A mean annual marginal bone loss of \( \leq 0.2 \) mm after the first year of loading is one of the criteria for implant success.\(^1\) The process of bone loss is initiated upon abutment connection. Although not fully understood, marginal bone loss has been linked to the implant abutment microgap and associated microbial contamination.\(^2,3\) In an attempt to reduce marginal bone loss, implant systems have been developed where the outer edge of the implant abutment interface (microgap) is moved toward the center of the implant and away from the bone margin. This design shifts the bacterial induced inflammatory response to the central axis of the implant and away from the vulnerable marginal bone and is called platform switching.

This concept, first described by Lazzara and Porter,\(^4\) refers to the use of a smaller-diameter abutment on a larger-diameter implant collar. In the 1980s, when wide-diameter implants were introduced, there was an initial lack of prosthetic components that matched the new diameter. Therefore, these wide implants were restored with the standard abutments that were smaller in diameter. Interestingly, radiographic evaluation of these implants showed no changes in the marginal bone levels after loading. After this coincidental finding, many platform-switched implant abutment systems were introduced.

Multiple studies have been conducted to test the platform switching concept and its claimed reduction of marginal bone loss.\(^5\)-\(^9\) Several of these studies used a 3-dimensional finite element method based on computed tomographic scans of implants and periimplant bone.\(^5\)-\(^7\) They have shown that stresses were shifted toward the center of the implant and away from the marginal bone around platform-switched implants compared to regular platform implants. This could mean less marginal bone loss clinically but could also concentrate stresses at the abutment screw area in platform-switched implants.\(^5\)-\(^7\) Two systematic reviews of clinical studies on the effect of platform switching on marginal bone loss have shown that platform switching may preserve marginal bone around implants and that the degree of bone loss is inversely related to the degree of implant abutment mismatch.\(^8\),\(^9\) Despite their potential benefits, information about the long-term performance and complications related to platform-switched implants is unavailable at this time because of the lack of properly designed randomized controlled trials. Additional research to validate their application would be of substantial value.

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technique, and the following 2 implants were placed: a 4.8×10 mm SLA bone level RC Straumann implant (Institut Straumann AG) at the molar site and a 4.1×10 mm SLA bone level RC Straumann implant (Institut Straumann AG) at the premolar site. The bone architecture sloped apically from the first premolar toward the molar region. This created a situation where the distal side of the implant in the premolar site was deficient in bone compared to the mesial. Cover screws were attached and particulate allograft was placed to cover the exposed threads around both implants on the buccal aspect. A 13×25 mm resorbable bilayer membrane (Bio-Gide; Osteohealth) was adapted over the particulate graft, and the flap was sutured closed.

Six months later, the implants were exposed and healing abutments were placed (SRC healing abutments, conical, 6.0 mm in diameter, 4.0 mm in height; Institut Straumann AG). Two weeks later, a reassessment of the implant revealed that mucosal recession around the implant placed at the premolar site had exposed the implant neck and 2 implant body screw threads (Fig. 1).

The computer-aided design and computer-aided manufacturing titanium platform-switched abutment that had been created to support the crown would compromise adequate oral hygiene and esthetics. In consultation with the periodontist responsible for the surgery, implant removal or soft tissue graft was not recommended because of the lack of supporting bone. The patient consented to proceed with the definitive restorations and to unswitch the implant abutment at the premolar site.

Two Straumann implant level impression copings (Institut Straumann AG) were attached to the implants

Figure 1. Implant thread exposure.

Figure 2. Clinical placement of splinted crowns with exposed switched platform on premolar implant, creating hygiene challenge.

Figure 3. Cast ring and splinted implant retained crowns unassembled.

Figure 4. Definitive result at 1-month follow-up with platform unswitched at premolar implant. Flat surface created by ring is easier for patient to maintain.

Figure 5. Radiograph made at time of delivery.
and a radiograph was made to verify complete seating. An autopolymerizing polymethyl methacrylate resin (GC Pattern Resin; GC America) was used to connect the 2 impression copings to reduce movement during impression making.\(^1\) An open tray fixture level definitive impression was made with light- and medium-body polyvinyl siloxane (Aquasil; Dentsply Caulk). The impression was poured with Type IV die stone (Prima-Rock; Whip Mix Corp) with a soft tissue analog. A waxing for 2 screw-retained splinted metal ceramic crowns was created on 2 platform level nonengaging abutments. The resulting metal framework was placed (Fig. 2), and a radiograph was made to verify complete seating.

A separate ring was waxed and cast in noble alloy (Argelite 61; Argen Corp) around the implant abutment at the premolar site to transform the implant abutment interface into a flush interface in an attempt to unswitch the abutment platform (Fig. 3). The ring was assembled at the time of insertion of the 2 splinted crowns, and a radiograph was made to verify seating and the appropriate contour of the restorations. The definitive result, although not ideal esthetically, provided an implant abutment interface that was easier for the patient to clean (Figs. 4, 5). The 1-year follow-up showed favorable gingival health and no evidence of radiographic bone loss (Figs. 6, 7).

**SUMMARY**

Platform switching was introduced to reduce marginal bone loss and therefore maintain the gingival architecture, leading to a more favorable esthetic result. However, limited information is available about the long-term performance and complications of this design. In this patient, recession resulted at the implant neck, exposing threads creating a site that was difficult for the patient to keep clean. A custom-made, additional prosthetic component was fabricated to facilitate daily mouth care. To avoid such complications, platform-switched implants may be best limited to the areas where maximum esthetics and minimum recession are expected. Avoiding this implant design in the posterior region where occlusal stresses are highest may also reduce stress concentration at the abutment screw area and reduce chances of its loosening or fracture. Finally, we recommend that manufacturers produce prosthetic components that allow platform unswitching when implant placement or healing is less than ideal.

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Figure 6. One-year follow-up showing no evidence of bone loss.

Figure 7. One-year follow-up clinical photograph.