

# Botulinum Toxin Injections Improve Depression

Jim Kling

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American Academy of Dermatology (AAD) 72nd Annual Meeting. Presented March 22, 2014..DENVER — Botulinum toxin A, commonly known as Botox, has an antidepressive effect when injected between the eyebrows that continues beyond the cosmetic effects of the injection, according to the results of a new study.

The fact that the antidepressive effect continued after the wrinkles reappeared suggests that the elevated mood isn't just related to cosmetic improvements, which is "profound and unexpected," said study investigator Michelle Magid, MD, clinical associate professor of psychiatry at the University of Texas Southwestern in Austin.

She presented the research here at the American Academy of Dermatology 72nd Annual Meeting.

There have been anecdotal reports of improvements in mood after botulinum treatments, but it hasn't been clear whether these were a direct effect on mood or whether they were secondary effects from cosmetic improvement, said Dr. Magid.

One pilot study showed that botulinum injection improved depressive symptoms in 9 of 10 patients (*Dermatol Surg*.[2006;32:645-649](#)).

Dr. Magid conducted the study with her husband, Jason Reichenberg, MD, who is an associate professor of dermatology at the University of Texas Southwestern.

In the 24-week randomized double-blind placebo-controlled study, 30 participants with depressive symptoms were randomized to receive botulinum injections into the glabellar region or placebo.

The men were injected with 39 units of botulinum and the women were injected with 29 units. At week 12, the placebo group crossed over to treatment, and the treatment group crossed over to placebo.

Participants were evaluated at weeks 0, 3, 6, 12, 15, 18, and 24. The primary outcome was a reduction from baseline of at least 50% in the 21-item Hamilton Depression Rating Scale score. Partial response was defined as a 25% to 49% reduction in the score.

The researchers noted significant improvements in both groups.

**Table. Hamilton Depression Rating Scale Responses**

Outcome	Botulinum Then Placebo, %	Placebo Then Botulinum, %	Placebo, Weeks 1–12, %
Mean change from baseline	–46	–35	–2
Response	55*	24*	0
Partial response	73	65	5
Remission	18	18	0

\**P* < .0001

In the group that received botulinum followed by placebo, the cosmetic effects of the injection wore off between weeks 12 and 16. The improvement in depressive symptoms, however, was maintained for the full 24 weeks.

There are 2 possible explanations for the improvement in depressive symptoms, explained Dr. Magid.

The first is that the botulinum injections made it difficult for the subjects to frown. If individuals smile more and frown less, they are likely to have better social experiences, which could lift mood.

The second possibility, favored by Dr. Magid, is a biologic explanation. MRI studies have shown that when people are unable to make angry facial expressions because of botulinum injections to the glabellar region, there is less activity in the amygdala than expected. Such a connection could be mediated by the trigeminal nerve, which links the glabellar region to the brain stem and amygdala and is the control center of anxiety, trauma, and the heightened fear response.

If a person can't frown, the brain does not register a frown, and the amygdala does not get the trigger that the person is upset, Dr. Reichenberg told *Medscape Medical News*.