

# INPLASY

## Correlation between clinical methods and CBCT cone-beam tomography in periodontal biotype determination: Systematic review

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### ADMINISTRATIVE INFORMATION

**Support** - No support.

**Review Stage at time of this submission** - Completed but not published.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202650087

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 15 May 2026 and was last updated on 15 May 2026.

### INTRODUCTION

**Review question / Objective** The primary objective of this systematic review is to investigate whether there is a correlation between clinical methods and cone-beam computed tomography (CBCT) for determining periodontal biotype.

#### Condition being studied

**Objective:** This systematic review aims to analyze the correlation between traditional clinical methods and cone-beam computed tomography (CBCT) in determining the periodontal biotype.

#### Methods:

An electronic search was conducted to identify randomized clinical trials (RCTs) comparing CBCT with conventional clinical techniques for assessing gingival and bone thickness. The study followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. The risk of bias was evaluated using the Cochrane Collaboration's Risk of Bias tool.

#### Results:

A total of 11 cross-sectional studies, including 540 patients, were analyzed. The findings revealed a significant increase in gingival thickness and underlying alveolar bone thickness in individuals with a thick periodontal phenotype. Clinical assessment of soft tissue thickness can be easily performed using a periodontal probe by evaluating the transparency of the probe's contour through the gingival sulcus or via transgingival probing with an endodontic K-file under anesthesia.

This correlation provides valuable insights during initial examinations, particularly for procedures that may impact periodontal structures, such as immediate implant placement and orthodontic treatment.

#### Conclusions:

CBCT is a reliable method for measuring gingival and bone thickness in both anterior and posterior regions, offering more precise and reproducible results compared to transgingival probing.

## METHODS

**Search strategy** A comprehensive search of electronic databases was carried out to identify relevant studies for this review. Four primary sources of scientific evidence were utilized: MEDLINE (PubMed), ScienceDirect, Cochrane, and EBSCO

The search process was conducted independently by three researchers (O. B. M., A. Kh., and B. S.), each performing the task separately and in triplicate to ensure accuracy and consistency.

The study selection was based on five specific keywords:

- Periodontium
- Gingiva
- Gingival phenotype
- Cone beam CT
- Alveolar bone loss

These terms were applied in four different search combinations to refine the results and capture relevant studies:

- (“Periodontium” [Mesh] ) AND “Cone-Beam Computed Tomography” [Mesh]
- (“Gingiva”[Mesh] ) AND “Cone-Beam Computed Tomography”[Mesh]
- (“Gingiva”[Mesh] ) AND “Cone-Beam Computed Tomography”[Mesh] AND “Diagnosis”[Mesh]
- (“Periodontium”[Mesh]) AND “Cone-Beam Computed Tomography”[Mesh] AND “Diagnosis” [Mesh].

**Participant or population** Included individuals (both men and women) with a healthy periodontium and intact anterior teeth, free from periodontal disease.

**Intervention** - Clinical assessment methods: Visual examination, probe transparency evaluation, ultrasound, and transgingival probing.  
- CBCT analysis: Used for measuring the thickness of both soft and hard tissues.

**Comparator** All possible comparisons among the selected interventions were analyzed.

**Study designs to be included** - Randomized controlled trial (RCTs) evaluating cone-beam computed tomography (CBCT) in comparison to conventional clinical methods for assessing gingival and bone thickness.

**Eligibility criteria** Studies were considered eligible if they met the following criteria:

- Randomized controlled trials (RCTs) evaluating cone-beam computed tomography (CBCT) in comparison to conventional clinical methods for assessing gingival and bone thickness.
- Publications dated between 2013 and 2024.
- Articles written in French, English, or Spanish.
- Clinical studies conducted on human subjects, specifically focusing on the comparative clinical and radiographic analysis of the periodontal phenotype.

**Information sources** A comprehensive search of electronic databases was carried out to identify relevant studies for this review. Four primary sources of scientific evidence were utilized: MEDLINE (PubMed), ScienceDirect, Cochrane, and EBSCO.

**Main outcome(s)** The evaluation criteria included:

- Gingival biotype classification: Defined as either thin or thick based on periodontal probe visibility through the gingival tissue (visible = thin, not visible = thick) or determined via transgingival probing or ultrasound.
- Bone thickness and height: Assessed using CBCT.
- Gingival and bone thickness measurements: Taken for each tooth, using the cemento-enamel junction (CEJ) as a reference on the buccal-lingual axis, perpendicular to the tooth’s sagittal plane.

**Quality assessment / Risk of bias analysis** The quality assessment focused on key methodological aspects, including randomization, allocation concealment, blinding of participants and clinicians, blinding of evaluators, and the completeness of follow-up. Based on these criteria, studies were categorized as follows:

- Low risk of bias: When all three quality criteria were satisfied.
- Unclear risk of bias: When one or more criteria were only partially met.
- High risk of bias: When at least one of the three criteria was not fulfilled.

**Strategy of data synthesis** This evaluation was carried out independently and in triplicate by three authors (O.B.M., A.Kh., and B.S.).

**Subgroup analysis** Data collection was performed independently by three reviewers (O.B.M., A.Kh., and B.S.), extracting the following information: study title, authors, year of publication, study design, sample size, outcome measures, type of intervention, study duration, clinical findings, and overall study quality.

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**Sensitivity analysis** Despite these limitations, sensitivity analyses showed consistent results across studies. This suggests that, although methodologies differ, the overall relationship between gingival phenotype and bone thickness remains relatively stable and significant.

**Language restriction** French, English, or Spanish.

**Country(ies) involved** Morocco.

**Keywords** • Periodontium • Gingiva • Gingival phenotype • Cone beam CT • Alveolar bone loss.

**Contributions of each author**

Author 1 - OULED BOUALLALA MERIEM - Author 1 drafted the manuscript.

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