The Medical RHINOPLASTY:

a simple and quite effective technique for remodelling nasal profile with BTxA and Hyaluronic Acid

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Introduction

Throughout life, from birth to death, the nose plays an essential role in olfactory function. And its importance in facial aesthetics is clear to everybody, patients and physicians, since it is a central organ related to all the other structures of the face. But what does the "beautiful and perfect" nose look like? Although it is not possible to bring nasal aesthetics back to a standard template,

as it often depends on small and various peculiarities (some noses are often definitely "interesting" in their imperfection), there is a concept of "harmony", which is universally accepted and allows us to offer our patients corrections on a scientific well codified basis.

The aging of the nose does not result in the appearance of wrinkles, but some small details change over time - the tip tends to fall, and skin and subcutaneous tissue, which are already very thin in this area of the body and especially on the bridge of the nose, become thinner. The naso-labial angle is reduced, while the distance between the nasal spine and upper lip increases.

The classical treatment of nasal deformities is surgery, of course, but the massive increase in minimally invasive medical treatments along with the advent of absolutely safe materials, allows the author to propose correction of the nasal profile with a completely medical technique combining injections of botulinum toxin and hyaluronic acid. So all those little postsurgical defects, which should require difficult reoperations, can sometimes easily be corrected with these techniques, but especially in the rejuvenation of an aging nose, we can have really perfect results.

History of rhinoplasty

First signs of surgical or medical interventions on the nose date back many centuries in Egypt, the Far East and ancient China.

After a long unknown period, with the Renaissance, beauty and aesthetics became important again and cosmetic surgery regained the importance it deserves, especially due to the work of some Italian families, including the Brancas, a Sicilian family coming from Catania, and the Tagliacozzis from Bologna.

Gaspare Tagliacozzi (born on March 2, 1545 in Bologna) was one of the first fathers of modern cosmetic & plastic surgery.[1]

His nasal reconstruction using flaps became world famous as "the Italian flap" and it is still known today. Then the barbaric practice of punishing criminals with nasal amputation allowed reconstructive techniques to develop greatly in an effort to correct these problems.

In the 18th century, the German surgeon Johann Friedrich Dieffenbach (1794-1847), studied a method of external incision to straighten a "flat or depressed nasal tip as well as to reduce a nasal appendix which is too pronounced".

Jacques Joseph (1865-1934) was the father of modern rhinoplasty *(Fig.1)*, with his first reductive rhinoplasty through a transcutaneous intervention, justifying the operation with the psychological impact of the nasal deformation.

The concept of interventions without scars, starts to mature. But the doctor who was the first to think about a medical correction of the nasal profile was Dr. Broeckaert, a Belgian who, in 1901, used the injection of cold and hot paraffin with a specific type of syringe *(Fig. 2)*, which allowed the material to become soft for the compression [2].

In recent years, at every congress, one hears about the medical correction of particular nasal deformities. This technique has become very safe, and also with the use of botulinum toxin [5, 13, 15] and hyaluronic acid [11, 13, 15, 20].

The anatomy

Knowing all the anatomical details is always very important before injecting any part of the face, but particularly the nasal area.

Here is a brief reminder of the anatomical details [3, 4, 14, 19, 20].

In *Fig. 3* it is possible to see the nasal cartilages and bones.
In *Fig. 4* we can see the nasal muscles that are:
1a: transversus nasalis,
1b: alar nasalis,
2a: procerus,
2b: corrugators,
2c: depressor supercilii,
3: inconstant fibers,
4: dilator narium,
5: compressor narium,
6: levator labii alaeque nasi,
7: depressor septi nasi,
8: orbicularis oris.

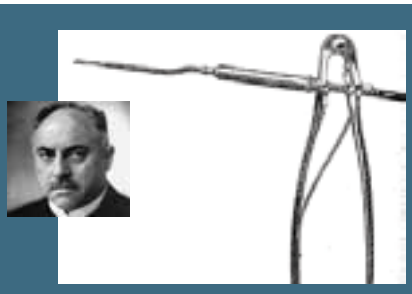

Fig. 1 & Fig. 2

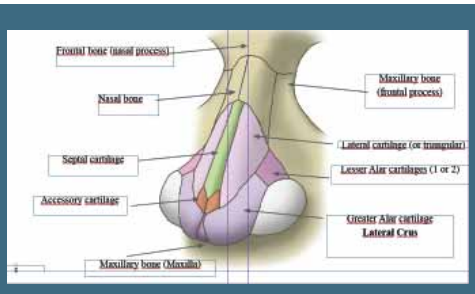

Fig. 3

Fig. 4

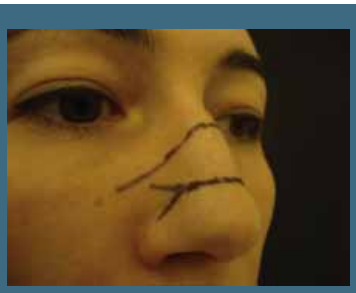

Fig. 5

Before every correction of the nose, we must know exactly all the nasal angles that will change a lot after the medical rhinoplast

Blood is supplied by terminal vessels from the internal (angular vessels) and external (lateral and columellar artery) carotid arteries.

Motor nerves derive from the facial nerve, while sensory nerves derive from the trigeminal nerve and its branches.

Finally, we have to emphasize that the skin and subcutaneous layer is thick and less adherent to the bones at the nasal root, while is they are thin and very adherent above the triangular cartilage and on the nasal tip and the lobules of the nose *(Fig 5)*.

Nasal aesthetic examination

Before every correction of the nose, we must know exactly all the nasal angles that will change a lot after the medical rhinoplasty:

- the naso-frontal angle: between 115° and 135°,
- the dorsal angle, normally straight,
- the naso-labial angle, between 90° and 110°.

Also the naso-facial and naso-mental angles are important to exactly understand the nasal tip projection and reference to appropriate text books should be made where necessary.

We must also determine whether the nasal tip drops down while speaking and smiling - in this case BTxA will be useful, otherwise it will not. So the dynamic examination of patients is of crucial importance in order to decide on the right strategy.

The technique

BTxA preparation and dilution

We use both Vistabex 50U (Allergan) and Azzalure 125U (Galderma), the two different types of botulinum toxins allowed in Italy for aesthetic indications. The "On Label" indication is for the treatment of wrinkles in the glabellar area. All other aesthetic indications are to be considered "Off Label", as is the treatment of the depressor septi nasi muscle.

The dilution of BTxA is of primary importance in order to reduce diffusion into nearby muscles [7, 8, 9, 11, 12, 17, 18, 19, 20]. In all cases, we inject BTxA with a 0,3 ml syringe for diabetes (30U for diabetes syringe) with a 30G needle.

Vistabex is always diluted with 1 ml of saline solution, so that 1 Vistabex Unit is in 0,02 ml. The dilution technique for Azzalure is rather different, since, in the author's opinion, reducing dilution reduces diffusion and so side effects, while the results obtained are excellent [19, 20].

The vial of Azzalure 125U is diluted with 0,25 ml of saline solution with adrenalin 1:100 000. To make this solution we dilute 0,1 ml of adrenalin (1mg/1ml) in 10 ml sodium chloride and we use 0,25 ml of this solution to dilute the vial. Following this, 5 Azzalure units are in 0,01 ml (1 step of the 0,3 ml syringe). The choice of injection points is based on the patient's situation. In the majority of patients, the author injects only the depressor septi nasi muscle bilaterally at the columella *(Fig. 6)* or at the nasal spine, but, if the superior lip and nasal wing levator and nasalis muscles aggravate the situation, we inject also the green points in *Fig. 7*, just laterally to the nasal wings, over the nasal spine *(yellow point in Fig. 7)*.

We inject from 2 to 2,5 Vistabex Units or from 10 to 15 Azzalure units per point. Remember that Azzalure is safe with our dilution. If it is more diluted, be aware that it can spread into nearby muscles. Prudence!!

Correction of the nasal profile with fillers

The fillers that we normally use are always resorbable, and in particular, we use hyaluronic acid fillers, which are strong and reticulated to provide stable long-term results [13, 14, 15, 19, 20].
We use:

- XHa3 and Volume (Filorga)
- Juvederm ultra 4 (Allergan)
- Teosyal (Teoxane)
- Restilane or Perlane (Q-Med)

We always avoid the use of non-resorbable materials and also restructurant materials (calcium-hydroxyapatite, PLLA and three-calcium-phosphate are never used).

The patient arrives in the office half an hour before treatment and signs an informed consent. A topical anaesthetic cream is administered at all injection points *(Fig. 8)*.
The amounts injected have to be adapted to each individual case, of course, but we can say that the amount for the nasal

root varies from 0,2 to 0,4 ml, for the nasal spine from 0,2 to 0,5 ml and also for the nasal tip the amounts can vary from 0,2 to 0,5 ml.

The technique is quite easy

Patients are always examined before treatment. In this particular patient *(Fig. 9 and 10)* it is possible to see a very diffuse defect to be corrected as the primary aesthetic indication.

It is mandatory to always examine all nasal angles, which must always be exactly calculated. *(Fig. 11)*

The injection at the nasal root must be done from rhinion to nasion, with a linear retrograde technique *(Fig. 12)*. We must not complete the correction with one injection, but the result is achieved with several injections, until the perfect result is achieved. When the injections are complete, a light compression is made with cotton wool to perfectly adjust the material over the bone *(Fig. 13)*. The results are visible immediately. *(Fig. 14)*.

The nasal spine is injected next *(Fig. 15)*. The injection is made directly and deeply in deep contact with the nasal spine of the maxillary bone to open the angle and also superficially to open the naso-labial angle, especially when it is reduced below 90°. In this case, this angle is opened (105°) and so we inject a very little quantity of filler, just to make the area a little fuller.

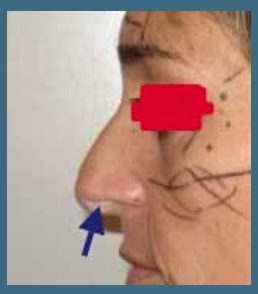
Fig. 6


Fig. 7


Fig. 8


Fig. 9

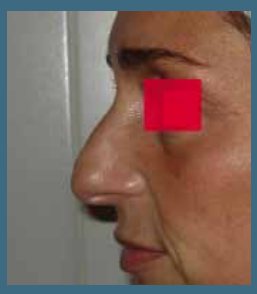
Fig. 10

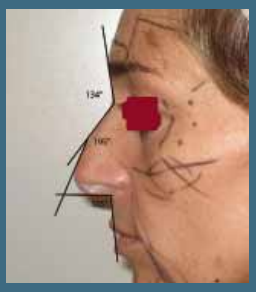
Fig. 11


Fig. 12


Fig. 13


Fig. 14

The rule of a very prudential approach, as always in aesthetic medicine, is absolutely important to remember as during any case.

Finally we inject the nasal tip *(Fig. 16)*. This injection must be made slowly, with a radial, retrograde technique. The skin over the alar cartilages is adherent and can suffer from a too high pressure of the injection. If it bleaches too much, it is imperative to stop the injection.
As shown in *figure 17 and 18*, it is possible to better redefine some areas, but the technique is finished and it is possible to see the results immediately.

At the end of the session, a camphor cream is spread over the injected skin and after 10 minutes the patient can return to their normal activities.

Results

Following BTxA injections, the result becomes evident after about 7 to15 days. The patient doesn't feel any strange sensation. The nasal tip, no longer restrained by the muscles, points more upwards. This result is very natural and normally only the patient is able to see it.

The result after filler correction is absolutely immediate, and can be seen immediately after the session. This result is also very natural, and even if really immediately visible, when the patient arrives home, it is usually not noticed by others until after the correction is pointed out by the patient. This is the goal!

Side effects

Pain on injection of the nasal spine and tip is the most unpleasant side effect. Topical anesthetic cream applied at least half an hour before injection is absolutely mandatory.
In our experience, normal side effects, such as swelling and bruising occur, but are usually mild and last for no longer than 12-24 hours.

Redness of the nasal tip was present in a single patient, after a second correction, and lasted for 1 month [20].

Nasal tip necrosis, after injection of nonresorbable materials has been described. No cases have occurred in our patients, but, in order to avoid this unpleasant side effect, it is mandatory to follow the rules described above and in the discussion session.

Discussion

It is very important to completely understand the indications for medical rhinoplasty in order to obtain good results. Surgical correction remains the gold standard in most patients.
First of all examination of the patient is of primary importance to understand nasal movements, and to assess whether or not to inject BTxA.

With respect to BTxA, we must emphasize that if we inject the depressor septi nasi muscle in the columellar area, risks are really absent and we can use high doses. When we have to inject also the lip and nasal wing levator and the nasal muscle, we must pay attention to the possibility that the naso-labial distance will lengthen, and also it is possible that the patient may feel strange sensations. To avoid these problems it is mandatory to remain very close to the nasal wings to avoid too much levator involvement (the upper lip and nasal wing levator and the lip levator). Be aware that injection of the "Quadratus muscle" of the upper lip (made by many authors by the upper lip and nasal wing levator, lip levator and

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Fig. 15


Fig. 16


Fig. 17


Fig. 18

zygomaticus minor) can lead to a palsy of the malar and lip area.

The rule of a very prudential approach, as always in aesthetic medicine, is absolutely important to remember as during any case.

With respect to the filler correction, we would want to emphasize some important aspects:

Examination of the patients, and particularly of the nasal angles, is of primary importance to understand where and how use fillers:

In order to obtain good results it is better when the nasal angles are reduced. To better explain, if we have a naso-frontal angle less than 115°, we know that we can improve it. If in another patient we find a very opened angle (over 135°), we will pay attention that it will be possible to obtain a "Greek nose", often not so pretty!

The same is true for the naso-labial angle: if it is under 90° we'll have good chance of success, with a good rotation of the nasal tip. We'll make an important injection in the nasal spine, deeply and superficially to increase the angle and allow rotation. If this angle is already opened (over 110°), we will pay attention to inject the nasal spine without opening the angle, injecting only deeply, and only when needed.

Injection of the nasal tip:

It is of particular importance to inject slowly, as previously mentioned, with a radial retrograde technique. If we see bleaching, it is mandatory to stop the injection. Necrosis of the skin of the nasal tip has been described, even if it has never been seen by the author, and is absolutely to be avoided.

Postsurgical indications:

There are a lot of postsurgical nasal defects that can be corrected with this technique. Particularly when the Sheen lines are destroyed, restoration with fillers can lead to a very natural final look, avoiding in the great majority of cases, many insurance and medico-legal problems.

All postsurgical patients, must sign a specific informed consent where the history is completely described, and where all possible side effects are discussed with patients.
As the author always says in all his practical courses, the patient must decide when and how to make a particular correction, taking all the responsibility him- or herself about this. The patient needs, of course, to be completely informed about any possible risk, about the material and all the particulars, to make a "well informed decision".
This aspect is of course valid for all patients.

Functional corrections:

Rarely, there are some patients who may, after surgical corrections, experience functional problems of collapse of lateral cartilage on the nasal septum during forced inspiration. This is a new, emerging indication for medical correction. The injection of a filler between the nasal septum and the triangular cartilage can help the patient to breathe much better and sometimes can completely eliminate the problem.

Conclusion

Medical rhinoplasty is a growing field of aesthetic medicine that every aesthetic doctor must completely know. It is very safe and easy. This technique will be very useful for many aesthetic problems of the nasal dorsum, and particularly for kyphotic noses.

The technique will be very useful also for plastic surgeons, as it will correct many postsurgical defects without requiring operation. It is safe and easy to manage, and also, in author's experience, after performing many corrections, is not associated with significant complications.

Finally the correction also of functional inspiratory disorders, can lead us into a new field. This may be particularly useful for aesthetic plastic surgeons who may find this problem after surgery, but probably also for ENT surgeons and doctors.

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