

# Measurement of orthodontic tooth movement with dental magnetic resonance imaging

<b>Submission date</b> 11/04/2024	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 11/04/2024	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 16/05/2025	<b>Condition category</b> Oral Health	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

The objective of this clinical investigation is to examine different types of gums before starting orthodontic treatment and to analyze how the soft and hard tissues around the lower front teeth change during the process of moving them with braces. We will be using a new technique called dental MRI, which doesn't involve radiation like traditional CBCT imaging, to examine the dimensions of both soft and hard tissues around the lower front teeth..

### Who can participate?

Adolescent (aged 12 - 18 years) patients with substantial treatment need and crowding in the mandible.

### What does the study involve?

In this study, we will examine different types of gums using both clinical assessments and imaging techniques such as CBCT scans and intraoral scans. Additionally, we will use a new method called dental magnetic resonance imaging (MRI), which can show both soft and hard tissues. We will compare the measurements obtained from CBCT and intraoral scanning with those from dental MRI. We're particularly interested in the thickness of the free gingiva, the gingiva above and below the crest of the bone, and the size of the bone around the lower front teeth. Throughout the treatment process, we will monitor the lower front teeth of the patients for five months using dental MRI.

### What are the possible benefits and risks of participating?

Benefits of participation are the combination of radiologically assessed soft tissue dimensions and their monitoring throughout the initial treatment phase, ensuring that patients do not undergo unnecessary surgical procedures such as soft tissue augmentation, while at the same time selecting those who do require such a procedure.

Risks associated with the study interventions include patients experiencing claustrophobia during the MRI scan.

### 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?  
May 2021 to May 2024

Who is funding the study?  
Investigator initiated and funded

Who is the main contact?  
Dr Linda Schwarz, linda.schwarz@meduniwien.ac.at

## Contact information

### Type(s)

Public, Scientific, Principal investigator

### Contact name

Dr Linda Schwarz

### ORCID ID

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### Contact details

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## Additional identifiers

### Clinical Trials Information System (CTIS)

Nil known

### Protocol serial number

CPMS1090

## Study information

### Scientific Title

A novel approach for measurement of orthodontic tooth movement with dental magnetic resonance imaging

### Study objectives

There is no statistical significant difference in tissue dimensions in patients before, and after start of orthodontic treatment

### Ethics approval required

Ethics approval required

**Ethics approval(s)**

approved 06/07/2021, Ethics Committee of the Medical University of Vienna (Borschkegasse 8b, Vienna, 1090, Austria; +43 1 40400 21470; ethik-kom@meduniwien.ac.at), ref: 1654/2021

**Study design**

Prospective pilot study

**Primary study design**

Observational

**Study type(s)**

Diagnostic, Treatment

**Health condition(s) or problem(s) studied**

Moderate to severe crowding in the mandible

**Interventions**

2 MRI examinations, one before (T0) and one five months after (T1) start of orthodontic treatment.

**Intervention Type**

Other

**Primary outcome(s)**

Gingiva and bone thickness around the lower anterior teeth measured using MRI before (T0) and one five months after (T1) start of orthodontic treatment

**Key secondary outcome(s)**

Tooth movement measured using MRI before (T0) and one five months after (T1) start of orthodontic treatment

**Completion date**

01/05/2024

**Eligibility****Key inclusion criteria**

1. Crowding in the mandible of >3mm
2. All permanent teeth in the mandible, no missing teeth in the mandible
3. >12 years of age, orthodontic treatment need (IOTN 4 or 5)

**Participant type(s)**

Patient

**Healthy volunteers allowed**

No

**Age group**

Child

**Lower age limit**

12 years

**Upper age limit**

18 years

**Sex**

All

**Key exclusion criteria**

1. Claustrophobia
2. Systemic diseases
3. Cranio-facial anomalies
4. Smoking

**Date of first enrolment**

01/01/2022

**Date of final enrolment**

15/01/2025

**Locations****Countries of recruitment**

Austria

**Study participating centre**

Medical University of Vienna

Sensengasse 2a

Vienna

Austria

1090

**Sponsor information****Organisation**

Medical University of Vienna

**ROR**

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

**Funder(s)**

## Funder type

Other

## Funder Name

Investigator initiated and funded

# Results and Publications

## Individual participant data (IPD) sharing plan

The datasets generated during and analysed during the current study are not expected to be made available due to the highly sensitive nature of radiologic datasets.

## IPD sharing plan summary

Not expected to be made available

## Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>		15/05/2025	16/05/2025	Yes	No