

Botulinum toxin cosmetic therapy correlates with a more positive mood

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Summary

Background It has been suggested that botulinum toxin A (BTX-A) treatment for frown lines can also be used as a treatment for depression. A psychological mechanism for this effect is reviewed in which paralysis of the corrugator (frown) muscles leads to less facial feedback for negative emotions. Consequently, a negative affect is harder to maintain and so the person has a more positive mood.

Methods In order to test this mechanism, the mood of patients who had received BTX-A treatment for glabellar frown lines was measured and compared with patients who had received other cosmetic treatments.

Results The BTX-A-treated patients showed significantly less negative mood.

Conclusion The results support the facial feedback view that frowning can make one unhappier. Treatments that prevent frowning correlate with reduced negative mood.

Keywords: botulinum toxin A, glabellar frown lines, mood, depression, facial feedback

Introduction

Facial muscles do not just express emotions but they are also involved in the experience or feeling of emotions: Smiling while reading a cartoon, for example, increases amusement.¹ This feedback loop between the expression of and experience of emotions was suggested by Charles Darwin and there is now an accumulation of evidence illustrating how facial-muscular action can affect our mood and perception.²

Failure to produce emotional expression also affects mood: Patients with facial paralysis show symptoms of depression.³ The severity of such patients' depressive symptoms has been found to correlated with the degree to which their ability to smile was impaired.⁴ Patients unable to smile suffer from more depression. It is argued

that the lack of positive facial feedback received from the absent smile means that a positive mood is harder to maintain.

Localized facial muscular paralysis is a consequence of the use of botulinum toxin A (BTX-A; e.g. Botox® or Dysport®) for cosmetic dermatology. One treatment for glabellar frown lines involves injections into the corrugator (frown) muscles, paralyzing them for up to 6 months. The cosmetic effect of this treatment is a smoother, less-lined forehead.⁵

As well as being responsible for frown lines, the corrugator muscles are universally important in the expression of negative emotions including sadness, fear, anger and distress.⁶ The paralysis of these muscles means that the ability to form facial expressions of these emotions is reduced. Indeed, it has been demonstrated that people who have received BTX-A treatment for frown lines are rated as showing less negative facial expressions.⁷

The facial feedback effect suggests that the paralysis of muscles associated with negative emotions may have effects beyond the outward appearance of emotion;

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Paralysis of the frown muscles could make it harder to maintain negative emotions just as paralysis of smile muscles makes happy emotions harder to maintain. Some support for this comes from a study that suggests that BTX-A injections into the corrugator frown muscles could be used as a treatment for depression.⁸ Ten patients with depression were treated with BTX-A and it was found that there was a marked reduction in negative affect to a degree where nine of the patients no longer showed depressive symptoms. There were many limitations to this initial study, such as a lack of a control group or long-term follow-up, but the size of the observed effect means that it is worthy of further research. The treatment was based on theoretical grounds, but there is also anecdotal evidence of a general improvement in the mood of patients having received BTX-A therapy.⁹ This mood effect may help to explain why BTX-A treatment leads to higher satisfaction ratings than other forms of cosmetic treatments.¹⁰

If BTX-A treatment does have a large effect on mood then it should be apparent in patients who have elected for the treatment for cosmetic reasons. The current experiment evaluated this by testing the mood of patients who had received BTX-A therapy for glabellar frown lines and comparing these with patients who had other forms of cosmetic treatment. It was hypothesized that patients who had received the BTX-A treatment to the forehead would show a more positive mood than patients who had received other forms of cosmetic therapy.

Method

Participants

Twenty-five participants took part (all white females). The participants were recruited through the Court House Clinics and had all undergone some form of aesthetic cosmetic treatment in the previous 7 days to 3 months. Many of these patients had received a variety of treatments, but they were categorized as either having had BTX-A treatment to the forehead or not. Those not having BTX-A treatment to the forehead may have had BTX-A elsewhere (e.g. as a treatment for crows feet), but they were still classified as the control group as it was not hypothesized that this treatment would affect mood. The other treatments that the participants reported receiving included: glycolic peels, laser treatments, and Restylane.

Twelve of the participants had undergone BTX-A therapy to the forehead (including treatment for glabellar frown lines) as well as, in several cases, some other therapies. This group was designated as the BTX-A-treated group and had a mean age of 47 years (SD = 9.2). The

remaining 13 participants had received cosmetic therapies other than BTX-A to the forehead. This group was designated as the control group and had a mean age of 44 years (SD = 16.0).

Procedure

Participants were given a questionnaire to fill in and return anonymously to Cardiff University, School of Psychology. This questionnaire asked for demographic details and for details of any cosmetic treatment they had received recently and historically. The questionnaire also included a copy of the Irritability-Depression-Anxiety Scale (IDAS).¹¹ This questionnaire consists of 14 questions with four choices of answers. It provides three measures of mood based on three distinguishable elements (irritability, depression, and anxiety). The questionnaire also asked participants to provide a percentage value measure of their attractiveness now and prior to the treatment they had just received.

Results

The attractiveness ratings of the two sets of participants were greater after treatment (both being 52 on a 100-point scale) than before treatment. The size of the change, however, was small: BTX-A-treated group increased by 6 points ($N = 9$; $SD = 10.0$), whereas the control group increased by 3 points ($N = 10$; $SD = 6.5$). This difference did not reach significance [$t(17) = 1.143$; $P = 0.269$].

The means from the three values on the IDAS measure for the two groups are shown in Fig. 1. These data indicate

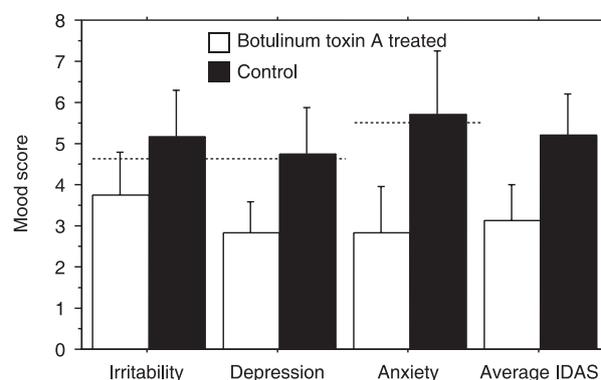


Figure 1 Individual and average scores from the three measures produced by the IDAS questionnaire split according to whether participants had received BTX-A treatment or not. Error bars represent 95% confidence intervals. The dotted lines represent the boundary between normal scores (below the dotted line) and borderline morbid scores (above the dotted line) for the IDAS questionnaire.

that the BTX-A-treated group scored consistently lower than the control group. This was significant [$t(23) = 3.382$; $P = 0.003$; $d = 1.410$]. The P -values for the individual Irritability, Depression and Anxiety measures were 0.063, 0.005, and 0.004, respectively.

Participants within the BTX-A-treated group varied in terms of how long they had been having this kind of treatment. For some participants, their first treatment was 2 weeks prior to treatment, whereas one participant had been receiving BTX-A treatments for 6 years. The mean number of days since the first treatment was 610 days, but this was highly skewed and so a better measure of central tendency is the geometric mean, which was 195 days.

Discussion

The results showed a clear and significant difference in the moods of the two patient groups. Those who had received BTX-A treatment to the forehead had a significantly more positive mood than those who had not, and this was carried mainly by lower anxiety and depression scores. On these two measures, the control group's average score was inside the borderline morbid level, whereas the 95% confidence range for the BTX-A-treated group was wholly within the normal range. The fact that there was no significant difference in how attractive the participants felt after treatment meant that we can discount an increase in attractiveness explanation for this difference in mood.

The research was observational in nature and so we cannot rule out the possibility that the differences observed are a result of differences in participants prior to treatment. The statistical analysis, however, reveals that the pattern of results is unlikely to be a result of chance variability. We cannot, however, without further research, discount the possibility that happier patients are more likely to choose BTX-A treatments over other treatments.

In spite of the limitations of this kind of correlational research, the results provide support for the research hypothesis. That hypothesis being that the paralysis of the corrugator muscles, which makes it impossible to make many negative facial expression, causes negative moods to be harder to maintain: The lack of the negative mood feedback from the facial muscles leads these people to feel happier.

Given the importance of the corrugator muscle as an organ of communication, a smoother forehead and possibly a happier mood might not be the only effects of

BTX-A treatment. The positive and potentially negative psychological implications of the elective paralysis of a major muscle involved in emotional expressions have received little scientific attention. From what we know of the psychology of emotions and their relationship with behavior, the treatment could potentially have effects on: risk evaluation, empathy to others, and communication. All of these warrant further psychological investigation if we are to understand the consequences of this increasingly popular cosmetic treatment.

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