What comes first: the expression or the emotion? If you smile do you become happy, or are you happy so you then smile? Since Charles Darwin first observed “that even the simulation of an emotion tends to arouse it in our mind,”1 a large body of evidence has supported the facial-feedback hypothesis, which suggests that the emotion follows the expression.2,3 Volunteers forced to smile by placing a pencil in their mouths found cartoons funnier, and those forced to frown rated unpleasant photographs more negatively.4,5 But recently, thanks to more advanced neuroimaging capabilities, we are beginning to better understand the mechanism at work. Since Paul Ekman illuminated the impact of facial expressions, we have gained a detailed understanding of how facial muscle movements linked through primitive coupled neural pathways within the amygdala trigger mood and autonomic nervous system manifestations.6-8 Those who are sad tend to frown, and those who frown are more likely to be sad.

The facial feedback hypothesis today is providing a framework for reevaluating and treating one of the leading causes of disability in the United States (US). Mood disorders, and depression in particular, are highly prevalent in Western society. The National Institute of Mental Health estimates 9.5% of Americans suffer from mood disorders, and in 2012 an estimated 16 million adults aged 18 or older in the US had at least one major depressive episode. This represented 6.9% of all US adults.9 The lifetime prevalence of depression is 16.2%,10 and depressive symptoms can be found in 44% of elderly people. Since 1987 there has been a 4-fold increase in the diagnosis of depression, which perhaps not surprisingly coincides with the approval of Prozac (Eli Lilly and Company, Indianapolis, Indiana). More than 10% of the US population is now taking antidepressants, spending 11 billion dollars on the second most commonly prescribed category of medication.11

Antidepressants though, are not without drawbacks. They must be taken daily to be effective, compliance can be a hurdle, and once started and taken regularly it can be problematic if they are suddenly stopped. Some of the antidepressant medications pose risks, including insomnia, decreased libido, cardiac symptoms, and more. And efficacy, while proven to benefit, many anti-depressants still leave 33% of patients symptomatic, despite multiple drug trials.12 Could there be a better, more direct, safer, and non-systemic alternative?

Since Finzi first described botulinum toxin A (BtxnA) effects on depression in 2006, multiple double-blind placebo-controlled studies have shown that the injection of BtxnA (Botox; Allergan, Irvine, California; or Dysport; Galderma, Fort Worth, Texas) into the corrugators significantly improves symptoms of depression in those who suffer from major depressive disorders, with remission rates comparing favorably to traditionally prescribed antidepressants.13-16 Yes, that is right: Botox/Dysport treats depression with results that rival the most recognized antidepressants.

Since BtxnA likely does not directly cause its effects from behind the blood-brain barrier, how does it affect mood? Using the facial-feedback hypothesis as a model, if a frown is inhibited then our ability to be sad is also reduced. But even prior, our ability to perceive negative emotions may also be attenuated. It is widely accepted that when attempting to empathize or understand sadness, whether from a book, movie, or story, we use our facial muscles to initiate a frown, which then prompts a mood of sadness coupled to a limbic system-triggered autonomic nervous system response resulting in the physical manifestations of sadness. This primitively driven behavior operates below our conscious mind. Havas et al showed that following placement of BtxnA in the corrugators, reading, recognition, and

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cognition of angry and sad sentences was decreased. And Hennenlotter et al reported that after placement of neuotoxin in the corrugators when participants were asked to frown, signaling in the amygdala and its coupling with the autonomc nervous systems became attenuated. If we diminish corrugator activity, then we mitigate the symptoms of anger and depression; it also may protect us from feeling the extent of sadness or anger in a confederate. To understand another’s, feelings we subconsciously mimic their expression and then start to feel that emotion ourselves. This simple, yet complex version of the child’s game “copycat” works via mirror neurons thought to be located in Brodmann area 44. In essence, moods are contagious. If we engage with others who are sad, we become sad. And if they are happy, we become happy. Happiness in fact seems to be highly contagious. And it has been shown to spread up through 3 degrees of people. Think about that: if you smile people around you and then they become happier. It is one of the reasons we likely are attracted to certain people. Call it the “x-factor” or what you wish but people who smile are infectious, as are their highly attractive elevated moods.

How does all of this relate to aesthetic medicine? It is well established that aesthetic intervention results in our patient projecting a better first impression and experiencing an elevated self-esteem or mood. This likely indirectly leads to others around them experiencing an improvement in mood. While this line of thinking can be well deduced with BtxnA treatments, could there be other aesthetic procedures in our toolbox that also work by this curious and covert mechanism of action? Take a good look at postoperative photographs of facelifts and filler patients: they seem to look happier; are they? Could it be that we are altering the corners of their mouth and lower facial musculature into a smile like orientation? Maybe fillers stimulate happiness by physically promoting a smile? And if not directly via the mechanical alterations, perhaps facelift and filler patients who have been shown to project a more favorable impression and improved self-esteem inspire their acquaintances to smile more, be happier, and sustain a reinforcing feedback mechanism of elevated mood that benefits both. Regardless of the specific mechanism, clearly aesthetic interventions are affecting mood and this likely expands far beyond fillers, BtxnA, and facelifts.

Other nonmedical aesthetic interventions from makeup to skin and hair care also have been shown to favorably alter the impression a person projects, along with elevating mood and self-esteem. And if this is the case, can these procedures be qualified, quantified, and dosed for treatment? It is well known that cancer victims and elderly gain mood elevation when treated with makeup and hair care. If we recognize that aesthetic interventions may not only improve the mood and self-esteem of patients but also extended up to 3 degrees of people from which they are associated with, then the indirect impact of aesthetic treatments on households, communities, and, dare we think, societies could be far more significant than we realize. While admittedly this reasoning is very expansive, especially considering that the safety and efficacy of aesthetics are yet to be FDA approved for such an indication. But such a line of thinking may locally revolutionize the way we approach, treat, and engage current and future aesthetically inclined patients.

The experts tell us that the potential market of people interested in medical appearance enhancement treatments is 5 times greater than the number of people actually receiving treatments. However, that is assuming that these prospective pursuers are interested in physically beautifying treatments. But if the question is slightly rephrased to how many are interested in improving their mood, the number of potential patients could be 20 times greater. As aesthetic medicine and surgery continues to evolve and we as aesthetic physicians better understand who we are and what we do, the future of the trade could evolve from a vanity-branded specialty focused on form and function for a few to a self-empowering trade devoted to improving mind and mood for all. And that is a mission and privilege ushering in limitless growth … are we ready for that?

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