

# Comparison between Clinical and Digital Soft Tissue Measurements

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## ABSTRACT

**Objective:** The use of periodontal probes harbors the risk of measurement errors. The aim of this study was to investigate the accuracy of the digital determination of gingival recession and papilla height on virtual jaw models, given the hypothesis that they show lower intrarater and interrater variability than conventional linear measurements taken clinically or on cast models.

**Materials and Methods:** Gingival recessions and papilla heights were measured at 30 sites by five examiners using the following methods: (A) direct measurements using a periodontal probe intraorally or (B) on cast models using a caliper; (C) digital measurements on virtual models obtained by optical scans taken intraorally, or (D) made of cast models using the same software. Measurements were repeated after 1 week and intraclass, intrarater, and interrater correlations of the measurements using the four different methods were analyzed.

**Results:** The greatest disagreement between the 1st and 2nd measurement was identified for method A. Recessions were less reliably measured than papillae. The best agreement between methods was found in the digital ones (C and D). Regarding papilla height, increased values were obtained when method D was applied as compared with both clinical evaluations. For gingival recession, method A measured the highest values.

**Conclusion:** In the present study, the use of digital technologies by intraoral scanning or scanning of cast models improved the reproducibility and lowered the variance of measurements within one individual and between different investigators.

## CLINICAL SIGNIFICANCE

Providing a more reliable and examiner-independent technique for measurements of the soft tissue architecture could improve data quality in periodontal research and in the analysis of different clinical treatment modalities.

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## INTRODUCTION

Periodontal probes are a commonly used to measure different soft tissue conditions in health and disease around teeth and implants such as probing pocket depth, the width of keratinized tissue, papilla height,

and the amount of gingival recessions. Different types of periodontal probes are available.<sup>1–5</sup> Depending on their design, they are characterized by horizontal markings at defined intervals (e.g., at each 1, 2, or 3 mm) for visual measurements, and values are usually rounded to the next millimeter. Therefore, a

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