

Botox: a possible new treatment for gummy smile

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Abstract:

A case is described where a patient complaining of a gummy smile is treated with Botox to reduce hypermobility of her upper lip. Whilst the initial result caused the patient some concern, 3 months after the initial procedure the patient was delighted with the results obtained. The results are completely reversible so 6 months after the initial treatment the patient had reverted back to the original situation. The procedure gave the patient some indication of the aesthetic changes that could be achieved, so she was able to make an informed decision as to whether to pursue further treatment or not.

INTRODUCTION

“The smile is the most recognisable signal in the world. Smiles are such an important part of communication that we see them far more clearly than any other expression. We can pick up a smile at 300 feet – the length of a football field”¹

Just as a nice smile can act as a powerful communication tool, an unpleasing smile can have the equally powerful negative impact and this is often one of the reasons why patients seek orthodontic treatment. This case report details a relatively new technique used in an adult patient who presented to us complaining of a ‘gummy smile’.

The gummy smile is a condition characterised by an excessive display of maxillary gingivae during smiling. Sexual dimorphism in smile types indicates that females are twice as likely as males to have gummy smiles.² A gummy smile may be present due to many factors. Hyperfunction of the upper lip elevators muscles (levator labii superioris, levator labii superioris alaquae nasii, levator anguli oris, and the zygomaticus muscles) can all play a major aetiological role in gummy smile and vertical maxillary excess may also be a contributory factor. Most cases of gummy smile will have skeletal gingival and muscular factors. Gingival inflammation resulting from medication or exacerbated by orthodontic appliances contributing to a reduced effectiveness of tooth cleaning can also cause excessive gingival show. Another possible reason for a gummy smile is altered passive eruption when the gingivae does not recede to a normal level after the teeth have erupted. Also when a person has parafunctional habit such as bruxism, this can lead to excessive tooth wear and the teeth will appear short, and the gingivae excessively prominent.

There are a number of different treatment methods described in the literature for the treatment of gummy smile. These includes both surgical and non-surgical options including; Le Fort 1 osteotomy, crown lengthening procedure, maxillary incisor intrusion, self curing silicone implant injected at the anterior nasal spine and finally myectomy and partial resection of the levator labii superioris or muscle repositioning.

Some patients do not wish to go through the long pre-surgical orthodontic treatment in preparation for a Le Fort 1 osteotomy. Others wish to avoid the possible complications surrounding surgery such as post-operative pain, swelling and infection, permanent or temporary nerve damage, root damage during osteotomy, surgical and/or orthodontic relapse, possible need for blood transfusion, and finally a less than optimal occlusal outcome.

A non-surgical alternative for reducing excessive gingival display may therefore offer a desirable treatment option for number of selected patients. Botulinum Toxin, 'Botox' have been used in medicine since the 1970s for treating excessive muscular contraction as seen in strabismus and cerebral palsy and in dentistry for treating facial pain and headaches. Since 1987 its use has increased dramatically in cosmetic treatment of overactive facial muscles which cause wrinkles.

It is a purified botulinum toxic type A isolated from the controlled fermentation of *Clostridium Botulinum*, an anaerobic bacterium. It is produced as a stable, sterile, vacuum-dried powder to be used after dilution with saline solution without preservatives⁴. Botox blocks muscular contraction by cleaving synaptosome associated protein SNAP-25 which blocks acetylcholine release thus neuromuscular transmission from motor neurones for 3-6 months. It does not interfere with acetylcholine production, and the effect is almost always completely reversible within 6 months. Some patients however have reported a longer duration when exposed over a prolonged period of time⁵.

The use of Botox has been previously been reported where a series of 5 patients with excessive gingival display gave informed consent for the treatment of their gummy smiles⁶. All five patients saw improvement by 10 days and there was an average lip length increase of 4.2mm and a similar decrease in the amount of gingival show. The effect lasted between 3 and 6 months.

The following case report describes Botox being used as a treatment for gummy smile in a female adult patient, for whom orthognathic treatment was thought inappropriate.

Case History:

A female estate agent, aged 35 years, was referred by her general dental practitioner complaining of a 'gummy smile'. She was very concerned about the excessive gum show on wide smiling which she felt contributed to her 'not smiling' at business colleagues and potential customers. This she felt had a significantly detrimental effect on the success of her business.

She presented with a class I incisor relationship on a class I skeletal base and her Frankfort mandibular plane angle was increased. Her lips were competent and there was a normal lip line with 6mm incisor show at rest but a 7-8mm gingival show on wide smiling which was the main cause for concern for the patient. The upper lip was 20mm long at rest (Figure 1a-d).



Fig. 1c Fig. 1d
Excessive gingival show on wide smiling

Intra-orally both lower second premolars were congenitally absent and both lower second deciduous molars were still present and healthy. There was very minor crowding in the upper arch with average inclination of upper incisors. The lower arch showed moderate crowding in with average inclination of lower incisors. She had a class I canine and molar relationship bilaterally (Figure 2a-d).



Fig. 2a



Fig. 2b



Fig. 2c



Fig. 2d

Intra oral photographs showing absence of significant malocclusion

Treatment plan:

The patient was seen on a joint orthognathic clinic and the following treatment options were all fully discussed:

1. Surgical crown lengthening and veneers to reduce the gingival show
2. Le Fort I osteotomy with anterior and posterior maxillary impaction to reduce the excessive maxillary show on wide smiling.
3. Administration of Botox to reduce upper lip hypermobility to reduce the excessive gingival show.

The three treatment options were discussed in some detail with the patient. As there was no significant malocclusion option 2 was discounted immediately. The patient considered option one but then felt if a less invasive treatment could give her an idea of the possible aesthetic improvement she would like to give this a try. Treatment option three was agreed upon and arrangements made to carry out this treatment.

Treatment progress:

The 160 U Botox powder was supplied pre-mixed with 4ml of saline and was therefore provided at 40 units /ml. The Botox was injected in small increments following aspiration into the upper circumoral musculature with the aim of effecting Levator Labii Superioris and the zygomatic muscle areas, in an effort to reduce the patients upper lip hypermobility.

Post-operative period

The patient presented a week after Botox injections and was a little distressed. She said the Botox had started to take effect after a couple of days but now she reported difficulty in pronouncing Ps and Bs, and also difficulty in eating.

On examination her upper lip was much less mobile than on initial presentation. On wide smiling the right hand side of her lip covered the gingival margins and cervical 1/3 of the right incisors and on the left- hand side the upper lip still only retracted to about the gingival margins of the incisors as shown in Figure 3a-h. There was a slight asymmetry of the upper lip about which the patient was very concerned. At this stage the patient was reassured that the asymmetry would gradually become less noticeable and that her speech would soon return to normal and a review appointment was arranged for 2 weeks later.



Fig. 3a



Fig. 3b



Fig. 3c



Fig. 3d



Fig. 3e



Fig. 3f



Fig. 3g



Fig. 3h

1 week post Botox
reduced movement of upper lip but asymmetric

The patient returned for the next review and reported that by necessity she was eating much more slowly she had lost approximately 6Kg in the 3 weeks since the Botox injections

to upper lip. She was absolutely delighted about this weight loss. The asymmetry in the upper lip was less noticeable and the patient was generally happier about the changes in her appearance.

Patient was kept under regular reviews and the aesthetic results continued to improve as the Botox effect gradually wore off. The asymmetry of the upper lip continued to reduce and 3 months after the procedure was performed the lip retraction was almost at the ideal level. On wide smiling it was impossible for the patient to show more than a couple of millimetres of gingivae above the upper central incisors. At this stage the patient was delighted with the result (Figure 4a-g).



Fig. 4a

Fig. 4b



Fig. 4c

Fig. 4d



Fig. 4e

Fig. 4f



Fig. 4g

50% reduction in gingival show after 3 weeks.
Lip position better on the right than the left

Six months after the Botox treatment, its effect

has completely worn off as can be seen in Figure 5a & 5b and we were back again to the initial situation of the patient showing about 8mm of gingivae on wide smiling.



Fig. 5a

Fig. 5b

6 months post Botox
patients lip has reverted to the original situation

DISCUSSION

On initial presentation the patient had a more than acceptable occlusion and neither wanted nor needed a prolonged course of orthodontic treatment. Whilst a Le Fort one procedure was described in some detail to the patient she was not really interested in this level of intervention.

Botox has been widely used in dentistry for the treatment of hyperfunctional facial lines, temporomandibular disorders, masseteric hypertrophy, hemifacial spasms, myofascial pain and bruxism. In this case report Botox has been used for treatment of hypermobile upper lip as a simple and minimally invasive correction method of gummy smile. Initially, perhaps due to unequal administration of the Botox the patient was left with a slight asymmetry about which she was concerned. Also the slight alteration to the patient's speech came as a surprise and the patient should be warned about this possible side effect of the Botox. The loss of weight, which in this particular case was most welcome, was another unexpected side effect of the treatment and this possibility should also be outlined to the patient.

One major advantage of this approach to treatment was that it was 100% reversible so if there is any aspect of the appearance change about which the patient is unhappy they can be reassured that the effect is temporary.

For some of our patients with unaesthetic smiles patients due to over retraction of the upper lip but with no obvious malocclusion that needs correcting, Botox may provide a medium term solution provided they are willing to undergo repeated injections every 6 months. Repeat treatments should allow

accurate titration of the optimal dose of Botox for each particular patient.

CONCLUSIONS

Injection with Botox provides effective, minimally invasive, temporary treatment of gummy smile for patients with hypermobile upper lip, which can be repeated if the patients like the aesthetic improvement achieved.

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