Botox in Dentistry

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DENH 1520

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April 15th, 2021

Introduction

Botox is a neurotoxin that causes weakening or paralysis to muscles and glands. This happens because the acetylcholine-release is blocked from the cholinergic nerve endings. Typically, Acetylcholine binds to receptors on the outside muscle cells, causing them to contract and tighten. Intramuscular administration of Botox acts at the neuromuscular junction, inhibiting the release of acetylcholine and stopping the muscle cells from contracting. In this way, the toxin helps the muscles to relax and become less stiff. However, the effects of Botox are short-lived and vary depending on the dose and frequency of administration. Before the Food and Drug Administration (FDA) approval, Botox was responsible for many accidental injuries and deaths. Botox was first introduced in the 1970s when treating Strabismus (a rare eye disorder). It wasn't until 2002 that Botox was approved by the FDA, gaining its widespread popularity as a cosmetic alternative to surgery (Monheit, G.D., & Picket, A., 2017).

Botox has become a multifunctioning therapeutic agent that is often regarded as an object of vanity, contributing to the reduction and appearance of fine lines, wrinkles, and aging. The efficiency and safety of botulinum toxin have recently been greatly improved. Recent studies have proven its beneficial use in non-cosmetic, medical, dental, and surgical operations of the head and neck. As research continues, there's no doubt the number of people receiving botulinum toxin as a therapeutic, non-cosmetic clinical application will significantly increase. The following review examines evidence for botulinum toxin's benefits in the non-cosmetic state of head and neck medicine.

Literature Review

A study from The Journal of Craniomandibular Practice by Guarda-Nardini supported that botulinum toxin type A (BTX-A / Botox) could effectively treat Bruxers' muscle

hyperactivity and Myofascial pain. The individuals in this study included twenty patients (ten males, ten females, aged between 25-45 years) who had either Bruxism or Masticatory myofascial pain (MMP). To be chosen for this study, the bruxer had to be experiencing grinding/bruxing sounds during sleep for the past six months, at least five times a week—as reported by his/her bed partner. Additionally, one or more of the following: attrition, shiny spots on restorations, experiencing pain or fatigue once waking, or masseteric hypertrophy upon digital palpation. Once chosen, ten placebo-controlled subjects received standard saline treatment while the remaining ten subjects received botulinum toxin injections (BTX-A / Botox) for control. A baseline was assessed in addition to clinical follow-ups at one week, one month, and six months after injection. In the patients receiving Botox injections, improvements in both the subjective (pain at rest; pain during chewing) and objective (range of mandibular motion) functions were seen at each of these follow-ups. Descriptive analysis showed that patients who received botulinum toxin type A (BTX-A / Botox) retained more functional improvements than those receiving standard saline treatment (Guarda-Nardini et al., 2008).

Many experimental procedures with a controlled placebo group support Botox as a preventative treatment for chronic migraines. OnabotulinumtoxinA (Botox) was injected into the designated therapeutic sites of the head, neck, and shoulders. Ultimately, the number of days of headache and migraine, the number of cumulative hours of headache, and the number of days of moderate/severe headache were significantly lower than baseline. When treating someone suffering from chronic daily migraines (more than 15 per month), it’s supported that Botox eases pain and severity of migraine symptoms. Subsequently, eye dystonia, tight skin, tingling, neck stiffness, muscle weakness, and neck pain are some of the more inauspicious reactions that can

occur at injection sites (Jackson et al., 2012). However, most found these complications to be minimal and short-lived.

Another clinical trial tested the effects of Botulinum toxin A (BTX-A / Botox) on 15 subjects (eight men and seven women) between ages 28 and 67 who suffered from Trigeminal Neuralgia. Evaluation of symptoms took place at one week, one month, and six months after the injection and effectiveness was noted (Bohuli et al., 2010). In addition to monitoring the length of days, the frequency of TN episodes was also assessed by an analysis of variance and the severity of pain based on Friedman's test. In short, seven patients experienced eradication of symptoms with no further need for medication and the rest of the subjects experienced a higher threshold for pain with significant improvements up to six months after injection. Finally, there were three patients who experienced transient paralysis in their facial nerves, but their complications were minimal and resolved in two of the patients in two weeks and the third patient in three months.

Discussion

Botox is an exotoxin derived from *Clostridium botulinum*. Botulinum toxin works by paralyzing the neuromuscular junction. This happens when the release of acetylcholine from the cholinergic endplate is blocked, causing inactivity of the innervated muscles or glands. In this paper, the cited articles review the evidence of Botox use to relieve pain for those suffering from Bruxism, chronic migraines, and Trigeminal Neuralgia. Because of this, many health professionals recommend Botox as a therapeutic agent in relieving symptoms in the head and neck.

In all three case studies referenced in this paper, participants were seeking pain relief for their head or neck disorders. In each study, patients were first clinically diagnosed to see if Botox

was an option for them. Once they got approval for Botox, they were assessed to see what their symptoms were and the extent they were suffering—this helped the researchers get a baseline. Once baseline was assessed, Botox was injected into the appropriate areas. Each patient was informed of the possible side effects they may experience due to botulinum toxin injections and informed consent was collected prior to the beginning of the study.

All procedures were done in a hospital setting by physicians. For those suffering from Bruxism, a total of 100 units of Type A botulinum toxin (BTX-A) were administered. Intramuscular injections were performed on each side of the face, 30 units within the masseter muscles and 20 units within the anterior temporalis muscles. Those suffering from migraines received injections of OnabotulinumtoxinA (Botox) into designated therapeutic sites in the head, neck, or shoulders. Lastly, patients suffering from Trigeminal Neuralgia received 50 units of Botox in patient-specific trigger zones.

Each study had follow-up appointments between one week and three months post-injection. These appointments served to evaluate if intervention was successful at improving the participant's symptoms. In each study, most patients reported improvements in their symptoms at the first follow-up appointment, with even more reports of improvement at the second appointment. Each study showed improvements in the patient's peripheral and central sensitization. Only a small percentage of participants reported the procedure unsuccessful.

Conclusion

Botox is highly regarded among Dermatologists for its contributions to facial aesthetics, such as the reduction and appearance of fine lines, wrinkles, and aging. However, Botox has now entered a new realm by becoming recognized in head and neck surgery, neurology, and dentistry.

Results of the studies provided indicate that Botox positively affects patients by reducing the number of referred pain episodes as well as a reduction of analgesic drug intake. These results can last between 3 and 12 months, depending on the frequency of treatment. Because of these successful clinical findings, the number of people receiving Botox as a therapeutic agent will likely increase. Though despite amazing results, it's important that more research is done to further the understanding of this drug and any unforeseeable, long-term side effects and/or consequences.

References

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