

Knowledge and Attitude of Iranian Dentists towards Peri-implant Diseases

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Abstract

Background. Despite successful results of implant therapy, complications occasionally occur in challenging situations. Apart from academic courses for implantology, dental associations also offer training courses for general practitioners. We sought to assess dentists' attitude towards peri-implant diseases.

Methods. The subjects in this questionnaire-based cross-sectional study consisted of dentists participating in the annual congress of the Iranian Dental Association in 2013, whose knowledge and attitudes towards peri-implant diseases were assessed using a five-section questionnaire (implant therapy training, peri-implant soft tissue assessment, peri-implant diseases and treatment planning for peri-implant diseases). Data were analyzed with SPSS 22, using descriptive and analytical methods.

Results. The results showed that due to extensive placement of implants and high prevalence of complications, academic and organized training courses are essential.

Conclusion. The results showed that due to extensive placement of implants and high prevalence of complications, academic and organized training courses are essential.

Key words: Attitude, dentists, implant therapy, knowledge, peri-implantitis.

Introduction

Tooth replacement is performed to restore soft tissue and periodontal integrity as well as aesthetics.¹ Healthy peri-implant soft tissues are essential for successful implant therapy. Dental implants have been used as an appropriate replacement for teeth in many situations.^{2,3} Despite successful results in implant therapy, complications occasionally occur

in challenging situations.⁴

Although other substitution techniques for tooth replacement are still used, general information and knowledge about implants is growing. Therefore, training in implant therapy, complications and related morbidity is essential.^{5,6} The Association for Dental Education in Europe (ADEE) published guidelines for curriculum unification in dental education. They suggested that all graduate dentists

should know the indications, contraindications and surgical techniques for implant installations, osseointegration, diagnosis of peri-implant pathology (such as peri-implantitis) and fundamentals of restorative prosthetic implant therapy.⁷⁻¹¹ Knowledge about the important factors that determine the success and failure of treatment can improve the outcomes.¹²

Bacterial infection and inflammation of the surrounding tissues are the most common causes of implant failure. In a five-year period, 14.4% of implants placed showed inflammation, and variable amounts of bone loss were noted around implants.¹² According to the proceedings of the Sixth Workshop of the European Periodontology Association in 2008, peri-implantitis has a prevalence of 28–56%.¹³ Long-term prognosis of dental implants can be influenced by peri-implantitis and peri-implant mucositis.¹³ Mattheos et al¹⁴ in 2012 demonstrated significant differences in the management of these conditions by British periodontologists compared to Australian periodontologists. In 2008, Blum et al in their questionnaire-based study indicated that all the dental schools in England had dental implantology courses at the undergraduate level with variable content and delivery methods. Modern dental education methods focus on training qualified undergraduate and post-graduate students. The impact of implantology education on treatment and management of complications during and post-implant therapy has been discussed in several studies.^{15,16} Due to the impact of tooth replacement on the quality of life in partially and fully edentulous patients, dentists' knowledge and perception about inflammation in the implant surrounding tissues, its prevention, assessment and treatment play an important role in achieving successful results and satisfying patients. Holding implantology training courses can enhance the level of knowledge of dentists in this regard. Nowadays in Iran, like many other countries, placement of dental implants is growing and in addition to academic courses for implantology training, dental associations also offer training courses for general practitioners. In the present study, we sought to assess the dentists' attitude towards peri-implant diseases in 2013.

Methods

Participants

This cross-sectional study was conducted on dentists attending the 52nd annual congress of the Iranian Dental Association in 2013 to assess the knowledge and attitudes of dentists and specialists towards peri-

implantitis. Two hundred questionnaires were distributed among the participants.

Measures

In this questionnaire-based survey, we designed a five-section questionnaire to assess: 1) demographic data of subjects with five questions; 2) implant therapy education with four questions; 3) knowledge about soft tissue assessment before implant placement with six questions; 4) knowledge about peri-implant complications with six questions; and 5) knowledge about the treatment plan with three questions.

Validity

Face validity of the questionnaire was assessed qualitatively by asking 10 post-graduate students to determine and rate the difficulty level, ambiguity and relevance of the questions as written. Content validity was also evaluated qualitatively by asking five specialists to express their opinion regarding the questions. They evaluated grammatical considerations, use of appropriate words, question arrangement and filling time. Corrections were made based on their opinions and the content validity ratio (CVR) was calculated to assess the content validity index (CVI). To calculate CVR, 11 specialists rated each question as 'necessary', 'useful but not necessary' or 'not necessary'. After score calculation, CVR was compared to Lawshe's table (17) and questions that scored >0.59 were accepted for inclusion in the questionnaire. Then, CVI was assessed according to Waltz and Basel¹⁸ content validity index. For this purpose, five specialists analyzed the questions in terms of specificity, simplicity, fluency and clarity using a four-point Likert scale (i.e. 1= irrelevant, 2= almost relevant, 3= relevant and 4= totally relevant). All the questions which gained a score >0.75 were accepted for inclusion in the questionnaire.¹⁹

Statistical analyses

Data were analyzed with SPSS 22.0. Descriptive (frequency distribution) and analytical analyses (Mann-Whitney, Pearson's correlation coefficient, chi-squared and Kruskal-Wallis tests) were applied and a P-value of <0.05 was considered significant.

Results

A total of 123 questionnaires were completed and returned (response rate=61.5%). Among 123 volunteers, 88 (71.5%) were males and 35 (28.5%) were females; 55.3% were general practitioners and 44.7% were specialists. Age range was 24–62 years and

range of clinical practice experience was 1–35 years. Participants' responses to questions are summarized in Tables 1 to 4. In calculation of scores for detection of peri-implant disease by nine Likert-type questions (1 was the lowest and 5 was the highest score), 17.1% of participants chose red gingiva as the first sign. The next criterion based on the participants' response was loss of keratinized tissue (73.2%). Hypersensitivity on percussion was the third (31.7%), bone loss (28.5%) was the fourth and implant hypermobility was the fifth sign (23.6%). In calculation of scores for important predisposing factors for peri-implantitis by eight questions, 32.5% of the participants selected genetic predisposition as the first cause. The next factor was implant system (28.5%); complexity of implant therapy (such as sinus elevation or placement of bone substitutes) (25.5%) was the third; and oral hygiene (22%) was

the fourth factor.

Comparison of specialists (prosthodontists, periodontists, and oral and maxillofacial surgeons) with general practitioners in terms of the implantology skills revealed significant differences in knowledge about implant surgery and restoration installation in the office (P=0.001), peri-implantitis classifications (P=0.01), differentiating peri-implantitis from peri-implant mucositis (P=0.04), initiating mechanisms in peri-implantitis and periodontitis (P=0.001) and progression of peri-implantitis and periodontitis (P=0.03).

Discussion

We did not find any study in Iran that investigated knowledge and attitudes of Iranian dentists towards peri-implant disease, its diagnosis and appropriate treatment. Therefore, more extensive studies are

Table 1. Participants' responses in "implant therapy training" section.

Questions	Answer Choices	Frequency (%)
Implant therapy course attendance	Yes	114(97)
	No	4(3.3)
Training course provider	No idea	5(4)
	Academic organization	76(61.8)
	Short training course	23(18.7)
	Moderate training course	21(17.1)
	Commercial courses	2(1.6)
Optimal efficacy of the training courses on peri-implantitis	Don't know	1(0.8)
	Totally agree	53(43.1)
	Agree	55(44.7)
	Disagree	14(11.4)
	Totally disagree	1(0.8)
Demand for especial and advanced courses on treatment of peri-implantitis	Totally agree	72(58.5)
	Agree	44(35.8)
	Disagree	6(4.9)
	Totally disagree	1(0.8)

Table 2 Participants' responses in "peri-implant soft tissue assessment" section.

Questions	Answer Choices	Frequency (%)
Demand for especial instrument for detection of peri-implantitis	Totally agree	70(56.9)
	Agree	36(29.3)
	Disagree	9(7.3)
	Totally disagree	3(2.4)
Suggestion about suitable instrument for cleaning the implant surface	No idea	5(4.1)
	Plastic curette	89(72.4)
	Titanium curette	23(18.7)
	Stainless steel curette	3(2.4)
Peri-implant soft tissue assessment in the office	No curette	8(6.5)
	Yes	119(96.7)
	No	3 (2.4)
	No idea	1(0.8)
Instrument(s) for assessment and management of peri-implantitis	Stain less steel probe	46 (37.4)
	Plastic probe- Stainless steel probe	3 (2.4)
	Plastic probe	56 (45.5)
	Plastic curette-Plastic probe	1(0.8)
	Titanium curette -Plastic probe	1(0.8)
	Implant cleaning brush-Plastic probe	3 (2.4)
Frequency of complications you have faced (failure/inflammatory diseases)	Diluted hydrogen peroxide-Plastic probe	3 (2.4)
	Titanium curette	2 (1.6)
	Reported range	General practitioners mentioned 1 to 70 cases and specialists mentioned 100 to 400 cases
	No response	1(0.8)

Table 3. Participants' responses in "peri-implant diseases" section.

Questions	Choices	Frequency (%)
Differentiating peri-implant mucositis from peri-implantitis	Yes	71(57.7)
	No	49(39.8)
	No idea	3(2.4)
Difference in initiating mechanisms of periodontitis and peri-implantitis	Yes	53(43.1)
	No	68(55.3)
	No idea	2(1.6)
Difference in progression time of periodontitis and peri-implantitis	Yes	79(64.2)
	No	40(32.5)
	No idea	4(3.2)
Peri-implantitis classification(s)	One	48(39)
	Two	25(20.4)
	Three	34(27.6)
	More than three	16(13)

Table 4. Participants' responses in "treatment plan for peri-implant diseases" section.

Questions	Answer Choices	Frequency (%)
Recall frequency for patients who received dental implants	Every 1-2 months	12(9.8)
	Every 3-4 months	30(24.4)
	Every 1-6 months in the first year, once a year thereafter	71(57.7)
	Annually	9(7.3)
	No idea	1(0.8)
	<i>Azithromycin (highest frequency of first choice)</i>	26(21.1)
Suitable antibiotic for peri-implantitis treatment (Most effective: 1, least effective: 5)	Ciprofloxacin (highest frequency of second choice)	24(19.5)
	<i>Doxycycline</i> (highest frequency of third choice)	26(21.1)
	Amoxicillin- Metronidazole (highest frequency of fourth choice)	27(22)
	Amoxicillin- Metronidazole (highest frequency of fifth choice)	69(56.1)
	Laser	45(36.6)
Note a possible treatment plan for peri-implantitis	GBR*	25(20.3)
	Implant cleaning	42(34.1)
	No idea	11(9)

*Guided Bone Regeneration

needed in this field. The current study aimed to assess the knowledge and attitudes of Iranian dentists towards peri-implant diseases to evaluate the efficacy and impact of academic training courses. Moreover, we wanted to compare the knowledge level of general practitioners and specialists. There were significant differences between general practitioners and specialists in terms of knowledge about peri-implantitis classifications, differentiation of peri-implantitis from peri-implant mucositis, initiating mechanisms and progression rates in peri-implantitis and periodontitis ($P < 0.05$). Academic training as an important factor influenced the responses. Harrison et al¹⁵ in a questionnaire-based study conducted in an academic environment demonstrated that most patients were satisfied with implant therapy. They showed that treatments rendered in academic environments were mainly successful and emphasized that contemporary knowledge is necessary to improve the quality of implant therapy. In 2009, De Bruynet al¹⁶ conducted a questionnaire-based study among 73 specialists from 18 European countries. The results indicated that although undergraduate students spent 36 educa-

tional hours in the pre-clinic, only 5% of them participated in the whole therapy; 70% of them only participated in prosthetic treatment; and 53% of them assisted in surgery. General practitioners may be able to perform partial restorations combined with surgery in posterior parts of the jaws by additional training courses but more complex cases must be treated by specialists. It seems that academic courses for undergraduate students on implant therapy, its complications and diseases are insufficient. It is necessary to schedule and organize appropriate training courses to improve the academic curriculum in this field.

Bacterial infection and overloading are the two main known etiologic factors in peri-implantitis. Most of the participants (40.7%) in this study implicated poor oral hygiene and plaque accumulation to be the main etiologic factors in peri-implantitis. Microbial plaque and calculus accumulate faster, easier and in larger amounts on the surface of dental implants compared to natural teeth.²⁰ In 1996, Cochran²¹ demonstrated that plaque accumulation around dental implants causes inflammation in the surrounding tissues,

which can lead to peri-implantitis. Heitz-Mayfield et al²² in 2008 and Serino et al²³ in 2009 showed a significant correlation between oral and peri-implant hygiene and peri-implant diseases. Moreover, Steenberghe et al²⁴ in 1993 reported more plaque retention in unsuccessful implants compared to successful ones. Mattheos et al¹⁴ indicated that both English and Australian dentists believe that the microbial plaque is the main etiologic factor for peri-implantitis. However, English dentists have a tendency to implicate smoking and overloading as the main etiologic factors. To maintain a perfect oral hygiene, sufficient vestibular depth is needed. In accordance to this, Tawse-Smith et al²⁵ demonstrated difficult plaque control and poor oral hygiene in patients with extensive bone loss and implant-assisted mandibular dentures. One of the most frequently performed techniques for soft tissue augmentation in peri-implant sites is use of the apically-positioned flap.⁶⁻³⁰ Application of this method can increase keratinized tissue width and vestibular depth; the latter allows easier oral hygiene.

It is important to train dentists on how to correctly perform soft tissue and vestibular depth assessments before implant therapy. In addition, oral hygiene instructions to patients are imperative to prevent disease, increase dental implant survival and maintain a healthy periodontium. There are several methods for treatment of peri-implantitis; the etiologic factors such as dental plaque must be eliminated. In addition to mechanical plaque removal (by plastic curettes), chemical methods are also employed for plaque elimination such as systemic application of antibiotics (accessory method) to enhance postoperative healing.³¹ In our study, most participants (56.9%) agreed with the selection of appropriate instruments for treatment of peri-implantitis and 72.4% of the participants chose plastic curettes for cleaning implant surfaces. Moreover, 56.1% chose a combination of amoxicillin and metronidazole for antibiotic therapy. Application of lasers for peri-implantitis treatment is a new approach; 36.6% of participants believed that laser therapy is less important than guided bone regeneration and implant surface cleaning. Currently, Er:YAG laser, carbon dioxide laser and diode laser are used for implant surface preparation and elimination of bacteria with promising results.³²⁻³⁴ In conclusion, although the majority of participants had participated in implantology training courses, most of them believed that more workshops and courses are needed on diagnosis and treatment of peri-implantitis.

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