

OROFACIAL HARMONIZATION PROCEDURES: A RETROSPECTIVE ANALYSIS OF CLINICAL RECORDS

ABSTRACT

Aline Wenginovicz

 <https://orcid.org/0009-0000-1560-5107>

Bárbara Raissa Budke

 <https://orcid.org/0009-0007-2211-098X>

Fernanda Ruffo Ortiz

 <https://orcid.org/0000-0003-0759-9661>

doi 10.5281/zenodo.21722570

Objectives: Interest in facial aesthetic procedures has grown globally, especially with the increase in life expectancy and the pursuit of rejuvenation. This study aimed to evaluate the profile of patients undergoing OFH procedures, analyzing the types of treatments performed, follow-up, and clinical outcomes. Methodology: This is a retrospective study analyzing 427 clinical records of patients treated between 2020 and 2024 in a private clinic in Chapecó, Santa Catarina, Brazil. Demographic data, types of procedures performed, and intervals between follow-ups were collected. Statistical analysis included correlation and comparison tests, adopting a significance level of 5%. Results: Most patients were female (91.57%), with a mean age of 44.7 years [Standard Deviation (SD) 11.69]. Percentages refer to the total number of procedures performed, since the same patient could undergo more than one procedure in the same appointment. Botulinum toxin was the most frequent procedure (73.71%), followed by lip fillers (22.54%) and collagen biostimulator (5.18%). The average interval between follow-ups was 5.27 months (SD 2.72), indicating regular monitoring. There was higher demand and review consultation for botulinum toxin and fillers in the lips, tear troughs, chin, and malar area, indicating the need for adjustments and monitoring. Women and older patients sought these procedures more often ($p < 0.03$). Only 5 complications were observed in the entire sample. Conclusions: OFH procedures are widely used by adult women and require continuous follow-up to maintain results and safety.

Keywords: Hyaluronic Acid; Botox; Medical Records; Dentistry.

INTRODUCTION

The demand for facial aesthetic treatments has increased significantly worldwide, accompanying the rise in life expectancy and the desire to age with quality. Data from the International Society of Aesthetic Plastic Surgery (ISAPS)¹ reveal that, in 2019, type A botulinum toxin (Botox) was the most performed non-surgical aesthetic procedure globally, followed by hyaluronic acid injections, which occupied second place with 4.3 million applications, a 16% increase compared to the previous year. Both are widely used for aesthetic purposes, with recognized efficacy and safety²⁻³. Alongside these, collagen biostimulators have been gaining ground in facial rejuvenation protocols due to their ability to stimulate endogenous collagen production and promote progressive improvement in skin quality⁴⁻⁷.

The increased demand for orofacial harmonization (OFH) procedures led the Federal Council of Dentistry, through Resolution No. 198/2019, to recognize OFH as a dental specialty, allowing dentists to perform interventions with botulinum toxin, hyaluronic acid, and biostimulators⁸. Patient follow-up after procedures through review consultations is essential to ensure the maintenance of results, prevent and treat possible adverse effects, and allow continuous evaluation of the protocols used. This practice aligns with research-based clinical practice, which emphasizes the importance of observation in real-world settings to improve the safety of interventions⁹⁻¹⁰.

Although the literature confirms the warranty of these resources, mainly in controlled clinical studies^{6, 11-12}, there remains a lack of research exploring everyday clinical practice through the analysis of medical records. Evidence-based dentistry advocates the integration of the best scientific evidence, clinical experience, and patient values. In this context, practice-based studies—such as retrospective ones—are essential to reveal real patterns of care, types of materials used, and population profiles served, directly contributing to the improvement of clinical practice⁹⁻¹⁰.

Given this scenario, the present study aims to evaluate the profile of patients undergoing orofacial harmonization procedures through the analysis of clinical records. The research seeks to identify the performed procedures, and procedure follow-ups, with the intent of strengthening aesthetic dentistry based on evidence applied to the reality of dental offices.

METHODOLOGY

This study was described according to the STROBE checklist guidelines, ensuring rigor in the presentation and analysis of observational data¹³.

This study was conducted through a retrospective analysis of clinical records, utilizing a real-world, clinical practice-based approach. The study was performed in a private clinic located in the city of Chapecó, SC, which has an estimated population of 254,785 inhabitants. All clinical records registered from 2020 to 2024 were included, corresponding to the period during which the clinic had been operating at the time of the research. The sample comprised a census of 427 clinical records from patients who underwent orofacial harmonization (OFH) procedures.

Data were collected from dental records, including procedures performed with type A botulinum toxin, hyaluronic acid fillers, and PDO thread biostimulator, calcium hydroxyapatite, and polylactic acid-collagen (collagen biostimulator). Treated regions included the face, lips, malar area, nasolabial fold, jaw, chin, tear troughs, and neck. In addition, review consultations, follow-up, complications and were collected. Review consultations were defined as the patient's return to the clinic to renew a previously performed procedure, and follow-up was defined as a new procedure performed by the patient. Extracted data encompassed demographic information (age, gender, city of origin), prior OFH history, type of procedure performed, and follow-up intervals between procedures.

Records of patients of both sexes, aged between 18 and 80 years, who underwent OFH procedures between 2020 and 2024 were included. Records of patients who had only an initial evaluation without procedure execution were excluded, as they did not provide clinical data or outcomes necessary for analysis. Incomplete records or those with insufficient information about the type of procedure, materials used, or results were also excluded to ensure data reliability and consistency.

The study outcome consisted of a follow-up of orofacial harmonization procedures. Statistical analysis was performed using descriptive statistics, with absolute and relative frequencies, means, standard deviations, median, and interquartile range. A normality test (Shapiro-Wilk) was conducted, yielding a p-value <0.001. Spearman's correlation test was used. Comparative analyses were applied using Spearman's Correlation test to assess the consistency of follow-ups among participants (e.g., review → follow-up 1; follow-up 1 → follow-up 2, and so on), and the Mann-Whitney test to compare follow-ups and OFH procedures.

Analyses were conducted using STATA 18.0 statistical software, adopting a significance level of 5% and a 95% confidence interval. Among the variables analyzed were "Review consultation" and "Follow-up". These variables were considered relevant for identifying patterns of loyalty, frequency of interventions, and possible associations with treatment continuity.

The study was approved by the Research Ethics Committee of ATITUS EDUCAÇÃO, under CAAE

84437024.4.0000.5319. Data were collected retrospectively, without direct contact with participants, ensuring total anonymity and confidentiality according to the General Data Protection Law (LGPD), with waiver of informed consent requested.

RESULTS

The study sample consisted of 427 patients. Table 1 shows a significant predominance of females, representing 91.57% of the participants. Participants' ages ranged from 18 to 79 years, with a mean of 44.7 years (SD 11.69). Regarding prior experience with aesthetic procedures, 420 patients had already undergone four previous procedures, while only 1.18% (n=5) reported never having had any. It is important to highlight that in the analyses presented below, the percentages refer to the total number of procedures performed, not the number of patients, since the same individual may have undergone more than one procedure in the same appointment.

Table 1 – Analysis of Demographic and Clinical Variables of the Sample (n=427).

Variable	Category/Statistic	Frequency (n)	Percentage (%)
Sex	Female	391	91.57
	Male	36	8.43
Previous Fillers*	None (0)	5	1.18
	1 procedure	63	14.75
	2 procedures	10	2.34
	3 procedures	25	5.85
	4 procedures	277	65.18
	5 procedures	45	10.54
City	Chapecó	408	95.55
	Other cities	19	4.43
Most Sought Procedures	Botulinum Toxin - No	112	26.29
	Botulinum Toxin - Yes	314	73.71
	Lip Filler - No	330	77.46
	Lip Filler - Yes	96	22.54
	Tear Trough Filler - No	396	92.96
	Tear Trough Filler - Yes	30	7.04
	Chin Filler - No	416	97.65
	Chin Filler - Yes	10	2.35
	Nasolabial Fold Filler- No	386	90.61
	Nasolabial Fold Filler - Yes	40	9.39
	Malar Filler -No	400	93.90
	Malar Filler- Yes	26	6.10

Variable	Category/Statistic	Frequency (n)	Percentage (%)
	Collagen Biostimulator – No	403	94.82
	Collagen Biostimulator - Yes	22	5.18
Age (years)	Mean	44.7	
	Standard Deviation (SD)	11.69	
	Minimum - Maximum	18 – 79	

* Previous Fillers: These are HOF procedures that patients have previously undergone at other clinics.

Regarding the procedures sought by patients, botulinum toxin was the most requested, performed in 73.71% of individuals (n=314). Next was lip filling (22.54%), followed by nasolabial fold filler (9.39%), tear trough filler (7.04%), malar filler (6.10%), collagen biostimulators (5.18%), and chin filler (2.35%).

Table 2 presents data regarding patient follow-up and review consultation visits over time. The “Follow-up” variable ranged from 5.27 to 6.67 months, indicating an average frequency of twice a year per patient. This regularity may be related to the maintenance of the effects of the aesthetic procedures performed, as confirmed by the correlation test ($p < 0.001$).

Table 2 – Descriptive and Comparative Analysis of Follow-ups and Returns of Facial Harmonization Procedures.

Variable	Number of participants	Mean (months)	Standard Deviation	Median	Interquartile range
Review consultation	425	5.27	2.72	6	0 - 10
Follow-up 1	303	5.51*	7.58	2.03	1 – 7.13
Follow-up 2	142	6.67*	7.02	5.06	2.03 – 8.13
Follow-up 3	80	6.20*	4.93	5.56	2.51 – 8.58
Follow-up 4	50	5.58*	3.28	5.1	3.06 – 7.06
Follow-up 5	30	6.37*	5.21	5.56	2.03 – 7.1

* Spearman’s Correlation Test. $p < 0.001$.

Table 3 shows the incidence of the procedures performed on each patient. Botulinum toxin was the most prevalent procedure at all times, followed by lip filling and tear filler. The number of procedures gradually declined. This reduction may be related to several factors, including the fact that some patients sought the clinic only for procedures requiring reapplication at longer intervals, such as every two years, naturally reducing the frequency of returns recorded during the analyzed period.

Table 3 – Incidence Analysis of the Orofacial Harmonization.

Procedure	Follow-up 1 n (%)	Follow-up 2 n (%)	Follow-up 3 n (%)	Follow-up. 4 n (%)	Follow-up 5 n (%)
Botulinum Toxin					
No	177 (58.22)	56 (38.36)	80 (58.39)	15 (28.30)	29 (54.72)
Yes	127 (41.78)	90 (61.64)	57 (41.61)	38 (71.70)	24 (45.28)
Lip Filler					
No	261 (85.86)	117 (80.14)	124 (90.51)	44 (83.02)	50 (94.34)
Yes	43 (14.14)	29 (19.86)	13 (9.49)	9 (16.98)	3 (5.66)
Tear Trough Filler					
No	281 (92.43)	136 (93.15)	135 (99.26)	52 (98.11)	52 (98.11)
Yes	23 (7.57)	10 (6.85)	1 (0.74)	1 (1.89)	1 (1.89)
Chin Filler					
No	297 (97.70)	142 (97.26)	132 (97.06)	-	-
Yes	7 (2.30)	4 (2.74)	4 (2.94)	0	0
Nasolabial Fold Filler					
No	288 (94.70)	135 (92.47)	131 (95.62)	48 (90.57)	50 (94.34)
Yes	16 (5.26)	11 (7.53)	6 (4.38)	5 (9.43)	3 (5.66)
Malar Filler					
No	288 (94.74)	137 (93.84)	133 (97.08)	46 (88.46)	50 (94.34)
Yes	16 (5.26)	9 (6.16)	4 (2.92)	6 (11.54)	3 (5.66)
Collagen Biostimulator					
No	289 (95.07)	143 (98.62)	130 (94.89)	50 (94.34)	48 (90.57)
Yes	15 (4.93)	2 (1.38)	7 (5.11)	3 (5.66)	5 (9.43)

The data reinforce the recurring use of botulinum toxin over time, while other procedures were more occasional. Statistically significant differences were found for botulinum toxin at the second follow-up, as well as for tear trough filling (first and second follow-ups), chin and malar filling (first follow-up), indicating distinct return patterns according to the procedure type ($p < 0.01$).

There was a statistically significant difference in the proportion of patients returning for the second follow-up after botulinum toxin use, a return in the first two follow-ups for tear trough filler, and a return at the first follow-up for chin and malar fillers ($p < 0.01$). Other procedures and follow-ups did not show statistical significance.

Additionally, a statistically significant difference was found between sex, botulinum toxin, and lip filling, indicating that women sought these procedures more frequently (Chi-square test, $p < 0.01$). Regarding age,

statistically significant differences were found for botulinum toxin and nasolabial fold filler, indicating that older individuals sought these procedures more often (Mann-Whitney test, $p < 0.03$). Other procedures showed no statistical difference (data not shown in tables).

Five adverse events related to orofacial harmonization procedures were recorded during the evaluated period. The reported adverse events included filler gel extravasation, facial edema in the upper third following botulinum toxin application, nodule formation after the use of a biostimulator, local pain after application of a calcium-based biostimulator, and removal of under-eye filler. All adverse events were clinically managed according to the appropriate protocol for each situation, including medication and/or filler removal, with no permanent sequelae or lasting outcomes observed (data not shown in tables).

DISCUSSION

The findings of this study show that OFH procedures are predominantly sought by adult women, with an average age of 44 years. This data corroborates the profile already described in the literature, which identifies adult women as the main consumers of minimally invasive aesthetic procedures, motivated by factors such as self-esteem, natural aging, and social demands^{1,14}.

The predominant age group, between 30 and 50 years, corresponds to the period when signs of skin aging become more visible, such as volume loss, sagging, and the appearance of dynamic wrinkles. At this stage, minimally invasive procedures like botulinum toxin and hyaluronic acid are preferred for their quick recovery and subtle yet effective results². This trend of higher demand and return for follow-up in procedures involving botulinum toxin and fillers may be associated with aesthetic perception, the need for adjustments, and professional guidance for maintaining results¹⁵.

The predominance of botulinum toxin and hyaluronic acid confirms this tendency, as both offer visible results with rapid recovery, being widely accepted and promoted as effective solutions for wrinkles, volume loss, and expression lines². Moreover, patients returned to the clinic on average every 5 months, indicating an approximate frequency of twice a year per patient. This regularity in follow-up suggests a perceived need by patients and professionals for maintaining the aesthetic effects, a fact confirmed by statistically significant correlation ($p < 0.001$).

It is important to highlight, however, that there was a significant attrition of patients who did not return for subsequent follow-ups, which may reflect various factors such as satisfaction with the results after the first session, financial limitations, or a lack of perception of the need for maintenance. The progressive decrease in the number of patients during follow-ups reinforces the importance of clinical strategies to encourage regular return and monitoring, ensuring better outcomes and safety.

In the present study, lip filling with hyaluronic acid was one of the most frequent indications among filler

procedures, accounting for approximately 60% of the filler cases recorded in clinical records. The demand for lip filling has consistently grown, motivated both by the aesthetic appreciation of lips as a symbol of youth and sensuality and by the functional improvement of lip support, especially in cases of premature aging or asymmetries^{2,4,10}. It is also noteworthy that, within facial harmonization, the lips are often the first area treated, offering immediate results, high aesthetic visibility, and almost instant positive emotional feedback for patients¹⁴.

Furthermore, according to the results presented, the more frequent returns for follow-ups of lip, tear trough, malar, and chin fillings (during follow-ups 1 and 2) may reflect the need for initial adjustments and early evaluations to ensure satisfaction with the final result¹⁵.

Our results also showed that biostimulators, although less frequent than the other two procedures, are growing in popularity, which can be attributed to the pursuit of long-lasting effects, progressive rejuvenation, and natural results¹⁶. This aligns with recent publications highlighting the use of poly-L-lactic acid (PLLA), calcium hydroxyapatite (CaHa), and polydioxanone (PDO) threads as alternatives for improving skin quality and laxity, with cumulative effects and good patient acceptance⁴⁻⁷. The importance of structured follow-up becomes even more evident for these procedures, as their gradual and progressive response requires periodic evaluations for adjustments and prevention of adverse effects¹⁷.

Another point of emphasis is the design of this study, which remains scarcely explored in the literature on orofacial harmonization. This approach enabled analysis of real clinical data and monitoring of patient progress over time, offering a perspective closer to everyday clinical practice and adding value to understanding the results and effects of the procedures on the treated population. This gap in the literature highlights the relevance of the present research and suggests that new studies with similar designs could further enrich the scientific field of aesthetic dentistry.

A limitation of this study is that it was conducted at a single private clinic; as such, the results may reflect specific characteristics of the clinic, city, or region, as well as the professional practices and protocols employed, which may limit the generalizability of the findings. Furthermore, no information was collected regarding the brands of materials, volumes, dosages, or specific details of the procedures. However, the choice of a retrospective model was appropriate for this study, as it allows analysis of real patient outcomes in a clinical context, with greater practical applicability and lower cost⁹⁻¹⁰. Additionally, this approach respects ethical considerations by using already collected data without direct interference with patients. Among the limitations is the dependence on the quality of available records, which may be incomplete or vary between cases. Also, being a retrospective study, it is not possible to control all variables that may influence results. Nevertheless, the study provides important information about the real practice of OFH, helping to improve clinical care.

Finally, this research presents a relevant contribution to the field of aesthetic dentistry by addressing real

clinical practice, which is still scarce in the scientific literature on facial harmonization. Future studies may expand this knowledge by incorporating long-term evaluations, patient satisfaction scales, and comparisons between different techniques or products.

CONCLUSION

The retrospective analysis demonstrated that orofacial harmonization procedures are predominantly performed on adult women, with a predominance of botulinum toxin and hyaluronic acid applications, the most sought-after filler being lip filling, with few complications.

REFERENCES

1. ISAPS. International Society of Aesthetic Plastic Surgery 2019. *Plastic Surgery Statistics Report*. 2020. Disponível em: <https://www.isaps.org/wp-content/uploads/2020/12/Global-Survey-2019.pdf>.
2. Camargo CP, Xia J, Costa CS, Gemperli R, Tatini MD, Bulsara MK, Riera R. Botulinum toxin type A for facial wrinkles. *Cochrane Database Syst Rev*. 2021 Jul 5;7(7):CD013850. doi:10.1002/14651858.CD013850.pub2.
3. Mady KKS, Santos MLF, Silva PVC, Santos RT, Silva MN. Use of botulinum toxin type "A" as a rejuvenator in facial aesthetics: a literature review. *Braz J Develop*. 2021;7(12):112299–312.
4. Christen MO. Collagen stimulators in body applications: a review focused on poly-L-lactic acid (PLLA). *Clin Cosmet Investig Dermatol*. 2022;15:997–1019.
5. Cunha MG, Engracia M, Souza LG, Machado Filho CD. Biostimulators and their mechanisms of action. *Surg Cosmet Dermatol*. 2020;12(2):109–117.
6. Miranda CR. Association of PDO threads and technologies-facial treatment protocols. *Cosmet Dermatol*. 2022;22(3):804–809.
7. Garcia PC, Meireles DP, Tassinari JAF, Pavani C. Combining red photobiomodulation therapy with polydioxanone threads for wrinkle reduction in the glabella region: a randomized, controlled, double-blind clinical trial. *J Biophotonics*. 2024;17(8):e202400139.
8. Haddad MF, Silva IB, Oliveira LRS, Ferreira ÍAS. Combination of techniques for orofacial harmonization in a young patient: case report. *Arch Health Investig*. 2021;11(1):186–191. doi:10.21270/archi.v11i1.5528.
9. Demarco FF, Correa MB, Cenci MS, Burke FJT, Opdam NJM, Faria-e-Silva AL. Practice-based research in dentistry: an alternative to deal with clinical questions. *Braz Oral Res*. 2020;34(suppl 2):e071.
10. Canceill T, Monsarrat P, Faure-Clement E, Tohme M, Vergnes JN, Grosogeat B. Dental practice-based research networks (D-PBRN) worldwide: a scoping review. *J Dent*. 2021 Jan;104:103523. doi:10.1016/j.jdent.2020.103523

11. Amaral AO, Mota ANR, Longatti SC, Nascimento GPV. Use of poly-L-lactic acid in facial rejuvenation. *Braz J Develop.* 2022;8(10):66436–66446.
12. Wollina U, Goldman A. Long lasting facial rejuvenation by repeated placement of calcium hydroxylapatite in elderly women. *Dermatol Ther.* 2020;33(6):e14183. doi:10.1111/dth.14183.
13. von Elm E, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *J Clin Epidemiol.* 2008;61(4):344–349. doi:10.1016/j.jclinepi.2007.11.008.
14. Bravo B, Correia P, Gonçalves Junior JE, Sant'Anna B, Kerob D. Benefits of topical hyaluronic acid for skin quality and signs of skin aging: from literature review to clinical evidence. *Dermatol Ther.* 2022 Dec;35(12):e15903. doi:10.1111/dth.15903.
15. Cardoso Sá VHL, Elias PE, Pereira Filho GV, Chehter EZ. Treating the face of women with botulinum toxin type A: 7-year review. *Rev Bras Cir Plást.* 2023;38(2):e0699. doi:10.5935/2177-1235.2023RBCP0699-EN.
16. Fitzgerald R, Bass LM, Goldberg DJ, Graivier MH, Lorenc ZP. Physiochemical characteristics of poly-L-lactic acid (PLLA). *Aesthet Surg J.* 2018;38(suppl 1):S13–S17. doi:10.1093/asj/sjx228.
17. Sundaram H, Liew S, Signorini M, Braz AV, Fagien S, Swift A, et al. Global aesthetics consensus: hyaluronic acid fillers and botulinum toxin type A—recommendations for combined treatment and optimizing outcomes in diverse patient populations. *Plast Reconstr Surg.* 2016 May;137(5):1410–1423. doi:10.1097/01.prs.0000483427.40455.6e.

Corresponding Author

Fernanda Ruffo Ortiz | E-mail: fernanda.ortiz@atitus.edu.br