



Innovations

Proposing a novel organic bench model utilizing vegetable to enhance basic vitiligo surgery skills

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ABSTRACT

This organic model can help develop essential skills required for vitiligo surgery in an affordable and sustainable manner. This study introduces an organic bench model using vegetables to teach and learn vitiligo surgery techniques. By using cucumbers, various techniques of dermabrasion and skin grafting were practiced. The model offers a versatile, cost-effective alternative to traditional simulators, enhancing practical skill acquisition.

Keywords: Organic bench model, Cucumber, Vitiligo surgery skills

PROBLEM STATEMENT

In training for skin grafting and dermabrasion techniques, the use of human skin for practice poses significant ethical challenges and is typically not permissible. Traditional alternatives, such as pig and chicken skin, although biologically relevant, are associated with high costs, limited shelf life, and demanding handling requirements that limit their practicality. Silicone models, while advantageous in durability and consistency, remain prohibitively expensive and are often inaccessible in resource-limited settings. Consequently, the organic bench model, employing affordable and readily available vegetable simulators, emerges as a viable, ethical, and cost-effective alternative. This model provides a practical solution for hands on training in dermatologic procedures, allowing for skill acquisition without the limitations of conventional models.

RECOMMENDED SOLUTION

Introducing an organic bench model from fruits and vegetables enhances surgical skill training with tactile, anatomically relevant experiences.¹ It refines dermabrasion and skin grafting techniques sustainably, promoting creativity in medical education. Skin grafting and dermabrasion on cucumbers offers a cost-effective, realistic simulation and is accessible even in resource-limited settings. This versatile model integrates seamlessly into existing curricula, fostering comprehensive skill development in various surgical disciplines. Adaptable for multiple sessions, it optimizes learning retention. Ultimately, the organic bench model cultivates a dynamic, effective learning environment, facilitating skill acquisition and refinement in surgical education.²

In surgical education, diverse simulators enhance practical skill acquisition, aiding smoother transitions to patient care. High-fidelity models like cadavers and virtual reality are popular but not essential for skill transfer.³ Low fidelity options, like organic bench models using fruits or

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vegetables, offer cost-effective training alternatives without compromising learning outcomes.² The proposed cucumber bench model for dermabrasion and skin grafting training provides a natural, affordable solution. Its texture mimics human skin, allowing versatile practice. Similar options include thick-peel fruits like bananas/pomelos/oranges.^{4,5} This approach promotes sustainability and comprehensive surgical competency development, which is particularly beneficial for novice learners seeking structured skill progression.⁶

The vegetable bench model offers a simple, versatile, and cost-effective supplement to traditional simulators in education. Its straightforward design and affordability provide medical students with practical, hands-on experience, preparing them for surgical procedures in their careers. Accessible and budget-friendly, this model enriches teaching methodologies, empowering students to develop essential skills effectively and immerse themselves in practical learning experience.

Materials required:

1. Cucumber
2. Blade
3. Blade holder
4. Dermabrasion burr
5. Motor
6. Manual dermabrader
7. Forceps
8. Scissors
9. Ultrasound jelly
10. Skin marker

Dermabrasion on a cucumber involves selecting a firm, fresh cucumber and washing it thoroughly. Optionally mark the area for dermabrasion, then gently rub the surface with a dermabrasion tool in circular motions to simulate exfoliation. Monitor texture changes and adjust the intensity as needed. Evaluate smoothness post-treatment and clean-up. This process mimics skin resurfacing and offers a practical way to practice dermabrasion techniques. By observing and adjusting throughout, learners can refine their skills effectively.

Skin grafting on vegetable like cucumber mimics surgical skin transplantation. First, start by selecting a suitable cucumber and washing it thoroughly. Harvest a thin skin layer with a sterile scalpel/Humby's knife. Prepare the recipient site by cleaning and disinfecting. Apply lubricating gel to create an entry on the cucumber with a 45° angle with gentle gliding motion and then reduce the angle to 15–20° and keep moving the blade forward with gentle TO and FRO motion. This harvested skin tissue will serve as the graft for the transplantation. Place the graft on the chosen area, ensuring alignment. Secure it with gentle pressure or surgical adhesive. Evaluate success by comparing the grafted area with untreated regions. Dispose of excess cucumber and clean instruments. This process emulates surgical skin grafting

in a simplified manner, offering a practical simulation for training purposes.

Using cucumber as an organic bench model offers a straightforward and cost-effective approach for simulating dermabrasion and skin grafting techniques. Figure 1 illustrates the organic bench model, showcasing the essential instruments for practicing skin grafting and dermabrasion on a cucumber.

The green peel of the cucumber effectively represents the epidermis, allowing trainees to practice dermabrasion by removing this layer, while the underlying white flesh mimics the dermis. Figure 2 and Video 1 demonstrate the process of skin grafting on cucumbers. Additionally, for skin grafting, thin slices can be precisely extracted from the cucumber, replicating the process of harvesting grafts. This organic model thus provides a practical, affordable, and anatomically relevant tool for skill development in dermatologic procedures.

Limitations

Although the simulator is very good to practice, it does not provide the real feel of skin like stretchability and elasticity.

Authors' contributions

Samkit Shah: Concept and design, manuscript drafting. Satish Shah: Supervision and critical review. Joy Dhirendranath Das: Data collection and analysis. Kinnari Pawar: Literature review and manuscript editing.

Ethical approval

The Institutional Review Board approval is not required.



Figure 1: Organic bench model from left to right instruments are motor dermabrader, straight scissors, forceps, burr, skin marker, cucumber, blade, blade holder, and manual dermabrader.



Figure 2: Demonstration of the process of skin grafting on a cucumber.



Video 1: Demonstration Video.

Declaration of patient consent

Patient's consent was not required as there are no patients in this study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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