Injectable Filler Techniques for Facial Rejuvenation, Volumization, and Augmentation

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KEYWORDS

• Hyaluronic acid • Calcium hydroxylapatite • Augmentation • Injectable • Filler • Facial

KEY POINTS

- Fillers are selected based on the biophysical properties for the tissue depth and type of correction contemplated.
- Fillers can restore facial volume aging loss or change the shape of the face.
- A combination of injection techniques usually produces a more complete correction.
- Correction of all of the deficits in a given region produces a more complete and harmonious correction than treating isolated features.

INTRODUCTION

Injectable fillers have become a prominent part of modern facial rejuvenation with more than 1.9 million treatments a year in the United States.[1] This growing popularity has been fueled by the advent of multiple biocompatible and reasonably durable filler materials, most notably hyaluronic acid (HA) fillers, allowing a number of previously unmet needs to be addressed in a predictable and reproducible manner. Treatment of facial volume loss owing to aging is the most common application, correcting a variety of early and late changes. The immediacy, predictability, and safety of these no-downtime treatments make them the treatment of choice in most clinical circumstances. By adding volume or shape restoration of the aging face, in combination with energy-based treatments (lasers, radiofrequency, and others) for skin surface changes, such as wrinkles and pigmentary changes, and surgical lifting for skin laxity, a more complete correction of the aging face can be obtained.

GENERAL APPROACH

Detailed knowledge of facial anatomy, typical aging changes in the face, and aesthetic planning are essential to obtain artistic, balanced, natural-looking results. Filler injection is extremely technique dependent. Basically, a 3-dimensional latticework of injected material is being placed beneath the skin surface to add volume, change surface conformation, or thicken skin or subcutaneous tissues or fill a rhytid. All of these things are a form of sculpture, which result in a change in facial appearance. The degree of correction and the volume required for any given result is greatly dependent on the injection technique used. Likewise, pushing beyond the limits of what the treatments can reasonably produce is a sure recipe for unnatural looking results, or worse, tissue damage and complications. As benign as these treatments are in most cases, even after repetitive treatments, excessive volume or frequency of treatment is likely to result in trouble that is otherwise easily avoided.

Disclosures: Advisory Boards, Allergan, Merz.
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Facial Plast Surg Clin N Am 23 (2015) 479–488
http://dx.doi.org/10.1016/j.fsc.2015.07.004
1064-7406/15/$ – see front matter

There are many specific details to treating each anatomic area of the face. However, there are certain overall principles that apply in all these areas. First, no one filler is the correct choice for any application. Next, no one filler is going to be optimal for all the application areas in routine clinical practice. Each provider must select at least a small number of fillers to stock and needs to become facile at the specific feel and nuances of those fillers.

CHOICE OF FILLER

As stated, no one filler is the correct choice for any application. Like selecting a golf club for a particular shot, a few clubs may be workable in skillful hands. Clearly, some choices will not work in a given situation (eg, a very soft, spreadable filler will not create a sharp, sculpted shape in the cheeks). The starting place for filler selection in this author's hands relates to the anticipated depth of placement. Subcutaneous or supraperiosteal (but an exception is in the orbital area) fillers are generally heavier, which means higher viscosity and cohesivity. Fillers such as calcium hydroxylapatite (CaHa) and high-viscosity, high-cohesivity HA fall into this category. The original lower viscosity HA fillers work well in the deep dermal tissue plane or at the dermal/subcutaneous junction. Thinner fillers (which have lower viscosity and elastic modulus) such as monophasic, polydensified HA are suitable for middermal injection. The circumstances most appropriate for a given depth of injection are illustrated in detail in the specific anatomic application areas discussed elsewhere in this article.

At the time of this writing, the filler selection approved by the US Food and Drug Administration (FDA) for aesthetic use is a relatively short list. With the introduction of multiple new fillers to the marketplace, filler selection will necessarily change. Such selection is guided by the general principles discussed herein, clinical experience, and performance of the new product as determined by the community of clinical providers after several years of use and the filler alternatives available at that particular time. The techniques and selection presented herein represent this author's preferred or usual techniques, but certainly not the only or necessarily best option. Each physician must base clinical choices on what works best in his or her hands.

Although neocollagenesis secondary to a pressure phenomenon inducing collagen synthesis in fibroblasts has been demonstrated secondary to HA filler injection, the magnitude of collagen replacement attributable to this mechanism is unclear.[2] Nonetheless, recurrent treatment with HA fillers seems to provide longer intervals and reduced volumes after several treatments, suggesting that there is clinical significance to these findings.

It is not necessary to stock all HA fillers. Wide cross-applicability exists; however, this author believes that the fine features of each filler provide nuance to the correction that make them preferable for certain treatments. Other injectors might prefer a different filler.

CaHa particles stimulate neocollagenesis through an inflammatory-mediated mechanism that produces significant collagen to replace the gel carrier which absorbs over the first 3 to 4 months. This is a unique combination of time zero contour improvement followed by neocollagenesis. The filler also has mechanical properties that are unique, providing a high elastic modulus compared with other available products. The safety profile and tolerance of the material is excellent even after recurrent use of significant volumes.[3] Owing to the time zero correction, a close match between what you see during treatment and what you get in clinical correction—stiffer mechanical properties and greater longevity—this filler is well-suited where defined shapes or sculpting are needed.

This author has restricted clinical practice to using only biological fillers with FDA approval for an aesthetic facial indication. Nonbiological, nonabsorbable materials in soft tissue locations have had a troubled past. Owing to the permanent nature of many of these materials, the potential for late misadventure is concerning. Breakdown of the materials after protracted residence in the body is another issue that will only manifest many years after adoption of a new material. Concern regarding biofilm formation on such materials is also a factor. Given the appropriately low tolerance of providers and patients for complications with aesthetic treatments, the biological, absorbable options seem preferable, particularly given the increased filler volumes and treatment frequencies that are being used. Whether a nonbiological nonabsorbable filler that is biocompatible and safe over the long term will be developed in the near future remains to be seen.

Because the details of differences in cross-linking and physical structure between different HA fillers is discussed elsewhere in this volume, this article does not reiterate these facts, but summarizes by saying that these differences affect physical properties, which in turn affect the clinical performance of the fillers.[4] Clearly, as more fillers enter the marketplace, a careful understanding of multiple physical properties of the fillers is going