Using Digital Technology for Complex Aesthetic Challenges

INTRODUCTION

Traditional analog diagnostic methods used to treat complex aesthetic challenges can be effective but often are inefficient, inaccurate, and do not precisely reflect definitive surgical or restorative solutions. Digital diagnostic techniques allow dentists to easily and economically fabricate surgical guides from CBCT while virtually placing implants precisely by standardizing an implant's size and the angle and depth of placement. This approach removes many of our implant complications. Unfortunately, despite their importance, scanning and virtual planning are not utilized enough, making patient communication and treatment more difficult. This case demonstrates a unique and innovative digitally generated systematic approach to guide the practitioner through a process that can expedite important decisions, provide unique patient communication options, and improve the predictability of aesthetic outcomes.

Joyce Bassett, DDS

CASE REPORT

Diagnosis and Treatment Planning

A 60-year-old male presented with an unsightly, monochromatic bridge; a crooked smile; and a lack of buccal posterior fullness (Figure 1). He reported that one abutment tooth had a history of repeated fracture. His initial goal was to obtain a "natural appearance." He wondered if implants were an option for him and wanted to help design the shape and form of the new front teeth. He was unhappy with the appearance of his current anterior bridge, reporting that the teeth looked like piano keys and the incisal edges were not aesthetic.

A comprehensive dental exam, including medical and dental histories, full-mouth radiographs, a TMJ exam, periodontal charting, bite registration, functional analysis, and clinical photos, was accomplished. Radiographic evaluation showed a long span bridge from teeth Nos. 6 to 11. The abutment teeth were structurally compromised due to past endodontics and post and core buildups.

The photographic evaluation involved a detailed analysis of midlines, the tissue display, lip asymmetry, length, and shape. In a Duchenne smile,[1] neither the patient's maxillary gingival zeniths nor interproximal papillae were visible. The smile was asymmetric, with his upper right lip raising more than the left side. The lower lip had a medium display, with all lower tooth structure except the gingival zenith showing in the Duchenne smile. There was a midline discrepancy between the upper and lower midlines.

The 6 anterior porcelain restorations appeared too dominant and were in proclined positions. The width of the 6 anterior teeth were identical and resembled piano keys (Figure 2). Although he had a low smile line, he would manually lift his lip to evaluate the tooth shapes and forms in a magnification mirror, and he did not like what he saw. A porcelain-fused-to-metal bridge was present on teeth Nos. 13 to 15, and it was more than 30 years old. The upper left was asymptomatic, and he was satisfied with the bite, function, and cleanability of that bridge.

His speech was slushy when pronouncing the "S" sound. Evaluation of the anterior bridge palatal anatomy revealed a hollowed-out design that anatomically created the inability to close this speaking distance (Figure 3).

A surgical consult was recommended to evaluate the edentulous sites of teeth Nos. 7, 10, and 14 for implant placement to reconstruct his dentition. At the follow-up consult, he elected to place only the 2 anterior implants. He did not desire to build out the left side of his smile corridor by replacing the upper left bridge because this area was invisible due to the lip laxity on his left side. He was motivated to have the anterior 6-unit bridge removed as soon as possible. He agreed to proceed with a 9-unit restorative treatment plan, including an implant-supported bridge from teeth Nos. 7 to 10 and single porcelain crowns on teeth Nos. 4 to 6, 11, and 12.

Preoperative records can be taken in either digital or analog format or both, creating a hybrid workflow, depending on the needs of the case. An intraoral scan (iTero Element 5D [Align Technology]) and the CBCT scan were sent to the lab for implant placement design of teeth Nos. 7 and 10 and the fabrication of a surgical guide. A PMMA provisional could also be milled from intraoral scans. Since this patient desired immediate changes in the shape and form of the restorations, a chairside analog impression was taken (Template Clear [Clinician's Choice Dental Products]) in an anterior dual-arch impression tray (Quad-Tray XL [Clinician's Choice Dental Products]) over the existing maxillary porcelain teeth. The patient was anesthetized, and the anterior bridge was removed. A long-span, semi-permanent, self-curing composite provisional bridge (LuxaCrown B1 [DMG America]) was fabricated. Luxacrown was selected because of its flexural strength and the clinician's ability to directly modify the provisional shape and form after a 5-minute set with flowable composite (Beautifil Flow Plus X FOO B1 [Shofu Dental]).

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