



Clinical and radiographic evaluation of implant in Iraq (A retrospective study)

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Abstract

Although favorable long-term results of implant therapy have been reported, complications as infections of peri-implant mucosa (Peri-implant mucositis) and deeper implant supporting tissues (Peri-implantitis) had been repeatedly reported. Studies regarding prevalence of peri-implant mucositis and peri-implantitis in our community are very rare because of the recent introduction of this new area of dental treatment to our country. So the aim of this study is to take an idea about the real state of implant dentistry in our community and to enrich the very poor base line data that available on this dental practice in Iraq. Sample of this research composed of 24 patients (13 Females & 11 Males). Their age range was (20-60 years). All of them had worn more than two implants for at least two years. Results of this research revealed that percentage of females' worn implants (54.17%) was greater than males (45.83%). Greater percentage of patients had worn implant for two years (45.83%) in comparison with other durations. Radiographic results revealed that there is no bone loss in most cases (66.67%) and in the remaining percentage horizontal bone loss (20.83%) was greater than vertical (12.5%). Clinical examination showed non significant differences between females and males for both Plaque Index (PLI) & Bleeding On Probing (BOP) scores.

Key words: Periimplantitis. Periimplant mucositis. Implant. Orthopantomogram . DSR.

Introduction

Dental implants have become an often used alternative to replace missing teeth, resulting in an increasing percentage of the adult population with implant supported prosthesis⁽¹⁾. Among the causes of the popular use of implants is their privilege over the traditional replacement of missing teeth with fixed or removable prostheses that may carry with their use dental, social, and psychological problems⁽²⁾. Although

favorable long-term results of implant therapy have been reported, complications as infections of peri-implant mucosa (Peri-implant mucositis) may be encountered. Moreover it is possible that some of these infections around implants develop slowly and that with time transformed to involve the deeper implant supporting tissues (Peri-implantitis) which is a complication that unfortunately may end with

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implant failure.

At the First European Workshop on Periodontology, Peri-implantitis was defined as an inflammatory process affecting the tissues around an osseointegrated implant, resulting in loss of supporting bone. On the other hand Peri-implant mucositis was defined as reversible inflammatory changes of the peri-implant soft tissues without any bone loss⁽³⁾.

The prevalence of peri-implant mucositis has been reported in the range of 8–44%^(4, 5, 6 and 7), while frequency of peri-implantitis has been reported in the range of 1–19%^(8, 9). The wide ranges for the frequencies seem to be due to differences in defining the two entities, at least in part. The frequency of peri-implantitis is most likely related to the number of years implants have been worn. Since dental implant treatment was introduced comparatively recently, the numbers will probably increase over the years⁽¹⁰⁾.

Studies of implant failure reveal two main causes of failure: infection and occlusal overload⁽¹¹⁾. It is well known that infection of peri implant tissues caused by microbial dental plaque. In more details, studies in man and animals have demonstrated that the gingiva and the Periimplant mucosa respond to de novo plaque formation with overt inflammation, e.g. increased migration of leukocytes through the junctional epithelium and the establishment of a leukocyte rich lesion in the connective tissue lateral to the junctional epithelium^(12, 13). The host response to biofilm formation on the implant includes a series of inflammatory reactions which initially occur in the soft tissue but which may subsequently progress and lead to loss of supporting bone. The tissue destruction in the bone compartment starts in the "marginal", i.e. neck region, of the implant and crater-like

bone defects develop and become visible in the radiograph⁽¹⁴⁾.

In regard to the second cause of implant failure, it was found that faster implant loading results in a decrease in discomfort for the patients compared with the long healing times in the delayed loading protocol. The local mechanical loading situation is believed to be a strong determinant in the processes of tissue differentiation and bone formation around implants. Early or immediate loading might offer the potential to stimulate osteogenic effects during implant healing under specific conditions⁽¹⁵⁾.

Pathogenic changes of peri-implant mucositis and peri-implantitis seems to be quite similar to gingivitis and periodontitis that occur around natural dentition. In other words, in a given individual, the early soft tissue response to plaque seems to be similar in the mucosa at implants and in the gingiva of natural teeth, and this principle found to be applicable when deeper supporting tissues were involved in the pathologic process when the case transformed into periodontitis in natural teeth or peri-implantitis in case of implant.

Both clinical and radiographic parameters are usually required for the examination and evaluation of periodontal health around natural teeth and dental implants as well. "Bleeding on probing" (BOP) represents a clinical parameter which is defined as the presence of bleeding noticed after the penetration of a periodontal probe into the periimplant sulcus or pocket using gentle force. Obviously, the size (point diameter) of the probe applied as well as the application force should be standardized. For teeth, the probing pressure for this parameter has been determined. In the healthy and normal periodontium, the probing force used is 0.25 N⁽¹⁶⁾. The same force is used in a healthy but periodontally reduced

dentition⁽¹⁷⁾. It is reasonable to use the same probing force for the determination of BOP around oral implants. Hence, standardized probes which produce standardized probing forces may be recommended. Other clinical parameters as gingival index (GI) and probing pocket depth may be used, but their results need to be documented by (BOP)⁽¹⁸⁾.

Conventional radiography is a widely applied technique in clinical practice in evaluating the bony structures adjacent to the implants, however, it should be noted that minor changes in bone morphology in the crestal area may not be revealed until they reach a significant size and shape⁽¹⁹⁾. Using of Orthopantomograms generally demand a correction factor of 1:1.3, while periapical dental exposures are to be evaluated with a factor of between 1:1.0 and 1:1.1 depending on exposure geometry and differences in radiographic set-ups and sites. On the other hand, for clinical research, Digital Subtraction Radiography (DSR) is highly recommended and has been successfully applied in longitudinal studies⁽²⁰⁾.

Studies regarding prevalence of peri-implant mucositis and peri-implantitis in our community are very rare because of the recent introduction of this new area of dental treatment at least on popular bases. So the aim of this study is to take an idea about the real state of implant dentistry in our community and to enrich the very poor base line data that available on this vital dental practice.

Material and method

Sample of this research composed of 24 patients (13 Females & 11 Males). Their age range was (20-60 years). All of them were healthy and had no history of systemic disease. All

of the patients had at least two implants for at least two years. The primary data on those patients were collected from their case sheets in the maxillofacial compartment in Al-Karkh surgical hospital in Baghdad. Then the selected patients were called for an evaluating visit in the same center after taking their permission to participate in this research. Clinical examination for plaque index (PLI) & bleeding on probing (BOP) were carried out by one of the researchers in the same hospital. The examinations were carried out on dental chair by using of sterilized examination sets including dental mirrors, tweezers and color coded (WHO) periodontal prop. The examiner was pass inter and intra examiner calibration test successfully to ensure an acceptable level of confidence in the recorded data. At the same day of the clinical examination, the required Orthopantomograms were taken for each patient by means of Dimax system. The collected data then analyzed using suitable statistical methods including SPSS- v.15 system for windows.

Results

Results of the present study showed that percentage of females' worn implants (54.17%) is greater than percentage of males (45.83%). Results also showed that most of patients in this research were in their fourth decade of age (33.33%) compared with (25%) for both fifth and sixth decade and only (16.67%) who were in their third decade. More details found in (Table 1).

In regard to implant duration, results of this research showed that total percentage of patient worn implants for two years was 45.83%. However the percentage of females (25%) seems to be slightly greater than percentage of males (20.83%). For

loner durations the results showed the following percentages: for three years it was (37.50%), for four years it was (8.33%) and for five & six years it was (4.17%) as shown in (Table2).

Radiographic screening of this study showed that there is no bone loss around the implants in most cases (66.67%). For the remaining percentage, it was found that horizontal bone loss represents a greater percentage (20.83%) when compared with vertical type of bone loss that occur in a smaller percentage (12.5%). On the other hand the percentages of both types of bone loss were found to be greater in males (12.5% & 8.33 %) than in females (8.33% & 4.17%). No oblique bone resorption was recorded in this study. (Table 3)

In the clinical examination, greater values of (PLI) were recorded for males (1.46) in comparison to females (1.25). And also greater values of (BOP) were recorded for males (0.45) than those recorded for females (0.27). Table (4)

In spite of the fact: that theses differences in bone resorption around implants were found to be greater in males than females, but they were non significant on statistical analysis for both measurements. (Table 5)

Discussion

In spite of the fact that the originally collected sample from patient case sheets was more than two hundreds, the ample size of this study may be relatively small in relation to its title. This can be explained by a lot of reasons include:

1. Very large number of the patients can not be reached either because they change their addresses or their phone numbers.
2. Some of patient refused to come for a recall visit because of the known unstable security situation.

3. Some of them did not agree to participate in this research.
4. Some of them agree but did not come to unknown causes.
5. Some of them had been excluded by the criteria of this research (mentioned in material and method).

This situation bring the researchers on making a decision to cancel the research, but they decide to go forth with it depending on the fact that something is more better than nothing especially when we know that such data on this vital subject was not available or very little in our country.

Majority of the patients wearing implants were in their forth decade of age may be logically explained because this age represent an intermediate period in which the number of extracted teeth were relatively small calling for replacement with implants rather than partial dentures or fixed bridges at least from cost point of view. On the other hand the greater percentage of females wearing implants can be easily explained as females drew more attention to their oral hygiene and cosmetic values than males.

Presence of bone loss around the implant is one of the most common findings of all studies carried out in this field. It is important to note that mean crestal bone loss around an implant decreases 0.9 to 1.6 during the first year of implant function but in the follow up period this range may decreases 0.5 to 0.13. Factors as implant design and its surface characteristics may influence the type and amount of this bone loss⁽¹⁴⁾. The greater percentage of horizontal bone loss than other types may be explained by the pathogenic pattern of progression of periodontal disease around the implant or due to one of the previously mentioned factors.

Although there is non significant differences in both clinical parameters (PLI&BOP) between females and males, but females had recorded lower means than males. This evidence can also be attributed to the greater concern of females to their oral health than males did.

The other important finding of this research is that it refers to the sharp shortage of information, base line data and studies regarding this important dental practice in our country. So it is strongly recommended to direct the researchers and post graduate students to enrich this area which may not represent the revolution in the art of missing teeth replacement alone, but it may represents the future of dentistry as whole.

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Table 1. Distribution of the population sample by age and gender

Age group (years)	Male		Female		Total	
	No	(%)	No	(%)	No	(%)
20-30	1	(04.17)	3	(12.50)	4	(16.67)
31-40	2	(08.33)	6	(25.00)	8	(33.33)
41-50	4	(16.67)	2	(08.33)	6	(25.00)
51-60	4	(16.67)	2	(08.33)	6	(25.00)
Total	11	(45.83)	13	(54.17)	24	(100)

Table 2. Distribution of the population sample by implant duration

Duration (years)	Male		Female		Total	
	No	(%)	No	(%)	No	(%)
> 2 yrs	5	(20.83)	6	(25.00)	11	(45.83)
2 - 3 yrs	4	(16.67)	5	(20.83)	9	(37.50)
3 - 4 yrs	1	(04.17)	1	(04.17)	2	(08.33)
4 - 5 yrs	1	(04.17)	0	(00.00)	1	(04.17)
5 - 6 yrs	0	(00.00)	1	(04.17)	1	(04.17)

Table 3. Distribution of the population sample by type of bone loss

Type of bone loss	Male		Female		Total	
	No	(%)	No	(%)	No	(%)
No bone loss	6	(25.00)	10	(41.66)	16	(66.67)
Horizontal	3	(12.50)	2	(08.33)	5	(20.83)
Vertical	2	(08.33)	1	(04.17)	3	(12.50)
Oblique	0	(00.00)	0	(00.00)	0	(00.00)

Table 4. Paired Samples Statistics of PLI & BOP

		Mean	N	Std. Deviation	Std. Error Mean
PLI	Female	1.2545	13	.35879	.10818
	Male	1.4636	11	.44333	.13367
BOP	Female	.2727	13	.46710	.14084
	Male	.4545	11	.52223	.15746

Table 5. Paired Samples Significant test of PLI & BOP

Pairs of comparison	Mean	Std. Deviation	Std. Error Mean	t	df	Sig.
PLI (Female- Male)	-.20909	.73818	.22257	-.939	10	.370 (NS)
BOP (Female- Male)	-.18182	.40452	.12197	-1.491	10	.167 (NS)

NS = Not significant

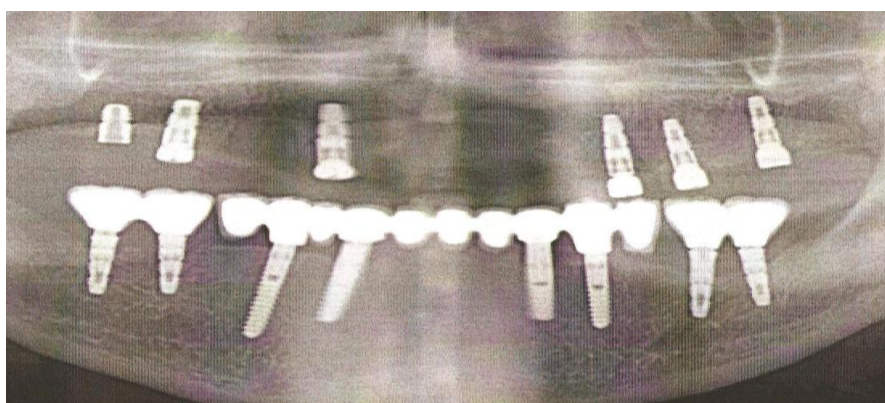


Fig (1) A case of multiple successful implants for more than three years



Fig (2) Early bone resorption around an implant replaced the missing right mandibular first premolar. Patient presented clinically with slight implant mobility.



Fig (3) Sever alveolar bone resorption around both implants. Patient presented clinically with sever implant mobility and periimplant abscess after two years of implantation