

Perspective

Skin boosters – The upcoming boom in cosmetic dermatology for healthy skin

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ABSTRACT

Skin-booster injections are popular esthetic treatments that are highly sought after because they are minimally invasive. They are used as one of the skin rejuvenation therapies to restore healthy hydrating skin of not only the face but also the neck, hands, and other regions of the body. Skin boosting is a revolutionary method of delivering either hyaluronic acid (HA) infused with other vitamins, amino acids, and antioxidants or HA *per se* to stimulate the body's natural response that is to make more collagen and elastin. Extrinsic and intrinsic factors affect the quality and vitality of our skin resulting in dull and not-so-esthetically appealing skin. Skin boosters are injected in the papillary dermis where they activate the fibroblast cells, which in turn promotes new collagen and elastin formation and reduces the activity of collagenase resulting in smooth glowing skin. There are multiple different techniques of injecting depending on the injector after clinical assessment of the patient. Skin boosters provide good hydration instant glow, reduce wrinkles and fine lines, and improve the texture of the skin. Skin boosters are different from fillers. Fillers act as a tool for sculpting by filling up the volume deficiencies, whereas skin boosters do not exert any mechanical effects, they only stimulate further collagen and elastin production through their biochemical properties. In comparison with various skin rejuvenation procedures and topical medications, the cost of skin boosters is higher; however, various factors determine the final price. Cost constraint is one of the major limiting factors for wide usage of skin booster. Amidst our multiple skincare routines, there is a growing need to seek new methods of maintaining healthy skin. The ultimate effects of skin boosters are skin hydration, rejuvenation, and healthy-looking young and vibrant skin.

Keywords: Skin boosters, Hyaluronic acid, Hydration, Skin rejuvenation

INTRODUCTION

The increasing popularity of procedures that address the quest for beautiful skin has led to a rise in different types of aesthetic treatments. One such technique is skin boosters. Skin-boosting treatments are booming because they are minimally invasive and relatively safe with minimal downtime. They act as a cutting-edge therapy for skin rejuvenation in restoring healthy luminous hydrating skin. The ability of the skin to glow depends on hydration levels and this hydration is perceptible by sight, touch, and biomechanics.

AGING

Skin aging is an intricate inevitable process affected by both genetic and extrinsic factors such as sun exposure, social habits such as smoking, alcohol, and unhealthy diet and lifestyle. They affect the quality and vitality of both facial and non-facial skin. The structural components of the

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dermis are collagen, elastin, and ground substance.^[1,2] The extracellular matrix and connective tissue are constituted by some endogenous polysaccharides and glycosaminoglycans, among them, hyaluronic acid (HA) is found in the highest concentrations in the dermis. Besides many functions, HA is hydrophilic and can bind water up to 1000 times its volume and this characteristic maintains skin hydration.^[3] As we age, the structure and volume of collagen, elastin, and glycosaminoglycans, decrease, and thus the skin loses its hydration. Collagen molecules also atrophy with aging [Figure 1].

ROLE OF SKIN BOOSTERS IN DERMATOLOGY

Although HA is naturally present in tissues, it can be synthesized by biological fermentation. Skin boosting is a revolutionary method of delivering either HA infused with other vitamins (A, C, and E), amino acids (arginine and glycine), and antioxidants (ascorbic, ferulic, and lipoic acids) and or HA *per se* to stimulate the body's natural response that is to make more collagen and elastin and promoting cellular metabolism and reducing oxidative damage.^[4,5] When injected in the papillary dermis, they activate the fibroblast cells, which in turn promotes new collagen, especially Type 1 and elastin formation, and reduces the activity of collagenase resulting in smooth glowing skin.^[6]

HA

HA which is used commonly in skin boosters is different from those in fillers because of its rheological properties. Unlike the HA in fillers, those present in skin boosters give only hydrating and mild lifting effects and do not contour or produce volumizing effects. To reduce the natural degradation of HA, by a neutralizing enzyme (hyaluronidases), there are chemical methods to introduce some cross-links between its chains to obtain a tridimensional network that is more stable and biologically compatible. The most used cross-linker is 1,4-butanediol diglycidyl ether (BDDE). The final product may differ from each other in the concentration of HA, presence or absence of cross-links, and additional additives due to different methods applied by each manufacturing



Figure 1: Changes in the skin with aging.

company, resulting in different products, with physical differences.^[7] Some of the commercially prepared ones do not contain cross-linked HA but can be combined with another polysaccharide (mannitol or glycerol) for attracting and retaining water molecules.^[6]

In common, all of them comprise small-size particles of HA, and they have the characteristic to produce skin hydration. Some of the commonly available skin boosters and their specifications are listed in [Table 1].

Respecting these rheological differences, the injection layer is also different for each product. Those without cross-links might be injected more superficially, in the dermis, resulting in small transient, visible papules. On the other hand, stabilized forms must be injected deeper [Table 1]. Most skin boosters come in prefilled disposable syringes with appropriate gauge sterilized needles, cannulas can also be used for injection especially while using stabilized HA. As non-stabilized HA must be placed at the superficial dermis, the only way to reach this level is with needles.

INDICATIONS OF BOOSTER INJECTIONS

- Premature aging – face/neck
- Lips
- Dehydrated skin
- Décolletage
- Dorsum of hands
- Post-radiation burns.

CLINICAL EFFECTS OF SKIN BOOSTERS

- Reduces wrinkles, fine lines, and pore size
- Improvement in the texture of the skin (smoother and firmer skin)
- Good hydration
- Instant glow.

DIFFERENT TYPES OF SKIN BOOSTERS AND THEIR TECHNIQUES OF INJECTION

A wide range of skin boosters are used in aesthetic practice such as Juvederm Volite, Restylane Vital, Restylane Vital light, Prophil, Rejuran healer, nucleofill, Vitaran skin booster, polydeoxyribonucleotide (PDRN)+EPICELL boosters, Teosyal meso, Mesolis, etc. and the commonly used ones are discussed in this article. A cross-linked injectable HA developed using VYCROSS technology (Juvéderm Volite), containing BDDE as a cross-linker improves skin quality after a single treatment, usually the results last for up to 9 months when given as two sessions 4 weeks apart. This skin booster is available in 1 mL prefilled syringe and is injected using a 32 G needle, intradermal injections are given as a micro bolus at an angle <45°, spaced at 0.5–1 cm

Table 1: Commonly available skin boosters and their specifications.

| Test material | Technology | Chemical cross-linker | HA concentration (mg mL ⁻¹) | Lidocaine (mg mL ⁻¹) | Additional additive |
|-----------------------|---|-----------------------|---|----------------------------------|---------------------|
| Juvéderm Volite | VYCROSS | BDDE | 12 | 3 | No |
| Restylane-Vital | NASHA | BDDE | 20 | 3 | No |
| Restylane-Vital light | NASHA | BDDE | 12 | 3 | No |
| Profilho | NAHYCO | - | 32 | No | No |
| PDRN | DNA fragments derived from the sperm cells of salmon trout or chum salmon | - | - | - | - |

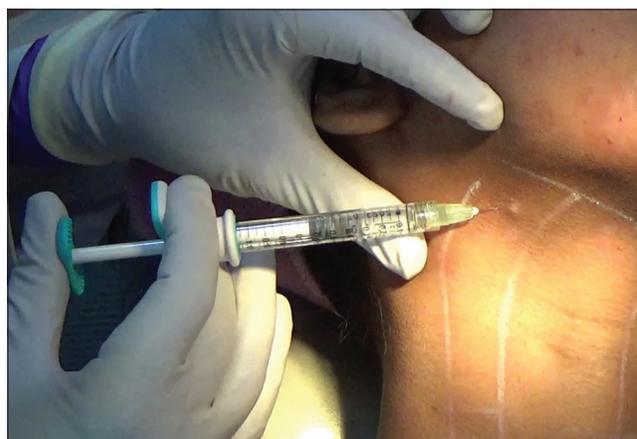
HA: Hyaluronic acid, BDDE: Butanediol diglycidyl ether, NASHA: Non-animal stabilized hyaluronic acid, PDRN: Polydeoxyribonucleotide, DNA: Deoxyribonucleic acid, NAHYCO: Sodium hyaluronic acid combination (NA-Sodium, HY-Hyaluronic acid, C0-combination)

apart about 0.05 mL per injection is given [Figure 2]. Linear threading technique can also be used in certain areas. It can be used for hydration of the face, lips, neck, and hands.

BDDE free thermally stabilized HA developed using a hybrid NAHYCO technology (PROFHILO), consists of a mix of both high molecular weight and low molecular weight HA which is injected into the skin in the superficial subcutaneous layer through bio-esthetic points injection technique on the face, neck [Figure 3], and hands [Figure 4] to improve the quality and texture of the skin. The concentration of HA is 3.2%, with 32 mg of high-HA and 32 mg of low-HA, in 2 mL of buffered sodium chloride physiologic solution. They come in a prefilled syringe of 2 mL. The product is administered as 0.2 mL bolus at each point using a 29-G needle in the deep dermis. In general, two sessions are recommended 1 month apart.^[8,9]

Non-animal stabilized HA (NASHA) (Restylane vital and Restylane vital light) are suitable for deep hydration and they give long-lasting and significant effects generally lasting up to 9–12 months [Table 2]. The syringe is equipped with a Smart Click System, for each 10 µL injected, a click is triggered, enabling the doctor to completely focus on the injection and attend to the patient while the product is evenly delivered. Injections are generally given 1 cm apart. Three treatments are recommended at an interval of 4 weeks and two treatments are repeated after 6 months. However, in everyday practice, the interval can be catered according to the patient's needs.^[10,11]

PDRN (Rejuran healer, Nucleofill, Vitaran skin booster, PDRN+EPICELL boosters) is a new skin booster that is derived from the sperm cells of salmon trout or chum salmon. PDRN is extracted and purified at high temperatures. This procedure allows for the recovery of more than 95% of pure active substances with inactivated peptides and proteins. The product is ideally safe because of the absence of any immunological effect. PDRNs are naturally occurring bricks that restore the skin from the inside, increasing collagen production. They act as bio stimulators and improve the skin's elasticity and hydration.^[12,13] The therapeutic effects of PDRN

**Figure 2:** Volite skin booster for neck rejuvenation.**Figure 3:** Profilho skin booster for neck rejuvenation.

include anti-inflammatory, anti-apoptotic, anti-oxidative, anti-melanogenetic, anti-osteoporotic, bone regenerative, wound healing, and scar preventive effects.^[13-15] Two to four sessions are needed, each session is performed at an interval of 30 days. The results usually last for 6–12 months.

In comparison with various skin rejuvenation procedures and topical medications, the cost of skin boosters is higher; however, various factors determine the final price. They include the type of skin booster, the area to be treated, the amount required to treat, the number of sessions, the expertise of the doctor, and follow-up.

Table 2: Product recommendations.

| Product | Restylane vital | Restylane vital light |
|------------------|---|--|
| Composition | 20 mg/mL stabilized HA with or without 0.3% lidocaine | 12 mg/mL HA with or without 0.3% lidocaine |
| Technology | NASHA | NASHA |
| Lifting capacity | Low | Very Low |
| Skin quality | Thick skin | Thin skin |
| Injection depth | Subcutaneous | Subcutaneous |

Product volume per site: Upper cheek and crow's feet – 0.5 mL/site. Upper cheek and chin – 0.5 mL/site. Peri oral lines – 0.25–0.5 mL in total, Hands – 0.5 mL/site. Décolletage – 1–2 mL/site. HA: Hyaluronic acid, NASHA: Non-animal stabilized HA

**Figure 4:** Profillilo skin booster for hand rejuvenation.

PRE-PROCEDURE

Patients need to be counseled in detail about the procedure and clinical outcomes and adverse effects before the procedure. A detailed history should be taken including medications such as blood thinners and previous history of fillers/skin boosters and other aesthetic treatments. Just before the procedure, the patient is asked to remove their makeup and wash their face gently with a mild cleanser. Pre-procedural photographs of the desired sites are taken. Topical anesthetic cream is applied for 45 min–1 h, then the area is cleaned with povidone-iodine (betadine) solution and alcohol swabs. Procedure is performed under strict aseptic precautions.

POST-PROCEDURE CARE

Photographs are taken at the end of the procedure. Antibiotic cream or arnica is applied over the injection sites, patient is advised to wash the treated area gently with a mild cleanser, preferably with drinking water (to prevent atypical mycobacterial infections). Massaging of the face should not be done and they are advised to apply topical antibiotics for 3-day post-procedure and drink plenty of water. Patients are advised to avoid makeup on the treated areas for the next 12 h, avoid physical strain for the first 2 days and avoid sauna, steam bath, and very cold temperatures for 2 weeks after the treatment. They must be instructed to use an appropriate moisturizer and sunscreen regularly. They should be called for a follow-up visit for secondary sessions whenever needed.

CONTRAINDICATIONS

- Hypersensitivity to one of the products in the cocktail or HA *per se*
- Pregnancy
- Lactation
- Active infection at the site of injection
- Bleeding disorders
- Porphyria
- Keloidal tendencies.

COMPLICATIONS AND THEIR MANAGEMENT

Complications with skin booster injections are not very common which is why they are the preferred treatments of skin rejuvenation. In general, mild-to-moderate injection-related pain is transient and tolerable. Topical anesthesia and or application of an ice pack before each injection is used to relieve this discomfort. Erythema and mild edema that develops post-procedure usually resolves within a couple of hours. If the procedure is not done under strict aseptic precautions, local infections can occur which can be treated by appropriate antibiotics. Bruising can be minimized by careful injection techniques and they usually resolve within a few days and arnica can be applied for faster resolution. Vascular occlusions are not common as small amounts are being injected per site of injection. Injections must be given at the correct depth, and if given very superficially they can result in lumps or small to medium-sized papules, especially while using products containing stabilized HA. They must be massaged immediately post-procedure and if they persist over a long duration, they must be treated with hyaluronidase. Whenever a non-stabilized HA is used, it is injected more superficially in the dermis. Some of the rare complications include granuloma formation and necrosis.

CONCLUSION

Advancements in aesthetic medicine always keep coming up claiming radiant skin but very few stand the test of time. Among those few, skin boosters give promising esthetic results. It is important to understand that skin boosters are different from other fillers. Fillers act as a tool for sculpting

by filling up the volume deficiencies whereas, skin boosters do not exert any mechanical effects, they only stimulate further collagen and elastin production through their biochemical properties and hydration. A wide range of products has expanded the ability to improve skin quality. Knowledge about these products and how to use them safely and effectively is important as these treatments have become very popular, especially in recent years. Each type of skin booster has peculiar benefits for different skin types. An experienced dermatologist is adept in choosing an appropriate skin booster according to the patient's needs. Skin boosters are often combined with other aesthetic procedures such as botulinum toxin, chemical peels, radiofrequency, intense pulse light, or fractional laser for better and longer-lasting effects. Combination treatments result in good aesthetic outcomes when compared to stand-alone treatments. In comparison with various skin rejuvenation procedures and topical medications, the cost of skin boosters is higher; however, various factors determine the final price. Cost constraint is one of the major limiting factors for wide usage of skin booster. The ultimate effects of skin booster are skin hydration, rejuvenation, and healthy-looking young and vibrant skin.

Declaration of patient consent

Patient's consent not required as patient's identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

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