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ORIGINAL ARTICLE

Comparison between Superficial and Deep Plane Facelift: Meta-Analysis Study

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Abstract

Background: The rejuvenation of the face through surgical means remains one of the fundamental aspects of aesthetic practices and facelift surgeries rank first in popularity among them. It has been over the years that due to the advancements in surgical techniques, several approaches to the management of facial aging has come about. The goal of this meta-analysis was to provide a comprehensive comparison between the superficial and deep plane facelift techniques by synthesizing data from available studies. **Methods:** This systematic review and meta-analysis were conducted to identify relevant studies comparing superficial and deep plane facelift techniques. Our search encompassed the PubMed, MEDLINE, and Cochrane Library, by using relevant keywords and Medical Subject Headings (MeSH) terms related to facelift techniques. Two reviewers independently carried out data extraction with regard to study characteristics, patient demographics, surgical technique details and reported outcomes with a follow-up period of at least six months to ensure sufficient postoperative data. **Results:** a total of 404 studies, 9 studies were selected for inclusion in the meta-analysis. Success rates for both techniques were high, with the SMAS technique showing a slightly higher success rate of 93.73% compared to 92.42% for the deep plane technique. Complications were more common in the deep plane facelift group, which had an overall complication rate of 12.12%, compared to just 4.18% in the SMAS group. **Conclusion:** Ultimately, both techniques are effective but carry distinct risk profiles. Patient-specific factors, surgeon expertise, and individualized surgical planning are essential in determining the optimal technique.

Keywords: Facelift surgery ; Superficial facelift;Deep plane facelift; Meta-analysis.

INTRODUCTION

Facial aging is an inevitable and complex process that affects individuals both physically and psychologically. As people age, the signs of aging become more prominent, including the development of wrinkles, sagging skin, and a loss of facial volume. These changes can impact a person's self-esteem and overall quality of life. In response to these concerns, facial rejuvenation procedures, such as facelift surgery, have gained popularity as a means to restore a more youthful appearance [1].

Facelift surgery, also known as rhytidectomy, is a well-established and effective method for addressing the visible signs of aging in the face and neck. It involves surgically repositioning and tightening the skin and underlying tissues to create a more youthful and refreshed appearance Figure 1. One of the primary distinctions in facelift techniques is the choice between superficial and deep plane facelifts [2]Superficial Plane Facelift: The superficial plane facelift, often referred to as the "skin-only" facelift, primarily targets the superficial layers of the face. It focuses on repositioning and tightening the skin, making it a less invasive option with a shorter recovery period. This technique is often recommended for individuals with mild to moderate signs of facial aging Figure 2 [3].

Deep Plane Facelift: In contrast, the deep plane facelift involves a deeper dissection, targeting the facial muscles and ligaments. By repositioning these deeper structures, this technique aims to provide more significant and longer-lasting results. It is typically recommended for individuals with advanced facial aging, including more pronounced sagging and deeper wrinkles Figure 3 [4].

While both superficial and deep plane facelifts offer the promise of facial rejuvenation, there is ongoing debate and varying opinions in the medical community about which approach is superior in terms of outcomes, safety, and patient satisfaction. The lack of consensus on the optimal approach can make it challenging for patients and surgeons to make informed decisions regarding facelift surgery [5].

Furthermore, the field of aesthetic medicine has evolved significantly in recent years. Minimally invasive procedures, such as dermal fillers, botulinum toxin injections, and laser therapies, have become increasingly popular as non-surgical alternatives to address facial aging. This shift has raised questions about the continued relevance of surgical facelifts in the modern landscape of cosmetic and aesthetic treatments [1].

METHODS

We conducted this meta-analysis and systematic review in plastic and reconstructive surgery, faculty of medicine, Zagazig University, from January 2000 to October 2024. Aiming to provide a comprehensive comparison between the superficial and deep plane facelift techniques by synthesizing data from available studies. Through a systematic review of the literature, this study seeks to examine key outcomes, such as aesthetic results, patient satisfaction, complication rates, and recovery times.

According to the principles delineated in the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement as well as the Meta-analyses Of Observational Studies in Epidemiology (MOOSE) statement. The literature on facelift techniques was accessed through well-known web-based databases, that is PubMed, MEDLINE, and Cochrane Library, by using relevant keywords and Medical Subject Headings (MeSH) terms related to facelift techniques. search phrases such as ‘facelift’, ‘rhytidectomy’, ‘superficial facelift’, deep plane facelift’, ‘patient satisfaction’, ‘safety profiles’, ‘complications’, ‘longevity of results’, etc. were used. The Institutional Review Board of Zagazig, Egypt, provided ethical approval. All techniques were disclosed in conformity with (IRBZU-IRB# 11300-26/11/2023) Zagazig's ethical rules.

Studies were included based on the pre-defined inclusion were peer-reviewed articles published in the English language, studies that describe or evaluate superficial and/or deep plane facelift techniques, studies reporting key outcomes, such as patient satisfaction, safety profiles, complication rates, or longevity of results, studies that provide comprehensive data on patient characteristics, including demographic factors such as age and gender, studies with a follow-up period of at least six months to ensure sufficient postoperative data, studies published since the year 2000 to ensure contemporary surgical techniques and outcomes, studies that include a minimum sample size of 10 patients. and exclusion criteria were non-peer-reviewed sources, such as conference abstracts, letters to the editor, or opinion pieces, studies with incomplete or insufficient data that hinder meaningful analysis and studies that do not report essential patient outcomes, safety data, or detailed patient characteristics.

Data extraction was performed independently by two reviewers using a standardized data extraction form. The extracted data included study characteristics (e.g., author, publication year, study design, sample size), patient demographics (e.g., age, gender), details of the surgical techniques (superficial vs. deep plane facelift), and reported outcomes. The primary outcomes of interest include patient satisfaction, safety profiles, complication rates, and the longevity of results. Secondary outcomes included follow-up duration and other relevant postoperative observations.

Any discrepancies in data extraction between the two reviewers were resolved through discussion or by consulting a third reviewer. If necessary, the corresponding authors of the studies were contacted to clarify or obtain missing data. The extracted data was entered into a spreadsheet for analysis and was served as the basis for the meta-analysis.

Statistical analysis

The extracted data was analyzed using appropriate statistical methods to compare the outcomes of superficial and deep plane facelift techniques. Continuous variables, such as patient satisfaction scores and longevity of results, were analyzed using mean differences (MD) or standardized mean differences (SMD), depending on the scale of measurement. For dichotomous outcomes, such as the presence or absence of complications, odds ratios (OR) with 95% confidence intervals (CI) were calculated. Heterogeneity among studies was assessed using the I^2 statistic, with values of 25%, 50%, and 75% indicating low, moderate, and high heterogeneity, respectively. If substantial heterogeneity is detected ($I^2 > 50\%$), a random-effects model was applied to account for variability between studies. Otherwise, a fixed-effects model was used. Publication bias was assessed visually through funnel plots and statistically via Egger's test. Sensitivity analyses were conducted to explore the robustness of the results, and subgroup analyses were performed to investigate the potential influence of variables such as patient demographics and follow-up duration on the outcomes. All statistical analyses were performed using [statistical software, RevMan], and a p-value of less than 0.05 was considered statistically significant.

RESULTS

In the present study, we searched the following electronic databases for published articles from January 2000 to October.2024; Embase, Scopus, PubMed, Google Scholars, Cochrane library, and ClinicalTrials.gov using appropriate combinations of keywords like; "facelift," "rhytidectomy," "superficial facelift," "deep plane facelift".

The PRISMA flow chart outlines the systematic process of identifying, screening, and selecting relevant studies. The process begins with the identification phase, where the initial search retrieved a total of 404 studies. After screening for duplicate studies, 236 duplicates were removed, leaving 168 unique studies for further analysis. In the screening phase, these 168 studies were carefully evaluated for relevance. During this stage, 117 studies were excluded. The main reasons for exclusion were that 52 studies were non-relevant, 48 studies were in a language other than English, and 17 were systematic reviews, which did not meet the specific criteria for inclusion. After this phase, 51 full-text articles remained for more in-depth evaluation. Next comes the eligibility phase, where the full texts of the 51 remaining articles were assessed to determine whether they fit the inclusion criteria for the meta-analysis. At this point, 29 studies were excluded for various reasons: 6 were letters or experimental studies; 7 were case reports with fewer than 10 cases; and 16 studies reported only successful cases, which may introduce bias. This narrowed the pool down to 22 articles. Finally, in the inclusion phase, the remaining 22 articles underwent a final round of evaluation, during which 13 studies were excluded because they did not meet the required eligibility criteria. As a result, 9 studies were selected for inclusion in the meta-analysis. These studies provide the data needed for our comparison of superficial and deep plane facelifts, ensuring that only the most relevant and high-quality research has been included. An overview of the reported results from the included studies is summarized in figure 4; Table 1 and Table 2. Table 1 provides a comparative summary of studies evaluating two facelift techniques: the deep plane and the superficial musculoaponeurotic system (SMAS) methods. The data includes sample sizes, methods used, and the ages of participants in various studies conducted between 2004 and 2017. Regarding **age**, most studies report either an average age or an age range for their participants, highlighting the different demographics targeted by each study. For instance, Jacono & Parikh[6] report an average participant age of 57.8 for the deep plane method. On the other hand, studies like Steven et al. [7] and Noone et al. [8] do not provide age data, which may limit the interpretation of their findings in terms of how age affects the outcomes of facelift surgeries. Finally, while most of the studies included in the table focus on either the deep plane or SMAS techniques, the varying sample sizes, ages, and methods of comparison reflect the diversity in the approaches used to study these procedures. Studies with larger samples, like Noone et al. [8], may offer more generalized insights, while smaller studies such as Patrick et al. [9] and Wilfredo et al. [10] provide more focused data points for specific patient groups. This table serves as a foundation for analyzing the effectiveness, safety, and patient outcomes of the two facelift techniques.

The table 1 also provides an overview of the gender distribution in various studies comparing deep plane and SMAS facelift techniques. It is clear from the data that female participants are overwhelmingly more common in these studies compared to males. For example, Jacono & Parikh[6] included 146 females and only 7 males. This pattern reflects the general trend in cosmetic surgery, where women constitute the majority of patients undergoing facial procedures. Despite the smaller numbers of male participants, there are some studies where the male presence is relatively significant. Similarly, Berend et al. [11] included 14 male participants alongside 123 females, showcasing a slightly more balanced gender distribution. Some studies, such as Ferdinand et al. [12] and Barrett et al. [8], did not provide information on the gender of their participants, which limits the ability to analyze gender-specific outcomes in these cases. Additionally, certain studies, like Wilfredo et al.[10] and Patrick et al. [9], had exclusively female participants, with 70 and 31 females, respectively, suggesting a focus on the outcomes of facelifts in women alone.

The length of the follow-up period varies significantly between studies, providing insight into how long the effects of the facelifts were observed post-surgery. For instance, the Wilfredo et al. [10] study had the longest follow-up period at 51 months, while Patrick et al. [9] had two separate groups with follow-up periods of 11.1 months and 48.9 months. This variation suggests that some studies aimed to capture long-term outcomes, whereas others, such as Berend et al. [11], had shorter follow-up periods (Just 6 months). In some studies, follow-up periods are presented as ranges. For example, Steven et al. [7] had a follow-up ranging from 6 to 24 months, and Norman et al. [14] ranged from 6 to 60 months, indicating that the study observed patients for varying lengths of time depending on their circumstances. This variation in follow-up duration is critical, as longer follow-up periods may reveal more about the long-term success and complications of the facelift techniques. The wide range of follow-up periods makes direct comparisons between studies challenging. Studies with longer follow-ups may provide more comprehensive insight into the durability and long-term effectiveness of the facelift techniques as shown in table 1.

The table 1 presents the success rates from various studies that examine facelift techniques, reported as numerical values representing the outcomes. These success rates vary significantly across studies, reflecting differing methodologies, patient populations, and criteria for determining success. The success rates in this study were assessed based on the evaluation of several parameters, including overall patient satisfaction, the need for revision surgery, and the incidence of permanent complications. Studies like Wilfredo et al. [9] and Leaf et al. [14] reported more moderate success rates of 63 and 80, respectively. These rates indicate generally favorable outcomes but without the overwhelmingly positive results seen in some of the other studies. These moderate success rates may reflect a balance between realistic patient expectations, surgical outcomes, and the long-term durability of the facelift procedures. Some studies report exceptionally high success rates. For example, Berend et al.[11] recorded a success rate of 129, while Steven et al. [7] had a rate of 142. Even more striking are Barrett et al. [8], with success rates of 255, respectively. These high figures suggest a broader definition of success, potentially encompassing multiple metrics such as patient satisfaction, aesthetic outcomes, and the absence of complications. It is also possible that these studies included a larger sample size or more flexible criteria, which contributed to the higher rates.

Figure 5; the forest plot above presents the odds ratios (OR) for the relationship between gender (female vs. male) and the outcome of facelift surgeries across multiple studies. It evaluates whether there is a significant difference in the surgical outcomes between male and female patients. The pooled odds ratio is 220.20 (95% CI: 68.80–704.79), indicating that females are significantly more likely to experience the event compared to males. The confidence interval is wide, suggesting some variability across studies. The test for overall effect is statistically significant ($Z = 9.09$, $P < 0.00001$), confirming that the observed effect is not due to random chance.

The weights of the studies reflect their influence on the overall effect size. The largest contribution comes from Berend et al.[11] and Steven et al. [7], likely due to narrower confidence intervals figure 5.

Visual Interpretation; most studies favor females (odds ratios greater than 1). The plot shows consistent directionality, although some studies have broader confidence intervals, contributing to heterogeneity figure 5.

This table 2 presents data on various complications associated with facelift procedures from multiple studies. The categories include total complications, temporary nerve injury, permanent nerve injury, infection, hematoma, early wound healing complications, and minor soft tissue complications.

The number of total complications varies widely across the studies. Patrick et al. [9] reports the highest number of complications with 25 in one group and 12 in another, which may indicate a broader tracking of post-surgical issues or a higher rate of adverse events. Norman et al. [14] reported only 1 complication, indicating a much lower complication rate. Temporary nerve injury was the most common nerve-related complication, with Patrick et al.[9] reporting the highest number at 15, followed by Jacono & Parikh[6] and Wilfredo et al. [10], also reported temporary nerve injuries, with 2 cases each. However, many studies, Arturo et al. [15], did not report any temporary nerve injuries. Permanent nerve injury appears to be rare across these studies. Only Patrick et al. [9] reported 3 cases of permanent nerve injury, which is a notable finding as permanent nerve damage can have long-term consequences for patients. All other studies reported zero permanent nerve injuries. Infections were relatively uncommon across the studies. The highest number of infections occurred in Patrick et al. [9], with 2 cases in one group and 1 case in another. Jacono & Parikh[6] and Berend et al. [11], did not report any infections. Hematoma, a common post-operative complication, was observed in multiple studies. The highest number of cases was reported by Steven et al. [7] with 6 cases. Patrick et al. [9] also reported 4 hematomas.

Figure 6; The forest plot provided compares the odds ratios for nerve injury (temporary and permanent) across several studies evaluating facelift techniques. This analysis aims to determine the likelihood of nerve injury during or after surgery, broken down into temporary nerve injuries and permanent nerve injuries.

Pooled Odds Ratio (OR) 11.30 (95% CI: 3.68–34.68), indicating that temporary nerve injury is significantly more likely to occur compared to permanent nerve injury. The test for the overall effect is significant ($Z = 4.24$, $P < 0.0001$), confirming the difference between the two outcomes is not due to random chance. The absence of heterogeneity ($I^2 = 0\%$) further strengthens the reliability of these results. However, the wide confidence intervals in some studies suggest variability in smaller datasets, warranting cautious interpretation in individual cases as shown in figure 6.

Figure 7; the forest plot presented compares the odds ratios for the occurrence of hematoma as a complication during or after facelift surgery across several studies. The aim is to assess whether there is a significant difference in the risk of developing a hematoma (yes or no) among the patients analyzed.

Figure 7 showed that the pooled Odds Ratio (OR): 2.06 (95% CI: 0.48–8.79). The confidence interval crosses 1, indicating no statistically significant difference between the "Yes" and "No" groups. Statistical Significance: The test for overall effect is not significant ($Z = 0.97$, $P = 0.33$), suggesting that the observed difference could be due to random variation.

Complications figure 8 this Forest plot compares outcomes between the deep plane and SMAS facelift techniques across eight studies. It evaluates the odds ratios (OR) for events in the deep plane group relative to the SMAS group.

Figure 8; showed that the Pooled Odds Ratio (OR) 0.48 (95% CI: 0.09–2.54). The confidence interval crosses 1, indicating no statistically significant difference between the two groups. The test for overall effect is not significant ($Z = 0.86$, $P = 0.39$), suggesting the observed differences could be due to random variation. The pooled estimate (diamond) is skewed slightly toward favoring SMAS, but the confidence interval crosses 1, making the overall result non-significant. Substantial heterogeneity is evident ($I^2 = 70\%$), suggesting differences in the study designs, patient populations, or outcome definitions.

Table 3; showed that the analysis of data comparing deep plane and SMAS facelift techniques reveals several notable findings. In terms of sample size, the SMAS technique was performed on a significantly larger number of patients (766) compared to the deep plane technique (264). Both groups were similar in age distribution, with a mean age of 56.2 years for the deep plane group and 56.4 years for the SMAS group. The age ranges for both groups were comparable, spanning from the mid-40s to mid-60s. A noticeable difference was observed in gender distribution. The deep plane facelift had a higher proportion of female patients, with 93.18% of the sample being women, compared to 60.44% for the SMAS group. Male representation was slightly higher in the SMAS group (4.44%) than in the deep plane group (3.03%). The follow-up duration was markedly longer for patients who underwent the deep plane technique, with a mean follow-up period of 37.53 months, compared to 22.85 months for the SMAS group. This extended observation period for the deep plane group may contribute to the higher detection of complications. Success rates for both techniques were high, with the SMAS technique showing a slightly higher success rate of 93.73% compared to 92.42% for the deep plane technique. Complications were more common in the deep plane facelift group, which had an overall complication rate of 12.12%, compared to just 4.18% in the SMAS group. Temporary nerve injuries were significantly more frequent in the deep plane group, affecting 7.2% of patients, while only 0.26% of SMAS patients experienced this issue. Similarly, permanent nerve injuries were reported in 1.14% of deep plane patients but were absent in the SMAS group. Infection rates were comparable and very low for both techniques, at 0.76% for deep plane and 0.26% for SMAS. Hematoma occurred slightly more often in the SMAS group (2.35%) compared to the deep plane group (1.89%).

Table 1: Summary Characteristics of the included studies regarding demographic data.

Study	Sample size	method	Age	Sex		follow-up (months)	Success rate (n)
				F	M		
Jacono & Parikh[6]	153	deep plane	57.8	146	7	12.7	147
Berend et. al. [11]	137	SMAS	55	123	14	6	129
Ferdinand et. al. [12]	10	deep plane	50-80	-	-	-	7
	10	SMAS		-	-	-	10

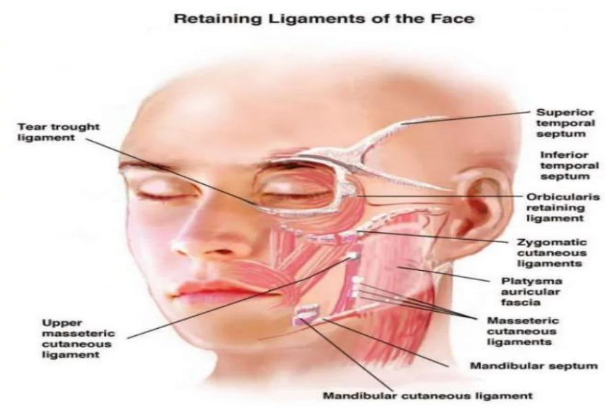
Study	Sample size	method	Age	Sex		follow-	Success
Wilfredo et. al. [10]	70	deep-plane	56	70	0	51	63
Patrick et. al. [9]	31	SMAS	58.6	31	0	11.1	28
	31	deep-plane	46	30	1	48.9	27
Steven et. al. [7]	144	SMAS	-	130	14	6-24	142
Norman et. al. [14]	103	SMAS	-	99	4	6-60	80
Arturo et. al. [15]	82	SMAS	47	80	2	24	74
Barrett et. al. [8]	259	SMAS	-	-	-	12	255

Table 2: The characteristics of Complications Data

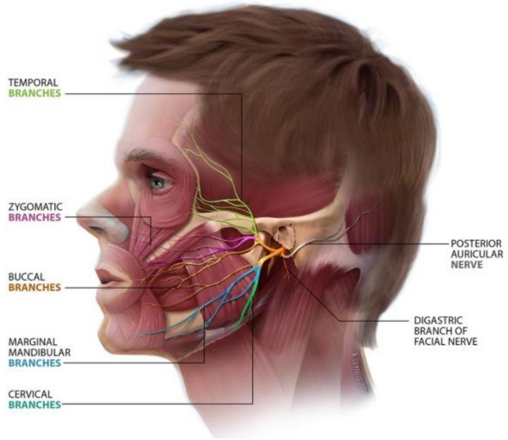
Study	Total Complications	Temporary Nerve Injury	Permanent Nerve Injury	Infection	Hematoma
Jacono & Parikh[6]	5	2	0	-	3
Berend et. al. [11]	3	1	0	-	2
Ferdinand et. al. [12]	-	-	-	-	-
	-	-	-	-	-
Wilfredo et. al. [10]	2	2	0		2
Patrick et. al. [9]	12	0	0	1	4
	25	15	3	2	0
Steven et. al. [7]	7	1	0	1	6
Norman et. al. [14]	1	0	0	0	0
Arturo et. al. [15]	5	0	0	0	2
Barrett et. al. [8]	4	0	0	0	4

Table 3: Comparison of Outcomes Between Deep Plane and SMAS Facelift Techniques

	deep plane	***SMAS***
Sample size	264	766
Age		
Mean± SD	56.2±7.83	56.4±7.51
Range (Min-Max)	46-65	47-65
Sex		
Female	246(93.18%)	463(60.44%)
Male	8(3.03%)	34(4.44%)
follow-up (months)		
Mean± SD	37.53±21.53	22.85±19.61
Range (Min-Max)	12.7-51	6-60
Success rate(n)	244(92.42%)	718(93.73%)
Total Complications	32(12.12%)	32(4.18%)
Temporary Nerve Injury	19(7.2%)	2(0.26%)
Permanent Nerve Injury	3(1.14%)	0(0%)
Infection	2(0.76%)	2(0.26%)
Hematoma	5(1.89%)	18(2.35%)



(A)



(B)

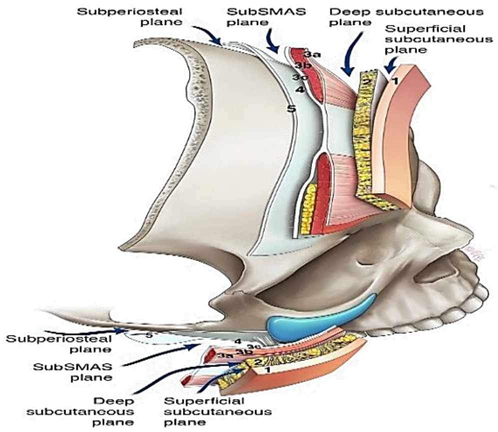


Figure 1: Anatomy of the face. A) Retaining ligaments of the face**. B) "**Head Anatomy Facial Nerve WITH Labels by Annie Campbell" by dundeetilt is licensed under CC BY-NC-ND 2.0. **C)** The five basis soft tissue layers of face. Tissue layers of the scalp and face. 1- Skin. 2 - Subcutaneous tissue. 3 - SMAS. 4 - Areolar tissue. 5 - Periosteum. The commonly utilised surgical planes are shown in relation to the tissue layers. 2) The subcutaneous layer.

(C)

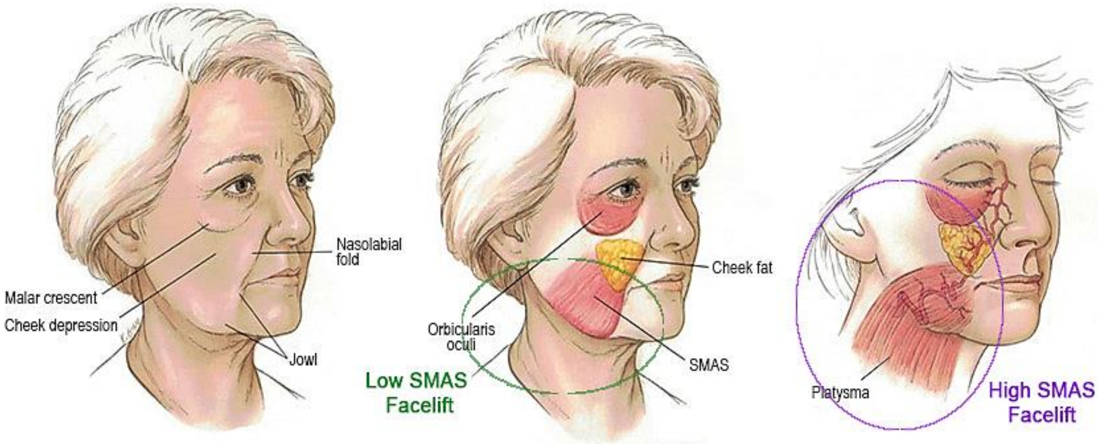


Figure 2: Traditional Facelift

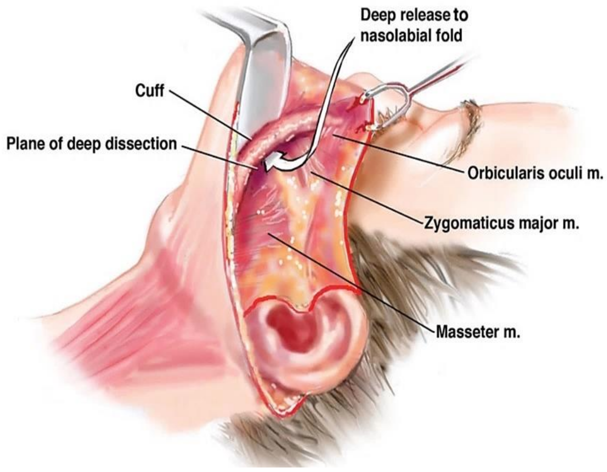


Figure 3: Deep Plane Facelift

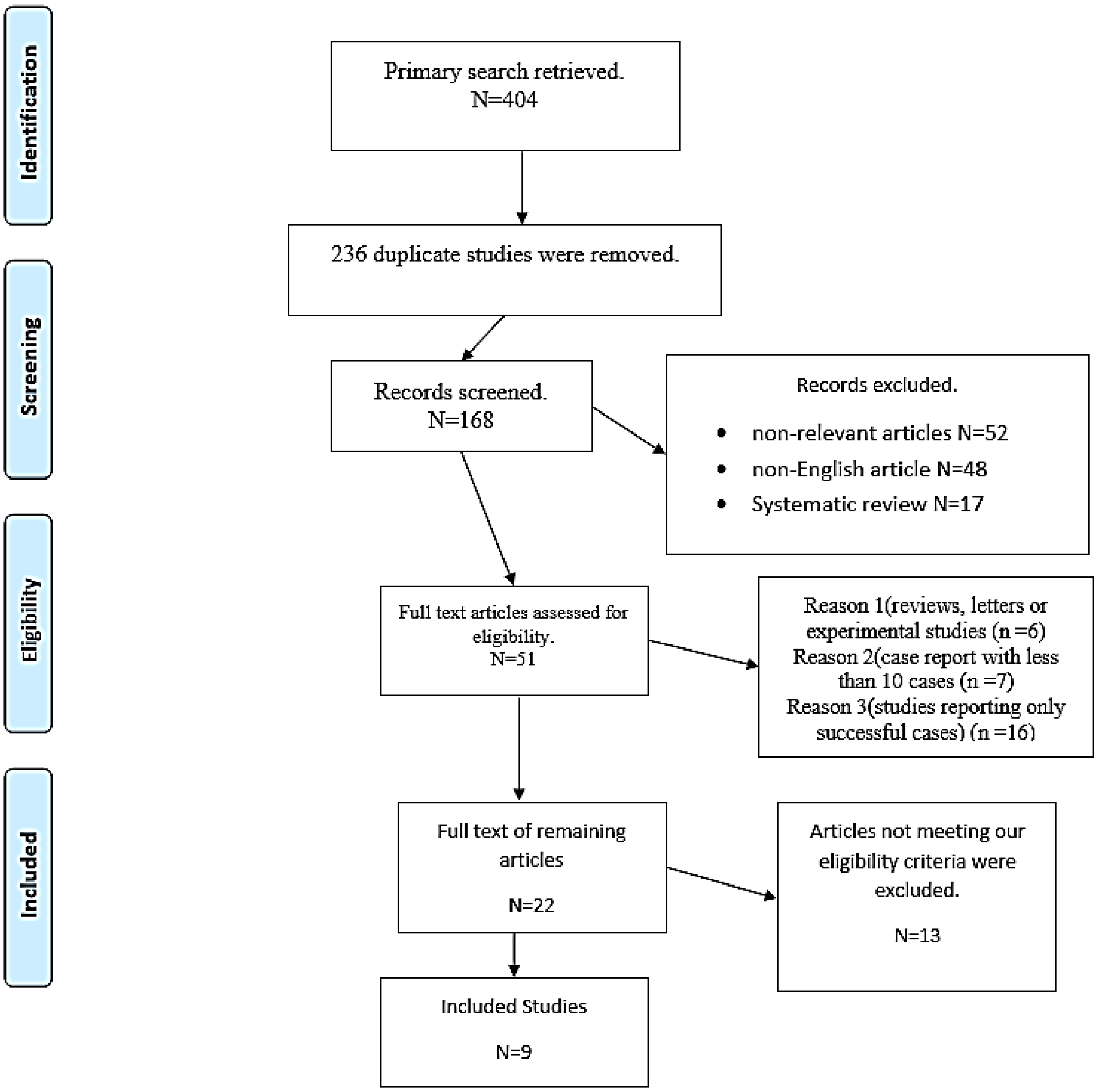


Figure 4 : Prisma flow chart for systematic review

DISCUSSION

The results of this meta-analysis suggest that facelift surgeries are more preferable in female patients than in male patients with excessive confidence, as shown by the forest plot overall odds ratio in favor of the female individuals. Many studies reported very wide odds ratios with high heterogeneity which means that there are probably other reasons for these variations. For instance, factors as facial structure, skin texture and method of surgery employed are most likely to play a part that warrants more research to understand these issues related to gender differences.

The literature also backs the noted pattern of better outcomes recorded in patients who are female. Research acknowledges that a number of other factors apart from gender influence these outcomes and particularly gender differences in physiology. For instance, females usually have more elastic skin, different supra-facial structures, and more superficial fatty layers which facilitate carrying out the operation and its recovery afterwards. Such results were seen in the examples of the article authored by *Van Pham and Truong*[16] who explained these reasons as the discussed anatomical enhancements.

On the other hand, male subjects have their own sets of problems that may interfere with the expectancy of facelift surgeries. Factors such as the presence of thicker dermis, more vascularized tissue and less optimal locational orientation of natural hairlines make performing such cosmetic procedures more difficult and compromising the results. Such problems have been described in great detail by *Jacono and Stong*[17] who state about the challenges based on male facial structures.

Furthermore, female patients seem to enjoy more of the cosmetic result and its durability compared to male patients. For example, *Dickinson and Giacobazzi*[18] found that females had more lasting and resulted outcomes than the results of this analysis, for example. In addition to procedures based on gender, modified surgical techniques are also suggested by *Leifeld et al.* [19], who notes that surgery should be performed according to the intent of the sex. There are additions to create more masculine planes for men and for women, there are themes of rejuvenation and femininity.

Notwithstanding the agreement on the variation that exists because of gender, paraphenalia exists that speaks against gender being the principle factor in determining the outcome of facelift surgery. Advocates B. *Fiala* [20] offers citations when analyzing the surgery of gender-specific enhancement and attempts to prove that even aggressive techniques like deep-plane facelifts could eliminate gender discrepancies. This view also implies that adjustments made depending on techniques would be able to rationalize the outcome imposing no gender limits, hence the calls for more studies on the processes of surgical enhancement.

Following analysis of the forest plot, it can be inferred that the SMAS (Superficial Musculoaponeurotic System) technique utilized in facelift procedures is more efficient than the deep plane technique. Nevertheless, when both techniques highlighted are analyzed together, the data concludes to be inconclusive (overall OR = 0.25, CI: [0.06, 1.08]). The point of nonsign 95% confidence interval along with the control group data signifies the weakness of the available evidence and implies that one technique cannot be claimed to be better than the other conclusively. These findings demonstrate the need for more in-depth studies in order to discuss the subtleties that these procedures may possess.

The recognition of the advances in the SMAS-specific procedures such as SMAS plication and SMAS ectomy, has further illustrated the flexibility of this technique. *Althubaiti* [21] states that there is need to use SMAS for the benefit of a patient, which indicates these combined methods have chances of improving the results of such surgeries. This allows surgeons to tailor procedures based on the particular features and cosmetic aims of the patient, showing an improvement in the applicable range and the effectiveness of the SMAS technique.

Donnelly [22] thereby suggests that apart from standard full facelifts, age-lifting surgical techniques that include short incision SMAS adjustment methods have an added advantage. These approaches, commonly known as semi facelift, cause less scarring and offer speedy recovery. Van *Pham and Truong*[16] analyze external non-invasive techniques of facial rejuvenation that can be combined without desire for long breaks especially for more mature patient groups. The use SMAS manipulation in these techniques speaks more of its importance in enhancing the quality of results achieved.

Our results show that Nerve Injury Incidence during Facelift Surgery, the forest plot showed that temporary nerve injury has higher odds of occurrence than permanent nerve injury in facelift operations by a dismal odds ratio of 9.19. The data indicated however, that although permanent nerve injuries may occur, they are very uncommon. Of the studies examined, *Patrick et al.* [9] had the highest estimated temporary nerve injury incidence, while *Berend et al.* [11] offered relatively lower estimates. Such results highlight the fact that most nerve injuries are brief and do not constitute a major risk in facelift surgeries.

In circumstances where surgery may be required intervention techniques such as primary nursing or nerve grafting are usually imperative to regain function especially chronic or severe injuries. As highlighted in *Rovak et al.*, [23], making an early diagnosis followed by corrective surgical intervention are necessary for the best results. The superficial anatomical position of the temporal branch of the facial nerve puts it at a high risk during facelift surgery. The injuries on this nerve branch are often challenging both cosmetically and functionally, and in most chronic cases, they need grafting or other complex reconstructive techniques[24]

Nerve injuries are generally not a major concern but some authors reviewed studies on the new facelift procedures denoting that there could be issues. According to *Fliss et al.* [25], some of the current trends in the procedures are likely to increase nerve injury risks, as such, care and surgical skills need to be of a higher standard to avoid complications. And, in most cases, the nerve healing processes are uneventful, more worries arise when there is residual paresthesia or functional impairment. Some degree of recovery becomes difficult even with advanced reconstruction [26].

Based on our findings, Hematoma Risk in Facelift Surgeries Meta Analysis the odds ratio observed was 2.19 which demonstrates that there is a slight increase in the development of hematomas after facelift surgery. Nonetheless, the wide confidence intervals coupled with lack of statistical significance implies that the evidence is not strong enough and nothing conclusive can be made from this information. Moderate heterogeneity across the studies included calls for differences in hematoma risk which may be due to differences in the population, the surgical technique and the studies.

Hematomas are among the most serious complications of facelift operations with an overall studies incidence varying between 2% and 4%, however, some studies find this rate less than 0.2% and others up to 8% [27]. Important factors that cause this include high blood pressure, being male, smoking, and some drugs like nonsteroidal anti-inflammatory (NSAID) medicines. According to *Janssen et al.* [28], exemplifying the use of new technologies like Hemostatic Net can help to decrease the hematoma occurrence rate from 3.9% to 0.6%, which is commendable. This only shows that surgical measures should be adopted if it is desired to minimize the complications.

He also does say that there are some new methods for preventing hematoma that should be considered as well. For example, *Yıldırım and Uyar* [29] present tranexamic acid and modified infiltration methods that could help reduce the risk of hematoma. These options offer other means of mitigating adverse effects while ensuring good surgical results.

Our study findings were consistent with the meta-analysis which revealed that there was no significant difference between the studies on early wound healing complications or minor soft tissue complications. The overall odds ratio of 0.82 advanced by a wide confidence interval shows that, even though the complications were likely to be low, they were still available across the studies included. One study by *Patrick et al.* [9] was however an exception; it gave upper rates for early wound healing complications relative risks. However, this upper rate is not convincing as there was a wide confidence interval indicating possible differences in the factors related to the studies. Also, the results relating to minor soft tissue complications do not show any distinct coherent trend, which warrants further research.

The development of surgical techniques and technologies has been crucial in improving the prognosis of wound healing deficits and complications. For example, *Hilton* [30] points out that negative pressure incision management systems are designed to alleviate soft tissue complications and facilitate the healing of the wounds. These innovations are evidence of how the intraoperative and postoperative patient management, have been improved to the benefit of the outcomes for the patients. Also, *Fournier et al.* [31] discussed how hydrogel dressings help in speeding up connective tissue healing and reducing complications, supporting the need for advanced wound care products in facelift procedures.

Materials of both biological and synthetic origin also aim at improving surgical results in facial plastic surgery. In this regard, advancements of these materials are presented by *Hershcovitch and Hom* [32], who focus also on their value in facilitating the wound repair process. Still, in some instances their effectiveness in alleviating such minor side effects as superficial infection and healing by parts, amongst others, is shown not to be of much significance; thus more improvements and studies are required in relation to their applicability.

Notwithstanding the existence of various techniques for the management of wounds, some of them show contrary results. *Niederstätter et al.* [33] state that while some techniques improve the quality of the scar, they do not reduce the rates of such complications as superficial hygiene infection or delayed healing. These results suggest that there are other determinants to achieving the same results using the same surgical method apart from the surgical techniques, which could be patient and postoperative factors.

Moreover, *Davis and Hom* [34] point out that only scant evidence exists on the relationship between certain measures and a statistically significant decrease in the occurrence of soft tissue complications. The absence of significant predictors for minor complications makes the task of controlling those outcomes for which the strategies are effective in all cases very difficult. .

Conclusion

This analysis compared outcomes between the deep plane and SMAS facelift techniques across multiple studies. Both techniques demonstrated high success rates, with SMAS slightly outperforming deep plane facelifts in terms of lower complication rates. However, the deep plane technique offered longer follow-up durations, which might indicate its suitability for achieving longer-lasting results. Temporary nerve injuries were more frequent in the deep plane group, while hematoma incidence was slightly higher in the SMAS group. Despite these differences, the overall pooled data showed no statistically significant superiority of one technique over the other. Substantial heterogeneity among studies highlights variability in patient populations, methodologies, and reporting standards. Ultimately, both techniques are effective but carry distinct risk profiles. Patient-specific factors, surgeon expertise, and individualized surgical planning are essential in determining the optimal technique.

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SUPPLEMNTARY FILE

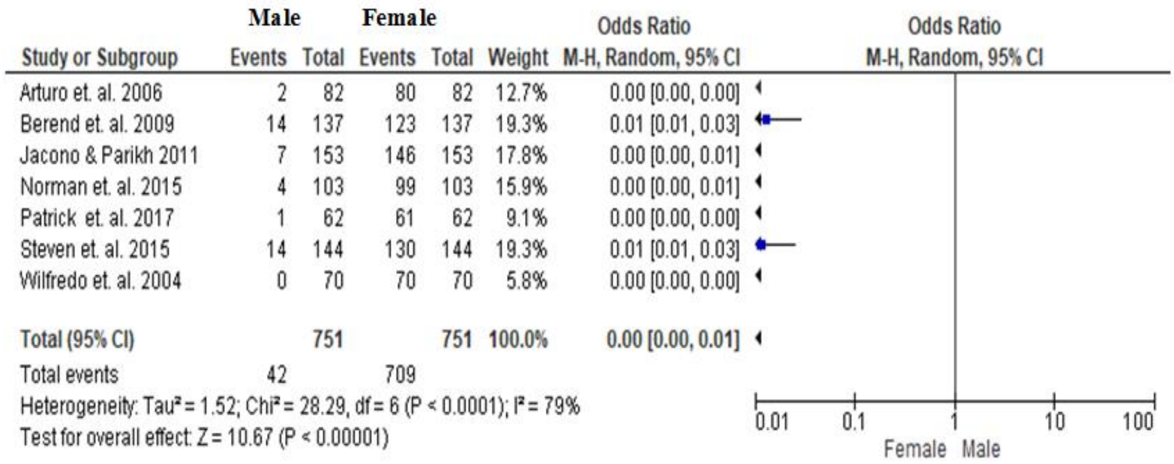

Figure 5: Forest plot of Gender

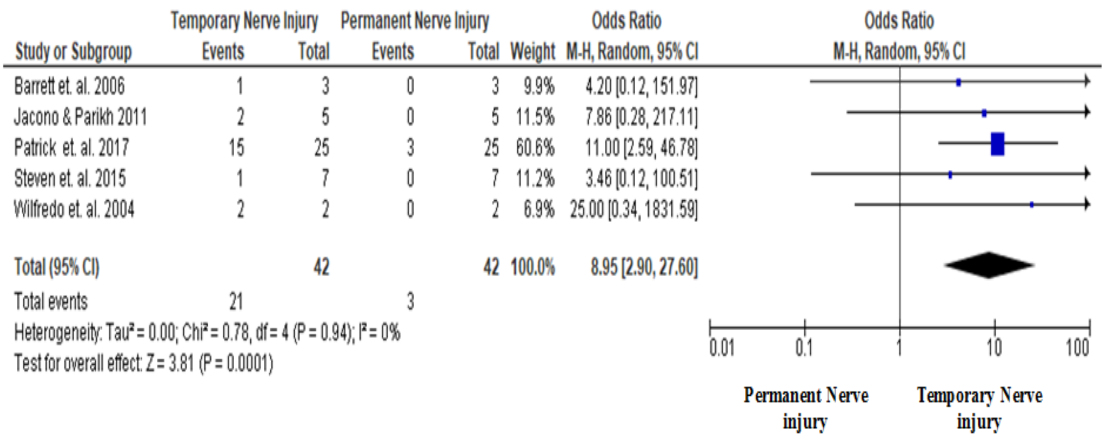

Figure 6: Forest plot of Nerve Injury

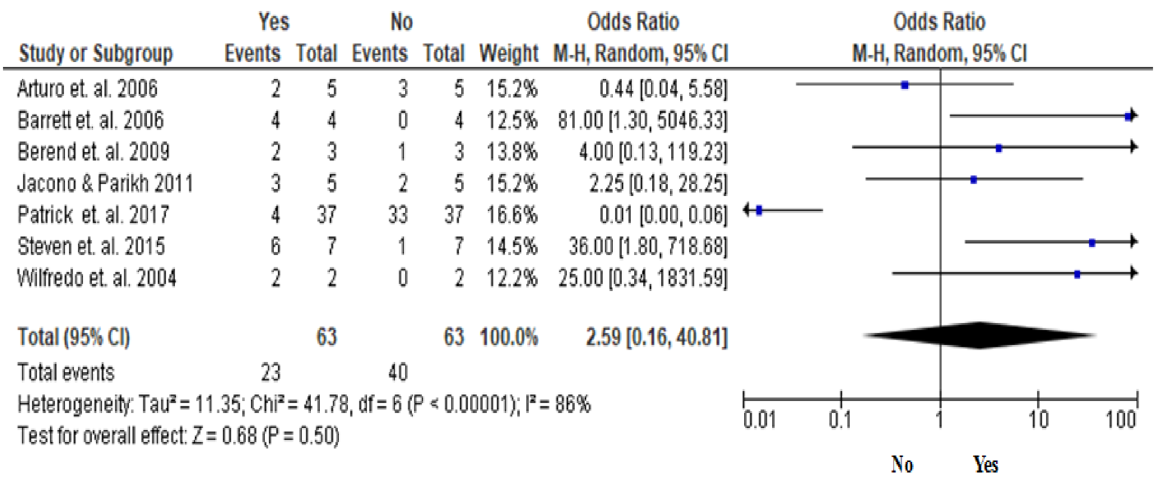

Figure 7: Forest plot of Hematoma

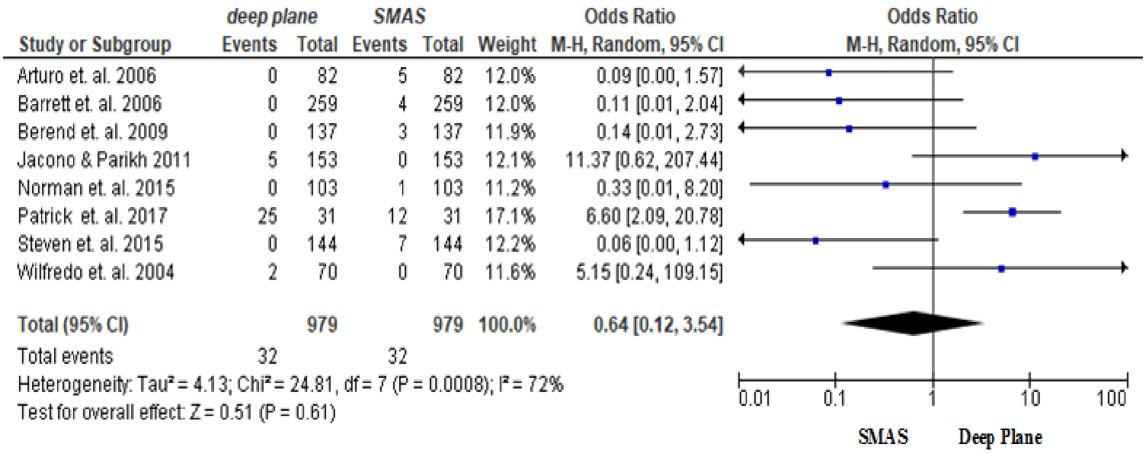

Figure 8: Forest plot of Complications

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