REVIEW ARTICLE

Major clinical evidence of cervicofacial liposculpture: a concise systematic review

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Abstract

Introduction: Liposculpture (LS) can complement cervicofacial aging surgery. Modern trends in face sculpting are expanding and adipose tissue transfer can result in optimal esthetic effects with minimally invasive techniques. Facial LS focuses on repositioning adipose tissue and increasing facial transition zones. This is accomplished using internal suspension sutures as well as with autologous fat grafting. **Objective:** To carry out a concise systematic review of the main clinical considerations and advances in facial and cervical liposculpture as an important aesthetic tool for dental surgeons. **Methods:** The rules of the Systematic Review-PRISMA Platform were followed. The search was carried out from November 2021 to February 2022 in Scopus, PubMed, Science Direct, Scielo, and Google Scholar databases. The quality of the studies was based on the GRADE instrument and the risk of bias was analyzed according to the Cochrane instrument. **Results:** Fifty articles were found involving facial liposculpture. A total of 30 articles were fully evaluated and 16 were included and developed in the present study. Considering the Cochrane tool for risk of bias, the overall assessment resulted in 10 studies at high risk of bias and 4 studies that did not meet the GRADE. Most patients who were involved in the studies showed improvements in facial augmentation and contouring. In patients with loss of facial volume, high-density fat transfer with SVF-gel facial injection resulted in significantly higher improvement scores and better patient satisfaction, with an improved/much improved esthetic appearance being observed. As a follow-up analysis of the studies, at an average of six months after completion, most patients were satisfied with the results. All procedures were well tolerated. **Conclusion:** According to the main clinical studies selected in the present study, cervicofacial liposculpture proved to be advantageous, with safety and efficacy.

Keywords: Liposculpture. Liposculpture facial. Liposculpture cervical. Aesthetic. Clinical trials.

Introduction

In the scenario of facial aesthetic surgery in recent decades, improvements have been observed in the techniques of suspending the superficial musculoaponeurotic system and adjacent fat pads. Thus, liposculpture (LS) can complement cervicofacial aging surgery [1,2]. Modern trends in facial sculpting are expanding and adipose tissue transfer can result in optimal esthetic effects with minimally invasive techniques [2-4]. According to The Aesthetic Society's 2018 report, liposuction is the second most popular cosmetic procedure in the United States [5].

In this sense, the principles of suction-assisted lipectomy were developed in Europe in the late 1970s and later became known as liposuction [6]. These techniques were first used for volume reduction, but have evolved into LS. Dental surgeons began to apply these principles to the neck and jowls for facial

rejuvenation through minimal access incisions, including endoscopic ultrasonographic lipectomy and the use of liposhavers. Facial LS focuses on repositioning adipose tissue and increasing facial transition zones. This is accomplished by employing internal suspension sutures, as well as with autologous fat grafting [6].

Therefore, LS is an alternative to facial rejuvenation that involves the skin, release of the retaining ligaments, and appropriate removal of adipose tissue from the subcutaneous layer, while improving skin tone and facial contour. In addition, a study presented experiences with 312 patients who underwent cervicofacial rejuvenation, demonstrating the benefits of liposculpture in cervicofacial rejuvenation in terms of reducing marionette wrinkles, perioral mound removal, V-shaped facial contour, defined jaw, reduced double chin, protrusion chin visual, and cervicofacial lift [7].

In this context, liposuction was a watershed in the evolution of cervicofacial LS, allowing the permanent removal of excess adipose tissue located under the skin. Thus, liposuction, which causes the skin to retract, can make shorter scars possible in most procedures. At the same time, several therapeutic means are constantly being improved, such as the use of a cutting cannula followed by a blunt cannula, laser/ultrasound-assisted liposuction, as well as rotating and vibrating cannula [8].

Therefore, the present study aimed to carry out a concise systematic review of the main clinical considerations and advances in facial and cervical liposculpture as an important aesthetic tool for dental surgeons.

Methods

Study Design

The rules of the Systematic Review-PRISMA Platform (Transparent reporting of systematic reviews and meta-analysis-HTTP://www.prisma-statement.org/) were followed.

Data Sources and Research Strategy

The search strategies for this systematic review were based on the keywords (MeSH Terms): "*Liposculpture. Facial liposculpture. Cervical liposculpture. aesthetic. Clinical trials*". The search was carried out from November 2021 to February 2022 in Scopus, PubMed, Science Direct, Scielo, and Google Scholar databases. In addition, a combination of keywords with the Booleans "OR", "AND" and the "NOT" operator were used to target scientific articles of interest.

Study Quality and Risk of Bias

The quality of the studies was based on the GRADE instrument [9] and the risk of bias was analyzed according to the Cochrane instrument [10].

Results and Discussion

Fifty articles were found involving facial and cervical liposculpture. Initially, article duplication was excluded. After this process, the abstracts were evaluated and a new exclusion was performed, removing the articles that did not include the topic of this article. A total of 30 articles were fully evaluated and 16 were included and developed in the present systematic review study (**Figure 1**). Considering the Cochrane tool for risk of bias, the overall assessment resulted in 10 studies at high risk of bias and 4 studies that did not meet the GRADE.

Figure 1. Flowchart showing the article selection process.
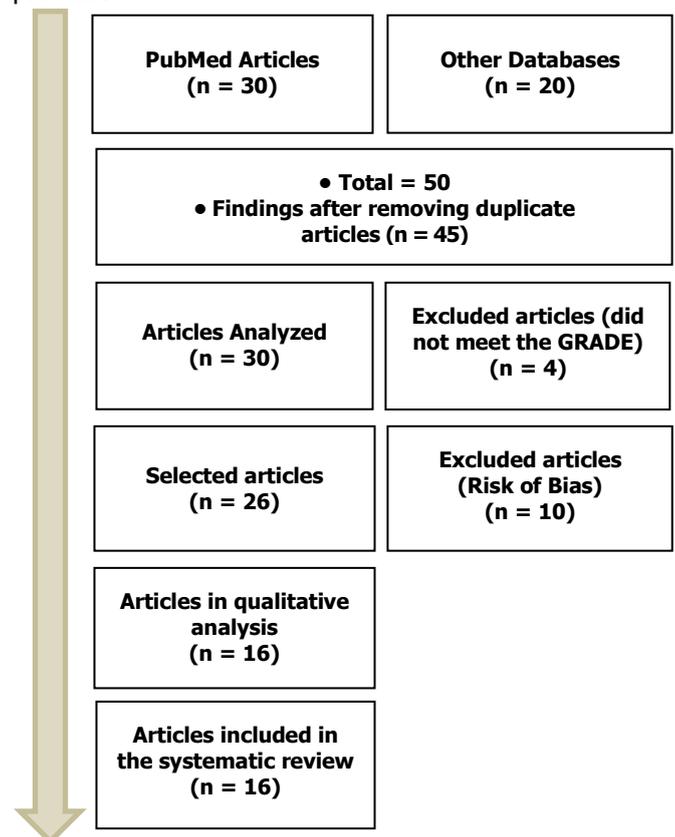
Based on the literary findings that were explored, we found a study performed by the author Yang et al., 2019 [7] that was an observational retrospective with 312 patients (mean age 53.3 years) that was performed in a single medical clinic between July 2010 and May 2017. Of the 312 patients (261 women and 51 men), 197 underwent cervicofacial liposculpture, 54 underwent liposculpture of other regions, and 61 were treated with liposculpture of the lower face. Patients

who had an Illoz test index <20%, with mild or moderate excess skin on the lower face, are recommended liposculpture of the lower face, and light or moderate excess skin in the submental area (according to the pinch test) is suggested for cervical liposculpture [6].

Also in this study, before and during the operation the patient was forced to grimace, whistle, and smile [7]. The depressed area induced by dynamic facial movements was marked. The solid area was recommended for lipolysis only, without removing adipose tissue. Under intravenous general anesthesia, a 2 mm incision was made over the preauricular region and/or submental area. About 100 mL of tumescent solution (500 mL normal saline + 20 mL of 2% xylocaine + 0.5 mL of epinephrine) was infiltrated over the liposculpture area. At 1.5 mm a suction-assisted liposuction cannula was used using a 2.0 mm cannula (a 3.0 cannula is suggested only for abundant subcutaneous tissue). The volume of liposculpture was between 30 mL and 100 mL. Postoperative wound closure was not performed. The compression band was used for 5 days. Of the 312 patients, only three had unsatisfactory results. In the postoperative results, only two patients had wrinkles and one patient had facial contour irregularities. The three patients were rescued with a micro fat graft and achieved satisfactory results after the second operation.

In addition, in this study by Yang et al., 2019 [7], patients undergoing cervicofacial liposculpture achieved reduced wrinkle puppet, perioral mound removal, V-shaped facial contour, defined jaw line, double chin reduction, visual protrusion of the chin, and cervicofacial elevation. Therefore, cervicofacial liposculpture proved to be advantageous, in safety and efficacy.

Besides, autologous fat grafting targeted at the LS process is commonly used for soft tissue augmentation and reconstruction, however, it is limited by a high graft absorption rate. Stromal vascular fraction gel graft/Stromal vascular fraction (SVF-gel) for facial volume augmentation may have a positive effect on skin rejuvenation, however, its major limitation is the low conversion rate of Coleman's fat. In this regard, one study investigated a new surgery using high-density fat in combination with SVF-gel in the treatment of hemifacial atrophy or Romberg's disease. From October 2017 to October 2019, 13 patients with hemifacial atrophy underwent high-density fat transfer with SVF-gel injection. The result was determined by the difference in the pre and postoperative FACE-Q modules (FACE-Q conceptual structure: 1, Satisfaction with Facial Appearance: 2, Health-Related Quality of Life: 3, Negative Sequelae: 4, Satisfaction with the Care Process). Excellent cosmetic results were observed during the follow-up periods, with no adverse events observed in the treatment group. All patients showed improvements in facial augmentation and contouring. In patients with loss of facial volume, high-density fat transfer with a facial injection of SVF-gel resulted in significantly higher improvement scores and better patient satisfaction. The preoperative and postoperative results of the FACE-Q modules reported by the patient showed a statistically significant improvement (p<0.05) [11].

Furthermore, a prospective controlled study evaluated the 6-month contouring efficacy of 1470 radial fiber-assisted liposuction and the effect of a volumetric increase of tissue harvested in facial fat grafting. Twenty individuals underwent lower abdominal or external thigh liposuction. In seven individuals, samples were grafted onto facial regions. Treatment safety, body weight, esthetic improvements rated by the blinded evaluator, and subject-rated satisfaction were monitored for 6 months. Abdominal and facial fat thickness was assessed by magnetic resonance imaging (n=5) within 3 months of treatment. One month after treatment, most subjects rated improvements as good/excellent (88%) and skin tightening satisfactory/very satisfactory (92%), with over 70% of subjects providing similar scores 6 months after treatment. Improved/much improved aesthetic appearance (87%) was observed. Harvested tissue injected as a facial filler (21.0 ± 5.2 ml) led to a 0.63 ± 0.12 mm increase in facial fat thickness, as observed by MRI, at 3 months. Six months after completion, most subjects (83%) were satisfied with the result. All procedures were well tolerated [12].

Despite this, several problems such as facial lipodystrophy and changes in the skin and skin texture have not yet been fully resolved. Thus, a retrospective observational clinical study analyzed the use of the Lipo-Facelift procedure, which consists of facial liposculpture performed simultaneously with a bivector biplanar facelift procedure of the submucosal aponeurotic system. The authors analyzed pre- and post-surgical photographs of 12 Lipo-Facelift patients after 3 and 12 months and analyzed their medical records for complications. In addition, CO_2 measurement was performed to assess the improvement of microcirculation. The longest follow-up period was 8 years. The Lipo-Facelift demonstrated very satisfactory results and no surgical intervention or revision was required. The results showed a lasting improvement in skin quality and a youthful appearance. Lipo-Facelift corrects age-related changes in the skin and the submucosal aponeurotic system as well as age-related lipodystrophy, improves skin circulation and skin revitalization, providing a long-lasting and natural result

[13].

These results can be achieved due to the improvement of angiogenesis due to the growth factors transferred in the lipoaspirate, as well as in the presence of mesenchymal adipose stem cells, exosomes, microRNA, and parakeets. Furthermore, the differentiation of progenitor cells into fibroblasts and increased collagen production contribute to firmer skin [14]. In particular, Coleman's Lipostructure is a procedure for transferring adipocytes, based on rigorous methodology and the use of specific material [15].

In this sense, a retrospective study involved 100 patients who underwent volumetric facial restoration with facelift and liposculpture. The mean surgery time was 15 months. Overall patient satisfaction was 82% with a mean score of 15/20 in the subjective assessment and 13.3/20 in the objective assessment. The results differed significantly according to the facial aesthetic subunit involved, with the best results being obtained in the malar region and cheek, and the least satisfactory in the upper and lower lips. Prolonged edema was the only complication (8%) [16].

Furthermore, a prospective clinical study described the surgical results with special emphasis on complications in patients undergoing high-definition liposculpture. A total of 417 patients underwent high-definition liposculpture between 2015 and 2018. Primary liposuction and secondary liposuction were performed in 308 (74%) and 109 (26%), respectively. Combined surgeries were performed in 121 cases (29%). There were no systemic complications. Local complications included hyperpigmentation (n=276), seroma (n=125), nodular fibrosis (n=83), unsatisfactory definition in the areas of superficial liposuction (n=16), unnatural appearance of the body contour (n=17), VASER-related burns (n=3) and Mondor syndrome (n=2). Most patients (94%) were satisfied with the results [17].

Also, a retrospective clinical study demonstrated that a spectrum of liposculpture definitions can be achieved using Power-Assisted Liposculpture liposuction. In addition, the authors described satisfaction and complication rates. Fifty male patients were included in this study between January 2018 and November 2019. The mean age was 37.34 years. The mean body mass index was 26.4 kg/m2. A total of 54.3% of patients opted for the high definition (HD), 36.4% for the moderate definition, and 9.2% for the light definition. There were no major complications. The HD subgroup had the highest incidence of minor complications (21%). Patient satisfaction levels were high in all 3 subgroups, with the highest scores in the HD subgroup (9.3/10) [5].

Finally, efforts to achieve predictable skin retraction have largely neglected the importance of the adipose tissue removal mechanism, focusing instead on the depth of the surgical plane and the vacuum pressure used. Recent experimental and clinical evidence points to the role of mechanical displacement as a key factor in the removal of adipose tissue. Thus, a modification of an existing cannula design was used to achieve predictable skin retraction on the face and neck in a series of 75 patients with a 3-month to 3-year follow-up. Elevation of the facial and cervical flap with this instrument (with or without deep tissue tightening and skin excision) showed consistently improved results, improving skin tone and facial contours while decreasing recovery and operative time. The combination of the described technique and existing techniques such as endoscopic and compound lifting approaches can improve the achievable results [18].

Conclusion

According to the main clinical studies selected in the present study, cervicofacial liposculpture proved to be advantageous, in safety and efficacy. Most patients who were involved in the studies showed improvements in facial augmentation and contouring. In patients with loss of facial volume, high-density fat transfer with SVF-gel facial injection resulted in significantly higher improvement scores and better patient satisfaction, with an improved/much improved esthetic appearance observed. As a follow-up analysis of the studies, at an average of six months after completion, most patients were satisfied with the results. All procedures were well tolerated.

Data sharing statement
No additional data are available.

Conflict of interest
The authors declare no conflict of interest.

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References

1. Charles-de-Sá L, Gontijo-de-Amorim NF, Coleman S, Rigotti G. Regen Fat Code: A Standardized Protocol for Facial Volumetry and Rejuvenation. Aesthet Surg J. 2021 Oct 15;41(11):NP1394-NP1404. doi: 10.1093/asj/sjab016. PMID: 33453100.

2. Egro FM, Coleman SR. Facial Fat Grafting: The Past, Present, and Future. Clin Plast Surg. 2020 Jan;47(1):1-6. doi: 10.1016/j.cps.2019.08.004. Epub 2019 Oct 21. PMID: 31739886.

3. Farkas JP, Pessa JE, Hubbard B, Rohrich RJ. The science and theory behind facial aging. Plast Reconstr Surg Global Open. Apr 2013;1(1).

4. Habbema L. Liposculpture of the aging face and neck. J Cosmet Dermatol. 2005 Sep;4(3):198-203. doi: 10.1111/j.1473-2165.2005.00312.x. PMID: 17129267.

5. Saad A, Altamirano-Arcos CA, Nahas Combina L, Saad M. Power-Assisted Liposculpture in Male Patients: A Spectrum of Definitions. Aesthet Surg J. 2021 May 18;41(6):NP447-NP455. doi: 10.1093/asj/sjaa435. PMID: 33400776.

6. Haack J, Friedman O. Facial liposculpture. Facial Plast Surg FPS. May 2006;22(2):147e153.

7. Yang WC, Shih PK, Wu DW. The benefits of liposculpture in cervicofacial rejuvenation: A review of 312 consecutive patients. Asian J Surg. 2019 Nov;42(11):974-975. doi: 10.1016/j.asjsur.2019.07.012. Epub 2019 Jul 23. PMID: 31345656.

8. Karcenty B, Flageul G. Lipo-aspiration et liposculpture [Liposuction and liposculpture]. Ann Chir Plast Esthet. 2003 Oct;48(5):399-404. French. doi: 10.1016/j.anplas.2003.08.006. PMID: 14599920.

9. H Balshem H, Grade guidelines: 3 ratng the quality of evidence. Journal of Clinical Epidemiology, Maryland Heights, 64 (4) (2011) 401-406.

10. Higgins, S Green, Cochrane Handbook for Systematic Reviews of Interventions. Version 5.1.0 [updated March 2011]. The Cochrane Collaboration; 2011.

11. Cao Z, Li H, Wang ZH, Liang XQ. High-Density Fat Grafting Assisted Stromal Vascular Fraction Gel in Facial Deformities. J Craniofac Surg. 2022 Jan-Feb 01;33(1):108-111. doi: 10.1097/SCS.000000000008038. PMID: 34519702; PMCID: PMC8694257.

12. Heller L, Menashe S, Plonski L, Ofek A, Pozner JN. 1470-nm Radial fiber-assisted liposuction for body contouring and facial fat grafting. J Cosmet Dermatol. 2022 Feb 2. doi: 10.1111/jocd.14767. Epub ahead of print. PMID: 35106886.

13. Pallua N, Wolter T. The lipo-facelift: merging the face-lift and liposculpture: eight years experience and a preliminary observational study. Aesthetic Plast Surg. 2013 Dec;37(6):1107-13. doi: 10.1007/s00266-013-0218-x. Epub 2013 Oct 19. PMID: 24142113.

14. Pacheco CMR, Ferreira PE, Saçaki CS, Tannous LA, Zotarelli-Filho IJ, Guarita-Souza LC, de Carvalho KAT. In vitro differentiation capacity of human breastmilk stem cells: A systematic review. World J Stem Cells. 2019 Nov 26;11(11):1005-1019. doi: 10.4252/wjsc.v11.i11.1005. PMID: 31768226; PMCID: PMC6851011.

15. Coleman SR, Lam S, Cohen SR, Bohluli B, Nahai F. Fat Grafting: Challenges and Debates. Atlas Oral Maxillofac Surg Clin North Am. 2018 Mar;26(1):81-84. doi: 10.1016/j.cxom.2017.10.006. PMID: 29362076.

16. Foyatier JL, Mojallal A, Voulliaume D, Comparin JP. Evaluation de la restauration volumétrique par Lipostructure en complément du lifting cervicofacial. A propos de 100 cas [Clinical evaluation of structural fat tissue graft (Lipostructure) in volumetric facial restoration with face-lift. About 100 cases]. Ann Chir Plast Esthet. 2004 Oct;49(5):437-55. French. doi: 10.1016/j.anplas.2004.08.006. PMID: 15518944.

17. Danilla S, Babaitis RA, Jara RP, Quispe DA, Andrades PR, Erazo CA, Albornoz CR, Sepulveda SL. High-Definition Liposculpture: What are the Complications and How to Manage Them? Aesthetic Plast Surg. 2020 Apr;44(2):411-418. doi: 10.1007/s00266-019-01475-6. Epub 2019 Aug 20. PMID: 31432229.

18. Goodstein WA. Superficial liposculpture of the face and neck. Plast Reconstr Surg. 1996 Nov;98(6):988-96; discussion 997-8. doi: 10.1097/00006534-199611000-00009. PMID: 8911468