

# Dermatology Procedural and Surgical Skills Workshop for Medical and Physician Assistant Students<sup>\*</sup>

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## ABSTRACT

**Background:** Evidence indicating the limited amount of hands-on experience in the current era of medical training has raised concern regarding students' development and potential deficiencies in the performance of basic procedural skills. Studies have demonstrated the value of surgical workshops for medical students; however evaluation of improved student performance during future clerkships or residencies has yet to be assessed. We initiated and evaluated a resident-led surgical skills workshop for students through the Department of Dermatology. **Methods:** Participants received instructions on surgical tools/techniques followed by hands-on practice. Anonymous surveys administered to 24 medical and physician assistant students assessed their skill level, confidence level, and likelihood of using surgical skills in future practice pre- and post-workshop using a 1 - 5 Likert scale. Overall experience was also assessed. Non-parametric bivariate tests were used for analysis to account for non-normal distribution of the data. **Results:** There was a statistically significant change in skill ( $p = 0.0001$ ) and confidence ( $p = 0.0001$ ) level post workshop. There was no significant difference in utility. There were also no statistically significant differences based on the year of medical student training, medical student versus physician assistant student responses, or number of procedures performed prior to the workshop. Estimated cost per participant was \$5.65. **Conclusions:** Research supports our finding that workshop learning experiences increase students' ability to perform common procedural skills, their confidence, and desire to practice such skills. Further studies are necessary to determine the impact of these skills workshops on long-term clinical performance in future clerkships and residencies.

**Keywords:** Procedural Skills; Workshop; Dermatology; Residents; Medical Students

## 1. Introduction

Recent studies have shown trends towards an increasingly limited amount of hands-on experience for medical students in the current era of medical training [1-10]. This observation increases concern regarding students' development and potential inadequacies in basic skills performance. The commonest reported obstacles to teaching basic technical skills include faculty and resident time constraints, medicolegal concerns such as malpractice liability, costs, students' safety including disease transmission, and patient preference [11]. Given the expanding role of multiple surgical procedures in dermatology clinical practice, sources highlight that resident training in procedural skills must be continually assessed

to keep pace with changes in the specialty [12]. Recent evidence suggests that residents as teacher-trainers improve resident attitudes and perceptions toward teaching as well as their theoretical knowledge, skills, and teaching behavior [11,13]. Furthermore, it has also been shown that medical students ascribe one-third of their clinical education to the teaching of interns and residents and consider them to be important role models and mentors [14-18]. Training opportunities during clinical years have been shown to promote skill instruction when they are most likely to contribute to accelerating clinical learning [19]. In addition, student experiences, such as acting internships, have also been designed to provide valuable practice in learning procedural skills [20]. Given the information gathered from recent literature, we decided to show our recent experience with resident-led surgical skills workshops for medical and physician assistant stu-

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dents through the Department of Dermatology.

## 2. Background

Recent Accreditation Council for Graduate Medical Education requirements mandate documentation of competency in procedural skills [21]. In addition, it has been reported that little change has occurred in the teaching and evaluation of technical skills in half of US medical schools since 1993 [11]. Results from medical student surveys demonstrated the value of incorporating preparatory surgical workshops in the medical school curriculum [1,22]. This suggests the need for further research to determine if such workshops improve future student performances during subsequent training. Over the past 14 years, one institution reported that the number of procedural workshops have increased from 11 to 31, and currently involve clerkship faculty from family medicine, internal medicine, and pediatrics [20]. We retrospectively reviewed the medical literature using PubMed, searching the terms procedural skills, workshop, dermatology, residents, and student. Subsequently, several articles describing models for procedural skill workshops were retrieved (**Table 1**).

## 3. Materials and Methods

Fifteen medical students and nine physician assistant students participated in skills workshops during the 2012-2013 academic year. The students in the study comprised of students enrolled in any of the one-month dermatology electives and Dermatology Interest Group members. There were a total of six workshops held throughout the year. The workshop started with an anonymous pre-workshop questionnaire (**Appendix 1**). This was followed by a ten-minute PowerPoint presentation about how to set up for biopsy, basic surgical instruments, safety precautions, sutures, and suturing techniques. After the presentation, hands-on practice with resident supervision began with skills including injection of local anesthetic, tangential and punching biopsies using pig feet, suturing/wound closure and knot tying. The workshop concluded with an anonymous post-workshop questionnaire (**Appendix 2**). The total time of the workshop was 90 minutes. Internal departmental educational activities are not subject to Institutional Review Board review.

In the anonymous surveys administered for the pre and post skills workshop, respondents were asked to assess their skill level, confidence level, and likelihood of use of surgical skills in future practice (utility). The results were recorded using 1 - 5 Likert scales. Respondents were also asked to assess overall experience after the surgical skills workshop using a 1 - 5 Likert scale. The Wilcoxon Signed Rank non-parametric bivariate test was used to compare the medians for pre- vs. post-workshop survey

**Table 1. Procedural skills teaching models.**

Model	Description
Theory-based method [23]	Four-step method: 1) Demonstration 2) Deconstruction 3) Formulation 4) Performance
Modem instructional design [24]	Nine events of instruction approach: 1) Getting attention 2) Informing the learner of the objectives 3) Stimulating recall of prerequisite learning 4) Presenting stimulus material 5) Providing learner guidance 6) Eliciting the performance 7) Providing feedback and performance correction 8) Assessing performance 9) Enhancing retention and transfer of knowledge 10) Enhancing retention and transfer of knowledge
Prerequisite knowledge [25]	Ensuring prerequisite knowledge using an Extended Match Questionnaire (EMQ) before proceeding to practical skills
Microskills and station-based deconstructed [26]	Training based on three concepts: 1) Skill 2) Microskill actions derived from deconstruction of each skill 3) Tuition in structured educational stations
Microskills with learning preference [27]	Categorizing learners as visual, auditory, and tactile learners for specialized procedural skills workshop

questions. The Kruskal Wallis non-parametric bivariate test was used to compare the medians for pre- vs. post-workshop survey questions specifically by year and number of procedures. The Wilcoxon Mann-Whitney non-parametric bivariate test was used to compare responses by the medical and physician assistant students. These tests were used to account for non-normal distribution of the data using SAS software, version 9.3. The supplies and estimated cost for each participant for the workshop was \$5.65 (**Table 2**).

## 4. Results

Results using the Wilcoxon Signed Rank Test showed a statistically significant change in skill ( $p = 0.0001$ ) and confidence level ( $p = 0.0001$ ) post workshop (**Table 3**). There was no significant difference in utility and there were no statistically significant differences based on the year of training, medical vs. physician student responses, or number of procedures performed prior to the workshop. More medical students (67%) had previously participated in a surgical skills workshop than physician assistant students (56%).

## 5. Conclusions

There was a statistically significant change in student

**Table 2. Supplies and estimated cost per student.**

Pig foot	\$1.00
Tomato	\$0.50
Marshmallow	\$0.05
Number 15 blade	\$0.31
Derma blade	\$1.28
Punch biopsy	\$1.67
1 Prolene suture	\$5.48*
1 Vicryl suture	\$8 - 11.00*
Plastic bag (used as placemat)	\$0.15
Antiseptic wipe	\$0.09
Local anesthesia (2% lidocaine with epinephrine)	\$0.15*
Non-sterile gloves	\$.20
1 cc syringe	\$0.30
30 G × 1/2 needle	\$0.10
Estimated total cost per participant	\$5.65

\*Expired supply item, cost not totaled.

**Table 3. Comparison of medians for pre- vs. post-anonymous survey questions (Wilcoxon signed rank test).**

	Pre (n = 24) Median (IQR)	Post (n = 24) Median (IQR)	Change Median (IQR)	p-value
Skill	2 (1 - 3)	4 (3 - 4)	1 (1 - 2)	0.0001
Confidence	3 (2 - 4)	4 (3 - 5)	1 (0 - 2)	0.0001
Utility	5 (5 - 5)	5 (5 - 5)	0 (0 - 0)	1.000
Overall Experience		5 (5 - 5)		

Legend: IQR (interquartile range).

skill level and confidence level post-workshop. Students unanimously expressed that the workshop was an overall good experience. Research supports our finding that workshop learning experiences increase students' ability to perform common procedural skills, their confidence, and their desire to practice such skills [20]. However, additional studies are necessary to determine the impact of these skills workshops on long-term procedural performance in future clerkships and residencies.

Limitations of our study include the small number of participants, not inquiring about the students' anticipated future career or specialty, and not comparing internal vs. visiting students. In the future, an alternative to pre- and post-self-surveys could be used, for example the 12-Step Performance Grading Instrument created by Wang *et al.* in order to measure the impact of the workshop using objective grading and documentation of competency. In

addition, although pigs' feet have traditionally been used to teach procedural skills in dermatology, technology has allowed the development of additional simulators which could be considered in future workshops [21]. The need for improvement in procedural skills is evident in the literature and has been affirmed to be an important learning process, therefore, these workshops may be beneficial for specialties like dermatology [21].

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## Appendix 1. Anonymous Pre-Workshop Self-Survey

Year (MS1, MS2, MS3, MS4 or PAS): \_\_\_\_\_

I have participated in a surgical skills workshop in the past

- 1) Yes
- 2) No

Regarding the number of biopsies and suturing opportunities, I have participated in:

- 1) <5
- 2) 5 - 10
- 3) >10

My skill level (biopsies, suturing, etc.) prior to participation in surgical skills workshop

- 1) No experience
- 2) Below average
- 3) Average
- 4) Excellent

I feel confident performing procedures under supervision during my clinical rotations

- 1    2    3    4    5

(1 = completely disagree, 2 = somewhat disagree, 3 = neutral, 4 = somewhat agree, 5 = completely agree)

I am likely to use surgical skills during a clinical rotation and in the future as a practitioner

- 1    2    3    4    5

(1 = completely disagree, 2 = somewhat disagree, 3 = neutral, 4 = somewhat agree, 5 = completely agree)

What would you like to learn/improve upon during this surgical skills workshop?

\_\_\_\_\_

\_\_\_\_\_

Legend: MS1 (first year medical student), MS2 (second year medical student), MS3 (third year medical student), MS4 (fourth year medical student), PAS (physician assistant student).

## Appendix 2. Anonymous Post-Workshop Self-Survey

Year (MS1, MS2, MS3, MS4 or PAS): \_\_\_\_\_

My skill level (biopsies, suturing, etc.) improved after participation in surgical skills workshop

- 1    2    3    4    5

(1 = completely disagree, 2 = somewhat disagree, 3 = neutral, 4 = somewhat agree, 5 = completely agree)

I feel confident performing procedures under supervision during clinical rotations

- 1    2    3    4    5

(1 = completely disagree, 2 = somewhat disagree, 3 = neutral, 4 = somewhat agree, 5 = completely agree)

I am likely to use surgical skills during my clinical rotations and in the future as a practitioner

- 1    2    3    4    5

(1 = completely disagree, 2 = somewhat disagree, 3 = neutral, 4 = somewhat agree, 5 = completely agree)

Overall, the surgical skills workshop was a good experience

- 1    2    3    4    5

(1 = completely disagree, 2 = somewhat disagree, 3 = neutral, 4 = somewhat agree, 5 = completely agree)

How well were your goals met during this surgical skills workshop?

\_\_\_\_\_

Any additions you would recommend for future surgical skills workshops?

\_\_\_\_\_

Additional comments: \_\_\_\_\_

Legend: MS1 (first year medical student), MS2 (second year medical student), MS3 (third year medical student), MS4 (fourth year medical student), PAS (physician assistant student).