

# Implant Realities™



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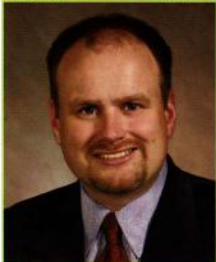
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## Altered Passive Eruption in Conjunction with Implant Placement in the Esthetic Zone

As implant supported restorations have become more predictable, and therefore more prevalent in daily practice, esthetic demands have also increased on the entire reconstructive team. Integration of the implant is no longer the sole requirement for a satisfying treatment outcome. In particular, ideal soft tissue esthetics has become an integral component of a successful implant-supported restoration. More attention has been focused on the influence that the implant body position has on the resultant emergence profile and final clinical crown form.<sup>1-3</sup> Oftentimes, however, the overall esthetic profile of the surrounding soft and hard tissues are overlooked.

A common clinical situation encountered in the esthetic zone is the presence of short clinical crowns which, in the absence of injury, occlusal wear, trauma or caries, is often referred to as altered or incomplete passive eruption (APE).<sup>4,7</sup> Short clinical crowns can sometimes result in what is commonly diagnosed as excessive gingival display or a "gummy smile."<sup>8,9</sup> In altered passive eruption, the thickness and/or position of



**Figure 1** A patient presents with altered passive eruption (APE) prior to crown lengthening.



**Figure 2** The patient after crown lengthening procedure has been performed.



**Figure 3** The proposed implant position in a patient with uncorrected APE.



**Figure 4** The proposed implant position in same patient, after crown lengthening. Note a variance of approximately 2 mm in apico-coronal implant shoulder position.

the alveolar bone may cause the gingiva to cover a significant portion of the anatomical crown(s).<sup>7,10</sup> Smile analysis is necessary in order to determine the esthetic impact of APE on the overall esthetic profile of the patient. A basic smile analysis should include an analysis of the facial midline, its relation to the interpupillary and incisal lines; lip length, lip position at rest and in full smile, gingival display with lips at rest and in full smile, and analysis of the dentition, including gingival quality and quantity, tooth shape, height, width, wear and restorative status.<sup>11-13</sup>

Correction of APE requires a crown lengthening procedure, whereby excess gingiva is removed or repositioned apically, following ostectomy and/or osteoplasty, when indicated. The goal is to reposition the alveolar crest approximately 2 mm apical to the cemento-enamel junction to account for biologic width, and to remove excess thickness from the facial alveolar bone.<sup>11,14,15</sup> Ideal osseous contours are imperative in order to avoid undesired tissue rebound and an unesthetic result. The position of the alveolar crest in relation to the CEJ position can vary if an artificial margin is planned (i.e. veneer or crown).<sup>16,17</sup> This procedure can often result in the exposure of 2 mm or more of additional anatomical tooth structure, which can have a dramatic effect on a patient's smile (Figures 1, 2). If implant treatment is being considered in the presence of APE, this additional crown height can drastically alter the three-dimensional position of the dental implant in relation to the surrounding dentogingival complex. Of particular importance is the apico-coronal position of the implant shoulder in a crown lengthened vs. a non-crown lengthened anterior dentition (Figures 3, 4).

If the ideal position of the implant shoulder is 1-2 mm apical to the desired CEJ,<sup>3</sup> the decision to expose or not expose the entire anatomical crown via a crown lengthening procedure could have a significant impact on a number of surgical and/or restorative decisions. The ideal course of action would be to inform the patient of the availability of additional clinical crown height and how this could affect the position of the implant fixture and the esthetic outcome of the implant restoration. Crown lengthening could then be incorporated into the treatment plan and the procedure performed either prior to or in conjunction with implant fixture placement.

However, if a patient, in consultation with the implant team, decides to not alter the amount of visible tooth structure, the implant shoulder would then be positioned in accordance with the presenting shorter clinical crown forms. The patient must therefore be informed that

future crown lengthening procedures may result in an unsatisfactory esthetic result since the implant body cannot be repositioned easily once osseointegrated.<sup>19</sup> The following case reports illustrate crown lengthening performed in conjunction with implant rehabilitation in three common clinical situations in the esthetic zone.

### Case 1

#### Increased clinical crown height of the implant-supported restoration (Restorative work by Dr. Kurt Riewe, San Antonio, TX).

An 18 year-old female patient presented with advanced root resorption on tooth #7 (Figures 5 and 6). She was referred for extraction of tooth #7, immediate implant placement and provisionalization. A longer clinical crown was desired for the final restoration in order to match the contralateral #10, thus requiring more apical placement of the implant body.

A Straumann® 3.3 x 10 RN SP implant and 4 mm Solid Abutment were placed in accordance with the planned position of the final restoration (Figure 7). The provisional restoration was fabricated in accordance to the initial clinical contours. Figure 8 shows healing at 1 week (Figure 8). After 2 months of healing, the Solid Abutment was torqued to 35 Ncm, the provisional restoration was recontoured and a gingivectomy was performed, in order to create the ideal tissue emergence profile. In addition, a gingivectomy

was performed on tooth #8 in order to more closely match the contralateral #9 (Figure 9). The final result shows that the contours of the implant-supported restoration #7 now more closely resemble those of the contralateral tooth #10 (Figure 10).



Figure 5 Case 1, at initial presentation. Note the discrepancy in clinical crown height between #7 and 10.



Figure 6 An initial periapical radiograph of tooth #7 shows dramatic root resorption.



Figure 7 A surgical stent utilized at the time of implant placement shows the desired clinical crown height for #7. The implant was placed accordingly at the appropriate depth.



Figure 8 A view of healing at 1 week post surgery, with the provisional restoration in place.



Figure 9 Gingivectomy has been performed 2 months post implant placement. The provisional restoration was recontoured to achieve the desired clinical crown height.



Figure 10 A view of the final treatment result.

## Case 2

### Crown lengthening in conjunction with implant-supported replacement of congenitally missing lateral incisors (Restorative work by Dr. William C. Martin, Gainesville, FL).

A female patient with congenitally missing maxillary lateral incisors (Figures 7, 10) presented for consultation for implant-supported restorations. Preoperative assessment showed completed orthodontic movement (Dr. Dawn Martin, Gainesville, FL) with the ideal mesiodistal space (5.5 mm) at positions #7 and 10. The patient's central incisors measured 7 mm apico-coronally x 7 mm mesio-distally (Figure 11).

Periodontal probing revealed an additional 2 mm of clinical crown height available subgingivally which, if exposed, would result in a more ideal height: width ratio throughout the entire anterior dentition. It was further determined that additional space for #7 and 10 could not be obtained orthodontically without negatively affecting the height:width ratio of the final restorations, and the final overall smile esthetics.

Diagnostic casts were obtained and a wax-up made which reflected the desired 2 mm of additional clinical crown height throughout the anterior sextant. The patient was presented with the treatment plan, including the need for crown lengthening of the adjacent dentition.

Upon patient acceptance of the treatment plan, the wax-up was duplicated in stone, in order to fabricate the radiographic and surgical guides. Figure 13 shows the surgical guide in place following tissue reflection (Figure 13). Because the surgical guide mirrors the desired clinical crown height of the final restoration, it is immediately noted that the alveolar bone position does not allow sufficient apical positioning of the implant bodies (Figure 13). Approximately 3 mm of alveolar bone was carefully removed to provide sufficient space for implant placement, as well as future development of the emergence profile (Figure 14). Note that the bone directly in contact with the adjacent dentition was not removed. This bone will support the interdental papillae. Following implant placement, ostectomy/osteoplasty was performed on the adjacent teeth to reposition the alveolar crest approximately 2 mm from the CEJ (Figure 15).

Guided bone regeneration (GBR) was performed to repair fenestrations and recreate root eminences. Primary closure was obtained over the healing caps to maximize soft tissue volume. This approach resulted in the need for second-stage surgery to expose the implants

as well as a gingivectomy to recapture the desired clinical crown heights (Figure 16). Provisionals were fabricated to shape the tissues into the desired emergence profile and final impressions taken (Figure 17).

The final restorations at one year demonstrate ideal contours as well as excellent integration with the surrounding soft tissues (Figure 18). The patient's smile is also a testament to her satisfaction with the final result (Figure 19).



Figure 11 Case 2 at initial presentation.



Figure 12 A cast of the wax-up, showing the anticipated final result. The surgical guide was fabricated from this cast.

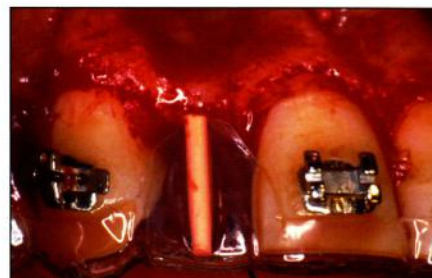


Figure 13 Osseous recontouring was performed to allow proper depth of implant insertion.

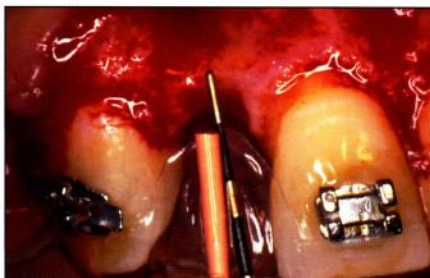


Figure 14 The stent was used to confirm adequate apico-coronal space for implant placement. Note the bone adjacent to the natural dentition is preserved for papilla support.

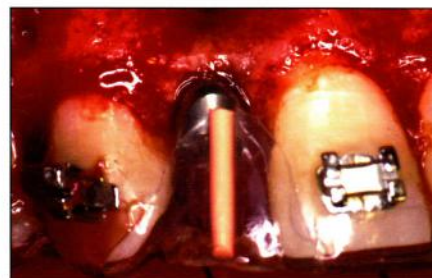


Figure 15 The implant is in position. Osteotomy and osteoplasty were also performed on the natural dentition at this time.



Figure 16 At uncovering, the final gingivectomy was performed. Note the osseous contours were previously established at the time of implant surgery.



Figure 17 Peri-implant soft tissue contours have been established at provisionalization phase.



Figure 18 A view of the final result. Note the improved height:width clinical crown ratios throughout sextant.



Figure 19 The patient's smile at 1 year post surgery.

### Case 3

**An implant-supported #8; the patient declines crown lengthening (Restorative work by Dr. Jason Gillespie, San Antonio, TX).** Whether due to finances, timing, or lack of perceived esthetic value, a patient may choose not to undergo crown lengthening in conjunction with implant placement. In such cases, the patient is informed that crown lengthening may or may not be possible in the future, depending on the position of the implant.

A female patient presented missing tooth #8. It had been extracted one year earlier. She had been wearing a provisional removable partial denture during that time (Figure 20). It was noted that she had incisal edge fractures on teeth #'s 6 and 7, heavy wear facets, and exposed margins on crown #'s 9 and 10. Closer examination revealed a 1:1 height:width ratio of the anterior natural dentition, giving the appearance of short, square clinical crowns (Figure 21). The patient was presented with the option of crown lengthening her natural dentition and restoring #6-11 to a more esthetic height:width ratio. The patient declined any additional treatment, reporting no concerns with the appearance of the rest of her anterior dentition.

Following the patient's wishes, the implant was placed at the #8 site using osteotomes and GBR therapy. Following 3 months of healing, the patient was referred for restoration of the implant, including guided tissue shaping during the provisionalization phase. The implant was restored using a 1.5 mm Octabutment and custom gold abutment. Figures 22 and 23 show the final result after two years in function. Note the excellent tissue response to the implant-supported restoration. The patient is satisfied with the overall esthetic result and has now expressed interest in restoring the adjacent teeth in the near future, in spite of the aforementioned limitations.

### Conclusion

Analysis of the patient's esthetic requirements is paramount when attempting to restore the anterior dentition with dental implants. Recognition of common clinical situations such as APE can have a significant effect on three-dimensional treatment-planning implant positioning and the desired esthetic outcome.

Special thanks to Drs. Farhad Eslambolchi, Dawn Martin, and Frank Higginbottom for their clinical talents and counsel.



Figure 20 Case 3 at initial presentation.



Figure 21 At initial presentation. Note the 1:1 height:width ratio of the anterior natural dentition.



Figure 22 A view 2 years post-restoration.



Figure 23 The patient's smile 2 years post-restoration.

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