

Dermal Fillers in Orthodontics

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Abstract:

Most of the signs of ageing can be related to volume loss. Dermal fillers are substances which can be injected beneath the skin, that helps restore the lost volume. They are gel like in consistency.¹ Patients seeking orthodontic therapy often also present with adjuvant soft tissue deformities. The soft tissue deformity caused by an underlying skeletal or dental deformity will be self-corrected by orthognathic and/or orthodontic treatment. The inherent soft tissue deformities like decreased lip length, increased or decreased lip thickness, inadequate vermillion show, can be addressed by injecting dermal fillers, Botulinum Toxin A and cosmetic surgical soft tissue procedures.

Key words: *Fillers, Dermal fillers, Botox, Orthodontics, Orthognathic surgery, Cosmetic surgery.*

1. INTRODUCTION:

An attractive person, is often successful as they are more likeable, easily accepted by their peers and are more social. The need to be accepted by their peers, or become the best version of one's self, pushes people to seek the help of doctors who can improve their facial aesthetics. As orthodontists, we play a major role in improving a patient's facial harmony. While we are happy with most of the treatment outcomes, still we do realise that orthodontic and / or orthognathic therapy, definitely has some shortcomings. If there are ways in which we can provide better aesthetic results to the patients, they need to be informed of this. Here is where cosmetic procedures come in handy.

2. THE AGING FACE:

Cosmetology became highly sought after with people's desire to look younger. As we age, the skin and tissues in the show signs of aging. The skin loses much of its vascular supply, there is muscle atrophy. Fat descent, collagen is lost and the end result is a sagging skin which is stretched and shows wrinkles on the surface. Various signs of aging are – thin, dry and wrinkled skin, loss of bone volume and facial fat, sagging skin, flattening of the eversion of lips, flattening of philtrum of lips, loss of chin contour, thinning of the lip vermillion etc.² One of the first fillers to be used was fat, harvested from the patient's own body, usually

the abdominal fat. Many oral and maxillofacial surgeons have reported using abdominal fats to restore the fat loss in the TMJ.

3. DERMAL FILLERS:

Fillers are basically substance which can provide volume to the skin that has lost most of its natural volume. The fillers can basically be 2 types – biodegradable and synthetic ones. The biodegradable ones are temporary and get resorbed by the body with time whereas the synthetic ones are more permanent ones which the body can't resorb. The dermal fillers are differentiated according to their source and their ability to produce antigenicity.³ The fillers should be retrievable in case the patient has an adverse reaction to it. If the patient is getting fillers for the first time it is advisable to get biodegradable ones so that the host's reaction can be observed. Unlike Botox, fillers should not be injected in the muscles.

4. HISTORY OF FILLERS:

The development of safe and biocompatible fillers was a result of years of research. The first ever used filler was Paraffin in 1863⁴, during the civil war. The complications of paraffin such as foreign body granuloma, lead to the use of Autologous fat as filler in 1923.⁵ Fat was used to treat diseases like lipodystrophy. In 1961, Liquid silicone was used for breast augmentation but it was banned by FDA⁶ In 1962 Polydimethylsiloxane (PDMS) was introduced. In 1981, Bovine collagen was the first to be FDA approved for cosmetic injection. In the year 2003, Hyaluronic acid which is even today one of the most popular⁷ dermal filler used, was approved by FDA as the first dermal filler. The most common trade names currently available widely across India is Restylane (Galderma), Juvederm and Perlane which are non-animal derived HA.

5. INDICATIONS OF DERMAL FILLERS:

Generally dermal fillers are used for correction of moderate to severe static lines for temporary soft tissue augmentation⁸. There are a few FDA approved indications for the use of fillers. Namely, correction of nasolabial folds often referred to as the 'Smile lines', cheek acne scars, restoration and correction of facial fat loss in people with human immunodeficiency virus (HIV), lip and cheek augmentation, correction of contour deficiencies, increase the volume of the dorsum of the hand. Patients may need more than one injection to get the desirable effect.

On the contrary, FDA has denied approval for the use of dermal filler in breast augmentation, to increase the size of the buttocks, fullness of the feet, to implant into bone, tendon, ligament or muscle.

6. CLASSIFICATION OF FILLERS:

Dermal fillers are divided based on three factors: material properties, biodegradability and duration of the effect of fillers.¹³

Material properties-

1. Autologous: when the material is taken from the same individual's body
2. Heterologous: when the material is taken from different species.
3. Alloplastic: when non-biological materials are used such as plastic, metal, ceramic.

Biodegradability-

- Biodegradable: products that are able to break down into non-harmful substances.
- Non-biodegradable: products that cannot be changed into a natural phase.

Duration of the effect-

- Temporary: the effect is visible for less than 6 months.
- Long lasting: the effect is visible for 6 to 24 months.
- Semipermanent: the effect is visible from 2 to 5 years.
- Permanent: the effect that does not fade with time.

4. INJECTION PLANES:

Dermal fillers should be ideally injected into the fat area. The fat area acts as a natural filler, hence the fatty area are suitable sites for injection. The facial fat is distributed into two planes, namely, superficial fat and deep fat. The superficial plane lies just beneath the skin, whereas the deep plane lies underneath the muscle layer. Results vary depending upon the plane of injection. Injecting into the superficial layer requires a small amount of filler to show visible results since there are only lesser layers to elevate. Whereas, injecting into the deep plane requires a larger amount of filler for visible results on the face. Fillers should be deposited in the correct plane to achieve the apt results hence the injector should take the right plane into consideration.

Injecting into the superficial fat should be at a depth of 3mm and the effect of filler last longer and the amount of filler to deposited is less. A needle or cannula can used to inject in all regions and concentrated results are seen. When injecting into the deep plane the depth is at the level of bone and the effect of filler last for a shorter period of time. Similar to the superficial plane , a needle and canula can be used. It can be injected into the tear trough region and diffuse results are seen.

5. INJECTION TECHNIQUES:

Linear threading technique – the full length of the needle is inserted into the tissues and slowly drawn backwards so the threads of filler are deposited along the fold or wrinkle⁹.

Serial puncture technique – multiple injections are placed serially close together along the length of fold so the it forms into a continuous pattern⁹.

Fanning technique – at the periphery of the area to be treated the needle is inserted and injected along the line and the direction of the needle is changed and injected along a new line⁹.

Cross hatching technique – at the periphery of the area to be treated the needle is inserted using linear threading. Then it is withdrawn and inserted 5-10mm adjacent to the initial injection site and repeated the same way. And this can be repeated at right angles to the original lines⁹.

Tower technique – the filler is deposited with a perpendicular approach to the deep plane with gradual taper of product deposition. This technique is commonly used in lateral brows, nasolabial folds, marionette lines ,mental region¹⁰.

Intraoral technique – the volume augmentation site is identified by the intersection of the line that runs from the tragus to the alar cartilage of the nose and the other line from the outer cantus of the eye to the labial commissure. The material is deposited at the upper outer quadrant of the crossing lines.¹²

6. FILLERS AND ORTHODONTICS:

Some mild asymmetry in the lips, may not be corrected by orthodontic or orthognathic treatment alone. It may require the use of fillers to make the lower border or the vermilion border on both side symmetrical.¹³ It can also be used to augment the mild deficiencies in the skeletal component that impacts the soft tissue drape over it. For example a mild asymmetry in the angle of the jaw due to the difference in the ramal height, can be enhanced by dermal fillers. To augment the chin, for people who are not interested in a genioplasty, they can be given an option of fillers. Though not a permanent solution, it is still possible to achieve similar effects. For patients who have gummy smile, the use of Botulinum Toxin A can be used to paralyse the upper lip elevators, so that the show of gums on smile is reduced.¹⁴

7. CONCLUSION:

With the recent advancements in the field of cosmetology, it is vital for clinicians to be aware of the various other options they can provide for their patients.

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