



KNOWLEDGE AND ATTITUDE OF DENTAL POSTGRADUATES TOWARDS AUTO-TRANSPLANTATION OF TEETH

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ABSTRACT

Background: There are various alternative means for replacing a missing tooth such as removable or fixed partial dentures, implants etc. Auto-tooth transplantation can serve as an effective alternative to these procedures due to its numerous advantages. It can be carried out during growth. Orthodontic treatment can be carried out following auto-transplantation. A natural tooth replacement is more favourable than a prosthetic replacement. There are few studies available in the literature assessing the knowledge and attitude of dental post-graduates towards Auto-transplantation of teeth which provided us an impetus to carry out the study. **Methodology:** A close-ended structured questionnaire was sent to the email-id's of dental post-graduates of Oral Surgery, Prosthodontics, Periodontics across Maharashtra through online survey (google survey). After the successful pilot survey, questionnaire was distributed to rest of the targeted dental post-graduates across Maharashtra and those who responded the questionnaire were included in the study. **Results:** Majority of them (91.33%) believe that auto-tooth transplantation depends on general health. Immediate auto-tooth transplantation (97.67%) offers better healing compared to late auto-tooth transplantation. Auto-tooth transplantation is cost effective (75%), more risky and technique sensitive (55.33%) compared to implant placement. The response regarding biocompatibility (83%), function (72.33%), and comfortability (81%) of auto-transplanted tooth was satisfactory. **Conclusion:** Majority of dental postgraduates involved in the study were having sufficient knowledge and positive attitude towards auto-transplantation of tooth as a viable alternative for replacing missing teeth. Still there exists a need to encourage and motivate them as well as patients regarding the procedure.

KEYWORDS: Auto-tooth transplantation, Dental Postgraduates, Missing Tooth.

INTRODUCTION

Since ages the replacement of missing teeth has been a functional and cosmetic necessity for mankind. There are multiple options for replacing missing teeth that generally fall into three categories; crown and bridges, removable dentures and dental implants which has its own indications and limitations.

Removable partial dentures are indicated in cases with lengthy edentulous span and no abutment for a fixed prosthesis, however, ill-fitting prosthesis and less comfort has always been a problem.^[1] The traditional treatment for a single edentulous space with healthy abutments has been a conventional fixed partial denture. A major shortcoming of this alternative is the reduction of healthy abutments, improper crown root ratio and inability for orthodontic tooth movement.^[2,3]

Apart from removable and fixed partial dentures, rapidly evolving implantation and alveolar ridge reconstruction technique has created a new era in modern dentistry where tooth loss is no longer a problem.^[4] There is no need of preparation of adjacent teeth in cases of implants.^[5] Endless variations of implant lengths, diameter, surface and design, along with autogenous, allogeneous, alloplastic or xenogenous bone substitutes made it possible to create physiologic occlusion, esthetic and masticatory function. However implant dentistry does not have the potential to adapt during growth and developmental changes.^[6] Moreover it also can't be applied to all the patients due to systemic health condition, and significant financial burden.^[7-9]

Thus, to overcome the aforementioned limitations of these three categories of replacing missing teeth, auto-transplantation of tooth could be considered as an

alternative treatment. The surgical movement of embedded, impacted or erupted vital or endodontically treated tooth from its original location in the mouth to another site in same individual is termed as autogenous tooth transplantation or auto-transplantation.^[10,11] The new location may be a fresh extraction socket after extraction of a non-restorable tooth, or an artificially-drilled socket on an edentulous alveolar ridge. The procedure itself is not a new invention and the earliest reports of tooth transplantation involve slaves in ancient Egypt who were forced to give their teeth to their Pharaohs.^[12] Abulcassis documented the first dental surgical intervention of such kind in 1050 but the first surgery with details of tooth-bud transplantation was recorded in 1564 performed by a French dentist Ambroise Pare.^[13]

The available literature reports excellent success rates following auto-transplantation of tooth if proper protocol is followed. Andreasen *et al*^[14] found 95 to 98% long term survival rates for 370 transplanted premolars observed over 13 years. Lundberg and Isaksson^[15] reported 84 to 94% success rate in 278 auto-transplanted teeth over a period of five years. Kugelburg^[16] *et al* reported 82 to 96% success rates in 40 patients for a period upto 4 years. Czochrowska *et al*^[17] reported on long term success of auto-transplanted teeth. They followed up 30 teeth for a period of 17-41 years and reported a success and survival rate of 90 and 72% respectively. Therefore, biological principles for auto tooth transplantation that are understood and described in the literature along with the correct indications may lead to a successful alternative treatment with a very good prognosis.^[18] However, there is scarcity of literature in Indian scenario regarding auto-tooth transplantation. Hence, the present study was taken up to assess the knowledge and attitude of dental postgraduates towards Auto-transplantation of teeth across Maharashtra which can serve as a new epoch in replacing missing teeth.

METHODOLOGY

Ethical considerations

This survey received ethical approval from the Institutional Research and Ethics Committee of D Y Patil Dental School, Pune, Maharashtra.

Questionnaire design, Participants and data collection

The present study was a Questionnaire based online survey (cross- sectional study) conducted from Dept. of Public Health Dentistry, D Y Patil Dental School, Pune, Maharashtra in August and September 2019. A close ended structured questionnaire of twelve items written in English was designed to assess the knowledge and attitude of dental postgraduates towards auto-transplantation of tooth. The questions asked were provided with two point Likert scale and respondents were invited to tick those responses most appropriate according to them.

The questionnaire was subjected to a pilot study on the twenty samples involving Dental students of D Y Patil Dental School, Pune which were not included in the main study so as to assess the feasibility of the questionnaire and to make any appropriate alterations, if required. The content validity was confirmed from an in-depth literature search and a review of different questions asked in several continuing dental education end of course assessments which were accessed on the internet. The validity of the questionnaire was subjected to Chronbach's alpha analysis and the internal consistency of the questionnaire was found to be 0.8.^[19]

The dental postgraduates involved in the survey comprised students of Dept. of Oral Surgery, Prosthodontics and Periodontics across Maharashtra as these branches students are mostly involved in auto-tooth transplantation compared to others. The questionnaire was distributed by the principal investigator online through Google Survey to the email-id's of those dental postgraduates. The email-id's of those dental post graduates were obtained from the respective dental colleges authorities after explaining them the purpose of the survey being carried out.

After the successful pilot survey the questionnaire was distributed to rest of the targeted dental postgraduates in the present study across Maharashtra. The reminder was sent every alternate day to their email-id for participating in the study by completing the questionnaire. A total 300 dental postgraduates who responded the questionnaire were included in the study. Data was collected about general demographic data, speciality pursued in dentistry and responses of the structured questionnaire. The investigator didn't come to know the individual responses of each question as that survey tool gave collective response of all the participants. As the data collected was qualitative, there is only descriptive statistics discussed in the present study.

RESULTS

Table 1 shows the responses of all the 300 dental postgraduates who responded the questionnaire regarding auto-tooth transplantation. The majority of study participants (91.33%) believe that auto-tooth transplantation depends on general health of an individual. Immediate auto-tooth transplantation (97.67%) offers better healing in the patients compared to late auto-tooth transplantation.

The present study results suggest that auto-tooth transplantation cannot be undertaken in periodontally unhealthy tissue (93.33%). The majority of study participants (57%) says that auto-transplanted tooth can be moved orthodontically.

Auto-tooth transplantation is cost effective (75%), more risky and technique sensitive (55.33%) compared to implant placement. The majority of study participants response regarding biocompatibility (83%), function

(72.33%), and comfortability (81%) of auto-transplanted tooth is satisfactory.

Table 1: Questionnaire Survey To Analyze The Knowledge and Attitude of Dental Postgraduates towards Auto-transplantation of Teeth.

Sr. no.	Questions	No. of respondents	%
1.	Missing tooth has to be replaced to achieve proper oral health and general health? Yes No	300 0	100% 0%
2.	Does, prognosis of auto-tooth transplantation depends on general health of an individual? Yes No	274 26	91.33% 8.66%
3.	In which of the following conditions healing will be better? Immediate auto-tooth transplantation Late auto-tooth transplantation	293 7	97.67% 2.33%
4.	Which of the following procedure has more longevity? Implant placement Auto-tooth transplantation	166 134	55.33% 44.67%
5.	Which of the following is more cost-effective? Implant placement Auto-tooth transplantation	75 225	25% 75%
6.	Can auto-tooth transplantation be undertaken in periodontically unhealthy tissue? a. Yes b. No	20 280	6.67% 93.33%
7.	Can an auto-transplanted tooth shows orthodontic movement and respond accordingly? a. Yes b. No	171 129	57% 43%
8.	What is your preference for replacing missing tooth? Removable or fixed prosthesis Auto-tooth transplantation	141 159	47% 53%
9.	Which of the following procedure is more risk and technique sensitive? Implant placement Auto-tooth transplantation	134 166	44.67% 55.33%
10.	What is your assessment regarding function of auto-transplanted tooth? Satisfactory Unsatisfactory	217 83	72.33% 27.67%
11.	What is your assessment regarding biocompatibility of auto-transplanted tooth? a. Satisfactory b. Unsatisfactory	249 51	83% 17%
12.	What is your assessment regarding oral comfort of the patient in auto-tooth transplantation? a. Satisfactory b. Unsatisfactory	243 57	81% 19%

DISCUSSION

The present study results showed that majority of dental postgraduates involved in the study were having sufficient knowledge and positive attitude towards auto-transplantation of tooth to serve as a viable alternative for replacing missing teeth.

The present study was conducted with the help of Google online Survey due to the feasibility of reaching out more and unlimited number of people can participate in such surveys via the web browser.^[20] With the advancement

of science and technology, online survey tools have evolved as a better option to conduct research at a fraction of cost and at a faster rate in a shorter time span compared to traditional research method.^[21] As the information is being gathered automatically, there is no need to wait for proforma be resent by participants. The forms created with Google Docs are mobile friendly and people can therefore send in their responses from android based mobile phone as well.^[20] All the responses get automatically collected in an Excel spreadsheet which helps to give you the overall results in a very

comprehensive manner. It also has an advantage of email notifications as soon as participant fills in a Google Docs form with their responses.^[20]

The majority of the study participants (91.33%) believe that auto-tooth transplantation depends on general health of an individual which is in agreement with multiple studies.^[22-25] Immediate auto-tooth transplantation (97.67%) offers better healing in the patients that may be due to continued vitality and less trauma to PDL membrane compared to late auto-tooth transplantation which is in accordance with the study conducted by Chugh *et al.*^[26]

The present study results suggest that auto-tooth transplantation cannot be undertaken in periodontally unhealthy tissue (93.33%). It may be attributed to the fact that there are specific requirements of the patient, the donor tooth, and the recipient site as seen in the studies conducted by Andreason *et al.*,^[14] Clokie CML *et al.*,^[22] Muhammad A-H *et al.*^[24]

The majority of study participants (57%) opined that auto-transplanted tooth can be moved orthodontically. It is in accordance with the findings of Park JH *et al.*,^[27] Unni KN *et al.*^[28] that, auto-transplanted natural tooth has the capacity for functional adaptation, movement and preservation of the alveolar ridge in orthodontic patients which is advantageous when compared to a prosthesis or an osseointegrated implants that are stationary and do not erupt to compensate for further growth.

Auto-tooth transplantation is cost effective (75%), more risky and technique sensitive (55.33%) compared to implant placement which is in concordance with Chugh *et al.*^[26] In this procedure the placement of implant-supported prosthesis or other form of prosthetic tooth replacement is not essentially required which is beneficial from economical point of view. It is risky and technique sensitive that may be due to the fact that surgical skills are essential to perform this procedure.

The majority of study participants response regarding biocompatibility (83%), function (72.33%), and comfortability (81%) of auto-transplanted tooth is satisfactory. It is similar to the studies conducted by Park JH *et al.*,^[27] Aslan BI *et al.*,^[29] Thomas *et al.*^[30] that concluded, successful tooth transplantation offers improved esthetics, arch form, dentofacial development, mastication, speech, and arch integrity. It may serve as a viable treatment option especially in growing adolescents.

Few of them believe that this procedure is not biocompatible (17%), improper functioning (27.67%), and uncomfortable (19%). This might may be due to inflammatory resorption and replacement resorption after 3 or 4 weeks, to 3 or 4 months after transplantation respectively. The incidence of both types of resorption can be decreased with atraumatic extraction of the donor

tooth and immediate transfer to the recipient site to minimize the risk of injury to the periodontal ligament.^[24,31]

Even though the dental postgraduates have knowledge and positive attitude towards auto-transplantation, there is a need to increase awareness and motivate the patients towards auto tooth transplantation has an alternative to replace the missing tooth. Although the concept of dental implants has spread all over the world due to its emphasis in dental literature, push driven by many companies, incorporation of the topic into curriculum by most of the dental schools etc; still the procedure in which PDL around the tooth is maintained will continue to be an attractive alternative in many cases.

In a perfect world, prevention of tooth decay and PDL disease would result in optimal dental health. The reality is, of course, that this does not happen consistently, & patients do end up with decayed teeth & failing PDL health. Auto-tooth transplantation could play a role, as most preservative treatment in such cases compared to implants, cantilever bridges & single tooth RPD.^[31]

More clinical & basic research is indicated to further enhance the predictability of this treatment modality. Auto-transplantation of cryopreserved tooth has been reported. This procedure requires a special facility & expertise to avoid damage to PDL & dental pulp. There is a hope that by preserving extracted teeth in tooth bank, (those extracted for orthodontic purposes, 3rd molars, & impacted teeth) one can use them for future auto-transplantation. However, research has to be continued to implement this method as a general clinical treatment.

Without a doubt, prevention is always the best treatment, but until the tooth decay, PDL disease, trauma, & congenital problems can be eliminated, there will continue to be a need for replacement of lost teeth. Auto-tooth transplantation offers an attractive, economic & sound approach for a number of situations and the patients deserve clinicians' consideration of all the possibilities when faced with potential and actual tooth loss.

CONCLUSION

Majority of dental postgraduates involved in the study were having sufficient knowledge and positive attitude towards auto-transplantation of tooth. It is a viable and practical alternative to implants and prosthetics in cases of tooth loss. Still there exist a need to encourage and motivate dental professionals as well as patients and increase the awareness regarding auto-tooth transplantation in Indian scenario.

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