Evaluation of Peri-Implant Soft and Hard Tissues Around Dental Implants Placed at the Faculty of Dentistry, UiTM.

Mohd Faizal Hafez Hidayat[1], Nur Hafizah Kamar Affendi[1], Rosharina Azian Hasirin[1] and Wan Anis Sufiah Wan Mohd Noor[1]

[1]Faculty of Dentistry, Universiti Teknologi MARA, Sungai Buloh Campus, 47000 Sungai Buloh, Selangor, Malaysia

Background: This study is carried out to assess the soft and hard tissue conditions around dental implant cases at the Faculty of Dentistry Universiti Teknologi MARA (UiTM). **Methods:** Patients with dental implants of more than 6 months in function were recalled for clinical and radiographic evaluation. Probing pocket depth, suppuration, bleeding, recession and plaque index were clinically evaluated. Periapical radiograph (IOPA) were also taken. The data from the findings were statistically evaluated using SPSS program. **Result:** 14.3% of implants placed in consider healthy, 4.8% implants have clinical stability and 81% have peri-implant mucositis and none of the participants have peri-implantitis and severe peri-implantitis. **Conclusion:** Within the limitation of this study, it's concluded that the status of peri-implant tissues is mainly affected by gender, systemic disease, smoking status,oral hygiene and years of implants functioning in oral condition. In addition, age plays a significant role that contribute to periimplant health.

1. Introduction

The application of dental implant as part of prosthetic mouth rehabilitations has proven to be satisfactory restoration to fulfill patient's function and aesthetics, as well as its long-term survival(1). Nevertheless, even in successful osseointegration, dental implants can loss supportive bone that mainly due to local inflammation during the course of periimplant disease that can include two different entities: peri-implant mucositis and periimplantitis. (2) The prevalence of peri-implant diseases has not yet been presented with absolute values due to insufficient number of studies (3). The absence of this information may be attributed to the lack of standardization of the scientific methodology; as well as, to the different definitions for peri-implant diseases (3-5). Peri-implant mucositis is clinically described as the inflammation of the peri-implant mucosa without bone loss; being the most important clinical diagnosis the presence of bleeding on probing (BOP) (7). Peri-implantitis is associated with clinical characteristics of mucositis in combination with radiographic presence of bone loss (8,9). The numbers of implants placed in Malaysia is increasing, however studies done to evaluate the post treatment of periodontal tissue condition is lacking (6). Dental implants once placed, needs to be maintained in order avoid failures and complications. Maintenance is a decisive factor for obtaining success when implant is first inserted into the alveolar bone (10). It is therefore important to ensure that the periodontal tissues are healthy with no sign of inflammation, which can lead to peri-mucositis and peri-implantitis that contribute to the main goal of conducting this study (11).

2. Materials and method

Sample size was calculated using to be 29 participants in reference to the paper by Matarazzo 2018 (20). Ethical approval was obtained from the Ethical Committee of Universiti Teknologi MARA (UiTM) Shah Alam. Twenty-eight patients record that have implants placed in function for more than 6 months was obtained from Department of Implantology, Faculty of Dentistry, However, 11 out of 28 patients responded and have agreed to participate in the research. The procedures of the research were clearly explained to the patient and consent was taken to record the demographic details and clinical findings. Inter and intra examiner calibration was done by one supervisor and two researchers for the reliability of soft tissue evaluation. The clinical parameters assess include the probing pocket depth (PD), presence or absence of suppuration (SUP), presence or absence of bleeding upon probing (BOP), recession (R) and plaque index (PI) (5). Meanwhile, hard tissue was evaluated by observing the marginal bone level (MBL) with intraoral periapical radiograph (IOPA). Based on the clinical findings of the soft and hard tissues, each of the implants were categorized according to the description mentioned by *Matarazzo et al 2018*:

1.Peri-implant health: Absence of BoP/SUP, and MBL less than 2mm

2.Clinical Stability: Absence of BoP/SUP, and MBL more than 2mm

3.Peri-implant mucositis: Presence of BoP/SUP, and MBL less than 2mm

4. Peri-implantitis: Presence of BoP/SUP, and MBL more than 2mm

5. Severe Peri-implantitis: Presence of BoP/SUP, and MBL more than 3mm

Implants was further categorized into further classification include location in the maxilla or mandible, single, multiple, screw and cemented type of restoration. The result were analysed using the Statistical Program for Social Science (SPSS) version 25 using the Pearson chi-square was used to test the association between peri-implant diseases with independent variables such as age, smoking status and oral hygiene.

3. Results

Eleven out of 28 participants contacted have agreed to participate in the research. The genders are nearly equal with 5 males and 6 females participants varied from 32 to 60 years old. There are 3 participants who are smokers, 5 are non-smokers and 3 were ex-smokers. The medical status of the participants were recorded with 47.6% are fit and healthy, 42.9% have hypercholesterolemia, 9.5% have hypertension and none of the patients were diagnosed with diabetes. From 11 participants, a total of 21 implants have been evaluated because each individual participants may have several numbers of implants placed in the mouth from 1 to 4 implants with 45.5 % of the participant having only 1 implant, 36.4% have 2 implants, 9.1 % have 3 implants and lastly 9.1% have 4 implants placed. All of the implants evaluated are located at the posterior region, in which 65% from mandible and 35% from maxilla. From what we have observed, most of the patients have 70% screwed abutment and 30% are cemented. In this study, 60% of the dental implants are single retained abutments and 40% are multiple retained abutment implants. The periodontal status of dental implants evaluated were 14.3% were considered healthy, 4.8% of having clinical stability and the majority of the implants were with peri-implant mucositis (81.0%).

4. Discussion

Peri-implant mucositis is a common peri-implant disease occurred in implant patients in this study sample. There are many risk factors that are associated with peri-implant mucositis such as oral hygiene, smoking status, medical condition and gender (17). Oral hygiene is a very important factor that can affect various condition inside the oral cavity including the tissue condition surrounding the dental implant (17). Just like teeth, biofilm can accumulate at the surface of the implant. However, due to the rough surface of the implants, it is more favorable for the biofilm to accumulate compared to the surface of teeth. Hence, it is imperative for patients with dental implants to have exceptional oral hygiene by brushing specifically around dental implants to prevent the formation of oral biofilm. In our study, there is an association between plaque score and peri-implant health. Therefore, patient is advice for maintenance of oral hygiene by home care cleaning and regular follow up. Smoking is a common worldwide negative social behavior (19). It is known that smoking is a risk factor for various medical diseases and dental implants are no exception (18). According to Haas R et. al,1996 and Schwartz-Arad D et. al,2002, smoking has a strong influence on the complication rates of dental implants. Smokers with dental implants are more likely to have significant marginal bone loss after implant placement compare to non-smokers, it increases the incidence of peri-implantitis, deep mucosal pockets around dental implants, inflammation of the peri-implant mucosa, and increased resorption of peri-implant bone (13,14). In a study by Levin et al.,2008 current smokers demonstrated higher marginal bone loss during all time intervals than ex-smokers, but both demonstrated higher marginal bone loss than nonsmokers (15). Finally, Rinke et al. (2011) has conducted a retrospective cross-sectional study in which smoking is regarded as a risk indicator for peri-implant mucositis (16). However, in our study, there is no association between smoking and peri-implantitis mainly due to limited number of data collection. As for gender, Ferreira et al. (2006) demonstrated that the male gender could be considered as a risk indicator for peri-mucositis both in the single and the multiple regression analysis. (17). Thus, in our research there is an association between gender and peri-implant health. Age also have strong association that contribute to implant health due to longer healing time, more systemic health problem and poorer bone condition (20).

The objective of this study was not fulfilled, as there were important shortcomings that we have not anticipated and lessons learned. Clinical studies require participation of subjects to be interested in the participation of the study. Eligible participants were mostly not interested to be recalled for the examination of their dental implants, as they perceived that their implants have no problems. This is a common problem with early peri-implant disease as the signs and symptoms do not involve pain and urgent care. Usually patient would seek help once there is pain and their dental implant is starting to get loose. Therefore, it is important to reinforce and educate patients regarding the importance of maintenance program even after implants was deemed to be successful by patients.

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