



The effect of intraoral scan design on digital scan accuracy.

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Introduction:

- Digital impression advantages over conventional impressions: reduced risk of distortion, improved patient comfort and acceptance, and improved efficiency.
- The first digitally scannable implant components were introduced by using an innovative coded healing abutment in 2004. This provided 3D information on the implant location in relation to the adjacent teeth and surrounding soft tissues.
- The first scannable impression copings were released and called scan bodies in 2008.
- The scan body has three components, the upper portion which is called the scan region, the middle portion which is the body, and the apical portion which is the base.
- The quality of digitized data depends on the measuring system used and the characteristics of the scanned surface.

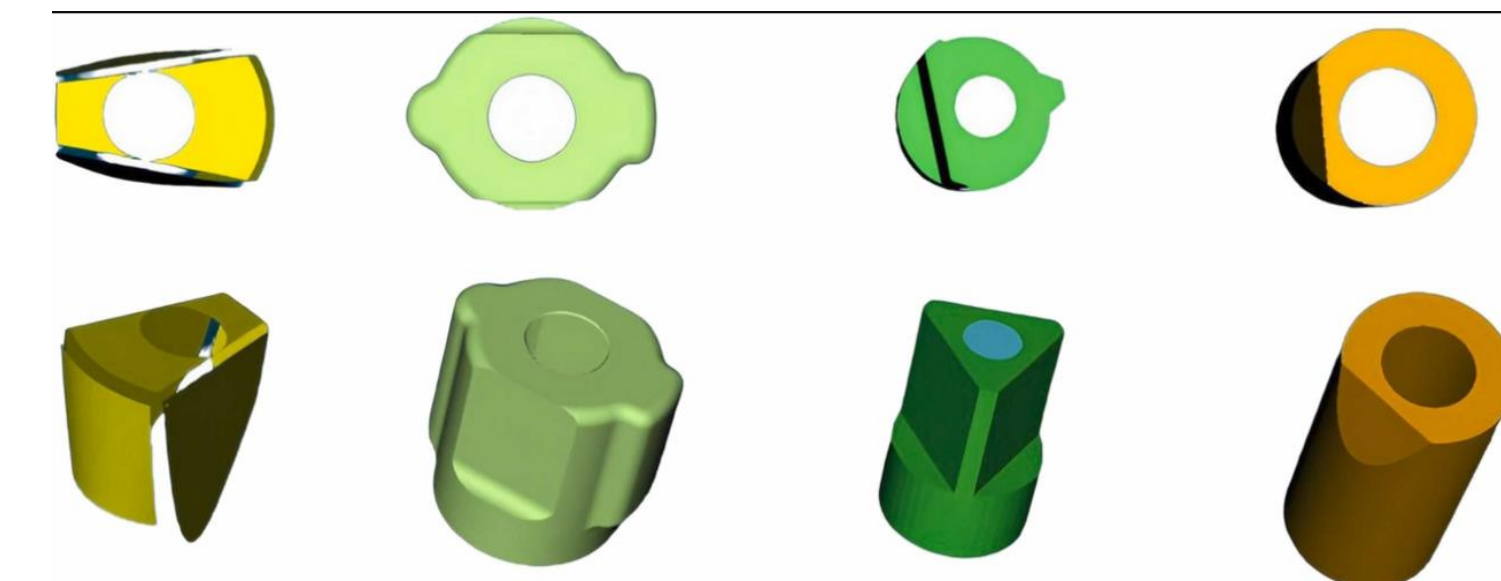
Purpose:

To identify and evaluate the specific features of intraoral scan bodies that influence the accuracy of digital impressions in implant planning. Understanding these factors is crucial for optimizing the design and use of scan bodies to ensure precise implant placement and prosthetic fitting.

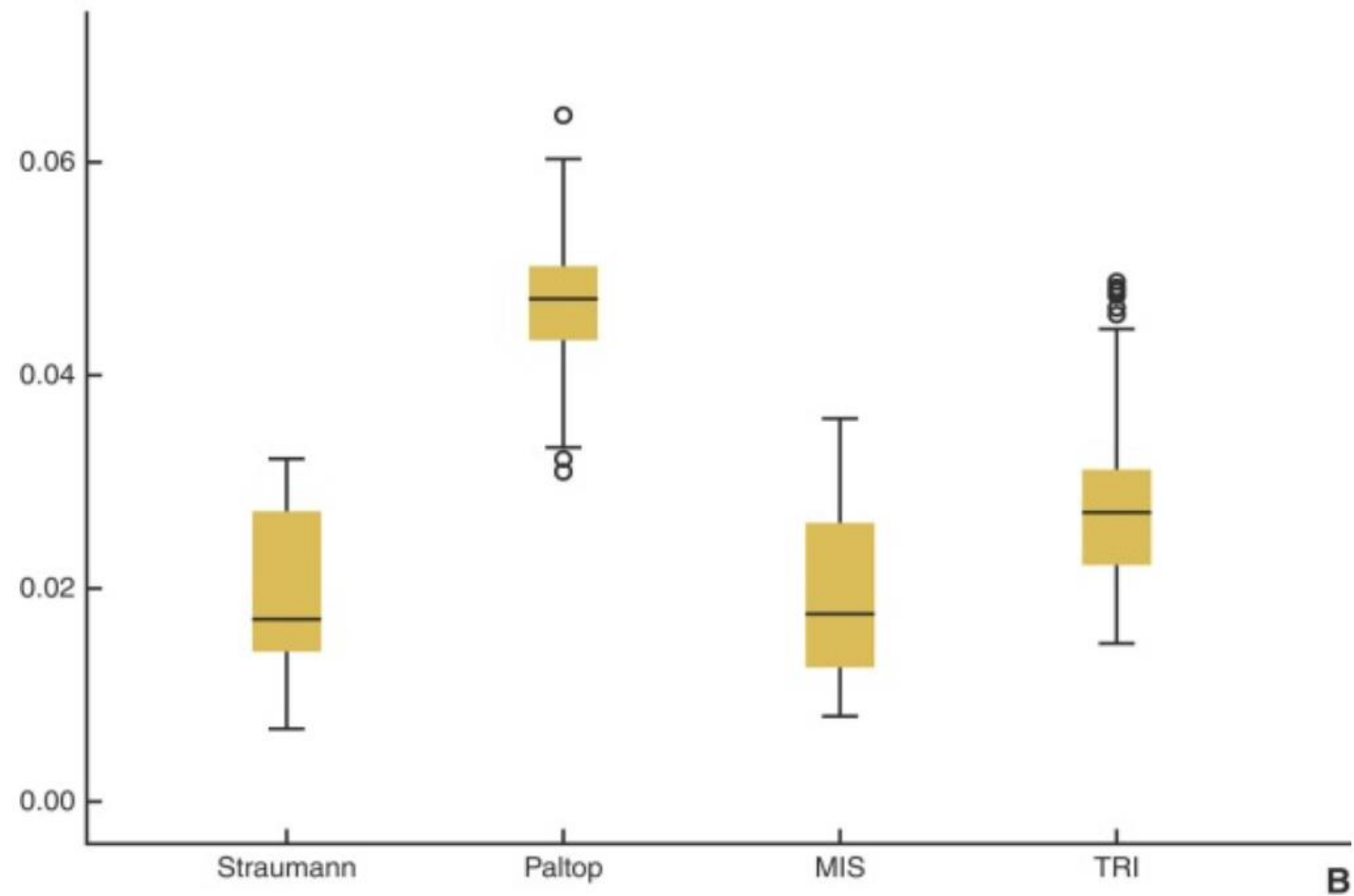
Methodology:

A comprehensive literature review was conducted using the OSU digital library, PubMed, and Embase databases. The search focused on studies published within the last ten years, emphasizing the relationship between scan body features and scan accuracy. Specific search terms included "scan body features," "scan body height," "scan body diameter," "scan body material," and "scan accuracy." Articles were selected based on their relevance, study design, and the robustness of their data in evaluating the impact of these factors on digital impression accuracy.

Effects of Body Geometry



From left to right: MIS, TRI, PLT, STR.



Effects of Wet Surface

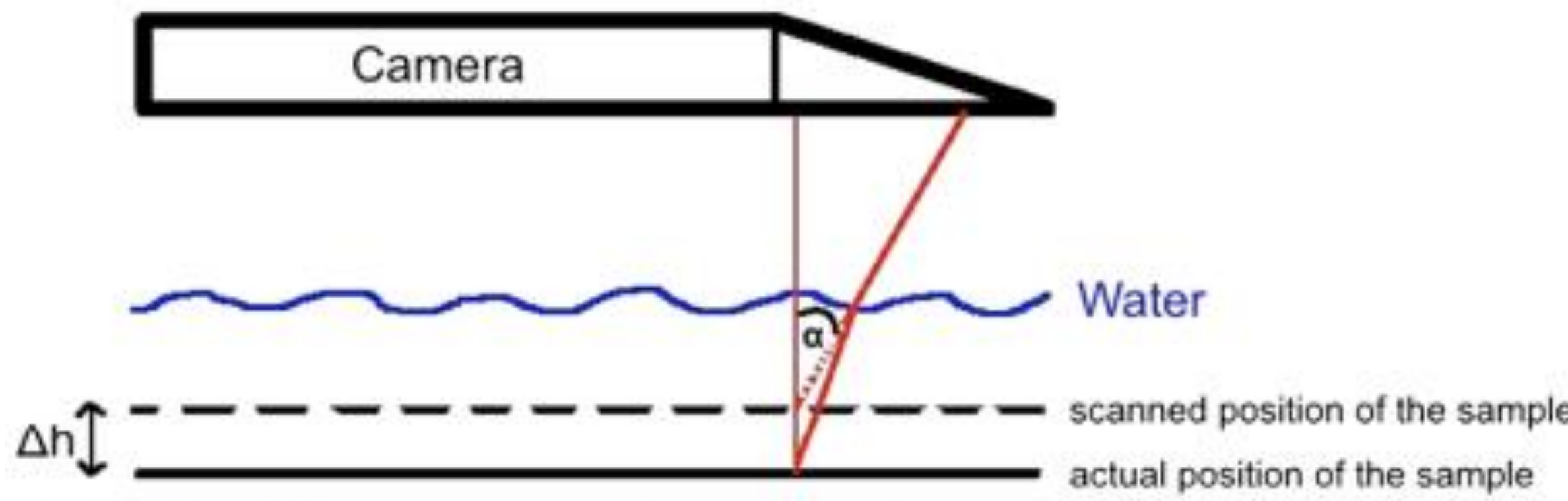
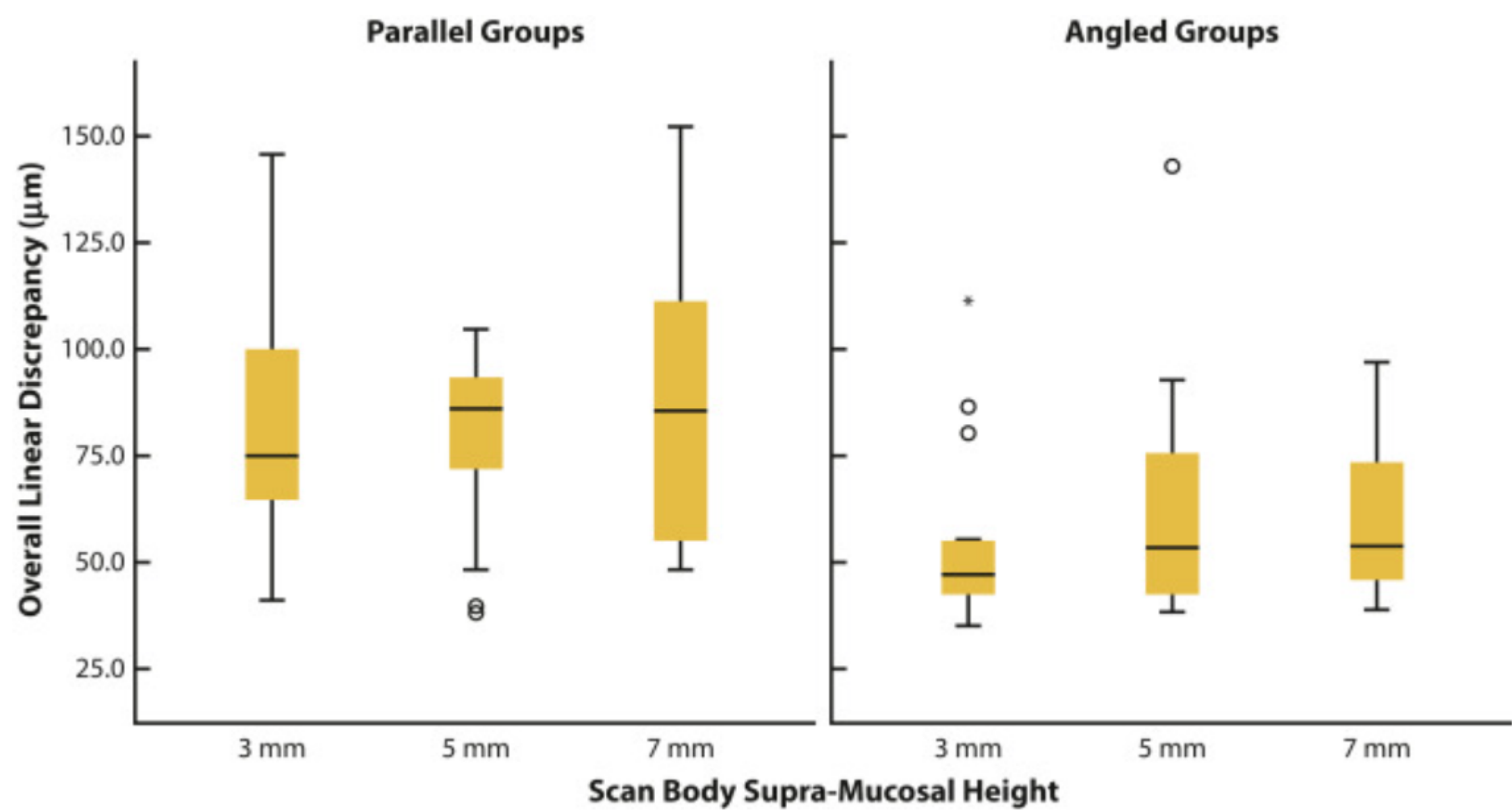


Fig. 5 Illustration of error in measurement (Δh) with the camera triangulation angle (α)

Effects of Diameter



Results:

- The body geometry should have less sharp line angles and a cylindrical shape.
- Surface of the scan body should be dried before scanning because the water can lead to errors in measuring the height of surfaces.
- The use of different dental materials gives rise to height differences in the scans but are within an acceptable range for the clinically relevant procedures.
- Noise on the materials is also within an acceptable range for clinically relevant procedures and can be decreased by holding the camera as close to perpendicular to the sample as possible, rather than at a 45° angle.
- Titanium scan bodies had lower displacement than PEEK scan bodies.
- Implant angulation or divergence of 18 degrees did not significantly affect the accuracy of the intraoral scans.
- The supramucosal height did not significantly affect the accuracy of the intraoral scans.

Conclusions:

- While the current literature provides valuable insights into the factors affecting scan accuracy, more research is necessary to determine the ideal design characteristics of implant scan bodies. Future studies should focus on refining features to enhance the accuracy of digital impressions and improve clinical outcomes in implantology.

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