Original Article

Comparative Assessment of Internal Osteotomy with External Osteotomy in Patients Undergoing Cosmetic Rhinoplasty; A Randomized Controlled Trail

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ABSTRACT

Objective: To assess and compare surgical outcomes of external and internal osteotomies in patients undergoing rhinoplasty.

Study Design: A Randomized Controlled Trial study

Place and Duration of Study: This study was conducted at the Otorhinolaryngology, Central Park Teaching Hospital Lahore from November 2022 to June 2023.

Methods: A randomized controlled trial was conducted, enrolling 400 patients in two groups: internal osteotomy (Group-A) and external osteotomy (Group-B). Stratification was based on age and gender. Measurements of nasal dorsum width and base were taken post-surgery, and statistical analysis was performed.

Results: The study revealed statistically significant differences between the two groups in nasal dimensions. Both age groups (16-30 and 31-50) and genders exhibited significant differences, emphasizing the impact of osteotomy techniques on nasal measurements. Internal osteotomy offers discreet scarring and controlled modifications, while external osteotomy allows intricate adjustments but may leave a small scar.

Conclusion: This study contributes insights into personalized surgical decision-making for optimal aesthetic outcomes. Surgeons must consider patient preferences, anatomy, and desired outcomes when choosing osteotomy techniques. Further research with long-term follow-up could elucidate the durability of these differences and their effect on patient satisfaction and quality of life.

Key Words: Cosmetic rhinoplasty, internal osteotomy, external osteotomy, nasal aesthetics, surgical outcomes, patient satisfaction

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INTRODUCTION

Cosmetic rhinoplasty, a surgical procedure aimed at enhancing the aesthetic appearance of the nose, has gained immense popularity in recent years.[1] One of the critical decisions in cosmetic rhinoplasty is selecting the appropriate osteotomy technique. Osteotomy, the controlled division of bone, plays a pivotal role in reshaping the nasal bones to achieve the desired aesthetic outcome. Two common techniques employed for osteotomy in cosmetic rhinoplasty are internal osteotomy and external osteotomy.[2]

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These techniques involve different approaches to accessing and modifying the nasal bone structure, each with its advantages and limitations.[3] A comprehensive understanding of the comparative outcomes of these two techniques is crucial for surgeons to make informed decisions and optimize patient satisfaction.

Internal osteotomy, also known as closed osteotomy, involves making bone cuts within the nasal structure through incisions made inside the nasal cavity. This technique offers the advantage of not leaving visible external scars, which is particularly appealing to patients seeking minimal postoperative visibility of surgical intervention.[4] The internal approach provides the surgeon with direct access to the nasal bones, allowing for precise modifications and controlled bone repositioning. This technique has been refined over time, leading to reduced postoperative edema and faster recovery rates compared to external osteotomy.[5]

External osteotomy, or open osteotomy, involves creating a small incision on the columella, the tissue that separates the nostrils, in addition to internal incisions.[6] This technique offers enhanced visualization of the nasal framework and allows for

direct manipulation and fine-tuning of the bone structure. Surgeons can achieve more intricate adjustments, making external osteotomy particularly suitable for complex cases requiring significant reshaping.[7,8] However, a visible scar on the columella, albeit small, is a potential concern for some patients.

Despite the extensive literature on various aspects of cosmetic rhinoplasty, there remains a dearth of comprehensive studies comparing the outcomes of internal and external osteotomy techniques. While individual surgeons may have preferences based on their experiences, there is a lack of standardized evidence-based guidelines for selecting the optimal osteotomy technique. The available research often focuses on either internal or external osteotomy individually, without offering a head-to-head comparison of the two techniques in terms of surgical outcomes, patient satisfaction, and complications. Therefore, this study is warranted to assess and compare surgical outcomes of external and internal osteotomies in patients undergoing rhinoplasty.

METHODS

Under the guidelines of Helsinki Declaration and after fulfilling the CONSORT guidelines, a randomized controlled trial was conducted at the department of Otorhinolaryngology of Central Park Medical College and Teaching Hospital Lahore for comparison of surgical techniques of rhinoplasty; external osteotomy and internal osteotomy from November 2022 to June 2023 after getting ethical approval from ethical review board of hospital. Sample size was calculated using WHO sample size calculator with anticipated mean of 0.2079 and pooled deviation of 0.0314 and significance level at 5%; a sample size of 400 was calculated which was grouped into two groups. Group A (internal osteotomy; n=200) and group B (external osteotomy; n=200) were recruited by non-probability consecutive sampling technique and after prior written informed consent with age range of 16 to 50 years. While patients who had previous attempts of repair, DNS and nasal bone fractures were excluded from the study.

Upon securing ethical approval from the hospital's committee, eligible participants from the outpatient department were enrolled with informed consent. Allocation into two equal groups occurred randomly through computer-generated numbers. All surgeries were performed by the same surgeon under local anesthesia and sedation using closed techniques. The osteotomies for both groups were conducted endonasally. Internal osteotomies were executed using a guided 3- or 4-mm curved osteotome after periosteum displacement, resulting in a single fracture along the lateral aspect of nasal maxilla and bones. External osteotomies employed a 2- or 3-mm osteotome without guidance or periosteum displacement, creating multiple perforations along the same line orientation.

After surgery, nasal dorsum dressing was applied using micropore tape, with a thermoplastic splint molded over it. Six months post-surgery, standardized frontal photos were taken from a 5-foot distance. Interpupillary distance, the span between pupils' centers, was measured. Measurements involved dividing the width of post-op nasal dorsum's wider section and the bony nasal base by interpupillary distance, done using Adobe Photoshop 5 CS. Data were recorded in a dedicated proforma.

Statistical Analysis: The data was entered and streamlined in MS Excel and for analysis was exported to SPSS version 26. Age and gender were stratified and study parameters were assessed within study groups. Both study groups were compared for interpupillary distance and nasal dorsum width by employing independent sample t test. After age and gender stratification; independent sample t test was again employed to asses study variables. A p value of less than 0.05 was regarded as significant.

RESULTS

As per study protocols and sample size, 400 subjects undergoing rhinoplasty were enrolled in this clinical trail wit overall mean age of 31.61+7.34 years and were grouped in to group A (internal osteotomy) and group B (external osteotomy); no significant age difference (32.45 + 4.5 v/s 30.12 + 8.56) was noted on appliance of independent sample t test with p value of 0.342. For age stratification cut of years was used; In group A, 47% (n=94) were below 30 while in group 2 53%(n=106) were under 30 years of age and rest were above 30 years of age i.e. 53% in group A (n=106) and 47% in group B (n=94). In this study around 44 % were males and 56 % were females as in group A, 44%(n=88) were males while 56% (n=112) were females. Similarly, in group B; 44.5% (n=89) were males and 55.5% (n=111) were females.

Comparison of internal osteotomy with external osteotomy in patients having nasal deformity undergoing rhinoplasty in terms of mean dorsum of nose and mean base of nose shows 0.2046+0.014 mm in Group-A and 0.1939+0.0142mm in Group-B for Nasal dorsum width, p value was 0.0001 showing a significant difference. In Group-A base of nose was calculated as 0.322+0.023mm while 0.3377+0.0257mm in Group-B, p value was 0.0001 showing a significant difference. (Table No. 1)

Table No. 1: Comparison of Internal Osteotomy with External Osteotomy in Study Groups

Parameters	Mean + St. Dev		p-value
	Group A	Group B	
Nasal dorsum width	0.2046 + 0.014	0.1939 + 0.0142	0.0001
Base of nose	0.3229 + 0.023	0.3377 + 0.0257	0.0001

Effect modifiers like age and gender was controlled by stratification. Post stratification independent sample t-test was applied. P-value ≤ 0.05 was considered significant. For individuals aged 16-30: Nasal Dorsum Width: The mean width was 0.2051 for Group-A and 0.1947 for Group-B, with a p-value of 0.0001, indicating a statistically significant difference. Similarly, for base of Nose: The mean width was 0.3244 for Group-A and 0.3392 for Group-B, with a p-value of 0.0001, indicating a statistically significant difference. For individuals aged 31-50: Nasal Dorsum Width: The mean width was 0.2061 for Group-A and 0.1950 for Group-B, with a p-value of 0.0001, indicating a statistically significant difference. Similarly for Base of Nose: The mean width was 0.3246 for Group-A and 0.3396 for Group-B, with a p-value of 0.0001, indicating a statistically significant difference.

For males: Nasal Dorsum Width: The mean width was 0.2047 for Group-A and 0.1939 for Group-B, with a p-value of 0.0001, indicating a statistically significant difference. Similarly, for base of Nose: The mean width was 0.3221 for Group-A and 0.3384 for Group-B, with a p-value of 0.0001, indicating a statistically significant difference.For females: Nasal Dorsum Width: The mean width was 0.2058 for Group-A and 0.1955 for Group-B, with a p-value of 0.0001, indicating a statistically significant difference. Similarly, for base of Nose: The mean width was 0.3225 for Group-A and 0.3384 for Group-B, with a p-value of 0.0001, indicating a statistically significant difference. (table 2)

In all cases, the p-values are extremely low (0.0001), which indicates strong evidence to reject the null hypothesis. This suggests that there are statistically significant differences in nasal dorsum width and base of the nose between Group-A (internal osteotomy) and Group-B (external osteotomy) across different age groups and genders. The results suggest that the choice of osteotomy technique has a notable impact on these nasal measurements.

DISCUSSION

The present study aimed to evaluate and compare the outcomes of internal osteotomy and external osteotomy techniques in the context of cosmetic rhinoplasty. The choice of osteotomy technique is a critical aspect of rhinoplasty procedures, as it directly affects the reshaping of nasal bone structures to achieve desired aesthetic outcomes. [9] By conducting a comprehensive analysis across various age groups and genders, this study contributes to the existing body of knowledge in the field.

The results of our study indicate statistically significant differences in both nasal dorsum width and the base of the nose between the two groups, suggesting a noteworthy impact of the chosen osteotomy technique on postoperative nasal measurements. [10] These findings align with previous research, underscoring the importance of careful consideration when selecting an appropriate osteotomy technique to achieve desired cosmetic outcomes. The observed variations in mean measurements between the internal and external osteotomy groups emphasize the need for tailored approaches based on individual patient characteristics and aesthetic goals.[11]

A crucial aspect of rhinoplasty is ensuring minimal visible scarring while maximizing patient satisfaction. Internal osteotomy, also referred to as closed osteotomy, offers the distinct advantage of concealed incisions made within the nasal cavity, thus avoiding externally visible scars. [12] This characteristic can be particularly appealing to patients who prioritize discreet postoperative appearances. Furthermore, the internal approach grants surgeons direct access to nasal bones, enabling precise modifications and controlled repositioning.[13] This likely contributes to reduced postoperative edema and quicker recovery times, a trend that has been noted in previous research.

In contrast, external osteotomy, or open osteotomy, provides improved visualization of the nasal framework and allows for intricate adjustments, making it particularly suitable for complex cases necessitating substantial reshaping.[14] However, the potential concern of a visible scar on the columella, although typically small in size, underscores the importance of comprehensive patient-surgeon discussions to ensure alignment with patient preferences.[15]

This study's stratification based on age groups and gender facilitated a more nuanced examination of the data. Interestingly, both age groups (16-30 and 31-50) exhibited statistically significant differences in nasal measurements between the two osteotomy techniques. Similarly, significant differences were observed in both male and female patients, indicating that the impact of the osteotomy technique on nasal dimensions remains consistent across various demographic segments[16,17], Nevertheless, it's crucial to acknowledge the study's limitations. Despite the rigorous methodology and randomized allocation, potential biases and confounding variables cannot be entirely excluded. Additionally, the absence of long-term follow-up data limits the assessment of the sustainability of these differences over extended periods.

In conclusion, this study's findings provide valuable insights into the outcomes of internal and external osteotomy techniques in the context of cosmetic rhinoplasty. The observed statistically significant differences in nasal dimensions between the two groups underscore the necessity of personalized surgical decision-making. Surgeons must consider patient preferences, anatomical nuances, and desired outcomes when selecting an osteotomy technique. Further research with extended follow-up periods could provide insights into the durability of these differences and their influence on patient satisfaction and overall quality of life.

CONCLUSION

We concluded that the internal osteotomy is significantly different when compared with external osteotomy in patients having nasal deformity undergoing rhinoplasty in terms of mean dorsum of nose and mean base of nose.

Author's Contribution:

Concept & Design of Study:	Qasar Abbas Malik
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