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Major considerations of gingivoplasty: a concise systematic review

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Abstract

Introduction: In the scenario of gingivoplasty, well-being is directly related to health, people with a balanced smile, between health and beauty, tend to smile more and this generates a condition of well-being. In gingival correction, process-specific techniques are used for each case, thus individualizing the patient and the proposed treatment, correcting not only the aesthetics but also the patient as a whole. **Objective:** This systematic review study described the techniques used to correct a gummy smile, with the gingivoplasty technique being selected. **Methods:** The PRISMA Platform systematic review rules were followed. The search was carried out from March to June 2024 in the 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 and Conclusion:** 78 articles were found and 15 articles were evaluated in full and 06 were included and developed in the present systematic review study. Considering the Cochrane tool for risk of bias, the overall assessment resulted in 25 studies with a high risk of bias and 22 studies that did not meet GRADE and AMSTAR-2. Most studies did not show homogeneity in their results, with X^2=87.5%>50%. It was concluded that applications of injectable platelet-rich fibrin have shown positive effects on epithelial wound healing after gingivectomy and gingivoplasty operations. A patient with a meso facial profile, compatible with hypertonic lips, improves our favorable prognostic acceptability with a lower risk of relapse and dissatisfaction. Bone-removing gingivoplasty is indicated for cases where removal of the gingival band only reduces the gingival sulcus invading the biological distance and thus needs to remove the bone for soft tissue stability.

Keywords: Aesthetics. Gingival aesthetics. Gingivoplasty.

Introduction

In the scenario of gingivoplasty, well-being is directly related to health, people with a balanced smile, between health and beauty, tend to smile more and this generates a condition of well-being. Currently, the demand for medical and dental procedures for aesthetic purposes has increased significantly, which keeps us active in the search for less invasive and longer-lasting techniques [1,2].

The variables that can be altered for a smile aesthetic balance conditioning are tooth color, tooth size, shape, dental positioning, and soft tissues of the face and mouth, these are lips, and the gum. A small gingival plastic can modify the smile as a whole, also changing the other variables [3-5].

In gingival correction, process-specific techniques are used for each case, thus individualizing the patient and the proposed treatment, correcting not only the aesthetics but also the patient as a whole. The smile becomes aesthetically pleasing when the lips, teeth, and gum are arranged in proper proportion, and the exposure of the gingival tissue is limited to 3 mm. When gingival exposure is greater than 3 mm, a non-aesthetic condition called gingival smile is characterized [6].

Periodontics is the specialty of dentistry that assists in smile correction, acting on the manipulation of

gingival tissues, and creating harmony between lips and gum [7]. The gingival smile may have different etiologies as hypermobility of the upper lip elevator muscles; pronounced vertical jaw growth; upper dentoalveolar extrusion; thin upper lip and gingival hyperplasia [5].

Careful planning and correct diagnosis of the cause of a gummy smile directly influences the proposed treatment's success and the results' longevity. To treat the harmony of the patient's smile, the cause of the gummy smile is sought, and precise planning is carried out to remove the causes and balance the effects [2].

To this end, this systematic review study described the techniques used to correct a gummy smile, with the gingivoplasty technique being selected.

METHODS

Study Design

The present study followed the international systematic review model, following the rules of PRISMA (preferred reporting items for systematic reviews and meta-analysis). Available at: http://www.prisma-statement.org/?AspxAutoDetectCookieSupport=1. Accessed on: 04/12/2024. The methodological quality standards of AMSTAR-2 (Assessing the methodological quality of systematic reviews) were also followed. Available at: https://amstar.ca/. Accessed on: 04/12/2024.

Data Sources and Research Strategy

The literary search process was carried out from March to June 2024 and was developed based on Scopus, PubMed, Web of Science, Lilacs, Ebsco, Scielo, and Google Scholar, covering scientific articles from various to the present. The health science descriptors (DeCS/MeSH Terms) were used: *"Aesthetics. Gingival aesthetics. Gingivoplasty"* and using the Boolean "and" between the MeSH terms and "or" between historical discoveries.

Study Quality and Risk of Bias

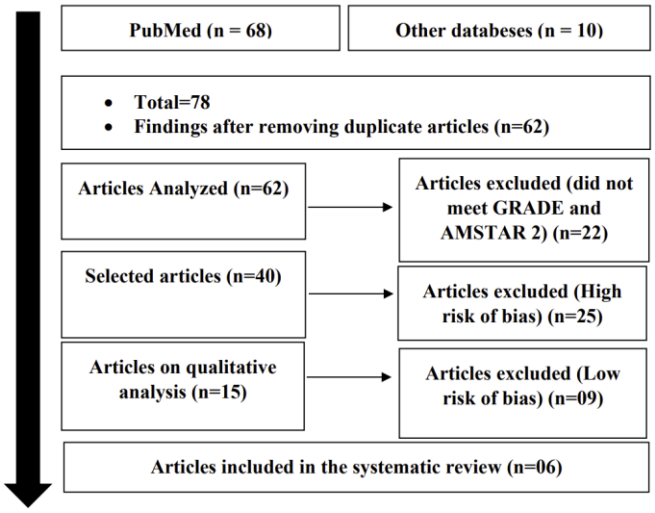
Quality was classified as high, moderate, low, or very low in terms of risk of bias, clarity of comparisons, precision, and consistency of analyses. The most evident emphasis was on systematic review articles or meta-analyses of randomized clinical trials, followed by randomized clinical trials. The low quality of evidence was attributed to case reports, editorials, and brief communications, according to the GRADE instrument. The risk of bias was analyzed according to the Cochrane instrument by analyzing the Funnel Plot graph (Sample size versus Effect size), using the Cohen test (d).

Results and discussion

Summary of Findings

A total of 78 articles were found that were subjected to eligibility analysis, with 06 final studies being selected to compose the results of this systematic review. The studies listed were of medium to high quality (Figure 1), considering the level of scientific evidence of studies such as meta-analysis, consensus, randomized clinical, prospective, and observational. The biases did not compromise the scientific basis of the studies. According to the GRADE instrument, most studies showed homogeneity in their results, with X^2=87.5%>50%. Considering the Cochrane tool for risk of bias, the overall assessment resulted in 25 studies with a high risk of bias and 22 studies that did not meet GRADE and AMSTAR-2.

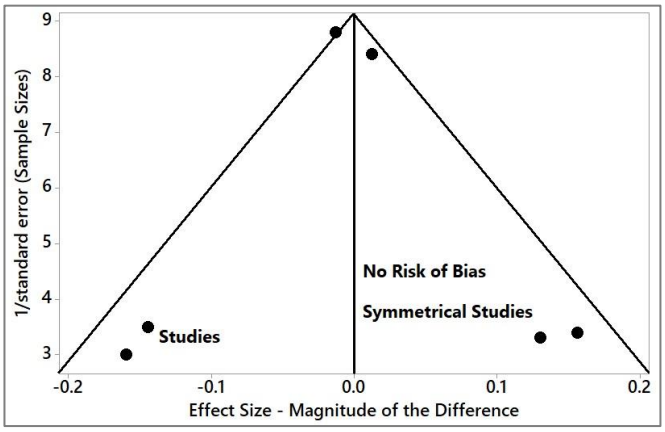
Figure 1. The article selection process by the level of methodological and publication quality.



Source: Own authorship.

Figure 2 presents the results of the risk of bias of the studies using the Funnel Plot, showing the calculation of the Effect Size (Magnitude of the difference) using the Cohen Test (d). Precision (sample size) was determined indirectly by the inverse of the standard error (1/Standard Error). This graph had a symmetrical behavior, not suggesting a significant risk of bias, both between studies with a small sample size (lower precision) that are shown at the bottom of the graph and in studies with a large sample size that are presented at the top.

Figure 2. The symmetric funnel plot suggests no risk of bias among the small sample size studies that are shown at the bottom of the graph. High confidence and high recommendation studies are shown above the graph (n=06 studies).



Source: Own authorship.

Major Findings

A randomized controlled clinical trial conducted by authors Bahar, Karakan, and Vurmaz (2024) [8] evaluated the wound healing effects of injectable platelet-rich fibrin (IPRF) after gingivectomy and gingivoplasty. 46 systemically healthy patients with chronic inflammatory gingival enlargement were randomly treated with gingivectomy-gingivoplasty + I-PRF (n=23) or gingivectomy-gingivoplasty alone (n=23). The primary outcome was to evaluate the effect of I-PRF on wound healing during a 3-week follow-up period. Gingival crevicular fluid (GCF) samples were processed using enzyme-linked immunosorbent assay (ELISA) to measure the biomarkers VEGF and FGF-10. Surgical sites were stained with Mira-2 and evaluated in ImageJ. Wound healing was assessed using the Modified Manchester Scar (MMS) scale and the Landry, Turnbull, and Howley (LTH) index. The VEGF values of the control group at baseline, week 2, and week 3 were significantly higher than those of the test group. At weeks 2 and 3, FGF-10 values were significantly higher in the control group than in the test group. The amount of staining was significantly higher in the control group than in the test group on days 3, 7, and 14. The LTH values of the control group were significantly lower than those of the test group, and the MMS values were significantly higher than those of the test group.

In this context, excessive gingival display (EGD) is defined as more than 2 mm of gingival display above the maxillary incisors. A recent study by Maleki et al. (2024) [9] evaluated the efficacy and stability of surgical (SX) and non-surgical (NSX) interventions for EGD correction through a systematic review and meta-analysis. The results were expressed as mean change in gingival display using the random-effects model at 1, 3, 6, and 12 months of follow-up. At 1 month, SX and NSX treatments produced a comparable mean reduction of 3.50 mm (2.13–4.86) and 3.43 mm (2.67–4.19) in the gingival display, respectively. However, at 6 months, NSX treatments showed a reduction of 0.51 mm compared with 2.86 mm with SX treatments. SX results remained stable after 6 months, whereas NSX results partially relapsed at 6 months and returned to baseline levels at 12 months. Furthermore, gingival hyperpigmentation resulting from physiological melanosis causes aesthetic discomfort. A clinical case study showed a surgical procedure combining gingivectomy with gingivoplasty for the treatment of physiological melanosis. The surgical procedure was performed on a 40-year-old female patient with bilateral pigmentation in both arches. The results of the histological analysis confirmed the diagnosis of melanotic macule, with papillary hyperplasia and cytopathic changes suggestive of HPV infection, which was verified using an immunohistochemical analysis based on the detection of an important HPV capsid protein. Acceptable functional and aesthetic results were obtained for the patient without major discomfort during the postoperative period [10].

For the success of an aesthetic correction must be aware of the causes of the change in normality, added to the patient's reasons [11,12]. Suber et al. (2013) [13] suggest that before any aesthetic correction, the patient's and dentist's thoughts should be aligned so as not to entertain hopes about postoperative outcomes.

The ideal planning according to Kane et al. (2003) [11] is when post-surgical effects directly influence cause removal and patient satisfaction, which is in line with our research results. For successful planning the patient's age should always be taken into account, for patients over 45 years the lips become hypotonic, and for correction of gingival exposure caused by contraction of the upper lip elevator muscles, so this is always postoperative relapse. To be considered, associated with age we should also observe the patient's facial profile, those with long faces are susceptible to prolonged maintenance of a gingival smile, and less invasive techniques are not fully recommended.

Conclusion

It was concluded that applications of injectable platelet-rich fibrin have shown positive effects on epithelial wound healing after gingivectomy and gingivoplasty operations. A patient with a meso facial profile, compatible with hypertonic lips, improves our favorable prognostic acceptability with a lower risk of relapse and dissatisfaction. Bone-removing gingivoplasty is indicated for cases where removal of the gingival band only reduces the gingival sulcus invading the biological distance and thus needs to remove the bone for soft tissue stability.

CRediT

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Conflict of Interest

The authors declare no conflict of interest.

Similarity Check

It was applied by Ithenticate®.

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It was performed.

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