



## Two New Phenomena Associated With Filler Injection

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Facial ultrasound imaging provides insights into “live” anatomy, enabling increased quality of care in filler treatment.<sup>1,2</sup> With respect to the filler injection treatment itself, remarkable phenomena have been observed that may influence the way in which fillers are injected.

In the past year, we became aware of 2 such phenomena observed during facial ultrasound in B-mode. One of the most stunning observations is that of “retrograde flow” while injecting filler. Van Loghem et al were the first to notice this behavior in their research on cadavers.<sup>3</sup> DeLorenzi speculated on the phenomenon in relation to vascular adverse events after filler injection.<sup>4</sup> As expected, during the injection process the filler material spreads through regions of least resistance. Unexpectedly, but quite logically, many times this is only along the shaft of the needle or cannula. Hence, instead of producing a bolus at a particular location, the tunnel that is created by the cannula or needle becomes filled with filler. This event is particularly obvious with hyaluronic acid fillers (Figure 1). Examples of this phenomenon in vivo are displayed in the Video. Studies are needed to clarify the frequency, locations, types of filler material (in particular its  $G'$  value), and the types of needles/cannulas resulting in this phenomenon. And ideas should be formed how to overcome this phenomenon or use it to our advantage. Although relevant research is scarce, we tend to believe that the phenomenon might be less obvious in needles as opposed to cannulas. This makes sense because cannulas generally have a larger diameter than the needles used for the same indication. Moreover, cannulas when being moved forward follow existing areas of least resistance, making them wider and more accessible to the filler substance. Therefore one method to diminish the



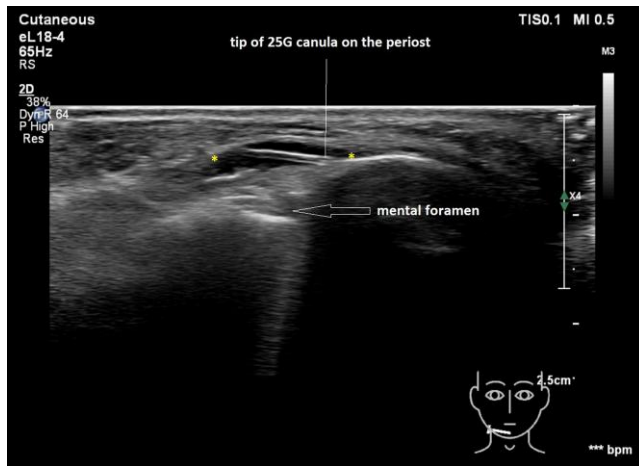
**Video.** Watch now at <http://academic.oup.com/asj/article-lookup/doi/10.1093/asj/sjac271>

phenomenon might be the use of needles instead of cannulas. In areas such as the malar region, where a sausage-shaped volume of filler material might be a preferred outcome, the phenomenon could be helpful and the use of a large-circumference cannula might be warranted. The

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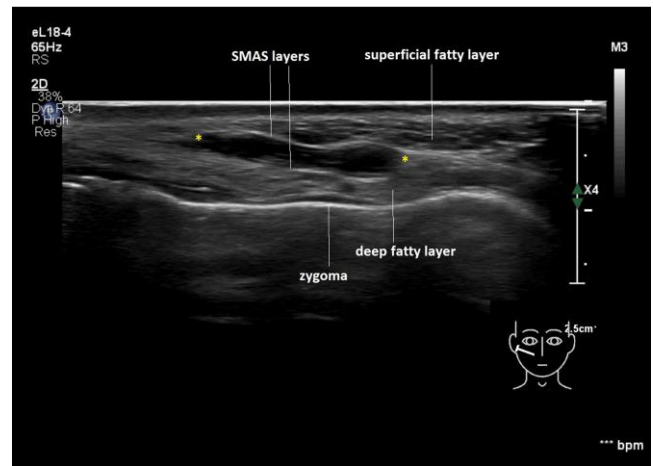


**Figure 1.** Retrograde flow on the right chin. Immediately after injection of hyaluronic acid filler, the material is situated (= anechoic mass between markers) around the shaft of the 25G cannula (= more or less straight hyperechoic line).

same might be the case in areas such as cheeks where cross-hatching is the standard method of filler application.

Another important phenomenon is the accidental delivery of filler material above the superficial musculoaponeurotic system (SMAS) when injecting with a cannula. When using a cannula to introduce filler material to deeper layers such as the periosteum or deep fat pads, initially the skin is pierced with a needle. After that, the physician inserts a cannula and drives it downwards until bone is felt. However, if the SMAS is thick, the cannula does not pierce the SMAS and, although bone is felt, a pocket of filler material will be dropped off above the SMAS or between the fascial layers of the SMAS (Figure 2). This process will lead to filler material unintentionally being placed too superficially, exerting a different effect than intended. Future studies need to confirm our observations and provide clinical guidance of how best to increase patient safety. One possibility might be to pierce with the entrance needle deeper and puncture through the SMAS as well. Because finding the initial needle entrance through the skin is sometimes difficult, a thicker needle might be necessary to open skin and the SMAS at the same time. In addition, pushing skin and subcutaneous tissue together while applying the initial needle opening to diminish the distance might help. But further research should be performed to elucidate the best way to resolve the problem described. Alternatively, opting to use needles instead of cannulas will probably overcome the problem.

Facial ultrasound imaging has already been instrumental in increasing filler safety and outcomes. We hope that the brief outline provided here will inspire colleagues around the world and guide their investigative efforts to ultimately



**Figure 2.** Right zygoma area. Hyaluronic acid filler (= anechoic longitudinal mass between markers) placed between two fascial layers of the SMAS. SMAS, superficial musculoaponeurotic system.

increase patient safety and obtain individualized and reproducible outcomes.

### Supplemental Material

This article contains [supplemental material](http://www.aestheticsurgeryjournal.com) located online at [www.aestheticsurgeryjournal.com](http://www.aestheticsurgeryjournal.com).

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