

What is Botulinum Toxin?

- Botulinum toxin is a neurotoxin, also known primarily as “Botox” that is derived from *Clostridium botulinum*.
- The toxin has a multifactorial use and can be used to remove skin wrinkles, relieve muscle spasms, migraines, headaches and can even be used for the treatment of TMDs (Ghavimi et al., 2019).
- The injection of the toxin results in the paralysis of nerves by blocking the release of acetylcholine (ACh) (Choudhury et al., 2021).
- The toxin is able to block the release of ACh, causing those muscles to fail to contract and thus resulting in less or diminished pain in the temporomandibular joint.
- Botox has been considered to be generally safe because the dosages used for pain conditions such as TMDs are far from the lethal doses (De la Torre Canales et al., 2022).
- Botox has been validated as an effective treatment for TMD due to its ability to paralyze and reduce muscle activity (Rezazadeh et al., 2022).

How Botulinum Toxin is Used to Treat TMD's

- The toxin is injected into the lateral pterygoid muscle, which depresses the mandible and opens the mouth when assisted by the anterior belly of the digastric muscle and the mylohyoid muscle.
 - The lateral pterygoid muscle contraction comprises the junction between the motor neuron and the muscle fiber (Choudhury et al., 2021).
 - ACh is released from the terminals of motor axons when the action potentials within the CNS arrive to the terminals (Choudhury et al., 2021).
 - Muscle fibers contract when ACh binds to and opens a receptor in the muscle fiber (Choudhury et al., 2021).
- Botulinum Toxin is able to block the release of ACh, causing skeletal muscles to fail to contract even though action potentials continue to reach the motor end plate (Choudhury et al., 2021).

Temporomandibular Disorders

- TMD is an umbrella term used to describe chronic pain that affects the masticatory muscles and/or the temporomandibular joint (Anwar et al., 2023).
 - Although there are too many TMDs to name, some common symptoms of TMD are joint pain, joint sound or clicking, and limited jaw function (Rezazadeh et al., 2022).
 - Studies have shown a significant improvement in disc placement and joint clicking after administration of Botulinum Toxin into the lateral pterygoid muscles.
- It has been shown that disc-condyle relationship has been improved and, in some cases, joint sound has been completely diminished (Rezazadeh et al., 2022).

Preconceived Notions (Brand name vs Generic)

- A preconceived notion about Botulinum Toxin is that they are all the same. The chemical makeup of brand name (Botox) and generic (Dysport), however, are not the same. Brand name Botox consists of onabotulinumtoxin A, whereas Dysport consists of abobotulinumtoxin A (Catalent Biologics, 2022; Vanity Medical Spa, 2022).
 - Both toxins are used to treat TMDs and are almost interchangeable. The main difference between Botox and Dysport is their chemical composition and the amount of the toxin in each of them (Choudhury et al., 2021).
 - Although both Botox and Dysport are relatively similar, Dysport is known to have longer duration, likely due to its higher quantities of neurotoxin (Choudhury et al., 2021).
 - Although Dysport has a higher concentration of the neurotoxin, it also has a higher chance of adverse effects occurring (Choudhury et al., 2021).
 - Due to the possibility of adverse effects, individuals typically go with a more renowned brand such as Botox.
- The amount of toxin in the concentrate, the dose administered, and the injection volume all play significant roles in the therapeutic effects of each formula (Choudhury et al., 2021).

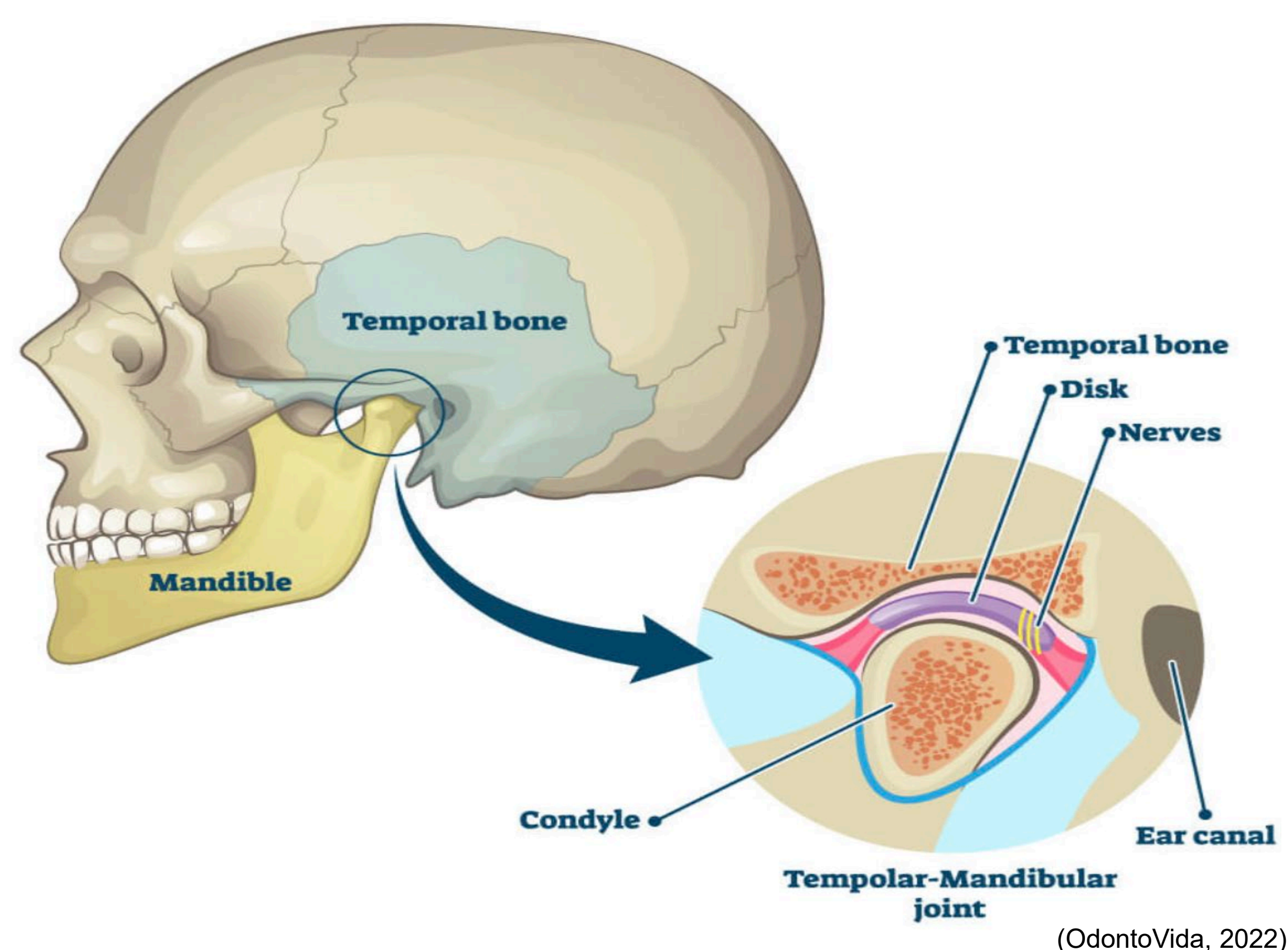


(Vanity Medical Spa, 2022)



(Catalent Biologics, 2022)

TMJ DISORDER



(OdontoVida, 2022)

Role of the Dental Hygienist

Although in New York State it is not within the dental hygienists' scope of practice to administer Botox as a therapeutic agent, dental hygienists are able to recommend or inform patients on non surgical treatments. Dental hygienists may also:

- Refer to a dentist that administers Botox treatment for TMDs
- Educate patients on the other possible treatments of TMDs
- Educate patients on the mechanism of action of Botox



(Prokupek, 2021)

Conclusion

Statistics show that “31% of adults and 11% of children experience temporomandibular disorders” (Anwar et al., 2023). Due to being multifaceted complex conditions, the chronic nature of temporomandibular disorders can be a source of depression and disability (Anwar et al., 2023). Although there is not a definitive answer as to where temporomandibular disorders arise from, they are typically related to clenching and grinding, which can worsen from stress and depression. If one has exhausted all other avenues for relief, and symptoms haven't subsided, why not give Botulinum Toxin a chance? A good start to the solution would be to consult an oral healthcare specialist.

References

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