Dental practitioners face difficulties when looking to restore deeply decayed teeth with defects at the subcrestal level. The remaining tooth structure dependent on the location of decay is considered the primary obstacle to a favorable long-term prognosis of the final reconstruction. Subgingival preparation margins and subcrestal defects are liable to violate the biologic width. Moreover, a design with no ferrule proved to have a major impact on clinical success, while the restoration margin directly affects the patient’s periodontal health. To overcome these issues, surgical crown lengthening and orthodontic extrusion prior to restorative procedures have been suggested in the literature. While most orthodontic appliances prove too complex for everyday practice, this clinical case report presents a convenient method for forced orthodontic extrusion with the Tissue Master Concept (TMC).
CASE HISTORY REPORT

A 30-year-old male patient presented with a severely decayed premolar due to a carious lesion that was free of symptoms and immobile with probing depths, as illustrated in Fig 1. The tooth had a circumferential defect at the subcrestal level. Radiographic findings showed no periapical radiolucencies. The adjacent teeth were sufficiently restored with resin composite, and the interocclusal space allowed for a monodirectional extrusion of the tooth. This approach aimed to reestablish the biologic width and relocate the restoration margin to the supragingival level. A fiber-reinforced composite-based bar (Komet Dental) was adhesively bonded to the root surface of the tooth on the buccolingual aspect (Fig 2). A second bar served as the abutment and was placed between the adjacent teeth using the etch-and-rinse technique with a flowable composite (Tetric EvoFlow, Ivoclar Vivadent). In order to apply an extrusive force in the occlusal direction and initiate tooth movement, elastics were placed in the orthodontic appliance. A circumferential supracrestal fibrectomy and scaling and root planing were performed during the first appointment and during a control visit 4 days later.\textsuperscript{5} The patient was instructed to change the elastics two times a day, and proper oral hygiene was thoroughly demonstrated. Due to a reduced root length after treatment, the crown-to-root ratio was inevitably compromised.
However, the root length allowed for an extrusion of 4 mm while not exceeding a prospective crown-to-root ratio of 1:1. After 7 days, the amount of extrusion proved to be sufficient (Fig 2). To enable reattachment, the tooth was splinted to both adjacent teeth with composite resin (Tetric EvoCeram, Ivoclar Vivadent) and retained for 3 months. After revision of the root canal treatment, a post-and-core buildup of a fiberglass post (X-Post, Dentsply Sirona) and a composite material was applied. Figure 3 shows the circumferential preparation. A ferrule of 2 mm was obtained on the buccal, distal, and palatal aspects, and the mesial ferrule was measured at 1 mm. The tooth was restored using a CAD/CAM (Sirona Dental Systems) with an all-ceramic crown (e.max CAD, Ivoclar Vivadent; Fig 4). The crown was cemented using a dual-curing self-adhesive resin cement (RelyX Unicem 2 Automix, 3M ESPE). The probing depth was 2 mm at all aspects of the tooth except for the buccal aspect, which amounted to 1 mm. At the 2-year recall, the clinical and radiographic findings were stable.

**DISCUSSION**

Orthodontic extrusion moving the entire tooth in the vertical dimension contrasts surgical crown lengthening, in which the bone level is reduced to a certain amount. Therefore, orthodontic extrusion can be considered a minimally invasive preservative technique that maintains surrounding biologic structures. Surgical crown lengthening negatively affects the attachment level of the adjacent teeth due to the ostectomy, especially when the defect is located in interproximal

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**Fig 2**  
(a) A composite-based bar was placed on the root surface of the tooth buccolingually, and (b) a second bar was attached to the adjacent teeth.  
(c) The tooth was extruded as necessary and (d) adhesively splinted to the adjacent teeth.
From a preservative perspective, forced orthodontic extrusion with the TMC is a valid treatment alternative to areas. Furthermore, all risks and complications of a surgical therapy must be taken into account. Aside from these tooth-preserving methods, teeth with defects at the subcrestal level are often considered hopeless. Extraction of the tooth and subsequent installation of an implant is a common alternative therapy. Orthodontic extrusion may be achieved by many techniques, most of which involve chain elastics and arch wires. Due to the fast advances in adhesive dentistry, adhesion to root-canal dentin became possible withstanding forces applied in the process of forced extrusion. Furthermore, due to the simple and straightforward methodology, this technique has been shown to be applicable in everyday practice. Clinical prerequisites are a prospective crown-to-root ratio not exceeding 1:1 after treatment, enough space for the final reconstruction (eg, single crown), a sufficiently restored dentition, and proper oral hygiene. Teeth with ankylosis or hypercementosis, vertical root fractures, root proximities, and/or an exposure of the furcation after treatment pose contraindications to this technique. For a successful extrusion, a sufficient distance between bars, proper adhesion to root-canal dentin, and the patient’s compliance are necessary. However, clinical long-term evidence is lacking or limited to case reports and case series. Therefore, clinical studies are needed to provide long-term data for this treatment modality.

CONCLUSIONS

From a preservative perspective, forced orthodontic extrusion with the TMC is a valid treatment alternative to
surgical crown lengthening. Due to the relatively simple appliance, this therapeutic method is practicable in everyday routine. Along with adequate case selection, this technique seems worth considering as an alternative to crown lengthening or replacement with an implant.

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REFERENCES


Fig 4 (a and b) Computer-aided design of all-ceramic crown and (c) restoration in situ. (d) Two-year–recall radiograph showing a stable situation.