One of the most fulfilling aspects of being a dermatologist is the daily opportunity to tangibly help patients by improving upon what they can see. This opportunity is enhanced within the subspecialty of cosmetic dermatology, where visual harmony is all. It is usually more challenging to restore that harmony through the correction of suboptimal results from an injectable treatment than it is to perform treatment de novo. However, I find this corrective work immensely satisfying, by dint of its being the ultimate distillation of the injector’s art—and also because it provides substantial improvement in quality of life for the patient. The anticipation of the easy fix is especially alluring, as in the case presented below.

Case Presentation
A 57-year-old white woman from California presented complaining of persistent bruising on her left cheek which had appeared the day after the area was injected with a large particle non-animal stabilized hyaluronic acid (NASHA) filler (Perlane, Medicis). She had discussed her concern by telephone with the injector and had been advised that the bruising would resolve with time. She stated that she felt very unhappy about the outcome of her filler injections and that it was impairing her social life. She reported extensive sun exposure throughout her lifetime and was a non-smoker. She was not taking anticoagulants, non-steroidal anti-inflammatory drugs (NSAIDs) or other medications that might predispose her to extensive or prolonged ecchymosis. At my first consultation with this patient one month after the filler injections there was focal elevation, induration, and patchy bluish discoloration of an area on her left lower cheek surrounding rhytidosis of superficial and moderate depth. She had Fitzpatrick Type I skin with rhytidosis at rest.

Treatment
The area of discoloration on this patient’s left cheek was injected with ovine hyaluronidase (Vitrase, ISTA Pharmaceuticals): 0.375ml of a stock solution of Vitrase (200 USP units/ml) was diluted with 1.5ml of 1% lidocaine with epinephrine. A total of 0.5cc diluted Vitrase was injected into the epidermis and superficial dermis within the area of skin discoloration and elevation, 0.1cc being injected via a 30G needle at each of five sites.

At follow-up 14 days later the skin discoloration, elevation, and induration had resolved completely. The patient reported that she was completely satisfied with the results and no longer felt socially embarrassed. She subsequently received injections of small and large particle NASHA filler (Restylane and Perlane, Medicis) and botulinum toxin A (Botox, Allergan) for nonsurgical facial lifting and improvement of her rhytidosis. The large particle NASHA was injected into the nasolabial folds, the vermilion lips, the perioral frames, and the midface. The small particle NASHA was injected alone into the rhytides on the cheeks, into the periorbital frame, the vermilion borders, and the philtral columns, and layered over the large particle NASHA in the nasolabial folds.

Discussion
This patient’s skin discoloration, associated with induration and elevation of the injected area, was consistent with placement of NASHA filler too superficially. NASHA fillers are transparent and may be particulate gels (e.g. Perlane and Restylane) or nonparticulate and thus non-gels from a scientific point of view (e.g. Juvéderm and Juvéderm Ultra Plus, Allergan). Large particle NASHA (Perlane) is FDA approved for implantation into the deep dermis to superficial subcutis for the correction of moderate to severe facial folds and wrinkles, such as nasolabial folds. Perlane is my mainstay for lifting, contouring and global volumization of the face and for correction of moderate to deep rhytidosis. I implant Perlane into the deep dermis, the subcutis, and also supraperiosteally where appropriate to optimize the extent and longevity of aesthetic improvement, such as in the superior midface and prejowl regions. Small particle NASHA (Restylane) and nonparti-
ticulate NASHA (Juvéderm Ultra and Juvéderm Ultra Plus) are indicated for mid to deep dermal implantation. I inject Restylane alone for correction of superficial and moderate facial rhytido-
sis and for volume restoration to the periorbital frame, and I layer Restylane over Perlane to fine-tune facial volume restoration, lifting and contouring. Based on this treatment paradigm, Restylane implanted into the mid to deep dermis would have been a more appropriate first-line choice than Perlane for correction of the superficial and moderately deep rhytidosis of this patient’s cheeks.

A NASHA filler that has been inappropriately implanted into the epidermis or superficial dermis may cause light beams that penetrate the skin surface to be dispersed in many different directions—a physical process known as light scattering. The intensity of the scattered light is proportional to the fourth power of the frequency of the light waves. Blue light has a shorter wavelength (400nm) and thus a higher frequency than red light, which has a wavelength of about 700nm. Therefore, the superficially implanted filler material scatters blue light about ten times more strongly than red light. This scattered blue light then traces a visible path back to the skin surface. The resultant bluish appearance of the skin is an example of the Tyndall effect, the phenomenon by which an invisible beam of light becomes visible when it passes through non-homogeneous material, in this case, a zone of skin containing boluses of filler. The Tyndall effect is also the reason that the sky appears blue although it is, in reality, colorless; again, this is due to stronger scattering of blue light than red light. The sun appears red at sunrise and sunset because there is more scattering of blue light away from an observer’s eyes when the sun is low in the sky. The Tyndall effect is more accurately described as Rayleigh scattering, since the phenomenon was discovered and elucidated mathematically by the nineteenth-century English scientist and Nobel Laureate, Lord Rayleigh.

In my experience, based on patients who have consulted me for correction of suboptimal results following filler injections, the bluish skin discolaration that occurs after implantation of NASHA filler too superficially may persist for months to years unless corrective measures are taken. In contrast, ecchymosis following injection of a NASHA filler tends to resolve in one to two weeks, unless the patient is taking anticoagulants, NSAIDs or other medications that prolong the extent and duration of ecchymosis. The quality and pattern of this patient’s skin discolaration and the associated skin elevation and induration were consistent with the presence of filler material within the epidermis and/or the superficial dermis, rather than with prolonged ecchymosis. The strategy employed for correction of this problem was to remove the misplaced large particle NASHA filler from the left cheek via enzymatic digestion with hyaluronidase and to replace it during a subsequent treatment session with appropriately placed small particle NASHA. I prefer to dilute hyaluronidase with lidocaine with epinephrine for reasons of patient comfort and to reduce the rate of localized
skin hypersensitivity, which was reported in one study to occur in 25 percent of patients receiving injections of undiluted hyaluronidase. As an alternative to hyaluronidase injection, NASHA filler that has been injected into very superficially into the epidermis may be simply extruded after puncture of the skin with a 26-gauge needle.

I believe that follow up of patients two to four weeks after injection of dermal fillers or botulinum toxin is essential in order to optimize results. This is even more important when the patient reports a complication. In this case, the patient expressed her concerns by telephone to the injector but she was not advised to return to the office for follow up. Had she followed up, it might have been apparent at that time that her skin discoloration was due to misplacement of filler rather than to persistent bruising as she believed, and appropriate action could have been taken to resolve the problem.

Filler injections may result in aesthetically undesirable outcomes or in other adverse effects if inappropriate injectables are selected or if inappropriate injection techniques are used. In this case, Perlane, an FDA approved, large particle NASHA filler, was injected too superficially into the cheek. I prefer to use NASHA fillers for facial volume replacement because they have a proven track record of safety and can be injected via small gauge needles with slow, controlled technique to minimize tissue trauma.

Additionally, NASHA fillers possess the significant advantage that they have excellent longevity after injection, particularly when full volume correction is achieved, yet they are reversible within a few days through the injection of hyaluronidase to enzymatically digest them. This affords the clinician a safety level and a comfort zone that are not present with other types of dermal filler which are irreversible and therefore not correctable when misplaced, except through passage of time.

Dr. Sundaram has served as an Advisor, Clinical Investigator, Consultant, Speaker and/or Trainer for Medicis Pharmaceutical Corp. and ColBar Life Science Ltd. and has performed media work for Allergan, Inc. She has no stocks, shares or other financial interests in these or any other pharmaceutical or medical device companies.