FACE-Q ANALYSIS OF BOTULINUM TOXIN APPLICATION IN AESTHETIC MEDICINE

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Abstract: The number of aesthetic procedures worldwide, as well as in our country, is growing, and there is a noticeable increase in the number of men as patients of aesthetic medicine. This research analyzes the effects of botulinum toxin application in aesthetic medicine and its safety profile.
Subjects and research methods: The research was conducted from November 1, 2024, to March 10, 2025. This study used the FACE-Q aesthetic module, which was developed for facial aesthetic procedures and proved to be a reliable instrument for measuring patient-reported outcomes after treatment.
Results: The study included 29 (29%) male and 71 (71%) female participants. The results indicate a significant difference between pre- and post-treatment assessments in all domains of the FACE-Q scales, and all findings are statistically highly significant ($p < 0.001$). The mean value of the appearance satisfaction scale increased from 61.33 ± 18.21 to 89.5 ± 5.73, indicating a strong improvement in subjective perception of appearance. An even more pronounced increase was recorded on the skin appearance satisfaction scale, where the mean value increased from 49.06 ± 18.09 before treatment to 91.64 ± 6.14 after treatment, which represents the largest absolute shift in this analysis. Wrinkle related scales also show a strong change.
Conclusion: The post-treatment results indicate a high degree of satisfaction with all aspects of facial appearance, particularly with a pronounced sense of harmony and aesthetic balance. These findings indicate the success of the treatment in improving subjective face perception and can serve as a strong argument for its efficacy in clinical and aesthetic practice.
Keywords: botulinum toxin, botox, effects, safety.

1. INTRODUCTION

The number of aesthetic procedures worldwide, as well as in our country, is growing, and there is a noticeable increase in the number of men as patients of aesthetic medicine. Effects of the botulinum toxin (BoNT) have been extensively studied, and the results are now widely used by many professionals in the field of cosmetic treatments. Following its approval in 2002, BoNT has been used for aesthetic purposes. Numerous studies have been conducted to investigate all potential applications of this toxin in the beauty industry (Etrusco, 2023). The facial aging process involves changes at all levels, from the epidermis to subcutaneous tissue, and even under the bone. Stem cells are responsible for regeneration and degeneration balancing of these tissues, but as people age, their regenerative properties decrease and net tissue loss may occur. This can result in deflation of subcutaneous fatty tissue, reduction in total collagen content, and degeneration of dermal collagen and elastin. These changes can cause various external signs, such as skin laxity, wrinkles, rhytides, roughness, and xerosis (Lambros, 2008).
Use of BoNT for aesthetic purposes has become increasingly popular due to the wide spectrum of improvements it can provide. Patients have reported high levels of satisfaction with treatment effects, which include selective weakening of facial muscles. This effect helps reduce the appearance of dynamic wrinkles caused by muscle activity while creating a softer and more natural appearance. Although BoNT can be used to reduce dynamic wrinkles, it cannot replace procedures such as skin resurfacing as treatment of static wrinkles (Fagien, 2008).
In many countries, the use of botulinum toxin type A is approved for treating glabellar lines. Furthermore, in some countries it is also used to address lateral canthal lines, hyperkinetic facial lines, transverse forehead rhytides, glabellar region, eyebrow lifting, and lateral orbital region. It has been suggested that transverse forehead wrinkles can be improved with off-label use of BoNT-A. Patient's wrinkles must be assessed to determine whether they are static or dynamic in nature. When treating dynamic rhytides, BoNT-A is applied to soften the wrinkles. On the other hand, static wrinkles can be treated with dermal fillers or skin resurfacing. When applying BoNT-A to the frontalis muscle, care must be taken to keep the application at least one to two centimeters above the supraorbital rim to avoid eyebrow or eyelid ptosis (Wieder, 1998; Hankins, 1998; Huang, 2000; Pribitkin, 1997).
Botulinum toxin type A is an irreplaceable tool used in aesthetic medicine, and its wide appeal has made it a trademark of modern culture. The key to the best effect of botulinum toxin is understanding patient-specific factors that will determine the treatment plan and the aesthetician's ability to personalize injection strategies (Carruthers,

2013). Besides aesthetic benefits, it is also known that the effect of botulinum toxin on the upper third of the face is associated with emotions such as anger, worry, and anxiety. This cosmetic application is associated with improving patients' emotional well-being and inhibition of limbic system activation caused by involuntary muscle contraction Costa, 2022).

The aim of this research was to examine the short-term and long-term effects of botulinum toxin application and to assess its safety profile in aesthetic medicine.

2. SUBJECT AND RESEARCH METHODS

This research represents a retrospective-prospective, descriptive-analytical, comparative clinically applicative study. The research was conducted from November 1, 2024, to March 10, 2025. The study included 100 participants (men and women), clients of Magic Crystal d.o.o., who received botulinum toxin for aesthetic purposes.

Surveying was conducted before botulinum toxin application and at the first follow-up exam. The FACE-Q questionnaire modified for the needs of this research, was used as a research instrument. Since the development of FACE-Q Aesthetic in 2010, it has been widely used in clinical practice and research, measuring quality of life and patient satisfaction. It quantifies the impact and changes in various aspects of facial cosmetic surgery and minimally invasive treatments.

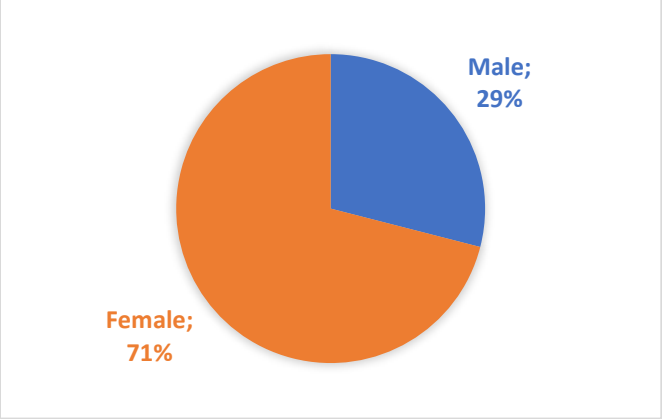
Items within scales are ranked base on clinical relevancy, and assess so-called domains (for example, "facial appearance satisfaction"). Item responses are scored on a four-point Likert scale (strongly disagree, strongly agree), summed and converted to a score of 0 to 100 for interpretation. Scales are grouped into three categories/domains: appearance assessment (24 scales), health-related quality of life (10 scales), and adverse effects (6 scales). This research used eight scales (66 questions) from the FACE-Q appearance assessment domain, two scales (11 questions) from health-related quality of life domain and one scale (10 questions) from adverse effects domain (Ottenhof, 2022).

Statistical analysis in this research was conducted using the latest version of the RStudio software package (2024.12.0 + 467), which enables precise and flexible data processing through advanced statistical methods.

3. RESULTS

Responses collected from 100 participants before and after treatment were analyzed. The study included 29 (29%) male and 71 (71%) female participants. Overall, the average age was 43.1 ± 9.6 years.

Graph 1. Gender distribution of participants



Source: Author's research

Table 1. Analysis of scale scores before and after treatment

	Before Treatment		After Treatment		t	p
	Mean	SD	Mean	SD		
Appearance satisfaction	61.33	18.21	89.5	5.73	-16.202	<0.001
Skin appearance satisfaction	49.06	18.09	91.64	6.14	-23.315	<0.001
Wrinkle appearance satisfaction scale	51.73	21.01	89.43	6.03	-18.547	<0.001

Forehead wrinkles appearance satisfaction scale	46.81	27.58	88.19	7.15	-14.967	<0.001
Glabellar wrinkles appearance satisfaction scale	48.14	25.97	90.71	6.14	-16.646	<0.001
Outer eye wrinkles appearance satisfaction scale	49.52	23.94	89.67	7.54	-16.373	<0.001
Lip area wrinkles appearance satisfaction scale	45.67	18.85	89.17	7.12	-21.826	<0.001
Outer lip wrinkles (marionette lines) appearance satisfaction scale	45.71	21.44	91.95	6.48	-20.814	<0.001
Psychological well-being scale	75.1	18.82	88.67	7	-7.201	<0.001

Source: Author's research

The results shown in the table clearly indicate a significant difference between pre- and post-treatment assessments in all domains of the FACE-Q scales, and all findings are statistically highly significant ($p < 0.001$). The mean value of the appearance satisfaction scale increased from 61.33 ± 18.21 to 89.5 ± 5.73, indicating a strong improvement in subjective perception of appearance. An even more pronounced increase was recorded on the skin appearance satisfaction scale, where the mean value increased from 49.06 ± 18.09 before treatment to 91.64 ± 6.14 after treatment, which represents the largest absolute shift in this analysis.
Wrinkle-related scales also show a strong effect. General wrinkle appearance satisfaction increased from 51.73 ± 21.01 to 89.43 ± 6.03, while specific facial regions showed a similar pattern: forehead wrinkles (increase from 46.81 to 88.19), glabellar wrinkles (from 48.14 to 90.71), outer eye corner wrinkles (from 49.52 to 89.67), and lips area wrinkles (from 45.67 to 89.17). The largest satisfaction increase with wrinkle aspect was recorded in the marionette lines scale, where the mean value increased from 45.71 ± 21.44 to 91.95 ± 6.48.
Significant improvement was noticed on the emotional aspect. The psychological well-being scale, although it had a relatively high value before treatment (75.1 ± 18.82), further increased after treatment to 88.67 ± 7.00, indicating positive changes in how participants see themselves.
In all domains, the t-test showed very high t-statistic values and extremely low p-values (<0.001), meaning that the observed differences are not only statistically significant but also clinically relevant. In conclusion, the data confirms that the treatment led to comprehensive improvement – not only in aesthetic appearance but also in subjective satisfaction and emotional perception of self-image.

Table 2. Appearance analysis in relation to age according to participants' opinions

		I look 15 years younger	**I look my age**	**I look 15 years older**	**x^2**	**p**
How many years younger or older do you look compared to your actual age?	Before treatment	18%	82%	0%	1.444	0.229
	After treatment	25	75	0		

Source: Author's research

The table shows the change in self-assessment of age appearance relative to actual age, before and after treatment. Before treatment, 18% of participants stated they looked 15 years younger, while the remaining 82% considered they looked their age; no participant stated they looked older. After treatment, the number of those who perceive themselves as younger increased to 25%, while 75% maintained the opinion that they look their actual age. Even after treatment, no one judged that they looked older.
The Chi-square test did not show a statistically significant difference in perception before and after intervention ($\chi^2 = 1.444$; $p = 0.229$), meaning that although there is a slight increase in subjective experience of youthfulness, it is not pronounced enough to be statistically confirmed. However, clinically speaking, the shift in a positive direction may indicate subjective benefit and increased self-confidence in some participants.

4. DISCUSSION

There are numerous methods for assessing patient satisfaction with glabellar rhytides neuromodulation using botulinum toxin type A. As the use of aesthetic neuromodulation increases both in breadth and number of procedures, there is a need for more comprehensive tools for assessing patient-reported outcomes. FACE-Q is a recently validated instrument for assessing patient-reported outcomes that can be used to measure patient perceptions of botulinum toxin type A neuromodulation, which performed excellently in this research as well.

The observed sample shows an extremely high degree of satisfaction with all aspects of facial appearance after treatment, with a particularly pronounced sense of harmony and aesthetic balance. These findings indicate the success of the treatment in improving subjective perception of the face and can serve as a strong argument for its efficacy in clinical and aesthetic practice. In Ascher and colleagues' study, the most pronounced treatment effect was shown on the individual FACE-Q facial appearance satisfaction scale item, "how rested your face looks," with a significant treatment difference at each study visit (mean change: +0.5 to +0.7 versus -0.1 to 0.2, respectively, $P < 0.0001$ to $P = 0.0415$). While significant differences were observed on items "how balanced your face looks" ($P = 0.0018$-0.0481), "how fresh your face looks" ($P = 0.002$-0.6490), and "how your face looks at the end of the day" ($P = 0.0042$-0.0266). The remaining items were significant when compared to pre-treatment state, which correlates with our research results (Ascher, 2020).

After treatment, the perception of one's appearance relative to chronological age significantly improved. A quarter of participants (25%) stated they looked 15 years younger compared to their actual age, while the remaining 75% considered they looked their age. It is important to emphasize that no participant stated they looked older, which represents a clear indicator of treatment success in achieving a rejuvenated appearance effect.

These results suggest not only objective improvement in aesthetic features but also strengthening of subjective perception of youthfulness, which can have a direct impact on self-confidence and emotional well-being of participants. Results correlating with ours were reported by Ascher and colleagues (Ascher, 2020).

In Morhy and colleagues' study, no statistically significant difference was observed regarding perceived age; however, all female participants were satisfied with botulinum toxin results for forehead and glabellar wrinkles, as is the case in our research (Dayan, 2022). In Dayan and colleagues' study, all groups treated with botulinum toxin stated they looked on average between 1.2 and 3.2 years younger than their actual age (Morhy, 2023).

An increasing number of patients over the years are now seeking non-surgical aesthetic procedures motivated by reasons beyond simply improving physical appearance. Parallel to this, botulinum toxin formulations are increasingly used in aesthetics to temporarily weaken muscle hypercontraction based on the toxin's ability to inhibit acetylcholine neurotransmitter release.

It is suggested that the use of BoNT in the upper face for facial aesthetic improvement offers pragmatic advantages in psychological well-being and overall quality of life, even without changes in attractiveness, which was also shown in our research. Therefore, research today focuses on approved cosmetic protocols for BoNT, with potential for mood improvement, as an alternative approach for prevention and treatment of psychological disorders. The mechanisms underlying BoNT's mood-lifting effect are currently an area of active research (Pereira, 2022).

5. CONCLUSION

A beautiful face is one of the factors influencing the life satisfaction in people, therefore more attention is being paid to facial rejuvenation and beauty enhancement in recent years. The observed sample measured by the FACE-Q scale after treatment shows an extremely high degree of satisfaction with all aspects of facial appearance, with a particularly pronounced sense of harmony and aesthetic balance. These findings indicate the success of the treatment in improving subjective perception of the face and can serve as a strong argument for its efficacy in clinical and aesthetic practice.

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