

MEDICAL EDUCATION IN DERMATOLOGY

Fresh-Tissue Cadavers for Nail Procedures in Dermatology Residency

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ABSTRACT

Background: Dermatology residents often face limited opportunities for nail procedures. Cadaver-based learning provides a controlled environment for developing procedural skills. In contrast to formaldehyde-embalmed cadavers, fresh-tissue cadavers (FTCs) are prepared using methods that preserve tissue in a manner that closely resembles live patients, maintaining similar elasticity and anatomy. This study evaluates the novel use of FTCs as a realistic and practical training model for nail procedures.

Method: A structured FTC-based nail procedure lab was conducted for six dermatology residents. Participants completed pre- and post-lab surveys assessing their confidence, anatomical understanding, and procedural competence on a 5-point Likert scale.

Discussion: Post-lab responses showed improvement in resident confidence and knowledge. Feedback indicated a high level of satisfaction among all residents regarding the training experience. All residents strongly agreed that the workshop enhanced their understanding of nail procedures and confidence. All residents found the training to be easy to participate in and would like to participate in similar training in the future. Majority of residents strongly agreed that FTCs were realistic models for practicing nail procedures and a useful tool to learn nail anatomy.

Conclusion: FTC-based training offers dermatology residents a valuable, realistic model to develop procedural competency in nail procedures. This learning tool can enhance anatomical understanding, improve confidence, and bridge an important gap in dermatology education.

INTRODUCTION

Dermatologists play a crucial role in diagnosing and treating nail disorders; therefore, it is imperative that dermatologists know how to perform nail procedures.¹ This aspect of dermatology can be challenging, as nail procedures can be technically demanding. In the Medicare database between 2012-2016, only 0.28% and 1.01%

of all general dermatologists and Mohs surgeons, respectively, performed nail biopsies.¹ A possible contributing factor is the lack of nail surgery training in dermatology residency leading to apprehensive dermatologists.¹ The Accreditation Counsel for Graduate Medical Education (ACGME) mandates that dermatology residents perform a minimum of three nail procedures during their training, however, opportunities

for additional practice may be limited due to number of available cases.

Given the procedural nature of dermatology, various simulation techniques such as pig's feet, cadavers, synthetic models, and live animals for practicing procedures like punch biopsies and excision are available.² However, resources specifically for nail procedures remain limited, and cadavers serve as a vital resource for residents. According to ACGME guidelines, one of the required nail procedures may be performed on cadaver models. We advocate for the use of fresh-tissue cadavers (FTC) for training in nail procedures, as FTCs offer a realistic model that replicates the conditions encountered in clinical practice.

In contrast to formaldehyde-embalmed cadavers (FECs), FTCs are prepared using methods that preserve the tissue in a manner that closely resembles live patients, maintaining similar elasticity and mechanical properties while minimizing damage to anatomical structures.³ This realistic preservation makes FTCs particularly valuable for training in surgical subspecialties and procedure-intensive fields, ranging from intubation to flap reconstruction to ultrasound training.^{3,4} Performing a nail procedure on a live patient can be intimidating for many trainees; FTCs can serve as an effective introduction to this procedure, allowing residents to develop their skills in a controlled environment.

RESULTS

Our institution organized an FTC nail procedure lab for six residents (PGY-3, PGY-4). In pairs, two residents shared each cadaver, allowing them to practice on multiple fingernails and toenails. The residents engaged in hands-on training for

various nail techniques, including nail plate avulsions and nail biopsies (**Figure 1**). To evaluate the practicality and effectiveness of the lab, participants completed a post-lab survey. The feedback indicated a high level of satisfaction among all residents regarding the training experience (**Table 1**). All residents strongly agreed that the workshop enhanced their understanding of nail procedures and enhanced their confidence in relation to skills associated with nail procedures. They also strongly agreed that the work was easy to participate in, steps were easy to follow, and they would like to participate in similar training in the future. The majority of the residents strongly agreed that the cadavers were realistic models for practicing nail procedures and a useful way to learn the anatomy of the nail.

Importantly, practicing nail procedures on FTCs provides dermatology residents with ample time to ask detailed questions and take their time with each procedural step which may not be appropriate with patients. This supportive environment encourages a deeper understanding of the critical nail anatomy and technical aspects of these procedures. Such hands-on experience can significantly enhance residents' confidence in their skills early on in their training.

There are a few limitations to using FTCs for nail procedure training. The residents noted that extracting the nail from the nail bed on FTCs required less force than when working with live human nails. Additionally, real-life complications of nail procedures like pain or bleeding cannot be replicated with FTCs. However, we believe that building a strong foundation in the technical aspects of the procedures will allow residents to concentrate on understanding potential complications when given the opportunity to practice nail procedures on live patients.



Figure 1. Reflection of the proximal nail fold on a fresh-tissue cadaver

Table 1. Resident assessment of FTC nail procedure lab (1=strongly disagree, 2=disagree, 3=neither disagree nor agree, 4=agree, 5=strongly agree).

	Average (n=6)
The lab enhanced my understanding of nail procedures.	5.00
The cadavers used were realistic models for practicing nail procedures.	4.83
This lab is an effective way to learn the steps of a nail procedure.	4.83
This lab is an effective way to learn the anatomy of a nail.	4.67
This lab is an effective way to improve my skills.	5.00
The training was easy to participate in	5.00
I would participate in a similar training again	5.00
I feel more confident performing nail procedures after this training	5.00

Cost can be a significant barrier to accessing FTCs.⁴ At our academic institution, we acquired FTCs through the Gross Anatomy Department. Our institution has a fee per cadaver which covers recovery charges, transportation, storage, and cremation which can vary by institution. To optimize

resources, it may be possible to collaborate with other departments who also utilize FTCs. We worked with the Emergency Medicine residency program, who utilized the FTCs for procedures like intubation and chest tube placement, leaving the nails available for dermatology residents. Additionally, the

preservation time for FTCs is considerably shorter, typically 2-6 weeks, than that of FECs which can lead to a limited supply of FTCs.⁵ For instance, our institution typically has FTCs available only twice a year, largely depending on supply, whereas FECs are accessible year-round. Cadavers are often reserved for preservation as FECs are commonly used by professional academic programs such as medical, physical therapy, and physician associate programs rely on FECs for anatomy courses. These logistical challenges must be considered when planning nail procedure training.

CONCLUSION

In conclusion, our residents found the FTCs to be effective models for nail procedures. We strongly advocate for FTCs as an effective method to strengthen residents' competence and comfort level with nail procedures, ultimately improving patient care outcomes.

Conflict of Interest Disclosures: None

Funding: None

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