

TITANIUM IMPLANT VS ZIRCONIA IMPLANT: CONSCIOUSNESS OF DENTIST IN KSA

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ABSTRACT

A dental implant is a surgical element that interacts with the jaw or skull's bone to support and serve as an orthodontic anchor for dental prostheses. The biological process of osseointegration, in which materials like titanium creates a close link with bone, is the foundation of contemporary dental implants. This study aims to assess the knowledge, attitude, and practice level of Zirconia implants on periodontal health among dentists in KSA. More than half of the participants (58.3%) reported that (patients with a history of peri-implantitis, metal allergies, and anterior esthetic zone cases) were the main indications of using zirconia implants. The majority (81.6 %) agreed that corrosion is considered one of the significant drawbacks of the metal. Nearly (9.5%) stated that zirconia has better performance against bacterial challenges. There was a statistically significant difference between the year of experience in dentistry and knowledge when asking participants about their opinion about one of the significant drawbacks of the metal. Corrosion, osteointegration of zirconia and titanium implants are similar, zirconia implant seems to be less susceptible to Peri-implantitis s and if zirconia implant has better esthetics and higher biocompatible compare to titanium. (P-value < .05). The dental practitioners have adequate knowledge regarding the overall properties of Titanium implants and Zirconia implants, (81.6 %) agreed that corrosion is considered one of the significant drawbacks of the metal. Also, (77.4%) and (74.1%) agreed that Zirconia implants can provide a protective effect against inflammation and are less susceptible to peri-implantitis respectively.

Key words: Zirconia implants, Titanium implants, Osseointegration, Dental materials.

Introduction

The rehabilitation of single and multiple edentulism with implants is currently regarded as an effective and well-documented treatment [1]. Titanium (Ti) has been one of the most well-documented biomaterials in dental implantology since 1970, It has been recognized as the ideal material for making dental implants due to its bioinert nature, and strength, but one of the drawbacks in the oral cavity would be more susceptible of titanium to cause corrosion than other regions of the body (gingivitis or periodontitis) [2, 3]. Due to the drawbacks of titanium implants, zirconium dioxide (zirconia, ZrO₂) implants were developed. These implants have a more favorable color when compared to Ti implants, as well as being biocompatible and having a lower affinity for bacterial plaque [4]. A study on the biological reaction of soft tissue to zirconia and titanium abutments discovered considerably increased blood flow in free gingival around zirconia abutments than titanium abutments [5]. Regardless of the design, it is widely known that titanium implants, in cases with a thin peri-implant mucosa or recession, may result in a dull greyish background of the soft tissue [6].

The gold standard material for dental implant fabrication has

been medical-grade commercially pure titanium or titanium alloy for more than forty years. The clinical outcome of titanium implants showed survival rates of 97.2 percent for implants supporting single crowns and 96.4% for implants supporting fixed-dental-prostheses (FDPs) after five years [7]. Aniruddh Menon, International Journal of Current Research July of 2017 shows Ninety clinicians in all took part in this study. There were 25 female practitioners and 65 male practitioners in all. Prosthodontists and implantologists made up 55 of the total participants, with general dentists making up the remaining 35. In terms of sample size and participant selection, the study's results differed from those of previous investigations. When the replies were compared to the key, over sixty percent of the participants received a score of fifty percent or above [8]. Based on the limited number of studies on this subject, particularly in Saudi Arabia, titanium's main drawback is its dark grayish color, which frequently shows through the epithelium and is less aesthetically pleasing when there is a thin mucosa present. Gingival recession may result in this, which is more concerning for maxillary-central-incisors. Novel implant methods that create ceramic implants are being developed as a result of these drawbacks [9].

This study aims to assess the knowledge, attitude, and practice level of Zirconia implants on periodontal health among Dentists in KSA.

Materials and Methods

Study design

This study was a cross-sectional questionnaire survey, based on a structured questionnaire, conducted in KSA.

Study setting: Participants, recruitment, and sampling procedure

Cross-sectional questionnaire survey, studies population consisted of undergraduate dental students from all five years of dentistry and dentistry in KSA.

Inclusion and exclusion criteria

This study includes dental students, dental internship students, and general practitioners in Saudi Arabia. The people who are non-dentistry students or dentists outside Saudi Arabia will be excluded.

Sample size

The population size was done by using the statistical sample size formula=

$$\frac{(z)^2 \times p(1-p) / e^2}{1 + (z^2 \times p(1-p)) / e^2N} \tag{1}$$

N = population size, e = Margin of error (percentage in decimal form), z = z-score (SurveyMonkey, 2022), and p = sample proportion.

Method for data collection and instrument (Data collection Technique and tools)

Cross-sectional questionnaire, online. A structured questionnaire was used as a study tool. This tool was developed after consulting relevant studies conducted in Saudi Arabia. The survey instrument was a self-administered anonymous questionnaire in English, containing questions. The final version of the questionnaire consisted of 49 classifieds into main four sections. Section one contained socioeconomic background characteristics questions. The second section includes questions on implant knowledge. The third and fourth part asked questions on Attitude and practice. Data collection was done in the form of the participant's responses to the questions for the Target group (dental students, interns' doctors, and specialists in dentistry in KSA).

Analyzes and entry method

The PC was used to enter data using the "Microsoft Office Excel Software" (2016) Windows software. The Statistical Package of Social Science Software (SPSS) application was then used to import the data and perform statistical analysis. We analyzed terms from the collected data using a term map that we visualized.

Results and Discussion

Table 1 shows socio-demographic characteristics of the participants. About 762 individuals participated in this study. Among the participants (62.1%) were females. About (48%) of the studied participants were in the age category of (22-25) years old. The majority of them (83.7%) were of Saudi nationality. As regards educational level more than half of them (56.8%) were students. Also (24.3%) of them had less than 5 years of experience. Also (8.5%), (3.7%) had (5-10 years) and (10-15 years) of experience in dentistry respectively.

Table 1. Socio-demographic-characteristics of the Participants (No= 762)

Variables	Frequency Percentage		
	(No)	(%)	
Age	18 - 21	148	19.4
	22 - 25	366	48
	26- 30	159	20.9
	31-36	58	7.6
	> 36	31	4.1
Gender	Male	289	37.9
	Female	473	62.1
Region	Central Region	269	35.3
	Eastern Region	71	9.3
	Northern region	116	15.2
	Southern region	188	24.7
	Western Region	118	15.5
Nationality	Saudi	638	83.7
	Non Saudi	124	16.3
Marital status	Single	556	73.0
	Married	144	18.9
	Divorced	37	4.9
	Widowed	25	3.3
Educational level	Student	433	56.8
	Specialist	44	5.8
	Internship	132	17.3
	General practice	153	20.1
Year of experience in dentistry	Student	441	57.9
	Less than 5 years	185	24.3
	5-10 years	65	8.5
	10-15 years	28	3.7

15-20 years	21	2.8
Above 20 years	22	2.9

Table 2 Shows Participant’s knowledge, attitudes, and practices regarding zirconia and titanium implants on periodontal health. More than half of the participants (58.3%) reported that (patients with a history of peri-implantitis, Patients with metal allergies, and anterior esthetic zone cases) were the main indications of using zirconia implants. The majority of them (81.6 %) agreed that corrosion is considered one of the significant drawbacks of the metal. Also, (77.4%) and (74.1%) of them agreed that Zirconia implants can provide a protective effect against inflammation and less susceptible to Peri-implantitis. (36.6 %) stated that marginal bone loss more in Zirconia implants.

when they were asked which implant can decrease the stress peak in the peri-implant (56.3%) answered Zirconia implant. Additionally (79.4%) said that the zirconia implant has better esthetics compared to titanium. About (30.8%) revealed that the implant body was the part to which more bacteria can adhere. (58.1%) stated that bacterial viability is greater on titanium abutments. About half of them (50.7%) said that Porphyromonas gingivalis was the type of bacteria that plays a major role in adhering to the implant surface. Nearly (35%) of them said that Bacterial viability is greater on the zirconium abutments with *S. sanguinis* than on titanium abutments with *P. gingivalis*. When asked about the difference between the disk and cylinders (38.1%) said that no clear difference was observed. (38.7%) reported that the Zirconium implant was superior in Osseointegration however (32.3%) thought that Titanium and Zirconium implants were the same in Osseointegration.

Table 2. Distribution of Participants according to their answers about Knowledge, attitudes, and practice regarding zirconia and titanium implants on periodontal health

Variables	Answer	No (%) (No=762) (100%)
1) what is the main indication of using zirconia implant	Patients with a history of peri-implantitis	30 (3.9)
	Patients with metal allergies	98 (12.9)
	Anterior esthetic zone cases	190 (24.9)
	All of the above	444 (58.3)
2) one of the significant drawbacks of the metal is corrosion	Agree	622 (81.6)
	Disagree	140 (18.4)
3) Osseointegration of zirconia and titanium implants are similar are influenced by microstructure and the treatment of the surface	Agree	577 (75.7)
	Disagree	185 (24.3)
4) Zirconia implant can provide a protective effect against inflammation	Agree	590 (77.4)
	Disagree	172 (22.6)
5) zirconia implant seems to be less susceptible to peri-implantitis than titanium implants	Agree	565 (74.1)
	Disagree	197 (25.9)
6) Titanium particles are potentially harmful to the peri-implant tissue	Agree	522 (68.5)
	Disagree	240 (31.5)
7) Marginal bone loss more in:	Zirconia implant	279 (36.6)
	Titanium implant	227 (29.8)
	Both	256 (33.6)
8) Survival rate is more in:	Zirconia implant	334 (43.8)
	Titanium implant	206 (27)
	Both	222 (29.1)
9) which implant can decrease the stress peak in the peri-implant bone	Zirconia implant	429 (56.3)

	Titanium implant	333 (43.7)
10) Is there a difference in the health of the soft tissues adjacent to the ZrZrO2 and Ti abutment	Yes	599 (78.6)
	No	163 (21.4)
11) Does the plaque formation around the zirconia implant have limited compared to the titanium implant	Yes	575 (75.5)
	No	187 (24.5)
12) Does a zirconia implant have better esthetics compared to a titanium implant	Yes	605 (79.4)
	No	157 (20.6)
13) which one of the following has good marginal bone preservation	Titanium implant	355 (46.6)
	Zirconia implant	407 (53.4)
14) Does the Zirconia implant have higher biocompatible compared to titanium	Yes	588 (77.2)
	No	174 (22.8)
15) Is there a difference in Osseointegration between titanium implants and Zirconia implants	Yes	581 (76.2)
	No	181 (23.8)
16) Is the amount of probing depth similar in Titanium implant and Zirconia implant	Yes	550 (72.2)
	No	212 (27.8)
17) Is the color of the peri-implant mucosa similar to Titanium and Zirconia implant	Yes	515 (67.6)
	No	247 (32.4)
18) Is the amount of bleeding on probing is similar in Titanium implant and Zirconia implant	Yes	546 (71.7)
	No	216 (28.3)
19) Do you know the methods of investing in osteointegration	Yes	499 (65.5)
	No	263 (34.5)
20) Do you know that mucosal barriers around the implant defend against bacteria invading areas between the oral cavity and bone	Yes	577 (75.7)
	No	185 (24.3)
21) which one do you think of the following implant material type the bacteria will adhere more in its surface	Zirconium implant	188 (24.7)
	Titanium implant	193 (25.3)
	Both can bacteria adhere on it is surface	381 (50)
22) of A. actinomycetemcomitans and P gingival is around the implant surface	Yes	541 (71)
	No	221 (29)
23) which part of the implant do you think more bacteria can adhere	Abutment	185 (24.3)
	Fixation scow	191 (25.1)
	Implant body	235 (30.8)
	Implant crown	151 (19.8)
24) Do You think bacterial viability is greater on which of the following	Titanium abutment	443 (58.1)
	Zirconium abutment	319 (41.9)
25) What do you think about bacterial adhering is greater on which of the following	Titanium abutment	404 (53)
	Zirconium abutment	358 (47)
26) Do you think what type of bacteria play a major role in adhering to the implant surface	Porphyromonas gingivalis	386 (50.7)
	Streptococcus mutans	185 (24.3)

	Streptococcus sanguinis	191 (25.1)
27) which of the following do you think is more viability bacteria	Bacterial viability is greater on the titanium abutments with P. gingival than on the zirconium abutments with S. sanguinis)	242 (31.8)
	Bacterial viability is greater on the zirconium abutments with S. sanguinis than on titanium abutments with P. gingivalis	267 (35)
	I think both are the same	253(33.2)
28) which type and part of implant do you think more adhering bacteria can occur	Titanium abutment	196 (25.7)
	Titanium fixing screw	192 (25.2)
	Zirconium abutment	169(22.2)
	Zirconium fixing screw	205 (26.9)
29)From your point of view which one is the most important factor in determining implant treatment success	Available space	105 (13.8)
	Bone density	57 (7.5)
	Bone level/sufficiency	82 (10.8)
	Bone volume	52 (6.8)
	Implant size	150 (19.7)
	Osseo integration	316 (41.5)
30) do you think surface topography, chemistry, and micro roughness' play a role in the influence rate and quality of new tissue formation	Yes	639 (83.9)
	No	123 (16.1)
31) What do you think is the difference between the disk and cylinder specimens on the soft tissue treated with blasted HF or UV and blasted HF+UV	The control showed a slight scratch due to polishing	236 (31)
	Little damage due to machining	236 (31)
	No clear difference was observed	290 (38.1)
32) The probing depth of the implant will be different from the natural tooth how; much do you think will be the difference	The depth probing will be $P<.05$	254 (33.3)
	The depth probing will be $P=1$	176 (23.1)
	The depth probing will be $P>0.5$	332 (43.6)
33) what do you think is more significant of the color parameter in the following implant	Titanium implant	204 (26.8)
	Zirconium implant	345 (45.3)
	Both same	213 (28)
34) Which one is more superior do you think for Osseointegration	Titanium implant	221 (29)
	Zirconium implant	295 (38.7)
	Both same	246 (32.3)
35) Which one do you think is faster in the initial Osseointegration	Titanium implant	191(25.1)
	Zirconium implant	341(44.8)
	Both same	230(30.2)
36) Which one do you think shows significant best and highest level in the early months of the procedure	Titanium implant	173 (22.7)
	Zirconium implant	336 (44.1)
	Both same	253 (33.2)

37) Do you think any differences were found at 12 months after the procedure in zirconia implant in the probing depth	Yes	564(74)
	No	198 (29)
38) what do you think is more presence of remodeling and or inflammation phenomena around the implant in which material	Titanium implant	276 (36.2)
	Zirconium implant	298 (39.1)
	Both same	188 (24.7)
39) do you agree with this part there are several factors such as (there are several factors, such as manufacturing difficulties and surface modification, ideal material-stabilizer combination, long-term surface stability, selection of restorative material, and clinical experience have all contributed to the limited implementation of zirconia	Yes	614 (80.6)
	No	148 (19.4)

As shown in **Table 3**, shows the distribution of participants according to their opinion about the cause of using zirconia implants. About (22.5%) said aesthetic reasons. Additionally (12.1%) said that (Aesthetic reason and patient with a history of periodontitis/peri-implantitis). Nearly (9.5%) stated that zirconia has better performance against bacterial challenges. Moreover (37.3%) said that the cause to prefer using a zirconia implant was all of the previously mentioned causes i.e. (Aesthetic reasons, Patient with a history of periodontitis/peri-implantitis, Zirconia has better performance against bacterial challenges, Zirconia have less susceptible to peri-implantitis and Zirconia has better Osseointegration)

Table 3. Distribution of Participants according to their opinion about the cause of using zirconia implant

cause of using a zirconia implant	No (%)
Aesthetic reason	172 (22.5)
Aesthetic reason and Patient with a history of periodontitis/peri-implantitis	92 (12.1)
Patient with a history of periodontitis/peri-implantitis	76 (10)
Zirconia has better performance against bacterial challenges	73 (9.5)
Zirconia are less susceptible to peri-implantitis	18 (2.4)
All of the above	284 (37.3)
Zirconia has better Osseointegration	47 (6.2)

As illustrated in **Table 4** shows relation between educational level and knowledge about zirconia & titanium implants on periodontal health among Participants. There is a statistically significant difference between education level and knowledge when asking participants about their opinion as regard the following: one of the significant drawbacks of the metal is corrosion, osteo-integration of zirconia and titanium implants are similar, zirconia implant seems to be less susceptible to Peri-implantitis, and if zirconia implant has higher biocompatible compare to titanium. (P-value < .05)

Table 4. Relation between educational level and knowledge about zirconia & titanium implants on periodontal health among Participants

Variable	Educational level				P-value*
	General practice (153) (20.1%) (No.) (%)	Internship (132) (17.3%) (No.) (%)	Specialist (44) (5.8%) (No.) (%)	Student (433) (56.8%) (No.) (%)	
One of the significant drawbacks of the metal is corrosion					
Agree	114 (15)	95 (12.5)	29 (3.8)	384 (50.4)	< .001
Disagree	39 (5.1)	37 (4.9)	15 (2)	49 (6.4)	
Osseointegration of zirconia and titanium implants are similar					
Agree	101 (13.3)	92 (12.1)	25 (3.3)	359 (47.1)	< .001
Disagree	52 (6.8)	40 (5.2)	19 (2.5)	74 (9.7)	
Zirconia implant seems to be less susceptible to Peri-implantitis.					
Agree	96 (12.6)	93 (12.2)	25 (3.3)	351 (46.1)	< .001
Disagree	57 (7.5)	39 (5.1)	19 (2.5)	82 (10.8)	
Does zirconia implant have better esthetics compared to titanium?					
Yes	118 (15.5)	97 (12.7)	36 (4.7)	354 (46.5)	.177
No	35 (4.6)	35 (4.6)	8 (1)	79 (10.4)	
Does the Zirconia implant have higher biocompatible compared to titanium?					
Yes	101 (13.3)	93 (12.2)	30 (3.9)	364 (47.8)	< .001
No	52 (6.8)	39 (5.1)	14 (1.8)	69 (9.1)	
Do you know the methods of investing in Osseointegration?					
Yes	99 (13)	88 (11.5)	26 (3.4)	286 (37.5)	.806
No	54 (7.1)	44 (5.8)	18 (2.4)	147 (19.3)	

Table 5 shows the relation between the years of experience in dentistry and knowledge about zirconia & titanium implants on periodontal health among Participants. There is a statistically significant difference between year of experience in dentistry and knowledge when asking participants about their opinion as regard the following: one of the significant drawbacks of the metal is corrosion, osteo-integration of zirconia and titanium implants are similar, zirconia implant seems to be less susceptible to Peri-implantitis and if zirconia implant has better esthetics and higher biocompatible compare to titanium. (P-value < .05).

Table 5. Relation between years of experience in dentistry and knowledge about zirconia & titanium implants on periodontal health among Participants

Variable	Years of experience in dentistry				Student (441)	<5 (185)	P-value *
	10-15 (28)	15-20 (21)	5-10 (65)	> 20 (22)			
	(3.7%) (No.) (%)	(2.8%) (No.) (%)	(8.5%) (No.) (%)	(2.9%) (No.) (%)			
one of the significant drawbacks of the metal is corrosion							
Agree	21(2.8)	13(1.7)	40(5.2)	12(1.6)	395 (51.8)	141 (18.5)	.001
Disagree	7(0.9)	8(1)	25(3.3)	10(1.3)	46(6)	44 (5.8)	>
Osseointegration of zirconia and titanium implants is similar							
Agree	14(1.8)	13(1.7)	39(5.1)	11(1.4)	376 (49.3)	124 (16.3)	.001
Disagree	14(1.8)	8(1.0)	26(3.4)	11(1.4)	65(8.5)	61(8)	>
Zirconia implant seems to be less susceptible to Peri-implantitis.							
Agree	18 (2.4)	11 (1.4)	38 (5)	13 (1.7)	368 (48.3)	117 (15.4)	.001
Disagree	10 (1.3)	10 (1.3)	27 (1.3)	9 (1.2)	73 (9.6)	68 (8.9)	>
Does zirconia implant have better esthetics compared to titanium?							
Yes	20 (2.6)	15 (2)	47 (6.2)	14 (1.8)	370 (48.6)	139 (18.2)	.01
No	8 (1)	6 (0.8)	18 (2.4)	8 (1)	71 (9.3)	46 (6)	>
Does the Zirconia implant have higher biocompatible compared to titanium?							
Yes	19 (2.5)	17 (2.2)	48 (6.3)	12 (1.6)	368 (48.3)	124 (16.3)	.001
No	9 (1.2)	4 (0.5)	17 (2.2)	10 (1.3)	73 (9.6)	61 (8)	>
Do you know the methods of investing in Osseointegration?							
Yes	18 (2.4)	11 (1.4)	38 (5)	15 (2)	300 (39.4)	117 (15.4)	.44
No							4

No	10 (1.3)	10 (1.3)	27 (3.5)	7 (0.9)	141 (18.5)	68 (8.9)
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A dental implant is a prosthetic tooth that is surgically implanted into the jaw to replace a missing tooth. Teeth can be lost as a result of trauma, periodontal disease, infections, malignancies, and abnormalities in development [10].

Originally employed to repair fully edentulous arches, they demonstrated enhanced complete denture retention, stability, and functional efficacy in addition to enhancing patient satisfaction [11]. Long-term, multicenter trials showed that single tooth replacements and partly edentulous arches had good survival rates. Although commercially pure titanium is the most commonly utilized material in implant dentistry, researchers have been looking for substitutes for this material for many years. Since more and more patients and dentists tend to choose metal-free options, yttria-stabilized zirconia does seem to suit all requirements [12]. Patients' increasing worries regarding titanium sensitivities, allergies, or intolerance are the driving force behind this movement, notwithstanding the paucity of research suggesting that these characteristics may be clinically significant [13].

It has been documented that titanium particles induce peri-implant tissue degenerative alterations when they are phagocytosed by neutrophils and macrophages that have been activated as a component of the biological response [14]. While recent study evidence has indicated that titanium particles may induce inflammatory responses in the tissue around implants, concrete proof of a cause-and-effect link has not yet been presented [15]. It is still up for dispute whether immunological responses comparable to those caused by titanium implants may occur from zirconia implants or not. Restorations in the aesthetic zone provide another problem. Here, titanium implants may cause tissue discoloration in locations where there is localized bone loss, particularly in individuals with a thin gingival biotype [16]. Because zirconia implants resemble teeth and have the added benefit of less bacterial and plaque adherence, they may be appropriate in certain circumstances. The macro- and microscopic surface features of early zirconia implants led to poor Osseo-integration and removal torques, and their fracture rates were excessively high [17]. Manufacturers appear to have addressed these problems in light of recent advancements in fracture tolerance, flexural strength, and hardness, and they now advise zirconia implants to be used in surgical and restorative procedures similarly to those used with titanium implants [14].

This study aims to assess the knowledge, attitude, and practice level of Zirconia and titanium implants on periodontal health among Dentists in KSA.

Regarding participant's knowledge, attitudes, and practices about zirconia and titanium implants on periodontal health. We have found that more than half of the participants

(58.3%), reported that (patients with a history of peri-implantitis, patients with metal allergies, and anterior esthetic zone cases) were the main indications of using zirconia implants. The majority of participants (81.6 %) agreed that corrosion is considered one of the significant drawbacks of the metal. Also, (77.4%) and (74.1%) of them agreed that Zirconia implants can provide a protective effect against inflammation and less susceptible to peri-implantitis respectively. (36.6 %) stated that marginal bone loss is more common in Zirconia implants. when they were asked which implant could decrease the stress peak in peri-implantitis, the Zirconia implant was selected by 56.3% of respondents, defying the literature's assertion that the two materials had identical stress distribution characteristics. Additionally (79.4%) said that zirconia implant has better esthetics compared to titanium which follows the literature. Also (38.7%) reported that the Zirconium implant was superior in Osseointegration however (32.3%) thought that Titanium and Zirconium implants were the same in Osseointegration which follows the literature. In another study conducted in Saudi Arabia [18], to evaluate the knowledge of dental practitioners towards periodontal complications, When asked which material was more biocompatible than the other, the most common response was that they are both biocompatible, while the second-highest response was that titanium is more biocompatible. This response deviates from published research, which suggests that zirconia implants exhibit superior biocompatibility and gingival-tissue-response in comparison to titanium implants [19].

When asked about the materials' osteointegration, the most common response was that titanium had superior osteointegration, followed by the statement that both materials had the same osteointegration. However, literature claims that both materials have the same osteointegration, with zirconia being on par with titanium [20]. In addition, when quizzed about the distribution of stress, the most common response was "I Don't Know," accounting for 43% of the total. The second most common response was that Zirconia had more stress surrounding the implant than Titanium, which defies the literature since it states that both materials have the same properties regarding stress distribution. However, the incorrect response may have resulted from confusing stress distribution with resistance to shear forces, since the most common response for the material with the lowest resistance to shear forces was Zirconia implants, which matches the literature [21].

In line with the results reported in the literature, titanium implants were the most frequently mentioned solution for increased bone growth and density, while zirconia implants were the most frequently mentioned solution for decreased bacterial colonization [22]. A further investigation was carried out by the American Academy of Maxillofacial Prosthetics (AAMP) and the American College of Prosthodontists (ACP) to determine the most often used implant in practice and during training, as well as to assess general restorative preference and understanding of the

various material prosperities. The brand of implants that participants most frequently chose for usage in all areas of the oral cavity—between 34 percent and 39 percent, depending on the location—was Nobel Biocare, which was also used during the majority of respondents' training (79 percent) sessions. Preferences for abutments differed by area: prefabricated-titanium abutments were favored for premolars and molar locations, while custom-milled zirconia abutments were more common for incisors and canines (29 percent) and very esthetic places (53%) [23].

Few research have examined zirconia implants' long-term survival as well as their biological and cosmetic qualities, according to the literature study [24]. According to Oliva *et al.* [25], When divided down by roughness, the total success rate of 100 zirconia-implants is 98 percent [26] also observed stability of the peri-implant marginal bone level in post extractive zirconia implants positioned at the level of the upper first premolar during two years of follow-up.

Conclusion

The dental practitioners have adequate knowledge regarding the overall properties of Titanium implants and Zirconia implants, (81.6 %) agreed that corrosion is considered one of the significant drawbacks of the metal. Also, (77.4%) and (74.1%) of them agreed that Zirconia implants can provide a protective effect against inflammation and less susceptible to peri-implantitis respectively. It's advised for dental practitioners who feel some inadequacy in their dental implant knowledge to participate in some official implant training to improve their knowledge on the topic of implant materials.

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