

Piezoelectric drills for dental implants

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

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

Contact name

Dr Manish Rathi

ORCID ID

<https://orcid.org/0000-0002-7689-2506>

Contact details

D3-113
NDA Khadakwasla
Pune
India
411023
+91 (0)9971238331
manishrathi.077h@gov.in

Additional identifiers

Clinical Trials Information System (CTIS)

Nil known

ClinicalTrials.gov (NCT)

Nil known

Protocol serial number

16CNAHMDS000002

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 (Dhaua Kuan, New Delhi, 110010, India; +91 (0)9862157110; dental.oc86-ar@gov.in), ref: 16CNAHMDS000002

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)

Dhaula 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-publically 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 Rathi (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?
<u>Results article</u>		27/11/2025	06/01/2026	Yes	No