

# Why periodontal surgery?

## Reappraisal of the reasons

Murray Arlin, DDS, FRCD(C)

*Periodontal surgical procedures are the treatment of choice when: 1) deep periodontal pockets preclude thorough root scaling; 2) osseous grafting is necessary to preserve the tooth; 3) there is inadequate supragingival tooth structure for proper restoration; 4) there is inadequate attached gingiva or mucogingival involvement. The decision to perform surgical procedures is influenced by the age of the patient, the prognosis of the teeth involved and the treatment plan for the whole dentition.*

Periodontal surgery has arisen out of a need to find ways to treat clinical problems that could not be resolved by non-surgical methods (1). Although there are many situations where there would be little doubt as to the need for surgery (e.g., surgical crown lengthening, certain mucogingival defects, root amputation in order to salvage a strategic molar, etc.) some of the classical indications for periodontal surgery have recently been challenged. It is timely, therefore, to re-appraise the "why" of periodontal surgery.

Whenever contemplating any periodontal therapy, one must keep in mind that the "PRIMARY" objective is to "MAINTAIN THE NATURAL DENTITION OF THE PATIENT FOR THEIR LIFETIME IN REASONABLE HEALTH, COMFORT, FUNCTION AND ESTHETICS". The choice of therapy to achieve this goal should ideally be the most "PREDICTABLE" one and should be as atraumatic as possible. Striving to attain pocket elimination and adequate bands of attached keratinized gingival tissue are "SECONDARY" goals of therapy. In order to achieve and maintain these goals of periodontal therapy, it is

critical that the therapist pay meticulous attention to the initial and maintenance phases of periodontal treatment as well as any surgical component of therapy that might be indicated. For example, a 65 year old patient exhibiting minimal bone loss, 6mm pockets and borderline mucogingival defects could most likely be maintained non-surgically in order to achieve our primary therapeutic goal. The same clinical conditions in a 25 year old patient, however, presents an entirely different picture, where initial, surgical and maintenance therapy might result in more "PREDICTABLE" means of achieving all of our goals of periodontal therapy.

One must also always keep in mind that although microbial plaque is undoubtedly the "primary" cause of inflammatory periodontal diseases, (2) factors that hinder plaque removal (e.g., overhangs, poor margins, tooth malposition, root proximity) and the patients' immunological response,

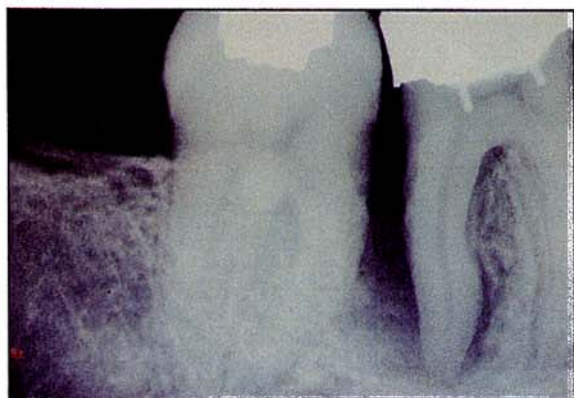
are important modulating "secondary" factors. Some of the secondary factors that inhibit plaque removal can be eliminated but unfortunately there is inadequate information available on how to bolster the patient's immune response to periodontal microbial pathogens. This then limits our therapy to be directed against the primary etiological factor in periodontal disease, namely, subgingival microbial plaque and the associated subgingival calculus which is always covered by a layer of microorganisms. (2)

The important question is how much of the plaque and calculus must be removed? or, looked at another way: how much can be missed? Unfortunately, we do not have an exact answer to this question. Indeed the answer is probably different for each patient and might even vary in an individual's own lifetime depending on other factors such as the patient's immunocompetence. As clinicians, we must therefore strive to achieve as near as possible total elimination of plaque, calculus and inflammation that is "PRACTICAL" for that unique patient who presents with his unique set of circumstances. This does not mean to justify per-

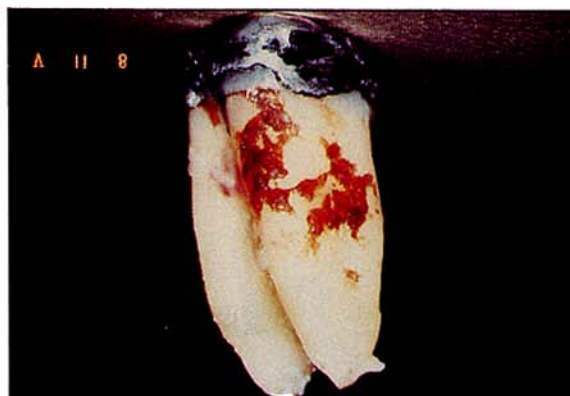
Dr. Arlin has a private practice in Periodontics in Weston, Ontario

We are pleased to present this original article written specially for Oral Health.



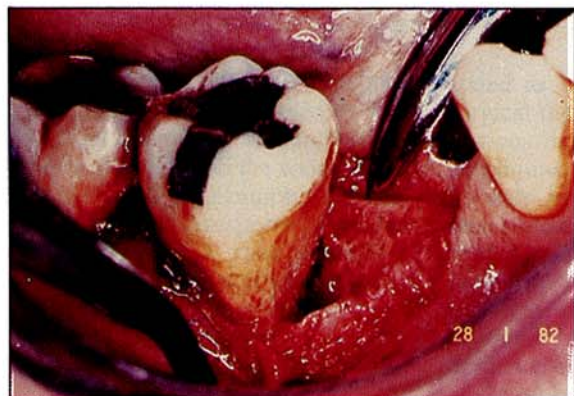


**Fig. 1** — In this case, the patient presented with pain, swelling and a deep pocket on the distal of the first molar. A diagnosis of an acute periodontal abscess was made and the prognosis was poor. The emergency treatment consisted of extensive scaling, root planing and gingival curettage under local anaesthetic. This was done with a "closed" procedure in that a flap was not raised. Approximately 15 minutes was spent on this procedure and was localized to the distal root of the first molar only.

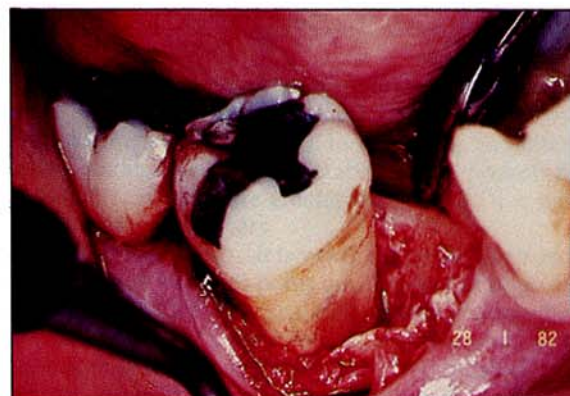


**Fig. 2** — When the emergency treatment failed, the first molar was extracted without delay. It was important not to allow the uncontrolled infection from the first molar to encroach upon the periodontal support of the mesial aspect on the adjacent second molar.

It is noteworthy that *in spite of extensive scaling and root planing a tremendous amount of residual calculus was evident.* This reinforces the concept that *the effectiveness of scaling and root planing decreases as pocket depth increases.*



**Fig. 3** — The osseous defect and root surface were visualized after a full-thickness periodontal flap has been raised and the granulation tissue has been curetted away. In this case, the osseous defect had a deep and wide 3-walled configuration while the root surface demonstrated abundant subgingival calculus deposits. Again, it is noteworthy that this patient had recently undergone a series of subgingival scaling and root planing appointments yet abundant residual calculus is evident.

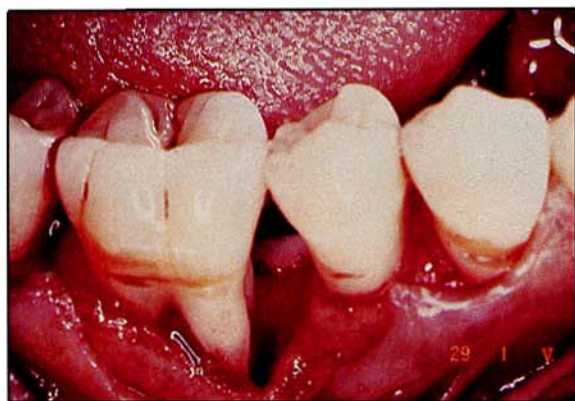


**Fig. 4** — With visualization of the diseased root surface, it was possible (but still difficult) to remove all the tenacious deposits. This would not have been possible without a flap approach that provided improved access. Note that the discolouration on the root that remains was not calculus but was probably indicative of a variable thickness in the root cementum and/or dentin.

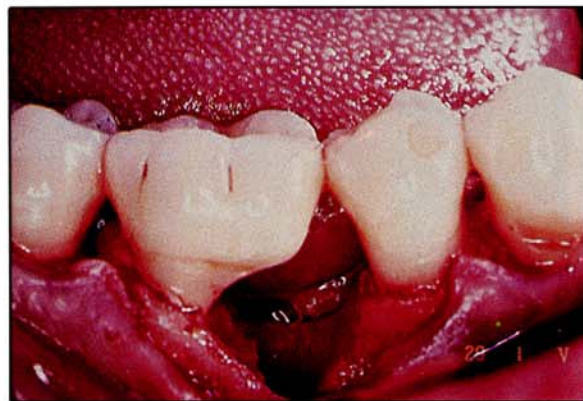


**Fig. 5** — The morphology of the osseous defect was such that it was more conducive to a regenerative procedure rather than a resective approach. In this case, the 3-walled defect was suitable for containment of an osseous graft substitute.





**Fig. 6** — Some common treatment options, when one is confronted with a deep isolated osseous defect include extraction (Fig. 1, 2), regenerative therapy such as open curettage with or without subsequent osseous grafting (Fig. 3, 4, 5) and root amputation (Fig. 6, 7). The treatment of choice depends of course on many factors some of which are (a) the degree of attachment loss (b) the morphology of the osseous defect (c) the root anatomy and (d) the strategic value of the tooth.



**Fig. 7** — Important considerations in this case included (a) the attachment loss being so extensive that the prognosis of the mesial root of the first molar was poor and (b) the periodontal support on the mesial aspect of the second bicuspid would be jeopardized if the defect were to extend further mesially. The distal root being well supported, it was decided to salvage the tooth with its crown intact by carrying out a mesial root amputation only rather than a hemisection.

forming surgery on every 4mm pocket "just in case" there might be some residual calculus. A flap approach to thoroughly debride the roots is indicated, where for example, the clinician strongly suspects abundant residual calculus that cannot be removed non-surgically and that if left would likely cause further periodontal breakdown.

Several recent clinical studies have indicated that meticulous non-surgical therapy can be effective in controlling moderate and advanced periodontitis. (3, 4) Unfortunately, some dentists have oversimplified these results and have erroneously interpreted this to mean that almost all periodontal patients can adequately be controlled by instituting a 3 month recall program in their office. Certainly this interpretation would be more accurate if the conditions in these studies were to be replicated in the dental offices that were attempting to institute such a periodontal maintenance program. Most of the dentists do not realize that for the most part these research studies were (a) carried out on anterior teeth only; (b) non-surgical treatment on a single patient took on the average of *five to eight* hours, often twice as much time that was necessary for surgical therapy; and (c) that non-surgical treatment when done thoroughly was

stated as being more difficult than surgical therapy. Indeed it should be obvious that recall appointments of 30 minutes in length are inadequate for most periodontal patients. When one is familiar with what scaling and root planing involves, it becomes more evident why it is so difficult and time-consuming. (Is that why we invented hygienists?) Below is the definition of periodontal root planing as stated by the American Academy of Periodontology.

#### **Statement on root planing**

##### **Definition: periodontal root planing**

Root planing is a meticulous treatment procedure designed to remove bacterial plaque and its toxins, calculus, and diseased cementum and dentin from the root surface. This procedure may be a definitive treatment in some stages of periodontal disease, may be part of pre-surgical procedure in others and is an essential part of maintenance care. Root planing is arduous and time consuming. It may be done by quadrant(s) or full mouth scheduling, may need to be repeated, and may require local anesthetic.

The limitations of scaling and root planing has been demonstrated by several investigations. (5, 6, 7) Their conclusions are similar in that they state: (a) the effectiveness of scaling

and root planing decreases as the pocket depth increases and (b) scaling and root planing becomes very unpredictable when pocket depths are greater than four to five millimeters.

It is worth digressing for a moment to point out that just as important as the scaling and root planing during a periodontal maintenance appointment is the "monitoring" of the periodontal status. Using a properly designed periodontal maintenance assessment form (8) pocket depths and mobilities should be documented at least every 6 months. The format of the assessment form should facilitate data comparison over a period spanning five to ten recall appointments. In this manner, areas of deterioration are detected as early as possible, so that interceptive therapy might prevent more advanced periodontal attachment loss.

So, why periodontal surgery? The answer is different for every patient but in arriving at a decision one should consider:

- (a) accessibility of the root surfaces to non-surgical treatment
- (b) quantity and tenaciousness of suspected residual plaque and calculus
- (c) patient immunocompetence or

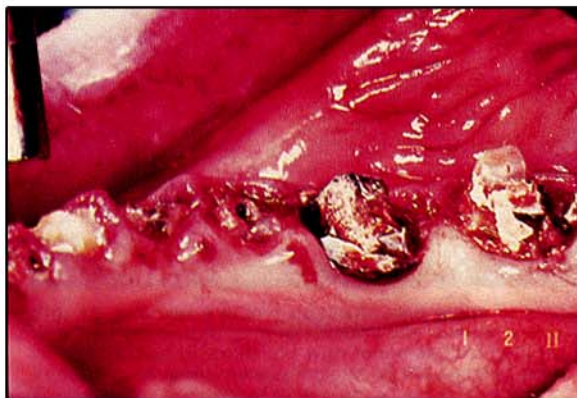




**Fig. 8** — Patients with periodontal disease who also have very thick alveolar bone are prone to develop infrabony osseous defects. Interproximal crafters, facial and lingual ledges with infrabony moat-like troughs are commonly found. The osseous defects are generally accompanied by deepened periodontal pockets that are difficult if not impossible to maintain.



**Fig. 9** — With a surgical approach, osseous recontouring can reduce or eliminate these anatomical defects. With a combination of judicious osteoplasty (removal of non-supporting bone) and ostectomy (removal of supporting bone) one strives to establish a "positive osseous architecture" which can parallel the same parabolic curvature as the overlying soft tissues such that pocket depth is reduced to a minimum.



**Fig. 10** — When confronted with inadequate supragingival tooth structure, it is impossible to "properly" restore the dentition. When caries and/or old restorations extend too far subgingivally it is improper to utilize electrosurgery to gain additional clinical crown length. This technique would only remove soft tissue with the result that the restorative margins would violate the "biological width" and induce unpredictable bone loss.



**Fig. 11** — The surgical crown lengthening technique of choice in a situation such as is seen in Fig. 10 consists of an apically positioned periodontal flap in conjunction with osseous resection. The osseous recontouring technique is based on a need to not only create a "positive" bony architecture (see Fig. 8, 9) but most importantly to remove sufficient bone such that a minimum of 3mm of sound tooth structure is exposed coronal to the bone. This 3mm dimension known as the "biological width" is needed to allow 1mm for the connective tissue attachment, 1mm for the epithelial attachment and 1mm for the gingival sulcus.



**Fig. 12** — With adequate plaque control following surgical healing, (usually after 6-8 weeks) the final restorative procedures can be undertaken in a periodontal environment that is pocket free and where adequate supragingival and supraosseous tooth structure has been created. The restorative margins can now be placed on sound tooth structure that is easily accessible and need not violate the biological width. Where esthetics allow, the margins should be placed supragingivally.



susceptibility to disease (taking the patient's age into account)

(d) recurrence of disease

(e) prognosis

(f) clinician's non-surgical skills

(g) additional treatment being planned (when for example, a patient might be considered a "borderline" surgical candidate). If extensive prosthetic treatment were anticipated it would be

prudent to proceed with the more "definitive surgical therapy" pre-prosthetically.

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Fig. 13 - When a patient presents with areas of inadequate attached keratinized gingiva, the clinician is faced with a choice of observation or treatment with mucogingival surgery. Some important influential factors include (a) the patient's age (b) rate of recession (c) extent of recession (d) underlying tissue quality (e) functional demands (e.g., frenum, orthodontics, prosthetics) and (f) esthetic considerations.



Fig. 14 - Utilizing a large graft (in order to maximize collateral circulation) it is possible not only to re-establish an adequate band of keratinized attached gingiva, but also to gain new "clinical" attachment by "bridging" over the denuded root surface. When root coverage is an objective, it is also necessary to harvest a thicker than usual palatal gingival autograft (1½-2mm). This is done so that the vessels of the transplanted gingival tissue are left undamaged as much as possible in order to enhance the chances of graft survival over the denuded root surface area.