

BOTOX AND DERMAL FILLERS IN DENTAL CLINIC: TRAINING AND PRACTICE ASSESSMENT

Samira Osailan^{1*}

¹Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia. smosailan@kau.edu.sa

ABSTRACT

Botulinum toxin (BT) is a protein extracted from the bacterium *Clostridium* and dermal fillers (DF) are injectable soft tissue. Both are widely used for cosmetic and therapeutic purposes. Nowadays many healthcare professionals including dentists are using them in their practice. To assess and evaluate if dentists can do BT and DF in their practice and to determine if training is crucial for dentists before they apply BT and DF in their practice. This descriptive cross-sectional study was conducted in Saudi Arabia in 2019. A self-administered questionnaire, which includes 25 questions, was distributed randomly to dentists. The participants answered questions related to their main demographic data, their opinion of who should practice BTX and DF injections, and their experience regarding these procedures. Nearly 71% of participants support the practice of BT and DF in dentistry and most of them find training is crucial before using them. It can be concluded that dentists can use BT and DF only if they are trained and this practice should be safeguarded by local authorities to ensure patients' wellbeing and prevent malpractice.

Key words: Dentist, Botox, Dermal fillers, Cosmetic treatment, Facial aesthetic, Botulinum toxin.

Introduction

Botulinum toxin (BT), known as Botox (BTX), is a protein and a neurotoxin extracted from the bacterium *Clostridium*. It has various types, and the most common type is type A. When BT is injected, it causes temporary inhibition of muscle contraction by blocking the release of acetylcholine from the neuromuscular junction [1]. BT has been used for functional therapy since the 1970s and it has been approved by the FDA for multiple uses such as chronic sialorrhea, glabellar lines, blepharospasm, and so on. Dermal fillers (DF) are injectable soft tissue beneath the skin to restore facial volume loss, correct facial asymmetry or reduce the other facial aging features [2]. They may be composed of collagen, synthetic polymers, or hyaluronic acid and according to the type they can be biodegradable or non-biodegradable [3].

Cosmetic treatment using BT and DF in the past was started by dermatologists and plastic surgeons, but nowadays other healthcare and non-healthcare professionals such as dentists, nurses, and beauticians are providing them. Many dentists around the world are including BT and DF in the patient's dental treatment plan to enhance the overall aesthetic since the perioral tissues contribute to the smile as the teeth do [4, 5].

In a study that was done by Alhamdan *et al.* in 2013 in Saudi Arabia, 128 out of 339 participants are considering adding BT and DF to their dental clinic [6]. Another research shows that many dental clinics are advertising and offering BT treatment along with lip and cheek fillers [7].

Botulinum toxin has been widely used in dentistry for cosmetic and functional purposes. These functional uses include the treatment of temporomandibular joint disorders (TMJD), trismus, gummy smile, high lip line, trigeminal neuralgia, sulcus deepening, and clenching [8, 9]. It is now popularly used for aesthetic reasons such as reducing wrinkle lines, skin folds, and the volume of hypertrophic muscle [10]. BT can be a conservative treatment for high lip line cases due to hypermobility in the lip versus extensive periodontal surgery because crown lengthening jeopardizes the tooth and bone structure. On the other hand, BT treatment is one appointment with no harmful effect on tooth or bone [11]. Dermal fillers are mainly used for facial augmentation to smooth wrinkle lines and to restore the natural convexity and the volume loss that happens with aging [2]. Moreover, it can be used to alter muscle movement either by reducing or increasing its contraction depending on the site of injection [12].

Many studies agree that dental practitioners are specifically suited for offering face rejuvenation cosmetic treatment because they have comprehensive training in the anatomy of the head and neck and they can deal with emergencies in that region [4, 10, 13-15]. Moreover, they are accustomed to injections and they give them daily and work on delicate procedures. In addition, dentists with their knowledge of the facial anatomy and their involvement with infusions, are the best to understand the impact that BT and DF treatment can have on the smile lines and facial contour. Hands-on preparation is significant in figuring out how to give these methods and interweaving them with dental treatment plans. Dental practitioners with appropriate training are generally more capable than other practitioners in providing these

procedures to patients, both for functional and aesthetic needs [16].

Botox and dermal fillers treatment has quickly developed and evolved within dentistry over the last decade. These strategies have become more democratic on the ground that patients need to look better with choices that are obtainable and less radical than surgery. Their utilization in dentistry in Saudi Arabia has increased toward cosmetic treatment. To our knowledge, few studies assess the practice and attitude of dental practitioners towards the utilization of BT and DF for dental treatment.

For the above-mentioned reasons, this study aimed to assess if dentists can do BT and DF in their practice and to determine if training is crucial for dentists before they apply BT and DF in their practice.

Materials and Methods

This descriptive cross-sectional study was conducted in Saudi Arabia in 2018. Ethical approval was obtained from the Research Ethical Committee at the Faculty of Dentistry at King Abdulaziz University. A self-administered questionnaire was randomly distributed to 300 dentists working in different governmental and private settings. The questionnaire was collected either by e-mail or by interview and it was filled anonymously. Dental assistants, students, and interns were excluded from this study. The questionnaire form had 25 questions and some of them are included in (Table 1).

Table 1. Sample of some questions that were asked to participants

What type of practice are you working at?
What is your specialty?
Have you ever received Botox or dermal fillers training?
Do you support dentists using Botox and Dermal fillers?
Have you ever used Botox, Dermal fillers or both in your practice?
In your opinion, which kind of training would be the most appropriate for dentists to use Botox and Dermal fillers in their practice?

The respondent answered 3 main parts; demographic data and education level (age, gender, type of practice, year and country of bachelor's degree, and any other degree and dental specialty). Also, the respondent's opinions on who should practice Botox injections and dermal fillers and what is the most acceptable type of training in this field. Finally, the respondent's experience with BT and DF practice.

Data analysis was done using data statistical software Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive analysis was done for all data. A p-value of 0.05 has been used to indicate the level of statistical

significance, a student t-test to compare the mean of two groups, and a chi-square to determine the association between variables.

Results and Discussion

A total of 210 out of 300 responses were gathered yielding a response rate of 70%. Their age ranged from 24 to 63 years old with a 1.05 female to male ratio. The mean age is 35.98 years old with a standard deviation of 9.29. Among participants, 56.9% were working in governmental practice and 43.1% in private. Data collected shows that 64.8% have a bachelor's degree as their last scientific degree, 22.9% have a master's and 12.4% Ph.D. and 21.9% of them have a board certificate (Table 2).

Table 2. Summarizes the last scientific degree of participants and those who have a clinical certificate in addition

Highest scientific degree / clinical certificate	Valid responses		Percent of cases
	Number of participants	Percent	
Bachelor	136	53.1%	64.8%
Master	48	18.8%	22.9%
PhD	26	10.2%	12.4%
Board certificate	46	18%	21.9%
Total	256	100%	121.9%

The dentists who support dentists using BT and DFs were 70.9%. We studied the relationship between different variables and the answer to the main question: do you support dentists using BT & DF or not (Table 3).

The variables age, gender, experience less than 20 years or more, and country of bachelor graduation were not significant. On the other hand, the type of practice was highly significant p=.003 with 80.9% of dentists working in private supporting it. Also, there was an association between participants who received training vs. not trained participants and those who used BT and DF vs. others who did not use them, and the p-value was less than 0.05 (Table 3).

Table 3. The association between different variables and the answer to the question: do you support dentists using BT and DF.

Variable	Do you support dentist using BTX & DF		P value
	No	Yes	
Age (in mean)	61 (37.64)	143 (35.21)	P=.806
Has used vs not used	Not used Used	60 116 2 30	P=.0002
Gender	Male	36 66	P=.090

	Female	26	80	
Experience	0-20 years	43	111	P= .679
	>20 years	11	24	
Country of graduation (Bachelor)	Saudi Arabia	37	74	P= .390
	Other Arabian countries	22	55	
	Others	3	14	
Type of practice	Governmental	45	73	P= 0.003
	Private	17	72	
Trained vs. not trained	Not trained	58	111	P=.003
	Trained	4	35	

Only 40 out of 210 received Botox or dermal fillers training. 32 participants have used BT, DF, or both. Only 24 of those 32 have received training and 23 used them for functional purposes (TMJ, trismus, hyperactive mentalis muscle, deepening the sulcus, clenching, and deepening the sulcus) and 27 of 32 used them for cosmetic purposes (facial wrinkles, facial augmentation, acne, and scars) (Tables 4 and 5).

Table 4. The different types of functional therapy that were provided by participants using BT and DF

Functional therapy type	Valid responses		Percent of cases
	Number of participants	Percent	
TMJ	8	20%	36.4%
Trismus	5	12.5%	22.7%
Clenching	4	10%	18.2%
Gummy smile	19	47.5%	86.4%
Deepening the sulcus	2	5%	9.1%
Others	2	5%	9.1%
Total	40	100%	181.8%

Table 5. The different types of functional therapy that was provided by participants using BT and DF

Cosmetic treatment type	Valid responses		Percent of cases
	Number of participants	Percent	
Facial wrinkles	21	55.3%	80.8%
Facial augmentation	13	34.2%	50%
Scars	2	5.3%	7.7%
Acne	2	5.3%	7.7%
Total	40	100%	146.2%

Most of the participants 94% agreed that dentists should use BT & DF only if they are trained. Another question was what is the most suitable training needed for the dentist in order to practice BT & DFs and the most chosen answer were

respectively; clinical certificate, workshops, conferences, diploma (Table 6).

Table 6. The percentages of the training types chosen by participants which they think it is appropriate before practicing BT and DF.

BT and DF Training Type	Valid responses		Percent of cases
	Number of participants	Percent	
Academic degree	63	15.8%	30.3%
Diploma	81	20.4%	38.9%
Clinical certificate	2132	33.2%	63.5%
Online Training	6	1.5%	2.9%
Workshops	100	25.1%	48.1%
Industrial Training	16	4%	7.7%
Total	398	100%	191.3%

The result of this current study showed that 70.2% of participants support the practice of BT and DF by dentists. Other similar studies agree with this finding and many authors from other countries advocated the use of those materials in the dental clinic [4, 15]. In the United States of America (USA) there are many dentists with appropriate training who are practicing BT and DF and they are very popular in their private practice according to the USA law nobody could do this without their party being confirmed by the authority and this again confirms that dentist can do BT and DF with appropriate training. Alhamdan (2013) found that lack of knowledge refrained 46.8% of dentists working in the government sector from using it and that is because dentists in the private sector have more knowledge regarding these materials due to their interaction with dermatologists and plastic surgeons more often [6].

Many healthcare professionals approved the use of BT and DF by dentists. In a previous study by Small *et al.* in 2014 that was based on a questionnaire and completed by over 880 plastic surgeons worldwide and interestingly those participants support other healthcare providers such as dentists who do them with appropriate training [17]. These required training and a standard practice guideline are mandatory to ensure consistency, and reproducibility and to avoid harmful effects on patients. The GDC expects only competent dentists to perform them to stick to the Council’s standard and prepare to back up any decision which been made [18].

The provident of BT for cosmetic treatment by dental practitioners is also familiar to the public. A survey in 2018 was done in the UK by the GDC asking the public the following question, “If you were considering having Botox injections for cosmetic reasons, how confident, if at all, would you be for people in the following jobs to administer the injection.” The results show comparable percentages

between dentists and general practitioners as administrators for these injections [7].

There are countries where they are considering the introduction of BT and DF contents to the dental undergraduate degree and to include it in their curricula such as the UK and this can be achieved through training them on the pharmacology of these materials, the injection techniques, and the aging anatomy and this is in alignment with the GDC regulation which is the government body for safeguarding these procedures in the UK [19].

It is a very important point to mention that in the upcoming years' dental schools will be teaching the use of BT and DF because it is already within the scope of dental subjects, like head and neck anatomy and it will just add the anatomy of aging and that is a part of it. Also, knowing the pharmacology and pharmacokinetics of BT and DF can be taught easily within the pharmacology course which is already there. For injection techniques, dental students learn different techniques like the intra-muscular and the dental intra-oral injection, which are even more difficult comparing it to very simple subcutaneous injections in the face. Thus, all these areas are already familiar and easy to be taught for dental students.

In summary, this study supported dentists doing BT and DF with the appropriate training and evidence showed that this statement is also being supported in different countries like the UK and other European countries. Moreover, In the USA some dentists had training and are already practicing BT and DF legally. Many dental practitioners around the world are treating patients with BT and DF for functional purposes like clenching, sulcus deepening, gummy smile, and TMJD and this has already been proved in the literature that people with a dental background are doing those procedures. This study has included the cosmetic treatment using BT and DF by dentists and as mentioned before they should have adequate training as a prerequisite for practicing them.

Conclusion

In conclusion, dentists can do BT and DF in their practice for functional and cosmetic purposes after receiving pertinent training. This practice must be safeguarded by the local authority such as the Saudi Commission for Health Specialties by providing guidelines to limit their use to qualified dentists and ensure the patient safety and well-being and prevent malpractice.

Acknowledgments: Special thanks to the Deanship of Scientific Research (DSR) and the Faculty of Dentistry at King Abdulaziz University, Jeddah, for supporting this project

Conflict of interest: The authors declare that there are no conflicts of interests.

Financial support: The study did not receive any external funding.

Ethics statement: Ethical approval was obtained from the Research Ethical Committee at Faculty of Dentistry in King Abdulaziz University, Jeddah, Saudi Arabia (Ethical approval number: 039-03-17). Participants were informed that their participation is voluntary and filling the questionnaire indicates their consent to participate.

References

1. Dunlop N, Abramowicz S, Fisher E. Pharmacology of Aesthetic Medicines. *Oral Maxillofac Surg Clin North Am.* 2018;34(1):189-200.
2. Labadie JG, Dover JS, Alam M. New Toxins and Fillers on the Horizon: Implications for Both Patients and Practices. *Adv Cosmet Surg.* 2018;3(1):123-34.
3. Ballin AC, Brandt FS, Cazzaniga A. Dermal fillers: an update. *Am J Clin Dermatol.* 2015;16(4):271-83.
4. Roberts W. Incorporating facial rejuvenation procedures in the dental practice. *Today's FDA.* 2013;25(2):50-3.
5. Malcmacher L, Kosinski T. Bruxism, Botox, and Dental Implants. *Dent Today.* 2017;36(4):94-6.
6. Al Hamdan EM, Algheryafi AM, Al-Ghareeb FJ, Ashri NY. Knowledge and attitude of dentists towards the use of botulinum toxin and dermal fillers in dentistry, Riyadh, Saudi Arabia. *J Cosmet Laser Ther.* 2013;15(1):46-54.
7. Sinha, Aditya, Megha Hurakadli, and Pramod Yadav. "Botox and derma fillers: The twin-face of cosmetic dentistry." *International Journal of Contemporary Dental and Medical Reviews* 2015: 131214.
8. Kwon KH, Shin KS, Yeon SH, Kwon DG. Application of botulinum toxin in maxillofacial field: part I. Bruxism and square jaw. *Maxillofac Plast Reconstr Surg.* 2017;41(1):38.
9. Archana MS. Toxin yet not toxic: Botulinum toxin in dentistry. *Saudi Dent J.* 2016;28(2):63-9.
10. Sheen D, Clarkson E. Botox and Dermal Fillers: Review and Its Role in the Dental Office. *Dent Clin North Am.* 2018;64(2):325-39.
11. Duruel O, Ataman-Duruel ET, Berker E, Tözüm TF. Treatment of Various Types of Gummy Smile with Botulinum Toxin-A. *J Craniofac Surg.* 2017;30(3):876-8.
12. de Maio M. Myomodulation with Injectable Fillers: An Innovative Approach to Addressing Facial Muscle Movement. *Aesthet Plast Surg.* 2018;44(4):1300-16.
13. Tran Cao P. The Use of Botulinum Toxin and Dermal Fillers to Enhance Patients' Perceived Attractiveness: Implications for the Future of Aesthetic Dentistry. *Dent Clin North Am.* 2017;64(4):659-68.
14. Malcmacher L, Krever K, Feck A. Total facial aesthetics for the general practitioner. *Dent Today.* 2010;29(4):136-8.

15. Costa LE, 2nd. The dentist, botox, and injectable fillers. *J Esthet Restor Dent.* 2014;26(1):1-4.
16. Malcmacher L. Do dentists practice medicine? *Dent Today.* 2012;31(3):18-20.
17. Small K, Kelly KM, Spinelli HM. Are nurse injectors the new norm? *Aesthet Plast Surg.* 2014;38(5):946-55.
18. GDC. Principle One: Put Patients' Interests First Frequently Asked Questions UK: General Dental Council; 2013.
19. Walker TWM, Gately F, Stagnell S, Kerai A, Mills C, Thomas S. Can UK undergraduate dental programmes provide training in non-surgical facial aesthetics? *Br Dent J.* 2017;222(12):949-53.