Commentary on: SMAS Fusion Zones Determine the Subfascial and Subcutaneous Anatomy of the Human Face: Fascial Spaces, Fat Compartments, and Models of Facial Aging

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Dr Pessa’s current article is a well written and beautifully illustrated cadaver study that should be of significant interest to those performing sub-SMAS facelift surgery and/or facial volume augmentation.1 He has extended the findings of Kikkawa et al2 and Mendelson et al,3 who have previously described the orbital retaining ligaments as a bilaminar membrane and roof of the prezygomatic space. Dr Pessa describes 4 additional bilaminar membranes travelling from fascia or periosteum to the SMAS. Further, he describes the deep fat compartments as bordered by a series of bilaminar vertically and horizontally oriented septae through which vessels, nerve branches, and lymphatics may be stabilized as they pass from deep to superficial. The superficial fascia is then further related to the dermis by the unilaminar reticula cutis passing from superficial fascia to skin. Understanding where these fusion points exist allows the surgeon to avoid facial nerve injury.

Dr Pessa’s use of dye-injection techniques correlated with cross-sectional rather than layered anatomy makes the cadaver dissections abundantly clear. This means of illustration emphasizes the all-important 3-dimensional nature of this complex anatomical area.

While descent, deflation, and ligamentous attenuation have each been implicated in the etiology of facial aging, Dr Pessa is clearly a proponent of deflation as the major contributor. He implies that because the deep fat compartments are fixed to bone, position change in these compartments is unlikely to be a major factor. He also suggests that ligamentous laxity is similarly unlikely to be a major factor in the physiology of facial aging since such laxity occurs nowhere else in the body. This latter argument is less than convincing.

And while Dr Pessa clearly derides the age old problem of surgeons naming and renaming the same anatomic structure in various publications, his article suffers a bit from the same. In discussing the upper horizontal fusion planes, Dr Pessa identifies the most superior SMAS zone of fusion as the orbicularis retaining ligament. He then identifies a second fusion plane inferior to the suborbicularis fat. Although he fails to name it, this clearly represents the zygomatic cutaneous ligaments. Further, the 2 fusion planes together define the prezygomatic space. Providing conventional well-recognized names to these structures would simplify the anatomy for the reader.

As stated by Hamra, anatomy is only anatomy. How the surgeon makes use of it determines the benefit to the patient.4 As this should be our ultimate goal, Dr Pessa’s article is successful in providing important clinical correlation to his cadaver study. Specifically, he provides several precautionary notes for those who volumize the face. Dr Pessa suggests that when injecting along the orbital rim with fat or alloplast, a firm oblong mass or “sausage” may occur because of inadvertent injection of the fat pad that lies between the two lamina of the orbital retaining ligament. This misadventure has been previously described by
Surek et al as the “iatrogenic malar mound.” According to their analysis, this occurs because of inadvertent injection of the superficial fat pad overlying the prezygomatic space.

Similarly, in defining the vertically oriented SMAS fusion zones between the lateral deep cheek fat and the buccal space, Dr Pessa cautions against inadvertent injection of filler in the buccal space. He notes that such injection will lead to immediate increase in jowl formation. To avoid this, Dr Pessa suggests aiming the trajectory of the needle medial to the zygomaticus major. Surek et al previously noted the same phenomenon and described this danger area as the “lower malar adverse event zone.”

They too emphasize the importance of more medial injection into the deep medial compartment.

So, is the concept of ligamentous laxity as a major cause of facial aging a passé concept to be replaced by deflation of the deep fat compartments? Although we have clear histologic evidence of the existence of major ligaments of the face, and some histologic detail of the septae of the superficial fat compartments, this information is rudimentary at this time. Quantitative data correlating individual fat compartment volume changes with age would be helpful in addressing this important question. As stated by Dr Pessa, information documenting variability in volume changes within individual fat compartments also does not currently exist.

Much is in the name. For example, in Stuzin et al’s description of the masseteric cutaneous ligaments, they clearly describe them as a fusion plane rather than “true ligaments.” Their location of this fusion plane is identical to Dr Pessa’s location of septae at the anterior border of the masseter.

So the answer may be somewhere in the middle. As suggested by Stuzin, the retaining ligaments receive their origin from deeper facial structures and then pass more superficially to contribute to the septae that separate the fat compartments. Further, in both descriptions, the facial nerve branches lie in close proximity to these fusion planes, providing support and protection to nerves and vessels, but also acting as sentinels for the surgeon as an area of potential nerve injury.

Finally, the prerequisite for effective facial rejuvenation remains adequate release of fusion planes or retaining ligaments. Inadequate release prevents correction of soft-tissue laxity distal to this point of restraint.

The realization of the importance of the fat compartments is clear. That volume loss in the deep fat compartments is a major factor in aging of the midface may also be true. However, at the current time, this remains a hypothesis only. Even the observation that volume restoration of the deep fat compartments ameliorate facial aging is not direct proof of concept. This will require quantitative fat-compartment volume changes and correlating this with advancing age. But this will have to wait for another day. Dr Pessa is to be congratulated on his work, which is certain to stimulate further analysis.

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REFERENCES