

Clinical Trial Protocol

Iranian Registry of Clinical Trials

10 Jun 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

Country

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 Training Drawing 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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Sponsors / Funding sources

1

Sponsor

Name of organization / entity
Hamedan University of Medical Sciences

Full name of responsible person
Alireza Soltanian

Street address
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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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