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Comparison of piezoelectric surgery with conventional technique in preparing dental implant beds

Submission date 07/05/2025	**Recruitment status** Recruiting	[X] Prospectively registered [_] Protocol [_] Statistical analysis plan [_] Results [_] Individual participant data [X] Record updated in last year
Registration date 19/05/2025	**Overall study status** Ongoing	
Last Edited 19/05/2025	**Condition category** Oral Health	

Plain English summary of protocol

Background and study aims
Dental implant treatment involves many invasive procedures, therefore, many studies aim to make it a less traumatic treatment. This study evaluates the effectiveness of piezoelectric surgery, which uses ultrasonic vibrations to perform bone surgery, in reducing postoperative pain and oedema, and improving the dental implant success rate.

Who can participate?
Adult patients who are systemically stable and have bilateral edentulous areas and sufficient alveolar bone volume.

What does the study involve?
The experimental group will receive dental implants using piezoelectric surgery, while the control group will receive the traditional dental implant procedure. The participants will be followed up for 90 days.

What are the possible benefits and risks of participating?
The potential benefits of using piezoelectric surgery include reducing postoperative pain and oedema. However, the potential risks involve a dental implant failure rate of up to 5%.

Where is the study run from?
Oral and Maxillofacial Surgery Hospital, Faculty of Dentistry, Damascus University (Syria).

When is the study starting and how long is it expected to run for?
November 2022 to November 2026

Who is funding the study?
Investigator initiated and funded

Who is the main contact?
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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
Nil known

Study information

Scientific Title
Comparing of piezoelectric surgery with conventional drilling in preparing of dental implant beds: randomized, controlled clinical trial

Study objectives
The null hypothesis posited that there is no a significant difference between piezoelectric surgery and conventional drilling in dental implant stability

Ethics approval required
Ethics approval required

Ethics approval(s)

approved 18/10/2022, Vice President for Scientific Research and Study in Damascus University (Damascus University (Oral and Maxillofacial Surgery Department - Faculty of Dental Medicine) (Mezzeh Highway), Damascus, -, Syria; +963; dean.dent@damascusuniversity.edu.sy), ref: DN-180225-416

Study design
Randomized controlled trial

Primary study design
Interventional

Study type(s)
Quality of life, Treatment

Health condition(s) or problem(s) studied
Dental implant insertion in edentulous areas of the mouth

Interventions
This study is a randomized controlled trial, involving piezoelectric surgery tips and conventional drills in dental implant bed preparation. The experimental group received piezoelectric surgery while the control group received the conventional drilling for dental implant bed preparations. Implant stability is measured using a resonance frequency analysis device during the surgery intervention time, after 30, 60 and 90 days. Each group was randomly selected using http://www.randomizer.org/

Intervention Type
Procedure/Surgery

Primary outcome(s)
Dental implant stability was measured using a resonance frequency analysis device at the surgery intervention time, and at 30, 60 and 90 days

Key secondary outcome(s))
Pain severity postoperatively in each group was measured using a Visual Analogue Scale (VAS) over 7 days

Completion date
30/11/2026

Eligibility

Key inclusion criteria
1. Stable medical condition and able to withstand the stress of surgery
2. At least 6 months of teeth extraction healing without any grafting
3. Minimum alveolar bone dimensions required of6mm in width and 12mm in height in both implantation sites

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
20 years

Upper age limit
60 years

Sex
All

Key exclusion criteria
1. Unstable systemic conditions
2. Harmful oral habits (such as smoking, high load occlusions)
3. A history of radiation, chemical, or bisphosphonate therapy

Date of first enrolment
10/11/2025

Date of final enrolment
13/11/2026

Locations

Countries of recruitment
Syria

Study participating centre
Oral and Maxillofacial Surgery Hospital, Faculty of Dentistry, Damascus University
Mezzeh Highway
Damascus
Syria
4671

Sponsor information

Organisation
Damascus University

ROR
https://ror.org/03m098d13

Funder(s)

Funder type
Other

Funder Name
Investigator initiated and funded

Results and Publications

Individual participant data (IPD) sharing plan
The data sharing plans for the current study are unknown and will be made available at a later date.

IPD sharing plan summary
Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes