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# Horizontal animation deformity as unusual complication of neurotoxin modulation of the gummy smile

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## Abstract

Injections of botulinum toxin type A represent the most common nonsurgical cosmetic treatment worldwide. The authors report a case of dynamic horizontal wrinkling in the upper lip that appeared after botulinum toxin type A injections to treat gummy smile associated with nasal alar base reduction, in a 28-year-old woman. The anatomic features and pathogenic mechanism underlying this unusual complication are analyzed and discussed.

*Keywords: Botox, botulinum toxin, facial rejuvenation, gummy smile*

## Introduction

The use of injections of botulinum toxin type A for aesthetic purpose is rapidly growing in the Asian population, especially to treat dynamic wrinkles and hypertrophy of masseter muscles [1]. A recent trend in this targeted population also includes the treatment of gummy smile. This condition is currently corrected by injections in the levator labii superioris alaeque nasi and the levator labii superioris [2-5]. Analogous approach is also successfully adopted to reduce the nasal alar base width during smiling and to correct facial synkinesis [6, 7]. The aim of this report is to present an unusual complication observed after botulinum toxin type A injection for gummy smile associated with nasal alar

base reduction, which may also potentially occur in case of synkinesis treatment.

## Case Synopsis

A 28-year-old woman presented to our outpatient clinic complaining about gummy smile associated with excessive width of the nasal alar base. This condition was highly emphasized while smiling, engendering social discomfort and embarrassment for the patient (**Figure 1A, B**).

The treatment was conducted in accordance with our protocol for gummy smile and nasal alar base reduction, which includes botulinum toxin type A injection into the levator labii superioris alaeque nasi and the levator labii superioris, one site per muscle, 2.5 unit per site. At one-week follow-up, we observed disappearance of the gummy smile and tightening of the nasal alar base as expected. However, an unusual complication was also noticed. A horizontal depression line appeared when the patient was smiling, and this became even more obvious when she was laughing (**Figure 1C-E**). This condition disappeared at the 3-month follow-up when the botulinum toxin type A effect resolved.

## Case Discussion

The interest in ethnic cosmetic surgery has grown tremendously over the past decade, leading to various treatments of different anatomic regions



**Figure 1.** Pre-treatment views of a 28-year-old Asian female patient with a complaint of gummy smile and excessive width of the nasal alar base, **A)** in static condition, and **B)** while smiling. Post-treatment views one month after botulinum toxin type A injection into the levator labii superioris alaeque nasi and the levator labii superioris. **D)** A horizontal depressing line is observed while the patient smiles, **D-E)** and becomes more evident while she laughs. A decrease in upper lip elevation is also noted in dynamic conditions.

characterized by ethnic specific features, such as the gluteal region and the face [6-9]. In this regard, face rejuvenation with injectables or fillers certainly is one of the most relevant areas of interest for the cosmetic surgeon. Notably, treatment with botulinum toxin type A of the lower face in women specifically includes injections in the masseter muscle, the hypertrophy of which is possibly associated with a prominent mandibular angle leading to a square face [1]. In addition to this common indication, a growing request for dynamic wrinkles and gummy smile correction has also been reported [3-5, 10]. Gummy smile is effectively treated by injection of botulinum toxin type A into the levator labii superioris alaeque nasi and the levator labii superioris muscles, offering a safe treatment with low complication rate [11].

A similar approach is currently used in our practice to treat cases of excessive width of the nasal alar base. This condition is often associated with characteristics that create the gummy smile, which generally becomes more manifest during smiling and laughing. Alar base reduction can be indeed

successfully achieved with the classical treatment for the gummy smile. Paralysis of these muscles is recommended for the desired and uneventful result. However, in the present case, we observed as a complication a horizontal depression line appearing when the patient was smiling, which became even more obvious when she was laughing. This was not previously reported in other articles on gummy smile and synkinesis treatment with botulinum toxin type A injections; generally, the major adverse effect is asymmetric smiling and oral motor insufficiency and pain [11].

A possible explanation for this phenomenon may be the physiological dynamics of the smiling process, which indeed involves the levator labii superioris alaeque nasi, the levator labii superioris, the zygomaticus major and minor, and the risorius. These muscles work by pulling the upper lip in different directions: levator labii superioris alaeque nasi and levator labii superioris, superiorly, and the zygomaticus major and minor, superiolaterally. Instead, the risorius pulls the oral commissure laterally. In our case, the levator labii superioris

alaeque nasi and the levator labii superioris were paralyzed. The risorius and the zygomaticus major muscles were still active after our injections, generating lateral pulling of the upper lip, which resulted in a thinning in the lower half of the upper lip. Meanwhile, the levator labii superioris alaeque nasi and the levator labii superioris failed to pull the upper part of the upper lip superiorly, resulting in a redundancy of labial tissue at this part during smiling. We therefore hypothesize that this resulting difference of tissue thickness in the upper and lower halves of the upper lip was responsible for determining the horizontal wrinkle when the patient was smiling or laughing.

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## Conclusion

Attention should be paid when reducing the nasal alar base or gummy smile or treating synkinesis with botulinum toxin type A injection. A horizontal depression line could appear as a consequence of unevenly balanced lip elevator muscles.

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## Potential conflicts of interest

The authors declare no conflicts of interests.