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## Study complications associated with dental implants in patients with bruxism

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### ABSTRACT

Clinical surveys with self-questionnaire were conducted on 360 patients and information and demographic data related to patients were collected from several different hospitals in Iraq within a period of 1 year, that is from March 11, 2020 to December 5, 2020. This study was done by collecting patient information and discovering the study complications associated with dental implants in patients with bruxism. The study was conducted in several different hospitals to evaluate the complications, in addition to knowing the health related–quality of life (HRQoL) for patients. The Oral Health Impact Tool 14 (OHIP-14) was used to analyze the HRQoL with bruxism and the results obtained indicate a statistically significant presence in the HRQoL of patients surveyed with ( $P < 0.001$ ). The implant number for the studied patients was 580 and was more distributed in the age group from 25 to 29 years for 240 patients (41.3%) and health outcomes related to the survival rate of patients study.

A direct, statistically significant relationship was found between the variables and complications with bruxism, in addition to a relationship between dental bruxism and fractures of the prosthetic infrastructure, and an association was also found between bruxism and the loss of the implant itself, and in this study, an evaluation of complications present in this study was also conducted. The most common complication was the fracture of ceramic. The use of ceramics as the base material for implant prosthetics, despite its rigidity, indicates an increase in special biological complications that affect the implant outcome.

**Keywords:** *Fracture, bruxism, complications, implant, OHIP, dental*

## INTRODUCTION

Bruxism is a movement disorder that affects the teeth; its signs are bruxism<sup>1</sup> and frequent bruxism during sleep; in particular, bruxism during sleep is the repetitive jaw movements during sleep characterized by rhythmic chewing muscle activity with a frequency of about 1 Hz and episodic teeth grinding.<sup>2,3</sup>

It is hypothesized that most episodes of bruxism during the light sleep phase are associated with brief periods of cardiac and brain reactivation,<sup>4</sup> termed as “partial awakenings.” Rhythmic muscle activity is secondary to the sequence of events associated with partial awakening during sleep.<sup>5</sup>

As a result of increased activity of the sympathetic nervous system, the activity of the heart and brain increases for several minutes or seconds, which, in turn, excites the masticatory muscles.<sup>6–8</sup>

Since the cause of bruxism lies in the asymmetric central system, it is almost impossible to prevent the development of its seizures from the dental point of view.<sup>9,10</sup>

There are very few clinical trials regarding the effect of bruxism on the success of implant-supported prostheses.<sup>11</sup>

Prager recognized a causal relationship between bruxism and prosthetic fractures, but the researchers were unable to prove a link between bruxism and the loss of the implant itself.<sup>12</sup>

On the other hand, Engel points out that bruxism in no way affects the marginal bone loss around the implant.<sup>5,13</sup>

Based on the results of these studies, the presence or absence of a direct relationship between bruxism and the risk of losing orthopedic and dental implants was established.<sup>14</sup>

According to Lau Kraisen’s study, bruxism is defined as a neuromuscular disorder characterized by unconscious muscle hyperactivity resulting from signals from the central nervous system, resulting in compressive and sliding loads on dental structures and prosthetics.<sup>15</sup>

In this expansion of the use of dental implants, since there are more actors in surgery, rehabilitation, and prosthetics with different levels of specialization and experience, it is necessary to know the risk factors for damage or loss of implants in general, especially in patients with bruxism,<sup>16</sup> who should be identified for prevention and control.<sup>17</sup>

## PATIENTS AND METHOD

Clinical surveys with self-questionnaire were conducted on 360 patients and information and demographic data related to patients were collected from several different hospitals in Iraq within the period of 1 year, that is, from March 11, 2020 to December 5, 2020.

Written consent was obtained from patients in a letter of informed and voluntary consent, and they complied with ethical principles.

Where the following were collected [name, age, gender, and address, for sleep stridor (SB)], and the same questionnaire was used through a personal interview consisting of four self-report questions that the patient answered depending on his perception, whose answers were dichotomous: yes or no in addition, as part of the same questionnaire, an anamnesis of symptoms in the past 6 months was conducted.

### STATISTICAL ANALYSIS

Statistical analysis was carried out in two stages, where descriptive statistics were performed using frequencies, percentages of variables, qualitative means, and standard deviations of

quantitative variables. Then, inferential statistics were performed, using an independent sample t-test to determine if there was a relationship between potential bruxism and HRQoL.

The type of statistical relationship between study complications associated with dental implants in patients and bruxism was also identified by knowing the type of statistical relationship between the variables.

Data on gender, age, and HRQoL were collected by a questionnaire. To assess HRQoL, the Oral Health Impact Profile (OHIP-14) was used. Participants answered a subjective questionnaire using a scale from 0 to 5, and thus, the lower the patient's score, the better his assessment of the quality of life (QL).

**TABLE 1.** Distribution of patients according to age, N = 360.

|       | N   | P%   |
|-------|-----|------|
| 25–29 | 120 | 33.3 |
| 30–34 | 80  | 22.2 |
| 35–39 | 98  | 27.2 |
| 40–45 | 62  | 17.2 |

**TABLE 2.** Distribution of patients according to sex, N = 360.

| Type   | F   | P%    | P-value | Chi-square | T-test |
|--------|-----|-------|---------|------------|--------|
| Male   | 200 | 55.5  | 0.05    | 11.1       | 6.77   |
| Female | 160 | 44.44 |         |            |        |

**TABLE 3.** Distribution of implant number for study patients, N = 580.

|       | Implant number | P %  |
|-------|----------------|------|
| 25–29 | 240            | 41.3 |
| 30–34 | 100            | 17.2 |
| 35–39 | 120            | 20.6 |
| 40–45 | 120            | 20.6 |

**TABLE 4.** Evaluation of complications present in this study.

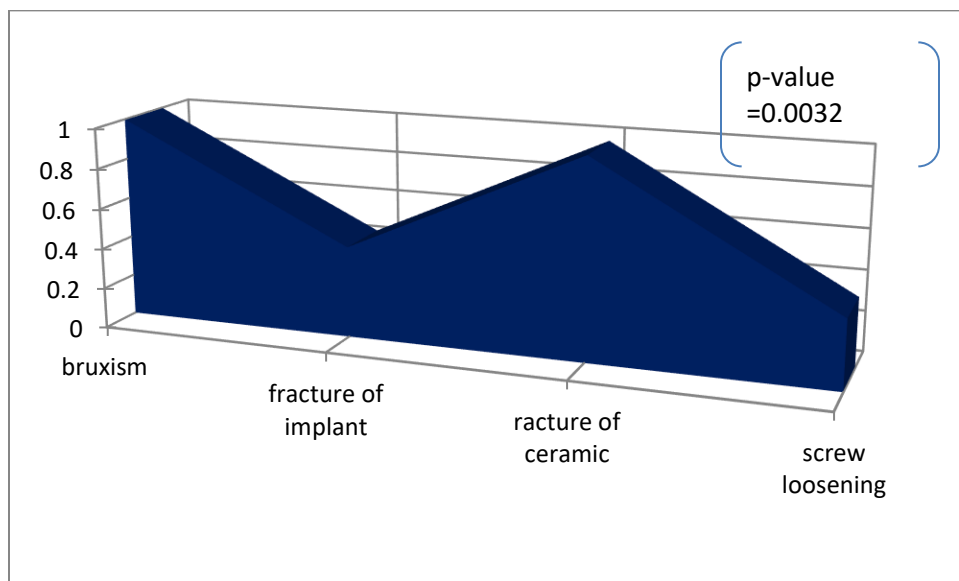
| Variable                            | Male | Female | P-value |
|-------------------------------------|------|--------|---------|
| Number of implants                  | 70   | 40     | 0.005   |
| Single crown                        | 30   | 20     | 0.04    |
| Partial fixed, 2–6 prosthetic units | 60   | 50     | 0.001   |
| Complete prostheses                 | 43   | 37     | 0.02    |
| Fixation screwed                    | 90   | 70     | 0.05    |
| Fixation cemented                   | 45   | 35     | 0.06    |

**TABLE 5.** Distribution of the spread of patients according to the complications of fixation.

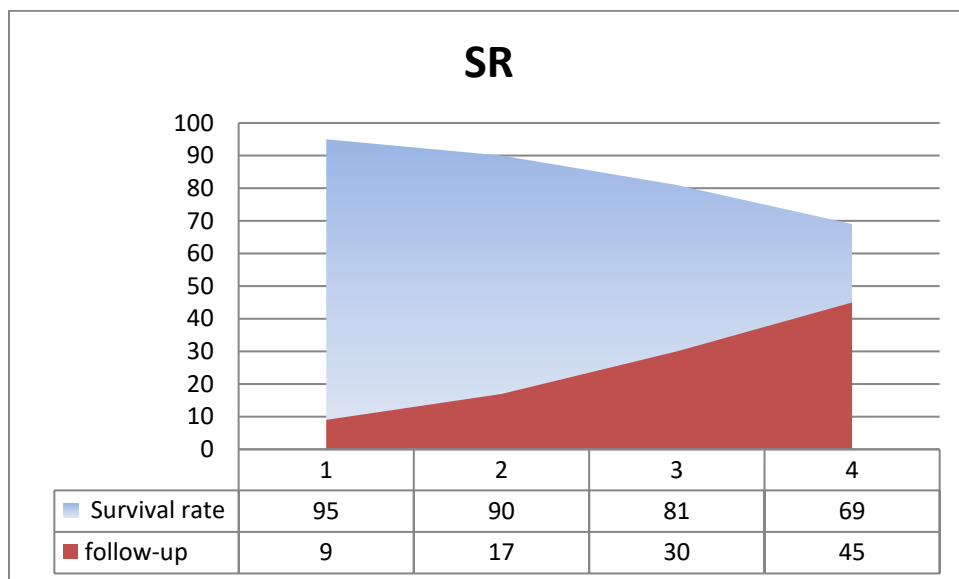
| Variable            | Male    |          |         | Female  |          |         |
|---------------------|---------|----------|---------|---------|----------|---------|
|                     | Screwed | Cemented | P-value | Screwed | Cemented | P-value |
| Fracture of implant | 6       | 4        | 0.76    | 4       | 3        | 0.99    |
| Fracture of ceramic | 60      | 25       | 0.001   | 40      | 20       | <0.001  |
| Screw loosening     | 10      | 4        | 0.07    | 10      | 5        | 0.45    |
| Crew fracture       | 7       | 3        | 0.83    | 11      | 4        | 0.079   |
| Documentation       | 7       | 4        | 0.1     | 5       | 3        | 0.83    |

**TABLE 6.** Assessment of quality of life for patients with bruxism.

| Variable                   | Male       | Female      |
|----------------------------|------------|-------------|
| 1.34 Functional limitation | 2.1 ± 1.1  | 1.87 ± 0.88 |
| Physical pain              | 1.98 ± 1.3 | 1.55 ± 1.1  |
| Physical disability        | 2.3 ± 0.99 | 1.44 ± 0.55 |
| Social disability          | 1.5 ± 1.34 | 2.1 ± 0.524 |



**FIG 1.** Correlation between bruxism habit and complications.



**FIG 2.** Health outcomes related to the survival rate of patient's study.

## DISCUSSION

In this study, 360 patients participated, and demographic data and information were collected from different hospitals, and the patients were distributed according to age into four groups ranging from 25 to 45 years.

The most prevalent age group in this study was 25–29 years for 120 patients (33.3%), then 30–34 years for 80 patients (22.2%), 35–39 years for 98 patients (27.2%), and 40–45 years for 62 patients (17.2%).

The cases studied in this research were also distributed according to gender, there were 200 male patients (55.5%) and 160 female patients (44.44%), and a statistically significant relationship was found with a P-value of 0.05 with chi-square 11.1.

The implant number for study patients was 580 and it was more distributed in the age group from 25 to 29 years for 240 patients (41.3%).

Often bruxism is a causative factor for the development of disorders in the temporomandibular joint region, the cause of pathological wear of the teeth (erosion), loss of periodontal attachment, and a decrease in the success of dental restorations.

Due to the fact that bruxism leads to the development of excessive occlusal loads, indirectly, it can also cause excessive loss of bone around dental implants, which support the artificial structures. This is why some researchers consider dental bruxism as a contraindication to implantation, due to which patients with bruxism were usually not included in research samples to test different implant-based rehabilitation methods.<sup>18–21</sup>

In a study of 379 patients treated with implant-supported prosthetics, evidence of signs of pathological wear and tear that could affect vertical bone loss in the area around the implant was found.

Thus, it is clear that the role of bruxism as a risk factor for dental implants in patients and that the presence of signs of dental erosion may directly indicate the presence of bruxism.

An analysis of the available literature on implant and bruxism issues indicates that the currently available data indicate a statistically significant relationship with a P-value of 0.05.

The use of ceramics as a base material for prosthetic limbs in implants, despite its hardness, indicates an increase in special biological complications that affect the result of implants.

On the other hand, in the study described above, during the entire follow-up period, the prevalence of complications according to the fracture of ceramic was frequently observed for men and women with P-value less than 0.001.<sup>21,22</sup>

In another study analyzing the sex variable with the highest potential squeaking rate, 63.6% were women (n = 21) versus 36.4% were men (n = 12). This result is consistent with that obtained by Silva A.,<sup>22</sup> where women are the most affected, but the study found that it is not related to sex.

The results showed that in the patients with bruxism among the group of women against men, there were statistical differences in HRQoL (P < 0.001). Plus, a mean score of  $4.3 \pm 7.1$  in OHIP-14 for the men group versus  $6.96 \pm 3.3$  for the women group. The above is in agreement with the study by Thetakala RK et al.,<sup>23</sup> where the mean OHIP-14 score is significantly higher due to the fact that the group of prisoners with bruxism had a mean of  $38.52 \pm 12.8$  versus the group without bruxism  $31.67 \pm 12$  (P < 0.001).

## CONCLUSION

Currently, bruxism is an existing entity, and over time, knowledge about it has evolved from its initial concept to its current understanding. In this study, a significant prevalence of potential bruxism was observed.

In conclusion, this study noted a possible effect of bruxism on HRQoL, which indicates a significant significance. In other words, potential bruxism generates a lower level of HRQoL and thus affects the way the individual performs in his daily activities, which affects the whole perception that surrounds life.

## REFERENCES

- Anitua E, Saracho J, Almeida GZ, et al. Frequency of prosthetic complications related to the implant-borne prosthesis in a sleep disorder unit. *J Oral Implantol.* 2017; 43(1): 19–23. <https://doi.org/10.1563/aaid-joi-D-16-00100>
- Chatzopoulos GS, and Wolff LF. Symptoms of temporomandibular disorder, self-reported bruxism, and the risk of implant failure: a retrospective analysis. *Cranio J Craniomandib Pract.* 2020; 38(1): 50–57. <https://doi.org/10.1080/08869634.2018.1491097>
- Chrcanovic BR, Kisch J, Albrektsson T, et al. A retrospective study on clinical and radiological outcomes of oral implants in patients followed up for a minimum of 20 years. *Clin Implant Dent Relat Res.* 2018; 20(2): 199–207. <https://doi.org/10.1111/cid.12571>
- Chrcanovic BR, Kisch J, and Larsson C. Retrospective evaluation of implant-supported full-arch fixed dental prostheses after a mean follow-up of 10 years. *Clin Oral Implants Res.* 2020; 31(7): 634–645. <https://doi.org/10.1111/clr.13600>
- De Angelis F, Papi P, Mencio F, et al. Implant survival and success rates in patients with risk factors: results from a long-term retrospective study with a 10 to 18 years follow-up. *Eur Rev Med Pharmacol Sci.* 2017; 21(3): 433–437.
- Cavallo P, Savarese G, and Carpinelli L. Bruxism and health-related quality of life in southern Italy's prison inmates. *Community Dent Health.* 2014; 31: 117–122.
- Einarson S, Gerdin EW, and Hugoson A. Oral health-related quality of life and its relationship to self-reported oral discomfort and clinical status. *Swed Dent J.* 2014; 38: 169–178.
- Ghalebani M, Salehi M, Rasoulain M, et al. Prevalence of parasomnia in school-aged children in Tehran. *Iran J Psychiatry.* 2011; 6: 75–79.
- Inglehart MR, Widmalm SE, and Syriac PJ. Occlusal splints and quality of life – does the patient-provider relationship matter? *Oral Health Prev Dent.* 2014; 12: 249–258.
- Mengatto CM, Dalberto CDS, Scheeren B, et al. Association between sleep bruxism and gastroesophageal reflux disease. *J Prosthet Dent.* 2013; 110: 349–355. <https://doi.org/10.1016/j.prosdent.2013.05.002>
- Murrieta J, Hernández D, Linares C, et al. Parafunctional oral habits and its relationship with family structure in a Mexican Preschoolers Group, 2013. *J Oral Res.* 2014; 3: 29–35. <https://doi.org/10.17126/joralres.2014.009>
- Tosun T, Karabuda C, and Cuhadaroglu C. Evaluation of sleep bruxism by polysomnographic analysis in patients with dental implants. *Int J Oral Maxillofac Implants.* 2003; 18: 286–292.
- Thymi M, Visscher CM, Yoshida-Kohno E, et al. Associations between sleep bruxism and (peri-) implant complications: a prospective cohort study. *BDJ Open.* 2017; 3: 17003. <https://doi.org/10.1038/bdjopen.2017.3>
- Serra-Negra JM, Paiva SM, Auad SM, et al. Signs, symptoms, parafunctions and associated factors of parent-reported sleep bruxism in children: a case-control study. *Braz Dent J.* 2012; 23: 746–752. <https://doi.org/10.1590/S0103-64402012000600020>
- Yamashita JM, Moura-Grec PG, Freitas AR, et al. Assessment of oral conditions and quality of life in morbid obese and normal weight individuals: a cross-sectional study. *PLoS One.* 2015; 10: e0129687. <https://doi.org/10.1371/journal.pone.0129687>
- Manfredini D, Poggio CE, and Lobbezoo F. Is bruxism a risk factor for dental implants? A systematic review of the literature. *Clin Implant Dent Relat Res.* 2014; 16(3): 460–469. <https://doi.org/10.1111/cid.12015>
- Mikeli A, and Walter MH. Impact of bruxism on ceramic defects in implant-borne fixed dental prostheses: a retrospective study. *Int J Prosthodont.* 2016; 29(3): 296–298. <https://doi.org/10.11607/ijp.4610>

18. Mohanty R, Sudan PS, Dharamsi AM, et al. Risk assessment in long-term survival rates of dental implants: a prospective clinical study. *J Contemp Dent Pract.* 2018; 19(5): 587–590. <https://doi.org/10.5005/jp-journals-10024-2303>
19. Moher D, Shamseer L, Clarke M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev.* 2015; 4(1): 1. <https://doi.org/10.1186/2046-4053-4-1>
20. Mendonça G, Mendonça DB, Fernandes-Neto AJ, et al. Management of fractured dental implants: A case report. *Implant Dent* 2009; 18: 10-16. <https://doi.org/10.1097/ID.0b013e318192cafe>
21. Misch CE. The effect of bruxism on treatment planning for dental implants. *Dent Today.* 2002; 21: 76-81.