# Clinical Trial Protocol
# Iranian Registry of Clinical Trials

22 Nov 2026

## Effect of Concept Map-Based Instruction on Learning and Critical Thinking in Undergraduate Forensic Dentistry Education

### Protocol summary


**Study aim**

To evaluate the effect of concept map-based instruction on learning and critical-thinking skills among undergraduate dental students enrolled in a forensic dentistry course.

**Design**

A quasi-experimental pretest–posttest study involving 42 fifth-year dental students in intervention (n=21) and control (n=21) groups. Concept map-based instruction was compared with conventional lecture and PowerPoint-based instruction. Learning and critical thinking were assessed before and after the intervention.

**Settings and conduct**

The study was conducted in the first semester of 2018–2019 at Kerman University of Medical Sciences, Iran. Both groups were taught by the same instructor using a standardized protocol. Knowledge was assessed with a 12-item researcher-developed test, and critical thinking with the Persian version of the California Critical Thinking Skills Test (CCTST-B).

**Participants/Inclusion and exclusion criteria**

Forty-two fifth-year dental students enrolled in the compulsory forensic dentistry course at Kerman University of Medical Sciences were included. Eligibility criteria were fifth-year enrollment, participation in the course, willingness to participate, and no previous experience with concept map-based instruction. Absence from one or more instructional sessions was an exclusion criterion.

**Intervention groups**

Participants were randomly assigned to two groups of 21. The intervention group received concept map-based instruction using case scenarios, key concept identification, concept map construction, and guided discussion, while the control group received conventional PowerPoint-based lectures. Both groups received the same content and learning objectives.

**Main outcome variables**

Knowledge score in forensic dentistry and critical-thinking score measured before and after the intervention. Concept map construction performance was also assessed in the intervention group.


### General information

**Reason for update**

**Acronym**

**IRCT registration information**

IRCT registration number: **IRCT20260910071001N1**
Registration date: **2026-10-17, 1405/07/25**
Registration timing: **retrospective**

Last update: **2026-10-17, 1405/07/25**
Update count: **0**

**Registration date**

2026-10-17, 1405/07/25

**Registrant information**


**Name**

Maryam Moosanejad

**Name of organization / entity**

**Country**

Iran (Islamic Republic of)

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**Recruitment status**

**Recruitment complete**

**Funding source**

**Expected recruitment start date**

2018-03-21, 1397/01/01

**Expected recruitment end date**

2019-05-11, 1398/02/21

**Actual recruitment start date**

empty

**Actual recruitment end date**

empty

**Trial completion date**

empty

**Scientific title**

Effect of Concept Map-Based Instruction on Learning and Critical Thinking in Undergraduate Forensic Dentistry Education

**Public title**

Effect of Concept Map-Based Instruction on Learning and Critical Thinking in Undergraduate Forensic Dentistry Education

**Purpose**

Education/Guidance

**Inclusion/Exclusion criteria**

**Inclusion criteria:**

Fifth-semester dental students who were willing to participate in the study No prior training in the concept map-based teaching method.

**Exclusion criteria:**

There was one absence during the forensic dentistry training course.

**Age**

No age limit

**Gender**

Both

**Phase**

N/A

**Groups that have been masked**

*No information*

**Sample size**

Target sample size: **42**

More than 1 sample in each individual

Number of samples in each individual: **21**

The intervention group consisted of 8 boys and 13 girls, and the control group consisted of 14 boys and 7 girls.

**Randomization (investigator's opinion)**

Randomized

**Randomization description**

A total of 42 fifth-semester dental students currently taking the forensic dentistry course were included in the study via a census approach; they were assigned to either a control group or an intervention group. Given the limited number of students, all eligible dental students were recruited using purposive sampling; although random assignment to groups was employed, the study deviated from true randomization and assumed a quasi-experimental design.

**Blinding (investigator's opinion)**

Not blinded

**Blinding description**

**Placebo**

Not used

**Assignment**

Other

**Other design features**

This prospective quasi-experimental controlled study was conducted among 42 fifth-year dental students enrolled in a compulsory forensic dentistry course. Participants were randomly allocated to either a concept map-based instruction group (n = 21) or a conventional lecture-based teaching group (n = 21). Both groups received identical educational content over two instructional sessions delivered by the same instructor. Knowledge was assessed using a validated researcher-developed 12-item multiple-choice examination, and critical-thinking skills were measured using the Persian version of the California Critical Thinking Skills Test before and after the intervention. Between-group and within-group comparisons were performed using independent- and paired-samples t-tests.

## Secondary Ids

empty

## Ethics committees

### 1

**Ethics committee**

**Name of ethics committee**

Ethics Committee of Kerman University of Medical Sciences

**Street address**

University of Medical Sciences Campus, beginning of Haft-Bagh-e Alavi Boulevard, Kerman

**City**

Kerman

**Province**

Kerman

**Postal code**

7616910002

**Approval date**

2019-02-18, 1397/11/29

**Ethics committee reference number**

IR.KMU.REC.1397.492

## Health conditions studied

### 1

**Description of health condition studied**

Forensic Dentistry Education

**ICD-10 code**

**ICD-10 code description**

## Primary outcomes

### 1

**Description**

Students’ learning score in forensic dentistry course content

**Timepoint**

Before the intervention and immediately after the intervention

**Method of measurement**

Measured using a 12-item written test designed to assess learning; each correct answer was scored 1 point and each incorrect answer 0 points, and the total number of correct responses was calculated as the learning score.

**2**

**Description**
Students' critical thinking score
**Timepoint**
Before the intervention and immediately after the intervention
**Method of measurement**
Measured using the California Critical Thinking questionnaire

## Secondary outcomes

empty

## Intervention groups

**1**

**Description**
Intervention group: Concept map-based instruction in the forensic dentistry course. The course content was reviewed and organized into scenarios, and concept maps were developed following analysis of the content and presented during two instructional sessions.
**Category**
Other

**2**

**Description**
Control group: Conventional instruction in the forensic dentistry course using lectures and PowerPoint presentations.
**Category**
Other

## Recruitment centers

**1**

**Recruitment center**
**Name of recruitment center**
School of Dentistry, Kerman University of Medical Sciences
**Full name of responsible person**
Esmat Nouhi
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Rezvan 17
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## Sponsors / Funding sources

**1**

**Sponsor**
**Name of organization / entity**
Kerman University of Medical Sciences
**Full name of responsible person**
Dr. Hamid Sharifi
**Street address**
Deputy of Research and Technology, Kerman University of Medical Sciences, Ibn Sina Street, Somayeh Intersection (Tahmasab Abad), Kerman, Iran
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sharifihami@gmail.com
**Grant name**
**Grant code / Reference number**
**Is the source of funding the same sponsor organization/entity?**
No
**Title of funding source**
Kerman University of Medical Sciences
**Proportion provided by this source**
100
**Public or private sector**
Public
**Domestic or foreign origin**
Domestic
**Category of foreign source of funding**
*empty*
**Country of origin**
**Type of organization providing the funding**
Academic

## Person responsible for general inquiries

**Contact**
**Name of organization / entity**
Kerman University of Medical Sciences
**Full name of responsible person**
Esmat Nouhi
**Position**
Faculty Members
**Latest degree**
Ph.D.
**Other areas of specialty/work**
Nursery
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## Person responsible for updating data

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## Sharing plan

**Deidentified Individual Participant Data Set (IPD)**
No - There is not a plan to make this available
**Justification/reason for indecision/not sharing IPD**
Due to the need to protect participants' confidentiality and privacy, and considering the educational nature of the study, there is no plan to make individual participant data (IPD) publicly available.
**Study Protocol**
No - There is not a plan to make this available
**Statistical Analysis Plan**
No - There is not a plan to make this available
**Informed Consent Form**
No - There is not a plan to make this available
**Clinical Study Report**
Not applicable
**Analytic Code**
Not applicable
**Data Dictionary**
Not applicable