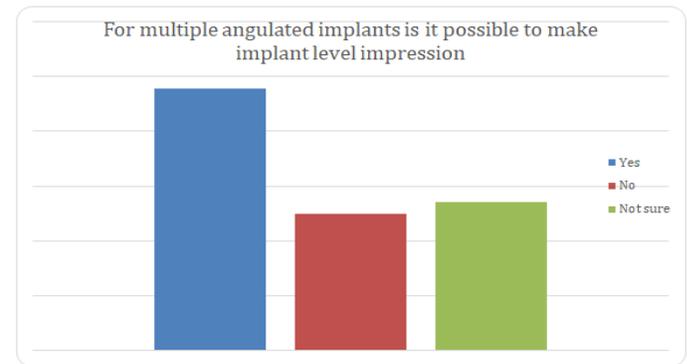
Graph 4



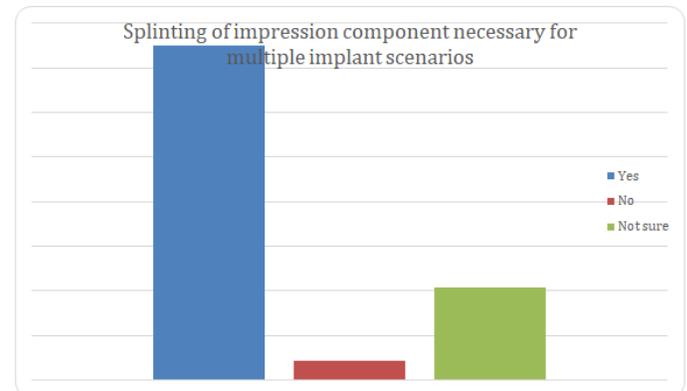
Graph 5



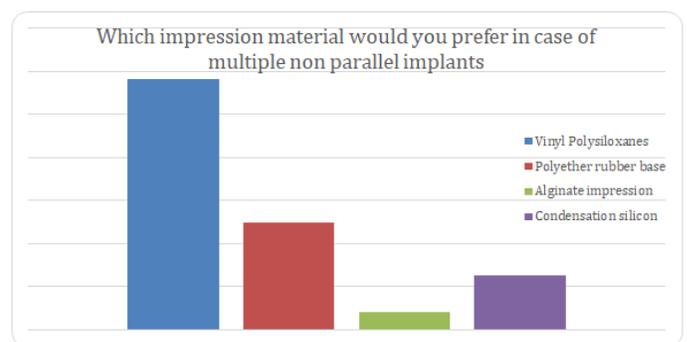
Graph 6



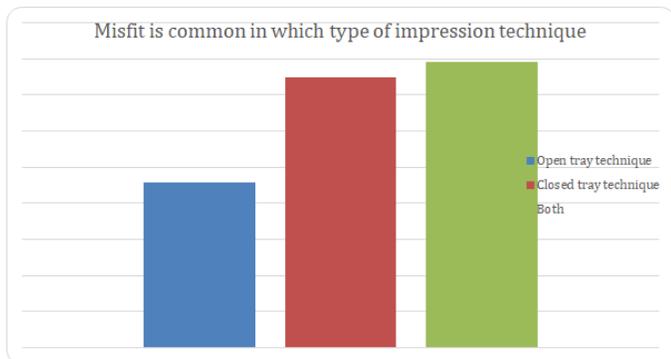
Graph 7



Graph 8



Graph 9



Discussion

The implant misfit is one of the major reasons for the dental implant failure and is dependent upon many factors such as, implant cast accuracy, implant angulation, impression material used, impression technique preferred, etc. And the current study gives us an overview of knowledge and practices among dental post graduate students and private dental practitioners while placing a dental implant. The maximum number of study participants were belonging to the age group of 25-35 years. Similar results were found in the study conducted by Alqahatani and Al-Mansoori et al.¹⁷

The impression made at implant level is also possible for multiple angulated implants as it transfer the soft tissue profile, implant position and hex orientation. For single missing tooth in ideal patient, most of them believed a conventional FPD like impression would suffice for cemented crowns and not for screw retained crowns. As in a cemented crown, abutment projects supra-gingivally just like abutment tooth of FPD, so its sufficient to record finer details of abutment.

Splinting of impression components is necessary for multiple implant scenarios as it will prevent individual coping movements during impression making procedure and results in more accuracy of impression.²⁰ The splinting of coping using GC pattern resin also found to be one of the effective method in dental implant impression making

as it's a low shrinkage modeling resin has proven a safe, versatile and easy to handle material.²⁰⁻²¹

About the material of choice for impression making, participants chose vinyl polysiloxane over others. Although, study conducted by Chatterjee et al³ revealed the impression material of choice was addition silicon.¹⁸ It has been advised to use vinyl polysiloxanes with some nano-fillers providing some unique properties.¹⁹ Vinyl polysiloxane preferred for multiple non-parallel implants, as it reduce the permanent deformation of impression material determined by the stress between the material and impression copings created when an impression with copings is removed from internal connection implants.

The current study clearly shows that the postgraduate students and private practitioners are well aware of the different implant impression techniques used. These results are in fact in tandem with the ones conducted elsewhere. Whereas, it was 50% response for the awareness towards snap fit impression technique compared to 24% found in similar study conducted in southern part of India few years back. This could be due to wider spread of dental implant practices across country in last few years.¹⁵

Dental implant success in totality depends upon the osseointegration and it has been quoted by previous studies like, material biocompatibility, implant design, surface, surgical technique and the current study participants were quite aware of the same.²³ Misfit is one of the major reason for dental implant failure and the occurrence is more in close tray impression technique. Evidence suggests, in close tray technique there can displacement of transfer copings and analogues in impression material during manual placement. This will result in distortion of impression and alters accuracy of master cast especially in multiple implant case.²⁴ And it was the outcome expected with many study participants

opting to go with requirement of special components to make impression for dental implant.²⁵

The current study was limited to only dental institute of Bhopal city and inclusion of wider postgraduate students from dental institutes with varying teaching patterns might yield different results. Also, the response of private dental practitioners was less than expected owing to email only reminders sent from time to time. Inclusion of private dental practitioners from urban, semi-urban and rural area might have an impact on results as compared to the current study.

Conclusion

From the current study, it was concluded that there was satisfactory level of knowledge regarding impression making in dental implant cases. Although, with recent advances in dental implant science like cortical implants, more emphasis should be given to practice perfect the dental implant impression making right at dental curricular level itself.

Also, further studies need to be conducted with wider study population with different demographics for both postgraduate students as well as private dental practitioners, for better extrapolation of current study results.

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