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VIEWPOINT

Reappraisal on the Superficial Fascia in the Subcutaneous Tissue: Ultrasound and Histological Images Speaking Louder Than Words

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Nowadays, the concept of subdivisions pertaining to the subcutaneous tissue layers is more or less clear in (plastic and reconstructive) surgery, as it is for physicians who are experienced in (ultrasound) imaging. There is still some confusion in the terminology, and debate still seems to persist with regard to anatomy. Indeed, in the *Terminologia Anatomica*, published by the Federative Committee on Anatomical Terms,^[1] the superficial fascia (or fascia superficialis or tela subcutanea or membranous layer) is reported to consist of variable amounts of fatty and membranous components in all regions of the body. In addition, terminology such as “stratum musculosum” or “muscle layer” is maintained, despite the absence of any histological characteristics of a muscle. This causes confusion among various physicians and researchers. It therefore behooves

our scientific societies to address this issue. In other words, the lack of consistency calls for consensus.

Our fresh cadaver dissections, layer by layer, revealed that the subcutaneous tissue is divided (by a fibrous lamina) into sublayers, each with distinct features. The superficial one is referred as “superficial adipose tissue,” the deep one as “deep adipose tissue,” and the fibrous lamina in the middle as “superficial fascia.” The superficial fascia is connected to the skin (retinaculum cutis superficialis) and to the deep fascia (retinaculum cutis profundus) by fibrous septa, which impart specific mechanical properties to the subcutis.^[2] These findings were also confirmed by imaging and histological examination (Fig. 1). It is also evident that the subcutis is clearly structured, with specific features that differ according to the body region.

Fig. 1. (Left) Ultrasound image of the superficial fascia in the subcutaneous tissue of the abdomen. (Center) Histological specimen fixed in formalin and (right) the histological image (Weigert Van Gieson staining) show the organization of the superficial fascia in the subcutaneous tissue. SAT, superficial adipose tissue; DAT, deep adipose tissue; &, retinaculum cutis superficialis; ×, superficial fascia; ⌘, retinaculum cutis profundus; Ø, deep fascia.

On ultrasound imaging,^[3] the superficial fascia appears as a thin hyperechoic layer in the subcutaneous tissue, deep to the (epi)dermis. It is easily identified in all regions and levels of the human body, splitting to envelope vessels and nerves and appearing as a bilamination.^[4] The superficial fascia is always clearly evident given the contrast within the hypoechogenic subcutaneous adipose tissue. Its thickness (measured by ultrasound) is different throughout various topographic regions of the human body and in the same

region among different levels.⁴ To this end, during sonographic examination, it is important to explore the superficial fascia in the middle of the subcutaneous adipose tissue, distinguishing it from the deep fascia (especially its superficial layer) that is closer to the muscles. Needless to say, the two fasciae have different microscopic and anatomic appearances and functions. Of note, the superficial fascia is connected to the subcutaneous structures (organizing the fat tissue), but it also envelops the small subcutaneous vessels and nerves. As such, it plays an important role during wound closure—avoiding complications after surgery.⁵

To summarize, in light of the aforementioned discussion, awareness of the superficial fascial anatomy is necessary for sonographers, physicians, anatomists, and surgeons alike. In this way, not only will optimal interpretations be possible during daily imaging, procedures, and surgery, but a common terminology can also be established for a better, prompt exchange of knowledge and research.

DISCLOSURE

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Figure 1

