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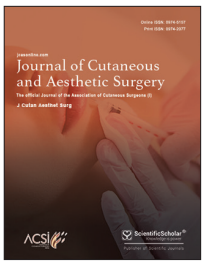
Journal of Cutaneous and Aesthetic Surgery

Article in Press



Innovations

Surgical Innovation: Ultrasound gel – A dermal filler training tool for young injectors

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Received: 04 September 2024
Accepted: 17 December 2024
Epub Ahead of Print: 15 February 2025
Published:

DOI
10.25259/JCAS_67_2024

Video available online at
https://doi.org/10.25259/JCAS_67_2024

Quick Response Code:

ABSTRACT

Dermal fillers have gained increased popularity as a nonsurgical esthetic procedure over the past few years. The learning curve in injectables is very steep and needs a lot of practice. Young injectors get trained in dermal filler injection techniques at various workshops through observation courses or through cadaveric studies. However, due to the high cost of the filler injections, it has been very difficult for young trainees to afford hands-on injectable training courses. We describe an alternative to the expensive hyaluronic acid fillers as a training tool for young injectors.

Keywords: Fillers, Injectable procedures, Dermal filler simulator, Ultrasound gel, Cadaver training

PROBLEM STATEMENT

Dermal fillers have gained increased popularity as a non-surgical esthetic procedure over the past few years. As injectables became popular, the number of cases with serious injection-related complications such as skin necrosis and blindness has also increased.[1] Clinical anatomic knowledge and technical skills are necessary to avoid such complications.

The art of injection has a steeping learning curve. It involves knowing how the syringe feels in the hand, the plane of injection, the resistance while injecting and how the filler flows. This is critical to avoid side effects while performing a procedure. Young injectors face financial barriers in obtaining adequate hands-on training with expensive hyaluronic acid fillers. Traditional methods include observation courses and cadaver studies, but these can be costly and inaccessible to many. Fear is another crucial roadblock for any young injector to perform the procedure confidently and to eliminate it, one has to have adequate training in order to develop good muscle memory.

RECOMMENDED SOLUTION

We describe an alternative to the expensive hyaluronic acid fillers as a training tool for young injectors during cadaver workshops. Ultrasound gel is a commercially and easily available product in the market. Most standard ultrasound gels are composed of water and propylene glycol.[2] Few of them even contain hyaluronic acid.[3] The ultrasound gel's[4] viscoelastic properties are similar to the "soft" hyaluronic acid fillers [Table 1].[5]

To provide filler simulator experience for trainees, the ultrasound gel is loaded into a 1 mL syringe connected to a 3 way cannula. 2 units of Eosin or Methylene-blue dye is taken in another

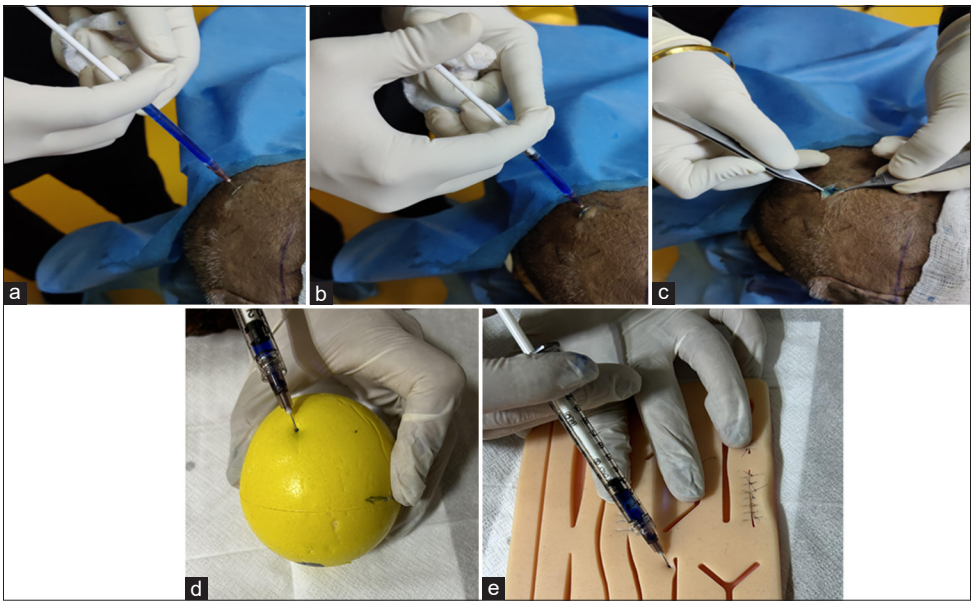
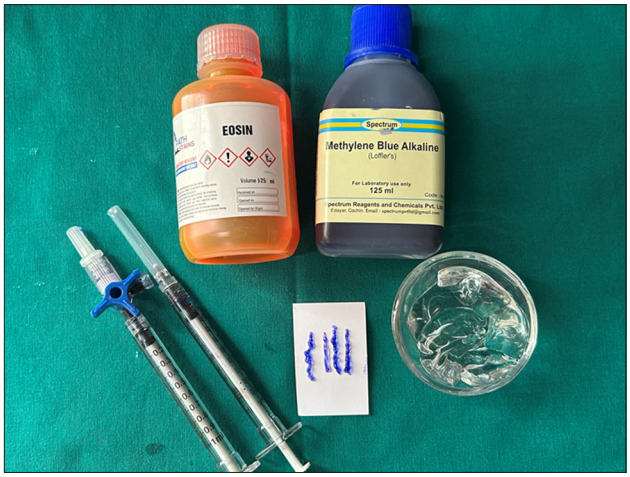


Figure 1: (a) Ultrasound gel-based filler mixed with methylene blue dye. (b) Methylene blue-infused ultrasound gel-based filler injected in the cadaver. (c) Dissection after injection with the color showing the plane of injection. (d) Methylene blue-infused ultrasound gel-based filler injected in the stress ball. (e) Methylene blue-infused ultrasound gel-based filler injected in the surgical suture pad.

Table 1: G^2 values of filler injection and commercially available ultrasound gel (USG) gel.

Restylane Fynesse	Commercially available USG
10 Pa	14.6Pa



Video 1: Demonstration of stained ultrasound gel preparation as an alternative to fillers.

1 mL syringe and connected to the 3 way cannula. The dye and ultrasound gel is mixed and taken into a 1 mL syringe. When this stained mixture [Video 1] flows out of the needle or cannula during injection, it is viscous in nature and the resistance offered is comparable to the hyaluronic acid filler [Figure 1]. This method can be tested using a 1 mL syringe with dye and a 2 mL syringe with gel to simulate the experience of pushing gel from a 2 mL syringe.

Another useful way one can use this tool is to practice these ultrasound gel-based fillers on inanimate objects such as fruits, foam-based stress balls, and Silicone suture pads. This approach enables trainees in mastering the skill of injection, enhancing muscle memory and helps them gain extensive hands-on experience from the comfort of their own homes.

Ultrasound gel provides the trainee a first-hand feel of the filler and can be a cost-effective training tool for young injectors.

Authors' contributions: Conceptualization: Dr. Aniketh Venkataram; Study design: Dr. Aniketh Venkataram and Dr. Sukhbir singh; Data collection: Dr. Pooja Kanumuru, Dr. Venkataram Mysore, Dr. Aniketh Venkataram, Dr. Sukhbir singh; Manuscript preparation: Dr. Pooja Kanumuru, and Dr. Venkataram Mysore.

Ethical approval: Institutional Review Board approval is not required.
Declaration of patient consent: Patient's consent was not required as there are no patients in this study.
Financial support and sponsorship: Nil.
Conflicts of interest: There are no conflicts of interest.
Use of artificial intelligence (AI)-assisted technology for manuscript preparation: The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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How to cite this article: Kanumuru P, Venkataram A, Singh S, Mysore VN. Surgical Innovation: Ultrasound gel – A dermal filler training tool for young injectors. J Cutan Aesthet Surg. doi: 10.25259/JCAS_67_2024