

# Piezoelectric drills for dental implants

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

**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****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)**

Dhaulta 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?
<a href="#">Results article</a>		27/11/2025	06/01/2026	Yes	No