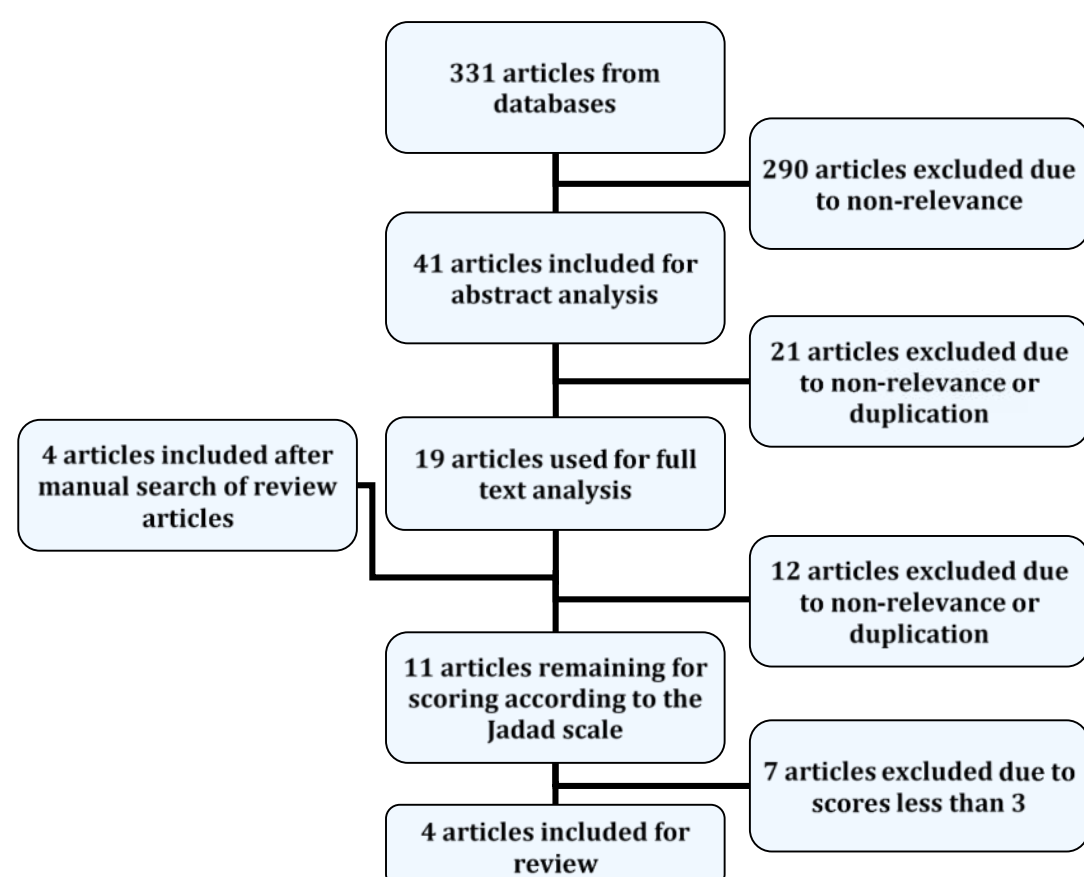


Review: is there an effect on bruxism from botulinum toxin injections?

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Abstract

Objective: To systematize evidence on the efficacy of botulinum toxin type A (BTA) in the treatment of bruxism measured through bite force or electromyography (EMG) at the masseter muscle. **Method:** Identification of relevant articles through databases PubMed, Web of Science, SCOPUS, Ovid and EBSCO and manual search were performed for sources from review articles. Studies scoring less than 3 on the Jadad Scale were excluded. **Results:** Four articles were included after an exclusion of 327 articles. 3 articles measured EMG and 1 bite force. 1 article did not record a significant drop of activity, 1 article recorded reduction midway and at final endpoint. 2 articles recorded initial reduction, but a non significant difference at later follow up. **Conclusion:** The available research is inconclusive and does not show enough evidence that bruxism can be treated with BTA injections. However, promising results have been shown in individual studies and further research in this area is needed.



Results

Initial search results yielded 331 articles. 327 articles were excluded, leaving 4 articles included. In 3 of 4 articles both masseter and temporalis muscles were injected with BTA, in 1 article only the masseter muscle was injected. 1 study measured EMG in awake state [2]. When relaxing the jaw, a significant drop in activity was prevalent at day 14 but not day 28. After clenching, a significant drop was prevalent in the masseter at day 14, but not in temporalis at any point. 2 studies measured EMG activity at sleep. One article with one measuring point (4-8 weeks), did not record a significant drop of muscle activity [3], whereas the other study recorded significant drops at all measuring points, ending at week 12 [4]. 1 study measured maximal voluntary bite force where there was a significant drop in bite force at all points ending at 6 months [5], but no significant difference to the control at 6 months, but at 3 months and prior.

	Number of individuals	Measurement	Awake or asleep	Mouse units (U) of BTA [†] injected unilaterally	Placebo/control	Follow up
Ondo et al. (2018)[3]	23	EMG [‡]	During sleep	Masseter 60U, temporalis 40U (n=13)	Placebo (n=10)	4-8 weeks
Jadhao et al. (2017)[5]	24	Bite force	Awake	Masseter 30U, temporalis 20U (n=8)	Placebo (n=8), control (n=8)	3 and 6 months
Lee et al. (2010)[4]	12	EMG [‡]	During sleep	Masseter 40U (n=6)	Placebo (n=6)	4, 8 and 12 weeks
Kurtoglu et al. (2008)[2]	24	EMG [‡]	Awake	Masseter 30U, temporalis 20U (n=12)	Placebo (n=12)	14 and 28 days

[†] Botulinum toxin type A. [‡] Electromyography.

Background and Aim

Botulinum neurotoxin type A (BTA) injection in muscle tissue renders motor nerve filaments unexcitable. The effect gradually wears off and normal neural signaling occurs within 12 weeks. Generally bruxism is not a disorder, but a risk factor for among other extensive tooth wear and implant failures. The bite force is mainly generated by the three jaw closing muscles, masseter, temporalis and medial pterygoid muscles, where the masseter muscle contributes to 43 % of the strength. The aim of this review was to evaluate the scientific evidence present today, whether BTA injection influence bruxism, be that less episodes of clenching or less bite force, and if the effect is long-lasting.

Conclusion

The available research is inconclusive and does not show enough evidence that bruxism can be treated with BTA injections. However, promising results have been shown in individual studies and further research in this area is needed.

Methods and Materials

A PICOS question was formed as follow: Population included study groups treated for headache, bruxism, myofascial pain or masseter hypertrophy. Intervention was treatment by botulinum toxin injections of masseter muscles. Control would be pre-injection values and/or placebo injections. Outcome would be difference in EMG activity or change in bite force and study design would be RCT, prospective or retrospective studies. To identify relevant articles following databases were used; PubMed, Web of Science, SCOPUS, Ovid and EBSCO. A manual search were performed for sources from review articles. Case reports, unilateral treatment, botulinum toxin of not type A, patients treated due to systemic diseases or afflictions, or patients treated due to an initial trauma leading to bruxism, and studies scoring less than 3 on the Jadad scale [1] were all excluded.

References

- [1] Jadad AR, Moore RA, Carroll D, et al. Assessing the quality of reports of randomized clinical trials: is blinding necessary? *Control Clin Trials*. 1996;17(1):1-12.
- [2] Kurtoglu C, Gur OH, Kurkcu M, Sertdemir Y, Guler-Uysal F, Uysal H. Effect of botulinum toxin-A in myofascial pain patients with or without functional disc displacement. *J Oral Maxillofac Surg*. 2008;66(8):1644-1651.
- [3] Ondo WG, Simmons JH, Shahid MH, Hashem V, Hunter C, Jankovic J. Onabotulinum toxin-A injections for sleep bruxism: A double-blind, placebo- controlled study. *Neurology*. 2018;90(7):e559-e564.
- [4] Lee SJ, McCall WD, Kim YK, Chung SC, Chung JW. Effect of botulinum toxin injection on nocturnal bruxism: a randomized controlled trial. *Am J Phys Med Rehabil*. 2010;89(1):16-23.
- [5] Jadhao VA, Lokhande N, Habbu SG, Sewane S, Dongare S, Goyal N. Efficacy of botulinum toxin in treating myofascial pain and occlusal force characteristics of masticatory muscles in bruxism. *Indian J Dent Res*. 2017;28(5):493-497.