Diagnosis and Treatment of the Short Clinical Crown
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Introduction
Dental patients are more concerned with the esthetics of their smile than ever before. Patients’ dissatisfaction with their oral appearance can negatively affect their self-confidence and how other people perceive them. Short anterior clinical crowns are one of the most common esthetic complaints for which patients seek treatment.

The ideal dimensional proportion of a maxillary incisor is 73-78%. A tooth is considered “short” when there is a decrease in the apico-coronal dimension, i.e., length, or an increase in the mesio-distal dimension, i.e., width, resulting in a proportion less than 73%. For example in Figure 1, the first image was simply stretched to mimic an increase in the width of the lateral giving the appearance of a short crown. The purpose of this clinical update is to discuss the diagnostic approach and treatment considerations when addressing unesthetic anterior short clinical crowns.

Introduction

Fig 1. Ideal proportion in A compared to increased width and short appearance in B
When a patient presents with short clinical crowns, the first step is to determine which dimension is wrong and why. Unless the tooth is malformed, excessive width of a tooth usually occurs only after restorations have been placed. For example, closure of diastemamas in Figure 2 resulted in teeth that are too wide and, therefore, give the appearance of short crowns. More often than not, the culprit for a short clinical crown is an inadequate crown length. The two primary etiological categories of this appearance are incisal tooth structure loss and gingival excess. Once the etiology is identified, the appropriate treatment is fairly straightforward.

Fig 2. Diastemas present in A, closed with composite in B

Tooth deficiency → Prosthetic treatment
If incisal tooth structure is missing due to attrition, trauma, or malformation, the treatment recommended is restoration of the crown via prosthetic measures.

This can be accomplished using direct or indirect methods such as composite or veneers as seen in Figure 3.

Fig 3. Incisal attrition in A, restored to proper proportions with indirect veneers in B

Tissue excess → Surgical treatment
Gingival excess occurs when the free gingival margin (FGM) is positioned too coronally to the cementoenamel junction (CEJ). This condition is most commonly caused by altered passive eruption. As a tooth erupts into the mouth, the dentogingival complex, or where the gingiva attaches to the tooth, along with the supporting bone, gradually move apically to expose more of the clinical crown. If this process is interrupted, the FGM will remain too coronal with a portion of the crown still covered by gingiva. The underlying bone might also remain equal or even coronal to the CEJ. This condition is relatively common. A recent study found that 42.1% of post-orthodontic patients and 29.5% of non-treated patients demonstrate some degree of altered passive eruption. The correction of altered passive eruption or excessive gingival tissue is accomplished with surgical repositioning of the FGM apically (see Figure 4).

Fig 4. Tooth #9 with gingival excess in A, and after the FGM was surgically repositioned in B

Pre-surgical planning
When planning the surgical approach for the correction of excessive gingiva, the width of keratinized tissue (KT) and the position of the bone must be determined. Coslet described four types of altered passive eruption based on the position of the bone and the amount of KT since these are the two factors that must be considered when planning the surgical intervention. Type I describes adequate amount of KT while Type 2 delineates minimal KT. Sub-type A describes bone that is 2-3 mm below the CEJ while sub-type B describes bone that is at or above the CEJ. Figure 5 shows the four different classifications of altered passive eruption in this scheme.
Fig 5. Coslet’s classifications for altered passive eruption

Type 1 cases can be treated with gingivectomy to place the FGM at the desired level. On the other hand, Type 2 cases require that a flap be raised and repositioned apically without removal of marginal KT because this will result in an insufficient amount of KT after healing.

Regarding crestal bone position, gingival tissue will typically heal after crown lengthening such that the FGM is about 2.5-3.5 mm from the bone. The standard recommended distance from the crest to the free gingival margin is 3 mm, which is based on the average biologic width and sulcus depth. Therefore, failure to remove enough bone during surgery can result in coronal rebound of the gingiva after healing. Type A cases, where the bone is already 2-3 mm apical to the CEJ, will typically not need hard tissue removal. However Type B cases generally require some form of ostectomy otherwise the tissue will rebound coronally and the tooth might appear short again. It is important to note that Type B cases are encountered more often than Type A, thus most patients will need some form of ostectomy. Also, a patient may exhibit distinct Coslet types on different teeth or even on a single tooth, so a combination of surgical approaches may be required.

Clinical case

This 43 year old female was unhappy that her teeth looked short after orthodontic therapy (see Figure 6). Soft tissue examination and radiographs were used to classify her tissue relationship as primarily Coslet type 1B, which was confirmed at time of surgery. The patient was treated accordingly with both soft and hard tissue removal. She was thrilled with the results and reported, “I can’t stop smiling”.

Post-surgical changes

Apically positioned gingival tissues, with or without bone reduction, will re-establish at the new location and remain stable long-term. The gingiva is fairly stable by 5 weeks and the attachment apparatus is completely remodeled and indistinguishable from non-treated sites by 3 months. The tissue margin typically moves in a coronal direction, primarily for the first 6-12 months, unless there is inadequate bone reduction, at which point it remains stable out to 7 years. Therefore, restorative treatment should not be finalized until 6 months post-surgery when gingival levels have mostly stabilized.

Conclusions

Identification of short crown etiology is the first step when planning treatment. Most cases can be addressed with restorative treatment, crown lengthening, or both and necessitates clear communication between the restorative and surgical providers to maximize outcomes. Rare, severe cases involving pathology, hyperactive musculature or skeletal deformities may require more invasive, multi-specialty interventions including orthognathic surgery, facial surgery or orthodontic treatments. Whatever treatment is required, the immense patient satisfaction and improved confidence with the treatment outcomes makes any treatment, whether simple or complex, worthwhile.

References

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