New Insights for Botulinum Neuromodulator Targets for Correction of the Nasolabial Fold and Midface Rhytids: An Anatomic study and Introduction of the Malar Levator Muscle

Background: An acute nasolabial angle and prominent medial nasolabial fold are features of the aging midface (1). The medial nasolabial fold is a difficult area to correct and is not easily addressed by current facelift procedures. As minimally invasive procedures are becoming mainstay in aesthetic surgery (2), botulinum toxin has become a preferred method for treating dynamic facial rhytides. We therefore sought to identify relevant nasolabial fold and midfacial musculature anatomy to determine the ideal location of neurotoxin injection for patients with prominent nasolabial folds and midface rhytids.

Methods: Twelve hemifacial cadaveric dissections were performed to expose the midfacial muscles and identify their origin, points of insertion, relationship to surrounding musculature, greatest width, and vector of pull. Particular attention focused on the levator labii superioris alaeque nasi (LLSAN), levator labii superioris (LLS), nasalis, and orbicularis oris. Measurements were obtained based on palpable surface landmarks, including the medial canthus, for future neurotoxin injection.

Results: The central portion of the LLSAN was located 8.4 (+/- 0.9) mm inferior and 4.6 (+/- 0.8) mm medial to the medial canthus. Insertion sites included the medial nasolabial fold and alar base. The LLS has a broad insertion into the middle third of the nasolabial fold before extending to meet the obicularis oris at a point 4.5 (+/- 0.4) cm inferior and 5.9 (+/- 0.8) mm lateral to the medial canthus. We also uncovered a tubular muscle, obliquely oriented between the orbital obicularis oculi and the LLSAN, separated by adipose tissue, with its cephalad origin in continuity with the LLSAN and its insertion into the malar fat pad. This so-called "malar levator" was found in all twelve specimens and diverges from the LLSAN 8.7 (+/- 2.1) mm inferior and 2.8 (+/- 0.5) mm lateral to the medial canthus. The affects of this muscle on medial periorbital rhytids and the tear trough deformity were observed in the live patient.

Conclusion: This cadaveric study further defines the musclular anatomy of the midface and medial nasolabial fold and provides new insights into the use of neuromodulators for midfacial rhytids, tear trough deformity, and the medial nasolabial fold, all of which are challenging areas to correct with current surgical techniques. Neuromodulators may be sufficient to provide a youthful midface and soften the snarl appearance that comes with age, without affecting the upper lip.

1. Pessa JE: Improving the acute nasolabial angle and medial nasolabial fold by levator alae muscle resection. Ann Plast Surg. 1992; 29:23-30.
2. American Society of Plastic Surgeons. 2015 plastic surgery report. 2000/2014/2015 national cosmetic procedures. Available at: http://www.plasticsurgery.org/Documents/news-resources/statistics/2015-statistics/cosmetic-procedure-trends-2015.pdf. Accessed February 26, 2016.