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Factors Influencing Dentists' Choice of Implant System: A Cross Sectional Study

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ABSTRACT

Aim: To report a comprehensive description of dental implant system selection practices among dentists practicing implantology in Telangana.

Materials and Methods: An online questionnaire was designed and sent randomly to the dentists practicing implantology in TELANGANA. The survey questions addressed: Demographic and job-related characteristics, Basis for implant system selection, Characteristics of the chosen implant system, Dentists' satisfaction with their implant system(s). Responses were compiled and analysed to determine correlation of responses using the chi-squared test (level of significance α 0.05).

Results: Out of 300 invitations sent, a total of 237 (response rate=79%) dentists participated in the survey. Approximately more than half of survey respondents (65%) were Prosthodontists. Implant-abutment connections were the most important dental implant system selection criterion (91%), followed by scientific evidence available on the implant system (89.7%), and simplicity of surgical steps (88.5%). Offers by dealers (55%) were rated as the least important aspect. Sandblasted large gritted acid etched implant surfaces (SLA) were the most commonly used implant surfaces (45%).

Conclusion: According to the results of this survey, most survey respondents practiced both surgical and prosthetic phases of dental implantology. The majority of survey respondents agreed on the importance of implant-abutment connections, scientific evidence available on implant systems, and simplicity of surgical steps when selecting implant systems.

Keywords: Dental implants; implant system selection practices; survey questionnaire.

INTRODUCTION

Dental implant therapy is one of the best treatment modalities for replacing missing teeth.[1] It has existed as a treatment option for more than 30 years, and the popularity of this treatment option increased with the introduction of the concept of osseointegration.[2-4] Since then, implant dentistry has seen huge advances. Now, implant treatment has been documented as well as any other modality in dentistry with predictable long-term survival and success rates[5]. Several studies[6-8] have reported that in the presence of healthy tissues, a well-integrated implant with proper biomechanical loads can have a long-term success that ranges from 92% to 98% between 5 and 20 years, with one study reporting a

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cumulative survival rate up to 20 years of 98.9%. To meet the demands of replacing missing teeth, multiple implant systems have been engineered. As many as 80 manufacturers were producing nearly 200 implant brands in 2003[9], with a worldwide count of over one million implants inserted yearly[10]. As more types of implant systems have become available, clinicians are faced with the dilemma of choosing an implant system from a large number of options for multiple clinical situations. Although there are different regulatory bodies that control and create the initial requirements for clinical acceptance of dental implant systems, it is ultimately the dentists' decision which implant system should be used in clinical practice[11]. In the absence of consensus and randomized controlled trials, opinion remains divided over which implant system is the most effective in dental implantology, and clinicians have been left with the question of which criteria one should adopt when choosing a specific implant system[12]. Dentists may choose their implant system based on many factors like scientific-based evidence, financial considerations, implant-related factors (e.g., design characteristics, clinical performance, success rate, survival rate, healing time, operational efficiency), and manufacturer-related factors (e.g., technical support, promotional factors, training courses, warranty on implants).

The aims of this study were to report a comprehensive description of implant system selection practices among dentists working with dental implantology across the Telangana, determine qualities that dentists consider when choosing their implant system, and to report the most commonly used implant systems by dental practitioners in Telangana.

MATERIALS AND METHODS

This cross-sectional study was conducted during march 2019 for a period of 1month. An online questionnaire was made, consisting of 21 questions and was divided into 4 sections:

1. **Demographic and job-related characteristics of participants**: Gender, age (years), specialty, and years of experience in implant dentistry. A multiple-choice format was implemented for each question in this section.

2. **Dental implant system selection criteria**: price, simplicity of surgical and prosthetic steps, implant surface, scientific based evidence on the implant system, implant abutment connections, healing period after implant placement, popularity of the implant system, recommendations by colleagues/courses, technical support and availability of stock products,training provided by the manufacturer/dealer, warranty on the implant system, medical and/or dental history as well as anatomy of patients, request/desire of the referring dentist, and patient preferences.

3. **Characteristics of the chosen implant system** : Participants were asked about the characteristics of the implant system they used: type of surface treatment, type of implant abutment connection.

4. **Dentist satisfaction with their implant system(s) :**Participants were asked about the number and name of implant system(s) they use.

The survey invitation was sent directly to 300 active member dentists practicing implantology. The names and e-mail addresses of potential participants were obtained. The subjects were selected randomly from the total members list using simple random sampling technique to ensure that each element in the sampled population has the same probability of being selected.

RESULTS

The survey was sent directly to 300 members. A total of 237(response rate = 79%) dentists out of 300 participated in the survey after a total of three reminders were sent. Not all respondents answered every question. The total number of dentists who answered each question was mentioned.

Table 1 shows the socio-demographic characteristics of respondents. The majority of survey respondents were females. Respondent age ranged from 25 to 68years. Approximately more than half of the survey respondents (65%) were Prosthodontists; however, periodontists, oral surgeons and general practitioners made up 7.5%, 6.3%, and 10% of the respondents sample, respectively. The remaining 11.2% were orthodontists and endodontists.

About 3/4th of the survey respondents had less than 5years of experience in implant dentistry, and

about 15.2% had 5 to 10 years of experience in implant dentistry.

Table 1: Demographic data.

	Criteria	Percent
1	Age	
	25-35years	54
	35-45years	39
	>45years	6
2	Gender	
	Male	45.6
	Female	50.6
	Prefer not say	3.8
3	Speciality	
	General practitioner	10
	Prosthodontist	65
	Periodontist	7.5
	Oral surgeon	6.3
	Other	11.3
4	Years of experience	
	<5 years	75.9
	5-10 years	15.2
	>10 years	8.9

Table 2: Implant system selection criteria reported by all respondents.

	Criteria	**Percent**
1.	Scientific related factors	
	Scientific-based evidence available on the chosen implant	89.7
	Popularity of the implant system among other dentists	75
	Request/desire of the referring dentist	59.7
2.	Clinical related factors	
	Simplicity of surgical steps	88.5
	Simplicity of prosthetic steps	85.7
	Medical/dental history/anatomy of the patients	79.7
	Shorter healing period after implant placement	69.2
3	Economical factor	
	Price	71.8
4	Manufacturer related factors	
	Availability of stock &technical support	79.2
	provided by local distributor	74.4
	Warranty provided by the manufacturer	63.6
	Training provided by the dealer	55
	Offers by dealer	
5	Implant specific factors	
	Implant surface	84.4
	Implant abutment connection	91

Table 2 shows implant system selection criteria reported by all respondents. Implant/abutment connection was the most selected criterion, followed by scientific-based evidence available on the chosen implant (research documentation), and simplicity of surgical steps. On the other hand, offers by dealers was the least commonly selected criterion.

Among the implant surfaces in the survey, the most commonly used implant surface was SLA surface (45%), while acid etched surface was the least commonly used (figure 1). Regarding implant/abutment connections, most of the survey respondents have used implants with platform switching, and about 30% have used internal implant abutment connection implants (figure 2).

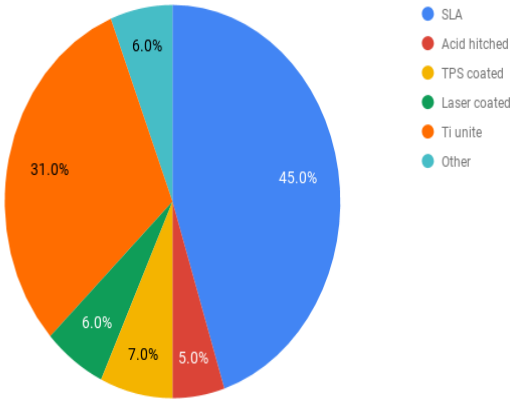


Fig 1: Types of implant surfaces.

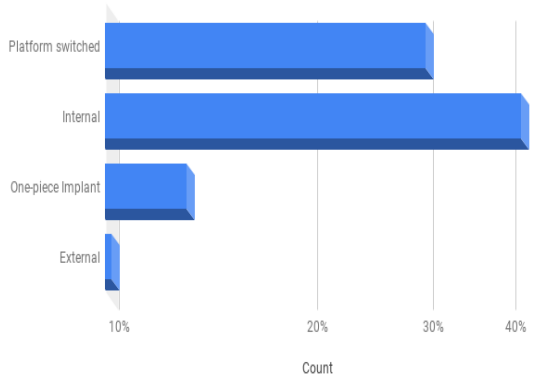
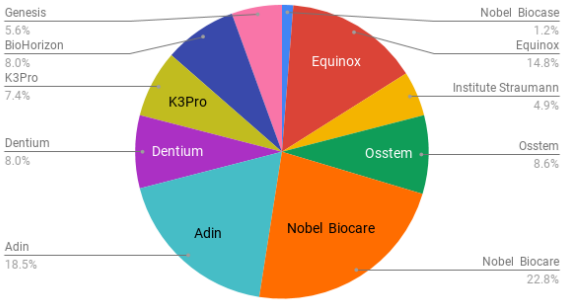


Fig 2: Types of implant/abutment connections.

Figure 3: Shows Primary implant system used by survey respondents. Nobel biocare was most commonly used followed by Adin.



DISCUSSION

A total of 300 dentists had participated in the survey with a response rate of 79% (237 dentists).

Prosthodontists were predominant in this study probably because the number of Prosthodontists involved in implant dentistry is increasing dramatically.

Implant/abutment connection was the most important selection criteria reported by respondents. Implant/abutment connection is the critical junction between the implant fixture and the abutment. It is an essential determinant of the stability and strength of an implant-supported restoration.[13] In addition, the implant/abutment connection plays an important role in implant success.[13,14] The presence of an unstable implant/abutment connection may cause recurrent screw loosening and screw fracture. Also, it causes plaque accumulation, an unfavorable soft tissue response, and eventually osseointegration failure.[15,16]

Scientific-based evidence available on the chosen implant system was the second-most important selection criteria reported by all survey respondents. In recent years the number of manufacturers of implants increased, and dentists have had problems orienting themselves in the jungle of various products.[9] Unless dentists exercise due care in the selection and handling of the implant materials, they are at risk of being held liable for patients suffering from any defect in the material during the treatment.[17]

There are a large number of implant surfaces in the market produced by different implant manufacturers, all claiming to have better clinical results. There is no clear evidence in the literature to prove the superiority of one particular surface over the other.[18] In a systematic review conducted by Esposito et al,[19] implant systems with greater than 5 years function were recorded, assessing primary outcomes such as implant mobility, loss of implant, and implant fracture, and secondary outcomes such as radiographic bone loss and peri-implantitis. This allowed different implant surfaces to be compared with regard to their modified surfaces. The review found high success rates for all surfaces.

When implants were introduced, they had an external implant abutment connection, but due to external connection drawbacks, which include the incidence of abutment screw loosening and fracture, as well as dynamic micro-motion at the implant/abutment interface,[20] internal connection implants were developed.[21,22] Internal implant abutment connection has proven to be successful, and now almost all companies have shifted their production to implants with an internal implant abutment connection.

It is widely accepted in the literature[23-26] that platform switching may preserve inter implant bone height and soft tissue levels. The degree of marginal bone resorption has been shown to be inversely related to the extent of implant abutment mismatch.[27] The use of platform switching for maintaining peri-implant bone levels has gained popularity among most implant manufacturers.

One-piece dental implants are not new to implant dentistry. Recent variations from the early designs have created a renewed interest in one-piece dental implants for all indications of implants.[28] Despite the great number of advantages these implants offer, only 20% of survey respondents have used it. This might be due to the technical and biological complications frequent in one-piece implants, as placing a one-piece abutment into the appropriate site and desired angulation is very critical.[29]

CONCLUSIONS

Within the limitations of this cross-sectional questionnaire report, the following conclusions were drawn:

- In general, Implant abutment connection was the most important implant system selection criteria.
- Implants with internal implant abutment connection was preferred mostly.
- SLA implant surface was the most commonly used implant surface among survey respondents.
- Nobel biocare was the most commonly used implant system among survey respondents.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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