

# The Apically Repositioned Flap in Tooth Exposure

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**Abstract:** Methods of exposing impacted teeth in order to bring them into the line of the arch include gingivectomy, the apically repositioned flap and closed eruption techniques. These procedures aim to facilitate the eruption of the impacted tooth with a minimum of disruption or damage to the tooth itself or adjacent structures. The aim of this paper is to discuss the various surgical methods of exposing impacted teeth and to help to identify where the use of the apically repositioned flap is indicated. Clinical examples are presented and a surgical method for carrying out this procedure recommended.

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**Clinical Relevance:** In the exposure of impacted teeth it is important to maintain the mucogingival complex to help ensure the healthy long-term periodontal status of the tooth.

They may become displaced, diverted or angled away from their natural path of eruption.<sup>5</sup>

The most commonly impacted teeth are the third molars, followed by the maxillary canines;<sup>6</sup> of patients seeking orthodontic treatment about 2% present with impacted maxillary canines. Of these, approximately one-third are labially impacted.<sup>7</sup> Confirmation that the tooth is labially impacted may be obtained through visualization, digital palpation and radiographic localization. Exposure of an impacted tooth should be considered if it fails to erupt or is unduly delaying instigation of active orthodontic treatment. It is important to plan carefully as space may need to be maintained or even created orthodontically within the arch.

### Gingivectomy

It has been suggested that a gingivectomy should be carried out to expose at least one-half to two-thirds of the crown of the tooth while retaining at least 3 mm of attached gingiva.<sup>6</sup> This technique is simple and quick to carry out but sacrifices healthy attached gingiva and may increase the risk of detrimental changes in the periodontal tissues<sup>5</sup> (Figure 1).

### Closed Eruption Technique

In situations where the labially impacted tooth is positioned very high within the buccal sulcus, near to the nasal spine or deep within the alveolus, an apically repositioned flap may be difficult to use.<sup>6</sup> In these clinical situations the surgical method of choice is the closed eruption

Within a healthy oral environment teeth are surrounded by a zone of keratinized gingiva. A varying amount of gingiva is bound tightly to the underlying alveolar bone and is known as *attached gingiva*; this is defined as that gingiva extending from the free margin of the gingiva to the mucogingival line minus the pocket or sulcus depth measured with a thin probe in the absence of inflammation.<sup>1</sup> Attached gingiva serves as a means of attachment to the tooth and bone, preventing detachment of the periodontal tissues by movement of the muscles of the face.<sup>2</sup>

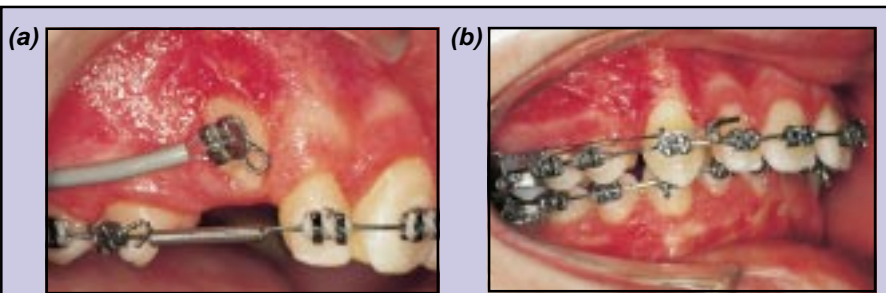
Attached gingiva is considered necessary for a healthy periodontium; however, there has been no

quantitative measure of the width of attached gingiva that is considered adequate for this purpose. The attached gingiva has evolved to withstand the forces inflicted upon it during mastication and other oral functions. Alveolar mucosa is a more fragile tissue and, although it may adapt if exposed to these forces to a limited extent,<sup>3</sup> where it is found surrounding a tooth it is often associated with inflammation.<sup>2</sup> Therefore, when choosing the method of surgical exposure it is important to ensure maintenance of the periodontal complex if at all possible.

Impacted teeth are those teeth which fail to erupt naturally for a number of reasons, including:

- an ectopic follicle;
- arch length shortage;
- faulty root resorption;
- large tooth size; and
- the presence of cysts or tumours.<sup>4</sup>

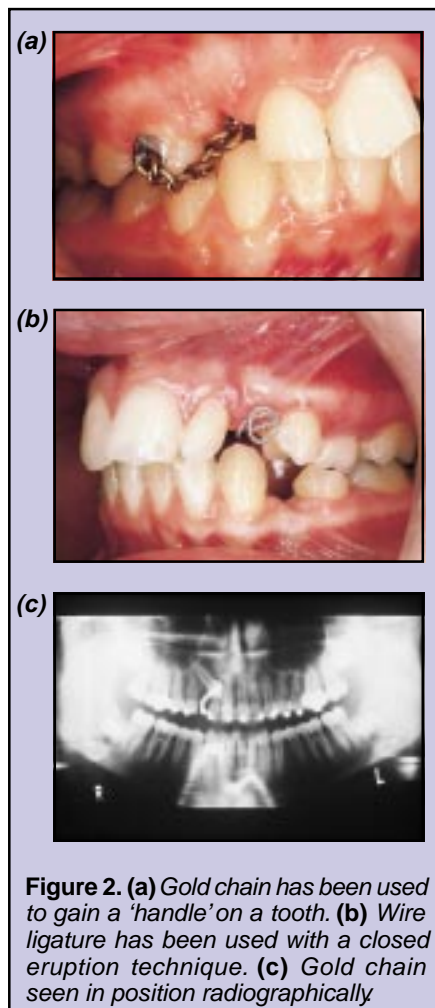
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**Figure 1.** (a) Little, if any, attached gingiva surrounds the tooth and the alveolar mucosa present is inflamed. (b) The tooth is now in the line of the arch but there has been little improvement in the amount or quality of attached gingiva.

technique. The disadvantage of this technique is that once the flap has been replaced no direct inspection of the tooth can be made:<sup>8</sup> debonding of attachments may therefore take some time to detect and repairs are made difficult. The

technique itself is time-consuming and if acid-etch techniques are to be used in order to bond on attachments the tooth may be difficult to isolate. Eruption times have also been shown to be longer than other methods of exposure—which in turn will increase treatment time<sup>2,9</sup> (Figure 2).



**Figure 2.** (a) Gold chain has been used to gain a 'handle' on a tooth. (b) Wire ligature has been used with a closed eruption technique. (c) Gold chain seen in position radiographically

### The Apically Repositioned Flap

The term *apically repositioned flap* was initially used in 1957 by Ariaudo and Tyrell, who suggested modifications on the technique first introduced by Nabers in 1954.<sup>9</sup> The technique was primarily used by periodontologists and general dental practitioners to eliminate periodontal pockets. The apically repositioned flap was soon adopted by orthodontists as an effective method of exposing certain unerupted teeth while maintaining the mucogingival complex.

### SURGICAL TECHNIQUE FOR THE APICALLY REPOSITIONED FLAP

Most patients undergoing the exposure of a tooth are in their early teens. In many the procedure is carried out under local anaesthesia but a small percentage may require general anaesthesia. It is therefore very important to use a technique that is quick, simple and reliable. The patient must be well motivated with a high level of oral hygiene.

This example discusses an impacted lower left canine, which could be visualized and palpated within the buccal sulcus (Figure 3). Initially, local anaesthesia of the area was achieved,

then an incision made just lingual to the crest of the alveolar ridge in the space into which the tooth will eventually erupt; this helped to maximize the amount of attached gingiva retained. From each end of the crestal incision two parallel vertical incisions were made into the buccal sulcus, extending at least 10 mm beyond the mucogingival junction (Figure 4). The reason for the vertical (as opposed to diverging relief) incisions is to minimize any deficiencies between the margins of the flap and the adjacent tissue once it has been repositioned.

A full-thickness mucoperiosteal flap was raised and at least one-half of the crown exposed (Figure 5).

The crown of the tooth was then easily isolated, etched and an attachment bonded to the crown (Figure 6). It must be remembered that sterile water—not



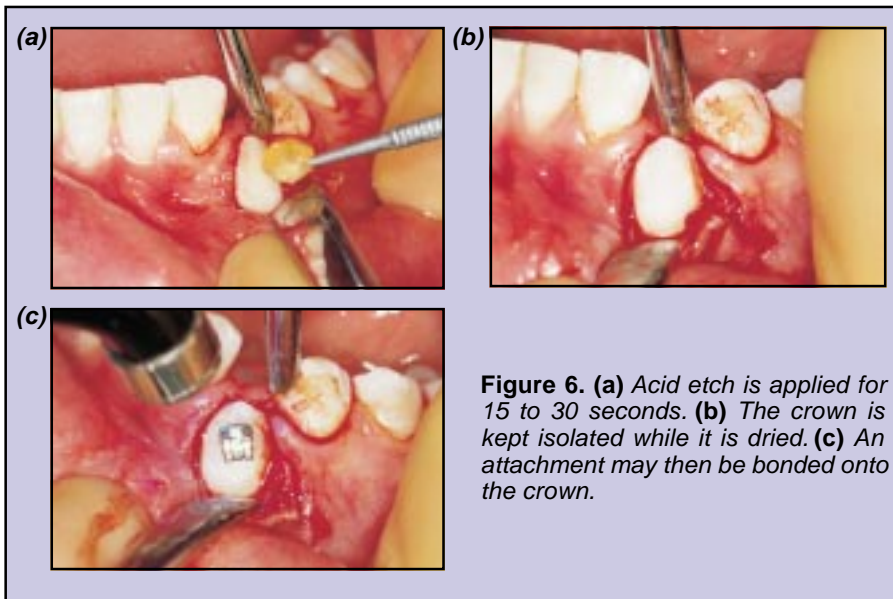
**Figure 3.** Labially impacted lower left canine.



**Figure 4.** Vertical buccal incisions should be made as parallel as possible.



**Figure 5.** At least one-half of the crown of the tooth should be exposed.



**Figure 6.** (a) Acid etch is applied for 15 to 30 seconds. (b) The crown is kept isolated while it is dried. (c) An attachment may then be bonded onto the crown.

primary intention, which is rapid and will reduce scarring. Minimal bone loss occurs, which, combined with good oral hygiene, will usually produce excellent postoperative results.<sup>9</sup>

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saline—must be used to wash the tooth and that intermittent use of a hair dryer will help to dry the tooth.

The flap was then repositioned apically below the bonded attachment with at least two sutures (Figure 7). Deficiencies between flap margins should be avoided as they will heal by secondary intention, increasing the risk of scarring and a poor periodontal outcome. Healing is

invariably uneventful, producing in most patients a margin of healthy attached gingiva that will advance with the crown of the tooth as it erupts (Figure 8).

**SUMMARY**

The apically repositioned flap is a quick, simple and reliable method for exposing most teeth that are impacted labially or within the line of the arch. It is suitable for tooth exposure in both children and adults and will help to minimize potential problems. However, its use is limited if the tooth is positioned very high in the buccal sulcus or is palatally impacted.

The technique allows accurate control of the amount of keratinized gingivae postoperatively and helps maintenance of the mucogingival complex, which will help to ensure a healthy long-term prognosis for the tooth. The tooth can easily be inspected at follow-up appointments; debonding of the attachment is readily detected and repairs simple. Healing is by



**Figure 7.** The flap may then be repositioned apically and secured with two sutures.



**Figure 8.** The cuff of healthy attached gingiva will accompany the tooth as it erupts.

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