

Piezoelectric drills for dental implants

Submission date 08/04/2024	Recruitment status No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
Registration date 09/04/2024	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
Last Edited 06/01/2026	Condition category Oral Health	<input type="checkbox"/> Individual participant data

Plain English summary of protocol

Background and study aims

Traditional dental implant site preparation methods pose challenges including tissue damage and compromised appearance. Piezosurgery offers a minimally invasive alternative, but its effectiveness is underexplored. This study aims to compare piezosurgery and conventional surgery for dental implant site preparation, focusing on bone density, implant stability, and bone loss.

Who can participate?

Patients aged 18-50 years who are missing at least two teeth, at least one of which is in the back region of the lower jaw

What does the study involve?

Patients are treated sequentially at the two sites where they are missing teeth: at one site implant placement is conducted using piezoelectric surgery and at the other site conventional surgery is used. Post-surgical evaluations were conducted at 6 and 9 months.

What are the possible benefits and risks of participating?

Participants may benefit from receiving dental implants. Possible risks are post-operative complications including pain and swelling.

Where is the study run from?

Army Hospital Research and Referral (India)

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

December 2016 to October 2023

Who is funding the study?

Army Hospital Research and Referral (India)

Who is the main contact?

Manish Rathi, manishrathi.077h@gov.in

Contact information

Type(s)

Public, Scientific, Principal investigator

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Additional identifiers**Clinical Trials Information System (CTIS)**

Nil known

ClinicalTrials.gov (NCT)

Nil known

Protocol serial number

16CNAHMMDS000002

Study information**Scientific Title**

Comparative evaluation of piezosurgery versus conventional surgery in dental implants

Study objectives

Implant sites prepared with piezoelectric drills are better in terms of implant stability, bone density around implants and patient post-operative recovery.

Ethics approval required

Ethics approval required

Ethics approval(s)

approved 29/09/2016, Army Dental Centre (R&R) Institutional Committee (Dhaura Kuan, New Delhi, 110010, India; +91 (0)9862157110; dental.oc86-ar@gov.in), ref: 16CNAHMMDS000002

Study design

Single-centre split-mouth interventional randomized controlled trial

Primary study design

Interventional

Study type(s)

Treatment

Health condition(s) or problem(s) studied

Dental implant

Interventions

Thirty patients with two edentulous sites, at least one of which was in the posterior mandibular region, were treated sequentially at two sites: Site A, where implant placement was conducted using piezoelectric surgery, and Site B, where conventional surgery was employed. Post-surgical evaluations were conducted at 6 and 9 months.

Intervention Type

Procedure/Surgery

Primary outcome(s)

1. Bone density measured using dual-energy x-ray absorptiometry (DEXA) scan at baseline, 6 and 9 months
2. Implant stability measured using resonance frequency analysis (RFA) scan at baseline and 6 months

Key secondary outcome(s)

Patient's perception of surgery by measuring postoperative pain using a visual analogue scale (VAS) at 7 days postoperative

Completion date

31/10/2023

Eligibility**Key inclusion criteria**

1. Aged 18 - 50 years
2. Edentulous site in posterior mandibular region
3. Availability of adequate bone volume without any surgical modification

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Adult

Lower age limit

18 years

Upper age limit

50 years

Sex

All

Total final enrolment

30

Key exclusion criteria

1. H/o extraction <6 months prior to placement of implant
2. Immunocompromised individual
3. Previous irradiation treatment in head and neck area
4. H/o periodontal disease (active/treated)
5. H/o bone metabolic disorders

Date of first enrolment

16/12/2016

Date of final enrolment

26/01/2022

Locations**Countries of recruitment**

India

Study participating centre

ADC (R&R)

Dhaura Kuan

New Delhi

India

110010

Sponsor information**Organisation**

Army Hospital Research and Referral

ROR

<https://ror.org/04zh7mt66>

Funder(s)**Funder type**

Hospital/treatment centre

Funder Name

Army Hospital Research and Referral

Results and Publications

Individual participant data (IPD) sharing plan

Data is saved in a non-publicly available repository: the institutional repository of the University of Delhi.

The type of data stored: tables, figures, photographs.

The process for requesting access (if non-publicly available): contact the corresponding author Manish Rath (manishrathi.077h@gov.in).

IPD sharing plan summary

Stored in non-publicly available repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		27/11/2025	06/01/2026	Yes	No