

## Background

Suturing is a foundational procedural skill for medical students and is recognized by the Association of American Medical Colleges as an essential competency prior to graduation. Despite this, many medical schools lack structured, longitudinal opportunities for students to practice suturing with guided feedback.

A local needs assessment revealed substantial gaps in training: 88% of students reported no access to ongoing suturing instruction, and only one student reported receiving adequate feedback on technique. Notably, 94% of respondents felt that a longitudinal suturing curriculum would be very or extremely useful. These findings highlight a critical need for sustainable, feedback-driven skills training early in medical education.

## Objective

To develop and implement a longitudinal, asynchronous suturing curriculum for medical students and to evaluate its feasibility, learner engagement, and impact on confidence and technical skill acquisition.

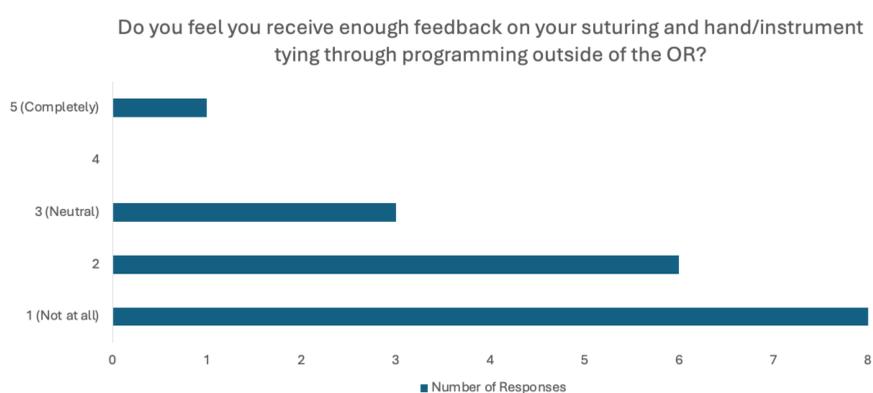


Figure 1. Medical student needs assessment demonstrating limited access to longitudinal suturing training and a strong perceived need for structured skills education..

## Methods: Curriculum Design

We developed a six-month, asynchronous suturing curriculum designed to promote deliberate practice and progressive skill development outside of formal coursework.

Key elements include:

- Initial in-person instructional workshop led by resident mentors
- Completion of pre- and post-curriculum assessments (see Assessments below)
- Independent practice with structured longitudinal tasks (Table 1)
- Required submission of:
  - Two-minute video recordings of suturing performance
  - Final product photographs
  - Asynchronous, individualized feedback from resident mentors focusing on:
    - Knot security and efficiency
    - Instrument handling and ergonomics
    - Suture spacing, tension, and wound eversion

This design allows flexible participation while maintaining consistent feedback and mentorship.

## Assessments

Pre- and post-curriculum assessments include:

- Subjective confidence surveys
- Objective timed suturing tasks:
  - 7 cm running baseball stitch with hand-tying
  - 7 cm simple interrupted closure with instrument tying

Completion rates and performance outcomes are being used to assess feasibility and effectiveness.

Table 1. Suturing curriculum for medical students

Month	Task	# Who Completed Task
1	Two-Handed Knot-Tying	19
2	One-Handed Knot-Tying	18
3	Simple Interrupted Stitch with Instrument Tie	12
4	Continuous Closure	10
5	Vertical Mattress Closure	7
6	Horizontal Mattress Closure	7
Optional	Subcuticular Closure	N/A

## Results

- High initial interest and enrollment
- Attrition primarily occurred after task 2, coinciding with increased clinical responsibilities
- Most students cited time constraints and clinical workload as barriers to completion
- Post-curriculum confidence surveys and objective performance data are pending

## Discussion

This pilot curriculum demonstrates that asynchronous, video-based feedback can provide meaningful technical instruction without the constraints of synchronous teaching or dedicated skills lab time. While initial engagement was strong, retention challenges underscore the need for improved strategies to sustain participation, such as curricular integration, protected time, or incentivization.

The longitudinal structure supports skill retention and confidence building, while near-peer mentorship benefits both medical student learners and resident educators by reinforcing teaching skills.

## Conclusions and Future Directions

This asynchronous suturing curriculum addresses a significant gap in medical student technical training and represents a feasible, scalable model for early procedural education.

Future directions include:

- Improving retention through curricular integration or scheduling flexibility
- Expanding the program to additional institutions
- Adapting the framework to other foundational skills (Figure 2), including:
  - Microsurgical skills for junior residents
  - Vascular anastomosis training for senior residents

### Longitudinal Asynchronous Suturing Curriculum: Program Structure

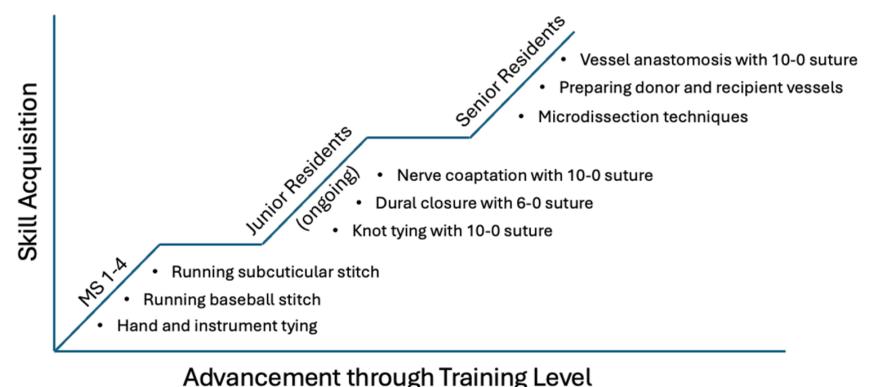


Figure 2. Overview of the asynchronous, graduated surgical skills curriculum for medical students, junior neurosurgical residents, and senior neurosurgical residents, illustrating sequential task progression, required photo and video submissions, and asynchronous mentor feedback.

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