Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 2026

Effectiveness of Ergonomic Principles Training and Workplace Stretching Exercises on Reducing Upper Limb Musculoskeletal Disorders in Dentists

Protocol summary

Study aim
The aim of this study is to evaluate the effectiveness of online general ergonomics training and preventive stretching exercises in managing upper extremity musculoskeletal disorders among dentists.

Design
a quasi-experimental pretest–posttest study on 19 dentists

Settings and conduct
After obtaining ethical approval participants will be enrolled in the study. The status of upper extremity musculoskeletal disorders at baseline will be assessed using the Disabilities of the Arm, Shoulder, and Hand questionnaire. The training sessions will be delivered through online platforms.

Participants/Inclusion and exclusion criteria
Inclusion criteria: Being a dentist, age between 27 and 65 years, at least 1 year of work experience (one year after completing the program). Exclusion criteria: unwillingness to participate in the study.

Intervention groups
In this study, dentists' upper limb disability is assessed with the DASH questionnaire before and after a two-month intervention. The intervention consists of two parts: two virtual training sessions: the first session is about ergonomic risk factors (improper posture, repetitive movements, inappropriate tools, etc.), the second session is about strategies to correct these factors. Virtual training on stretching exercises: sending 16 educational posters including stretching exercises applicable in the workplace and how to perform them; participants must perform these exercises daily and at least three times per shift and report them.

Main outcome variables
The total score of the shortened version of the Disabilities of the Arm, Shoulder, and Hand

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20251223068421N1**
Registration date: **2026-04-26, 1405/02/06**
Registration timing: **retrospective**

Last update: **2026-04-26, 1405/02/06**
Update count: **0**

Registration date
2026-04-26, 1405/02/06

Registrant information
Name
Ali Moradi
Name of organization / entity
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Iran (Islamic Republic of)
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Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2026-01-21, 1404/11/01

Expected recruitment end date
2026-04-20, 1405/01/31

Actual recruitment start date
empty

Actual recruitment end date
empty

Trial completion date
empty

Scientific title

Effectiveness of Ergonomic Principles Training and Workplace Stretching Exercises on Reducing Upper Limb Musculoskeletal Disorders in Dentists

Public title
Ergonomics and Stretching Training for Dentists' Musculoskeletal Pain
Purpose
Education/Guidance
Inclusion/Exclusion criteria
Inclusion criteria:
At least 1 year of work experience (one year after completing mandatory service) Being a dentist Age 27 to 65 years
Exclusion criteria:
Unwillingness to participate in the study
Age
From **27 years** old to **65 years** old
Gender
Both

Phase
N/A
Groups that have been masked
No information
Sample size
Target sample size: **19**
Randomization (investigator's opinion)
N/A
Randomization description
Blinding (investigator's opinion)
Not blinded
Blinding description
Placebo
Not used
Assignment
Single
Other design features
A quasi-experimental pretest–posttest study on 19 dentists. Upper-extremity musculoskeletal disability will be assessed using the QuickDASH questionnaire. Ergonomics and workplace stretching trainings will be delivered via educational contents and videos on online platforms

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Ethics committee of Hamadan University of Medical Sciences
Street address
Hamadan University of Medical Sciences, Shahid Fahmideh St, Hamadan
City
Hamadan
Province
Hamadan
Postal code
6517838736
Approval date
2025-09-20, 1404/06/29
Ethics committee reference number
IR.UMSHA.REC.1404.496

Health conditions studied

1

Description of health condition studied
Upper limb work-related musculoskeletal disorders in dentists
ICD-10 code
M79.1
ICD-10 code description
Myalgia

Primary outcomes

1

Description
Total score of the shortened Disabilities of the Arm, Shoulder and Hand questionnaire (range 0 to 100; higher scores indicate greater functional disability)
Timepoint
At baseline (before training) and 2 months after training
Method of measurement
the shortened Disabilities of the Arm, Shoulder and Hand questionnaire

Secondary outcomes

1

Description
Subscale score for upper extremity symptoms and function in the shortened Disabilities of the Arm, Shoulder and Hand questionnaire
Timepoint
At baseline (before training) and after completion of the 2-month training period
Method of measurement
the shortened Disabilities of the Arm, Shoulder and Hand questionnaire and the subscale score was calculated

Intervention groups

1

Description
Intervention group: The level of upper limb disability among participants who meet the study's inclusion criteria will be measured using the DASH (Disabilities of the Arm, Shoulder, and Hand) instrument. Subsequently, participants will undergo a "two-month ergonomics educational intervention" comprised of the following components: Part I – Classroom-based Instruction Based

on scientific content and published research articles, two virtual training sessions will be held on the Skyroom platform during the fourth and sixth weeks of the intervention. 1) First session (approximately one hour): This session will address ergonomic risk factors such as improper posture, prolonged working hours, repetitive movements, vibration, and unsuitable hand tools in clinical environments. The aim is to ensure that dentists become familiar with the causes of musculoskeletal disorders and are able to recognize them effectively in their workplaces. 2) Second session (approximately one hour): This session will focus on strategies for mitigating the identified ergonomic risk factors. Participants will be introduced to appropriate workstation designs, healthy behavioral habits, ergonomic hand tools, and related topics. They will be expected to select and implement suitable solutions according to the risk factors identified in their own work settings.Part II – Social network-based TrainingDrawing upon scientific sources and published articles, appropriate stretching and exercise movements to relieve tension caused by static and improper postures will be developed—movements that can be performed within the dental work environment. Using artificial intelligence tools, the content will be prepared as illustrative pictorial messages with detailed explanations. To achieve this goal, 16 educational posters will be designed, each containing clear and motivational explanations including a full description of the movement, targeted body region, recommended daily frequency, and repetitions per session. These posters will be delivered to participants via online platforms. Participants will be instructed to include these exercises in their daily routines and perform them at least three times during each work shift. Furthermore, they will be asked to notify the researcher through a reaction whenever they perform the instructed movements.By the end of the eighth week, participants are expected to be familiar with and able to correctly perform all 16 stretching exercises related to upper limb and neck discomfort.At the conclusion of the two-month intervention, the dental practitioners' upper limb disability levels will be reassessed using the DASH to evaluate the effectiveness of the designed educational intervention.

Category
Behavior

Recruitment centers

1

Recruitment center

Name of recruitment center
Faculty of Dentistry, Hamadan University of Medical Sciences

Full name of responsible person
Ali Moradi

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Faculty of Dentistry, Hamadan University of Medical Sciences, Shahid Fahmideh Boulevard, Pajouhesh Crossroad, Hamadan, Iran

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity
Hamedan University of Medical Sciences

Full name of responsible person
Alireza Soltanian

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Office of Vice Chancellor for Research and Technology, Hamadan University of Medical Sciences, Building No. 4, Shariati Crossroad, Hamadan, Iran

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Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?
Yes

Title of funding source
Hamedan 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
Hamedan University of Medical Sciences

Full name of responsible person
Ali Moradi

Position
General Dentistry Student

Latest degree

A Level or less

Other areas of specialty/work

Dentistry

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Position

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Latest degree

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Person responsible for updating data

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Sharing plan

Deidentified Individual Participant Data Set (IPD)

Yes - There is a plan to make this available

Study Protocol

Yes - There is a plan to make this available

Statistical Analysis Plan

Yes - There is a plan to make this available

Informed Consent Form

No - There is not a plan to make this available

Clinical Study Report

Yes - There is a plan to make this available

Analytic Code

Yes - There is a plan to make this available

Data Dictionary

Yes - There is a plan to make this available

Title and more details about the data/document

De identified individual participant data including baseline demographic variables and the shortened Disabilities of the Arm, Shoulder and Hand questionnaire scores at baseline and after completion of the 2 month training period; along with the data dictionary and the study protocol

When the data will become available and for how long

Access will start 6 months after publication of the main results and will remain available for 5 years

To whom data/document is available

Researchers from universities and scientific centers who has specific scientific aims

Under which criteria data/document could be used

Use is permitted only for scientific purposes such as meta analysis, systematic reviews, and secondary analyses related to the study objectives; only de identified data will be shared; requestors must sign a data use agreement, agree not to attempt re identification, not to share data with third parties, and to cite the trial registration in any resulting publications

From where data/document is obtainable

Requests should be sent to the principal investigator: Ali Moradi, email Ali.moradi206@gmail.com , mobile 0098 9359385871

What processes are involved for a request to access data/document

Requestors submit a written application including the proposed project title, objectives, analysis plan, and institutional details; the research team reviews the request; if approved, a data use agreement is signed and the de identified dataset, data dictionary, and protocol

are provided electronically	
Comments	The informed consent form will not be publicly shared due to confidentiality and research ethics considerations