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Nonsurgical Rhinoplasty with Radiesse®

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Nonsurgical Rhinoplasty with Radiesse®

56

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56.1 Introduction

Due to its low morbidity and the high patient satisfaction, non-surgical rhinoplasty (also known as a non-surgical nosejob) is a viable option for primary nasal augmentation and for correction of nasal deformities. Non-surgical rhinoplasty, whether performed for primary nasal augmentation or post-operative revision, is increasing in popularity due to advancements in the various soft tissue fillers. There is no FDA-approved soft tissue filler specifically directed for non-surgical rhinoplasty yet; however, various soft tissue fillers have been used in off-label protocols with mixed results. Examples of such fillers include injectable silicon (a device banned by the federal government [1]), collagen, non- and crosslinked hyaluronic acid, and calcium hydroxyapatite (CaHA). These alloplasts are regarded as minimally invasive counterparts to cartilage, fat, and other autologous grafts used in surgical nasal augmentation. In recent years, the xenograft Permacol has also been used for nasal augmentation in the UK [2]. With a non-surgical approach, it is essentially an augmentation rhinoplasty, so it has limitations compared to a surgical rhinoplasty. Various properties of the commercially available calcium hydroxyapatite media (CHM), Radiesse® (BioForm Medical, San Mateo, Calif.) will be discussed with its uses for non-surgical rhinoplasties and avoidance of pitfalls. Attention is focused on Radiesse® (Fig. 56.1) because of its longevity, ease of administration and molding, as well as its excellent safety profile.

Fig. 56.1 Radiesse® Syringes (Used with permission of Bioform Medical, San Mateo, CA)

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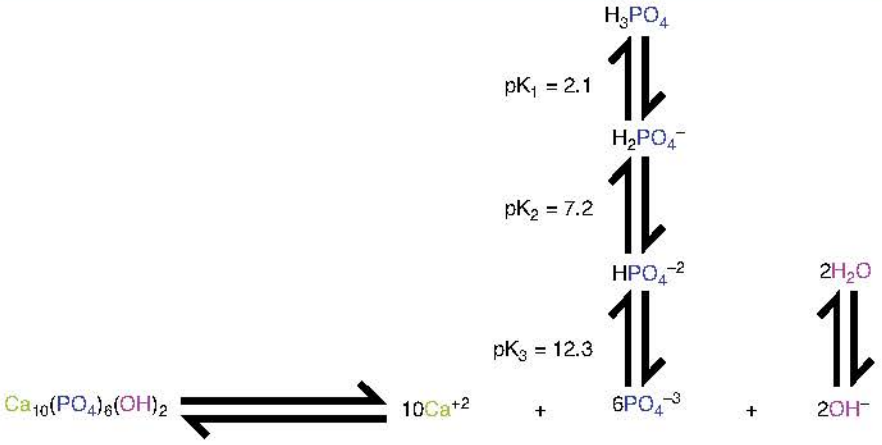


Fig. 56.2 The dissociation equilibrium of calcium hydroxyapatite

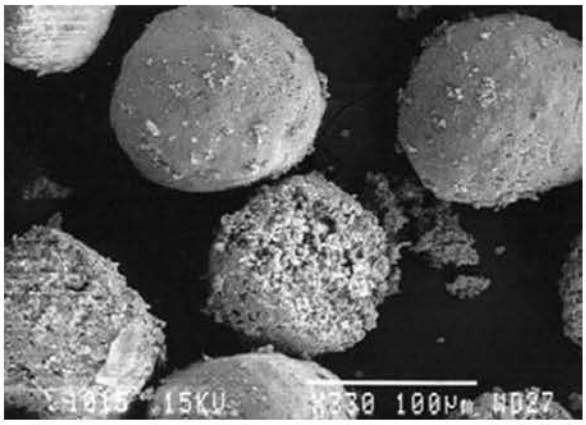


Fig. 56.3 Radiesse® at a microscopic level. CaHA particles after implantation (Image credited to David Goldberg, MD. Used with permission of Bioform Medical, San Mateo, CA)

56.2 Biochemistry

The chemical formula for calcium hydroxyapatite is $Ca_{10}(PO_4)_6(OH)_2$. In the body, hydroxyapatite is a weak base and dissociates into phosphate and hydroxyl ions (Fig. 56.2). Phosphate is capable of accepting up to three protons, but at physiological pH ranges it is only capable of existing as dihydrogen phosphate or hydrogen phosphate ions.

Radiesse® is composed of a sodium carboxymethylcellulose, water, and glycerin suspension (70%) of microspheres (30%; 24–45 μM in diameter) of CaHA. In Radiesse®, the average microsphere volume is 620 cubic microns [3] (Fig. 56.3).

The blend of CaHA with carrier gel is chemically referred to as CHM [4]. Before being mixed with media, sophisticated ceramic processing techniques are utilized to prepare the CaHA particles, which are segregated into a narrow size range, maximizing the volume between the particles [3]. Particles sizes were chosen in order to minimize the possibility of migration and to allow unproblematic injection through a reasonably small needle [3].

56.3 Storage

Radiesse® comes in 0.3, 0.8, 1.3, and 1.5 mL syringes and can be shipped and stored at room temperature for up to 2 years. It must be injected without any dilutions or alteration, immediately after opening. It should not be reused after initial use for risk of contamination. The current recommendation from the manufacturer is that the Radiesse® that is unused at the first treatment may be stored for up to 3 months for that patient before it must be discarded [5]. It is important that no visible air be present in the capped syringe to prevent premature hardening of the material [5]. The company provides three labels identifying the lot number of the Radiesse syringe in use so that the first and second procedures can be documented in the patient's chart alongside self-adhesive labels.

56.4 Mechanism of Action

Calcium hydroxyapatite media is an injectable soft tissue filler that is palpable and malleable, allowing the physician to mold it into the appropriate form. Although inorganic, it is found naturally in bones and teeth. After injection into the body, it is eventually absorbed and

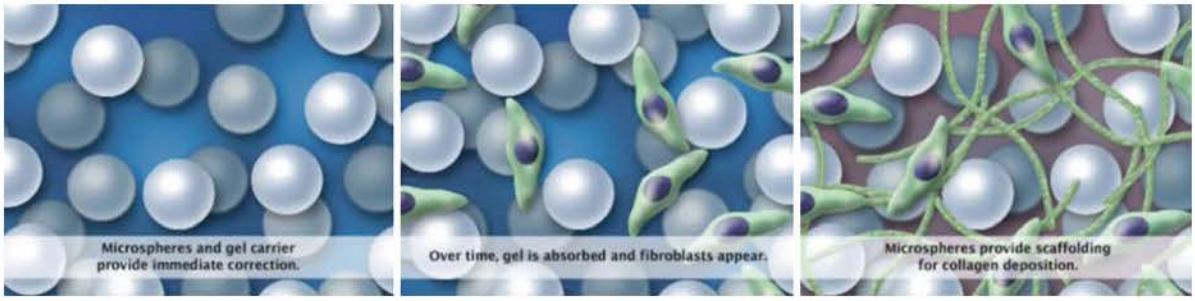


Fig. 56.4 Mechanism of action of Radiesse® (Used with permission of Bioform Medical, San Mateo, CA)

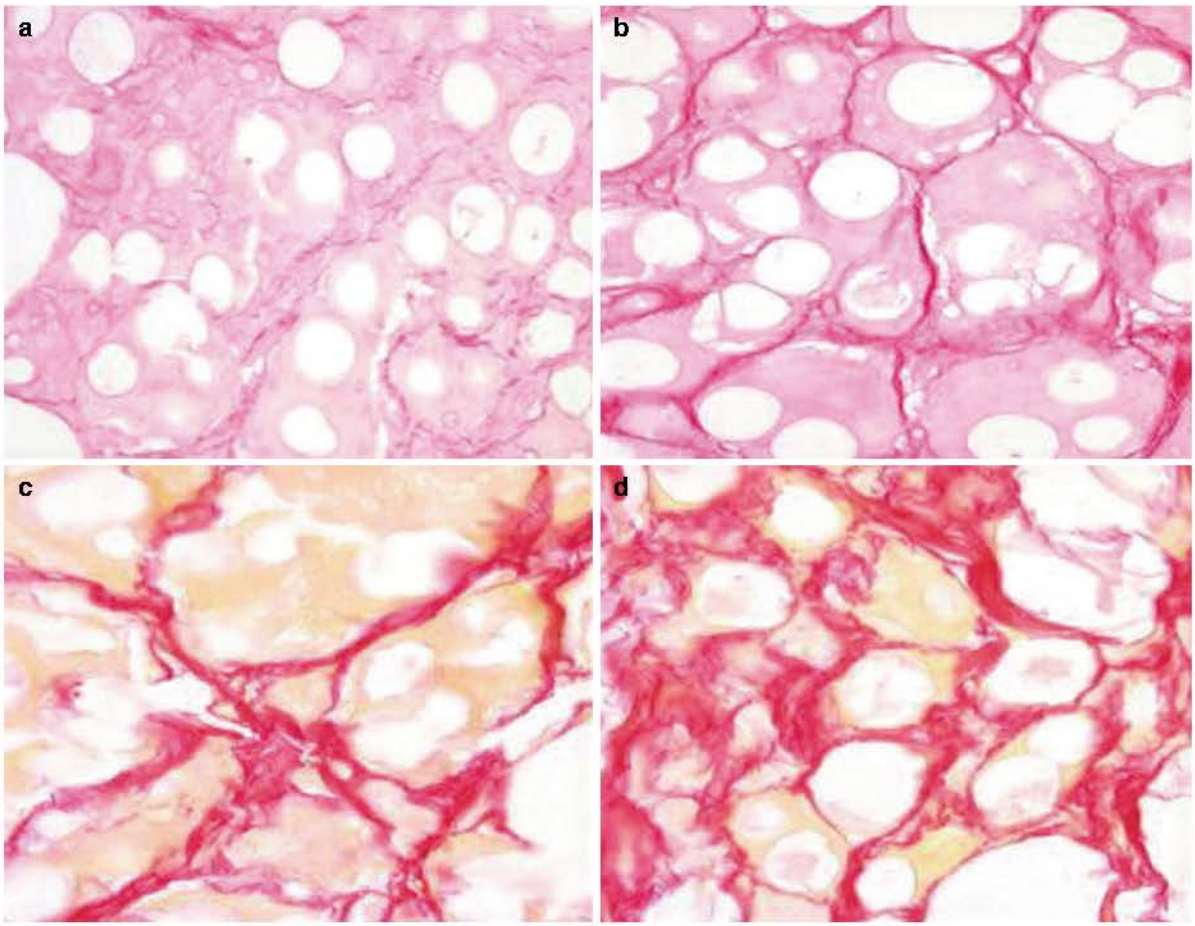


Fig. 56.5 Histological evidence of duration of action. Using picrosirius red staining, increased collagen deposition is seen around the CaHA microspheres at 4 (**a**), 16 (**b**), 32 (**c**), and 78 (**d**) weeks. Note the gradual changes in the appearance of the CaHA microsphere, which can be attributed to their breakdown and resorption through normal metabolic processes (Images credited to David Goldberg, MD. Used with permission of Bioform Medical, San Mateo, CA)

metabolized into calcium and phosphate ions before being excreted through normal metabolic processes [6].

Positive long-term effects may be explained by the fact that it remains localized at injection sites. While the aqueous gel component is resorbed by 6 months after injection [3], the CaHA microspheres remain as scaffolds for osteoblasts at the periosteum and fibroblasts in the soft tissues for a much longer period of time (Fig. 56.4). Histological evidence shows CaHA microspheres stimulate collagen production (Fig. 56.5),

but they do not stimulate bone growth in the periosteum [7]. For this reason, Radiesse® has also been injected with harvested fibroblasts in order to study their combined effects on collagen synthesis [8]. This putative mechanism of action may explain the observation that a smaller volume of Radiesse® is needed for the same degree of correction provided by higher volumes of hyaluronic acid or collagen [7].

Hydroxyapatite cement, which is denser than the granular Radiesse®, has been used for surgical nasal implants for over two decades. This is due to its biocompatibility, which is associated with its osteoconductive and osseoporous properties [9]. It is nonresorpable, however, which leaves risks of infection and extrusion [10].

33.5 Duration of Action

Injectable CaHA lasts longer in areas with less movement, blood supply, and lymphatic drainage because its loss is more limited in these areas [11]. Hence, injecting Radiesse® deep along the periosteum or in facial areas with less movement seems to produce greater longevity than immediately under the skin [11]. In a study involving injection into the neck of the bladder in animals, CaHA lasted for the entire 3 year length of the study [6].

For non-surgical rhinoplasty, desired results may last 1–2 years [11] (Fig. 33.5) with a single injection (approximately 1.3 mL), although additional touch-up injections may be performed around 6 months after initial treatment to maintain the desired nasal contour. Some patients report longer duration for minor improvements, such as smoothing of irregularities up to 3 years [8]. In one reported case, rhinoplasty revision surgery was performed uneventfully on a patient who received 0.6 mL of Radiesse® 14 months earlier [12]. Interestingly, no residual Radiesse® was noted during that operation [12], which is consistent with the absorption of Radiesse® gradually.

33.6 Clinical Uses

33.6.1 FDA-Approved Uses

Radiesse is approved by the Food and Drug administration (FDA) as a filler to augment vocal cords, for HIV-associated facial lipoatrophy, for nasolabial folds and smile lines, for oral and maxillofacial defects, and a radiopaque marker [13].

33.6.2 Aesthetic Off-Label Uses

The only FDA-approved aesthetic use for Radiesse® is to serve as a soft tissue filler for correction of moderate to severe facial deficiencies at nasolabial folds and in HIV-associated facial lipoatrophy. The most common off-label aesthetic uses of Radiesse® are for non-surgical facial rejuvenation procedures to smooth wrinkles, fill depressions, and reduce facial asymmetry in lips (where it is sometimes associated with nodule formation), labiomandibular folds, and the pre-jowl sulcus. It is also a dependable filler for augmenting the facial boney contour, i.e., nose, chin, cheeks, and forehead [5]. Additionally, it has been used in spreader graft injections as a nonsurgical alternative for internal nasal valve collapse patients, minimizing obstruction and improving breathing and snoring [14]. In 2007, Stupak et al. [15] first described use of Radiesse® for correction of post-rhinoplasty contour deficiencies and asymmetries.

Other off-label uses include other facial rejuvenation procedures, bladder dystrophy corrections, nipple projection after failed reconstruction surgery [16], cosmetic correction of enophthalmos [10], and restoration of orbital volume [11]. Radiesse® has received approval for many of these off-label procedures, including non-surgical rhinoplasty, outside of the USA [13].

33.7 Safety and Efficacy

Due to its inorganic nature Radiesse® is non-immunogenic, unlike collagen, so no skin testing is needed prior to injection. It has been found to be nontoxic, non-irritable, non-antigenic, and biocompatible through both in vivo and in vitro testing [17]. Should any particles become phagocytized, they are degraded in situ to calcium and phosphate ions like small fragments of bone. Furthermore, it is eventually absorbed by the body, rendering it reversible and preferable to other permanent alloplasts – such as polymethyl methacrylate (PMMA). Because it is semi-permeable, it lasts longer than collagen and hyaluronic acid-based fillers, making it more cost effective and reducing frequency of injection.

The major obstacle preventing formal FDA approval of Radiesse® for non-surgical rhinoplasty and other facial augmentation procedures is the lack of a large, long-term study of its safety and efficacy. There are many studies showing its effectiveness in nasal augmentation on a small scale [8, 12, 16, 17–21] thus warranting further study. A study published in 1996 following more than 200 patients during an 8-year period found the use of porous hydroxyapatite granules – similar to Radiesse® – as favorable means of augmenting the craniofacial skeleton [22]. This study, however, only included a limited number of cases involving nasal augmentation, concluding the method to be investigatory at that time [22]. Similarly, a German study followed 128 augmentations with hydroxylapatite granules filled in a Vicryl-tube in 36 patients from 1986 to 1992 [23]. Implanted in the subperiosteum, these granules proved to be well-tolerated and consistently in form in patients with facial deformities [23]. Furthermore, a Chinese study following 50 patients over 8 years found a particulate hydroxyapatite to be aesthetically stable with good long-term results for nasal augmentation [24], however, this form of hydroxyapatite differs from the granular form found in Radiesse®.

In 2008, a case was reported of a 37-year-old Asian woman who experienced ptosis due to eyelid mass development secondary to receiving CaHA for nasal augmentation 3 days earlier [24]. Symptoms were relieved after surgical excision of the mass 2 months later, but this complication emphasizes the need for proper site selection, meticulous injection techniques, and avoidance of overinjection of CaHA [25].

33.8 Non-surgical Rhinoplasty

Non-surgical rhinoplasty with Radiesse® (also known as a Radiesse® rhinoplasty) should be performed by a surgeon with a mastery of nasal anatomy and who is experienced in performing surgical rhinoplasties. Various guidelines have been reported in the literature by clinicians regarding anesthesia, injection, and post-operative care related to Radiesse® rhinoplasty.

33.8.1 Initial Consult

A patient's chief complaint about his or her nose needs to be addressed. The level of nasal deformity as it relates to the magnitude of the patient's concerns should be critically assessed, as well. Past medical history should be reviewed, with an emphasis on drug use, allergies, history of cold sores, presence of autoimmune disorders, history of facial herpes virus, previous facial operations (specifically rhinoplasties or dermal filler treatments), and whether the patient is pregnant or nursing [20]. Patients should also report sinus or nasal congestion, as well as use of decongestants. Due to minor bleeding during injections, patients should not be on any blood thinners including warfarin, NSAIDs, vitamin E (including multivitamin form), certain herbs, and excessive alcohol intake. One recommendation is to cease ingesting anything that can thin the blood for 10 days prior to the procedure [6]. The authors recommend cessation of above products for 2 weeks prior to the procedure with the consent of the patient's primary care physician.

Patients should be informed of the risks and benefits of the procedure in order for them to have realistic expectations toward a satisfactory outcome. They should be informed that the results are not permanent, and may require further revision before acquiring the desired appearance. Moreover, non-surgical rhinoplasty with Radiesse® does not exclude patients from surgical rhinoplasty in the future. Patients with one or more of the following conditions may also be excluded from the procedure: acute or chronic nasal infection, existing keloid scars, history of systemic collagen diseases, severe bleeding disorders, nasal respiratory impairment, and unrealistic expectations [21].

An essential part of the informed consent is the discussion of a surgical rhinoplasty as a permanent alternative to a non-surgical rhinoplasty. It is very important for patients to know that both options, the surgical and non-surgical ones, are viable options if that is the case. Various reasons may sway the patient to have a non-surgical rhinoplasty such as cost, lower risk, desire for a minimal change, time of recovery, and fear of surgery. Pre- and post-treatment photographs should also be taken, and patients should be given the opportunity to speak with previous patients who have undergone non-surgical rhinoplasty with Radiesse®, if possible.

33.8.2 Physical Examination

Before performing a non-surgical rhinoplasty with Radiesse®, it is important to examine the nose (Fig. 56.6) thoroughly, including the skin, cartilage, boney pyramid, different relationships of the esthetic

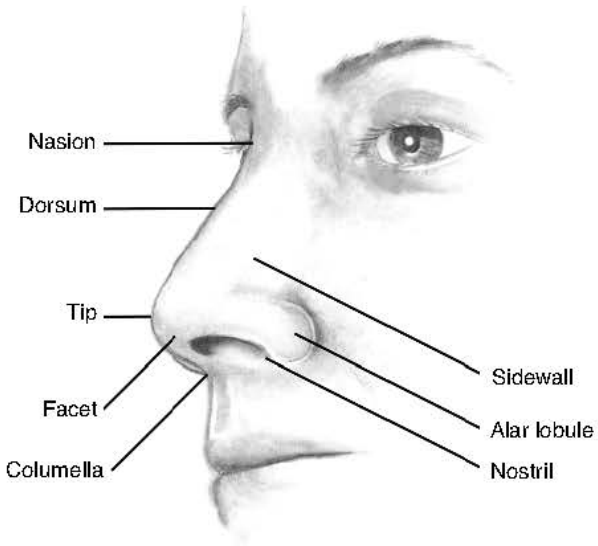


Fig. 56.6 Nasal anatomy

subunits, whether there is septal deviation, enlargement of inferior turbinates, difficulty breathing, prior trauma, as well as identify any possible locations of scar tissue. Also take into consideration that thickness and moisture of skin differs between ethnicities. Treatment should be delayed if any active lesions exist, with initiation of anti-viral therapy (e.g., acyclovir) for patients with a history of the facial herpes virus [6].

33.8.3 Nasal Anatomy

For non-surgical rhinoplasty, good knowledge of the relations of the nasal subunits is essential. Surface anatomy is also of paramount importance. Knowledge of nerve and blood supply will allow the injecting surgeon to avoid complications. For a non-surgical rhinoplasty, Radiesse® is typically injected into depressions at the fronto-nasal angle, dorsum, nasal tip, columella, and naso-labial angle.

33.8.4 Anesthesia and Prophylaxis

The most common types of anesthesia to injection sites include: lidocaine with epinephrine, topical lidocaine with tetracaine for 30 min [18], anesthetic gel [26], or topical anesthesia with BLT applied for 15–30 min prior to injection. Applying an icepack to the nose decreases sensation and provides good analgesia. A judicious combination of the above may also be used with care not to compromise the blood supply to the nasal tip. Anesthesia can also be used as a means of loosening tissue and cartilage prior to filler injection. For this, a 25-gauge or 27-gauge needle can be used to create a space for the filler from a distal puncture site [19]. For post-rhinoplasty contour corrections, injections have been performed without anesthesia (only an alcohol pad), or in the operating room in conjunction with facial procedures [15]. In the latter, it was found that concurrent procedures do not affect injection treatment results [15]. In July 2009, the FDA approved the mixing of Radiesse® with lidocaine. This is another method of anesthesia that has been proven to improve patient comfort and satisfaction with Radiesse® injections [4].

Nerve blocks are helpful mainly when the infiltration of the anesthetic solution may cause undesirable distortion of the surgical site or require an amount of anesthetic that exceeds the maximum recommended dose [19]. For non-surgical rhinoplasty with Radiesse®, blocking the infraorbital and supratrochlear nerves, which are branches of the trigeminal nerve, has been recommended [19], although neither are used in our institute. An infraorbital nerve block specifically targets the lateral nose [19], but also anesthetizes the lower eyelid area, through the cheeks, and the upper lip [7]. Topical anesthesia may be applied to the oral mucosa prior to anesthetic injection [7]. In our institute, we administer a topical anesthesia of lidocaine 6%, tetracaine 4%, and benzocaine 20% applied for 30–45 min directly to the entire nose, along with icepack application. That application gives excellent pain control and does not distort the nasal anatomy.

Prophylactic antibiotics are not used for non-surgical rhinoplasty, but there is anecdotal evidence supporting prophylactic use of *Arnica montana*, bromelain, and 1% vitamin K1 (phytonadione) cream to reduce bruising [7].

After anesthesia and prophylaxis are administered, patients are marked and then injected subcutaneously or into a subperiosteal plane at the desirable location of the nose. For an experienced surgeon, markings may not be necessary.

33.8.5 Needles

For non-surgical rhinoplasty, Radiesse® has reportedly been injected in various ways, with any of the following needles: a 23 gauge 1.5-in. straight or angled

spreader graft needle [14], a 25 gauge 5/8 in. needle, a 27 gauge 1.75 in. needle [5], a 27 gauge in. needle [18], a 30 gauge 1.30 cm needle [15], or a 27 gauge 0.60 cm needle [15]. Our preference is a 27 gauge in. needle as it is convenient to inject smoothly but does not leave a large needle hole.

33.8.6 Injection Technique

The authors' approach is to address the nose from top to bottom. First, the radix (Fig. 56.7) is assessed. Is it with appropriate height, or does it need to be augmented? Next, the dorsum is injected if necessary. If there is a dorsal hump, injection cephalad to it, or caudal to it may mask that hump (Fig. 56.7).

If there is a deviated septum, the injections may be done to achieve symmetry by injecting unequal amounts to the left and right side. If there is an isolated depression, it can be addressed with a direct injection to fill it. Caution needs to be exercised if a depression is tethered to the underlying bone or cartilage, since an overly aggressive injection can create a "pin-cushion" effect, with the Radiesse® ending up surrounding the depression rather than filling it.

The nasal tip skin needs to be assessed next (Fig. 56.8). If it is thick and immobile, it may be difficult to change the shape with injections, and may need to be addressed surgically. If the skin is lax, a good outcome can be expected from a nasal tip injection.

The columella can also be injected if it is retracted or deficient. Because it is abundant in sebaceous glands, the nasal tip should be approached preferably from the dorsum to decrease the chance of contamination and infection. Very few times the nasal nares need to be augmented. That should be done with caution as it may narrow the internal nasal valve.

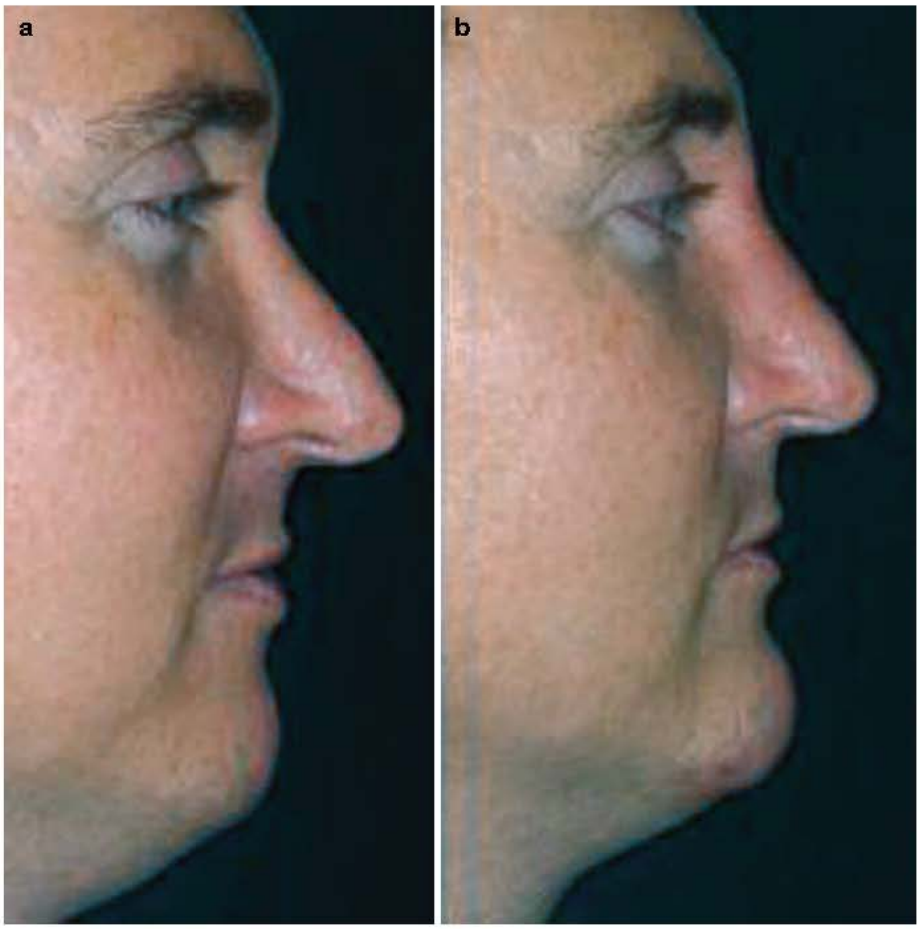
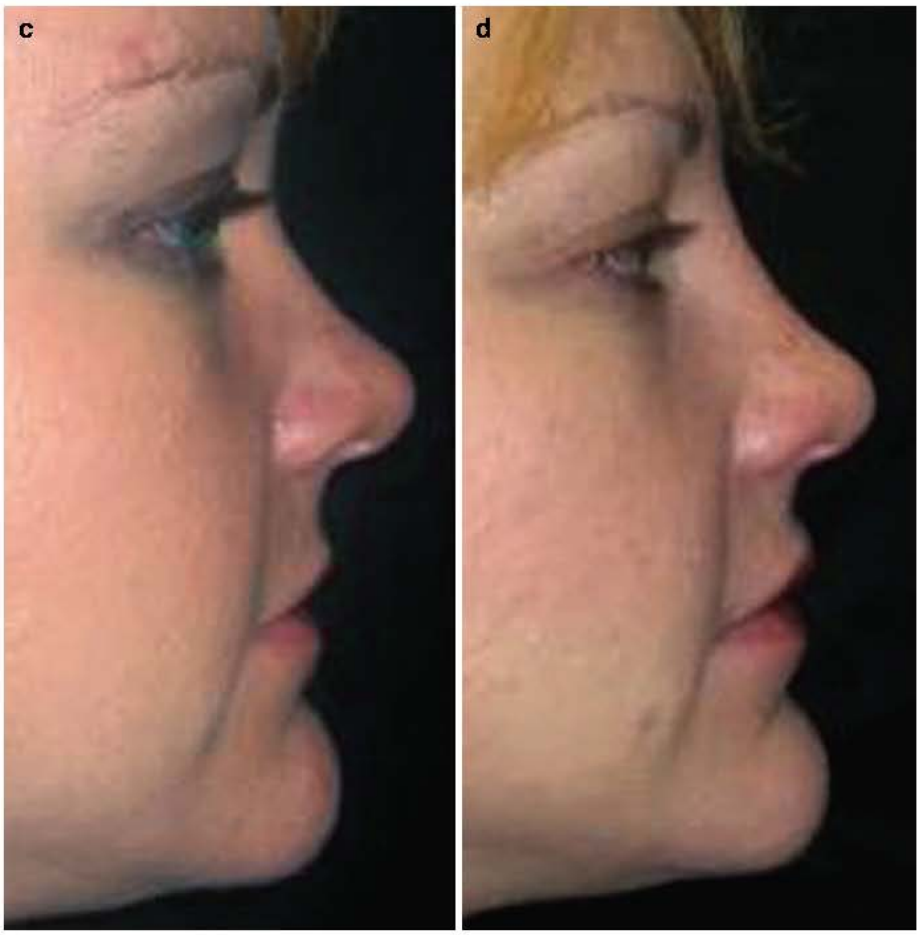


Fig. 56.7 (**a**) Pre-procedure Caucasian male. (**b**) Post-procedure following injections with Radiesse® to the dorsum and radix, resulting in increased height. (**c**) Pre-procedure Caucasian female. (**d**) Post-procedure following injections with Radiesse® at the dorsum and radix, resulting in increased height

Fig. 56.7 (continued)



Injection is typically done into the deep dermis in a threaded fashion in doses ranging from 0.1 to 0.3 mL at any given time because higher volumes may create undue tension and cause skin necrosis. Crosshatching, linear, and fanning techniques of injection have been reported [6]. If anesthesia were not used, injections can alternatively be coupled to loosening of subcutaneous tissue. Due to its composition, Radiesse® should not be injected into the superficial or middle dermis [5]. Similarly, the thick, white texture of Radiesse® may make it visible under thin skin, which is not aesthetically pleasing. Superficial injections can lead to overcorrection and nodule formation, so it is important to finish injecting before removing the needle. Persistent nodules may be avoided with proper injection of the Radiesse® in the plane immediately deep to the dermis and proper site selection [5]. Areas of extensive scar tissue deposition may be more difficult to treat because of tissue retraction and lack of a boney base for projection. Even so, some correction can often still be achieved in such areas [8]. Care should be taken not to inject into an artery, as this may cause necrosis [18].

33.8.7 Dosage

Doses vary depending on individual patient characteristics, but suggested maximum doses include: 1.5 mL at the fronto-nasal angle, 0.5 mL at the dorsum, 0.5 mL at the tip, and 1.5 mL at the nasolabial angle; as maximum doses to each specific area [19]. We recommend limiting the initial total injection to 1.5 mL to avoid tension on the overlying skin as well as overcorrection. It is better to under-correct deformities, as they can be filled in or touched up during a follow-up visit in 2 weeks to 3 months.

33.8.8 Post-injection Care

Ice should be applied during breaks between injections and for a period afterward to reduce edema and

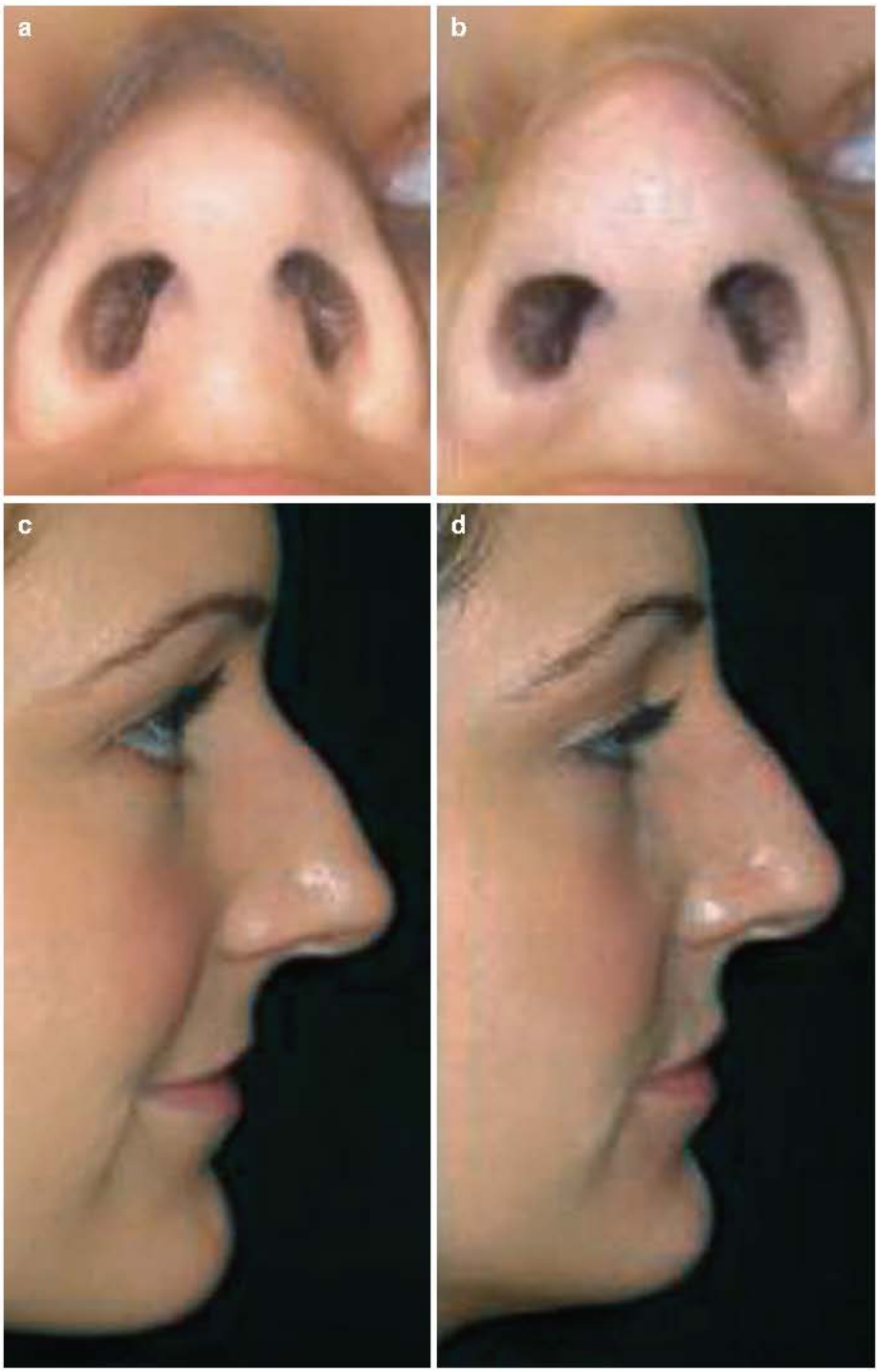


Fig. 56.8 (**a**) Pre-procedure Caucasian female in her early 20s. (**b**) Post-procedure with injections with Radiesse® to the tip, resulting in a more pointed shape. (**c**) Pre-procedure Caucasian woman in her twenties. (**d**) Post-procedure after injections with Radiesse® superiorly and inferiorly around a hump on the dorsum, which masked it and resulted in the appearance of a more prominent tip

ecchymosis. The procedure is typically well-tolerated, and no post-procedure pain control is typically required.

Injection is followed by massaging, which molds the desired shape and ensures the absence of palpable lumps. Molding may be enhanced by micropore taping for 24 h after injection [15, 19]. Taping may also help to reduce swelling. Splint placement for a few days after injection may prevent displacement of the filler [6]. At our institute, we do not tape or splint the nose afterward, but encourage patients to place cold compresses

on the nose to decrease the edema for the 24 h following the non-surgical rhinoplasty. The authors have not seen the filler being displaced by this follow-up care.

The most common adverse effects are local and transient. They include mild pain, erythema, ecchymoses, edema, pruritus, and hematoma [12, 17]. Other adverse effects include soreness, numbness, contour irregularities, tenderness, and irritation. Overall, Radiesse® rhinoplasty is typically well-tolerated and patient satisfaction for non-surgical nasal augmentation is high [8].

Removal of excess Radiesse® with an 18-g needle can lead to correction if Radiesse® is injected into the middermis [5] or in excess. Radiesse® has a 1:1 injection-to-augmentation ratio, thus it requires no additional post-treatment augmentation monitoring [27]. Additional touch-ups may be required after 2 weeks to 3 months. Patients are seen 2–3 weeks after injections to ensure that they are satisfied after most of the edema and ecchymosis has subsided.

33.8.9 Patient Satisfaction

As with any aesthetic procedure, satisfaction depends not only on surgical technique, but realistic expectations from patients, as well as proper prior communication between surgeons and patients. Non-surgical rhinoplasty with Radiesse® has a high rate of patient satisfaction in the literature [8, 12, 15, 17–21], as well as at our institute. Furthermore, one study found no correlation between patient satisfaction scores and demonstration of improvement by photographic analysis [8].

In the rhinoplasty literature, the standard for measuring patient satisfaction is through patient-reported outcome measures. The most common instruments used to measure patient satisfaction after surgical rhinoplasty are the Rhinoplasty Outcomes Evaluation, the Glasgow Benefit Inventory, and the Facial Appearance Sorting Test [28]. For non-surgical rhinoplasty with Radiesse®, there is a need for the use of such instruments to assess patient satisfaction.

33.9 Specific Types of Noses

At the nasal radix and dorsum, Radiesse® can be used to augment height, to give a wider appearance or correct saddle deformities. By correcting retracted columellas, it can give a more prominent nasal tip. Radiesse® has also been used to improve post-rhinoplasty contour defects, such as dorsal nasal defects (cartilaginous and boney), nasal sidewall depressions, overly deep supratip breaks, and alar asymmetries [15]. Typical candidates include people with ethnic noses: Asians, Middle Easterners, African–Americans, and Hispanics. This is because, in general, such people have thicker skin, lower nasal dorsums, and bulbous tips compared to Caucasian patients.

When performing a rhinoplasty on any patient population it is important to take cultural issues into consideration. While such patients seek correction of nasal defects, most patients also cherish subtleties and preservation of their ethnicity. Rhinoplasty should refine facial features while maintaining ethnic identity. When they arise, also recognize language and cultural barriers.

33.9.1 Asian

Augmentation rhinoplasty is a common procedure in the Asian community due to their generally lower and more caudal nasal nasion compared to Caucasian patients. A common misconception is that such rhinoplasty is done to look more "Western," despite the fact that high, narrow bridges are aesthetically pleasing in many Asian cultures [29]. To achieve such results, surgical augmentation is performed with autogenous or alloplastic material placed into the nasal dorsum to make the nasion level higher and more cephalic. Over the years, there has been a debate over the more preferable material. To this end, it has been found that surgeons performing augmentation rhinoplasty on Asian patients have had to recognize that many are unhappy with autogenous implants and prefer alloplasts, particularly silicon, despite long-term side effects [29]. Such surgery, however, may produce conspicuous and unsatisfactory results [30], particularly due to exposure and extrusion of implants. Implant exposure can lead to scarring, which can be difficult to treat with revision surgery [31].

As inhabitants of the largest continent, Asian's noses vary depending on different geographical regions. Northern Asian noses can have dorsal humps and high nasions extending onto the glabella [29]. Filipinos and Polynesians typically have "flat" noses which start off narrow at the bridge and gradually become wide and blunt at the tip [29]. Despite differences, the goal of rhinoplasty in Asian patients can generally be seen

as similar to the goal of Occidental rhinoplasty: a strong dorsum with a prominent origin but not competing with the tip as the leading point of the nasal profile [27].

Non-surgical rhinoplasty with Radiesse® in Asian patients (Fig. 56.9) can increase tip projection, create a higher dorsum, and improve tip contour [32]. Augmentation is also performed at the glabella in

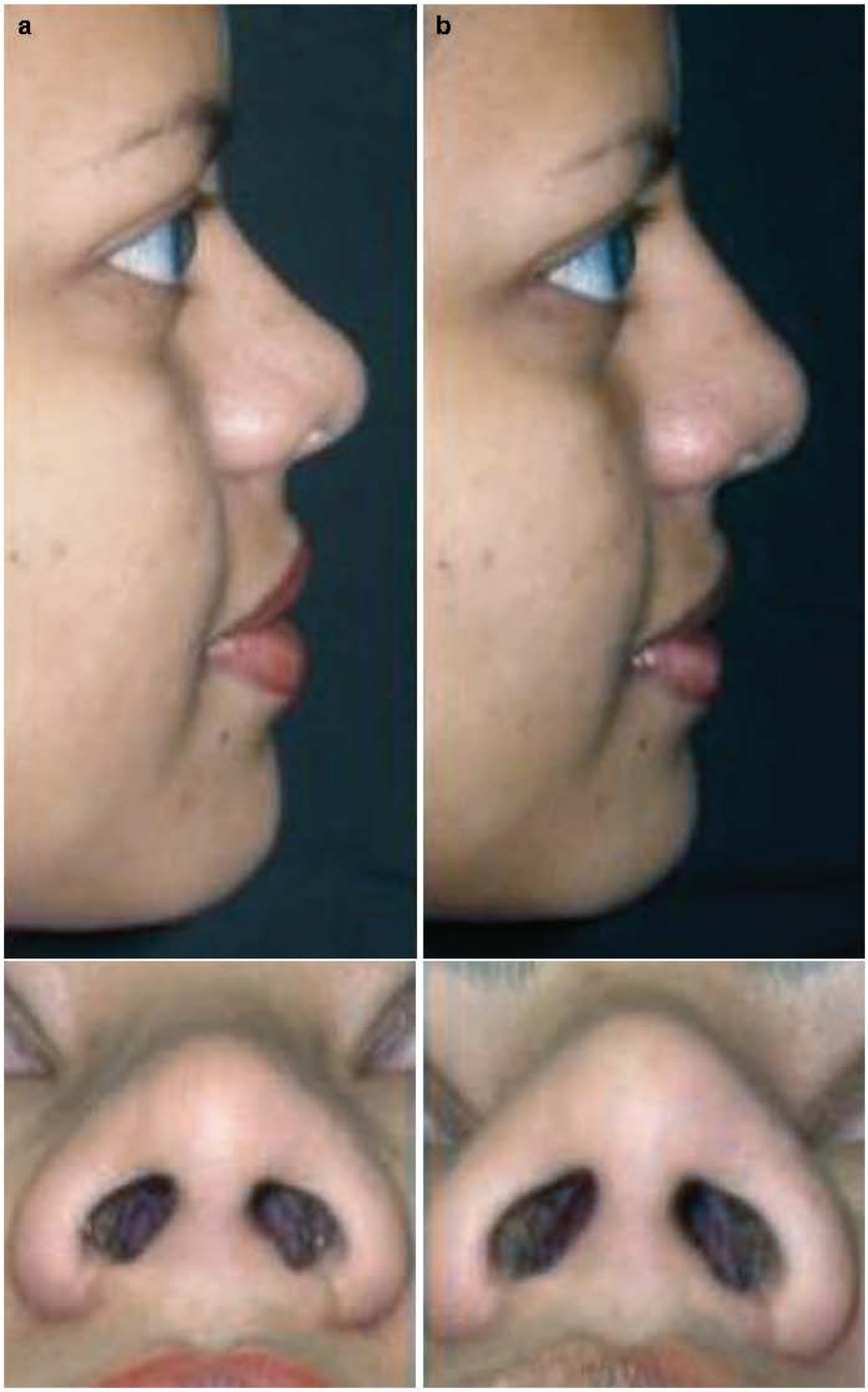
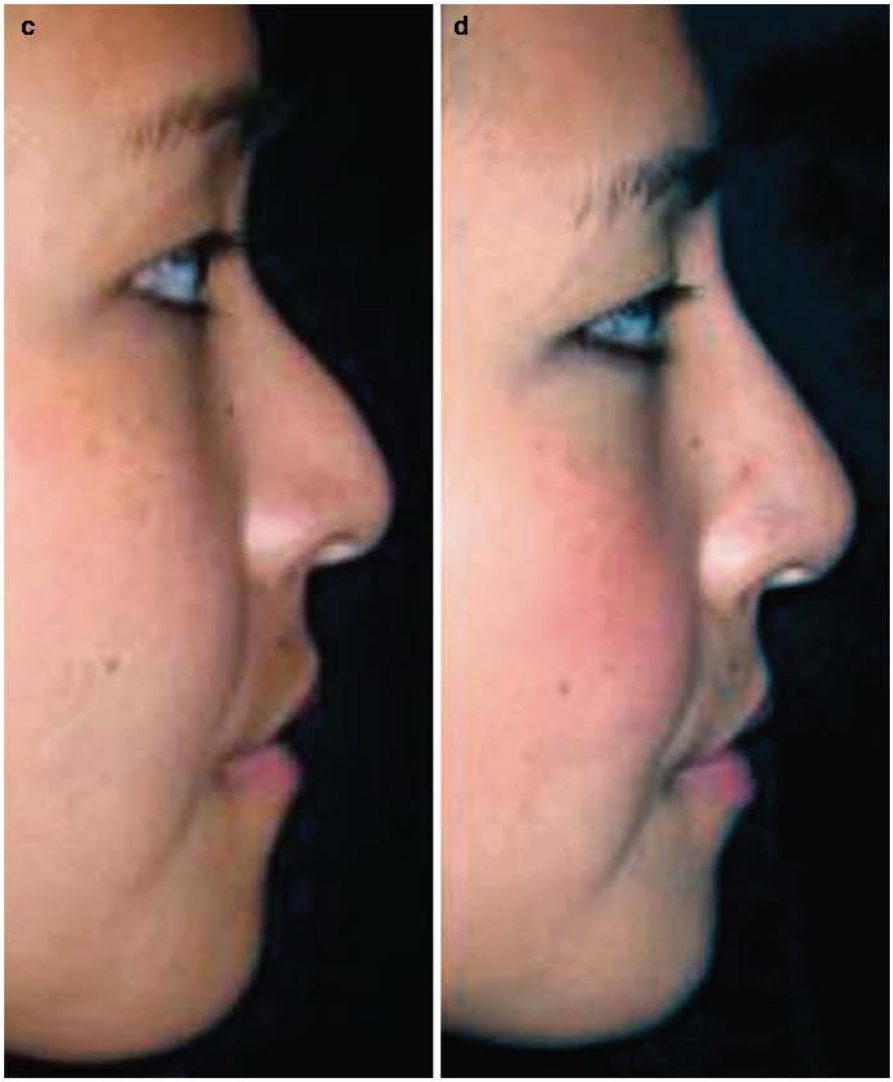


Fig. 56.9 Asian Radiesse® rhinoplasty. (**a**) Pre-procedure Indian woman. (**b**) Post-procedure after injections with Radiesse® in the radix, dorsum, and tip. (**c**) Pre-procedure Chinese woman. (**d**) Post-procedure following injections with Radiesse® to the dorsum and radix. (**e**) Pre-procedure 26-year-old Philippino woman. (**f**) Post-procedure after injections with Radiesse® to the radix, bridge, and tip

Fig. 56.9 (continued)



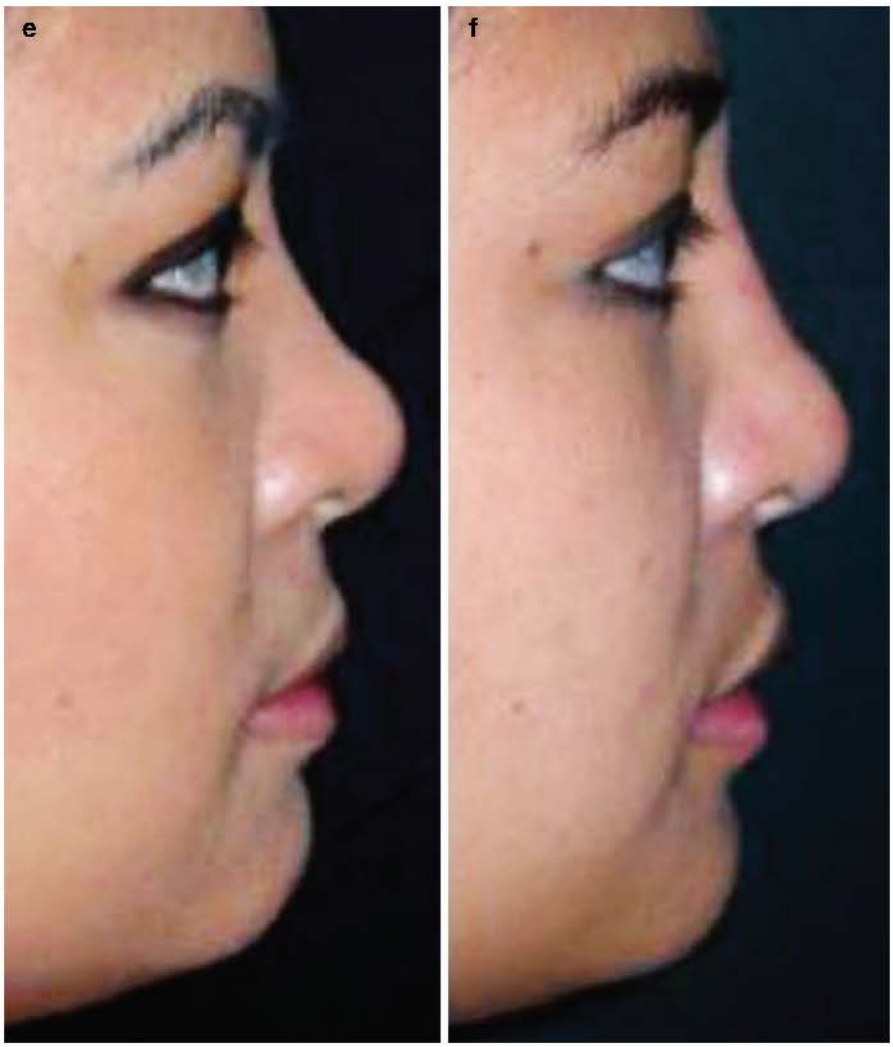


Fig. 56.9 (continued)

response to deficiencies there, and the columella to correct vertical deficiencies. Dorsal augmentation can also be used to create the appearance of a narrow bridge, a procedure also common in African–American noses [33]. In Asian populations, non-surgical augmentation is also frequently done as part of revision or after removal of an implant.

33.9.2 African–American

A frequent complaint of African–American patients is a lack of a projection from the dorsum and the tip. In addition, African–American patients commonly complain of short columella, small nasolabial angle with the upper lip too close to the nasal tip, round nostrils, and excessively broad alae [29].

Augmentation to the dorsum is as routine in African–American patients as hump removal is in Caucasian patients [29]. Approximately 50% of African–Americans are good candidates for augmentation [29]. African–American patients with American Indian heritage frequently also have dorsal humps and high nasions that may extend on the glabella [29]. To this end, non-surgical rhinoplasty with Radiesse® in African–American patients can increase the height of the dorsum, as well as convert saddle deformities into more linear forms (Fig. 56.10). Dorsal augmentation with Radiesse® is also advantageous because the caudal end of the nose tends to be mobile, therefore rigid

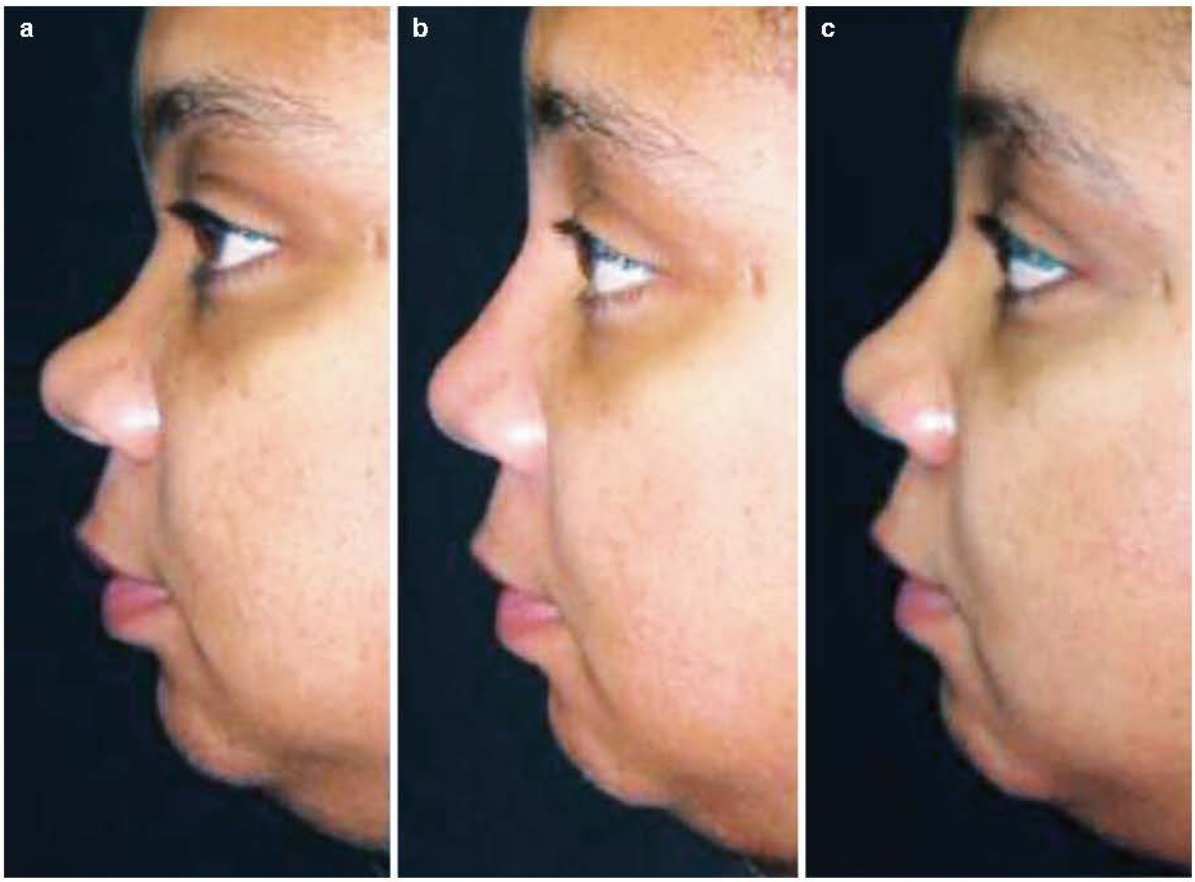


Fig. 56.10 African American Radiesse® rhinoplasty. (**a**) Pre-treatment 42-year -old African American woman. (**b**) Post-treatment immediately after injections with Radiesse® to the radix, bridge, and tip. (**c**) One month post-procedure after initial swelling subsided

implants are not routinely used [29]. In order to address wide-bridge appearances from frontal views, dorsal augmentation alone (without an osteotomy) can create the appearance of a narrower bridge [33].

In African–American patients, tip injections with Radiesse® can also give a more prominent appearance to an otherwise bulbous, flattened tip. The nasal tip in African–American patients has also been described as fleshy, flat, wide, depressed, pendulous, or depressed, while the aim is to create a more sculpted tip [29]. Flared nares cannot be treated with Radiesse® rhinoplasty and need surgical correction.

56.9.3 Hispanic

Nasal surgery is one of the most commonly requested aesthetic surgeries requested by Hispanic Americans. A mestiso nose typically has a narrow and deficient radix that may be augmented with Radiesse® to balance the cephalad aspect with the caudal aspect of the nose. Other common characteristics are insufficient anterior project of the entire nose, wide alar bases, retracted columellas, acute nasolabial angles, and depressed piriformis areas [29].

The dorsum is typically wide, and the goal is to convert it into a straight or slightly concave shape (Fig. 56.11). This is difficult to address with Radiesse®. The tip is ptotic and Radiesse® can provide a more prominent shape. Another problem site is the columella, which is often weak and found to lie above the alar rim. Radiesse® injection can increase the projection of the columella by adding structure. As with African–Americans, nostril flaring may only be corrected surgically.

56.9.4 Arabic (Middle Eastern)

While generalizations should be avoided, morphologically the Middle Eastern nose falls somewhere between

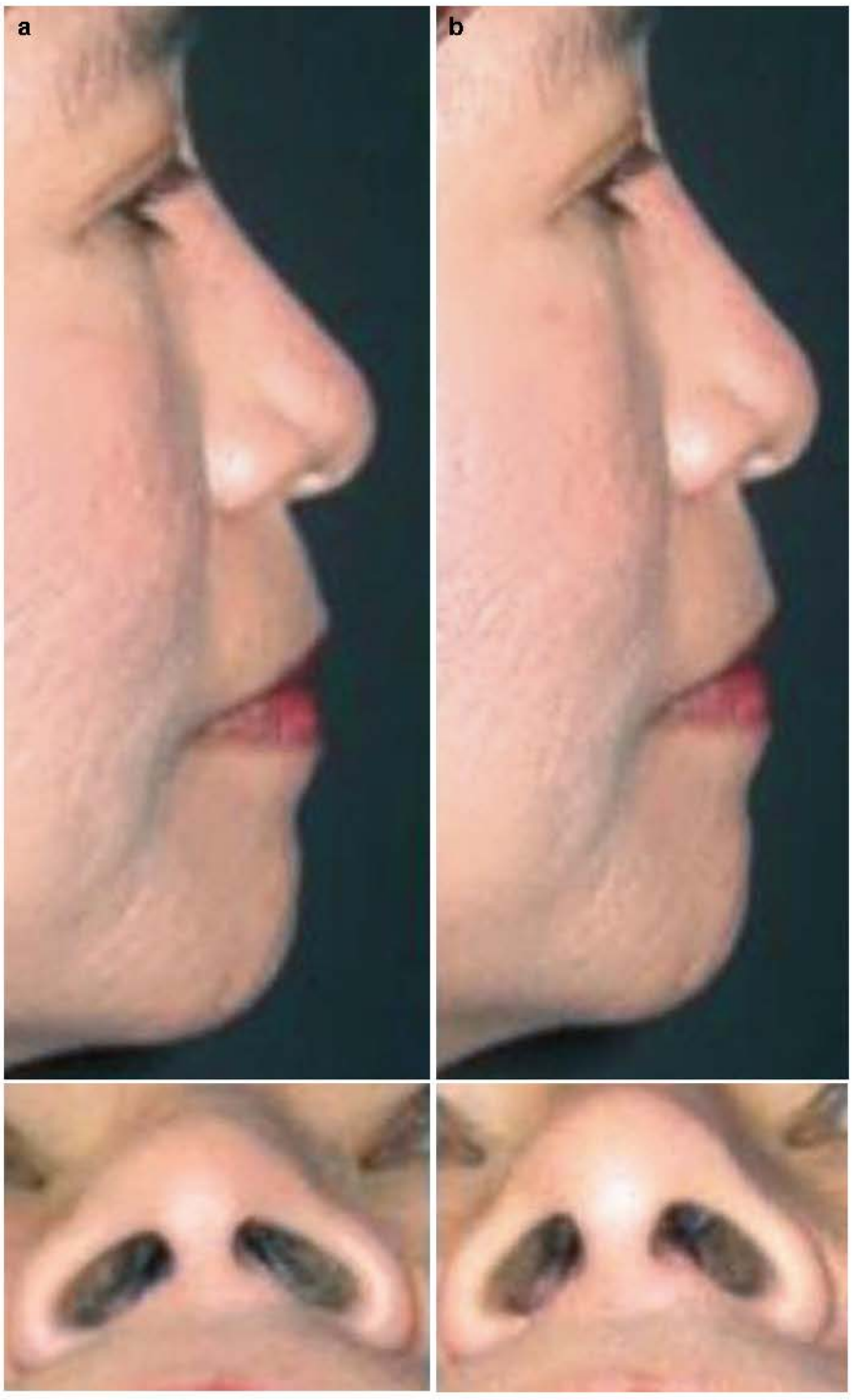


Fig. 56.11 Hispanic Radiesse® rhinoplasty. (**a**) Pre-operative 50-year-old Hispanic woman. (**b**) Post-procedure after injections with Radiesse® to the dorsum, radix, and tip

African and Caucasian noses [34]. Some of the most common features of Middle Eastern noses are: wide nasal bones, slight alar flaring, ill-defined bulbous tips, bulky infratip lobules, over-projecting radix, high and wide dorsums, and acute columellar-labial angles [34]. In addition, these patients commonly have thick, sebaceous nasal skin – especially at the tip [34]. Middle Eastern noses can also have dorsal humps and high nasions extending onto the glabella [29]. Correction with Radiesse® should proceed with caution, since this

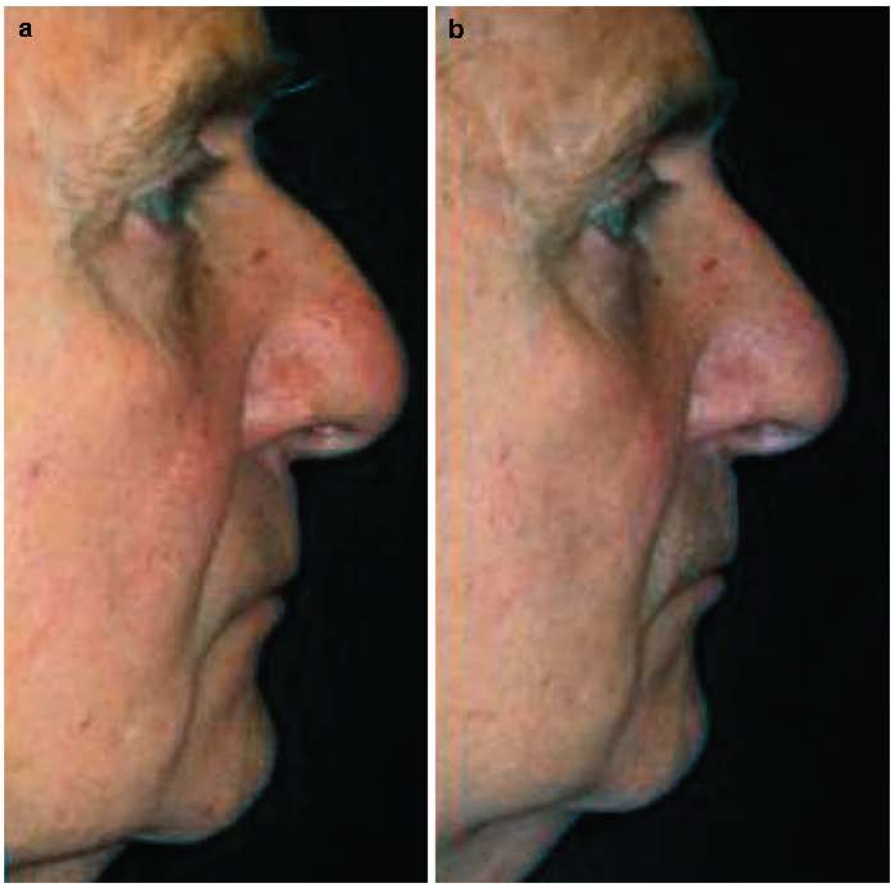


Fig. 56.12 Radiesse® rhinoplasty in response to aging. (**a**) Sixty-two year-old male before treatment. (**b**) Post-procedure after Radiesse® injection above and below a dorsal hump, which masked it

population typically needs a "reduction" rhinoplasty as opposed to an augmentation rhinoplasty. Reduction typically involves a septorhinoplasty in response to a deviated septum, removal of a dorsum hump, correction of a crooked tip, and/or reduction of a broad base [29]. Small improvements can be offered with Radiesse® rhinoplasty such as injections to the radix to augment it if it is deficient, to the tip to offer more definition, as well as to the columella to create a more obtuse columellar-labial angle. In women, this angle should be between 95° and 105°, while in men the angle should be approximately 90° [29]. From a lateral view, the columella should lie 2–3 mm below the alar rim [29].

56.9.5 Aging

Facial aging is a complex process characterized by thinning of the epidermis, atrophy of subcutaneous fat layers, a degree of bone resorption, progressive loss of elastic fibers and collagen organization, and weakening of underlying muscles [7]. In the nose, Radiesse® injection can be used to augment areas affected by the aging processes. For example, augmentation with to the base of the pyriform aperture can provide the columella with additional support. Nevertheless, it should be noted that Radiesse® can be used to smooth nasal wrinkles and depressions associated with aging in patients (Fig. 56.12). It is already used to improve aesthetic effects of aging on the forehead, cheeks, nasolabial folds, and labiomandibular lines.

56.10 Revision Rhinoplasty

Contour irregularities after a rhinoplasty have to be assessed on an individual basis, and may be improved with Radiesse® injections. Because the skin may be compromised or there may be excessive scar tissue,

caution needs to be exercised not to compromise the blood supply to the nasal skin with an aggressive injection of Radiesse®. In this category of non-surgical rhinoplasty correction with Radiesse®, each nasal contour problem is unique and needs to be addressed on an individual basis.

56.11 Discussion

The first report of using an injectable filler for non-surgical rhinoplasty was by Han et al. [18, 35] in 2006. In that study, hyaluronic acid mixed with autologous human fibroblasts was injected subcutaneously along the nasal dorsum and immediately shaped by hand to correct flat nasal bridges. While hyaluronic acid is known not to be a long-lasting filler, when combined with fibroblasts its aesthetic results last up to approximately 1 year [35]. Drawbacks of this method of nasal augmentation are the significant preparatory time for harvesting fibroblasts and morbidity [18]. With Radiesse®, these drawbacks are negated and results are maintained for an even longer period.

Since the Han et al. [35] study and FDA approval for Radiesse® as a soft filler for nasolabial folds, which was also in 2006, there have been a plethora of studies where Radiesse® has been used for non-surgical nasal augmentation. Like other facial rejuvenation procedures, the most important issues for non-surgical rhinoplasty are longevity, biocompatibility of the soft tissue filler, low adverse events, and a sound cost–benefit ratio. While rhinoplasty surgery under the correct circumstances can produce astounding results, it is a very costly operation with many consequences. Some patients may prefer to spend $700–$1,000 on Radiesse® rhinoplasty annually or biannually, as opposed to spending $6,000–$13,000 on surgical rhinoplasty.

While complications were previously discussed, another possible risk is internal nasal valve collapse, although no cases have been reported [15]. There is also no evidence of granuloma formation (a problem with injectable silicon) or osteogenesis when CaHA is placed in soft tissue [7]. The problem of nodule of formation seen in the lips has also not been seen in non-surgical rhinoplasty with Radiesse®. Furthermore, because it is radiopaque there was concern that Radiesse® may interfere with radiological study interpretations, but this theory has been disproved [36].

Because non-surgical rhinoplasty with Radiesse® is a relatively new procedure, Radiesse® is injected in relatively low doses not only to avoid overcorrection, but due to concerns of safety. In the future, higher doses at more diverse locations may be attempted once longer-term analysis confirms product safety for non-surgical rhinoplasty [19]. Furthermore, computer-assisted analysis may permit even more objective measurements of nasal symmetry and contour, as seen with surgical rhinoplasty, which may lead to better injection techniques and dosages [19, 37].

Over the last 2 years the authors have performed non-surgical rhinoplasty with Radiesse® on all ethnic groups discussed previously, with patients ranging from 17 to 62 years old. Non-surgical rhinoplasty with Radiesse® has also been performed for revision after a primary surgical rhinoplasty. Approximately 30% of patients return for additional touch-ups. Overall, we have experienced no complications or adverse effects, and enjoy an over 95% satisfaction rate. Our high patient satisfaction is a result of good communication and administration of conservative dosages.

56.12 Conclusions

Non-surgical rhinoplasty with Radiesse® is a feasible alternative for many patients who require nasal augmentation or correction of minor asymmetries, slight depressions, and subtle contour irregularities. A large-scale, long-term study of its safety and efficacy in non-surgical rhinoplasty may lead to Radiesse® being the first FDA-approved soft filler for this procedure, as current indications show Radiesse® is preferable.

Like surgical rhinoplasty, non-surgical rhinoplasty with Radiesse® requires high-quality consultations, physical examinations, surgical knowledge of nasal anatomy, expert execution of the procedure, and post-injection care. Guidelines have been outlined regarding these steps, including needle specifications, dosages, and use of anesthesia and prophylaxis.

Besides the actual procedural considerations, it is important to identify the potentials and limitations of non-surgical rhinoplasty with Radiesse®. Typical candidates for the procedure are patients in need of nasal augmentation, particularly patients with ethnic noses, as well as patients with defects related to normal nasal features, aging, or previous surgical rhinoplasty operations. While generalizations can be made

regarding how to approach specific ethnic and other nasal features, like surgical rhinoplasty, individual aesthetic subtleties vary between all patients. It is important to approach patients on a case-by-case basis.

With a clear understanding of its background and what it entails, non-surgical rhinoplasty with Radiesse® is a high satisfaction, comparatively low-cost, and low-risk procedure aesthetic surgeons can easily incorporate into their practices as a cheaper – albeit temporary – alternative to surgical rhinoplasty.

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