ISRCTN39200305 https://doi.org/10.1186/ISRCTN39200305

Does practicing suturing on different materials improve medical students' ability to transfer suturing skills to a new tissue model?

Submission date
13/11/2026

Recruitment status
No longer recruiting

Registration date
16/11/2026

Overall study status
Completed

Last Edited
16/11/2026

Condition category
Other

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Medical students commonly learn basic suturing skills using silicone practice pads. However, becoming familiar with only one training material may not fully prepare students to work with tissues that have different physical properties. This study investigated whether practicing suturing on several different materials improves the ability of medical students to transfer basic suturing skills to an unfamiliar tissue model.

Who can participate?
Fifth-year medical students at Malatya Turgut Özal University Faculty of Medicine

What does the study involve?
Participants were randomly assigned to one of two training groups. The single-model group practiced suturing only on a silicone pad. The variable-model group practiced on silicone, chicken skin, and banana peel. Both groups completed the same total number of simple interrupted sutures and received the same standardized instruction and feedback.
After the training sessions, all participants performed suturing on beef tongue, which had not been used during training. Their performance was assessed within 24–48 hours after the final training session and again approximately four weeks later. Suturing performance was evaluated using standardized technical performance scores, procedure time, and measurements of suture quality.

What are the possible benefits and risks of participating?
Participants may improve their basic suturing skills through structured practice. The study was conducted using simulation and biological training materials and did not involve performing procedures on patients. Therefore, no direct clinical risk to patients was expected.

Where is the study run from?
Malatya Turgut Özal University (Türkiye)

When did the study start and how long did it run?
April 2026 to September 2026

Who is funding the study?
Malatya Turgut Özal University (Türkiye)

Who is the main contact?
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Scientific, Principal investigator, Public

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Additional identifiers

Study information

Scientific Title

Single-model versus variable-model training for the transfer of basic suturing skills in fifth-year medical students: a randomized controlled trial

Study objectives
To determine whether variable-model suturing practice using silicone, chicken skin, and banana peel improves the transfer and short-term retention of basic suturing skills in fifth-year medical students compared with single-model practice using silicone alone.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 22/01/2026, Malatya Turgut Özal University Health Sciences Scientific Research Ethics Committee (Malatya Turgut Özal University, Malatya, 44210, Türkiye; +90 (0)422 846 12 55; ilker.ayten@ozal.edu.tr), ref: 2025/470

Primary study design
Interventional

Allocation
Randomized controlled trial

Masking
Blinded (masking used)

Control
Active

Assignment
Parallel

Purpose
Health services research, Treatment

Study type(s)

Health condition(s) or problem(s) studied
Basic suturing skills and transfer of procedural skills in undergraduate medical students

Interventions
Participants were assigned to either the single-model practice group or the variable-model practice group in a 1:1 ratio using a computer-generated randomisation sequence with randomly varying block sizes. The sequence was prepared by an investigator who was not involved in the training sessions or outcome assessment. Group assignments were placed in sequentially numbered, opaque, sealed envelopes and opened after the baseline assessment had been completed.

All participants received the same standardized instruction on basic suturing and completed 45 simple interrupted sutures over three training sessions, with 15 sutures performed per session at intervals of 7 ± 2 days. The single-model group performed all 45 sutures on a silicone suturing pad. The variable-model group performed sutures on three different materials: silicone suturing

pad, chicken skin, and banana peel, completing five sutures on each material during each session. The order of materials was balanced across participants. Both groups received standardized structured feedback after every five sutures. Within 24–48 hours after the final training session, all participants completed an immediate transfer assessment by placing five simple interrupted sutures on beef tongue, which had not been used during training. A retention assessment using a newly prepared beef-tongue specimen was performed 28 ± 3 days later. No corrective feedback was provided during the baseline, transfer, or retention assessments.

Intervention Type
Behavioural

Primary outcome(s)
1. Total modified Objective Structured Assessment of Technical Skills (mOSATS) score measured using the total score on an eight-domain modified mOSATS scale, with each domain scored from 1 to 5 and a total score ranging from 8 to 40; higher scores indicate better technical performance. Assessment was performed by two independent blinded evaluators using anonymized video recordings at immediate transfer assessment, 24–48 hours after the final training session

Key secondary outcome(s)
1. Sundhagen suturing checklist score measured using an eight-item suturing-specific checklist adapted from Sundhagen et al.; total score 0–8, higher scores indicating better performance; at immediate transfer assessment at 24–48 hours after final training and retention assessment at 28 ± 3 days after the immediate transfer assessment

2. Procedure completion time: time in seconds from first needle contact with the tissue until completion of the final knot measured using standardized video recordings at immediate transfer assessment and 28 ± 3-day retention assessment

3. Bite asymmetry: the absolute difference in bite distance between opposite sides of the incision measured using calibrated digital image analysis at immediate transfer assessment and 28 ± 3-day retention assessment

4. Suture spacing variability: the coefficient of variation of distances between adjacent sutures measured using standardized calibrated photographs at immediate transfer assessment and 28 ± 3-day retention assessment

5. Suture orientation deviation measured using the absolute deviation of each suture from a 90° angle relative to the long axis of the incision at immediate transfer assessment and 28 ± 3-day retention assessment

Completion date
30/09/2026

Eligibility

Key inclusion criteria
1. Fifth-year medical students at Malatya Turgut Özal University Faculty of Medicine
2. Provision of written informed consent
3. Agreement to attend all training and assessment sessions

Healthy volunteers allowed
Yes

Age group
Mixed

Lower age limit
18 Years

Upper age limit
99 Years

Sex
All

Total final enrolment
76

Key exclusion criteria
1. Previous additional structured suturing training beyond the standard medical curriculum
2. Substantial previous clinical suturing experience

Date of first enrolment
01/04/2026

Date of final enrolment
15/08/2026

Locations

Countries of recruitment
Türkiye

Sponsor information

Organisation
Malatya Turgut Özal Üniversitesi

ROR
https://ror.org/01v2xem26

Funder(s)

Funder type

Funder Name
Malatya Turgut Özal University

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available