American Journal of Public Health and Epidemiology
Volume. 10, Number 1; January-February, 2024;
ISSN: 2644-0032 | Impact Factor: 7.08
https://zapjournals.com/Journals/index.php/ajphe
Published By: Zendo Academic Publishing

OPTIMIZING RHINOPLASTY RESULTS: UTILIZING AUTOGENOUS COSTAL CARTILAGE AND SILICONE AUGMENTATION

[1]Tim Lee

Article Info

Keywords: Rhinoplasty, Filling materials, Cosmetic surgery, autologous materials, allogeneic materials.

DOI
10.5281/zenodo.10563044

Abstract

Facial beauty is profoundly influenced by the aesthetic appeal of the nose. The ever-evolving modern society places increasing emphasis on facial aesthetics, resulting in a surge of individuals seeking nose plastic surgery each year. Many patients in cosmetic clinics aspire to enhance their facial contours and symmetry through rhinoplasty. Rhinoplasty predominantly involves the utilization of various filling materials to modify the nasal structure. These materials can be broadly categorized into autologous and allogeneic substances.

Autologous materials primarily encompass one's own soft tissue, notably rib cartilage, known for its high safety profile, ample supply, low absorption rate, and robust support. Allogeneic materials, on the other hand, predominantly consist of silicone gel substances. These materials have extensive applications in both cosmetic and plastic surgery, including rhinoplasty and breast augmentation.

Historically, clinical practice predominantly employed single materials for rhinoplasty. However, recent research suggests that the combination of diverse materials can yield superior cosmetic outcomes, harnessing synergistic effects that enhance patient satisfaction. This study aims to assess the clinical applicability of various surgical methods through a comparative evaluation of 84 patients who underwent nose cosmetic and plastic repair between January 2022 and January 2023.

1. Introduction

The beauty of the nose has a great impact on the overall beauty of the face. With the rapid development of modern society and economy, people pay more attention to the beauty of the face, and the number of patients undergoing nose plastic surgery every year has also increased [1]. In the beauty clinic, many patients hope to improve the shape of the nose through rhinoplasty, so as to create a more three-dimensional facial appearance. Rhinoplasty mainly uses various filling materials to improve the nasal structure. At present, the main materials used can be divided into autologous materials and allogeneic materials. The autologous materials mainly use their own soft tissue as filling materials, which has high safety. Especially, the supply of rib cartilage is sufficient, the absorption rate is low, and the hardness and support force is high, which is widely used in clinical [2]; the allogeneic materials are mostly silica gel materials, which are widely used in cosmetic and plastic surgery. In addition to rhinoplasty, they are also widely used in breast augmentation surgery. Different materials have different advantages,

[1] Kangxi Medical Beauty Co., Ltd, Medical Beauty Clinic, Hohhot, China

disadvantages and scope of application [3]. In the past, single materials were mainly used for filling in clinical practice, but in recent years, studies have pointed out that the combination of different materials can achieve more ideal cosmetic effects, achieve complementary effects, and improve patient satisfaction. In order to observe the application value of different surgical methods, 84 patients with nose cosmetic and plastic repair from January 2022 to January 2023 were selected for comparative observation. The study is as follows.

2. Clinical Data and methods

2.1. Clinical data

From January 2022 to January 2023, 84 patients with nose cosmetic and plastic repair were divided into observation group (44 cases were treated with autogenous costal cartilage transplantation combined with silicone augmentation rhinoplasty) and control group (40 cases were treated with silicone augmentation rhinoplasty). There were 3 males and 41 females in the observation group; the age ranged from 18 to 41 years, with an average of (28.6 ± 5.3) years. There were 2 males and 38 females in the control group; the average age was (29.1 ± 5.2) years, ranging from 19 to 42 years old. This study was approved by the hospital ethics committee. Inclusion criteria: ① The patients who meet the applicable certificate of nasal cosmetic and plastic repair have a clear intention of surgery; ② Both the patient and his family members were informed of the study and voluntarily signed the consent form. Exclusion criteria: patients with previous rhinoplasty, insufficient nasal dorsum tissue, donor site abnormality, skin infection, and scar constitution. There is no statistical difference between the two groups in terms of general data, which is comparable.

2.2. Methods

In the control group, silicone rhinoplasty was performed. The specific methods were as follows: according to the patient's face shape, nose appearance and preoperative conversation, silicone prosthesis was selected for carving, after local anesthesia, all openings were made at the upper edge of the left nostril, the subcutaneous tissue was passively separated, the prosthesis was inserted into the appropriate position, the guide paddle was inserted, and then the prosthesis was placed under the periosteum of the nasal bone, and the prosthesis was properly trimmed after the paddle was removed. Observe the curvature of the nasal root and back, and suture the incision after confirming that the effect is satisfactory. After the operation, sterile cotton balls were routinely used to fill the nostrils and the dressing was changed regularly.

The observation group adopted autogenously costal cartilage transplantation combined with silicone rhinoplasty. The specific method was: tracheal intubation general anesthesia, a 2cm incision in the seventh rib, blunt separation of subcutaneous tissue, exposure of costal cartilage, cutting 0.5×3.0~3.5cm cartilage tissue, and suture the incision. Then the collected costal cartilage was carved and made into two cartilage slices and a shield cartilage slice. Make an inverted V incision on the alar cartilage, free and expose the alar cartilage and lateral nasal cartilage, place the first piece of cartilage on the nasal septum cartilage and insert it on both sides, and fix it with conventional suture. The second piece of cartilage is sutured in the space between the nasal septum cartilage and the lateral nasal cartilage. After merging the two pieces of cartilage, a triangular scaffold is constructed with the nasal septum cartilage, and the nasal base is adjusted to an isosceles triangle. Then the shield cartilage piece was transplanted to the head of the triangular scaffold. Then the silicone prosthesis was trimmed and placed in the periosteum of the nasal bone, and the incision was closed after suture and fixation.

2.3. Observation indicators

Compare the difference of postoperative prognosis indicators and complications between the two groups, and compare the changes of nasal parameters before and after surgery between the two groups, and finally compare the difference of patient satisfaction between the two groups.

2.4. Statistical analysis

Statistical analysis was performed using SPSS22.0 statistical software. The measurement data were expressed by standard deviation. The mean measurement values of the two groups were expressed by tvalue test. The counting data were expressed by percentage. The counting values of the two groups were expressed by X^2-value test. When $P<0.05$, the difference was statistically significant.

3. Results

3.1. Difference of surgical prognostic indicators between the two groups

The 3dVAS score of the observation group was lower than that of the control group (P<0.05), and the wound healing time was shorter than that of the control group (P<0.05), as shown in Table 1.

Table 1: Difference of surgical prognosis indicators between the two groups

Group	Postoperative 3dVAS score (points)	Wound healing time (d)
Observation group (n=44)	3.3±0.6	10.6±2.3
Control group (n=40)	4.5±0.9	16.8±4.2
t/X^2	5.132	5.234
P	0.041	0.042

3.2. Difference of postoperative complications between the two groups

The incidence of postoperative complications in the observation group was 4.5%, and that in the control group was 15%. The incidence of postoperative complications in the observation group was lower than that in the control group (P＜0.05). See Table 2.

Table 2: Difference of postoperative complications between the two groups

Group	Infect	Haemorrhage	Delayed healing	Total incidence
Observation group (n=44)	1	1	0	4.5
Control group (n=40)	2	3	1	15.0
X^2				5.432
P				0.044

3.3. Changes of nasal parameters in two groups

There was no significant difference between the two groups (P>0.05) in the nasal angle, nasal root height and nasal face angle before operation. The nasal angle, nasal root height and nasal face angle in the observation group were higher than those in the control group 3 months after operation (P<0.05), as shown in Table 3.

Table 3: Changes of nasal parameters in two groups

Group	Angle of nasal tip (°)		Nasal root height (mm)		Rhinofacial angle (°)	
	Before operation	After surgery	Before operation	After surgery	Before operation	After surgery
Observation group (n=44)	85.1±2.3	89.4±2.9	5.4±0.6	6.2±0.9	25.1±2.0	28.6±2.6
Control group (n=40)	85.0±2.4	87.2±2.6	5.3±0.5	5.8±0.7	25.0±1.9	26.7±2.2
t	1.245	5.325	1.325	5.265	1.245	5.336
P	0.115	0.043	0.123	0.042	0.115	0.043

3.4. Difference in satisfaction between the two groups

The total satisfaction rate of the observation group was 88.6%, and that of the control group was 75%. The satisfaction rate of the observation group was higher than that of the control group (P<0.05), as shown in Table 4.

Table 4: Difference of satisfaction between the two groups

Group	Very satisfied	Basically satisfied	Dissatisfied	Total satisfaction rate (%)

Observation group (n=44)	12	27	5	88.6
Control group (n=40)	8	22	10	75.0
X^2				5.234
P				0.042

4. Discussion

The nose is one of the important components of the five facial features. It is located in the center of the face and has a unique anatomical structure, which has a direct impact on the beauty of the face. Chinese residents belong to the yellow race, and generally have the characteristics of low and flat nasal root and round and blunt nasal tip [4]. With the continuous improvement of the modern people's pursuit of facial beauty, more and more young people begin to pay attention to the beauty of the nose. Therefore, they choose to improve the beauty of the nose through rhinoplasty to make it more advanced, thus shaping the three-dimensional facial features [5]. Rhinoplasty is a common operation in cosmetic and plastic surgery. At present, various filling materials are mainly used to increase bone mass and improve the coordination of the nose in the five senses.

The main materials used in augmentation rhinoplasty can be divided into allogeneic materials and autologous materials. Allogeneic materials have the advantages of stable chemical properties and good plastic effects, and have been used for a long time in clinical practice. However, this material has low histocompatibility and risks of infection and bone absorption, so it has certain limitations [6]; The safety of autologous materials is significantly higher than that of allogeneic materials, so they are also widely used after rhinoplasty. These two materials have their own advantages and disadvantages. In the past, they were usually used alone, but the overall repair effect was not ideal. For example, the use of allogeneic materials for a long time may lead to bone resorption problems, leading to a decline in patient satisfaction; Autogenous materials are prone to bending and deformation, which will also affect the surgical effect [7]. Therefore, in recent years, the surgical method of combining autologous materials with allogeneic materials has been proposed in clinical practice, combining the characteristics of the two materials to complement each other's advantages, so as to improve the surgical effect.

Some studies have pointed out that autogenous costal cartilage transplantation combined with silicone augmentation rhinoplasty can achieve better nasal repair results, thus improving patient satisfaction, which is consistent with the results of this study [8]. Ge Yanna and others found through comparative observation that autogenous costal cartilage stent combined with expanded polytetrafluoroethylene rhinoplasty can better reduce the occurrence of postoperative complications than single material application, which is also consistent with the results of this study [9]. Some scholars believe that silica gel prosthesis is prone to rejection reaction when used alone, resulting in an increase in the rate of secondary surgery. The use of autologous soft tissue can reduce rejection reaction, reduce the incidence of complications, and improve the prognosis of patients [10]. In this study, the VAS score and postoperative complication rate of observation group at postoperative 3 days were lower than those of control group ($P<0.05$), and the wound healing time was shorter than that of control group ($P<0.05$). There was no significant difference in nasal tip angle, nasal root height and nasal-facial angle between the two groups before operation ($P>0.05$). The nasal tip angle, nasal root height and nasal-facial angle in the observation group were higher than those in the control group 3 months after operation ($P<0.05$). The satisfaction degree of the observation group was higher than that of the control group ($P<0.05$). Therefore, autogenous costal cartilage transplantation combined with silicone augmentation rhinoplasty has better application value, which is helpful to improve the nasal appearance and reduce the occurrence of complications.

5. Conclusion

The difference of nose shape is closely related to the race. The nose tip of the yellow race is round and blunt. Compared with the Caucasian, the face is more flat and lacks three-dimensional sense. With the change of modern people's ideas, the demand for augmentation rhinoplasty is also increasing. The traditional repair and suture operation cannot achieve the effect of raising the nose tip, and usually depends on various grafts. Among all kinds of grafts, autologous materials have high safety, especially costal cartilage, which has high hardness, sufficient donors and convenient carving, high survival rate and good stability after surgery, and can meet the effect of patients on improving the nasal tip. However, there are certain defects in its use alone. Therefore, at present, the

method of joint application is often adopted, adding silica gel material on the basis of autogenous costal cartilage, which can form a composite scaffold structure, thus shaping a more smooth nasal curve, and helping to improve the survival rate. In addition, it can reduce the impact on the thorax, make full use of the advantages of the two materials, and use the rib cartilage and silica gel materials in the epidemic situation, so as to avoid the longitudinal deflection and reduce the occurrence of problems such as the nose facing the sky and the hook nose. The combined application can achieve stable support effect, break through the defects of traditional suture fixation, do not need to excessively free the nasal septum, so it has little impact on the surrounding blood supply, avoid the postoperative prognosis due to insufficient blood supply, and reduce the occurrence of delayed healing. In general, combined therapy has good application value.

To sum up, autogenous costal cartilage transplantation combined with silicone augmentation rhinoplasty has the advantages of short wound healing time, less postoperative complications and good repair effect, which is helpful to improve patient satisfaction and can be widely used.

References

Wang Song. Study on the application of autogenous costal cartilage transplantation combined with silicone augmentation rhinoplasty in the aesthetic and plastic repair of nose [J]. China Practical Medicine, 2019, 14(25): 59-61.

Wu Lehao, You Jianjun, Xu Yihao, etc. Observation on the effect of nasal augmentation with autogenous costal cartilage and silicone prosthesis [J]. Chinese Journal of Medical Aesthetics and Beauty, 2020,26(3): 193-196.

Song Liancheng. Comparison of the effects of autogenous costal cartilage and prosthesis transplantation in augmentation rhinoplasty [J]. Henan Medical Research, 2020, 29(20): 3705-3706. [4] Fan Rongjie, Liu Yidong, Wang Wei, etc. A case of severe contracture nose was repaired with autogenous costal cartilage combined with free transplantation of inferior turbinate mucosa [J]. Chinese Journal of Aesthetic and Plastic Surgery, 2020,31(9): 571-572.

Ye Senming, Lin Lixue, Zhou Xiayang. Comparative study on the effect of costal cartilage rhinoplasty and silicone prosthesis augmentation rhinoplasty in rhinoplasty [J]. China Medical Device Information, 2022, 28(2): 68-70.

Shuai Xiurong, Yuan Wenzhou, Luo Dong. Clinical effect of autologous fat combined with costal cartilage transplantation in the treatment of Binder syndrome [J]. Shenzhen Journal of Integrated Traditional and Western Medicine, 2020, 30(6): 10-12.

Song Zhaodan, Zhang Ke, Li Hongqiong. Study on the value of autogenous costal cartilage transplantation and silicone augmentation rhinoplasty in the aesthetic and plastic repair of nose [J]. Medical Aesthetic Beauty, 2020, 29(9): 26-27.

Yin Jiqing, Cheng Jun. The effect of autogenous costal cartilage transplantation combined with silicone augmentation rhinoplasty in the cosmetic and plastic repair of nose [J]. Medical Aesthetic Beauty, 2020,29(20): 53-56.

Ge Yanna, Zhao Jiangbo, Chen Ya, etc. Clinical observation of augmentation rhinoplasty with "L" shaped autogenous costal cartilage scaffold and expanded polytetrafluoroethylene [J]. Chinese Journal of Aesthetic and Plastic Surgery, 2022,33 (10): 593-595.

Fu Junli. Analysis of the application of autogenous costal cartilage transplantation to construct nasal tip complex in nasal tip plastic surgery [J]. Chinese and Foreign Medical Research, 2019, 17(18): 32-34.