

MANAGEMENT OF GUMMYSMILE WITH BOTULINUM TOXIN – A CASE REPORT BY PANDAS0301 PROTOCOL.

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ABSTRACT

The requisite of being effortlessly beautiful and presentable has been a prime concern of the modern world. Among the apprehensive populace, lip esthetics concerned with gummy smile has been considered as a hindrance in an alluring smile. Botulinum toxin type A, being a savior is a minimally invasive procedure, does the needful amend for hyper active lips causing gummy smile by chemically decreasing the muscle activity. Rational injection points will undoubtedly be doing wonders in ones lip esthetics. Here is a case presentation of a patient complaining of unaesthetic & unpleasing smile due to excessive gingival display due to hyperactive lip elevator muscles. A modified 2 injection points, achieved a desired aesthetic smile. We name it as “**Pandas0301 protocol**” for managing a gummy smile with 5mm of excessive gingival display.

KEYWORDS: Botulinum toxin, Pandas0301 protocol, Botox, Siax, Gummy smile, hyperactive lips, Lip aesthetics

INTRODUCTION

Smile is a global way of expressing gratitude and politeness towards others and it has a few clinically appreciable components like the full smile, medial folds of smile, upper lip elevation etc. The muscles responsible for these clinical appearance are levator labii superioris, levator labii superioris alaeque nasii, zygomaticus major and zygomaticus minor and to some extent superior fibers of buccinators¹.

Gummy smile is a condition displaying excessive amount of gingiva upon smiling, more than the imperative amount of 3mm for a perfect smile, ranging from 5 to 8 mm. As a perfect esthetically sound smile depends not only on the teeth and lip framework but also the gingival scaffolding², gummy smile is an issue of concern both esthetically and psychologically. This has varied reasons ranging from skeletal defects like vertical maxillary excess, muscular malfunctioning with hyperactive lip elevator muscles, periodontal issues

regarding delayed passive eruptions and some other orthodontics reasons ranging from bimaxillary protrusion to incompetency of lip due to short upper lip length which has an ideal measure of 20-22 mm in young adult females and 22-24 mm in young adult males³.

The potential treatment aftermath includes various surgical procedures like Lefort I osteotomy, crown lengthening procedures, muscle resection, lip repositioning, etc and a very feasible non- surgical minimally invasive approach with the use of botulinum toxin type A⁴. Not every cause of gummy smile can be treated with botulinum toxin as diagnosis of the case plays a prime role. Diagnosing a case well before outlining its treatment has been of vital importance considering all the factors in the ultimate lip esthetics to be achieved. Hence we deduce the inclusion criteria for treating gummy smile with botulinum toxin type A as ‘the gummy smile resulting from hyper

functional and hypertonic upper elevator lip muscles with slight incompetency⁵.

Botulinum toxin, abbreviated as BTX or BoNT, is a neurotoxin protein produced by fermentation of clostridium botulinum. Out of 7 distinct botulinum toxins produced by different strains, botulinum toxin type A has been used more often, under the trade names like Botox, Siax, Dysport, Xeomin, etc. SIAX is a sterile, stable, vacuum freeze dried powder supplied in 100 U vials and is heat labile with a mandatory storage at 2-4 degrees. Its action on muscles causes a chemical partial denervation of muscles via mechanism of obstructing the release of neurotransmitter acetylcholine at the neuromuscular junction leading to decrease in the muscle activity of the hyperactive muscle. Zooming in further we learn that the Snare Protein complex (SNAP-25, synaptobrevin and syntaxin) that helps the neurotransmitter acetylcholine vesicle to bind to the presynaptic membrane to facilitate further release of Ach towards the Ach receptors on the muscle, its action is put to halt by the heavy chain of botulinum toxin type A by cleaving SNAP 25⁴. Botulinum Toxin has been used in many fields of medicine including ophthalmology, dentistry, pain management etc.

In the field of facial aesthetics, the US FDA has approved the use of Botulinum toxin for use in Forehead lines, frown lines and crows feet. We use Botulinum toxin in management of gummy smile by the “**Pandas0301 protocol**” as an off label use.

CASE REPORT - A male patient aged 22 years complaining about his lip esthetics was well judged as a case of gummy smile with hyperactive lip muscle as the patient satisfied the inclusion criteria mentioned earlier for treatment with botulinum toxin. The patient had competent lips at rest with 21 mm of lip length and wide unposed smile with gingival display of 5mm in the maxillary anterior region (Fig 1. and 2.) Hence he was injected with the same material and method discussed below under sterile conditions.



Fig.1 - Preop posed smile



Fig.2 - Preop unposed smile showing excessive gingival display (5mm)

TREATMENT PROCEDURE -

Materials required:

Botulinum toxin type A (SIAX) was used in the above mentioned case that was studied, reconstitution of the same was done as follows:

- Requirement- A vial of 100 U of botulinum toxin type A (SIAX- MEDYTOX), BD syringe with needle of 30 gauge, preservative free normal saline.
- Reconstitution- The reconstitution of the toxin is considered very important as it plays a cardinal role in calculating the units to be delivered to the patient. 1 vial of SIAX (Medytox) contains 100 U of botulinum toxin type A with 0.5 mg human albumin and 0.9 mg of sodium chloride.

This is then infused with 2.5 ml of 0.9% preservative free saline giving us a solution ready to be injected in the muscles of the patient. Hence 1ml of this solution will contain a total of 40 units of botulinum toxin type A which can be easily calibrated in a BD syringe.

Method- With gummy smile as the point of interest, the muscles (LLS-Levator labii Superioris, LLSAN – Levator Labii Superioris Alaeque Nasi, ZMi-Zygomaticus minor) related to it are the ones to be targeted. Hence deriving points of injections to the above stated muscles clinically is mandatory. After performing Botulinum toxin injections for a number of patients with gummy smile due to hyperactive upper lip levator muscles, the author derived that injecting at 2 points on either side as described below produced the best results. Hence we named it as “**Pandas0301 protocol**”, wherein the first point of injection was the “Yonsei Point” where 3 U were injected and the second point was just lateral to ala of nose, where 1U was injected.(Fig. 3) The first point or the “Yonsei point” is where the 3 elevator muscles overlap and the second point was where the LLSAN is. Yonsei point is simplified by marking 3 different points for each muscle, lateral point of ala (for LLSAN), midpoint of nasolabial fold between the ala and the lip commissure (for LLS) & a point located at one quarter distance between ala and tragus (for ZMi) , and then amalgamating it to form a triangle with the center of the triangle being the point of target².

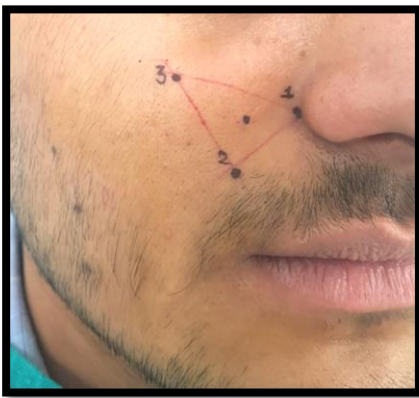


Figure 3 - Points of injection: Point Y and Point 1

The second point being the point where LLSAN is, this muscle elevates the lip and also flares the nostrils while in action. Hyperactivity causes gummy smile and widening of nares, both of which appear unaesthetic. This point is just lateral to ala of nose.² [Point 1 in Fig.3] Injecting 3 U at first point and 1 U at second point, i.e. 4 U on either side and accounting to a total of 8 U bilaterally gave us a pleasing aesthetic smile by correcting the lip lift and flaring of nostrils. (Fig.4)



Figure 4 - Postoperative unposed smile

FOLLOW UP- The patient was recalled after 4 days to check on the onset of the botulinum toxin resulting in the initial decrease in the muscle activity and again after 3 weeks to examine the absolute effect of the toxin on his muscles dealing with gummy smile. The aftermath of the 2nd visit was a very satisfactory smile with minimal to no gingival display in the maxillary anterior region upon both posed and unposed smile.(Fig.4) A follow up at 17 weeks showed the condition as it was preoperatively i.e. with an excessive gingival display.

DISCUSSION-

The study of the anatomy of facial muscles controlling the movements of the upper lip and being thorough in its clinical importance pertaining to the components of the smile is very important in diagnosing a case of gummy smile for treatment with botulinum toxin. The use of botulinum toxin therapy as an adjunct to surgical and orthodontic

treatment is of prime concern for the practitioner as our lip esthetics and the overall picture of esthetic dentistry are dependent on all the three elements as mentioned before i.e teeth , our lip scheme and the gingival arena.² As dentists, we ace theoretical aspect of the oral and maxillofacial area and should make it a point to reflect the same in our practice. Moving towards the clinical results given by botulinum toxin it is important to be well aware that the action of the toxin commences in 3-4 days (to disrupt the synptosomal process), while the maximum effect is seen in 2- 3 weeks and the effect lasts for a period of 3-4 months.⁶ Botulinum toxin inspite of being minimally invasive and preferred treatment is subject to timely replenishments due to the reversal effect of the toxin which includes axonal sprouting , regeneration of SNAP-25 , development of extra junctional Ach receptors and re-innervation of the muscle with respect to the crucial fact of antibody formation against it if not take care of the intervals in between the injections,^{4,6} only after the absolute effect of the toxin is vanished the patient is subjected to the next needed dose. The maximum recommended dose of botulinum toxin type A in treating adults should not exceed more than 360 u in a time interval of 3 months. With its efficacy in managing many other Maxillofacial conditions like masseteric hypertrophy, post orthodontics treatment to train the muscles in a particular fashion to avoid relapse , bruxism , implants , etc. botulinum toxin therapy is fast becoming a preferred nonsurgical therapy in not only in Dentistry but in aesthetics, ophthalmology, pain management etc.^{4,6} A few contraindications of botulinum toxin include hypersensitivity or allergies to human albumin or botulinum toxin, neuromuscular disorders like myasthenia gravis ,eaton-lambaert syndrome etc, medications like aminoglycosides , calcium channel blocker and antimalarials, and prior infection or inflammation at the injection site.⁴ Understanding the science is equally important as understanding the method of injection. As described above the

unaesthetic appearance due to the hyperactive upper lip levator muscles ie. LLSAN, LLS, ZMi is because of excessive gingival display due the excessive lift of the lip due to traction of the upper lip levator muscles and also the flaring of the nares due to LLSAN. To counter this unaesthetic appearance, injecting botulinum toxin into the areas that would relax these hyperactive muscles by chemically denervating them would improve the smile drastically.¹ As explained in previous section, points of injections, “**Pandas0301 protocol**” should be clearly marked and the injections should be made perpendicular, entering half to three quarters the needle length of insulin syringe, thereby entering right into the muscle mass.

CONCLUSION-

The points of injection as mentioned here as “**Pandas0301 protocol**” provided excellent results by reducing the lip elevation and also flaring of the nostrils. Although it is a modification to Yonsei point injections, its efficacy in improving the smile was significant. Simple to master, this protocol can be followed for all unaesthetic gummy smile cases due the hyperactive levator muscles.

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