References.

Benninger, M., & Knott, P. (2012). Techniques of botulinum toxin injections in the head and neck. San Diego, CA: Plural Pub.

Brin MF. (1997). Botulinum toxin: Chemistry, pharmacology, toxicity, and immunology. *Muscle & Nerve, 20*(6), 146-168.

de Felicio, C. M., Melchior, M. D. O., & da Silva, M. A. M. R. (2010). Effects of orofacial myofunctional therapy on temporomandibular disorders. *CRANIO: The Journal of Craniomandibular Practice, 28*(4), 249-259.

Ernberg, M., Hedenberg-Magnusson, B., List, T., & Svensson, P. (2011). Efficacy of botulinum toxin type a for treatment of persistent myofascial TMD pain: A randomized, controlled, double-blind multicenter study. *Pain, 152*(9), 1988-1996.

Girlanda, P., Vita, G., Nicolosi, C., Milone, S., & Messina, C. (1992). Botulinum toxin therapy: distant effects on neuromuscular transmission and autonomic nervous system. *Journal of Neurology, Neurosurgery & Psychiatry, 55*(9), 844–845.

Gladson, B. (2011). *Pharmacology for rehabilitation professionals (2nd ed.).* St. Louis, Mo.: Saunders.

Guarda-Nardini, L., Stecco, A., Stecco, C., Masiero, S., & Manfredini, D. (2012). Myofascial Pain of the Jaw Muscles: Comparison of Short-Term Effectiveness of Botulinum Toxin Injections and Fascial Manipulation Technique. *CRANIO®, 30*(2), 95–102.

Guss, J., Benson, B. E., & Blitzer, A. (2012). *Botulinum Neurotoxin for Head and Neck Disorders.* New York: TNY

Janal, M., & Raphael, K. (2011). Comment on: Efficacy of botulinum toxin type a for treatment of persistent myofascial TMD pain: A randomized, controlled, double-blind multicenter study, by Ernberg, Hedenberg-Magnusson, & Svensson. *Pain, 152*(9), 2186-2187.

Jessica, P., Mikkel, S., Torsten, L., Kristian, R., Martin, B., Tine, A., . . . R, F. (2017). Injection of high dose botulinum-toxin-A leads to impaired skeletal muscle function and damage of the fibrillar and non-fibrillar structures. *Scientific Reports, 7*(1), 1-14.

Keenan, J. R. (2015). Unclear results for the use of botulinum toxin therapy for TMD pain. *Evidence-Based Dentistry, 16*(4), 122.

Patil, S., Willett, O., Thompkins, T., Hermann, R., Ramanathan, S., Cornett, E. M., … Kaye, A. D. (2016). Botulinum Toxin: Pharmacology and Therapeutic Roles in Pain States. *Current Pain and Headache Reports, 20*(3).

Pingel, J., Mikkel, S. N., Lauridsen, T., Rix, K., Bech, M., Alkjaer, T., . . . Feidenhansl, R. (2017). Injection of high dose botulinum-toxin A leads to impaired skeletal muscle function and damage of the fibrillar and non-fibrillar structures. *Scientific Reports (Nature Publisher Group), 7,* 1-14.

Ravichandran, E. (2006). An Initial Assessment of the Systemic Pharmacokinetics of Botulinum Toxin. *Journal of Pharmacology and Experimental Therapeutics, 318*(3), 1343–1351.

Shahidi, G., Poorsattar Bejeh Mir, A., Khatib Shahidi, R., Balmeh, P. (2013) Severe Dysphagia after inferior alveolar nerve block preceded by cervical botolinum toxin injection: a case report. *Iran Red Crescent Med J., 15*(7), 608-610.

Simpson, L. (2013). The life history of a botulinum toxin molecule. Toxicon : Official Journal of the International Society on Toxinology, 68, 40-59.

Summary Statement.

The minimal contraindications and pain reduction associated with BoNT-A injection holds the promise of being able to assist in resolving chronic central sensitisation. Yet this, to date, has not been clinically realised. As such BoNT-A has only been shown clinically to yield temporary (< 3 months) outcomes.

Unfortunately, the gross inhibition of primary muscles that BoNT-A causes, upsets normal balanced function of the TM joint and associated structures - making functional rehabilitation virtually impossible whilst the toxin is active.

Consequently the administration of BoNT-A currently conflicts with conservative methods of pain relief. The fact that conservative interventions have been demonstrated to achieve clinically similar outcomes, BoNT-A should be reserved for use as an adjunct in only the most severe of cases.

FAST & FUNCTIONAL
Functional NeuromyoFascial Technique

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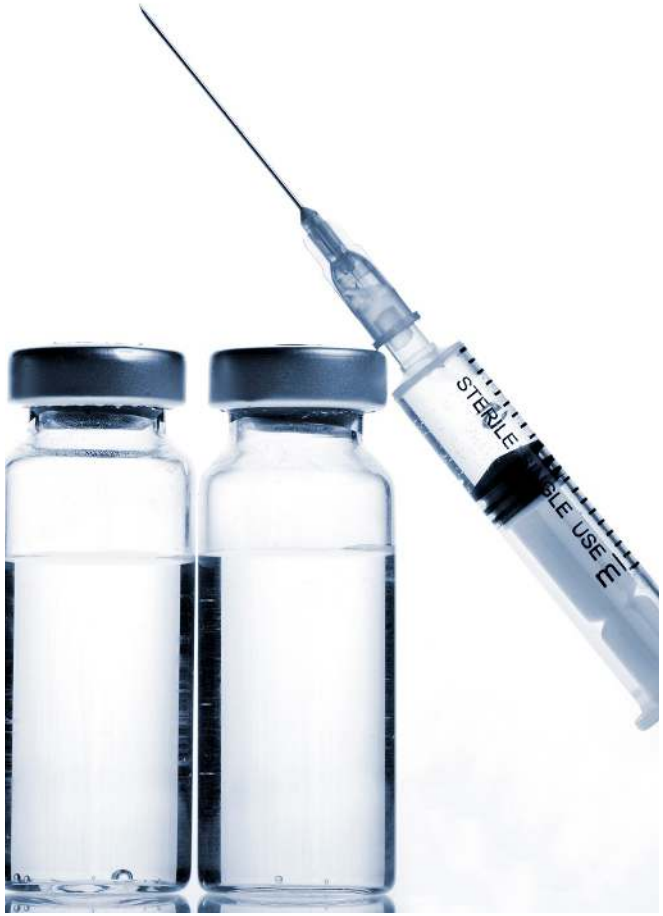
Botulinum Toxin for orofacial pain.

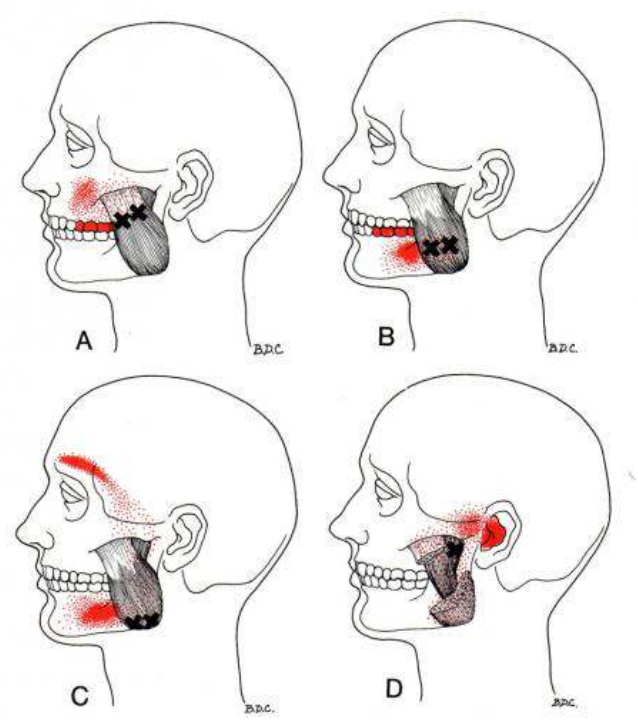
Evidence review and clinical recommendations for dentists.



Pain confusion.

The latest evidence based guidelines for primary care providers in Australia and the UK stipulate that 70% of chronic TMD pain is myogenous in origin. Pain relief from BoNT-A injections, as well as effective conservative manual or exercise therapy for orofacial pain, relies on this fact.

The first step in effective treatment is the correct differential diagnosis of pain. Localised arthrogenic pain is typically self limiting and should be managed conservatively.



Clinical consideration 1.

Although anecdotal clinical evidence for BoNT-A is strong no randomised controlled trials have yet validated the effectiveness of BoNT-A injections for orofacial pain.

Clinical consideration 2.

The toxin carries a level C pregnancy risk and the toxin may contribute to difficulty breathing, swallowing, or speaking. Especially when combined with other neuromuscular-blocking agents.

The problem with muscle paralysis.

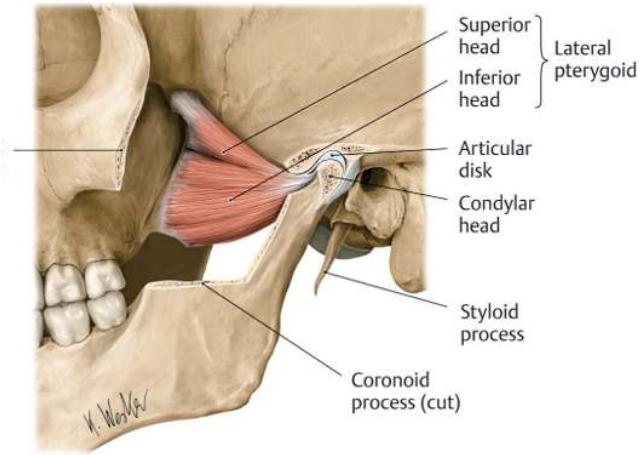
Muscle paralysis is of course the most common adverse effect of BoNT-A therapy. Although temporary pain relief may be gained, paralysis of one or more major masticatory muscles dramatically destabilises the the function of the orofacial complex causing a cascade of biomechanical consequences. These inhibit any functional rehabilitation of the cervical, oropharynx and orofacial complex, which is essential for any long term outcomes.

Clinical consideration 3.

Chronic musculoskeletal pain, especially TMD, is multifactorial. TMD has a very strong correlation with the psychological and social aspects of pain. As such, be aware that biological interventions like BoNT-A are temporary.

Clinical consideration 4.

Interventions that seek to inhibit muscle function in order to alleviate joint pain (e.g. Lateral Pterygoid injection) are based on the notion that chronic pain is primarily due to joint inflammation. This is irrefutably incorrect.



Effective collaboration.

Long term outcomes for chronic TMD pain only occurs when functional pain free movement in the TMJ and neck is achieved and central sensitisation issues are identified and addressed. Collaboration with exercise therapy, soft tissue therapy and psychology gives the greatest chance for lasting relief.

In severe cases BoNT-A may be useful to aid in breaking the cycle of central sensitisation but only if combined with therapies that seek to restore physical and psychological function, rather than simply alleviate pain.