

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service Available Online at: www.ijdsir.com

Volume – 5, Issue – 3, May - 2022, Page No. : 58 - 64

Knowledge and Awareness on Selection of Retention Systems in Implant Retained Prosthesis among Prosthodontist across Gujarat - A Questionnaire Based Survey

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Citation of this Article: Dr. Dhruvil Popat, Dr. Sareen Duseja, Dr. Vilas Patel, Dr. Bhakti Patel, Dr. Chirag Sengal, "Knowledge and Awareness on Selection of Retention Systems in Implant Retained Prosthesis among Prosthodontist across Gujarat - A Questionnaire Based Survey", IJDSIR- May - 2022, Vol. – 5, Issue - 3, P. No. 58 – 64.

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Introduction: Implant retained fixed dental prostheses are nowadays well-established treatment option for the replacement of missing teeth and oral structures. The purpose of the study was to evaluate the knowledge and awareness of prosthodontists on selection of mode of retention; screw retained or cement retained in implant retained prosthesis with different clinical situations.

Materials and method: Web based questionnaire was sent to prosthodontists (Institute faculties, trainee post graduates & private practitioners) across Gujarat. After collection of data, it was analysed using descriptive statistics.

Results: An overall total of 117 respondents participated in this survey. Most of the participating prosthodontists preferred cement retained prosthesis in case with adequate interocclusal space, short span FDPs, prosthetically malpositioned implant, to create proper occlusion and to avoid veneer chipping. They preferred screw retained prosthesis for inadequate interocclusal space, Provisionalization in anterior teeth, long span FDPs, cantilevered FDPs and to avoid biologic

complications and in term of survival, most of them believed that both retention systems have no difference. **Conclusion:** Within the limitations of this study, the data indicates that most prosthodontists are aware of and follow the prosthetic aspects in planning and selecting the retention systems (Screw or Cement retained) for implant retained prosthesis.

Keywords: Screw retained prosthesis, cement retained prosthesis, and screw vs. cement retained prosthesis.

Introduction

Implant supported rehabilitations are one of the best treatment options nowadays. The advances in implant biomaterials and designs have improved the clinical outcome of the treatment. The success of implant retained prosthesis have many factors to be considered; among which the phenomena of osseointegration is very crucial. The digital technology, improved surgical methods, improved stability between the implants, abutment and the prosthesis lead to success of the treatment without complications.¹ A systematic study, collected data from 72 clinical studies revealed 5-year survival rates of 96.03% and 95.55% for cemented and screw retained reconstructions, respectively.² This systematic study suggests that the choice of retention (Cement or screw retained) might not have a crucial role in term of survival of the prosthesis, but might be responsible for certain complications. Screw retained systems are preferred with multiple abutments because of the retrievability, ease of repair and better cleansing but they show higher rates of complication like screw loosening, screw fracture and esthetic considerations when implants are improperly positioned.³ Cement retained prosthesis are ideal for esthetic purpose and are an advantage in compensating for the unfavorable angulation of an implant with fabrication simplicity and less stress on bone compared to screw retained systems.

But they are more susceptible to biologic complications due to excess cement.⁴ So, the purpose of this study was to evaluate the knowledge and awareness of prosthodontists on selection of retention system; either screw or cement retained implant prosthesis. This connection can have an impact on the prognosis of the overall rehabilitation. The choice of retention system for individual patient depends on diverse factors, including indication; advantages and disadvantages, retrievability, esthetics and the clinical performance (failures and complications).⁵

Materials and methodology

In March of 2022, a web-based questionnaire was sent to prosthodontists in various institutes, trainee post graduates & private practitioner across Gujarat. So, the inclusion criteria for the study was that the participants must be from the field of Prosthodontics, either prosthodontist trainee prosthodontists. The or participants were sent a Google form link via social media platform enclosing both participant information sheet and a link created using Google form for survey questionnaire. The questionnaire was regarding the selection of mode of retention (Screw or cement retained) in different clinical situations. The survey included a total of 10 questions.

All questions were multiple choice questions & allowed the respondent to choose among screw retained prosthesis, cement retained prosthesis or any of them. The questions were collated at the Department of Prosthodontics Crown and Bridge, Narsinhbhai Patel Dental College and Hospital by Prosthodontic senior faculty prior to distribution. Data were analysed with descriptive statistics using Microsoft Excel, version 15.19.1.

Results

In total, 117 respondents filled the questionnaire and participated in the survey. The questions with results can be tabulated as under (Table 1),

Sn.	Questions	Screw retained	Cement retained	Any of them
		prosthesis	prosthesis	
1	What type of implant retained prosthesis do you prefer	24.4%	62.8%	12.8%
	when implant is placed in prosthetically ideal position			
	with adequate crown height space in posterior region?			
2	What kind of implant retained prosthesis do you prefer in	91%	7.7%	1.3%
	case with inadequate crown height space in posterior			
	region?			
3	What kind of implant retained prosthesis do you prefer in	37.2%	16.7%	46.2%
	the term of survival of implant retained prosthesis?			
4	What type of implant retained prosthesis are seen to have	11.5%	80.8%	7.7%
	higher chances of biological complications?			
5	What kind of implant retained prosthesis do you prefer in	24.4%	66.7%	9%
	case with short span implant supported FDPs?			
6	What type of implant retained prosthesis do you prefer	52.6%	43.6%	3.8%
	for provisional prosthesis in anterior region?			
7	What kind of implant retained prosthesis do you prefer	30.8%	61.5%	7.7%
	when the implant is prosthetically malpositioned in			
	anterior region?			
8	What type of implant retained prosthesis do you prefer in	64.1%	25.6%	10.3%
	case with cantilever design in implant supported FDPs?			
9	What type of implant retained prosthesis are seen to have	57.7%	20.5%	21.8%
	higher chances of veneer chipping with full mouth			
	implant retained prosthesis?			
10	What kind of implant retained prosthesis do you prefer	21.8%	65.4%	12.8%
	when proper occlusal contacts are required as in implant			
	protected occlusion?			
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 Table 1: Questions & Answers given by participants (in percentage)

prosthetically ideal position with adequate crown height space in posterior region as shown in Figure 1.

Among them, 62.8% respondents prefer cement retained prosthesis, 24.4% respondents prefer screw retained prosthesis and 12.8% believed that any of the retention mode can be used when implant is placed in



Figure 1: Adequate CHS in posterior region.

In the case with inadequate crown height space in posterior region, majority of the respondents preferred screw retained prosthesis (91.0%) over the cement retain prosthesis (7.7%) as shown in Figure 2.



Figure 2: Inadequate CHS in posterior region.

In term of the survival of the prosthesis, almost half of the respondents believed that any of the mode of retention can be used (46.2%), one third of them preferred screw retained prosthesis (37.2%) and few preferred the cement retain prosthesis (16.7%) as shown in Figure 3.



Figure 3: Survival of implant retained prosthesis. For the biologic complications, most of the respondents believed that the cement retained prosthesis (80.8%) have higher chances of complications and few of them believed that screw retained prosthesis (11.5%) can be the main cause biologic complications as shown in Figure 4.



Figure 4: Higher chances of biological complications.

In case with short span implant supported FDPs, more than half of the respondents chose cement retained prosthesis (66.7%) and 24.2% respondents chose screw retained prosthesis and only 9% believed that any of the retention system can be used as shown in Figure 5.



Figure 5: Short span implant supported FDPs.

For provisional prosthesis in anterior region, half of the respondents preferred screw retained prosthesis (52.6%) and half of them preferred cement retained prosthesis (43.6%) as shown in Figure 6.



For the implant that is placed in prosthetically malposition in anterior region, preferred choice of retention system for majority of the respondents was cement retained prosthesis (61.5%) followed by the screw retained prosthesis (30.8%) as shown in Figure 7.



Figure 7: Prosthetically malpositioned implant in anterior region.

In cases with cantilever design in implant supported FDPs, 64.1% respondents preferred screw retained prosthesis while 25.6% preferred cement retained prosthesis and 10.3% believed that any kind of retention system will satisfy the function as shown in Figure 8.



Figure 8: Cantilevered FPDs.

Complication like veneer chipping are more seen with screw retained prosthesis according to 57.7% respondents and according to 20.5% respondents, it is more with cement retained prosthesis as shown in Figure 9.



Figure 9: Higher chances of veneer chipping.

For proper occlusal contacts, 57.7% respondents preferred cement retained prosthesis, 20.5% preferred screw retained prosthesis and 21.8% believed that any of them can be used as shown in Figure 10.





Discussion

The results of the study indicate that there are differences in the selection of retention systems among respondents for different cases. So, a wide range of implant retention protocols are used in the dental practices. Hebel KS et al. conducted a study to achieve optimal occlusion and esthetics in implant retained prosthesis and concluded that when interarch space is adequate, cement retained prosthesis provide an excellent option as retention system as the machined abutment with adequate height and six degree taper provide ideal retention that is almost three to four times more than natural tooth preparation.⁶ Screw retained prosthesis require minimum amount of interocclusal space (4 mm) while cement retained prosthesis require 4 mm abutment height for optimal retention and a

minimum of 2 mm crown thickness; so a total of 6 mm interocclusal space. So, in cases with inadequate crown height space screw retained prosthesis are advantageous.¹²

Various systematic studies^{6, 7} and retrospective studies^{8, 9} conducted by different authors concluded that no statistically significant differences were found in term of survival or failure between screw and cement retained prosthesis but there were statistically significant differences in biologic and mechanical complications between screw and cement retained prosthesis. Zembic A et al. reviewed the survival rate and incidence of biologic, technical, and esthetic complications of single implant abutments supporting fixed prostheses and found out that the biological complications were significantly higher in cement retained prosthesis due to the remnants of the cement present in peri implant tissue leading to increased risk of peri implant infection.¹¹

Cement retained FDPs are most commonly fabricated because of ease of fabrication, compensation of improperly inclined implants and easier achievement of passive fit due to cement layer. And for long span FDPs, screw retained FDPs are fabricated due to ease of retrievability for maintenance and cleansability.⁵ In esthetic zone, for Provisionalization of implants to create soft tissue emergence profile and conditioning, screw retained prosthesis could be used as cement retained provisional prosthesis might lead biologic to complications as removal of residual cement is difficult if the implant is placed too deep and sub mucosal margins are required in esthetic zone. When the implant is not placed in an ideal position, so the screw channel in case with screw retained prosthesis may be visible in facial aspect. Esthetics is primary goal in case with anterior region, so the preferred prosthesis could be cement retained prosthesis. But when implant is placed

very deep, removal of excess cement is difficult. So, in this case a combination of screw and cement retention might be an option.⁵

Aglietta M et al. systematically reviewed the survival and complication rates of implant supported fixed dental prostheses with cantilever extensions after an observation period of at least 5 years and they concluded that the cantilevered design requires more maintenance and to compensate the leverage of extension, more retention is required. So, screw retained prosthesis can achieve this retention and it also have the advantage of retrievability for maintenance.¹³ Wittne ben JG et al. conducted a systematic review on the clinical performance of screw vs cement retained fixed implant supported prosthesis and they found out that veneer chipping of ceramic is most likely to happen with screw retained prosthesis due to presence of screw channel opening for abutment screw. This might interrupt the integrity of the framework and might create stress at the region of access opening.² Presence of intact occlusal surface in cement retained prosthesis might provide the better and easier control of occlusion like in case of narrow diameter crowns in posterior region.⁵

Conclusion

Within the limitations of this study, it can be concluded that most of the prosthodontists chose the retention systems (Screw or Cement retained) according to current guidelines and literature considering the various aspects of prosthodontics to minimize the post prosthetic complications.

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