



Training in Dermatologic Ultrasound

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Introduction

As with any application of ultrasound, dermatologic ultrasound can (and must) be trained through a systematically designed curriculum.

However, curriculum and training must be adapted to the educative level of the trainees and their ground knowledge both in dermatology and ultrasound.

Therefore, we divide this chapter into sub-chapters adapted to trainee knowledge and requirements.

specialized knowledge of sonography and specialized knowledge of correlation. **Level 3** is devoted to expertise, publishing, and skill maintenance.

This approach has also been adopted in dermatologic ultrasound by the DERMUS group (an international radiologist and dermatologist group headed by Dr. Ximena Wortsman) [2, 3] and has been regarded as valid in the last EFSUMB consensus on dermatologic ultrasound [4] (Table 2.1).

Towards a Structured Curriculum for Dermatologic Ultrasound Teaching

As in other applications, both knowledge and skills need to be trained from less complicated to more elaborated concepts and abilities [1].

In most applications, three levels are established:

Level 1 corresponds to basic ultrasound with general ultrasonography and normal anatomy together with elementary most common lesions. **Level 2** usually corresponds to more

Table 2.1 Level 1 dermatologic ultrasound curriculum

<i>Basic ultrasound concepts</i>
Echogenicity and artifacts
Color and power Doppler
Spectral curve analysis
Buttons
Basics of other imaging techniques in dermatology
Clinical, imaging, and histologic correlations
<i>Normal anatomy</i>
Skin
Nail
Hair
Adjacent structures
Anatomic variants
<i>Examination technique</i>
Skin
Nail
Hair

(continued)

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Table 2.1 (continued)

Basic pathology
<i>Benign skin lesions</i>
Hemangiomas
Vascular malformations
Epidermal cysts
Pilomatrixomas
Lipomas
<i>Benign nail lesions</i>
Glomus tumors
Fibromas
Subungual exostosis
Ungual psoriasis
Myxoid cysts
<i>Benign scalp and hair lesions</i>
Trichilemmal cysts
Subgaleal lipomas
<i>Malignant skin lesions</i>
Basal cell carcinoma
Squamous cell carcinoma
Melanoma
<i>Inflammatory skin lesions</i>
Plantar warts
Psoriasis
Superficial fluid collections
Granulomas and foreign bodies
Cosmetics
Fillers: basics
<i>Hands-on</i>
Normal anatomy of the skin, nails, hair, and adjacent structures
Basics on ultrasound buttons and dermatologic technique

Practical Considerations Regarding Course Organization in Dermatologic Ultrasound

Small workshops need to be distinguished from formal courses in dermatologic ultrasound. As suggested in DERMUS guidelines [3], a minimum of 2 days is necessary for theoretical-practical learning with up-to-date equipment and models.

Suppose the course is held in an academic institution with patients. In that case, the possibility of scanning real patients is unique, and, considering patients' privacy and consent, this is the ideal situation for a dermatologic ultrasound course.

However, it is not possible in some cases, and the complementary exposition of clinical cases is valuable as a learning source [4].

Dermatologic Ultrasound According to Academic Degree or Specialization

Pregrade Medicine Students

Dermatology is introduced to medical students during their training and along with other clinical subjects. Dermatologic ultrasound is helpful in this context to explore skin anatomy in real time in healthy cases or dermatologic diseases.

Based on this principle, Alfageme F. et al. published their experience in dermatologic ultrasound teaching to medical students as a half-day workshop [5]; after the workshop, students were tested with the same questions required in the Spanish Society of Ultrasound for level 1 certification and most students would have passed this exam. The satisfaction of students regarding this type of initiative is high.

Dermatology and Radiology Residents

Dermatologic ultrasound in postgraduate students in their specialization period is possible also as subspecialization courses for radiology residents or as fundamental courses for dermatologic residents. In Spain, a dermatologic ultrasound course has been recently implemented as a core theoretical-practical course of 2 days with a high degree of satisfaction [6]. These types of courses broaden the future specialist working spectrum in centers where dermatologic ultrasound is a requisite.

Dermatologic Ultrasound for Specialists

Post-specialization courses in dermatologic ultrasound are available in some scientific societies [7], which offer the possibility of the aforementioned

tioned level two training and evaluation. This is relevant as continuous training and certification are valuable to physicians practicing dermatologic ultrasound.

Dermatologic Ultrasound for Primary Care Practitioners

In the primary care setting, dermatologic ultrasound is useful to assess deep dermatologic diseases before specialized care is available. Access to specialized care is more difficult every day, and possibilities such as telemedicine, including teledermatology, are more common every day.

In the case of dermatologic ultrasound, teleultrasound has been recently reported as a possibility in these settings to prioritize dermatologic patients. However, this kind of system also requires appropriate training of primary care physicians regarding correct image acquisition and basic dermatologic ultrasound semiology and diseases [8].

Accreditation in Dermatologic Ultrasound

Accreditation of medical knowledge is defined as a certification issued by a medical society or university of a certain degree of knowledge at a certain moment. This means that certification is not a permission of this society or university to practice any kind of technique. The responsibility of the technique is always attributable to the healthcare professional.

However, accreditations are helpful for healthcare professionals to standardize the level of knowledge certified by an independent evaluator or institution, which can certify this knowledge. In that sense, accreditation requires a theoretical and practical assessment of the dermatologic ultrasound knowledge of the physician to be accredited. Scarce experience is available regarding this type of certification. The

Spanish Society of Ultrasound has created an accreditation exam for level 1 and 2 dermatologic ultrasound [7].

Conclusions

Dermatologic ultrasound training must always be structured and with enough quality to permit a safe learning journey for the physician. Past experiences and guidelines will have to confront new scenarios and requirements in the ever-changing environment of modern medicine.

References

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