

The effect of virtual reality distraction on dental anxiety and pain in adults undergoing root canal treatment

Submission date 13/10/2026	Recruitment status No longer recruiting	☐ Prospectively registered ☐ Protocol
Registration date 13/10/2026	Overall study status Completed	☐ Statistical analysis plan ☐ Results
Last Edited 13/10/2026	Condition category Oral Health	☐ Individual participant data ☒ Record updated in last year

Plain English summary of protocol

Background and study aims

Root canal treatment can cause anxiety and discomfort for some patients. Virtual reality (VR) may help patients feel more relaxed by distracting them with calming images and sounds during dental procedures.

This study aimed to investigate whether VR-based audiovisual distraction could reduce anxiety and pain in adults undergoing root canal treatment compared with conventional treatment without VR.

Who can participate?

Adults aged 18 years or older who required root canal treatment or retreatment at the Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia.

What does the study involve?

Participants were randomly assigned to one of two groups. Patients in the VR group wore a headset displaying relaxing nature scenes accompanied by calming music for approximately 15–20 minutes during the early stages of root canal treatment, including local anesthesia, placement of the rubber dam, and preparation of the tooth.

Patients in the control group received conventional root canal treatment without VR and wore standard protective glasses.

Dental anxiety was assessed before and immediately after treatment using a standardized questionnaire. Pain, heart rate, and blood pressure were also measured. Patients who used VR completed an additional questionnaire about their experience and satisfaction.

What are the possible benefits and risks of participating?

VR was intended to provide a relaxing distraction during dental treatment. Some patients might experience discomfort or difficulty tolerating the headset. Participants were assessed for their ability to use VR before enrollment.

Where is the study run from?

The Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia.

When is the study starting and how long is it expected to run for?

September 2023 to May 2024.

Who is funding the study?

The Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia.

Who is the main contact?

Prof Loai Alsofi, lalsofi@kau.edu.sa, at the Department of Endodontics, Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia.

Contact information

Type(s)

Principal investigator, Scientific, Public

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Deanship of Scientific Research (DSR), King Abdulaziz University IPP funding reference

274-165-2026

Study information

Scientific Title

Effect of virtual reality-based audiovisual distraction on dental anxiety and pain during nonsurgical root canal treatment: a randomized controlled clinical trial

Study objectives

To evaluate the effectiveness of virtual reality (VR)-based audiovisual distraction in reducing dental anxiety and perceived pain among adult patients undergoing nonsurgical root canal

treatment, compared with conventional treatment without VR. Secondary objectives include assessing changes in heart rate and blood pressure and evaluating patient acceptance and satisfaction with VR.

Ethics approval required

Ethics approval required

Ethics approval(s)

Approved 08/05/2023, Research Ethics Committee, Faculty of Dentistry, King Abdulaziz University (Faculty of Dentistry, King Abdulaziz University, P.O. Box 80209, Jeddah, 21589, Saudi Arabia; +966126952000; lalsofi@kau.edu.sa), ref: 043-03-22

Primary study design

Interventional

Allocation

Randomized controlled trial

Masking

Open (masking not used)

Control

Active

Assignment

Parallel

Purpose

Supportive care

Study type(s)

Health condition(s) or problem(s) studied

Dental anxiety and pain associated with nonsurgical root canal treatment (endodontic treatment) in adult patients.

Interventions

This was a single-center, two-arm, parallel-group randomized controlled clinical trial involving 100 adult patients undergoing nonsurgical root canal treatment or retreatment. Participants were randomly allocated using a computer in a 1:1 ratio to either a virtual reality (VR) intervention group (n = 50) or a control group (n = 50).

Intervention group: Participants wore a Shinecon 3D VR headset with integrated headphones displaying standardized nature scenes accompanied by relaxing music. VR audiovisual distraction was provided for approximately 15–20 minutes during local anesthesia administration, rubber dam isolation, and access cavity preparation.

Control group: Participants underwent conventional nonsurgical root canal treatment without VR distraction and wore standard clear protective glasses.

Dental anxiety, pain, heart rate, and blood pressure were assessed using standardized measurements before and after the intervention. Participants in the VR group also completed a post-treatment questionnaire evaluating their acceptance of and satisfaction with VR.

Intervention Type

Behavioural

Primary outcome(s)

1. Dental anxiety measured using the Modified Dental Anxiety Scale (MDAS), total score at baseline before treatment and immediately after treatment

Key secondary outcome(s)

1. Perceived dental pain measured using the Wong-Baker FACES Pain Rating Scale at baseline before treatment and immediately after treatment (retrospective assessment of procedural pain)

2. Heart rate measured using beats per minute (bpm) at baseline before treatment and immediately after treatment

3. Systolic blood pressure measured using a sphygmomanometer (mmHg) at baseline before treatment and immediately after treatment

4. Diastolic blood pressure measured using a sphygmomanometer (mmHg) at baseline before treatment and immediately after treatment

5. VR acceptance and satisfaction measured using a study-specific questionnaire assessing enjoyment, willingness to reuse VR, perceived effectiveness, and overall satisfaction, at immediately after treatment, VR group only

Completion date

31/05/2024

Eligibility

Key inclusion criteria

1. Adults aged 18 years or older
2. Patients requiring nonsurgical root canal treatment or endodontic retreatment of a permanent tooth
3. Patients able to understand the study procedures and provide informed consent
4. Patients able to tolerate and engage with the virtual reality (VR) headset during the pre-enrollment familiarization assessment

Healthy volunteers allowed

No

Age group

Mixed

Lower age limit

18 Years

Upper age limit

90 Years

Sex

All

Total final enrolment

100

Key exclusion criteria

1. Patients with cognitive impairment or other conditions preventing adequate understanding of study procedures or effective engagement with virtual reality (VR)
2. Patients unable to tolerate or comfortably use the VR headset during the pre-enrollment familiarization assessment
3. Patients taking anxiolytics, antidepressants, narcotics, or sedative medications
4. Patients with a history of epilepsy or seizure disorders

Date of first enrolment

01/09/2023

Date of final enrolment

28/04/2024

Locations**Countries of recruitment**

Saudi Arabia

Sponsor information**Organisation**

King Abdulaziz University

ROR

<https://ror.org/02ma4wv74>

Funder(s)**Funder type****Funder Name**

King Abdulaziz University

Alternative Name(s)

, L'université du Roi Abdulaziz, La Universidad Rey Abdulaziz, King Abdulaziz University of Saudi Arabia, KAU

Funding Body Type

Government organisation

Funding Body Subtype

Local government

Location

Saudi Arabia

Results and Publications

Individual participant data (IPD) sharing plan**IPD sharing plan summary**

Not expected to be made available