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Do students learn more about physical examination of the shoulder if they attend a blended learning module compared to 'traditional' teaching methods?

Submission date
24/09/2020

Recruitment status
No longer recruiting

Registration date
02/11/2020

Overall study status
Completed

Last Edited
03/08/2026

Condition category
Other

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
The study aims to create better evidence on the role of activating competency-based didactics in the course development of physical examination skills in preclinical students. It will find out whether integrating clinical investigation techniques and professional posture in an activating competency-based training session will lead to a greater increase in student competence compared to traditional teaching methods with lecture and case demonstrations. Competencies in the above-mentioned areas are assessed with an examination in which the student is asked to examine a patient with shoulder problems.

Who can participate?
All students of the preclinical semesters who are enrolled at the Medical Faculty of Tübingen University

What does the study involve?
Participants will be randomly allocated to either an activating competency-based (intervention group) or traditional teaching curriculum (control group). The activating competency-based intervention comprises a 1.5-hour e-learning module on professional posture and clinical examination as well as the functional anatomy of the shoulder. Next, students in the intervention group attend a 1.5-hour peer learning seminar in which they train in examining their peers and give mutual feedback. Participants in the control group will receive a 1.5-hour lecture on shoulder anatomy combined with a patient demonstration by a GP. Next, students in the control group are offered 1.5 hours of free training where shoulder models are available. Participants take an exam after 8 weeks. The exam takes about 25 minutes. Participants are given questionnaires at the start of the study and after the exam. The questionnaires take about 15 minutes to complete.

What are the possible benefits and risks of participating?
There is no risk for the participants. A personal benefit for the participants is the learning

opportunity (clinical elements for pre-clinicians). In order to compensate for any additional time expenditure, students who have participated in the study and passed the examination may partake in a lottery drawing one iPad in each intervention and control group. Furthermore, all participants will receive two cinema vouchers.

Where is the study run from?
University of Tuebingen at the Tübingen University Hospital (Germany)

When is the study starting and how long is it expected to run for?
December 2019 to August 2021

Who is funding the study?
Faculty internal ProfilPlus funding, University of Tuebingen at the Tübingen University Hospital (Germany)

Who is the main contact?
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Contact information

Type(s)
Scientific

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Additional identifiers

Study information

Scientific Title
Transfer of anatomical knowledge in the examination situation for pre-clinical medical students (TraceX): a randomized, controlled study comparing face-to-face teaching and blended learning

Acronym
TraceX

Study objectives
Current hypothesis as of 24/03/2021:
Preclinical medical students who have completed an activating competency-based learning unit on professional posture, clinical examination skills and basic anatomical knowledge achieve a higher competency score in a simulated shoulder examination than students who have completed the same amount of time in learning modules following traditional teaching methods.

Previous hypothesis:
Preclinical medical students who have completed a blended learning unit on professional posture, clinical examination skills and basic anatomical knowledge achieve a higher competency score in a simulated shoulder examination than students who have completed the same amount of time in face-to-face learning modules.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Assessed 04/05/2020, the study does not require ethic approval (Ethics Committee of the Medical Faculty, Gartenstraße 47, 72074 Tübingen, Germany; +49 7071 29 77661; ethik.kommission@med.uni-tuebingen.de), ref: 231/202BO1

Primary study design
Interventional

Study design
Two-armed randomized observer-blinded interventional trial

Study type(s)
Other

Health condition(s) or problem(s) studied
Effect of activating competency-based learning on a complex shoulder examination requiring professional posture, transfer of anatomical knowledge and clinical examination skills

Interventions
Current interventions as of 24/03/2021:
Participants (preclinical medical students) will be randomly assigned to either activating competency-based learning (intervention group) or traditional teaching methods.

The blended learning intervention comprises a 1.5-h e-learning module on professional posture and clinical examination as well as functional anatomy of the shoulder. Next, students in the intervention arm attend a 1.5-h peer learning seminar in which they train examining their peers and give mutual feedback.

Participants in the control arm will receive a 1.5 h lecture on shoulder anatomy combined with a patient demonstration by a GP. Next, students in the control arm are offered 1.5 h of free training where shoulder models are available.

Intervention and control at T2 (T0+6 weeks) run parallel and will last 2 weeks in total. They are followed by a 2-day formative exam at T3 (T0+ 8 weeks). For each participant, the exam takes

about 25 minutes. In the exam, the effect of the intervention is measured. Participants are given questionnaires at allocation (T0) and after the exam (T4). The questionnaires take about 15 minutes to complete.

The randomization is provided using an open-source online randomization tool (RANDI).

Previous interventions:
Participants (preclinical medical students) will be randomly assigned to either blended-learning (intervention group) or a face-to-face curriculum.

The blended learning intervention comprises a 1.5-h e-learning module on professional posture and clinical examination as well as functional anatomy of the shoulder. Next, students in the intervention arm attend a 1.5-h peer learning seminar in which they train examining their peers and give mutual feedback.

Participants in the control arm will receive a 1.5 h lecture on shoulder anatomy combined with a patient demonstration by a GP. Next, students in the control arm are offered 1.5 h of free training where shoulder models are available.

Intervention and control at T2 (T0+6 weeks) run parallel and will last 2 weeks in total. They are followed by a 2-day formative exam at T3 (T0+ 8 weeks). For each participant, the exam takes about 25 minutes. In the exam, the effect of the intervention is measured. Participants are given questionnaires at allocation (T0) and after the exam (T4). The questionnaires take about 15 minutes to complete.

The randomization is provided using an open-source online randomization tool (RANDI).

Intervention Type
Behavioural

Primary outcome(s)
Competency in professional posture, physical examination and anatomical knowledge measured as a combined score of maximum 45 points in an examination situation with an actor patient at T3 (8 weeks)

Key secondary outcome(s)
A newly developed and piloted questionnaire measures the following items at T0 and T4 and uses a pseudonym to measure pre-post development in the following domains:
1. Self-assessed competency level in the three domains (professional posture, anatomical knowledge and clinical examination skills)
2. German inventory on attitudes and assessment of blended learning at T0 and T4
3. Perceived stress questionnaire (PSYINDEX) at T0 and T4
4. Technology affinity (ATI) at T0 only
5. Sociodemographic characteristics at T0 only
6. Attitudes to e-learning and ways to improve the experience, assessed using focus groups with participants at T4

Completion date
30/08/2021

Eligibility

Key inclusion criteria
All preclinical students aged >18 years enrolled at the Medical Faculty of the University of Tübingen

Participant type(s)
Health professional

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 Years

Upper age limit
110 Years

Sex
All

Total final enrolment
36

Key exclusion criteria
Health status does not allow participation

Date of first enrolment
03/05/2021

Date of final enrolment
28/05/2021

Locations

Countries of recruitment
Germany

Study participating centre
Tübingen University Hospital
Institut für Allgemeinmedizin und Interprofessionelle Versorgung
Medizinische Fakultät
VITA Gebäude
Osianderstr. 5
Tübingen
Germany
72076

Study participating centre
Eberhard-Karls University Tübingen
Institute of Clinical Anatomy and Cell Analysis
Oesterbergstrasse 3
Tübingen
Germany
72074

Sponsor information

Organisation
Universitätsklinikum Tübingen

ROR
https://ror.org/00pjgxh97

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
Universitätsklinikum Tübingen

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		17/09/2025	25/09/2025	Yes	No
Study website	Study website	11/11/2025	11/11/2025	No	Yes