Rhinomodelation or non-surgical rhinoplasty: a safe and reproducible approach

Rinomodelação ou rinoplastia não-cirúrgica: uma abordagem segura e reprodutível

ABSTRACT

Introduction: Rhinoplasty often leads to unpredictable results, even in the hands of experienced surgeons. However, in specific cases, rhinomodelation with fillers, a non-surgical procedure to correct minor nasal external changes, can be used. Methods: This study describes the application technique of fillers (hyaluronic acid or calcium hydroxyapatite) for nasal modeling. Patients undergoing nasal filling between 2009 and 2012 were included. Edema of the nasal tip, pain, and the degree of patient satisfaction with the outcome were assessed. Results: Thirty-nine patients were included in the study. Regarding the outcomes of rhinomodelation with hyaluronic acid, 52% patients presented with mild edema, 74% had mild pain, 15% were very satisfied, and 74% were satisfied with the result. For the outcomes of rhinomodelation with calcium hydroxyapatite, 67% patients presented with moderate edema, 50% had moderate pain; 17% had severe pain, and 84% were satisfied with the result. Conclusion: Rhinomodelation with resorbable fillers is a simple procedure with acceptable esthetic results. However, a deep anatomical knowledge is necessary to decrease the risk of complications.

Keywords: Nose; Rhinoplasty; Dermal Fillers; Acquired nasal deformities; Nasal diseases.
INTRODUCTION

Rhinoplasty is a surgery that, even in experienced hands, presents unpredictable results, due to the anesthetic risks, possible functional and esthetic sequelae, and the necessary recovery period. As a result, rhinomodelation with fillers has been gaining popularity among both patients and medical professionals.

The idea arose at the end of the 19th century by Dr. Robert Gersuny, who used paraffin with the aim of increasing the nasal dorsum. Decades later, Robert Kotler and Jack Startz introduced silicone injections, leading to a high rate of granulomas and ulcers. In 1981, bovine collagen was introduced as the first facial filler approved for cosmetic use; however, with the need for a safer product, calcium hydroxyapatite (CaHA) was used to shape some defects in the nose. Subsequently, with the popularization and experience amassed by plastic surgeons and dermatologists using hyaluronic acid (HA), this became the most commonly used filler due to its reversibility with the use of hyaluronidase in the event of hypercorrection or inadvertent vascular lesions and its lower durability when compared to CaHA.

Some complications reported from the use of fillers (both HA and CaHA) include infection, ischemia, and necrosis due to vasospasm, intra-arterial injection, or extrinsic vascular compression in injections of large volumes at the tip or other areas with little tissue distensibility, chronic pain, or formation of osteophytes by injection in the periosteum, or ischemia in the dermis and epidermis from very superficial injections.

OBJECTIVE

Our objective was to describe in detail an application technique of nasal fillers, taking into account safety aspects, and to present a comparison between various characteristics of CaHA and HA, expanding the vision of their properties to facilitate in choosing the most suitable filler for each case.

METHODS

A retrospective analysis was performed of all patients who attended the clinic between 2009 and 2012 seeking improvement of their appearances through rhinomodelation and who did not wish to undergo a rhinoplasty.

Patients with clinical diseases contraindicating general anesthesia; those with functional breathing alterations; those under 20 and over 60 years; those with known allergies to HA or CaHA; who previously underwent nose filling procedures, rhinoplasty surgery, or fixation threads in the nose, and those with changes in the nose with the indication of rhinoplasty surgery were excluded.
All patients signed an informed consent form, and the rhinomodelation product (HA or CaHA) was chosen according to the information provided during the consultation. A plastic surgeon performed the application of the product.

All patients were reassessed the day following the procedure and after 14 days, at which point the product was re-applied in cases that the surgeon or patient considered the initial nasal deformity to require additional correction.

Edema of the nasal tip was evaluated on the day after the procedure by the subjective opinion of the professional who performed the application, taking into account the intensity of skin erythema, the hardness of the treated area upon palpation, and the increase in the tip volume. The edema was evaluated on a scale from no edema to mild, moderate, or intense edema.

Pain was evaluated on the day following the procedure by the patient by slightly pressing the nasal tip with the finger pad of the index finger of the dominant hand and measuring the pain on a scale of 1 to 5 (1 = no pain, 2 = mild pain, 3 = moderate pain, 4 = intense pain and 5 = unbearable pain).

The degree of satisfaction with the results was evaluated after 2 weeks by the patient assessing the pre- and post-procedure photographs before any reapplication, and it was measured on a scale from 1 to 5 (1 = very satisfied, 2 = satisfied, 3 = slightly satisfied, 4 = dissatisfied and 5 = totally dissatisfied, would not recommend and would not do it again).

**Technique**

After adequate antisepsis of the face with aqueous chlorhexidine, a topical anesthetic containing lidocaine 23% + tetracaine 7% gel was applied for 10 minutes, followed by the application of the dermal filler (CaHA or HA).

Application in the nasal spine: the syringe and needle were placed in direct orientation to the nasal spine joining the nasolabial angle (Figure 1). Recommendations: This was used for cases with closed nasolabial angles (less than 95–100 degrees in women and 93–98 degrees in men7). When feeling the bone with the tip of the needle, retreat 1–2 mm; aspirate to avoid an intra-arterial application and then delicately place the product, observing the opening of the nasolabial angle. This area does not need much digital modeling, but it requires compression to avoid ecchymosis.

Application in the columella: ingress from the base towards the nasal tip in the midline. The product is placed between the medial crus of each alar cartilage and the caudal septum (Figure 2).

Recommendations: This was used for cases with an easily depressible tip and a weak columella. The needle is inserted at an angle of 45 degrees to facilitate its application. The syringe is aspirated and the application of the product is delicately done in a retrograde direction, repeating the application as many times as necessary to achieve the result. The volume is large enough to provide support to the columella but not to leave it large and irregular. The objective is analogous to a columellar strut to sustain the tip. Modelling and digital compression for one minute are necessary, raising the nasal tip cranially.

Application in the tip: The ingress is straight up to the interdomal space (Figure 3). Recommendations: This is used for cases that are ill-defined, with a round tip and without projection. A straight needle is used to aspirate and delicately apply the material with low pressure in the retrograde direction. The color of the tissue is observed throughout the procedure, paying attention to any sign of ischemia (mottling, paleness, purplish coloration, reduction of temperature, or excessive redness). Immediate modeling and digital compression for one minute are necessary, providing shape and finesse to the tip, seeking to shape the product in such a way as to produce a triangular or diamond shape to the nasal tip.

Figure 1. Application in the nasal spine.

Figure 2. Application in the columella.

Figure 3. Application in the tip.
Application in the dorsum: the ingress is straight up to the supraperiosteal space of the nasal bone in the cranial direction (Figure 4).

Recommendations: This is used for cases with irregularities or depressions on the dorsum. Needle ingress is held at an angle of 30 degrees to aspirate and delicately apply the material, spreading the product symmetrically with the help of the other hand. Lifting the skin and pinching it helps to find the correct plane. Superficial application is avoided in order to not provoke the Tyndall effect in the skin, and scraping the needle in the periosteum is avoided to prevent pain or periosteal reaction. Immediate digital modeling and delicate compression for one minute are necessary.

After the application, skin-colored paper tape is placed over the nose in the shape of a usual rhinoplasty until the following day.

RESULTS

Forty-two patients seeking nasal filling and who met the selection criteria were evaluated; 2 patients were excluded (they did not return for the 14 day evaluation). One patient had signs of hypoperfusion when hyaluronic acid was applied in the nasal tip (skin pallor), so hyaluronidase was used, providing a satisfactory evaluation the next day. This was considered a complication, but it was not included in the analysis due to variations that it would cause in the evaluation of the results. A total of 39 patients were included in this study. Patient characteristics are summarized in Table 1.

Table 1. Patient Characteristics.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No. of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients included in the study.</td>
<td>39</td>
<td>100</td>
</tr>
<tr>
<td>Women</td>
<td>33</td>
<td>85</td>
</tr>
<tr>
<td>Men</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Age 20–40 years</td>
<td>30</td>
<td>77</td>
</tr>
<tr>
<td>Age 40–60 years</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>Rhinomodelation with HA</td>
<td>27</td>
<td>69</td>
</tr>
<tr>
<td>Rhinomodelation with CaHA</td>
<td>12</td>
<td>31</td>
</tr>
<tr>
<td>Complications with hypoperfusion (HA)</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

HA: Hyaluronic Acid; CaHa: Calcium Hydroxyapatite.

The results evaluated the following day and at 14 days are summarized in Table 2 and Figures 5–12.

Table 2. Results.

<table>
<thead>
<tr>
<th>Characteristics evaluated</th>
<th>HA (N: 27)</th>
<th>CaHA (N: 12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edema</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without edema</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mild edema</td>
<td>14 (52%)</td>
<td>4 (33%)</td>
</tr>
<tr>
<td>Moderate edema</td>
<td>13 (48%)</td>
<td>8 (67%)</td>
</tr>
<tr>
<td>Moderate edema</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without pain</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mild pain</td>
<td>20 (74%)</td>
<td>4 (33%)</td>
</tr>
<tr>
<td>Moderate pain</td>
<td>7 (26%)</td>
<td>6 (50%)</td>
</tr>
<tr>
<td>Intense pain</td>
<td>0</td>
<td>2 (17%)</td>
</tr>
<tr>
<td>Unbearable pain</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Degree of satisfaction (at 14 days)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very satisfied</td>
<td>4 (15%)</td>
<td>10 (84%)</td>
</tr>
<tr>
<td>Satisfied</td>
<td>20 (74%)</td>
<td>0</td>
</tr>
<tr>
<td>Not very satisfied</td>
<td>3 (11%)</td>
<td>2 (16%)</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Totally dissatisfied, would not recommend, and would not do it again</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reapplication of the product</td>
<td>24 (89%)</td>
<td>2 (17%)</td>
</tr>
</tbody>
</table>

HA: Hyaluronic Acid; CaHa: Calcium Hydroxyapatite.
Patients who were not very satisfied with the HA reported little change in the results. Patients who were not very satisfied with the CaHA reported discomfort due to edema and pain in the nose.

DISCUSSION

Discrete volumetric variations in the frontonasal angle, nasal dorsum, and nasolabial angle lead to significant differences in our perception of nasal esthetics.
Rhinomodelation or non-surgical rhinoplasty

With respect to rhinomodelation, several factors must be considered before choosing the product. Two of the most important characteristics of these products to be considered are elasticity (ability to resist deformation) and viscosity (ability to resist applied force preventing propagation) of the product. Therefore, a filler with high elasticity and viscosity provides greater support while using a smaller volume.

On the tissue application plane, we recommend the supraperiosteal use of CaHA and HA in the subcutaneous tissue or deep dermis of all other nasal areas that can be corrected, such as the dorsum, tip, columella, and nasolabial angle. Regarding the durability of the product, the literature shows a lifespan of 6–30 months in patients treated with CaHA. As for the use of other products as a complement, we recommend the use of botulinum toxin type A (12U) in all cases that present hyperactivity of the depressor muscle of the septum.

Although most researchers do not staunchly prefer one or the other, HA has become the most commonly used filler due to the safety offered by hyaluronidase, an enzyme that allows a certain degree of reversibility to the action of HA. In cases with signs of poor perfusion, the application of HA should be stopped, the area kneaded, and hyaluronidase injected (10 units per each 0.1 ml of HA injected). The use of antiplatelets, peripheral vasodilators, or hyperbaric oxygen can also be useful.

In our study, we found that HA led to a higher incidence of edema and mild pain, while CaHA led to a higher percentage of edema and moderate and intense pain on the day following the procedure. The necessity of reapplication in 2 weeks was less frequent with the use of the CaHA, which is in agreement with the literature. Both products presented a high degree of satisfaction with the esthetic results.

Some limitations of this study include the limited number of patients, the subjective evaluation by a single professional of the edema, the non-evaluation of the durability of each product, the short follow-up period (2 weeks), and the fact that possible differences between different brands of both products were not assessed.

CONCLUSIONS

Rhinomodelation with resorbable fillers is a simple procedure with acceptable esthetic results in selected cases, and a deep anatomical knowledge is necessary to decrease the risk of complications.

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HEB: Writing - Review & Editing
PSP: Final manuscript approval, Methodology, Writing - Original Draft Preparation, Writing - Review & Editing
ES: Analysis and/or data interpretation, Conception and design study, Data Curation, Final manuscript approval, Supervision

REFERENCES