

## Case Report

# Smile designing using gurel's technique for conservative esthetic rehabilitation: A case report

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## Abstract

Smile design has become an integral part of contemporary restorative dentistry, offering predictable outcomes by combining digital technology with minimally invasive techniques. Advances in digital smile designing software allow clinicians to visualize proposed changes, communicate effectively with patients, and achieve esthetic outcomes that meet individual expectations. Gurel's technique, based on mock-up guided preparation, ensures controlled and minimal enamel reduction, preserving natural tooth structure while providing an optimal bonding substrate. The use of high-strength ceramic materials, particularly lithium disilicate, further enhances esthetics, durability, and longevity of the restorations. In this case, digital planning, mock-up evaluation, conservative preparation, and ceramic restorations were combined to achieve functional and esthetic rehabilitation with high patient satisfaction. This protocol demonstrates how integrating digital workflows with evidence-based preparation techniques can provide predictable, minimally invasive, and natural-looking results, reinforcing the importance of conservative esthetic dentistry in modern clinical practice.

**Keywords:** Digital Smile Design, Gurel's Technique, Lithium Disilicate, Esthetic Rehabilitation

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## 1. Introduction

Smile is considered one of the most important aspects of facial esthetics, directly influencing self-esteem and social interactions.<sup>1</sup> Advances in digital dentistry have revolutionized the ability to analyze, plan, and execute smile design with high accuracy and predictability.<sup>2</sup> Digital Smile Design (DSD) software provides a systematic approach to evaluating tooth proportions, gingival levels, and facial harmony, thereby facilitating precise communication between the clinician, technician, and patient.<sup>3,4</sup>

Among the various protocols proposed for minimally invasive esthetic dentistry, Gurel's technique emphasizes conservative tooth preparation guided by mock-ups derived from digital wax-ups.<sup>5,6</sup> This approach ensures uniform enamel reduction, preserves tooth structure, and enhances the bonding substrate for ceramic veneers and crowns.<sup>6,7</sup> Furthermore, the integration of high-strength esthetic ceramics such as lithium disilicate has contributed

significantly to the success and longevity of such restorations, providing optimal balance between function and esthetics.<sup>7</sup>

The following report highlights the application of digital smile designing concepts combined with Gurel's technique in achieving predictable and harmonious esthetic rehabilitation.

## 2. Case Report

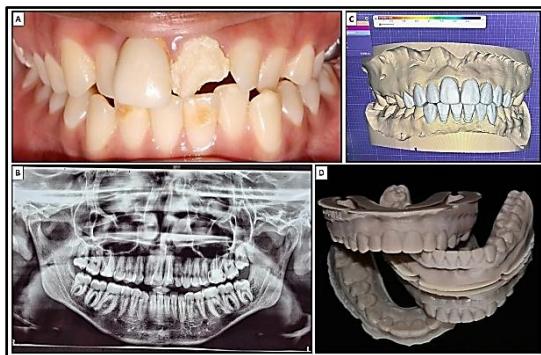
### 2.1. Patient information

A 24-year-old female patient, reported to the Department of Prosthodontics with the chief complaint of a dislodged prosthesis in relation to the maxillary left central incisor (21), along with dissatisfaction with the crown present on the maxillary right central incisor.<sup>11</sup> The patient also expressed concern regarding misalignment of her anterior teeth and compromised esthetics. The patient's medical history was non-contributory, and she exhibited good general health.

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### 3. Clinical and Radiographic Examination

On intraoral examination, the dislodged prosthesis with respect to 21 and an unsatisfactory crown on 11 were evident. Malalignment and esthetic disharmony were noted in the maxillary anterior region. The periodontal tissues were healthy, and no pathology was detected radiographically on the orthopantomogram (OPG). Occlusal and intraoral photographs, together with extraoral frontal and lateral photographs, were obtained for comprehensive esthetic evaluation. Interarch relationships and diagnostic casts were also recorded.



**Figure 1:** **A)** Pre-operative intraoral photograph; **B)** Pre-operative orthopantomogram; **C)** Digital smile designing; **D)** 3D-printed Models.



**Figure 2:** **A)** Depth-indication grooves; **B)** Final preparation; **C)** Temporization; **D)** Final Veneers.



**Figure 3:** Comparative demonstration of **A)** pre-operative smile and **B)** post-operative smile.

### 3.1. Treatment planning

After discussing various options with the patient, digital smile designing was planned to address her concerns. A comprehensive digital analysis was performed using Exocad software, focusing on the maxillary anterior teeth from 14 to 24 and the mandibular anterior teeth from 33 to 43. A digital wax-up was prepared and transferred intraorally through a silicone index to simulate the proposed outcome (**Figure 1**). The patient previewed the mock-up fabricated with bis-acryl material and approved the planned esthetic changes.

### 3.2. Tooth preparation and temporization

Tooth preparation was performed using Gurel's technique, which allows guided and minimal reduction based on the intraoral mock-up. Depth-indicator grooves were made directly through the mock-up, ensuring enamel preservation with a reduction of approximately 0.3–0.5 mm. A chamfer finish line was created with supragingival margins wherever possible. Provisional restorations were fabricated using a putty matrix of the wax-up and bis-acryl composite resin (**Figure 2**). These temporaries provided the opportunity to evaluate phonetics, esthetics, and function before proceeding with definitive restorations. The patient was monitored for one week during the provisional phase.

### 3.3. Final impression and laboratory procedures

Following confirmation of the temporary restorations, the definitive impression was made using a two-step putty-wash technique with addition silicone material. Both maxillary and mandibular arches were recorded, and interocclusal registration was obtained with polyvinyl siloxane bite material. The master casts were scanned, and lithium disilicate restorations (IPS e.max Press) were selected for their superior esthetics and strength. Full-coverage crowns were fabricated for teeth 11, 12, 21, and 22, while veneers were fabricated for 13, 14, 23, 24, and the mandibular anterior teeth from 33 to 43.

### 3.4. Cementation protocol

The restorations were conditioned with 9.5% hydrofluoric acid etching for 20 seconds, followed by silanization with Monobond Plus. The prepared teeth were etched with 37% phosphoric acid for 15 seconds, rinsed, and dried. A universal adhesive bonding agent was applied to both tooth surfaces and restorations. Cementation was performed using a dual-cure resin luting agent (Variolink Esthetic DC). The restorations were seated, excess resin was removed following tack-curing, and final light polymerization was carried out for 60 seconds per surface. Careful finishing and removal of excess cement were ensured.

### 3.5. Postoperative evaluation and follow-up

Occlusion was evaluated in centric and eccentric movements, and necessary adjustments were made to ensure functional harmony. The marginal adaptation and shade match were

confirmed to be satisfactory. The patient was recalled after one week, during which both clinical and photographic evaluation showed a harmonious, symmetrical smile with natural esthetics (Figure 3). The patient reported high satisfaction with the functional and esthetic outcome, expressing improved confidence in her smile.

#### 4. Discussion

The pursuit of esthetic excellence in dentistry has significantly evolved with the incorporation of digital tools, enabling precise smile design and conservative treatment approaches.<sup>8</sup> The integration of digital smile designing software, such as Exocad, allows clinicians to plan restorations with enhanced accuracy, improving communication between patient and dental team and ultimately increasing patient acceptance and satisfaction. Digital workflows also facilitate predictable treatment outcomes by simulating the final result before initiating irreversible procedures.<sup>9</sup>

Gurel's technique, introduced as a mock-up guided preparation approach, ensures minimal and uniform enamel reduction while maintaining maximum tooth structure.<sup>6</sup> This conservative philosophy aligns with the principles of adhesive dentistry, as bonding to enamel provides superior retention and marginal integrity compared to dentin bonding.<sup>10</sup> Studies have shown that mock-up guided preparations reduce the risk of over-preparation and improve the precision of final restorations.<sup>11</sup>

Lithium disilicate ceramics, such as IPS e.max Press, offer excellent esthetics due to their translucency and shade-matching capabilities, while also providing adequate flexural strength for anterior restorations. Their ability to mimic the optical properties of natural enamel makes them ideal for smile enhancement procedures. Proper surface treatment protocols, including hydrofluoric acid etching and silanization, combined with dual-cure resin cements, are critical for long-term success of such restorations.

Overall, the combination of digital smile design, conservative preparation through mock-ups, and high-performance ceramic materials represents a contemporary, patient-centered approach to esthetic rehabilitation. This protocol ensures minimally invasive treatment while delivering functionally and esthetically satisfying outcomes.

#### 5. Conclusion

Digital smile design combined with Gurel's technique provides a predictable and conservative approach to esthetic rehabilitation. The use of mock-up guided preparation ensures minimal tooth reduction, while lithium disilicate restorations offer excellent strength and natural esthetics. This treatment modality enhances patient satisfaction by achieving functional harmony and a pleasing smile with long-term stability.

#### 6. Source of Funding

None.

#### 7. Conflict of Interest

None.

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