aesthetic medicine

Original Article

Lip augmentation with a new generation of liquid implant: Agarose-gel

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Abstract

Dermal filler that is used in the lip area must be locally stable and have a low particularly potential for side effects. In addition to the previously established substances, stands a new alternative to choose from agarose gel, especially for their biocompatibility scores.

In Aesthetic Medicine, in addition to the body's own substances, such as autologous fat augmentation, are found a variety of dermal fillers for this use. The requirements for such fillers in general extend to the effectiveness, volume, elasticity and the safety profile of the fillers or liquid implants, such as the local resistance and a low side effect profile. Specially interesting are non-permanent fillers, that are stimulating by the fibroblast, that act for a volume-replacement. For the best results, are important, besides anatomical knowledge of the face, the physiology process of aging, and the suitable filler for the intervention. In tissue augmentation lies a central aspect in the three dimensionality of the face, thereby it is an advantage over the often two- dimensional surgical treatment. As we age, our skin loses the ability to preserve moisture, resulting in the visible loss of firmness, pliability, and plumpness. Augmentation means a restoration of the lost volume (age related misplaced skin) in sense of a three-dimensional tissue repositioning.

Keywords

Agarose gel, dermal filler, lip augmentation, lip restoration

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Introduction

Lips are one of the most injected areas on the human body. Hyaluronic acid (HA) is a golden standard mostly used for this procedure[1]. The main aspects in the treatment of lips are comfort (for both the practitioner and for the patient) and a long-lasting effect. In addition, it is necessary to use safe substances with regard to their compatibility and local resistance[2,3,4].
Based of the proven safety of Agarose gel it has been a factor in its increased use. Only rarely are complications reported. Agarose is in principle not a completely new material in medicine. It has been used in the dental field for more than a decade[5]. The substance class is a neutral polysaccharide, it is completely biocompatible and thus degradable[5].
The aim of this article is to show agarose gel as at least an equivalent to those for treatment of the lips.
The following overview describes the possibilities of this treatment method.

Lip augmentation

In the lower part of the face are the lips as a focal point, especially in the foreground of the interest. Lip augmentation is a cosmetic procedure that can give you fuller, plumper lips. These days, an injectable dermal filler is the most commonly used method of lip augmentation. There are many types of dermal filler that can be injected into your lips and around the mouth. But the most common fillers today are products that contain hyaluronic acid. The goal of an ideal injection is to make, improve the appearance of lips by adding shape, structure, volume, but also a natural softness too, without causing a change in movement or in facial expression. The best suited filler for the lip area is on one hand locally resistant, that means the injected substance remains in the addressed region and does not migrate in around tissue[6]. Other unwanted effects are also possible, such as pain, swelling and bruising, lip asymmetry, allergic reaction causing redness or itching around the lips. For this reason, the knowledge of the diversity of different materials and techniques in aesthetic medicine in cases of lip augmentation, is essential to increases the quality of treatment and for the patient satisfaction. A prerequisite for this process is a good cooperation between patient and doctor, and which techniques or products are best to be used. As a new alternative to the previous substances a new filler is now available: Agarose-gel.

One hundred percent natural

The agarose gel is available on the market fulfilling the expectations and requirements of the most demanding practitioners. Agarose is a polysaccharide from D-galactose and 3,6-anhydro-L- galactose, which are glycosidically linked[5,7]. It puts the main component on the agarose. As it is made up of 100% natural polysaccharides, it is complete biologically compatible and also degradable[8,9]. It contains for example no cross-linked synthetic chemicals BDDE (1,4-butanediol diglyceridyl ether). The gel is sterile, very viscous and elastic, and clear and transparent. Due to the isotonic property of the gel, this filler is almost painless when injected. It is locally stable and it has very few side effects. There is also an immediate result achievable without expected downtime. The increase in volume is directly visible because no hydrophilic volume process has to be waited for. The human organism has no specific enzyme, to break down agarose. Compared to hyaluronic acid, which is degraded by hyaluronidase, agarose degradation is made slowly by macrophages, before it finally takes place in the pentose cycle, and it is eliminated in the endoplasmic reticulum. Thereby agarose is a long lasting aesthetic effect expected to last[10-12].

Proven and compatible

Agarose has been the substance of choice in various studies regarding its biocompatibility and no cytotoxic and genotoxic properties. Due to its biocompatible character agarose gel has been around for over 10 years already in frequent use in the field of dental medicine and in oral surgery. It is described to be a soft tissue augmentation for the perioral region. The occurrence of complications is extremely rare. Another benefit of this new filler is the replacement of lost subcutaneous fat and remodeling of the upper and lower lip contours. Subcutaneous filler is able to achieve a youthful and natural look by filling-out lines around the mouth, the nasolabial fold as well as chin augmentation (*Figure 1*). Patients are trending to natural and biocompatible dermal fillers for a safe and effective solution to anti-aging[13-17].

Figure 1 *- Left before Injection. Right immediately after injection with 0.5 ml agarose gel 1,5% Lips.*

Application

Patients with acute or chronic skin pathologies or direct involvement in or around the lips to be treated were excluded. Pregnancy, lactation and hyaluronic acid treatment less than 3 months earlier were also excluded criteria. In total 11 patients were treated. The patients were between 19 and 38 years old. All patients were female. Nobody had had a treatment with permanent fillers before. Five patients had previously had an injection with hyaluronic acid in the lips (*Tables 1 and 2*).

Treatment area	Initial treatment		Touch-up		Initial and Touch-up in total	
	N	Mean (mL)	N	Mean (mL)	N	Mean (mL)
Overall	11	0.66	6	0.2	11	0.77
Upper lip	9	0.5	3	0.2	9	0.57
Lower lip	5	0.3	1	0.2	5	0.34
Oral commissure	3	0.3	1	0.2	3	0.37
Perioral line	3	0.1	1	0.1	3	0.12

Table 1 *- Injection Volume by treatment area.*

Treatment areas	Initial Treatment (N=11) % (n/N)
Upper lips	- 81,8% (9/11)
- Vermillion border	- 81,8% (9/11)
- Body of the lip	- 63,6% (7/11)
Lower lips	- 45,5% (5/11)
- Vermillion border	- 45,5% (5/11)
- Body of the lip	- 36,4% (4/11)
Oral commissures	- 27,3% (3/11)
Perioral lines	- 27,3% (3/11)
Treatment techniques	
Tunneling	- 100% (11/11)
- Retrograde	- 90,9% (10/11)
- Anterograde	- 9,1% (1/11)
Serial puncture	- 27,3% (3/11)
Fanning	- 45,5% (5/11)
Crosshatching	- 27,3% (3/11)

Table 2 *- Treatment areas and techniques.*

It is recommended to use before treatment a local disinfection and also to apply anesthetic cream to the injection site to numb the area. In some cases, there is also the need to consider a local injection with anesthetic (lip block). The treatment should be as painless as possible for the clients. For this, besides a topical anesthesia, also the application of a very thin cannula is recommended. Agarose itself is an almost painless injectable because of its isotonic properties, as mentioned above. Only in the expansion in the tissue does a burning symptom come. Therefore, the agarose gel can be mixed with a local anesthetic, such as Lidocaine. Due to the viscosity of the material generally it is possible to use the 30 gauge cannula for the lips. The reduction of hematomas and swelling is avoided largely by the direct compression and cooling, for example with cool packs, for a few minutes after the injection. This minimizes and closes the bleeding. Patients should avoid for about half an hour hot drinks (Coffee and Tea) due to lip anesthesia.

A direct reintegration into social life is easily possible due to the fast convalescence. For example, the treatment can also take place during lunch breaks or before important events (Weddings), and patients can return to work or participate in events after the treatment on the same day. According to the principle "What you see is what you get" the result is visible immediately after the injection as well the final result (*Figure 2*).

Figure 2 *- Above before Injection. Below immediately after injection with 0.7 ml agarose gel 1,5% Lips.*

An additional benefit is the use for patients who have been previously demonstrated intolerance, incompatibility to hyaluronic acid or other ingredients. The only adverse events described were hematoma, redness, bruising and swelling. All adverse events lasted for a maximum of 7 days. The sense of satisfaction by the patients were evaluated with the use of a subjective analog scale from 1 to 10. The mean score of satisfaction of cosmetic result was 7-10 immediately after treatment, and the score decreased after some months (*Table 3*). The results lasted 5 months with a gradual decline to baseline. The injected Agarose gel was very well tolerated with only a few mild adverse reactions which resolved spontaneously after a few days only. No major complications (e.g. infectious processes, palpable implants, nodularitiy, overcorrection, allergies) were observed.

Immediately after treatment	7-10
1 month	7-9
2 months	6-8
4 months	3-5
6 months	1-2

Table 3 *- Score of satisfaction of patients.*

Conclusion

Agarose gel is a safe, low-risk, easily applicable therapy option for practitioner and provides a particularly good alternative method for augmentation area of the lips. The application of agarose
shows through clinical studies and analysis a high safety. This innovative filler is characterized by local stability and good compatibility. Because of its biocompatible character, it does not matter what material was used previously in the injection area. As this remedy is 100% natural and very viscous substance, patients will achieve a high degree of satisfaction, as their facial expressions remain very natural and harmonious even when they move. Thus, a realistic satisfaction of the patient expectation can be achieved, with an excellent cosmetic effect. In addition, agarose has a very fast convalescent period and subsequent changes in shape do not come after the injection. In summary, treatment with agarose has many benefits. Thanks to its properties, this filler represents an important and successful option in the modern aesthetic medicine. Agarose Gel is available in four different strengths for very soft, moderate, mild and fairly deep wrinkles.

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