

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

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		<input type="checkbox"/> Protocol
<b>Registration date</b> 11/09/2025	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
<b>Last Edited</b> 11/09/2025	<b>Condition category</b> 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](mailto:gabriella.dvorak@meduniwien.ac.at)

## Contact information

**Type(s)**  
Public, Scientific

**Contact name**  
Dr Selma Dervisbegovic

**ORCID ID**  
<https://orcid.org/0000-0003-3325-013X>

**Contact details**  
Sensengasse 2 A  
Vienna  
Austria  
1090  
+43 (0)1400704720  
[selma.dervisbegovic@meduniwien.ac.at](mailto:selma.dervisbegovic@meduniwien.ac.at)

**Type(s)**  
Principal investigator

**Contact name**  
Prof Gabriella Dvorak

**Contact details**  
Sensengasse 2 A  
Vienna  
Austria  
1090  
+43 (0)1400704720  
[gabriella.dvorak@meduniwien.ac.at](mailto:gabriella.dvorak@meduniwien.ac.at)

## Additional identifiers

**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

Vienna

Austria

1090

## 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