

Botulinum neurotoxin in plastic surgery—what's the evidence for effectiveness?

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Botox and other botulinum neurotoxin (BoNT) products are widely known for their use in treating facial wrinkles—but they can also be used to treat a wide range of non-cosmetic problems. Eight conditions with good evidence of effective treatment with BoNT are identified in a special review in the August issue of *Plastic and Reconstructive Surgery*, the official medical journal of the American Society of Plastic Surgeons (ASPS).

The international review analyzed the research evidence on [plastic surgery procedures](#) using BoNT. "The use of botulinum neurotoxins has revolutionized the treatment of several different problems seen in the plastic surgeon's office, from [facial wrinkles](#) to painful conditions with limited treatment options," comments lead author Marie E. Noland, MD, of Dalhousie University in Halifax, Nova Scotia, Canada. Her coauthors were Donald H. Lalonde, MD, of Dalhousie University in Saint John, New Brunswick; G. Jackie Yee, MD, of Baker Plastic Surgery, Miami; and Rod J. Rohrich, MD, of University of Texas Southwestern Medical Center at Dallas.

Evidence and Experience Show Benefits of BoNT

A purified protein derived from bacteria, BoNT acts as a "neuromodulator"—it interferes with communication between nerves and muscles, causing local paralysis in the areas where it's injected. Two

types of BoNT are available: BoNT-A (with brand names including Botox and Dysport) and BoNT-B (Myobloc).

The review identifies eight conditions treated by [plastic surgeons](#) with high-quality evidence of good responses to BoNT. The evidence is strongest for minimally invasive treatment of *facial wrinkles (rhytides)*. The FDA has approved BoNT-A for treatment of forehead lines or wrinkles, while Botox specifically is approved for treatment of "crow's feet" at the corner of the eyes.

Studies support the use of BoNT for other types of facial aging problems as well. Cosmetic injection of BoNT-A is by far the most common [plastic surgery](#) procedure, with more than 6.5 million procedures performed in 2015, according to ASPS statistics.

Botulinum neurotoxin is also effective for some types of *facial movement disorders (dystonias)*—for example, tics caused by benign essential blepharospasm. It can also be used to treat issues related to *facial nerve palsy* and abnormal facial nerve regeneration, which can cause problems such as abnormal tears or sweating.

Two studies have reported that Botox can reduce *hand tremors* in patients with essential tremor, although hand function may not improve. Both BoNT-A and BoNT-B show evidence of effectiveness in patients with chronic, excessive sweating, especially of the hands (*palmar hyperhidrosis*).

Botulinum neurotoxin is a safe and [effective treatment](#) for *upper limb spasticity* of the arm and hand in adults. It also shows promise for treatment of muscle spasticity in children with cerebral palsy.

Neuromodulator therapy with BoNT has emerged as a useful new treatment for *migraine headaches*. This benefit was discovered

coincidentally when patients undergoing cosmetic BoNT injection for forehead wrinkles reported decreased migraines. Based on three large studies, Botox has been approved for treatment of chronic migraine headaches.

More recently, studies have supported BoNT for treatment of *neuropathic (nerve-related) pain*—a common problem with few effective treatments. Injection is effective for the [treatment](#) of some important causes of neuropathic pain, including diabetes and surgical nerve damage.

The review includes figures and online videos illustrating proper BoNT injection technique for plastic surgeons. In a featured video on the *Plastic and Reconstructive Surgery* website, Editor-in-Chief Dr. Rohrich comments: "Neuromodulators are safe, but they must be done appropriately—in the right dose, in the right area, in the right way."

More information: Marie E. Noland et al. Current Uses of Botulinum Neurotoxins in Plastic Surgery, *Plastic and Reconstructive Surgery* (2016). [DOI: 10.1097/PRS.0000000000002480](https://doi.org/10.1097/PRS.0000000000002480)

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