IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
ISSN 2349-7203
HUMAN

Human Journals
Case Report
October 2019 Vol.:16, Issue:3

Fracture of Dental Implants: A Case Report

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
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ISSN 2349-7203
HUMAN

Fotoula Nikolopoulou*[1], Aspasia Sarafianou[1]

[1]Assistant Professor at the Department of Prosthodontics, Dental School, National and Kapodistrian University of Athens, Greece

Submission: 23 September 2019
Accepted: 29 September 2019
Published: 30 October 2019

HUMAN JOURNALS
www.ijppr.humanjournals.com

Keywords: fracture of dental implants, parafunctional habits

ABSTRACT

Purpose The aim of this article was to present the fracture of a dental implant in a patient and to examine the causative factors that may lead to this failure. **Methods** An update review about the relationship between bruxism and implant failure was reported. This paper described a case demonstrating the management of implant fracture. Topics discussed were etiology of bruxism and its implications on dental implants. **Conclusions- Clinical implications. 1)** The update review illustrated that there was insufficient evidence to support or refute a causal relationship between bruxism and implant failure **2)** Bruxism control through the use of a night guard by rigid occlusal stabilization appliance is highly indicated.

INTRODUCTION

Dental implants are more susceptible to bending loads compared to the nature teeth, because of lack of periodontal ligaments. Several risk factors have been associated with the occlusal overloading of dental implants, such as occlusal morphology and scheme, an unfavorable crown-to-implant ratio, materials of dental implants and parafuntional activity of the patient.[1]

The burning problem that should be confronted is the fractures and the complications occurring with the treatment of osseointegrated implants. This paper reviews the current knowledge about influencing factors of implant fractures.

The causes of implant fractures may be analyzed into three categories: 1) The fractures with the related to the material and design of dental implants 2) Absence of fit between implant and crown and 3) Occlusal scheme (parafanctional habits, e.g. bruxism) [2]

Parafunctional activities such as bruxism and clenching have been reported to have biological, technical and mechanical impacts on implant prostheses. Some studies have advocated that parafunctional activities associated with marginal bone loss of osseointegration due to overloading of the implants. [3]

It has been reported that there is no direct causal relation between bruxism and implant fracture.[4] Other authors concluded that should be taken into account factors like location and size of implants in bruxers receiving dental implants.[5]

In fact both centric and eccentric bruxism can lead to implant overload and implant fatigue. For this reason, patients with any sign of parafunction should be treated with an increased number of dental implants[6, 7,8, 9] Fixture fracture is the most catastrophic failure of implant, because it usually causes the loss of the implant. A fixture fracture rate of 12,5% in the maxilla and 14,3% in the mandible has been reported for Branemark implants used in single –molar replacements.[10] Bruxism has also suggested to cause occlusal load on dental implants.

Not surprisingly, bruxism is therefore often considered a contraindication for implant treatment. [11 , 12]

There are some guidelines as to minimize the chance of implant failure. These guidelines are concern the number and dimensions of the implants, the design of the occlusion and

articulation patterns and at the end the protection of the final result with a hard occlusal stabilization splint. [4,13,14,15]

Since osseointegrated implants have no periodontal ligament, occlusal traumatism cannot exist. Instead, adverse forces generated by occlusal activity may result in mechanical complications of implant components as, screw loosening, screw fracture or fixture fracture. [10] After screws loosen, metal fatigue may result in screw fracture. Many retrospective clinical studies have reported a high incidence of screw loosening and/or fracture associated with the two-stage external hex implant systems. [17,18]

CASE REPORT

A 45-year old male came to our dental office, complaining of loosening of a screw- retained implant crown. It was a single implant placed at mandibular molar site #47. Non natural teeth or other implants existed distally. The placement of implant was made two years ago, in a regional hospital.

A medical and dental history was completed. He didn't have any disease. The patient reported a history of frequent his teeth grinding occurring per night and jaw muscle fatigue or tenderness in the morning. Periodontal indices such as probing pocket depth and attachment level were measured, because we wanted to examine the relationship between attachment level and marginal bone level. There was absence of inflammation around the implant. The marginal bone loss had not been observed by the radiographic examination. The implant crown was screwed and occlusal adjustment was performed. The treatment was completed by selective grinding of his teeth. The use of an occlusal splint had been suggested to reduce and modulate muscle hyperactivity and protect implant and teeth. A night guard was fabricated and delivered upon the next visit. A follow up visit, 8 days showed overall stable of fixture.

Five months later the patient came to our private clinic complaining of loosening of the same implant. Upon removal of the restoration, fracture of the implant was observed.(photo1,2)

The patient reported that he had not used the occlusal appliance.

We suggested the complete implant extraction, to be treatment of choice.(Fig. 1,2) .

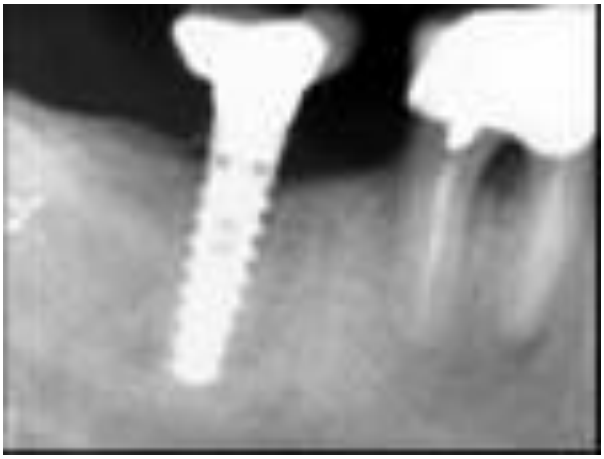

Figure No.1: X-Ray of implant at site #47

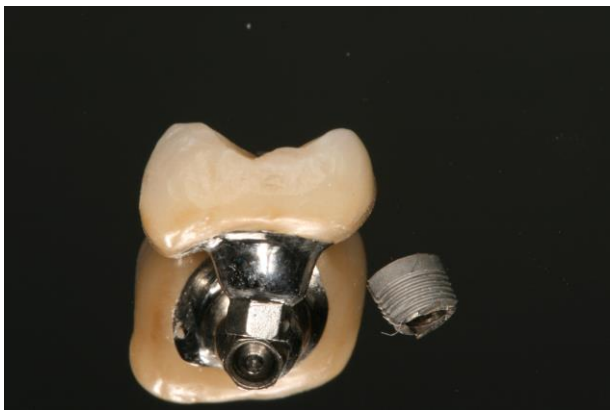

Figure No.: 2 Screw-retained implant crown and fractured implant of site #47.

DISCUSSION

Parafunctional habits are potentially destructive to implant prosthodontic components (such as screws) by causing metal fatigue. Yukua had reported that bruxism is an important factor in implant maintenance because of the possibilities of occlusal overload. He referred that clinicians didn't regularly identify parafunctional habits in their patients. He recommended placing additional implants, using a removable prosthesis or a softer type of restorative material, and using night guard.[19]

In our case the patient was complaining of loosening of a screw-retained implant crown. A night guard fabricated because of parafunctional habits (bruxism and clenching). Five months later the patient came to our private clinic complaining of loosening of the same implant. He had not used the night guard.

Manfredini et al reported in their systematic review of the literature concerning bruxism and fail of dental implant, that four (4) papers with uncertain findings described a higher failure rate in bruxers, identifying a trend toward a positive bruxism-implant failure relationship.[20]

Several studies have associated implant fracture of failures of implant supported prostheses with occlusal overload related to parafunctional habits.[2, 6, 21, 22, 23]

Bruxism is often considered a contraindication for implant therapy. [4] However practical guidelines are available to minimize the risk of failure. Many researchers used to believe that peripheral factors, mainly occlusal interference, were determinants in bruxism etiology. The treatment should be based primarily on irreversible occlusal interventions or the use of occlusal splints.[24]

The main warning sign for the failure of osseointergrated implants are recognized by loosening or fracture of screws or abutments.[25]

It has been reported by the same clinicians that the protection of the final treatment result in bruxers with implants by means of a hard stabilization splint for night-time use night guard, as to minimize the lateral destructive forces. [26, 27]

It needs future research to specifically address the possible relationship between bruxism and dental implant failure, using high-quality study designs.

CONCLUSIONS

After much study of the relevant literature we can conclude the following about bruxism and dental implants.

1) The literature data illustrated that there is insufficient evidence to support or refute a causal relationship between bruxism and implant failure.

2) Bruxism control through the use of a night guard by rigid occlusal stabilization appliance, is highly indicated.

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