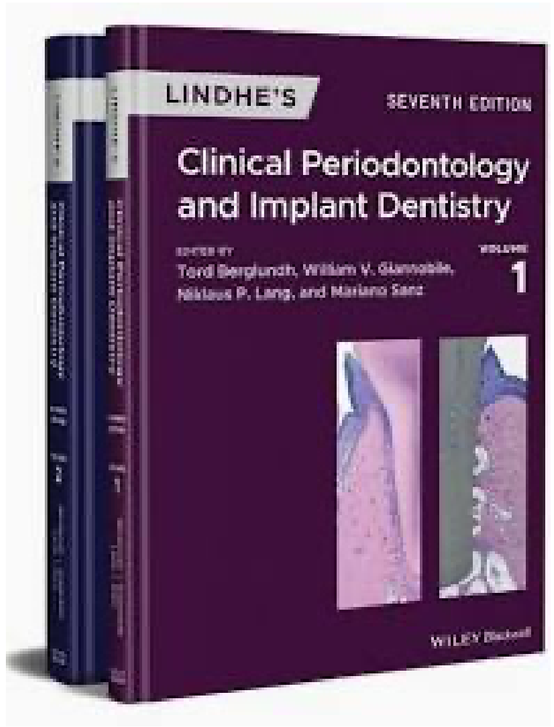
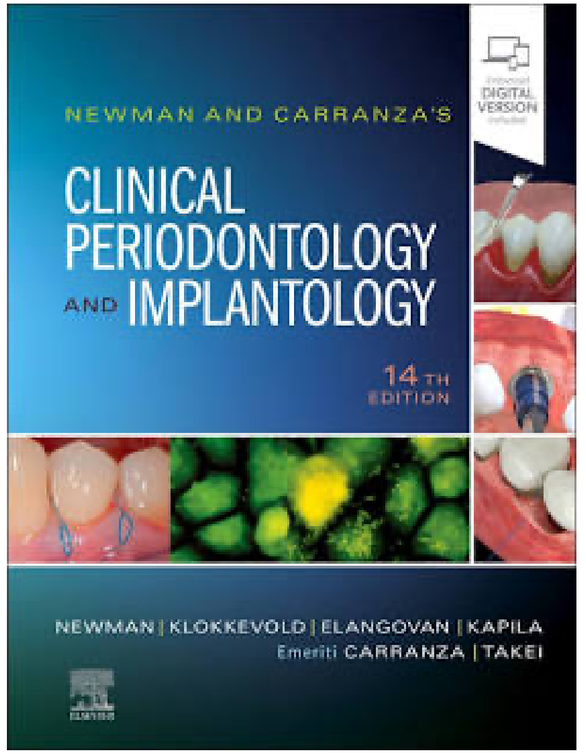
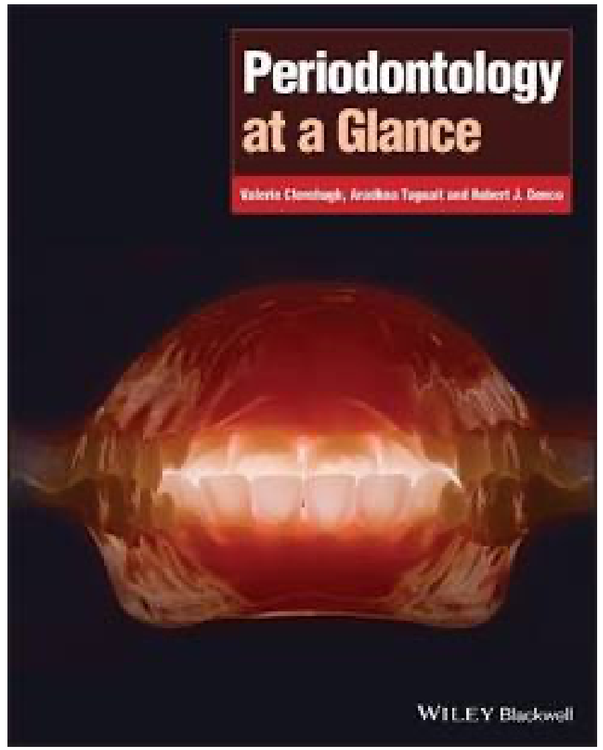
INTRODUCTION TO PERIODONTAL SURGERY

Amelia Hemmati

Key References







Images are from these references or from my own patients unless otherwise stated

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- Definition
- Objectives
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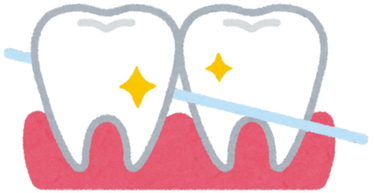
- Complications
- Patient Communication and Consent
- Evidence-Based Perspective

Definition of Periodontal Surgery

Periodontal surgery refers to surgical procedures performed to:

- Arrest progression of periodontal disease
- Access root surfaces for debridement
- Reduce or eliminate periodontal pockets
- Regenerate lost periodontal tissues
- Improve aesthetics and function



It is typically indicated after completion of non-surgical periodontal therapy when residual pathology persists.

Objectives of Periodontal Surgery

Primary Objectives

- Eliminate or reduce periodontal pockets
- Establish a maintainable periodontal environment
- Arrest disease progression

Secondary Objectives

- Regenerate lost attachment apparatus
- Improve aesthetics
- Facilitate restorative/prosthodontic treatment
- Correct mucogingival defects

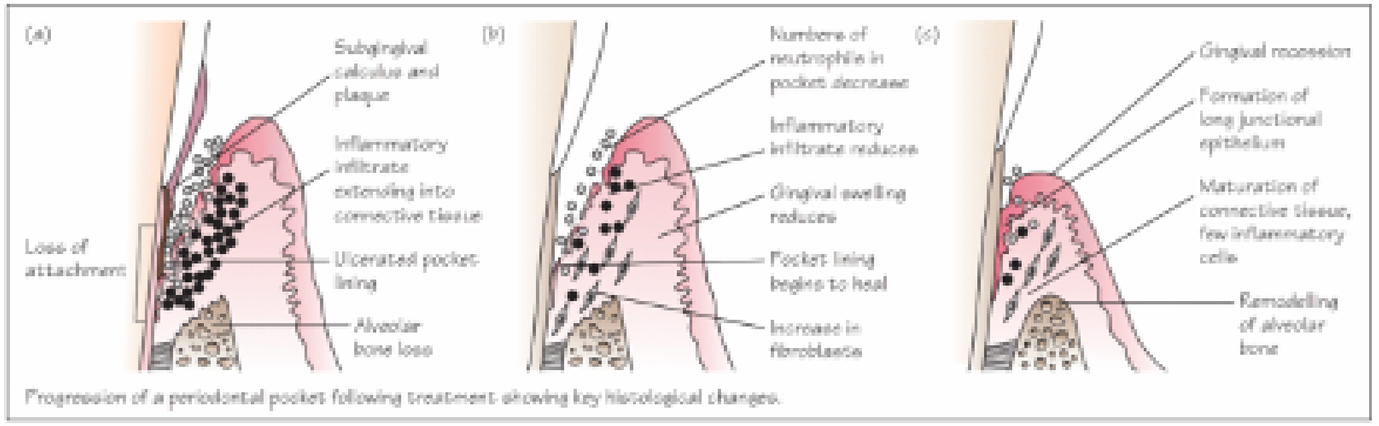


Figure 22.2 (a) A periodontal lesion before treatment. (b) Early healing of a periodontal pocket. (c) Further healing of a periodontal pocket.

Indications for Periodontal Surgery

- Residual pockets ≥5–6 mm with bleeding on probing after NSPT
- Infrabony (vertical) defects
- Class II furcation defects
- Mucogingival defects (recession, lack of attached gingiva)
- Altered passive eruption
- Crown lengthening for restorative purposes
- Periodontal abscess not responding to non-surgical care
- Root surface irregularities (e.g., palatoradicular groove)

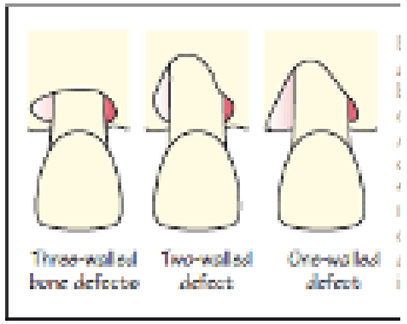
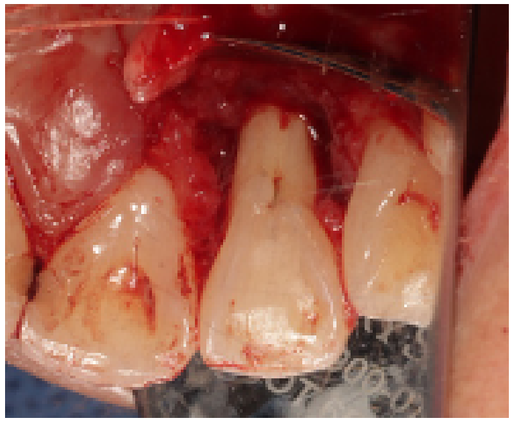
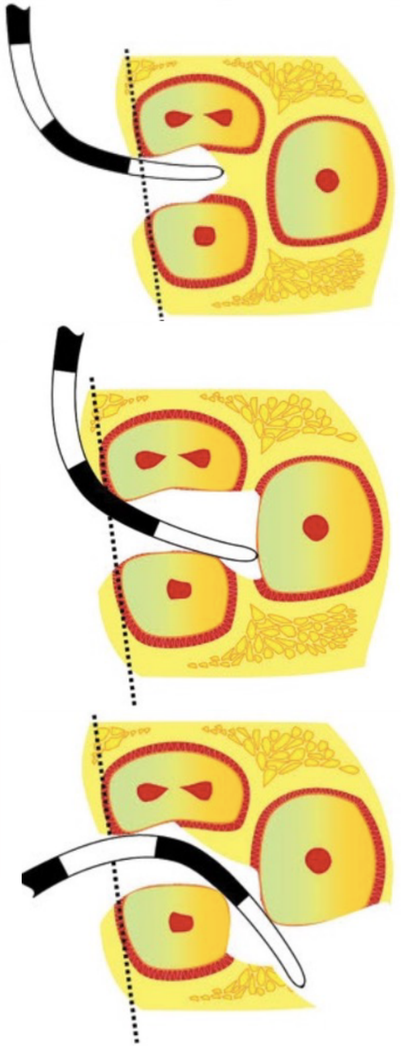


Figure 27.1 Anatomy of bone defects.





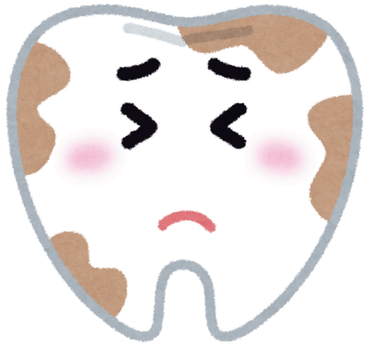
Contraindications

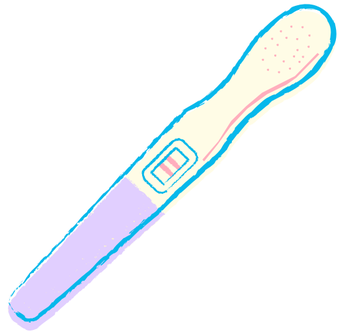
Absolute

- Uncontrolled systemic disease (e.g., uncontrolled diabetes)
- Poor plaque control
- Non-compliant patient

Relative

- Heavy smoking
- Pregnancy (elective surgery deferred)
- Poor restorative prognosis
- Psychological limitations





Periodontal Therapy - Steps

Journal of Clinical Periodontology

EFP

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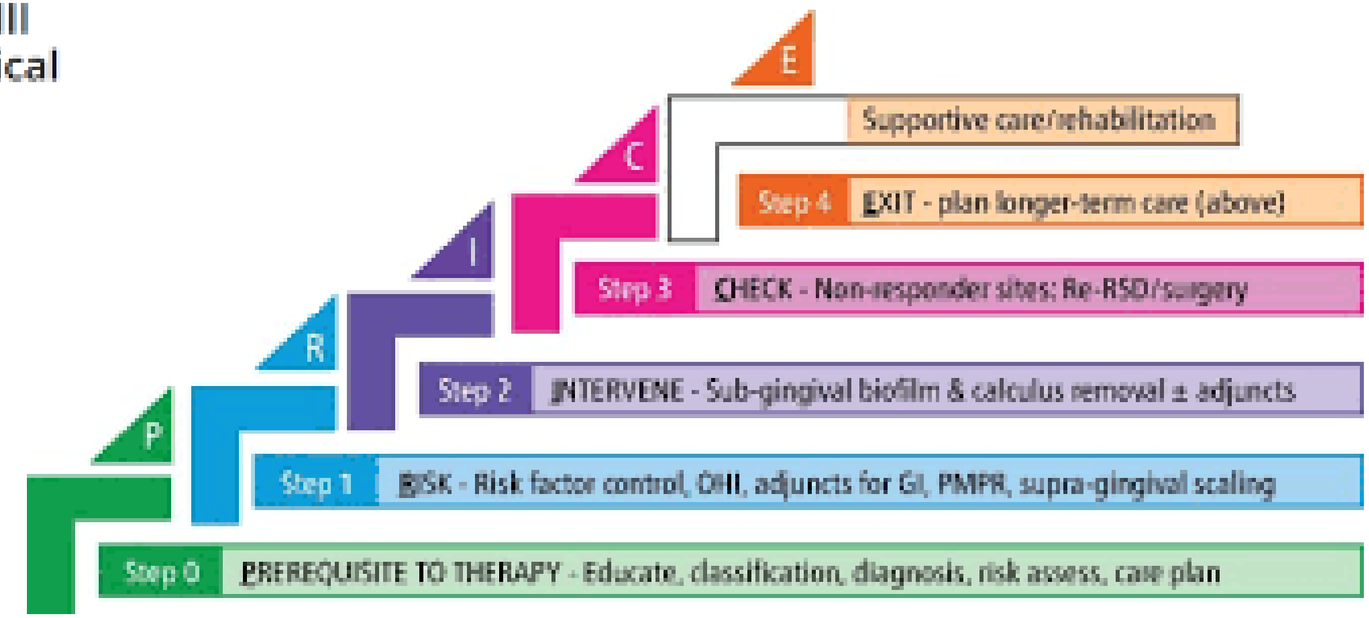
Volume 47, Issue S22

Special Issue: Treatment of Stage I-III Periodontitis. The EFP S3 Level Clinical Practice Guideline

Pages: 1-391

July 2020

Issue Edited by: David Herrera Gonzalez, Mariano Sanz, Maurizio Tonetti



EFP Clinical Guideline

Treatment of stage I-III periodontitis

The EFP S3-level clinical practice guideline

STEP 3

Aim:

Treating those sites non-responding adequately to the second step of therapy with the purpose of getting access to deep pocket sites, or aiming at regenerating or resecting those lesions, that add complexity in the management of periodontitis (infrabony and furcation lesions).

If periodontal pockets > 4 mm with bleeding on probing and/or deep pockets [≥ 6 mm] are still present at re-evaluation, different options for step 3 can be considered:

- Repeated subgingival instrumentation with or without adjunctive therapies.
- Access flap periodontal surgery.
- Resective periodontal surgery.
- Regenerative periodontal surgery.

Re-evaluation after step 2

Endpoints:

- **No periodontal pockets ≥ 5 mm with bleeding on probing.**
- **No deep pockets [≥ 6 mm].**

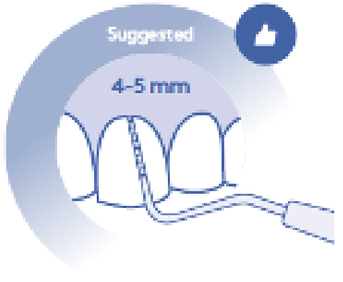
If these endpoints are achieved, the patient should join a SPC program.

General aspects of step 3

Recommended interventions — Recommended — Suggested

Surgery should be performed by dentists with additional specific training or by specialists.

As a minimum requirement, **repeated subgingival instrumentation, with or without access flap** of the area, in the context of high-quality step 1 and 2 treatment, and a frequent program of supportive periodontal care including subgingival instrumentation, are recommended.



In presence of moderately deep residual pockets (4-5 mm), **non-surgical subgingival instrumentation** should be repeated.

Classification of Periodontal Surgical Procedures

Resective Surgery

- Pocket reduction surgery
- Osseous resective surgery
- Apically positioned flap

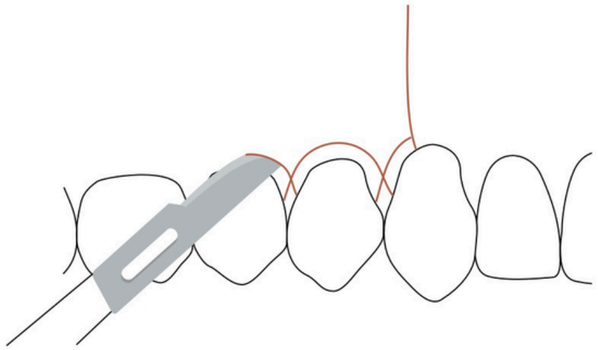


Fig. 32-17 Apically repositioned flap. Following a vertical releasing incision, the reverse bevel incision is made through the gingiva and the periosteum to separate the inflamed tissue adjacent to the tooth from the flap.

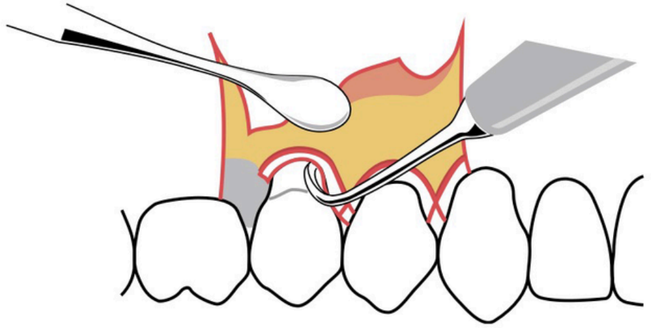
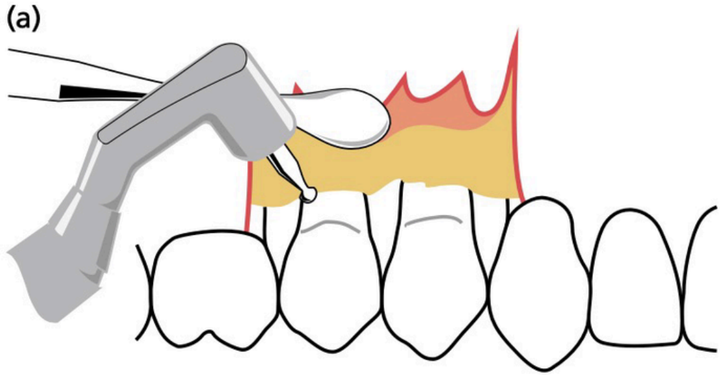
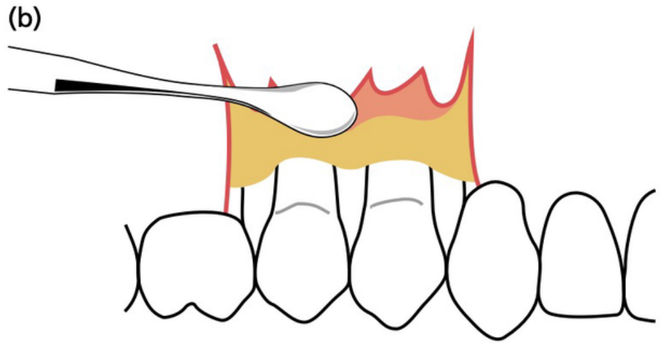


Fig. 32-18 Apically repositioned flap. A mucoperiosteal flap is raised and the tissue collar remaining around the teeth, including the pocket epithelium and the inflamed connective tissue, is removed with a curette.





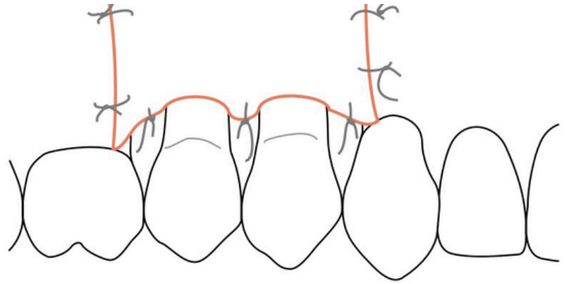
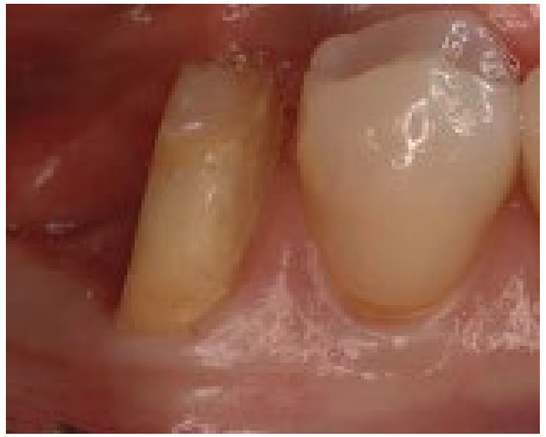


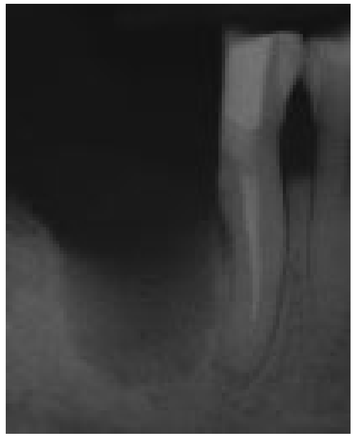
Fig. 32-20 Apically repositioned flap. The flaps are repositioned in an apical direction to the level of the recontoured alveolar bone crest and retained in this position by sutures.

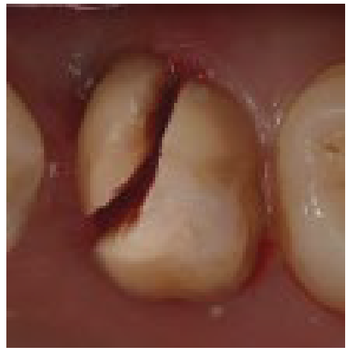
Classification of Periodontal Surgical Procedures

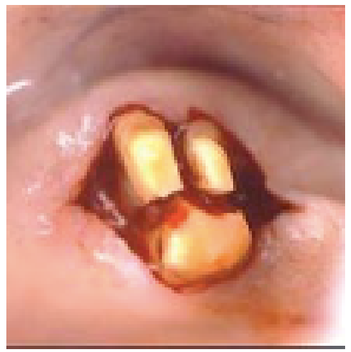
Resective Surgery

- Root resection
- Hemisection
- Furcation tunnelling









Images from Nibali, Diagnosis and Treatment of Furcation-Involved Teeth, 2018.

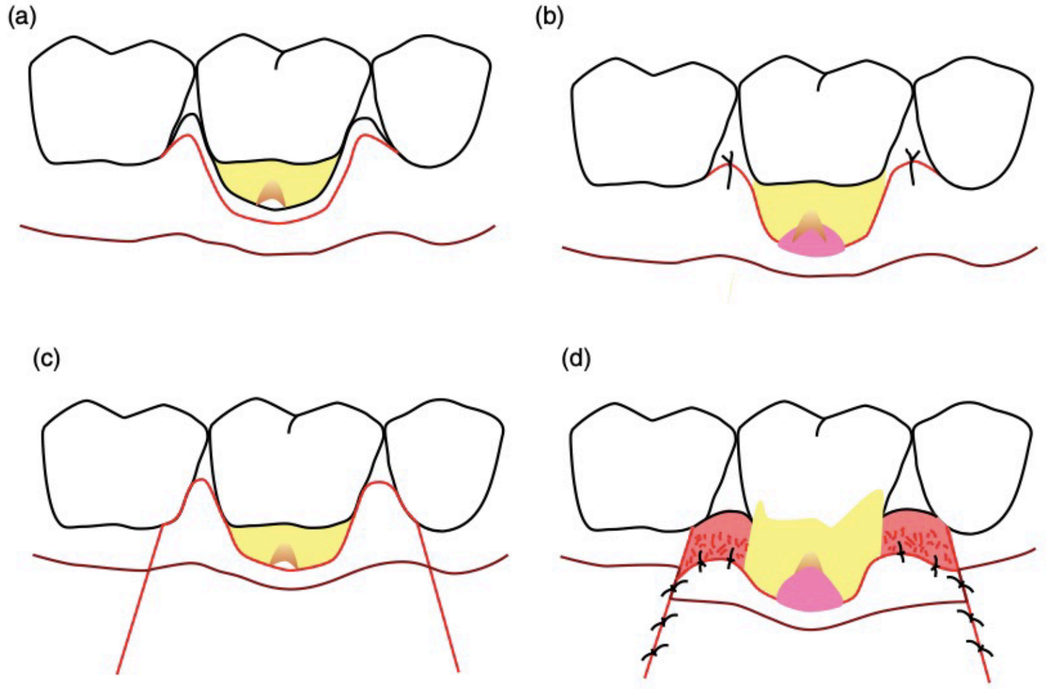
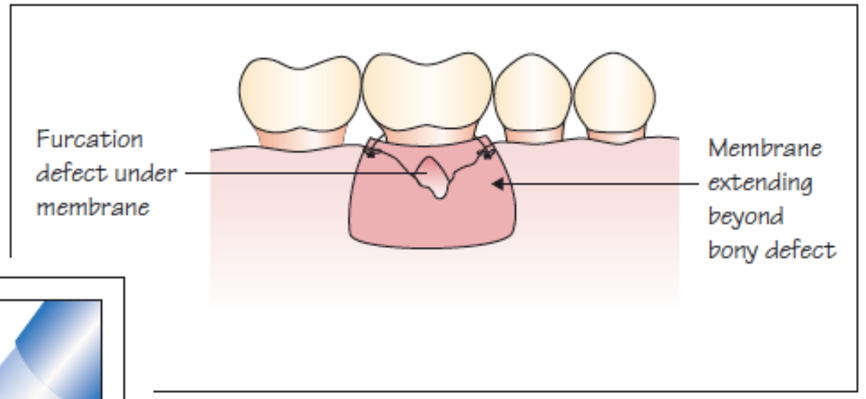


Figure 9.4 Different approaches for tunnelling surgery needed according to the amount of keratinized gingiva (KG). In a case of an adequate amount of KG (a), scalloped incisions can be performed to expose the furcation area for self-performed cleaning (b). In a case of a reduced amount of KG (c), an apically repositioned flap is performed in order to preserve the KG while still exposing the furcation area for self-performed cleaning (d).

Classification of Periodontal Surgical Procedures



Guided tissue regeneration: membrane placement.

- After gaining surgical access to the site the cleaned root surfaces are conditioned with an EDTA (ethylene diamine tetra acetate) gel to remove the smear layer
- The Emdogain® gel is syringed directly onto the washed roots and the flap replaced

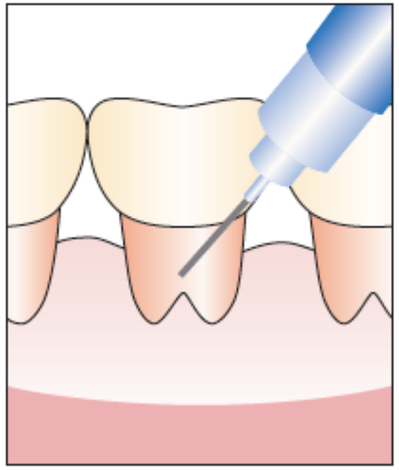


Figure 26.4 Procedure for use of Emdogain®.

Regenerative Surgery

- Guided tissue regeneration (GTR)
- Bone grafting
- Enamel matrix derivative
- Biologics (e.g., growth factors)

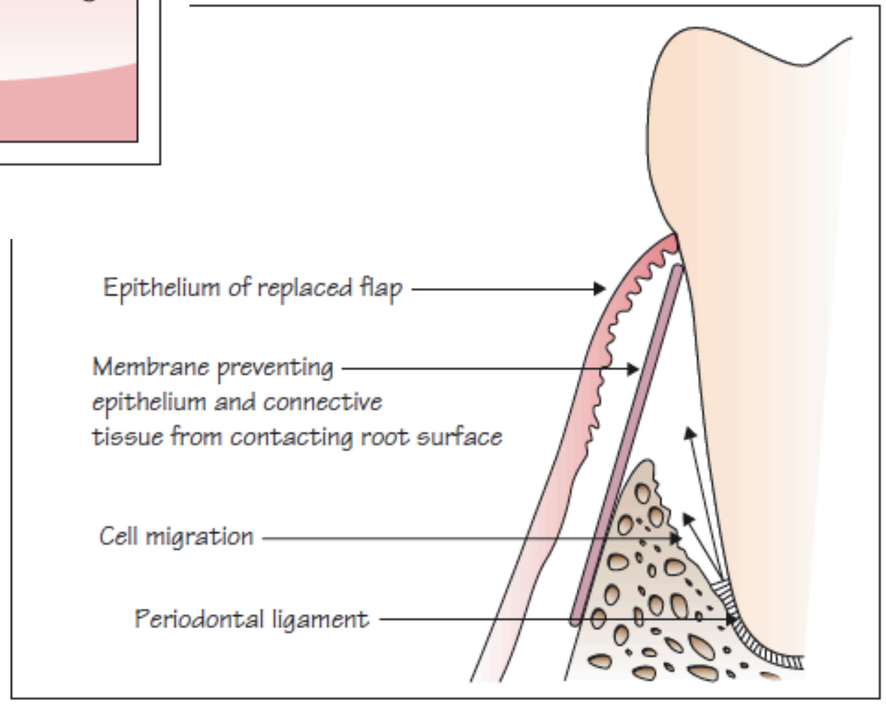
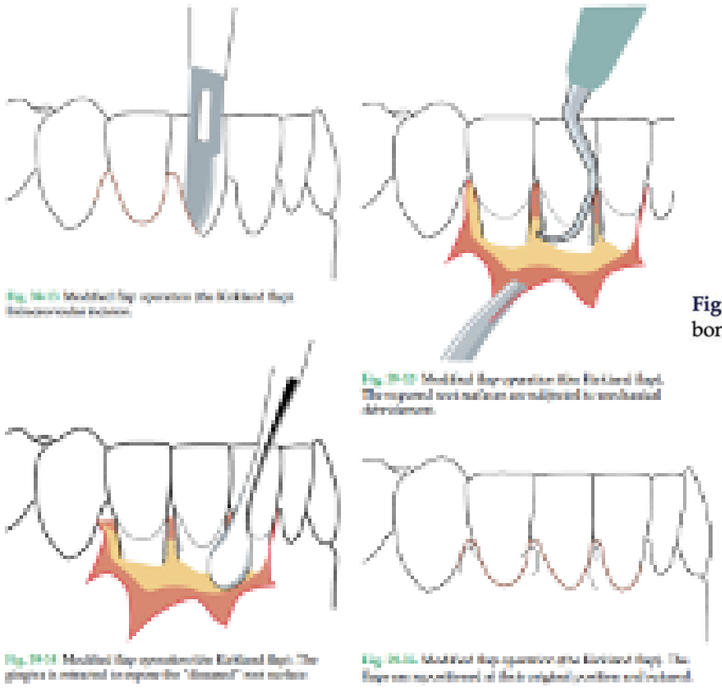


Figure 26.1 Guided tissue regeneration.

Classification of Periodontal Surgical Procedures

Access Flap Surgery

- Open flap debridement (left)
- Modified Widman flap (right)



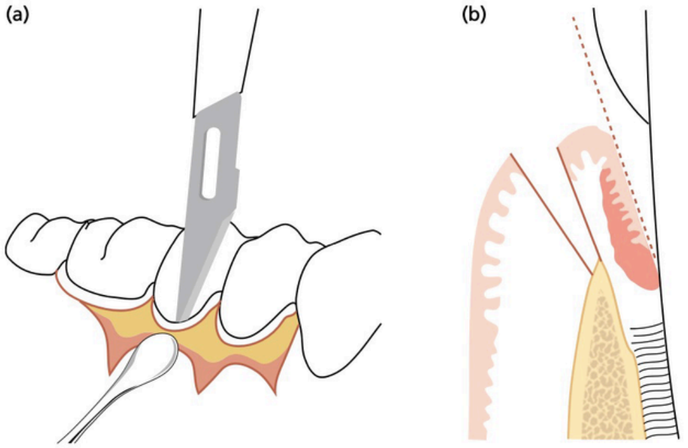


Fig. 32-27 Modified Widman flap. Following careful elevation of the flaps, a second intracrevicular incision (a) is made to the

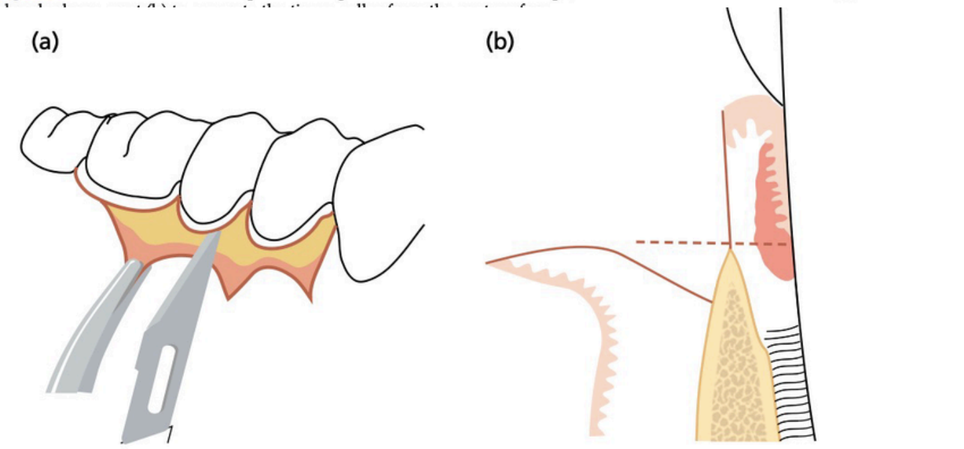


Fig. 32-28 Modified Widman flap. A third incision is made perpendicular to the root surface (a) and as close as possible to the bone crest (b), thereby separating the tissue collar from the alveolar bone.

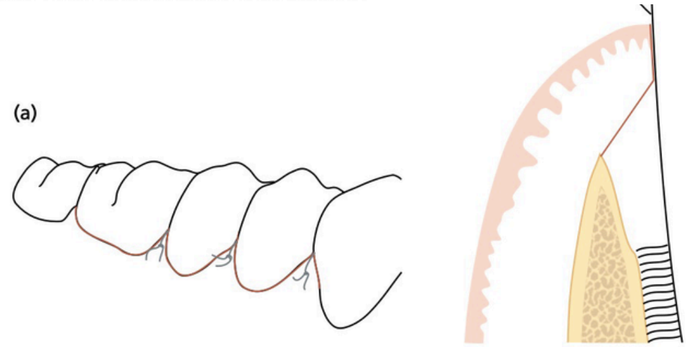
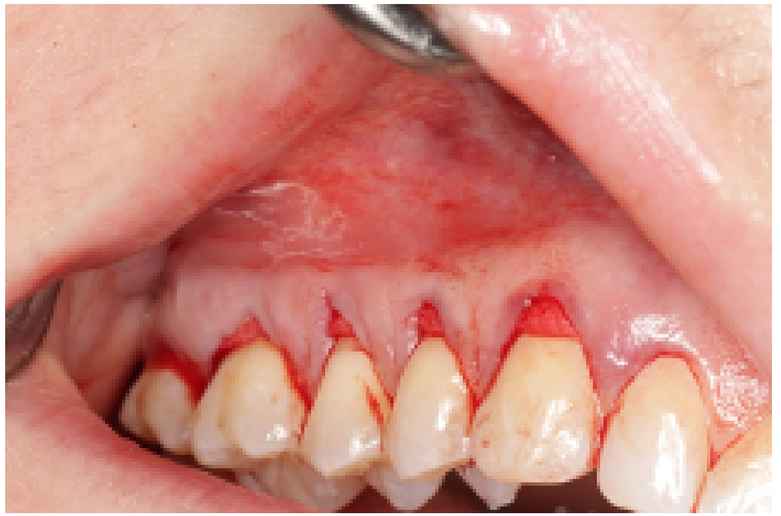


Fig. 32-29 Modified Widman flap. (a) Following proper debridement and curettage of angular bone defects, the flaps are carefully adjusted to cover the alveolar bone and sutured. (b) Complete coverage of the interdental bone as well as close adaptation of the flaps to the tooth surfaces should be accomplished.

Classification of Periodontal Surgical Procedures

Mucogingival/Plastic Surgery

- Coronally advanced flap
- Connective tissue graft
- Free gingival graft
- Tunnel technique



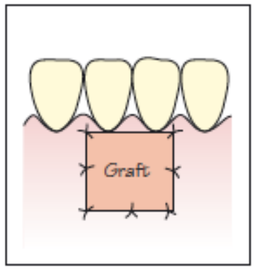


Figure 32.4 Free grafts: free epithelialised gingival graft. At the recipient site the epithelium and outer part of the connective tissue are removed by split dissection around and below the recession defect. The graft is taken from the remote donor site and sutured securely at the recipient site.

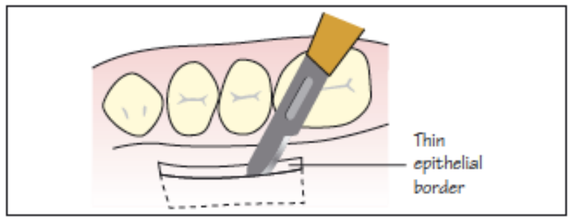


Figure 32.6 Free grafts: subepithelial connective tissue graft. A free graft is taken from the palate, removing underlying connective tissue with only a thin epithelial border. The tissue is sutured at the prepared recipient site. The graft is then covered by a flap (commonly a coronally advanced flap) so that the graft gains its nutrition from the underlying periosteum and deep connective tissue and the overlying flap.

Classification of Periodontal Surgical Procedures

Crown Lengthening Surgery

- Aesthetic crown lengthening for altered passive eruption (APE)

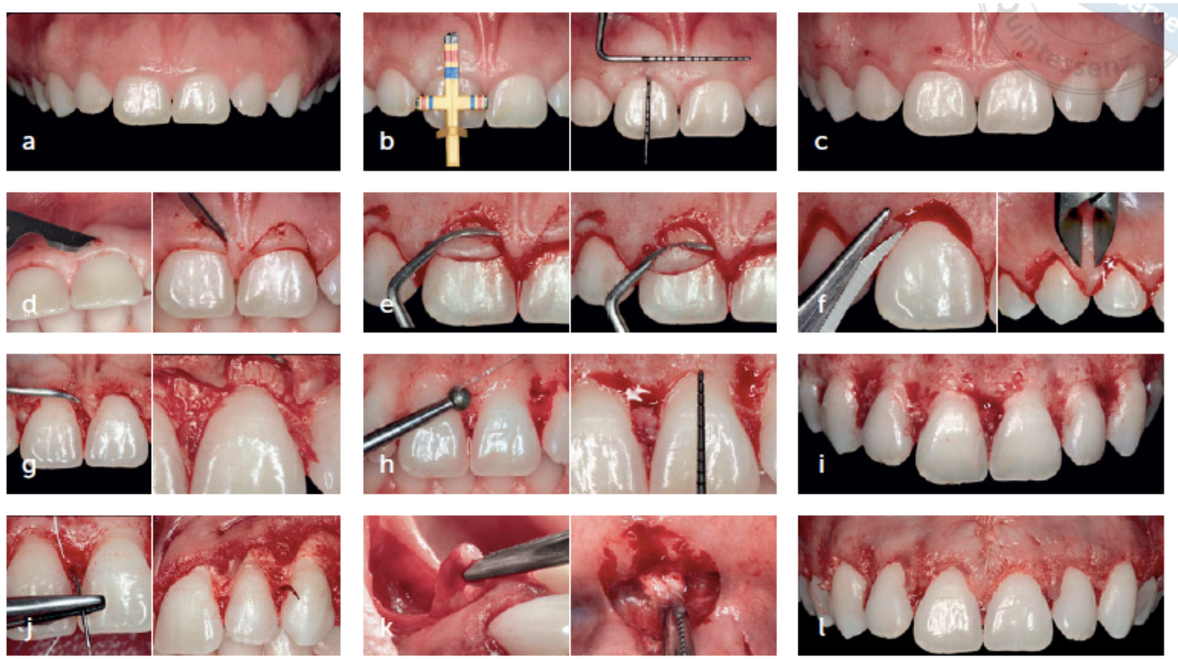


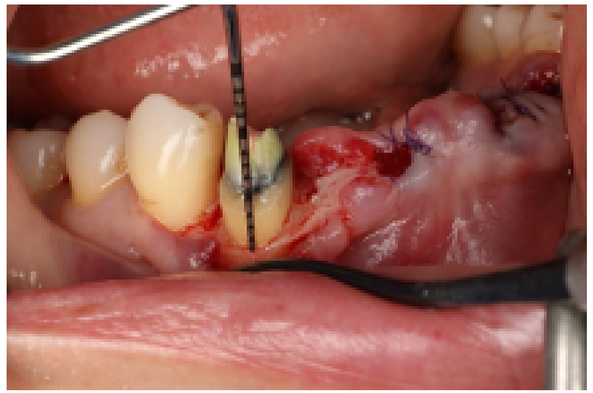
Fig 2 Representative case illustrating the esthetic crown lengthening surgical procedure (case 6). (a) Pretreatment view of the maxillary anterior teeth. (b) Gingival margin measurement using a specific tip. (c) Gingival demarcation on midbuccal aspect. (d) External bevel incision following the CEJ anatomy. (e) Gingival margin removal with a periodontal curette. (f) Gingival contour finalization using a Goldman Fox microscale and pliers. (g) Full-thickness flap elevation. (h) Ostectomy and osteoplasty using carbide steel burs. (i) Ostectomy and osteoplasty, final aspect. (j) Single interrupted sutures. (k) Labial frenectomy. (l) Immediate postoperative, final aspect.

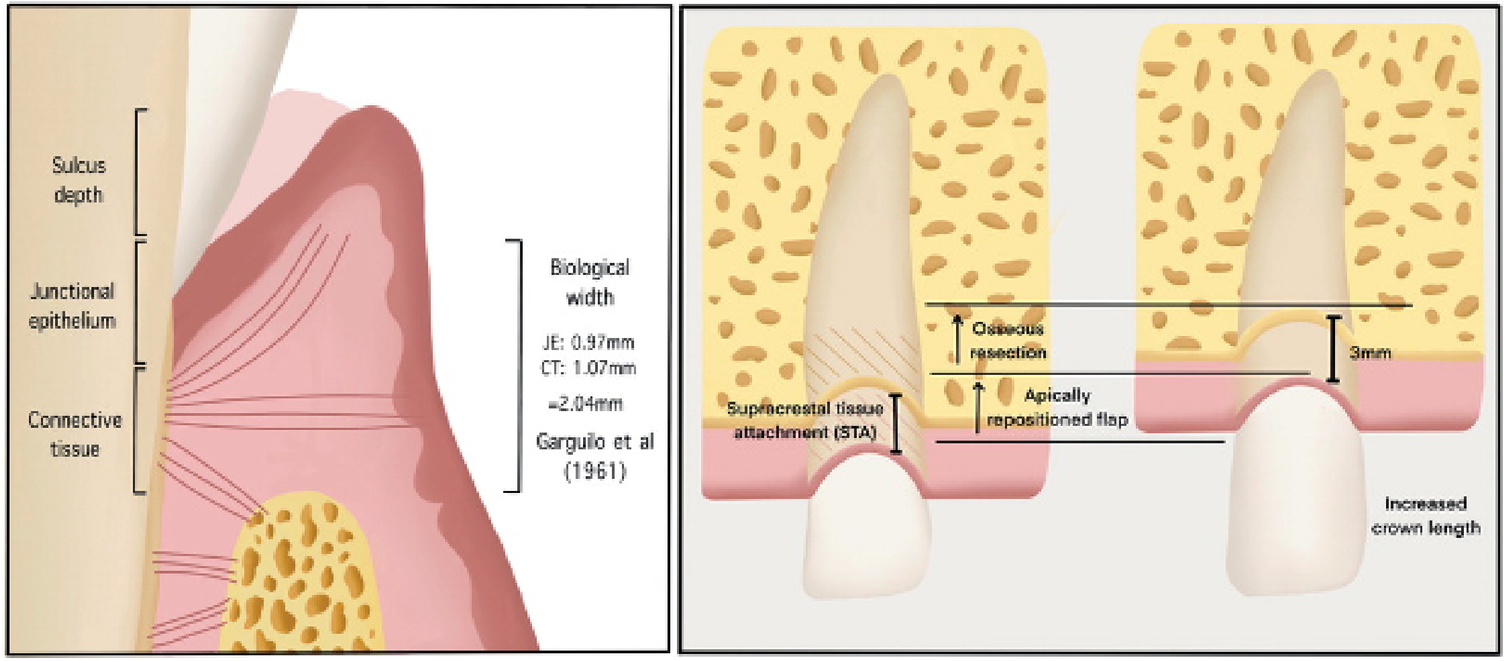
Aroni et al, The International Journal of Esthetic Dentistry, Volume 14, Number 4, 2019

Classification of Periodontal Surgical Procedures

Crown Lengthening Surgery

- Surgical exposure for restorative margin placement



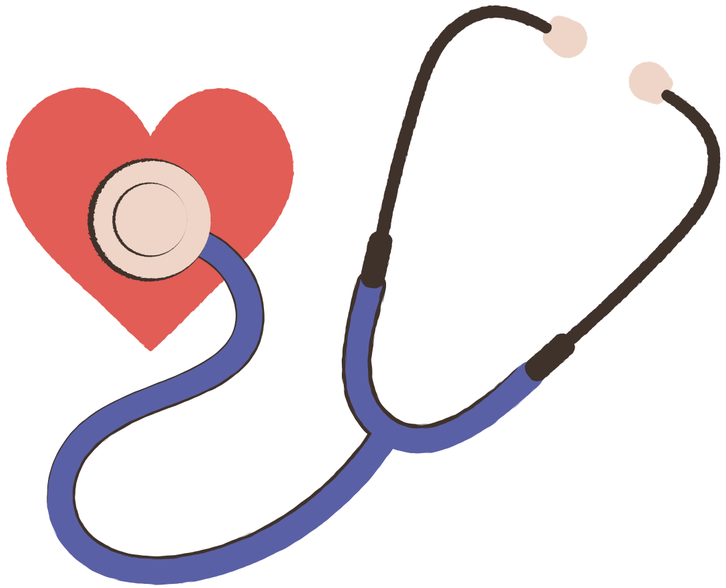


Images from Shah J, Webb L, McColl E, Daldry M, Bhagi S, Witton R. Supracrestal tissue attachment: an update. Dental Update, 2024, 50:1, 707-709.

Basic Surgical Principles

Patient Selection

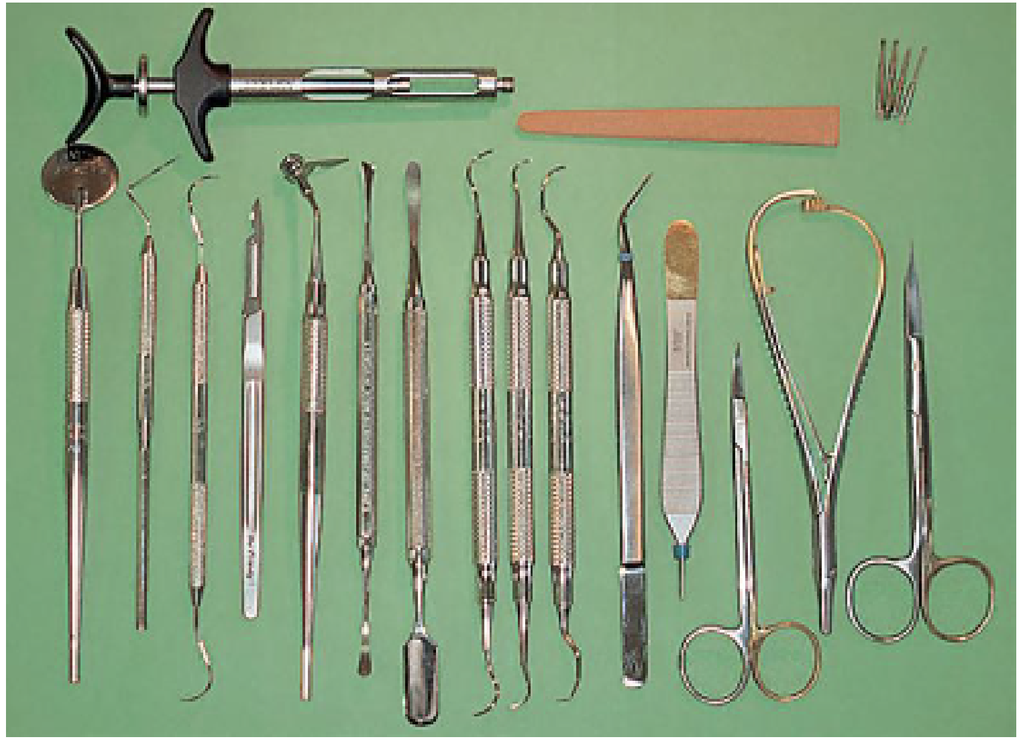
- Stable systemic health
- Good plaque control (<20% plaque score ideally)



Basic Surgical Principles

Surgical Asepsis

- Sterile instruments
- Proper draping
- Chlorhexidine rinse pre-operatively



Basic Surgical Principles

Flap Design Principles

- Preserve blood supply
- Ensure adequate access
- Allow tension-free closure
- Respect papillary integrity

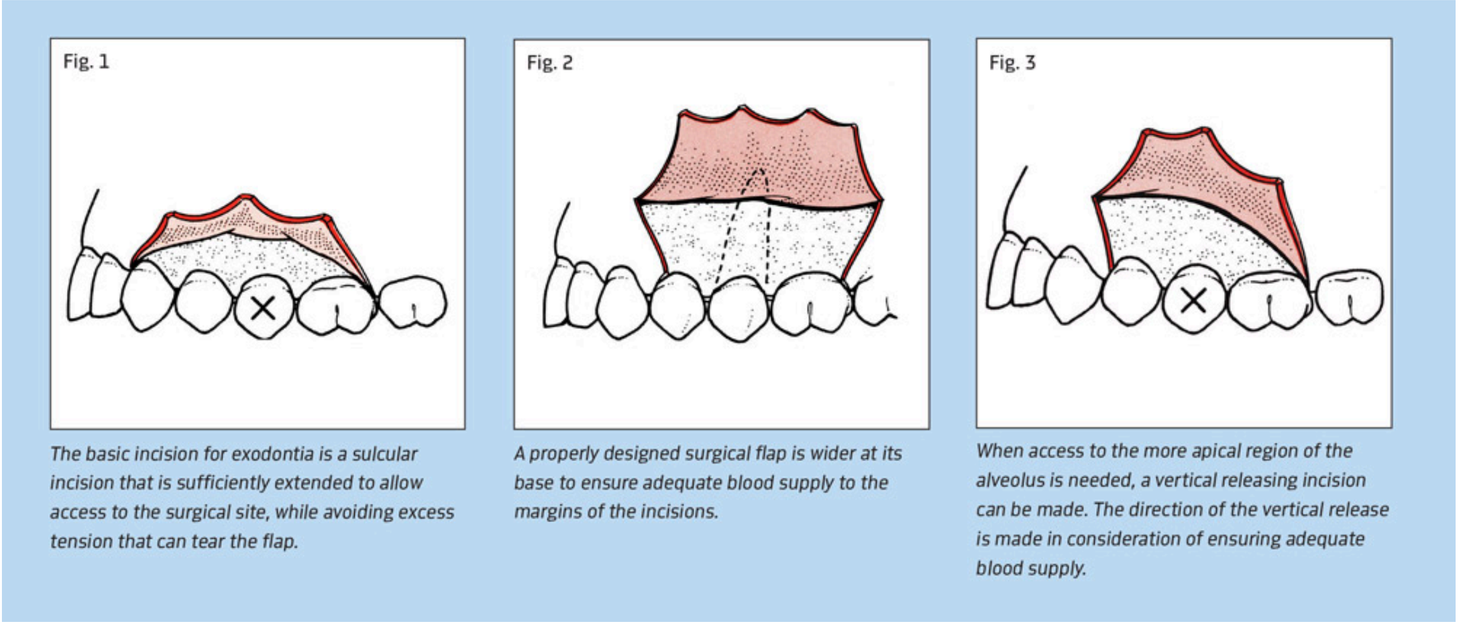


Image by Reznick, J.B. Principles of Flap Designs and Closure, 2016.

Basic Surgical Principles

Incisions

- Internal bevel incision
- Crevicular incision
- Vertical releasing incisions (when required)

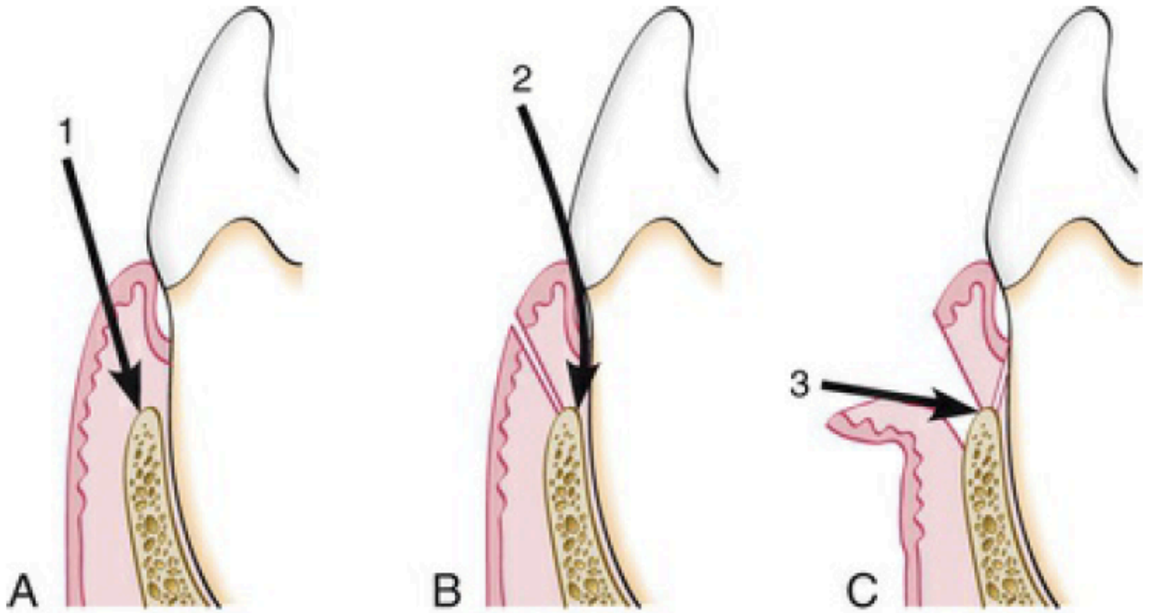
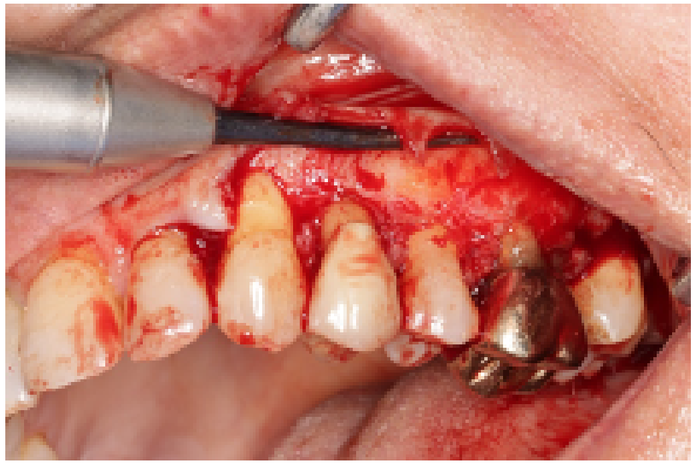


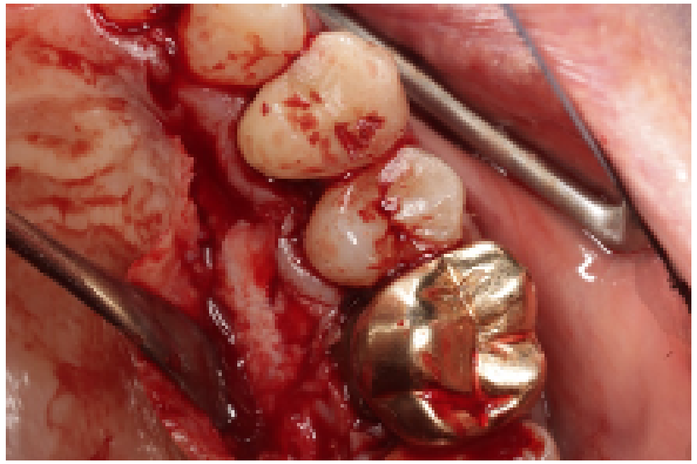
FIG. 60.15 The three incisions necessary for flap surgery. (A) First (internal bevel) incision; (B) second (crevicular) incision; and (C) third (interdental) incision.

Basic Surgical Principles

Tissue Handling

- Gentle reflection
- Minimal trauma
- Avoid excessive thinning of flaps



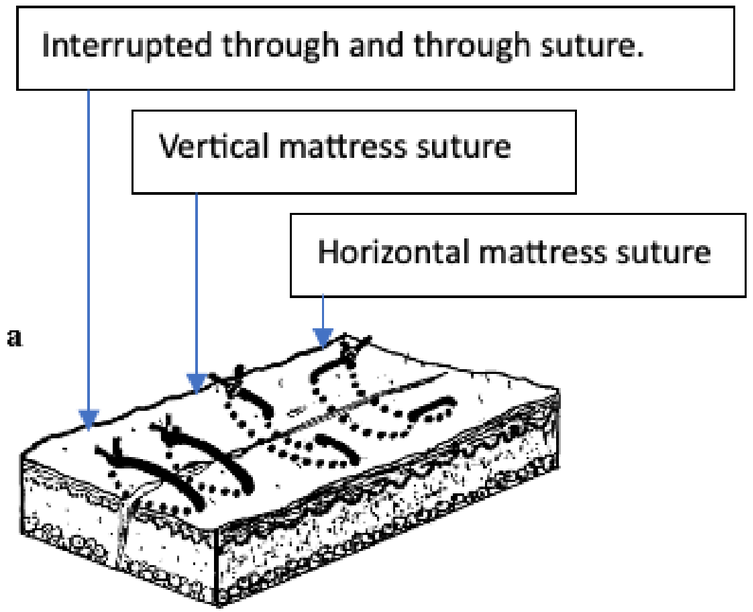


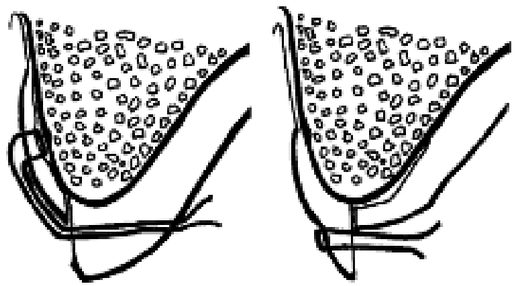
Basic Surgical Principles

Suturing

- Primary closure where possible
- Interrupted or mattress sutures
- Tension-free adaptation

Image from Moore and Hill, 1996, Periodontology 2000, Volume 11





Left: Vertical mattress suture
Right: Everting mattress suture

Biological Basis of Periodontal Surgery

Determinants of Healing:

- Defect morphology (3-wall defects more favorable)
- Blood supply
- Stability of clot
- Control of infection
- Patient factors (e.g., smoking)

Healing outcomes may include:

- Long junctional epithelium
- Connective tissue attachment
- New cementum formation
- True periodontal regeneration (new bone, cementum, and PDL)

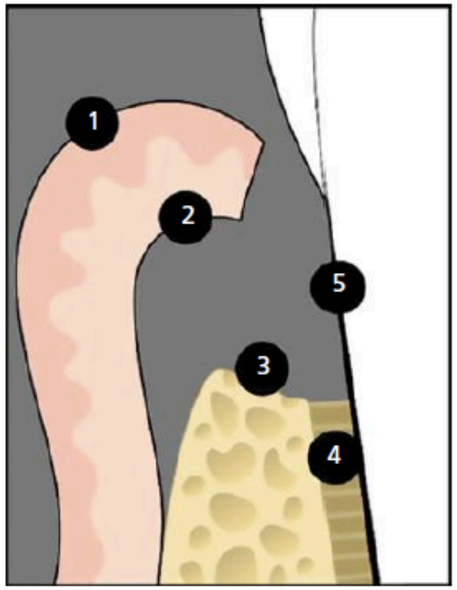


Fig. 27-3 Periodontal wound following flap surgery: (1) gingival epithelium; (2) gingival connective tissue; (3) alveolar bone; (4) periodontal ligament; and (5) cementum or dentin on the dental root surface.

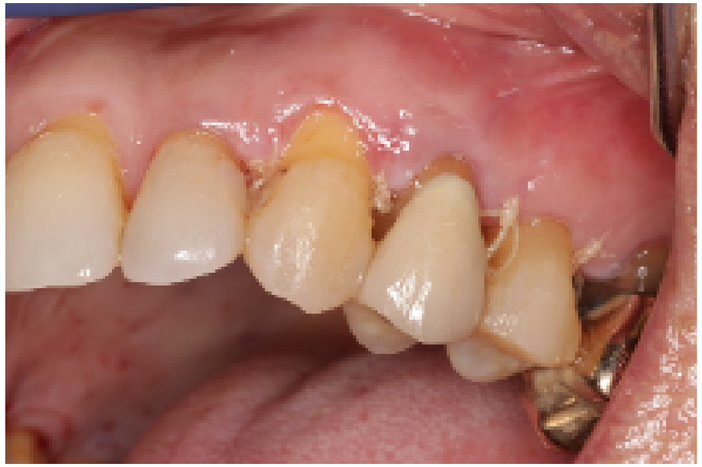
Complications

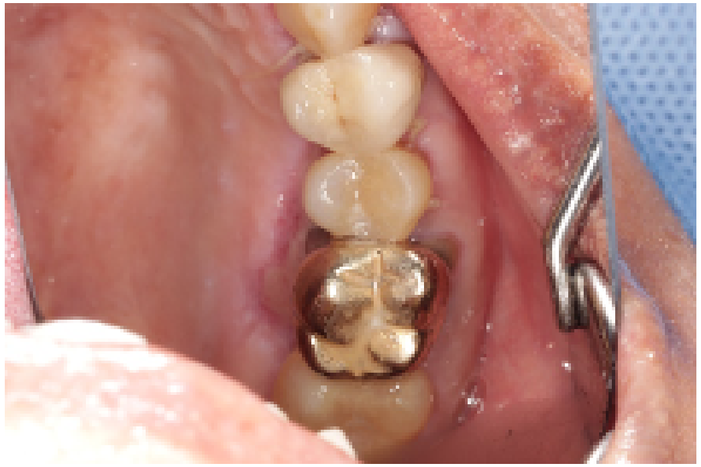
Early

- Bleeding
- Swelling
- Pain
- Infection
- Flap dehiscence

Late

- Recession
- Root sensitivity
- Aesthetic concerns
- Recurrence of pockets





Patient Communication and Consent

Discuss:

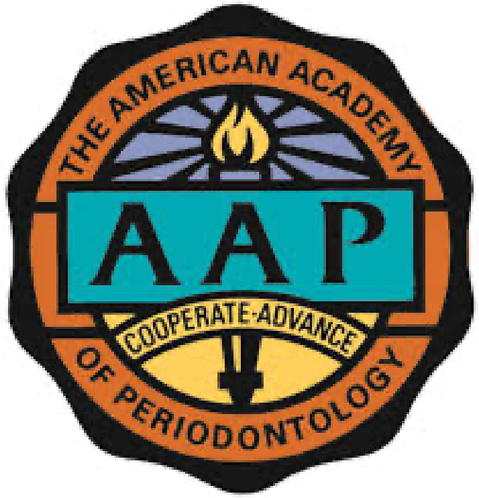
- Diagnosis and prognosis
- Surgical options
- Risks and benefits
- Alternatives
- Post-operative expectations
- Maintenance requirements

Emphasise that surgery is not a substitute for plaque control.

Evidence Based Perspective

According to consensus reports from the American Academy of Periodontology and European Federation of Periodontology:

- Surgery improves access in deep residual pockets.
- Regenerative therapy is indicated in contained infrabony defects.
- Long-term stability depends heavily on supportive periodontal therapy.



Key Take Home Message

- Periodontal surgery is performed after adequate non-surgical therapy.
- The goal is access, reduction, regeneration, or correction.
- Case selection and patient compliance determine success.
- Maintenance is critical for long-term outcomes.