Surgical crown lengthening for aesthetics—aka ‘the gum lift’

Correctly diagnosing the need for gingival surgery should not be overlooked as a less important part of smile improvement. Here’s an example of how to perform the procedure with a predictable technique that promotes rapid healing.

Don’t ignore gingivae!

Smile design, golden proportions, embrasure form, labial anatomy—just some of the terms used in so many of the articles published in journals today. Cosmetic dental education is so popular because patients are asking dentists for this type of work. As a result, dentists have to understand the latest techniques and materials to exceed their patients’ increasingly high expectations.

Many after-shots of cosmetic dentistry are published in the press and very often one aspect of an otherwise excellent case leaps out—‘Why did no-one treat the gingivae?’

The gingival aesthetics

Healthy, pink, well-contoured, symmetrical gum tissue complements and frames the teeth. Patients may describe how they wish to change the aesthetics of their teeth not their gums but what patients really want is a great smile. In over 50 per cent of all cosmetic procedures we undertake, crown lengthening is involved. This figure is not surprising, many clients’ aesthetic concerns are related to poorly aligned/crowded teeth; a protruding central will almost certainly have a gingival margin that is more apical than a tooth that is retroclined due to the relative positions of the crestal bone and thickness of the gingiva.

Classic smile design describes ideal gingival aesthetics as:

1. Lip line at or just above the gingival margin when smiling wide.
2. Symmetry between the upper central incisors.
3. Canines and central incisors have gingival margins at the same level when looking from the front.
4. Lateral incisors ideally 1-1.5mm below the level of centrals and canines, although it is acceptable if the levels are the same.

Asymmetrical gum tissue, for example, where the tissue is more coronal on one central, can giving the appearance that one tooth is longer than the other. Ultimately, this can affect the emer-

Education 15

Another common client concern is the ‘gummy smile’ (Fig. 1). A combination of crown lengthening and veneers in these patients can be one of the most dramatic and powerful changes that we make and the clients are simply amazed by the results. (Fig. 2)

Contouring v lengthening

Diode lasers have made gingival contouring procedures quicker and cleaner than ever, but their use must be properly planned to respect the underlying crest of alveolar bone.

When planning how much tissue can be removed with gingival contouring alone, the clinician must bear in mind that there should be 3mm between the gingival or restorative margin (which ever is more apical) and the alveolar crest. This is referred to as the biological width now (Fig. 8). The principles of biological width now need to be respected in terms of the gingival tissues with exposure of restorative margins. In a patient with a high lip line, either outcome would be a disastrous failure.

Refining the zenith

The ability to use electro surgery and, especially, lasers to cleanly perform gingival contouring has resulted in clinicians being taught to refine gingival outline/ reposition gingival zeniths on the same day as preparation. When the case is fitted, the tissue appears very healthy and stable.

Ultimately the gingiva has been shown to grow back into the original position as the individual’s gingival width is re-established.

Diagnosis

A full clinical and radiographic examination was performed—this article will only discuss the crown lengthening aspect of treatment planning. However, a vital tool in communicating with the technician is the use of imaging. The image below is not created via the ‘cutting and pasting’ of a library image, but created in front of the client in a Photoshop-type application using a graphic tablet. In this case, imaging allowed us to discuss the lip asymmetry (high on the left) and show how creating gingival symmetry would mask this and create a very pleasing result (Fig. 5).

The image result is also used to help in laboratory communication for the construction of the diagnostic wax-up. (This article assumes the reader’s ability in providing accurate records such as CR occlusal records, stick bites and face bow etc to the technician.)

Crown lengthening procedure

From the study models, diagnostic wax-up and imaging we determine where we would like the position of the gingival margins. Some advocate the use of a clear stent to help visualise the waxed-up position of the gingiva in the mouth. We prefer to use digital microscales (we find them more accurate in our hands) to communicate and verify the desired levels of the gingiva and crestal bone.

The use of the stick bite (Fig. 6) is very helpful in visualising the desired horizontal plane, even when the patients’ eyes are obscured by DVD headsets or dark glasses.

Figure 7 shows marks having been placed at the desired position of the new gingival zenith. The symmetry between the left and right sides can now be visualised.

The laser (Diolase ST) is then used to contour the gingiva to the required position. We now also use the calipers (Dentagauge/ erasable DENTAL) to record the distance from the incisal edge to the gingival zenith (Fig. 8). The principles of biological width now mean that this distance (15mm) plus 5mm (10mm) is where we need to position the crestal bone via osseous contouring.

We now need to raise a full thickness flap, sufficient to allow easy access to and visualisation of the alveolar bone (Fig. 9). We tend to avoid the use of any releasing incisions due to the scarring that can result.

Figure 9 shows the situation we usually find when a flap is raised. The alveolar bone is not smooth and the peaks and troughs in the crestal bone are reflected in the gingiva.

If probing in just one location, the probe may contact a peak or a trough in the crestal bone, resulting in a reading that is higher or lower than the ‘average’ position of the bone surrounding that tooth. For example, you may probe to bone and read 4.5mm off the probe when really the bone is at 3mm. This could result in gingival contouring alone being undertaken when really crown lengthening was necessary to achieve the desired gingival position.

A case study: crown lengthening and 10 veneers

Presenting complaint

This 52-year-old female attended the clinic for cosmetic dental treatment. Her concerns were the irregularity of the teeth and the ‘gummy’ appearance of her smile on the left side.

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The bone is then contoured to the desired position using a bur. We leave a very thin wafer of bone covering the root and then remove this last portion with a Hollenbach carver, as shown in Figure 10. This helps to prevent any damage to the root surface from the bur. We also will often thin the buccal thickness of the bone for two main reasons. Firstly, thick or bulbous bone can cause the lip to ‘ride up’; secondly, leaving thick bone at the margin can cause the gingivae to re-grow being visible labially and to minimize any knots palatally we use a continuous suture. Once the sutures are completed we place some gauze over the flap and apply gentle pressure for up to 20 minutes. This helps prevent any blood ‘pooling’ under the flap and encourages primary fixation. Detailed, written after-care instructions and oral hygiene aids such as soft brushes, Eladrol (chlorhexidine) mouthwash and Corsodyl gel are given.

The amount of bone removed is determined by adding 3mm to the previous measurement, thereby creating the correct biological width. As can be seen Figure 11 this distance is confirmed with the callipers. This procedure is repeated on all the teeth planned for crown lengthening. The flap is then replaced and sutured into position. (Fig. 12). To avoid unsightly knots the home care re-enforced. The sutures are usually removed after two days and the home care re-enforced. It never fails to impress us how little post-procedure discomfort these clients experience. The vast majority are simply delighted to see the immediate transformation in their smile.

The next appointment is scheduled for at least three weeks after the initial crown lengthening and Figure 13 shows how well healed the tissues appear. This appointment is referred to as the gum contouring. Once local anaesthetic has been administered we check the probing depths once again. The laser is then used to refine the gingival position (Fig. 14). There is also often some ‘plumping’ of the papillae and we thin this with the laser to help create a more aesthetic result and help with preparation design. In this case a minor frenectomy was also performed.

The vast majority of clients are ready for the preparation of their porcelain veneers three weeks later. The photographs in Figures 16-18 show the final results just six weeks after the gum contouring appointment or nine weeks after the initial crown lengthening procedure.

References: