Crown Lengthening Surgery Revisited

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Introduction

Crown Lengthening is a surgical procedure performed to expose a greater height of tooth structure above the gingival margin. ‘Crown Lengthening’ is a bad term, as often more than crowns with some of the tooth roots are exposed as a result. However, along with many other bad terms, e.g. ‘Gingival Recession’ which should be ‘Periodontal Recession’, Crown Lengthening is still used while ‘gum shortening’ is what patients perceive the procedure to involve. Crown lengthening can be performed to facilitate restorative and/or prosthodontic treatment and to improve aesthetics. It has recently been reported to be one of the most common reasons for periodontal surgery performed in the United States of America from the findings of an American Academy of Periodontology Practice Profile Survey of American Periodontists. It is a form of treatment also provided by general dental practitioners abroad and, as has been recently shown, in Hong Kong as well.

Revisitiation

Crown lengthening has become more widely practiced, for many reasons, partly due to increased aesthetic expectations, partly due to increased attempts to retain and restore fractured, worn and deeply carious teeth, and partly in response to the increasing popularity of incorporating dental implant therapy in the management of partial edentulism. Because crown lengthening surgery is being more commonly performed, there has been over recent years a revisitiation of some of tenets which used to guide its performance, and many papers have been published in recent years.

Biological width

The biologic width is the distance from the coronal most attachment of the junctional epithelium to the crest of the alveolar bone, accommodating the junction epithelium and the supra-osseous gingival connective tissues. The dimensions of this ‘biologic width’ were detailed in the early 1960s on the basis of human autopsy specimens. In 1994 a report on further human autopsy material seemed to confirm the mean figure given in the early 1960s but the 1994 study showed wide variations and significant differences between dimensions of the biologic with around different tooth types.

In very recent years supraosseous (supracrestal) measurements of gingival tissue dimensions in healthy living subjects have shown wide variations from tooth-type to tooth-type, but also no difference between genders. These recent studies have also shown that the dimensions are same on both (contra lateral) sides of each arch. These studies have demonstrated that transsulcular (trangingival) probing to register the exact supraosseous gingival dimensions should guide what it constitutes the biological width which must be respected and be allowed to be recreated following crown lengthening surgery.

The ‘3 mm Rule’ Revisited

On the basis of the 1960s autopsy study, a biological width (“one size fits all”) was proposed. In adding the depth of a gingival sulcus to the width of attached junctional epithelium and the supraosseous gingival connective tissue plus a little bit extra (to spare), a dimension of 3 mm was taken to be required from the final bone crest to the intended margin of any restoration, so as to avoid “violation” of the biological width by the
subsequent restoration. For decades this “3 mm rule” dictated the amount of alveolar bone to be removed during crown lengthening surgery. With the current understanding of wide variations in supra-osseous gingival tissue dimensions, which can accurately be determined from transulcular probing, bone removal can be tailored to the situation.

**In Crown Lengthening Surgery, what is wrong with keeping to the “3 mm Rule”?**

Basically greater removal of alveolar bone, which we all strive to preserve through good atraumatic oral hygiene procedures and regular prophylactic and supportive care, than required would often be the result.

**“Violation” of the Biological Width**

The Biologic Width is not necessarily something holy, sacred and sacrosanct which cannot be encroached upon by restorative margins. Recent research however has shown that restorative margins placed supragingivally or within the shallow histological gingival sulcus induce less inflammation in the long term than do restorative margins placed apical to the junctional epithelium and near to the bone crest, i.e. within the biologic width. The fidelity of the margin is also an important consideration. “Gappy” or overhanging margins retain more plaque and are more harmful than well fitting, well adapted margins. The harm induced is dependent in part on the gingival biotype, with the thin biotypes tending to exhibit gingival recession and thick biotypes developing increased probing depths and persistent inflammation.

**Crown Lengthening Surgery - indications**

To access deep subgingival caries or tooth fractures. To increase axial height of tooth structure supragingivally to allow for ferrule effect in endodontically treated teeth. To qualify uneven gingival margins. To expose the anatomical crowns obscured by delayed or altered passive eruption. To manage some cases of ‘gummy smile’.

**When will the position of the gingival margin become stable often crown lengthening surgery?**

There are at least ten publications which can be used to try to answer this question, and from these publications the answer seems to be a range of from 5 weeks to at least 12 months.

**How soon to place the restoration after crown lengthening surgery?**

The publications available to guide us suggest that for deep restorations, especially if the crown lengthening has been localized or the probability of gingival margin rebound is great, then the restoration should be placed as soon as is possible/practical. For routine indications a delay of 3-6 months is appropriate. For highly aesthetic indications it may often be advisable to wait for a full 12 months, if any gingival recession or rebound is likely to compromise the aesthetic outcome.

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**Contributors Wanted 歡迎投稿**

The HKDA newsletter welcomes any dentally related articles from you. It should be between one half to one page, either Chinese or English, preferably with one to three photos.

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