



# RISK OF IMPLANT FAILURE IN PATIENTS WITH BRUXISM

## LITERATURE REVIEW

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## INTRODUCTION AND OBJECTIVE

Bruxism is defined as a repetitive activity of the masticatory muscles, involving teeth grinding, clenching or contraction of the muscles without dental contacts [1]. This activity has harmful consequences for teeth, periodontal structures, muscles and skeletal structures. It is thought that bruxism may cause occlusal overload in rehabilitations with implants, which may lead to implant fracture or bone loss resulting in implant failure. Thus, bruxism is considered by many, a risk factor that reduces implant's rate of success [2].

The aim of this review is to evaluate the existence of a relationship between bruxism and the risk of implant failure, by fracture or loss of osseointegration.

The PICO question was defined as: "Does implant placement in patients with bruxism represents a higher risk of implant failure (loss of osseointegration or implant fracture), in comparison with patients without bruxism?"

## MATERIALS AND METHODS

An electronic search was conducted in November of with the keywords "(bruxism OR clenching) AND (implant fracture OR implant failure OR implant survival OR implant mechanical complications)" on the databases PubMed, Cochrane Database of Reviews e Cochrane CENTRAL e ADA-Center for Evidence-Based Dentistry, without restrictions of time and including articles in english, portuguese and spanish.

The results were selected based on title and abstract, according to inclusion and exclusion criteria previously defined: meta-analysis, systematic reviews, randomized clinical trials, prospective and retrospective studies (case series with more than 10 patients). *In vitro* studies or with animals were excluded. There wasn't any limitation regarding the population or follow-up of studies. For this review, failure was defined as the need of removing the implant due to loss of osseointegration or implant fracture.

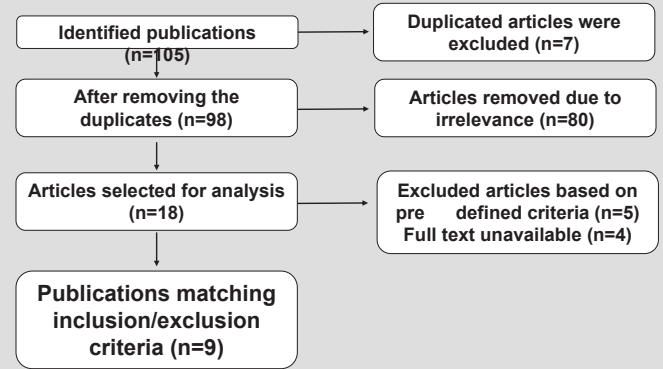


Figure 1 – Study screening process. The search strategy resulted in 105 publications, of which 9 were included

## RESULTS

Study	Study design	Population (N)	Diagnosis of bruxism	Follow up	Risk of loss of osseointegration	Risk of implant fracture	Conclusions	Bruxism – loss of implant relationship
Yadav et al, 2016 [3]	Retrospective	1100 patients (610♀, 490♂), half were diagnosed with bruxism	Clinical records and dental photos. In some patients a clinical evaluation was done + questionnaires (international criteria followed)	NS	Odds Ratio (OR) 2,45 in patients with bruxism (P<0,003)	NS	The success rate of implants is widely affected by bruxism.	POSITIVE
Chrcanovic et al, 2016 [2]	Retrospective	994 patients – 56 with bruxism and 938 without bruxism. 3549 implants	Classification followed a scale of severity. Clinical records, questionnaires and clinical observations when possible	NS	Rate of failure 13% in patients with bruxism vs 4,6% (P<0,001) Hazard ratio 3,396	NS	Bruxism may increase the risk of implant failure.	UNCLEAR
Chrcanovic et al, 2016 [4]	Retrospective comparative	2670 patients (1434♀, 1236♂) initially; 98 patients with bruxism and a 98 matched group – 427 implants in each group	Classification followed a scale according to evidence. Clinical records, questionnaires and clinical observations when possible.	Average of 2916 days for patients with bruxism vs 2627 days for those without bruxism	OR 2,71 for patients with bruxism. Higher failure rate in short and narrow implants	16 fractured implants in patients with bruxism vs. 0 in patients without bruxism	Bruxism may increase the implant rate failure and mechanical complications, despite the fact that other factors may influenced the results.	UNCLEAR
Chrcanovic et al, 2015 [5]	Meta-analysis (10 studies)	760 implants in patients with bruxism, 2989 in patients without bruxism	NS	NS	Risk ratio of 2,93 in patients with bruxism (rate of failure 6,45 vs 3,65 without bruxism)	NS	The authors considered within the limitations of the studies, it can't be said that bruxism may increase the rate of failure	UNCLEAR
Zhou et al, 2015 [6]	Systematic review and meta-analysis	Group A: 1788 prostheses, 509 in patients with bruxism. Group B 445 patients – 81 with bruxism	NS	1-10 years	Odds ratio 4,9 in group A and 3,65 in group B	Doesn't specify the kind of mechanical complications	Bruxism plays an important role in the risk of implant failure	POSITIVE
Manfredini et al, 2014 [7]	Systematic review	14 studies about biological complications (3447 implants, +1000 patients); 7 studies about mechanical complications(+700 patients e 1590 implants)	3 of the included studies did a clinical diagnosis of bruxism, other studies used questionnaires.	0-15 years (studies about biological comp.); 4 years minimum (studies about mechanical complications)	Only 4 of the 14 studies identified a tendency for positive relation bruxism-implant failure	Contradictory results	It's unlikely for bruxism to be a risk factor for biological complications, but it can be a risk factor for mechanical complications.	UNCLEAR
Ji et al, 2012 [8]	Retrospective	45 patients (18♂ e 27♀), 297 implants in full arch rehabilitation	NS	Average of 42 months	Rate of failure: 29,3% vs 4,6% in patients without bruxism	NS	A higher risk of implant failure may be associated with bruxism. The author doesn't specify the concept of failure	POSITIVE
Zupnik et al, 2011 [9]	Retrospective	341 implants	NS	4 years minimum	OR between 0,22 and 0,28	NS	Bruxism wasn't statistically significant for implant failure	NEGATIVE
Eckert et al, 2001 [10]	Retrospective	70 implants in patients without bruxism; 7 implants in patients with bruxism	Based on previous clinical records. Lack of further specifications.	Average of 286 days, between 0-734 days	Hazard ratio 1,7 (p<0,56)	NS	The studied implant showed a very low survival rate. Bruxism didn't have a statistically significant relation with implant failure.	NEGATIVE

The results of this review don't prove, without a doubt, the relation between bruxism and an increased risk in implant failure.

Despite the fact that several studies presented a higher risk of implant failure within the studied population, keeping in mind the limitations of the same studies, the authors remain cautious in presenting definitive conclusions.

The heterogeneity of conclusions within the different studies may be linked to various factors, as the study design, the variety in analysis of available evidence and diagnosis criteria for bruxism in each study.

## CONCLUSION

There is still a lot of controversy about the relation between bruxism and implant failure. More prospective studies, with less bias, are needed to answer this question.

## CLINICAL IMPLICATIONS

The possible association between implant failure and bruxism requires a detailed diagnosis of the existing parafunction in order to establish proper management of the problem during and after the rehabilitation treatment.

## BIBLIOGRAPHIC REFERENCES

- [1] Lobbezoo F, Ahlberg J, Glaros AG, Kato T, Koyano K, Lavigne GJ, et al. Bruxism defined and graded: An international consensus. J Oral Rehabil. 2013;40(1):2–4. [2] Chrcanovic BR, Kisch J, Albrektsson T, Wennerberg A. Bruxism and dental implant failures: a multilevel mixed effects parametric survival analysis approach. J Oral Rehabil [Internet]. 2016;(6). [3] Yadav K, Nagpal A, Agarwal SK, Kochhar A. Intricate Assessment and Evaluation of Effect of Bruxism on Long-term Survival and Failure of Dental Implants: A Comparative Study. J Contemp Dent Pract [Internet]. 2016;17(8):670–4. [4] Chrcanovic BR, Kisch J, Albrektsson T, Wennerberg A. Bruxism and dental implant treatment complications: A retrospective comparative study of 98 bruxer patients and a matched group. Clin Oral Implants Res. 2016;1–9. [5] Chrcanovic B, Albrektsson T, Wennerberg A. Bruxism and Dental Implants: A Meta-Analysis. Implant Dentistry. 2015;0(0):1–12. [6] Zhou Y, Gao J, Luo L, Wang Y. Does Bruxism Contribute to Dental Implant Failure? A Systematic Review and Meta-Analysis. Clin Implant Dent Relat Res [Internet]. 2015;18(2):410–20. [7] Manfredini D, Poggio CE, Lobbezoo F. Is Bruxism a Risk Factor for Dental Implants? A Systematic Review of the Literature. Clin Implant Dent Relat Res. 2014;16(3):460–9. [8] Ji T-J, Kan JYK, Rungcharassaeng K, Roe P, Lozada JL. Immediate Loading of Maxillary and Mandibular Implant-Supported Fixed Complete Dentures: A 1- to 10-Year Retrospective Study. J Oral Implantol. 2012;38(S1):469–77. [9] Zupnik J, Kim S, Ravens D, Karimbux N, Guze K. Factors associated with dental implant survival: a 4-year retrospective analysis. J Periodontol [Internet]. 2011;82(10):1390–5. [10] Eckert SE, Meraw SJ, Weaver AL, Lohse CM. Early experience with Wide-Platform Mk II implants. Part I: Implant survival. Part II: Evaluation of risk factors involving implant survival. Int J Oral Maxillofac Implants. 2001;16(2):208–16.