

How accurate is 3d dental scanning in measuring gum thickness compared to other common methods?

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		<input type="checkbox"/> Protocol
Registration date 11/09/2025	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
Last Edited 11/09/2025	Condition category Oral Health	<input type="checkbox"/> Individual participant data
		<input checked="" type="checkbox"/> Record updated in last year

Plain English summary of protocol

Background and study aims

This study aims to find out how accurately cone beam computed tomography (CBCT) - a 3D dental scanning technique - can measure gum thickness compared to other widely used methods like bone sounding, using an ultrasonic probe, or a digital caliper. Accurately measuring gum thickness is important for planning dental treatments such as implants, orthodontics, and gum surgery.

Who can participate?

Adults (18 years and older) who are scheduled for oral surgery (for example, root resection or dental implant therapy) at the University Clinic of Dentistry, Medical University of Vienna

What does the study involve?

Participants undergo gum thickness measurements at a specific point on their gum using four different techniques:

1. CBCT scan (while wearing a special mouth splint for accurate positioning)
2. Bone sounding (after local anesthesia, using a small probe)
3. Ultrasonic probe
4. Digital caliper (after a gum flap is lifted during surgery)

All measurements are taken under standardized conditions before planned surgery.

What are the possible benefits and risks of participating?

Participants may not directly benefit, but the study will help improve gum assessment methods for future dental treatments, making diagnosis and treatment planning easier and less invasive. All procedures (except the CBCT scan) are part of standard surgical care. The main additional procedure is the CBCT scan, which involves a small increase in radiation exposure, but this is minimized and within dental safety standards. Discomfort during standard gum measurements is minor and brief.

Where is the study run from?

Medical University of Vienna (Austria)

When is the study starting and how long is it expected to run for?
January 2012 to July 2012

Who is funding the study?
Medical University of Vienna (Austria)

Who is the main contact?
Prof. Gabriella Dvorak, gabriella.dvorak@meduniwien.ac.at

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Public, Scientific

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number

EK Nr:1132/2011

Study information

Scientific Title

Accuracy of cone beam computed tomography in gingival thickness measurement

Study objectives

Although cone beam computed tomography (CBCT) is used to evaluate bone volume, it would be beneficial to also measure gingival thickness at the same time. The purpose of this research was to determine whether or not gingival thickness measurement carried out with CBCT is reliable.

Ethics approval required

Ethics approval required

Ethics approval(s)

approved 10/01/2012, Ethics Committee of the Medical University of Vienna (Borschkegasse 8b /6, Wien, 1090, Austria; +43 (0)1 40400 21470; ethik-kom@meduniwien.ac.at), ref: EK Nr: 1132 /2011

Study design

Single-center diagnostic accuracy study

Primary study design

Observational

Study type(s)

Diagnostic

Health condition(s) or problem(s) studied

Gingival thickness measurement

Interventions

Gingival thickness at the buccal aspect was assessed using four methods:

1. Cone beam computed tomography
2. Bone sounding
3. Ultrasonic device
4. Digital caliper

Local anaesthesia was administered before all measurements.

Bone sounding was performed immediately after radiography using CBCT with the thermoplastic splint in situ. A thermoplastic splint was positioned in the mouth, hence a measurement point was tagged on the gingiva using a gingival marker pen. Bone sounding was performed to measure the distance to the bony surface.

The gingival thickness was measured immediately after elevation of a mucoperiosteal flap twice from two different investigators with a digital caliper on the marked position.

Within 15 minutes, all four measurement methods were evaluated in a standardized setting and in the order specified in the evaluation process.

Intervention Type

Other

Primary outcome(s)

Gingival (gum) thickness at the buccal aspect, measured in millimeters using:

1. Cone beam computed tomography (CBCT)
2. Bone sounding (gold standard/transgingival probing)
3. Ultrasonic probe
4. Digital caliper

All measurements are taken at a single timepoint during preoperative assessment (before any surgical intervention, after local anesthesia, within a 15-minute window per patient)

Key secondary outcome(s)

There are no secondary outcome measures

Completion date

30/07/2012

Eligibility

Key inclusion criteria

Consecutive patients requiring surgical dental procedures (e.g., root resection or implant placement) involving flap elevation

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Adult

Lower age limit

18 years

Upper age limit

90 years

Sex

All

Total final enrolment

41

Key exclusion criteria

1. Pregnant women
2. Lactating women
3. Patients below the age of 18 years

Date of first enrolment

01/02/2012

Date of final enrolment

15/07/2012

Locations

Countries of recruitment

Austria

Study participating centre

University Clinic of Dentistry, Medical University of Vienna

Sensengasse 2 A

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Sponsor information

Organisation

Medical University of Vienna

ROR

<https://ror.org/05n3x4p02>

Funder(s)

Funder type

Not defined

Funder Name

Medizinische Universität Wien

Alternative Name(s)

Medical University of Vienna, MediUni Wien

Funding Body Type

Government organisation

Funding Body Subtype

Local government

Location

Austria

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