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Direct Composite Veneers: Overview of Different Matrix Systems

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1 Introduction

The ascending demand for more aesthetic and conservative treatment options as well as the improvements in the quality of the composite resins, has led to an increase in the use of direct composite as a technique of choice for veneers. The vast variety of matrix systems currently available in the market, provide dental practitioners with the opportunity to select the best fitting method according to their personal preference and skills. Nevertheless, due to lack of updated knowledge or fear of engaging into new techniques, dentists often struggle to incorporate new approaches in their practice, since they are unfamiliarized with either their effectiveness, or means of utilization.

2 Objectives

The aim of this study is to comparatively evaluate 4 of the most widely used matrix systems: the modified putty index matrix technique with mylar strip, the Unica and Bioclear matrix systems, and the Injection Moulding with silicone key method. The laboratory trial was conducted by 8 undergraduate (4th and 5th year) students from the European University of Cyprus.

Methods and materials

The central incisors were selected as the teeth to be restored, since they are most commonly chosen in anterior restoration research projects. A diagonal crown fracture was designed on artificial teeth, that were then scanned with an intraoral scanner (3Shape Trios). Identical resin copies of the artificial teeth were 3D printed, as well as a mock-up, fabricated using a Computer-Aided-Design program. The mock-up served for the construction of an index for the Conventional and Injection Moulding techniques, and was further utilized for the comparison of the results. The participants were familiarized with each technique, through procedural demonstration videos performed by the manufacturer's representatives, accompanied by written guidelines.

Conventional
Putty index for palatal built-up and mylar strip for the interproximal surfaces

Injection Moulding Technique
G-ænial Universal Injectable Set was used for the research following strictly the clinical guidelines GC

Unica
Unica Anterior Matrices were used and followed the clinical guidelines of Polydentia

Bioclear
Black Triangle Matrices were selected and their clinical guidelines were followed step by step

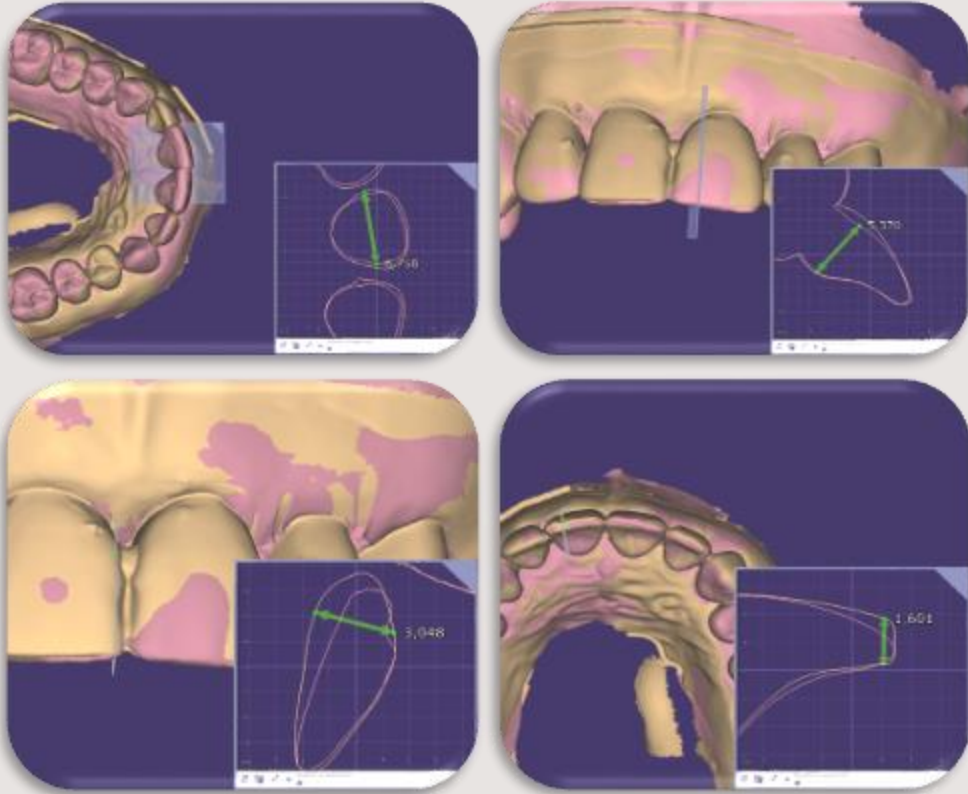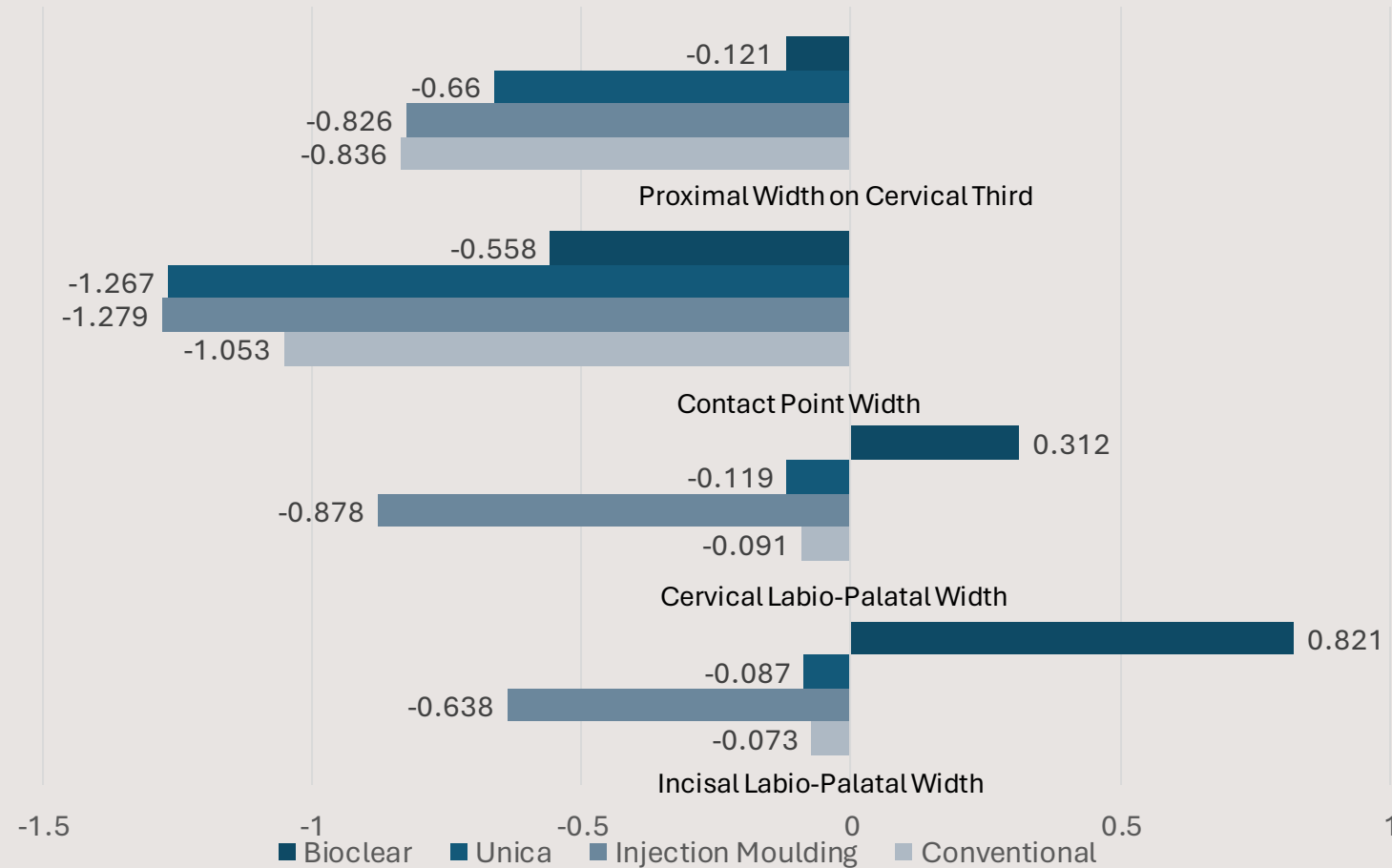# Results

Bioclear matrix

Unica matrix

Conventional

Injectable moulding

Results

Restorative Material Divergence (mm)

The typodonts were further analyzed through a Computer-Aided-Design program (Exocad). The 3D-printed mock-up was set as the comparative standard [0 value on the diagram].

Conclusion

Each participant was provided a questionnaire, after completing the four-methods trial, for a qualitative assessment. Following thorough analysis of the given answers, along with the participants' feedback, certain conclusion were drawn:

1 **TIME**

The most time-consuming method was the Conventional, while the fastest one was Bioclear.

2 **INTERPROXIMAL SURFACE**

The interproximal surfaces with the highest marginal integrity were achieved by using the Bioclear matrix. Interproximal contacts by Unica revealed asymmetry in some of the typodonts. Moreover, with the injection moulding technique, the resin material could flow in undesirable sites on interproximal surfaces requiring further modification.

3 **AESTHETIC OUTCOME**

According to the photographic material, the assessment of the results showed that the Injectable molding technique had the closest result to the mockup.

4 **EASE OF USE**

75% of the participants considered the injectable moulding technique the easiest approach followed by Bioclear method.
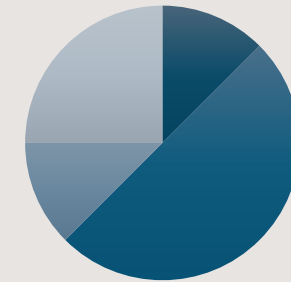
5 **LIMITATIONS**

Bioclear and Unica matrices had poor gingival adaptation on the typodont.

Matrix Preference

■ Conventional ■ Injection Moulding
■ Unica ■ Bioclear

Average Time

■ Conventional ■ Injectable Moulding ■ Unica ■ Bioclear

79.125   62.25   60   58.667

MINUTES