Commentary on: Superficial Enhanced Fluid Fat Injection (SEFFI) to Correct Volume Defects and Skin Aging of the Face and Periocular Region

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I find the authors’ historical view of clinical fat grafting mistaken, including their use of “micro” as definitive nomenclature, as well as their claim that the harvesting of fat with small side-hole cannulas (without further processing) is somehow novel. Coleman, as they indicate, indeed popularized modern fat grafting, by codifying a reproducible clinical technique that placed fat in a structural way—from deep to superficial—throughout the face with blunt needles, stressing the distribution of small fat parcels widely within a nutritive substrate. Equally important, he assured the survival of what many saw as another fad movement within plastic surgery through the presentation of impressive, long-term clinical results. He also developed and made available an instrument to support the new clinical activity. Early on, I, along with others (Dr F Benslimane, personal communication, 2001), had trouble with the large Coleman injection needles within the delicate suborbital zone. I responded by substituting a cumbersome but effective deep dermal–fat graft for a time, but eventually discovered an existing ophthalmologic McIntyre blunt, inner cannula: designed to irrigate the canaliculus, its delicate shaft fits easily within the Coleman injection needles and it has a blunt end and minute side hole, as I reported in 2001. Since its first use in 1999, I have had no visible irregularities within this challenging region. Soon after, I was introduced to a micro-infusion cannula with multiple small side-holes (also pre-existing and entirely similar to the authors’ much later harvesters) by one of the manufacturers, which facilitated the harvest of smaller fat parcels for what I now called “micro” fat grafting to contrast with “macro” grafting by the original Coleman needles, which I continued to use only in the vein-rich environment of the dorsum of the hand. Virtually all manufacturers of fat-grafting equipment have long since turned for most of their fat grafting needs. Improvements were subsequently brought to the micro-harvesting cannula by Tonnard (Dr PL Tonnard, personal communication to Tulip Medical, 1995) and Sorenson (J. Sorenson, personal communication to Tulip Medical, 2012), and others, providing a more rapid and efficient harvest that, nevertheless, continued to pass readily through the smaller needles. The authors’ insistence on contrasting their cannulas and needles with the 20-year-old original instrumentation of Coleman, therefore, presents an anachronistic and inappropriate comparison that ignores current usage.

In fact, many years ago Coleman shared with me his recent adoption of disposable sharp needles for challenging irregularities around the mobile oral commissure, as well as for skin creases and acne scars. I embraced what I came to call “sharp” fat grafting, adding it to my standard blunt micro grafting during facelifts and blepharoplasties, and recognizing it as an important addition to conventional fat grafting in my lectures and teaching courses. Coleman subsequently published the technique in 2009 in his second textbook as “intradermal placement.” While he reported the use of 22-gauge disposable needles, I came to prefer 23-gauge needles, so long as I harvested with the original, small-holed (and now long-retired) micro-infusion cannula from a decade-and-a-half before (which I have asked the manufacturer to re-issue for just this purpose). Two years later, Zeltzer, Tonnard, and Verpaele, as the authors cite, published their version of the technique (which they called

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SNIF), complete with impressive clinical results. I have found such sharp injection vastly superior to my prior approach to problem depressions and creases by blunt micro-needle placement with “subcision.” Thus, I now, along with an increasing number of fat-grafting colleagues, add to my routine micro fat preparation an additional 8–10 cc’s of smaller sharp fat parcels for commissure depressions, glabellar lines, lip white rolls, smokers’ lines, acne scars, etc. Suffice it to say that the fat grafting of today has evolved into an essential tool of modern facial rejuvenation … one that is safe, effective, and straightforward, with low risk of complications (such as the “unpredictable fat survival” and “visible lumps” of the past that the authors continue to emphasize in their introduction).

It is within this historical context of current, state-of-the-art clinical fat grafting that the authors’ bold recommendations arrive. In an irony of timing, they propose that fat grafting be limited entirely to the most superficial plane of the face, only months after others have proposed (in this same journal) that it be limited to the deepest. In my first reading, I was struck by three things: the unorthodoxy—even heresy—of their recommended techniques (effectively standing on their heads many of the accepted principles of Coleman); the lower complication rate, especially for visible superficial irregularities, than many might have predicted; and the overall good clinical results. I concur with the authors in respect to the second of these, as my eight-year personal experience with sharp fat grafting also suggests a degree of protection against irregularities in the superficial plane (for reasons that elude me). But another key aspect of the authors’ technique that will surely raise concern is their reliance upon sharp needles for injection. In this regard, it must be acknowledged that the statistics within their cited articles on fat embolization and blindness are likely subject to the “cockroach rule,” wherein for every insect that is seen, there are many more that go unseen. Coleman (who is consulted in many of these tragedies) says as much when he observes that most such cases are settled out of court and never come to the attention of the authors throughout an admitted subdermal plane, by contrast, do not, and have to remain concerning. In any case, their limited experience with but 98 cases (plus a series from an earlier paper) cannot rise to the level of a “favorable safety profile,” as they claim.

On a separate note, I consider fat preparation relatively unimportant to the overall success of clinical fat grafting (reflecting a wide variance in practice among experts worldwide), and will not discuss the authors’ preferences, except to point out my agreement with their conclusions (within their revised text) that the various “fat preparation technologies” they cite remain inappropriate for clinical use at this time and that “the role of platelet-rich plasma (PRP) enhancement to (their technique) remain(s) speculative.” I simply do not believe that PRP plays the vital role in their technique that they otherwise assume. I have used this additive for a decade-and-a-half in all of my facelifts as the major component of “platelet gel” (my preferred tissue sealant, which I consider essential to my lifting technique). Because of its ready availability to me, therefore, I have also added it to my fat grafts (in the same 1:10 proportion of the authors’ report) during the past 12 years … less as an essential than because “it can’t hurt.” My degree of conviction in its biological contribution to clinical fat grafting is reflected in the disconnect between my routines for the main operating room (in which the preparatory equipment resides and all full facelifts are performed), where it is added to all grafts, and the office operating room, where it is only occasionally added to the smaller grafts placed there under local anesthesia. Beyond the questionable matter of its biologic contribution to fat grafting, I also find the argument that it mechanically facilitates the proper passage and distribution of fat grafts to be weak. For eight years I have injected sharp
fat (harvested with cannulas very similar to the authors’ and through needles identical to theirs), both with and without PRP, and have found no difference in the delivery. If the authors persist in their belief that a more “fluid” graft is advantageous (a belief I do not share), any diluant such as normal saline would likely function as well.

I will skip other, less compelling, basic science components of their paper to focus on the clinical aspects, especially the techniques they recommend and the results they generate. I accept, incidentally, their priority claim for broader volumetric or architectural effects from superficial fat grafting alone. However, when parties set out to revolutionize an existing world order, they must expect some push-back; mine will come in the form of a detailed analysis, by anatomic region, of the key clinical data they put forward to support their cataclysm—specifically their six selected clinical cases. I will then attempt to counter their claims for technical and clinical superiority with similar visual data of my own, which—unlike theirs—will avoid the obfuscations brought by simultaneous eyelid surgery. Their cases present overall good results (perhaps deceptively so for some), suggesting a solid validation of their philosophies and techniques...a corroboration that does not, however, hold up well to case-by-case analysis. The first case (the authors’ Figure 5, fat grafting of the suborbit alone) shows, in their words, “adequate improvement” ...a good but not excellent result. The second (the authors’ Figure 6: upper-and-lower lid fat grafting and secondary blepharoplasties, with brow lift) shows an excellent periorbital outcome, with worthwhile improvements to the nasolabial folds, lower face, and lower lip. The third case (the authors’ Figure 7: two-stage upper- and lower-lid fat grafting and blepharoplasties, including lower-lid fat transposition, combined with brow lift) shows a very good periorbital outcome with improvements to the nasolabial folds and lower face, as well as an excellent correction of a complication. Case four (the authors’ Figure 8: upper- and lower-lid fat grafting and blepharoplasties, including lower-lid fat transposition, again combined with brow lift) shows a very good periorbital outcome with noteworthy improvements to forehead rhytids, nasolabial folds, and challenging bitterness (oral commissure) folds. Case five (the authors’ Figure 9: upper-and-lower lid fat grafting with brow lift) shows only a fair to good periorbital outcome overall, but with excellent improvements to forehead and facial rhytids, as well as lower facial contours. Case six (the authors’ Figure 10: upper-and-lower lid fat grafting and upper blepharoplasty, with brow lift, as well as extensive facial fat grafting) shows impressive improvement to superficial facial rhytids (but not nasolabial or marionette lines), with worthwhile enhancement of facial architecture; the periorbital changes, however, remain only fair, with limited volumetric improvement to the suborbital zone and an elevated brow position over an emptier-appearing upper orbit. My discussion of their techniques (and these attendant results) will focus on three anatomic regions: the upper orbit, the suborbit, and the overall face.

With respect to the first, the authors’ Figure 5 case presents no upper-orbital fat grafting, and while the authors’ Figure 8 case does, its upper-orbital changes are dominated almost entirely by the dramatic effects of blepharoplasty and brow lift, with little evident contribution from fat augmentation (see the authors’ Figure 8C). In the remaining four cases (where fat grafting can be adequately assessed), only the authors’ Figure 6 case rises to the level of a good (in this case, excellent) outcome, while the remaining three do not. In the authors’ Figure 7 case, the left upper-orbital space (Figure 7B) shows no volumetric improvement over the preoperative situation (Figure 7A); it is not until upper blepharoplasty has been added at a second stage (Figure 7C) that the result becomes good, although still under-corrected nasally. The authors’ Figure 9 case, which allows us to assess the authors’ efforts without upper blepharoplasty, shows a good improvement to the right upper-orbital space, but only a fair one to the left, leaving the final outcome significantly asymmetric. The authors’ Figure 10 case, with its elevated brow position, expanded orbital frame, and considerable pretarsal skin display, still leaves an upper-orbital space that presents an empty quality. Only one outcome better than fair among four cases, then, hardly inspires confidence in the authors’ superficial grafting approach to the upper orbit. In contrast to the authors, I have long considered centro-nasal upper-orbital aging a reflection more of bony than soft-tissue loss (as later confirmed by Kahn and Shaw in 2008). My strategic, long-term response has, therefore, been the deep placement of centro-nasal grafts (limited to 2 cc’s in a single application), strictly against bone. The experience of a decade-and-a-half of such deep, structural grafting to this zone has brought me a number of insights, some of them unexpected: the benefits of such deep grafting (combined with measured suspension of the temporal brow and conservative laser resurfacing) have allowed the elimination of upper blepharoplasty from the overwhelming majority of my rejuvenation patients (Figure 1). Also, such limited, deep structural grafting predictably lowers the elevated liddrop of an empty upper-orbital space, whether from an iatrogenic, post-blepharoplasty etiology (Figure 2) or a spontaneous, aging one (Figures 3-5). But it typically does something more when it lowers the elevated nasal brow position that frequently (and also spontaneously) accompanies suchemptying, returning it (by unknown mechanisms) toward an earlier level enjoyed in youth (Figures 3-5). Such nasal brow elevation as a frequent component of spontaneous upper-orbital emptying remains widely unrecognized, perhaps especially by those who, like the authors, prefer an elevated nasal brow position for their patients (the authors’ Figures 9–10). Such deep placement of fat also brings
frequent (but not invariable) improvement to upper-lid level malposition—whether it be too high (as in non-thyroid-related lid retraction: Figure 4) or too low (as in clinical or sub-clinical ptosis: Figure 5). These interesting, if mysterious, responses (along with that of the nasal brow) remain outside the scope of this discussion, but—whatever the cause—cannot be expected to follow fat grafting in a superficial plane.

**Figure 1.** (A) Preoperative photograph of a 58-year-old woman. (B) Nine months after deep structural fat grafting to upper-orbital space (1.5 cc per side), hitch of temporal brow, and conservative laser resurfacing of lids without upper-lid surgery. Included are structural fat grafting to suborbital zones, malar mounds, and lips, with facelift and lower blepharoplasty. Note the improved upper-lid relationships without direct surgery and compare with the early appearance. (C) Early candid photograph of the patient in her 20s.

**Figure 2.** (A) Photograph of a 53-year-old woman following inexpert upper blepharoplasty, upper lip augmentation, and facelifts. (B) Fifteen months (after second of two stages) following deep structural fat grafting to upper-orbital space (1.5 cc per side + 1.3 cc per side = total 2.8 cc per side) without upper- or lower-lid surgery. Included are structural fat grafting to lower face and lower lip, with reduction of upper lip. Note improved upper-lid relationships with 2.8 cc fat added and compare with early appearance. (C) Early candid photograph of the patient in her 30s.
Within the suborbital zone, the efficacy of the authors’ technique again fails to hold up to analysis. It is true that three of the six cases show very good to excellent results in this region, but each of these outcomes enjoyed additional eyelid maneuvers that significantly impacted lower-lid contour and appearance: the cases in the authors’ Figures 7 and 8 underwent lower-lid fat transfer, a technique that many proponents feel precludes entirely the need for further augmentation, while the authors’ Figure 6 case underwent skin-excision lower-lid blepharoplasty that likely accounts for the far greater component of its improvement.

In the three remaining cases where fat grafting can be independently evaluated, the story is different; while the authors’ Figure 5 case presents a good outcome, those in the authors’ Figures 9–10 do not. The Figure 9 case presents the purest opportunity for assessing lower-lid fat grafting, but shows only limited volume correction, especially on the left side. The same can be said of the Figure 10 case, particularly on the right (compare especially oblique Figures 10E and F). In neither of these is the volumetric repair robust (especially when compared to typical outcomes following structural fat grafting). Again, only one
good result among three is hardly validatory. In contrast to the authors’ superficial approach, I perform restoration of the nearly universal suborbital deficiency by deep and intermediate structural fat grafting, this time at higher fat volumes (typically 5–7 cc). I reserve superficial placements for the camouflage of iatrogenic deformities following inexpert fat grafting and for the improvement of color concerns. Here, again, a long history of structural grafting has brought me valued benefits. For example, I now reduce herniated, orbital fat bags in only 5% of all my rejuvenation patients, preferring to camouflage them instead by deep and intermediate structural grafting to the trough-like deficiency below them (Figure 6). And I also now limit lower blepharoplasty to 20% of aging lower lids (those with particular descent and redundancy of their orbicularis). Such deep and intermediate structural grafting alone may also support and improve a number of minor aging and iatrogenic lower-lid malpositions, such as outer bowing and scleral show (so long as they remain free of any component of lid retraction; Figures 4 and 7). Again, there can be little expectation that these benefits would attend the authors’ techniques.

But, on the other hand, the two benefits that I routinely expect from more superficial suborbital fat grafting would likely be enhanced using the authors’ techniques: the camouflage of iatrogenic tubes and other superficial deformities following inexpert fat grafting (which I have lately confirmed), and the improvement of dyschromias, especially those reflecting orbicularis (or its capillary-bed) color through susceptible skins (which I have not confirmed).

With respect to the latter, improved skin color may also follow widely-accepted stem-cell–mediated benefits of fat grafting, as well.

In turning to the face itself, a striking aspect of the authors’ recommendations remains their high average injection volume of more than 50 cc. I should disclose here that I limit fat grafting of the face proper to only 25% of my facelift patients (who typically receive less than 5 cc of such facial fat to the malar region alone). Because my facelift focuses on re-suspension of the subcutaneous tissues of the forward-most, paramedian face, I rely instead on soft-tissue shift (or redistribution) to eliminate jowl contour and enhance sub-malar presence. In the same spirit, instead of grafting multiple rhytids and irregularities of the facial integument, I rely predominantly upon the rhytidectomy, or the skin-redraping effects of facelift, for such improvements. It is here, in the aging superficial skin deformities and irregularities of the face especially, but also to a lesser degree in aging contour or architectural shifts, that the authors’ techniques show their greatest strength. And while traditional structural fat grafting performs better with respect to the latter (architectural) concerns (see such improvements to the lower face in Figures 2–3), it most certainly does not with respect to the former. Their four cases among six that received facial fat broadly (the authors’ Figures 7–10) all show improvements to such deformities that are remarkable. Treated entities range from fine transverse forehead rhytids (the authors’ Figures 8–10), to redundant skin creases of the older aging cheek (Figure 10), to the challenging commissure depression or “bitterness fold” (Figure 8C), to overall skin quality. With respect to the last of these, there is no need to invoke unproven effects of PRP here when the afore-mentioned stem-cell–mediated benefits of clinical fat grafting suffice, especially where fat is positioned superficially. Incidentally, my future pursuit of such sharp changes will continue to be confined to 23-gauge (as opposed to 20-gauge) needle placements.

But here there also lurks a dark side, reflective of the large average volumes the authors employ. It is not certain that all would rate the older patient in the authors’ Figure 10 “rejuvenated”; some might see her, instead, as merely different … with a larger face. Said again, while many patients would embrace such change (especially when freed from the burdens of facelift), some others decidedly would not. Also, those of us who try to help the

Figure 5. (A) A 33-year-old woman with apparent ptosis and elevated nasal brow position. (B) Nine-and-a-half years (after second of two stages) following deep structural fat grafting to upper-orbital space (2.0 cc per side + 0.5 cc per right side only = total 2.5 cc right side/2.0 cc left side) without upper- or lower-lid surgery; included is structural fat grafting to suborbital spaces. Note higher upper-lid level and lower nasal brow position—without surgery—a decade later.
challenging patients who consider themselves “over-grafted” often recognize, when they present some years after treatment, that despite the youthful fullness provided by the procedure a component of premature aging and descent has also set in, most evident around the telling areas of the mouth and jawline. That these patients have received traditional structural fat grafting throughout the facial planes, with a likely emphasis on deep over superficial placements, must raise special concern for such development in those patients receiving heavy deposits limited to the most superficial and least supported plane of the face. A cautionary tale in this regard concerns a male

Figure 6. (A) Preoperative photograph of a 55-year-old woman. (B) Eighteen months after deep and intermediate structural fat grafting to suborbital zones (6 cc per side), hitch of temporal brows, and conservative laser resurfacing of lids without upper- or lower-lid surgery; included are structural fat grafting to upper-orbital spaces, lips, and malar mounds, with facelift. Note nonsurgical camouflage of lower-lid fat bags and compare with early appearance. (C) Early candid photograph of the patient in her 20s (note early suborbital aging).

Figure 7. (A) A 53-year-old woman following lower blepharoplasty and facelift, with lower-lid outer bowing. (B) Three-and-a-half years after deep and intermediate structural fat grafting to suborbital zones (6 cc per side), hitch of temporal brows, and conservative laser resurfacing of lids without upper- or lower-lid surgery; included are structural fat grafting to upper-orbital spaces, lips, and malar mounds, with facelift. Note non-surgical camouflage of lower-lid fat bags and compare with early appearance; note similar support to lower lid in Figure 5. (C) Early candid photograph of the patient in her 30s.
patient in his early 30s I saw early in my fat grafting experience, some few years after he had undergone multiple sessions of superficial fat grafting for extensive acne scarring. While acknowledging improvement to his complexion, he remained inconsolable over what he saw as the premature aging of his jowled face, with an appearance more of late middle age than youth. Gravity works against mass (in this case, added mass), and when that mass is positioned far out along the radial vector of the face (at the level of the skin), its force can be expected to gain further mechanical advantage over the elements that support the skin against aging descent. The authors’ mean follow-up is but six months, whereas such gravity-induced changes require some years. They address this concern indirectly when they recommend a “[l]arger series with longer follow-up … to rule out potential long-term complications related to superficial placement of fat.” That this may be more than a speculative concern may be appreciated in comparing the authors’ Figure 10A and B: after correcting for differences in horizontal head tilt, there appears a remaining descent of the right oral commissure only one brief year after extensive superficial fat grafting (commissure descent is typically asymmetric, with a right-sided dominance, as also seen in the authors’ Figure 8A). If this pejorative descent continues over the ensuing year (which I predict it will), the only likely explanation is the procedure itself.

I applaud the authors for their intrepid paper that flies in the face of world opinion and usage (as I also applaud their candor in presenting one complication among their six cases). While I remain less impressed by what their recommended techniques bring to the challenging orbital zone (especially when compared with what I expect from traditional structural fat grafting), I remain positive about what they deliver to the rest of the face. And I am confident these techniques will contribute meaningfully to our growing body of knowledge surrounding clinical fat grafting, although perhaps not precisely as the authors intended. Do I expect experienced practitioners of fat grafting to now abandon their structural approach for a purely superficial one? Of course not … no more than I would expect them to for a purely deep one. But I do expect those skilled clinicians who have not yet begun sharp fat grafting in the superficial plane to now begin, as I also expect those who already have begun to now expand their use of this powerful tool, as I have and will continue to. One has only to contemplate the disappointed patient left with a specific skin irregularity despite overall improvements brought by rhytidectomy as but one obvious indication for this intervention. But there will be some, I predict, who will embrace the authors’ approach in its entirety, especially those for whom the established approach has not worked well, for whatever reason (and here I include that subset of clinicians who continue to suffer the “unpredictable fat survival” and “visible lumps” the authors complain of); plastic surgery has always presented a richness of choices in our quest to skin the cat. Also, there will be many within allied fields who do not (or cannot) perform facelift, for whom this approach will likely hold special appeal.

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REFERENCES