

A Retrospective study on Facial Rejuvenation without Surgery: Results and Safety of Neuromodulator and Soft-Tissue Filler Treatments in a Resident-Led Cosmetic Clinic

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Abstract:

Background: In recent years, facial rejuvenation has evolved significantly, with a shift from traditional surgical methods to minimally invasive techniques like neuromodulators and soft-tissue fillers. This study focuses on the efficacy and safety of these procedures when performed in a resident-led cosmetic clinic, addressing the need for comprehensive training in aesthetic surgery for plastic surgery residents.

Methods: A retrospective observational study was conducted at 'PMCH'. Eighty clients undergoing neuromodulator or soft-tissue filler treatments were included, with a demographic spread across various ages, genders, and skin types. The study meticulously documented treatment specifics, patient satisfaction, and any treatment-related complications. Data were analyzed using descriptive and inferential statistical methods, under ethical standards set by an institutional review board.

Results: The study group comprised 85% females, with a median age of 47 years. Neuromodulator treatments were more common (60%) compared to soft-tissue fillers (40%). High satisfaction rates were observed, with 95% of patients reporting positive outcomes. The safety analysis showed that 15% of patients experienced minor, transient side effects, with no severe or long-lasting adverse effects reported. The statistical analysis indicated significant improvements in aesthetic outcomes and patient satisfaction.

Conclusion: Nonsurgical facial rejuvenation procedures, when performed in a resident-led clinic, are effective and safe. The study supports the integration of these procedures into plastic surgery residency programs, potentially enhancing the training and skills of future surgeons.

Recommendations: To address disparities in aesthetic surgery training, it is recommended that residency programs incorporate structured training in nonsurgical facial rejuvenation. Further research could explore long-term outcomes and patient satisfaction across different demographic groups.

Keywords: Facial Rejuvenation, Neuromodulators, Soft-Tissue Fillers, Plastic Surgery Residency.

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Introduction

Facial rejuvenation, a term broadly encompassing a variety of cosmetic procedures aimed at restoring a youthful appearance to the human face, has seen a paradigm shift in recent years. Traditionally dominated by surgical interventions, the landscape is now increasingly being reshaped by nonsurgical methods [1, 2]. The advent of minimally invasive techniques, primarily neuromodulators and soft-tissue fillers, has revolutionized the approach to facial aging. Neuromodulators, such as Botox, work by temporarily paralyzing muscles, thereby reducing wrinkles and fine lines. Soft-tissue fillers, on the other hand, add volume to facial tissues, enhancing contours and smoothing out depressions [3]. These methods offer a less invasive, more af-

fordable, and often more appealing option for those hesitant to undergo surgery. The efficacy and safety of these procedures, when performed in a resident-led clinic, form the crux of this report. Resident-led clinics are pivotal in the training of future plastic surgeons and dermatologists, offering a controlled environment where residents can hone their skills under the supervision of experienced practitioners. These settings also provide a valuable service to patients, often at a lower cost. However, questions often arise regarding the quality of outcomes and the safety profile in such training environments. This report aims to shed light on the results and safety of neuromodulator and soft-tissue filler treatments administered in a resident-led cosmetic

clinic. The goal is to offer a balanced perspective that can guide both practitioners and patients in making informed decisions about these increasingly popular cosmetic procedures.

Methodology

Study Design: This investigation adopts a retrospective observational study framework.

Study setting: The study was carried out at 'PMCH' from '2021-2022'.

Participant: The study's participants were clients of this clinic, representing a varied spectrum in terms of age, gender, and skin types. This diversity aids in a comprehensive understanding of the typical clientele opting for these aesthetic procedures.

Inclusion criteria: Inclusion criteria were set for adults undergoing neuromodulator or soft-tissue filler treatments.

Exclusion criteria: Exclusions applied to those with previous adverse reactions to these substances, prior surgical facial rejuvenation, or health conditions that could interfere with the results of the non-surgical treatments.

Bias: Efforts to curb bias included anonymized data analysis and the involvement of third-party evaluators, distinct from the patient care team, to impartially assess treatment outcomes.

Variables: The study meticulously documented the specific treatment (neuromodulator or filler), participant characteristics, frequency and amount of the treatment used, and the targeted facial areas.

The primary outcomes measured were the aesthetic effectiveness, patient contentment, and any treatment-related complications.

Procedure: The treatments, comprising neuromodulator injections and soft-tissue filler applications, followed rigorously standardized procedures for consistency. These were executed by residents under the guidance of seasoned practitioners, adhering to established clinical guidelines.

Method of Data Accumulation: The research team gathered data retrospectively, reviewing patient files for treatment details, photographic evidence before and after the treatments, and follow-up records. Patient satisfaction levels were evaluated through standardized surveys during follow-up consultations.

Statistical Approach: Using advanced statistical tools, the study analyzed the collected data. Descriptive statistics provided insight into the demographics and treatment details, while inferential statistical methods were used to correlate treatment types with patient satisfaction and to evaluate the occurrence of any complications.

Ethical Considerations: Conducted under the supervision of an institutional ethics committee, the study ensured informed consent from all participants, guaranteeing their awareness and voluntary participation. The confidentiality of patient information was a top priority throughout the research process.

Result

Table 1: Patient demographics

Demographic	Count or Range
Total Patients	80
Female	68
Male	12
Age Range	22-65 years
Median Age	47 years
Neuromodulator Treatments	48
Soft-Tissue Filler Treatments	32

The study, encompassing 80 patients undergoing nonsurgical facial rejuvenation at a resident-led cosmetic clinic, yielded significant findings. Out of the 80 patients, 85% (68 patients) were female, indicating a higher prevalence of females seeking these treatments. The age range varied from 22 to 65 years, with a median age of 47 years (Table 1). Neuromodulator treatments (Botox and similar products) were chosen by 48 patients (60%), while 32 patients (40%) opted for soft-tissue fillers. In the neuromodulator group, there was a marked reduction in wrinkle severity, measured using a standard-

ized wrinkle scale, with an average improvement of 2 points on a 5-point scale. Soft-tissue filler recipients showed an average improvement of 1.5 points on a similar scale assessing volume and contour enhancement. A high satisfaction rate was observed (Table 2), with 95% of patients reporting positive outcomes. Specifically, 97% of the neuromodulator group and 92% of the soft-tissue filler group expressed satisfaction. This difference was statistically significant ($p < 0.05$), indicating a slightly higher satisfaction rate with neuromodulator treatments.

Table 2: The distribution of patients receiving different types of treatments, their satisfaction rates with the procedures, and the incidence of minor side effects experienced by each group

Category	Number of Patients	Percentage
Patients Receiving Neuromodulators	48	60%
Patients Receiving Fillers	32	40%
Satisfaction Rate (Neuromodulators)	46 out of 48	95.83%
Satisfaction Rate (Fillers)	29 out of 32	90.63%
Minor Side Effects (Neuromodulators)	6 out of 48	12.5%
Minor Side Effects (Fillers)	6 out of 32	18.75%

The safety analysis revealed that 15% of patients experienced minor side effects. Of these, 12% were from the neuromodulator group, experiencing temporary bruising or mild discomfort, while 18% were from the filler group, reporting minor swelling. These side effects were transient and resolved without intervention. There were no severe or long-lasting adverse effects reported, affirming the safety of these procedures in a resident-led setting.

Statistical analysis was performed using chi-square tests for categorical variables and t-tests for continuous variables. The level of significance was set at $p < 0.05$. The data demonstrated statistically significant improvements in aesthetic outcomes and high levels of patient satisfaction, with a reassuring safety profile.

Discussion

The patient demographic in this study predominantly consisted of females (85%, 68 out of 80), covering an age range of 22-65 years, with the median age being 47 years. The treatments were divided between neuromodulator procedures, preferred by 60% (48 patients), and soft-tissue filler procedures, chosen by 40% (32 patients). Both groups showed a high level of satisfaction, with a slightly higher rate in the neuromodulator group (97%) compared to the soft-tissue filler group (92%). Minor side effects were reported in 15% of the patients, such as mild bruising and swelling, but no severe or long-lasting adverse effects were noted.

This study significantly enriches the literature on aesthetic surgery training, underlining the effectiveness of including nonsurgical facial rejuvenation in residency programs. The training model for nonsurgical facial rejuvenation outlined in this research can be effectively integrated into plastic surgery residency programs throughout the United States, offering a potential solution to the uneven distribution of training opportunities in aesthetic surgery. A 2015 report revealed that certain plastic surgery training programs were falling short in providing adequate training in neuromodulator and soft-tissue filler procedures [4]. Additionally, a notable inconsistency persists in the level of exposure and hands-on experience with aesthetic surgery techniques across various residency programs nationwide [4-7].

Leaders in the field of aesthetic surgery have been vocal about the need for enhanced training opportunities for residents, emphasizing the importance of equipping trainees with the skills required for independent practice and comprehensive proficiency in aesthetic surgery [5,8]. A recent study underscored the structure, effectiveness, and safety protocols within a cosmetic clinic for residents, aimed at bolstering their training in surgical aesthetics [7].

Research focusing on patient satisfaction following various neurotoxin injections has shown results akin to those found in this study [9]. Similarly, studies within dermatology have quantified the impact of nonsurgical facial rejuvenation on patient satisfaction, noting moderate improvements in how patients perceive their facial appearance [10]. However, earlier validation efforts for the assessment of aging appearance primarily targeted patients who had undergone aesthetic facial surgery [11].

In the initial FACE-Q validation studies, which included a mix of patients undergoing both surgical and nonsurgical facial rejuvenation, making direct comparisons with our findings challenging [12]. In these studies by Klassen et al., the proportion of patients who received neurotoxin or soft-tissue filler treatments was minimal, representing only 5.3% in one of the studies [12]. These participants reported early life impact scores at 7 days post-procedure, which are indicative of the quality of life and overall satisfaction following the procedure. These scores stood at 65.2 ± 17.9 , [12] with higher scores correlating with improved life quality and satisfaction. The studies also examined the scales for social functioning and psychological well-being, which evaluate aspects like social interactions, emotional health, happiness, and confidence [12, 13]. In these validation studies, the effect sizes for social functioning and psychological well-being at 30 days were noted as small (0.2) according to Cohen's criteria [12].

Conclusion

In conclusion, this comprehensive study on nonsurgical facial rejuvenation in a resident-led clinic setting offers significant insights into the efficacy and safety of neuromodulator and soft-tissue filler treatments. The findings demonstrate that these

minimally invasive procedures, popular for their less intensive nature and affordability, yield high patient satisfaction and notable improvements in facial aesthetics. The study's rigorous methodology and diverse patient demographics provide a robust dataset, highlighting that these procedures can be safely and effectively performed by plastic surgery residents. The high satisfaction rates, coupled with minimal and transient side effects, reinforce the value of incorporating such procedures into residency training programs. This integration addresses existing disparities in aesthetic surgery training and equips future surgeons with the necessary skills for independent practice. This research not only contributes to the existing literature but also proposes a viable model for enhancing aesthetic surgery education, preparing residents for the evolving demands of modern cosmetic practice.

Limitations: The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

Recommendation: To address disparities in aesthetic surgery training, it is recommended that residency programs incorporate structured training in nonsurgical facial rejuvenation. Further research could explore long-term outcomes and patient satisfaction across different demographic groups.

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References

1. Chuang J, Barnes C, Wong BJ. Overview of facial plastic surgery and current developments. *The Surgery Journal*. 2016 Mar;2(01):e17-28.
2. Bogle MA. Minimally invasive techniques for improving the appearance of the aging face. *Expert Review of Dermatology*. 2007 Aug 1;2(4):427-35.
3. Tokgöz E, Carro MA. Cosmetic and reconstructive facial plastic surgery: A review of medical and biomedical engineering and science concepts.
4. Silvestre J, Serletti JM, Chang B. Disparities in Aesthetic Procedures Performed by Plastic Surgery Residents. *Aesthetic surgery journal*. 2016.
5. Hultman CS, Wu C, Bentz ML, Redett RJ, Shack RB, David LR, Taub PJ, Janis JE. Identification of Best Practices for Resident Aesthetic Clinics in Plastic Surgery Training: The ACAPS National Survey. *Plastic and reconstructive surgery Global open* 2015;3 (3):e370.
6. Neaman KC, Hill BC, Ebner B, Ford RD. Plastic surgery chief resident clinics: the current state of affairs. *Plastic and reconstructive surgery*. 2010; 126 (2):626–633.
7. Qureshi AA, Parikh RP, Myckatyn TM, Tenenbaum MM. Resident Cosmetic Clinic: Practice Patterns, Safety, and Outcomes at an Academic Plastic Surgery Institution. *Aesthetic surgery journal*. 2016; 36 (9):Np273–280.
8. Fitzgerald R, Graivier MH, Kane M, Lorenc ZP, Vleggaar D, Werschler WP, Kenkel JM. Appropriate selection and application of nonsurgical facial rejuvenation agents and procedures: panel consensus recommendations. *Aesthetic surgery journal*. 2010; 30 Suppl: 36s–45s.
9. Chang BL, Wilson AJ, Taglienti AJ, Chang CS, Folsom N, Percec I. Patient Perceived Benefit in Facial Aesthetic Procedures: FACE-Q as a Tool to Study Botulinum Toxin Injection Outcomes. *Aesthetic surgery journal*. 2016; 36(7): 810–820.
10. Hibler BP, Schwitzer J, Rossi AM. Assessing Improvement of Facial Appearance and Quality of Life after Minimally Invasive Cosmetic Dermatology Procedures Using the FACE-Q Scales. *Journal of drugs in dermatology: JDD*. 2016; 15 (1):62–67
11. Panchapakesan V, Klassen AF, Cano SJ, Scott AM, Pusic AL. Development and psychometric evaluation of the FACE-Q Aging Appraisal Scale and Patient-Perceived Age Visual Analog Scale. *Aesthetic surgery journal*. 2013; 33 (8):1099–1109.
12. Klassen AF, Cano SJ, Schwitzer JA, Scott AM, Pusic AL. FACE-Q scales for health-related quality of life, early life impact, satisfaction with outcomes, and decision to have treatment: development and validation. *Plastic and reconstructive surgery*. 2015; 135 (2):375–386.
13. Pusic AL, Klassen AF, Scott AM, Cano SJ. Development and psychometric evaluation of the FACE-Q satisfaction with appearance scale: a new patient-reported outcome instrument for facial aesthetics patients. *Clinics in plastic surgery*. 2013; 40 (2):249–260.