Introduction

The botulinum toxin (BoNTA) was first conceived for medical and therapeutic uses by a German physician Justinus Kerner (1786-1862) [1]. In 1895, the bacterium was isolated by Emile Van Ermengem. It wasn’t until 1944 when the toxin was finally isolated. The toxins’ high affinity for cholinergic nerve terminals decreases the release of acetylcholine, resulting in muscle paralysis. There are seven serotypes (A-G) of the toxin and each responds to a unique antibody. In 1973, Alan B. Scott found clinical use for the temporary paralysis of musculature and located the mechanism that furthered its development for therapeutic use. BTX-A (BoNTA) is the most commonly used and has less pain associated with the injection, and has a slower onset of action with longer paralysis. In 1989, BoNTA was approved for strabismus, blepharospasm, and hemifacial spasm. In 2000, BTX-B (Myobloc) was approved by the FDA for cervical dystonia. BTX-E and BTX-F is used only for those individuals who are resistant to A and B due to clinical resistance or antibody formation. In 2002, BoNTA was approved by the FDA for temporary treatment of glabellar lines. There are no absolute contraindications; however, many techniques used for the treatment of these pathologies are expensive, invasive for the patient, and may be ineffective. BoNTA inhibits acetylcholine release, blocking or reducing the contraction of muscles which can have a positive outcome for patients with increased muscle spasm, temporomandibular joint pathologies, bruxism, trismus, tolerance of intra-oral prostheses and other oral conditions.

Methods

A literature search of texts, journals and websites was conducted for BoNTA and its use in dentistry. We analyzed the basic science and clinical curriculum of 20 dental and medical healthcare training institutions.

Results

Today’s dentists are prepared to administer BoNTA because of their extensive head and neck anatomical training, pharmacology and the experience acquired from thousands of clinical injections.

Conclusion

Currently, the American Dental Association has not taken a position on the administration of BoNTA by dentists; however, several Dental State Boards have developed, or are developing a policy for its use. This study proposes that dentists should be allowed to inject BoNTA based on their didactic and clinical anatomy courses and clinical curriculum. BoNTA is an effective treatment for oral pathologies.
Methods
A literature search of texts, journals and websites was conducted for BoNTA and its use in dentistry. PubMed was initially used for the literature search, and this was followed up with a literature search using Google Scholar. The specific terms search were “botulinum toxin,” “botox,” “dentistry and botox,” “head, face and botox,” “oral maxillofacial surgery and botox.” We analyzed the basic science and clinical curriculum of 20 dental and medical healthcare training institutions, which were chosen at random. There was no funding for this study.

Results
Textbooks and journal articles revealed multiple uses for BoNTA therapy in treating intra and extra oral pathologies. Results from investigating basic science curriculum and clinical skill instruction, revealed excellent practice, and suggested that dental training safely prepared trainees to administer BoNTA. Generally, dentists receive an accelerated clinical anatomy course below the head and neck and an 11 to 12 week specific course of head and neck anatomy compared to their medical colleagues who receive on average 2 to 3 weeks of head and neck anatomy education during their first 4 years of prequalification training. A contemporary trained general dentist delivers between 3,000 and 4,000 injections at multiple sites intra and extra orally during 4 years of prequalification training. During the first 4 years of medical training, a medical student will give less than 50 injections, which are usually given into large joints or to laceration edges for sutures. In a 3-year or 4-year medical resident training program (family practice, internal medicine, surgical specialties) residents administer considerably less than 3000 to 4000 injections. Both medical and dental students receive comprehensive pharmacology and physiology courses. Many clinical training institutions provide yearly resuscitation courses to maintain updated certifications (Table 2).

Discussion
Historically, many of the neuromuscular pathologies presented to general dentists have been treated surgically by medical physicians, which included oral maxillofacial specialists. BoNTA has proven to be an effective method for therapeutic treatment of many pathologies intra and extra orally.

Botox has been used by head and neck clinicians to treat migraine headaches (Binder et al). Using Botox as part of the arsenal for a dentist would include treatment of headaches or migraines when related to TMD. Therefore, being aware of the classic described sites to inject Botox for migraines would be advantageous: 1. Glabella, 2. Temporal, 3. Forehead Temporal, 4. Forehead, 5. Occipital, and 6. Suboccipital. The drawback for dentists to treat headaches is that they do not receive training about signs, symptoms and differential diagnosis of brain tumors or space occupying lesions. If the headache is due to TMD, they could use Botox to treat accordingly. Implants and other surgical procedures can aid the integrity of the intraoral architecture and maintain the orientation of hard and soft tissues. BoNTA can be administered for extra oral aesthetics to compliment one’s oral-to-face relationships. A compromise would be to allow the general dentist to provide BoNTA injections limited by anatomical boundaries. The authors suggest that injections are limited to the neck and face at or below the infra orbital rims and temporal regions.

There doesn’t appear to be an obvious set of criteria within the healthcare profession to determine who can administer BoNTA injections. The results of this study revealed that a dentally trained clinician has appropriate knowledge and training in the basic sciences and clinical skills compared to contemporary medically trained physicians, which enable them to administer BoNTA injections safely. In order to police a high standard of care and safety, governing boards that decide on which healthcare providers are allowed privileges to administer BoNTA injections could demand regular continuing dental/medical education courses. This would ensure safe treatment to patients and maintain high delivery standards by updating the clinician’s basic science knowledge and clinical skill level.

Dental trainees receive more didactic training of the head and neck region and develop a more extensive repertoire of injection techniques during their training compared to contemporary medical school trainees. Specialty clinics, such as Oral Maxillofacial surgery, are being inundated by patients presenting with facial pain generally treated with BoNTA therapy. Many Oral Maxillofacial surgeons would be grateful if the responsibility for BoNTA injection was shared with their general dentist colleagues. This would allow Oral Maxillofacial surgeons to see potential surgical conditions in a more timely manner, thus better utilizing their specialized training.

Conclusion
This study revealed the training of a general dentist appears to satisfy the basic science knowledge and clinical skills one would need to administer BoNTA injections to the head and neck region.
References


