Using Orthodontics to Alter Gingival Levels

The dental standard of care is rapidly changing. In our daily practices, patient demands are extremely high, and we are often required to reach into our bag of tricks to satisfy a patient’s aesthetic expectations. It is critical that a dentist perform a complete examination, establish an accurate diagnosis, and present all possible treatment alternatives to the patient. Creative and meticulous treatment planning using dental procedures from various dental specialties often leads to results that one wouldn’t have believed possible just several years ago. A simple recipe from our dental cookbook is the use of orthodontic extrusion of teeth as a tool to alter gingival levels and recreate aesthetic harmony.

The use of orthodontics has become a most valuable aesthetic tool in our day-to-day practices. It enables us to re-establish and alter gingival and bone levels to create the type of restorations required by today’s dental standards.

Orthodontic eruption, also known as orthodontic extrusion, allows us to alter the position of the gingiva and the underlying crestal bone. The ability to change the gingival position via the extrusion of teeth using orthodontics gives clinicians the ability to enhance dental aesthetics. Traction forces are placed on a tooth, bringing the crestal bone along with it into a new position. The gingiva follows the vertical movement of the tooth and bone. The presence of a tooth allows us to modify the position of the bone and gumline. The absence of teeth makes these alterations extremely difficult.

This article will profile several everyday uses of orthodontic extrusion.

REPAIRING PERIODONTAL DEFECTS

Our patient presented with generalized moderate periodontal bone loss, significant gingival recession on the upper right canine, and severe gingival recession on the upper left canine (Figure 1). She understood and accepted that her dental problems were a result of her own neglect. At 50 years of age, she decided that something had to be done. She had previously been presented with various treatment options, by different dentists, ranging from full-mouth periodontal therapy and crown and bridge, to extraction of all of her upper teeth.

The breakdown of the interdental papilla and the beginning of the appearance of what is frequently referred to as a black triangle between the anterior incisors is an indication of underlying alveolar bone loss. A composite restoration previously placed on the root surface of the upper left canine further complicated the ability to achieve root coverage with gingival grafting.

Visually, the central incisors were short (7.75 mm). Current aesthetic principals accept a width-to-length ratio of 70 to 75% and a crown length of 10 to 11 mm to be ideal. So if we use periodontal surgery creatively to raise the gingival level, we can diminish the discrepancy between the incisor and canine gingival level. To reposition the gingival margins of the canines, we chose to initially place free gingival grafts and then use orthodontic extrusion to create gingival level harmony. Figures 2 and 3 illustrate the placement of the gingival grafts and the subsequent extrusion of the canines. It is important to create an adequate band of attached gingiva to aid in the orthodontic extrusion and to reposition both gingival and bone levels.

Once the canines were in a satisfactory position, we took study models and created a diagnostic wax-up to serve as a template for our final projected restoration (Figure 4). We then prepared and temporized the teeth with Luxatemp Fluorescence (Zenith/DMG) following our wax-up. We may use a laser, electro-surgery, or blade to place the gingival margins where we want them regardless of where the alveolar bone is located. In this case, an Odyssey 2.4G diode laser (Ivoclar Vivadent) was used. Aesthetics is our criterion at this point in treatment, and we may sculpt papillae in the gingival tissue, align gingival levels, and place teeth in harmony with the golden proportions (Figure 5).

Periodontal surgery was then performed, with the periodontist utilizing the position of the temporaries to recreate biological width and to repair defects in the bone. Our professionals were the periodontist’s template for gingival margin placement. If the periodontal treatment had been performed before temporization, then we may have been left with a lack of interdental papillae, the presence of black triangles, and irregular gingival architecture, because without the professionals the periodontist would not have a frame of reference.

After 4 months of periodontal healing, final impressions were taken of the prepara-
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Figure 4. Diagnostic wax-up used as a template for the final restoration.

Figure 5. Luxatemp provisionals recreating gingival harmony.

Figure 6. The final IPS Empress restorations.

Figure 7. Chronic inflammation surrounding the gingival margin of a crown on the upper left central incisor.

Figure 8. Orthodontic traction used to extrude the upper left central incisor.

Figure 9. Provisionalization of the 4 anterior teeth with Luxatemp.

Figure 10. The final Empress porcela-in restorations.

Figure 11. Severely decayed, discolored, and broken root of the upper left central incisor.

Figure 12. Extrusion of the incisor.

Figure 13. The Luxatemp temporary crown.

Figure 14. The final IPS Empress all-porcelain crown.

Figure 15. Pretreatment: recasons, abrasions, and gingival disharmony.

After 4 months of stabilization with the provisional, impressions were taken of the preparations and of the temporaries.

The gingival margin had migrated apically due to years of irritation. We believed that by just simply replacing the crown we would not be able to restore the tooth to meet our patient’s expectations. The chances of still having a discolored gum line and of having a longer tooth gingivally than the other central incisor motivated us to think of more predictable alternatives. Orthodontic eruption to alter the gingival position of the crown to be replaced was chosen as the solution.

The maxillary teeth from canine to canine were bracketed, and orthodontic traction was placed on the affected incisor (Figure 8). Three months of treatment allowed the gingival position to be progressively altered. A harmonious gingival level was recreated with a diode laser. The extruded central incisor was to receive a full crown, and the 3 adjacent anterior teeth were prepared for porcelain veneers. A 4-unit Luxatemp Fluorescence provisionals were placed for orthodontic retention and as a template to re-establish gingival harmony (Figure 9).

After 4 months of stabilization with the provisional, impressions were taken of the preparations and of the temporaries. Individual IPS Empress restorations were fabricated, bringing the teeth back into aesthetic harmony (Figure 10).

PREPARING AN AESTHETIC IMPLANT SITE

Orthodontic extrusion can often be used to help predict aesthetic harmony in situations where a tooth must be lost. Sometimes teeth are broken beneath the gumline, or are severely discolored and decayed. Extraction of these teeth quite possibly may leave a defect in the gingiva and bone that may be extremely difficult to repair once the extraction is done. The presence of an existing root gives us the ability to place traction on it, which enables us to change the position of the gingival crest and underlying alveolar bone. If we overcompensate the gingival crest position, we have a safety factor if a defect remains after the extraction.

Our patient presented with a loose crown on the upper left central incisor. The remaining root was decayed and severely discolored (Figure 11). Any attempt to salvage this root would be highly unpredictable. As the patient was only 40 years old, it was unlikely that a new post and crown would last her lifetime.

Extraction of the root and placement of an implant was prescribed as our treatment of choice. However, the extraction of this fragile root presented the dilemma of potentially creating a large bony defect that would not be easy to repair. By taking advantage of having the existing root, we had the ability to alter the position of the bone and gingiva. If we could overcompensate this position before extraction, then it would help prevent having a huge defect after the extraction.

A No. 2 D.T. Light-Post (BISCO) was bonded into the canal using the All-Bond 2 technique. The tooth was re-built with LuxaCore (Zenith/DMG), and a provisional crown was fabricated with Luxatemp Fluorescence. It was cemented with Embrace Wet-Bond medium-viscosity resin cement (Pulpdent). Orthodontic brackets were then placed, and extrusion forces with a 16 to 22 Ni-Ti wire were exerted. The position of the gingival margin was altered significantly (Figure 12).

The root was extracted and was immediately replaced with a 4.7-mm Zimmer Tapered Screw-Vent implant (Zimmer). The placement transfer was prepared to accept immediate temporization. It was absolutely imperative that the immediately loaded provisional was not in any contact in centric occlusion or in any excursive movements.

Immediate placement and temporization satisfied the desire of the patient not to feel toothless, and it gave the dentist the ability to align.
and preserve the patient’s tissue levels and gingival papillae (Figure 13).

After waiting 6 months we had ideal gingival healing and implant integration. Impressions were taken, and a ceramic abutment and an IPS Empress crown were fabricated to match the adjacent central incisor, giving a pleasing, conservative, and aesthetic result (Figure 14).

ALTERING AN INHARMONIOUS GUMLINE

A 45-year-old female patient requested an upgrade of her smile. She disliked the amount of gingiva she displayed on her upper right central, lateral, and canine. She described herself as “getting long in the tooth,” displaying significant gingival recession and abfraction due to prematurities and lateral working interferences (Figure 15).

Photographs were taken, and the ideal gingival level was hand drawn (Figure 16) to aid us in visualizing the required changes. It was observed that the upper left central had an ideal level, the level of the upper right central had to be raised, and additions to the level of gingiva on the upper left lateral, canine, and first premolar had to be made. Orthodontic intrusion was our choice of treatment to bring the gingival levels of these teeth into aesthetic harmony.

Brackets were placed, and a 16- to 22-gauge archwire was used to place apical forces on the teeth (Figure 17). After 5 months the brackets were removed, displaying significant improvement to the gingival levels. A diode laser was then used to lengthen the upper right central, lateral, canine, and premolar in the gingival direction (Figure 18). The 10 anterior maxillary teeth were conservatively prepared for porcelain veneers, and a Luxatemp Fluorescence provisional was placed for 4 months (Figure 19). This allowed time for post-orthodontic retention and for the patient to approve her new look. When the 10 feldspathic veneers were placed with the Vitique cementation system, the patient was absolutely delighted (Figure 20).

CONCLUSION

The use of orthodontics has become a most valuable aesthetic tool in our day-to-day practices. It enables us to re-establish and alter gingival and bone levels to create the type of restorations required by today’s dental standards.

Sources


