

Original Investigation

Practice Patterns in the Perioperative Treatment of Patients Undergoing Septorhinoplasty

A Survey of Facial Plastic Surgeons

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IMPORTANCE The common practices used in the perioperative care of patients undergoing septorhinoplasty are diverse and controversial. A consensus statement on the preferred clinical pathway in the perioperative treatment of patients undergoing septorhinoplasty has yet to be approached formally.

OBJECTIVES To investigate the perioperative treatment of patients undergoing septorhinoplasty and to identify common practice patterns based on the preferences of leading facial plastic surgeons.

DESIGN, SETTING, AND PARTICIPANTS We distributed an online survey to members of the American Academy of Facial Plastic and Reconstructive Surgery. Specifically, fellowship directors and academic contact members were anonymously polled and stratified by the number of septorhinoplasties performed annually.

MAIN OUTCOME AND MEASURE A cohesive clinical guide to perioperative treatment after rhinoplasty.

RESULTS Of the 92 members surveyed, 67 (73%) successfully completed the survey. The distribution of respondents included 43 academicians (64%) and 24 physicians in private practice (36%). Twenty-eight surgeons (42%) performed fewer than 50 rhinoplasties a year and 39 (58%), more than 50, representing 3510 to 4549 septorhinoplasties in total among respondents. Forty-four surgeons (66%) refrained from using any packing, and 41 (61%) used intranasal splints, with polymeric silicone splints the most popular of these (n = 24 [59%]). Sixty-six surgeons (99%) used external nasal splints, including 49 (74%) who used a thermoplastic splint and 49 (74%) who left the external nasal splint in place for 7 days or longer. The most common postoperative interventions to reduce edema and ecchymosis were elevation of the head of bed by 62 (93%), ice packs by 50 (75%), and *Arnica montana* by 33 (49%). Only 12 surgeons (18%) used postoperative corticosteroids to reduce edema. Fifty-six respondents (84%) prohibited participation in contact sports until at least 6 weeks after surgery.

CONCLUSIONS AND RELEVANCE Perioperative care and practices after nasal surgery vary among the most highly trained and leading rhinoplasty surgeons. No published communication or consensus on perioperative practices has been disseminated in this setting. Given the results from those surgeons performing the most rhinoplasties in our field, some surgeons may choose to vary their practices to coincide with those of experienced surgeons. These guidelines could facilitate future studies of patient outcomes.

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In 2011, the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS) conducted a membership survey that revealed rhinoplasty as the most common facial plastic surgical procedure performed, with a mean of 53 rhinoplasties performed by each surgeon.¹ In addition, the survey elucidated the various backgrounds in surgeon training, demonstrating that members of the AAFPRS and the American Board of Otolaryngology all perform this procedure. The common practices used in the perioperative care of patients undergoing septorhinoplasty are diverse and controversial. Most conventional techniques, such as packing, taping, or splinting, are variable when comparing surgeons in different practice settings (eg, academic, private practice, fellowship trained), even among otolaryngology-trained surgeons. Several authors have examined the use of nasal packing, taping, and splinting in septal and nasal surgery, often revealing conflicting outcomes and recommendations.²⁻⁶

Kelley et al⁷ conducted a survey of aesthetic surgeons to evaluate packing and postoperative rhinoplasty management. Their analysis revealed that packing was more common in a private practice setting, with a drop-off in packing tendencies as case volume increased. Limitations in their study included an 8% survey response rate and the fact that only 8% of respondents were trained in otolaryngology.

A consensus statement on the preferred clinical pathway in the perioperative treatment of patients undergoing septorhinoplasty has not been formally approached. Previous authors have commented on their specific individualized practices, which has yielded noteworthy information with regard to the postoperative management of rhinoplasty. However, no survey to date has specifically addressed perioperative management by facial plastic surgeons. This report describes the results of a survey sent to facial plastic surgeons across North America inquiring about preferences in the perioperative treatment of patients undergoing septorhinoplasty, with the aim of developing a formal cohesive clinical pathway to guide all surgeons interested in rhinoplasty from novice to expert.

Methods

In January of 2012, fellowship directors and academic contact members within the AAFPRS were sent an online survey (Qualtrics Laboratories Inc) regarding practice patterns in the perioperative treatment of patients undergoing septorhinoplasty. Of the 92 members initially contacted, 67 (73%) ultimately responded and completed the survey in its entirety. No respondents returned partially completed measures or dropped out, and all answers were kept anonymous. The complete survey is provided in the Supplement (eAppendix). Internal review board approval was not necessary because the study carried minimal risk and is considered exempt. Informed consent was implied by respondents choosing to participate in the survey.

Respondents were asked to classify their practice type as private, academic, military, or other. Three respondents answered “other,” and their practices were each coded as academic given their written response of academic and private. Respondents were asked to classify the number of primary or

secondary septorhinoplasties they performed in the last 12 months as 0 to 10, 11 to 30, 31 to 50, 51 to 75, 76 to 100, and more than 100. (For the sake of simplicity, the terms *rhinoplasty* and *septorhinoplasty* will be used interchangeably throughout.) Surgeons were then asked about the use of intranasal splints, with choices regarding the type and length of use and whether they routinely used splints. Options for write-in responses were given if “other” was chosen. Similar questions were posed regarding packing after septorhinoplasty and use of external nasal splints. Several choices about the type and length of use were given, along with an option for write-in responses under “other.” Surgeons were also asked about the use of permanent suture if an external incision was made and, if used, the length of time before sutures were removed. Postoperative wound care was questioned in regard to the materials and types of ointments and the use of nasal saline. Questions regarding the use of nasal compression exercises were also posed.

Multiple-choice questions were also provided within the survey regarding preoperative and postoperative adjuncts aimed to reduce ecchymosis or edema. More than 1 choice could be selected, and each intervention was analyzed separately. Other practices surveyed included restrictions on the patient’s physical activities. These activities included their routine daily activity, manual labor, office work, strenuous exercise, and contact sports. Other questions specifically focused on restrictions related to wearing eyeglasses, resuming a regular diet, and nose blowing.

All descriptive calculations and statistical analyses were performed using commercially available software (SAS, version 9.2; SAS Institute Inc). The frequency of each response was reported and broken down within categories as appropriate. As described above, AAFPRS membership survey results showed respondents performed a mean of 53 rhinoplasties per year.¹ We designated those surgeons performing more than 50 rhinoplasties annually as a distinct group performing at a level above the mean. We will refer to this group as the most experienced surgeons in terms of case volume (ie, the high-volume group). This designation serves as a demarcation for comparison. We used Fisher exact tests to determine whether responses differed significantly between surgeons performing more than or fewer than 50 rhinoplasties in the past year.

Results

Of the 92 members surveyed, 67 (73%) successfully completed the survey. The distribution of respondents included 43 academicians (64%) and 24 physicians classifying themselves as surgeons in private practice (36%) (Table 1). The responses were then stratified by the number of rhinoplasties performed, with 28 surgeons (42%) performing fewer than 50 rhinoplasties in a year, and 39 (58%) performing more than 50. Surgeons in private practice were more likely than academic surgeons to perform more than 50 rhinoplasties a year (75% vs 49% [$P = .04$]) (Table 1). These results represent 3510 to 4549 septorhinoplasties among those who completed the survey.

The survey revealed that 44 surgeons (66%) refrained from using any packing (Table 2). Among the 23 surgeons who used

Table 1. Demographics

Practice	No. (%) of Surgeons		
	Overall (N = 67)	Low-Volume Group (n = 28) ^a	High-Volume Group (n = 39) ^b
Private	24 (36)	6 (25)	18 (75)
Academic	43 (64)	22 (51)	21 (49)
Overall	67 (100)	28 (42)	39 (58)

^a Indicates surgeons who perform fewer than 50 rhinoplasties annually.

^b Indicates surgeons who perform more than 50 rhinoplasties annually.

Table 2. Splints and Packing

	No. (%) of Surgeons		
	Overall (N = 67)	Low-Volume Group (n = 28) ^a	High-Volume Group (n = 39) ^b
Nasal cavity splints			
Use	41 (61)	19 (68)	22 (56)
Do not use	26 (39)	9 (32)	17 (44)
Polymeric silicone splint, any brand	24 (59)	13 (46)	11 (28)
Silastic sheet ^c	13 (32)	5 (18)	8 (21)
Other, x-ray film, Telfa, ^d silicone tube	4 (10)	1 (4)	3 (8)
Packing			
Do not use	44 (66)	19 (68)	25 (64)
Use	23 (34)	9 (32)	14 (36)
External splints^e			
Thermoplastic	49 (74)	19 (70)	30 (77)
Aluminum	12 (18)	5 (19)	7 (18)
Plaster cast	4 (6)	3 (11)	1 (3)
Other, tin, and adhesive bandage	1 (2)	0	1 (3)
Duration of splint, d			
≥7	49 (74)	19 (70)	30 (77)
<7	17 (26)	8 (30)	9 (23)

^a Indicates surgeons who perform fewer than 50 rhinoplasties annually.

^b Indicates surgeons who perform more than 50 rhinoplasties annually.

^c Indicates polymeric silicone (Dow Corning).

^d Indicates nonadherent film dressing (Covidien).

^e Totals exclude the 1 surgeon in the low-volume group who did not use external splints.

packing, nonadherent film dressing (Telfa; Covidien) was the most commonly used material (12 surgeons [52%]). Forty-one surgeons surveyed (61%) used intranasal splints, with 24 of these (59%) using splints with polymeric silicone material (Silastic; Dow Corning). Length of intranasal splinting was not posed as a question. Only 1 surgeon did not use external nasal splints. Of the 66 (99%) using an external nasal splint, 49 (74%) used a thermoplastic splint and 49 (74%) maintained the external nasal splint in place for 7 days or more (Table 2).

Less than half of the surgeons (27 [40%]) reported using preoperative adjuncts. The most common type was *Arnica montana*, with 23 of the 27 surgeons (85%) advocating its use (Figure 1A). The use or type of preoperative adjunct did not differ significantly based on the number of rhinoplasties performed (all $P > .20$). Only 6 surgeons (9% of all surgeons and 22% of those who use preoperative adjuncts) prescribe preoperative corticosteroids. The most common postoperative interventions were elevation of the head of bed (62 respondents [93%]), ice packs (50 [75%]), and prescription of *A montana* (33 [49%]) (Figure 1B). Surgeons in the high-volume group were almost twice as likely (24 [61%] vs 9 [32%]) to prescribe *A montana* postoperatively compared with surgeons performing fewer than 50 rhinoplasties per year ($P = .02$) (Figure 1B). Fifty-five surgeons (82%) did not prescribe postoperative corticosteroids.

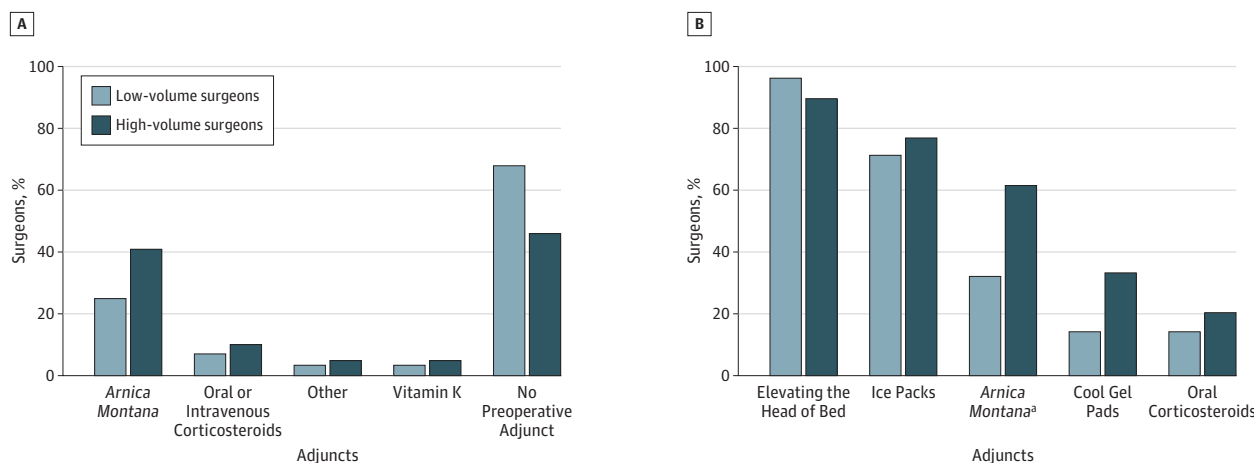
Forty-three surgeons (64%) used permanent sutures for closure of external incisions, and 34 (79%) removed them

on postoperative day 6 or 7. Wound care included the use of antibiotic ointment by 52 surgeons (78%), hydrogen peroxide by 44 (66%), and saline by 40 (60%) (Figure 2). For improved nasal hygiene, 62 surgeons (93%) advocated nasal saline sprays. Of the surgeons who suggested the use of nasal saline, 52 (84%) implemented its use within 3 days. Saline sprays were used for a minimum of 2 weeks by 60 of the 62 surgeons (97%), with 23 (37%) recommending it for longer than 4 weeks.

Nasal compression exercises were recommended by only 22 surgeons (33%). Among the high-volume surgeons, 16 (41%) advised the use of compression exercises, which did not reach statistical significance. Of those surgeons recommending nasal compression exercises, 12 (55%) agreed on 3 to 6 sessions per day, and 11 (50%) suggested 1 to 5 minutes per session. Seventeen (77%) waited until after the first postoperative week to implement the exercises.

Restrictions on wearing eyeglasses and postoperative nose blowing were placed by 52 (78%) and 60 (90%) surgeons, respectively. The timeline in allowing eyeglass wear varied greatly. Twelve of the high-volume surgeons (31%) allowed resumption of eyewear at 3 to 4 weeks, whereas 38 of all surgeons (73%) allowed wear after 3 weeks or longer. Similarly, resumption of nose blowing varied, with 32 of those surgeons (53%) placing restrictions of allowing nose blowing from 1 to 2 weeks after surgery. Forty-nine of all surgeons (73%) allowed immediate re-

Figure 1. Comparison of Perioperative Adjuncts



Perioperative adjuncts are stratified against the number of rhinoplasties performed by the 67 respondents. High volume indicates more than 50 rhinoplasties; low volume, less than 50. A, Preoperative adjuncts. B, Postoperative adjuncts. ^aP = .02.

sumption of a regular diet as tolerated. A limitation in sun exposure was the most common write-in restriction.

Questions regarding activity level were also analyzed, with routine daily activities and office work restrictions implemented for a minimum of 7 days or more by 39 (58%) and 43 (64%) surgeons, respectively. Manual labor restrictions were limited for at least 2 weeks in 60 of all surgeons' practices (90%), with 47 (70%) limiting strenuous activity and exercise for at least 3 weeks. Fifty-six respondents (84%) placed restrictions on returning to contact sports for at least 6 weeks (Figure 3).

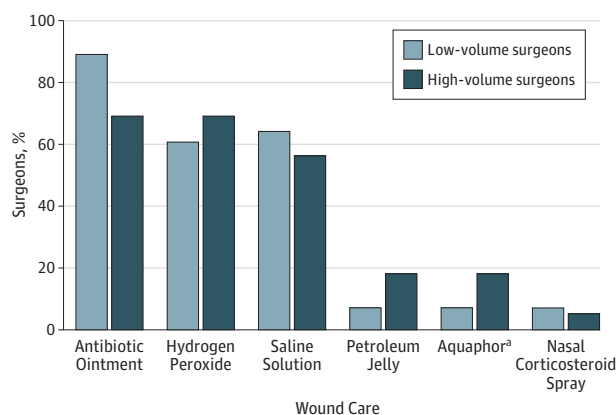
Discussion

Our results highlight the opinions of 67 experienced practicing facial plastic surgeons, specifically consisting of fellowship directors and academic contact members of the AAFPRS. For many topics, a clear consensus on the type of recommendations was found. However, often no significant difference was seen between high- and low-volume surgeons. Questions were broken into categories and will be discussed separately.

Packing and Splints

Controversial topics, such as packing and internal nasal splints, were addressed with a clear consensus about recommendations. Most surgeons (66%) did not use packing. This finding corroborates those of earlier studies performed by Malki et al³ and Guyuron,⁶ who highlighted the underwhelming results and the morbidity associated with postoperative nasal packing. The bias against formal nasal packing may be directly related to the postoperative pain, discomfort, and facial edema, the potential for septal perforation due to pressure necrosis, and the risk of toxic shock syndrome that has been associated with packing.⁷⁻¹⁰ More important, we suppose that most surgeons do not use packing because they believe that it is unnecessary. Among surgeons who

Figure 2. Postoperative Wound Care Management



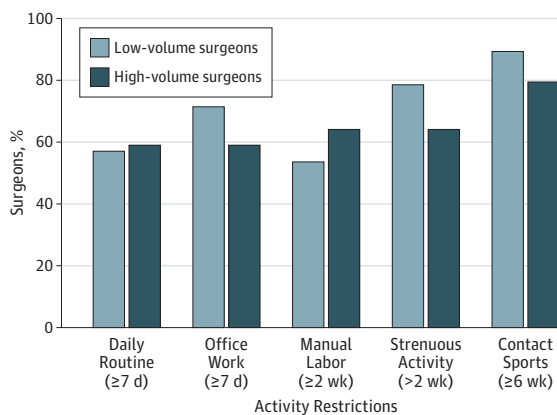
Wound care management is stratified against the number of rhinoplasties performed by the 67 respondents. High volume indicates more than 50 rhinoplasties; low volume, less than 50.

^aIndicates a petrolatum-based ointment (Beiersdorf, Inc).

chose to use packing (34%), nonadherent film dressing was the most commonly used material (52%). Packing was most commonly left in place for no longer than 24 hours, likely to avoid the morbidities of packing as discussed above. Respondents suggested not only hesitancy regarding intranasal packing but also an apparent shift to the use of intranasal splints for stability. The use of internal nasal splints has virtually supplanted the need for packing. When surgeons chose to use internal splints, the most commonly used types were polymeric silicone splints, including common brands and polymeric silicone sheets.

The use of external nasal splints is routinely accepted and advocated by many facial plastic surgeons, with multiple methods described.¹¹⁻¹³ Almost all surgeons surveyed said they used an external nasal splint. The aim of external splints is to preserve the operative results by allowing redraping of the soft-tissue

Figure 3. Postoperative Activity Restrictions



Activity restrictions are stratified by the number of rhinoplasties performed by the 67 respondents. High volume indicates more than 50 rhinoplasties; low volume, less than 50. The most common answer for length of restriction per designated activity is listed in parentheses.

envelope and securely protecting and stabilizing the nasal framework.¹⁴ The use of external nasal splints was found to be uniformly agreed on, with 99% of those surveyed taking this measure. External nasal taping was not addressed in the survey.

Perioperative Adjuncts

Herbals

The use of alternative medical therapies has grown substantially within the facial plastic surgery community in the last 20 years. Most notably, the perioperative use of herbal therapies such as *A montana* (wolfsbane, leopard bane, mountain tobacco) or bromelain (pineapple extract [*Ananas sativus*]) has increased, with goals of alleviating perioperative ecchymosis and edema and accelerating wound healing, respectively.^{15,16} Scientific studies surrounding *A montana* have produced equivocal results. Negative findings include those of a placebo-controlled study¹⁷ investigating the effects of topical *A montana* on ecchymoses after laser treatment, which revealed no difference from placebo in the reduction of ecchymoses. Conversely, Seeley et al¹⁸ were able to use computer models to objectively assess perioperative color changes in patients after rhytidectomy. Those patients taking perioperative homeopathic *A montana* exhibited less ecchymosis. In a randomized clinical comparison of dexamethasone and *A montana* administered to patients undergoing rhinoplasty,^{15,19} results showed that both treatments decreased edema when compared with the placebo. However, neither medication resulted in a significant decrease in ecchymosis.

Prevention and management of perioperative ecchymosis and edema varied among the surveyed groups. Most surgeons (40 [60%]) did not prescribe a preoperative adjunct. However, the most commonly used was *A montana*, prescribed by 85% of those surgeons using a preoperative adjunct. In addition, 16 (41%) of the high-volume surgeons prescribed *A montana* preoperatively. Bromelain was prescribed preoperatively by 2 surgeons.

The postoperative use of *A montana* increased to 61% of the surgeons in the high-volume group. Although conflicting evi-

dence exists in the literature, limitations in sample size from a single surgeon may explain the lack of significance in various studies. Within this survey, prevalence of *A montana* prescription increased among the respondents; in the setting of conflicting indications, validation with a larger sample is necessary. Common dosing practices were not addressed within this survey. The most commonly cited regimen of *A montana* administration begins on the day of surgery with a 500-mg capsule taken orally every 8 hours, with continued administration for the first 3 postoperative days at the same 8-hour interval.¹⁸⁻²⁰

Commonly used measures aimed to reduce ecchymosis and edema included ice packs (75%) and elevating of the head of the bed (93%). In addition, 26 of those surgeons in the high-volume group (67%) were more likely to prescribe 3 or more adjuncts in the postoperative setting. Perhaps with the greater operative experience, those surgeons performing more rhinoplasties annually have applied multiple adjuncts as a defense against bruising and swelling.

Antibiotics

The use of preoperative antibiotics was not part of the survey but is briefly discussed here for the sake of completeness. Randomized clinical trials have shown that prophylactic antibiotics are effective in preventing surgical wound infections when administered within 1 hour of incision.^{21,22} First- or second-generation cephalosporins are generally used for prophylaxis, whereas those patients at risk of colonization with methicillin-resistant *Staphylococcus aureus* require alternate preoperative and postoperative prophylaxis.²³⁻²⁵ The use of antibiotics in nasal surgery, however, remains a point of controversy. Despite several studies citing no difference in infection rates with the use of postoperative prophylactic antibiotics, a 200% increase in the use of perioperative antibiotics in rhinoplasty has occurred from 1985 to 2000.^{23,26-29} This trend for postoperative antibiotic prophylaxis likely originates from the fear of toxic shock syndrome, the use of intranasal splints, the clean-contaminated nature of the surgical wound, the increased incidence of methicillin-resistant *Staphylococcus aureus* colonization, and the use of multiple grafts in revision procedures.^{14,25}

Corticosteroids

The use of perioperative corticosteroids has long been debated, with conflicting data on the efficacy of routine systemic corticosteroid administration in rhinoplasty. The rationale behind prescribing perioperative corticosteroids stems from protracted cases of ecchymosis leading to discoloration of the skin or significant edema altering the ultimate result. Multiple variables exist when administering corticosteroids, including timing of the first dose, route of administration, and duration, all of which have been challenged. These details were not identified within the survey to maintain simplicity.

Recently, Hatef et al³⁰ evaluated the use of perioperative corticosteroids for minimizing edema and ecchymosis after rhinoplasty using a meta-analysis. Based on results from 4 prospective trials, perioperative corticosteroid use significantly reduced postoperative edema and ecchymoses of the upper and lower eyelids at 1 and 7 postoperative days.³⁰ In addition, the

investigators were able to show that the ideal times of administration were preoperatively (preoperative holding or at induction) and a continuing dose for 2 additional days using an oral dosage schedule.³⁰

Only 9% of surgeons used corticosteroids as a preoperative adjunct in our survey. Twelve surgeons (18%) prescribed corticosteroids in the postoperative setting, with only 8 of those high-volume surgeons (21%) initiating therapy with corticosteroids postoperatively. Fifty-five of the surgeons surveyed (82%) did not prescribe corticosteroids. The reluctance to use perioperative corticosteroids likely stems from conflicting studies regarding their efficacy and their published risks and morbidity.³¹⁻³³ However, based on the results of Hafez et al,³⁰ evidence-based guidelines for perioperative corticosteroid administration could be established when no medical contraindication exists. Based on this information, we would leave this choice to the discretion of the surgeon. Specifically, indications could include beneficial effects for those patients with social obligations and the need for more rapid decrease in the amount of edema.

Sutures

Direct comparisons of suture techniques for open rhinoplasty have not been investigated. Parell and Becker³⁴ evaluated facial wound closures using permanent (5-0 coated polypropylene) or absorbable (5-0 coated irradiated polyglactin 910) suture material, with no long-term cosmetic differences noted. Their conclusions were to use absorbable sutures because these sutures did not have to be removed, which in turn reduced patient anxiety and discomfort while saving the surgeon time.³⁴ This finding could be further extrapolated to children. Within our study population, 64% used nonabsorbable sutures and 79% of these surgeons removed them on postoperative day 6 or 7. In addition, 24 of the high-volume surgeons surveyed (62%) used a nonabsorbable suture to close their transcolumellar incisions. Most surgeons preferred a minimally reactive nonabsorbable suture to reduce conspicuous scarring despite the possible equal cosmetic outcomes of an absorbable suture.

Wound Care and Nasal Hygiene

More uniformly accepted among those surveyed was the use of saline (60%), hydrogen peroxide (66%), and antibiotic ointment (78%) for wound care. The low cost and accessibility of these products lends them to routine postoperative use.

Nasal saline sprays and irrigations have been well studied in patients undergoing nasal and paranasal sinus surgery, with clear benefits aimed at reducing inflammatory irritants and crusting and promoting mucociliary clearance.^{35,36} These benefits resonated within our survey, with 93% of providers advocating for the use of nasal saline sprays, 84% of these surgeons advocating that use of nasal sprays should be initiated immediately or within 24 hours, and 97% of them recommending a minimum of 2 weeks of use.

Nasal Compression Exercises

A paucity of data exist concerning the beneficial effects of nasal compression exercises. Twenty-three of the high-volume

group (59%) did not implement the use of compressive exercises. When we included all surgeons surveyed, only 33% used these exercises in the postoperative period. Of those who advise their patients to use the exercises, the most commonly used regimen was 3 to 6 sessions per day, with less than 5 minutes per session. These exercises were typically initiated after the first postoperative week. Most of this group of leading surgeons appeared to find no benefit in these exercises.

Restrictions

A more cohesive approach was seen when analyzing restrictions on postoperative activity. Routine daily activities and office work restrictions were implemented for a minimum of 7 days in 58% and 64% of those surveyed, respectively. Manual labor restrictions were imposed until after 2 weeks in 90% of surgeons' practices, with 70% limiting strenuous activity and exercise until after 3 weeks.

No randomized clinical trials exist in reference to postoperative activity. However, the potential risk of injury to the nose leads most surgeons to take justifiably conservative precautions when advising patients. Six weeks or longer was the necessary time frame chosen by 84% of the respondents before allowing patients to return to contact sports. This time frame would coincide with much of the wound healing literature showing tensile strength of surgical wounds achieving 80% to 90% of full strength at the 6- to 8-week mark.³⁷

Other restrictions enforced by surgeons included limitations on wearing eyeglasses and postoperative nose blowing (78% and 90%, respectively). The timeline in which the surgeons restricted their use was variable. Anecdotal encounters, mainly circulating around emesis leading to disruption of the surgical field or hematoma formation, led some surgeons to restrict postoperative diets. However, resumption of a regular diet as tolerated was agreed on by 73% of all surgeons surveyed.

Study Limitations

Limitations of our study are related to having only 67 surgeons respond. However, we believe that this subset of surgeons represents a significant segment of the leaders and educators in facial plastic surgery. The response rate of 73% is considered exceptional based on commonly published survey response rates. Given this rate, one can translate these responses into meaningful conclusions. The paucity of published data surrounding perioperative practices does not allow for a direct comparison against other cohorts. Nasal taping was an additional topic that was not addressed, but we believe that taping is extremely important in the postoperative period. We used 50 rhinoplasties as the delineation point for comparison knowing that no evidence exists that a high volume correlates with greater expertise or better patient care. We did not measure outcomes of the patients using the respective surgeons' algorithms, but we anticipated that most of the surgeons surveyed would adjust their practice patterns to fit the most ideal patient outcomes. The population studied allows us to infer acceptable outcomes without including reports of complications or outcomes.

Conclusions

The implications of this study allow us to generate formal perioperative guidelines for surgeons performing septorhinoplasties. Certainly, facial plastic surgeons will encounter a

variety of patients, and their care should be tailored to the individual. However, we hope that these survey results will provide a foundation to guide surgeons in the perioperative care of their patients undergoing septorhinoplasty. Future studies could be aimed at studying patient outcomes using these guidelines.

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Study concept and design: Shadfar, Shockley.
Acquisition of data: Shadfar.

Analysis and Interpretation of Data: All authors.
Drafting of the Manuscript: Shadfar, Deal, Yang, Shockley.

Critical revision of the manuscript for important intellectual content: Shadfar, Deal, Yang, Shockley.
Statistical Analysis: Deal, Yang.

Administrative, technical, and material support: Shadfar, Deal, Jarchow, Shockley.

Study supervision: Shockley.

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