Resin-matrix ceramic posterior crowns printed in a digital workflow.

Paradiso G.; Del Piñal Pellón M.; Soler Vázquez A.; Peláez Rico J.; Suárez García MJ.

Master of Prosthodontics and Occlusion, Complutense University of Madrid.

Introduction and Objectives:

In recent years, the increasing aesthetic demand and the evolution of digital systems and CAD-CAM technology have favoured research and development of new ceramic materials. Resin-matrix ceramics (RMC) have recently been introduced, a material that simulates the modulus of elasticity of dentine and it's easy to repair. The aim of this study was to evaluate survival, success rate and mechanical and biological complications of resin-matrix ceramic printed posterior crowns in a full digital flow.

Material and Methods:

A prospective clinical trial was conducted with 20 crowns in the posterior area, printed on a ceramic resin matrix (VarseoSmile Crownplus, Bego) using a DLP 3D printer. Dental preparations were made, scanned with an intraoral scanner, crowns printed, and cemented with resin cement. Clinical behavior and periodontal parameters were evaluated at 3 months, 6 months and one year after cementation. The data were statistically analyzed with the Wilcoxon range test.

Results:

Survival rate at the evaluation year was 95%. One crown failed due to fracture at 6 months. No biological complications were observed. All crowns remained within the satisfactory range. The margin remained stable throughout the observation period. The plaque index increased after 1 year of evaluation.

Material and Methods

C.I. 22/390 EC - P

20 Posterior crowns; Stable occlusion; Natural antagonistic tooth.

VarseoSmile Crown Plus (Bego)

***Fig.1**: 7 colours according to the VITA colour system: A1, A2, A3, B1, B3, C2, D3.*

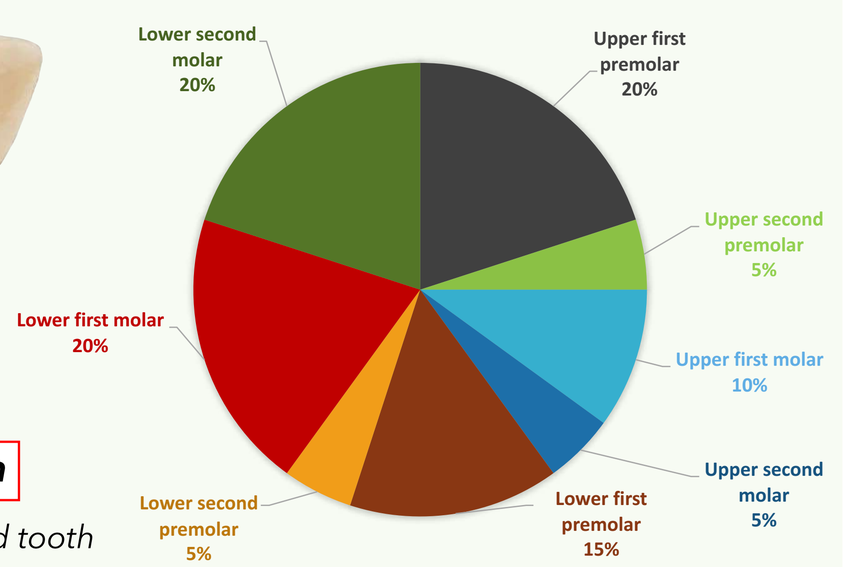


***Fig.2**: Pie chart.*

Inclusion

- *Posterior tooth*
- *Not previously treated tooth*
- *Perio/Endo health*

Exclusion

- *Previously treated tooth*
- *Poor hygiene*
- *Decay*
- *Perio/Endo disease*

- ***Restoration**: Sandblasting Al2O3 50 µm 1 bar*
- ***Tooth**: H3PO4 37%*

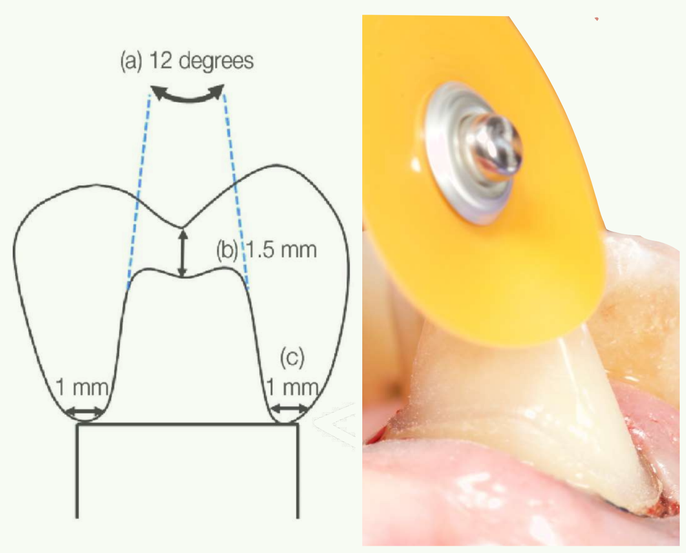


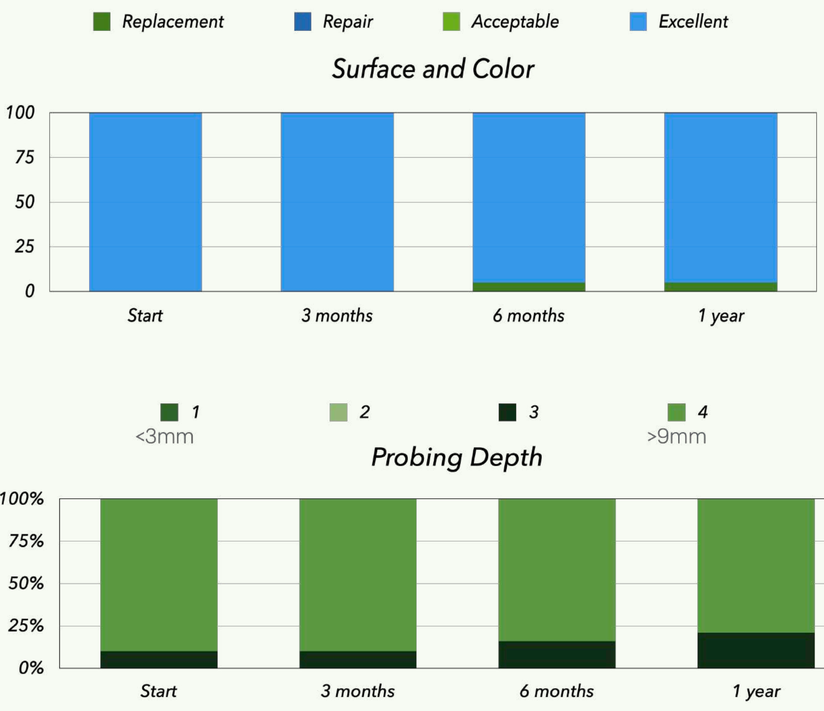
***Fig. 3,4:** Tooth preparation with 1mm chamfer.*

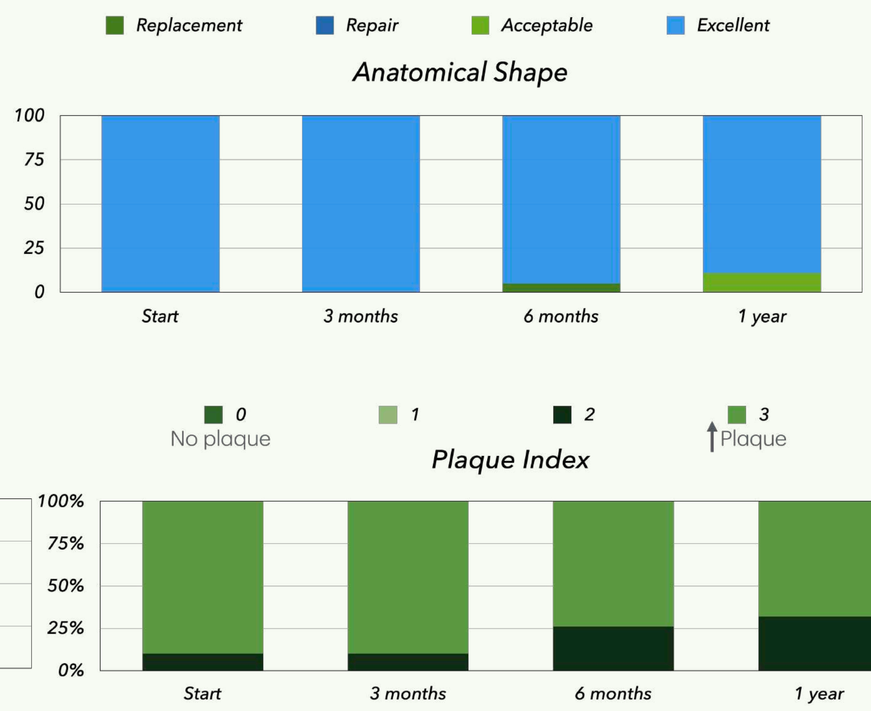
***Fig. 5,6:** 1.4 prepared and cemented.*

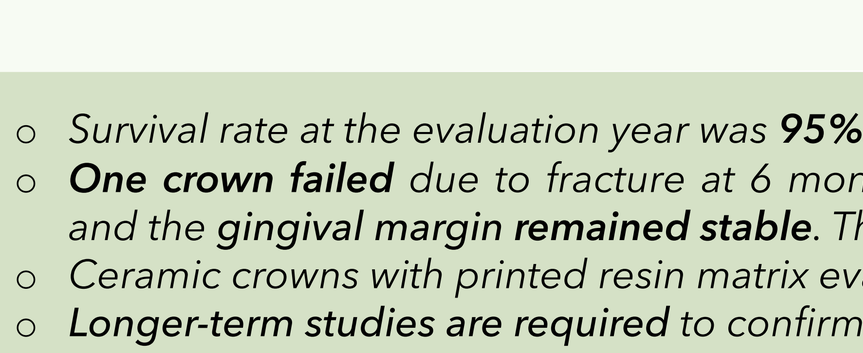
***Fig.7,8:** Intraoral scanner Trios 4 (3Shape), DLP 3D printer Varseo XS, (Bego).*

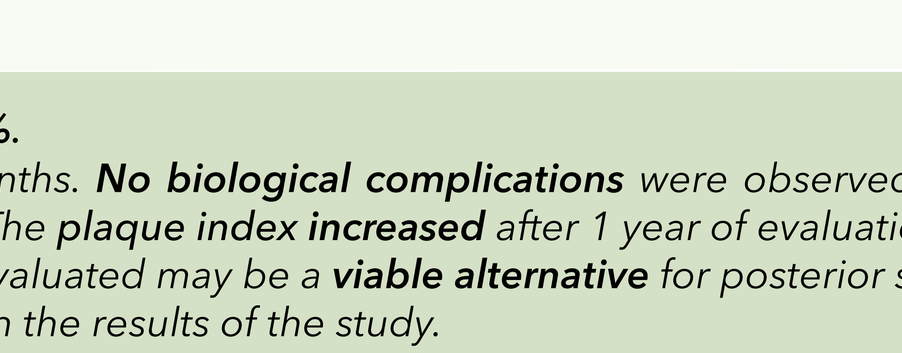
Results and Conclusions

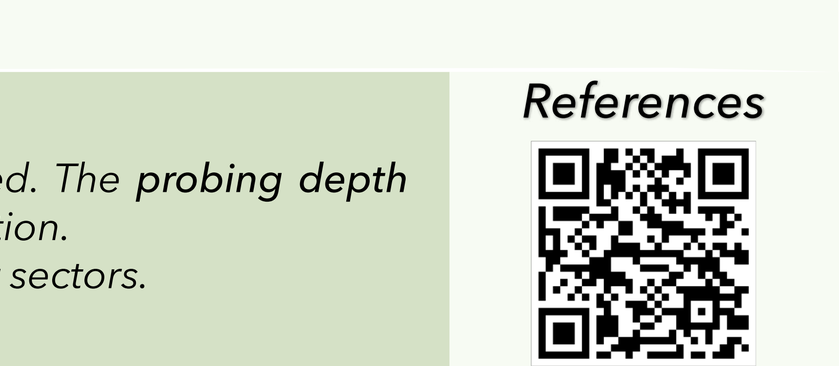
CDA Criteria











- *Survival rate at the evaluation year was **95%.***
- ***One crown failed** due to fracture at 6 months. **No biological complications** were observed. The **probing depth** and the **gingival margin remained stable**. The **plaque index increased** after 1 year of evaluation.*
- *Ceramic crowns with printed resin matrix evaluated may be a **viable alternative** for posterior sectors.*
- ***Longer-term studies are required** to confirm the results of the study.*

References