

139. The success of a soft tissue graft depends on all except:

- A. The survival of the connective tissue
- B. Establishment of blood supply to the graft during the vascularization stage
- C. Fibrous attachment of the graft to the recipient bed
- D. The survival of the keratinized epithelium

Answer D

The success of the graft depends on survival of the connective tissue. Sloughing of the epithelium occurs in most cases, but the extent to which the connective tissue withstands the transfer to the new location determines the fate of the graft. Fibrous organization of the interface between the graft and the recipient bed occurs within 2 to several days.

The epithelium undergoes degeneration and sloughing, with complete necrosis occurring in some areas. It is replaced by new epithelium from the borders of the recipient site. A thin layer of new epithelium is present by the fourth day, with rete pegs developing by the seventh day.

The fact that heterotopically placed grafts maintain their structure (keratinized epithelium), even after the grafted epithelium has become necrotic and has been replaced by neighboring areas of nonkeratinized epithelium, suggests that there exists a genetic predetermination of the specific character of the oral mucosa that is dependent on stimuli that originate in the connective tissue. This is the **bases for the technique that uses grafts composed only of connective tissue obtained from areas where it is covered by keratinized epithelium.**

Stages of graft healing

1. Plasmatic circulation 24-48 hours, graft nourished by diffusion from recipient bed through the fibrin clot
2. **Vascularization 2-3 days, capillaries extend into the graft and begin anastomosis with graft vasculature. 8 days adequate blood supply to the graft is established.**
3. Organic union 4-10 days, fibrous attachment of graft to the recipient bed

Sullivan, H., Atkins, J., Free autogenous gingival grafts. I. Principles of successful grafting. Periodontics. 6:5, 1968, 856.

The object is to attempt to correlate the surgical principles previously developed in plastic surgery to periodontics

- Recipient Site - **The most important principle in recipient site selection is the capacity of the recipient bed to form capillaries outgrowths for vascularization of the graft.** Adequate hemostasis of the recipient bed is another essential principle for successful grafting
- Recipient Site Preparation - the recipient site's epithelium, connective tissue, and muscle fibers are sharply dissected down to the periosteum. This forms a rigid base, for immobilization
- Donor Site - Basically: edentulous ridge tissue, attached gingiva, palatal mucosa. avoid post-extraction sites, inflamed or hyperplastic tissue. Palatal most common- anterior palate is rich in fat, posterior palate contains the greater palatine foramen. Grafts classified into full-thickness and split-thickness, split-thickness is further subdivided into thin, intermediate or thick. With immediate detachment of donor there is shrinkage this is primary contraction. Secondary contraction occurs with healing . Less primary contraction with thick donor. Thinner graft can easily be maintained by diffusion and is easier to vascularize.
- Donor site preparation - an access incision is made allowing the surgeon to observe the thickness of the graft to be removed.
- Immobilization - vestibular extension if needed. steps- suturing, formation of the fibrin clot, placement of the rubber dam and dressing, 5-0 atraumatic needle, pressure 5 minutes
- Stages of a graft Take - plasmic circulation, vascularization, and organic union, plasmatic circulation occurs most efficient throughout the fibrin clot.

140. Which of the following fibers are most resistant to periodontitis?

- A. Gingivodental Fibers
- B. Transseptal Fibers
- C. Circular Fibers
- D. All are equally susceptible to periodontitis.

ANSWER: B. Transseptal Fibers

- “The transseptal fibers comprise groups of collagen fibers in a ligament like fashion running from one tooth to another. **In lesions in which the marginal periodontium has been destroyed, collagen fibers arranged in a similar fashion are seen above the alveolar crest**”
 - Page 254, First two lines of “Summary and Conclusions”
- BL: Transseptal fibers are always present, regardless of the degree of inflammation

Goldman H M. The behavior of transseptal fibers in periodontal disease. J Dent Res 36:249-254, 1957.

- “Whereas the highly organized fiber bundles of the marginal gingiva lose their characteristic orientation and architecture completely, the **transseptal fiber bundles appear to be continuously regenerated as the lesion progresses apically**. This band of fibers appears to separate the coronally located infiltrate from the remaining alveolar bone, even when the interdental bone septum has been resorbed to the apical third or more of the root.” (Page 241, second paragraph under “Advanced Lesion”)
- Extremely classic article on the pathogenesis of periodontal disease. Describes extension of inflammation along blood vessels, which makes sense because that is where the inflammatory cells come from.

Page R C, Schroeder H E. Pathogenesis of inflammatory periodontal disease. Lab Invest 33:235-249, 1976

- 350 human autopsy and surgical specimen
- “Our observations are in agreement with earlier descriptions (Goldman) of the **continual presence of intact transseptal fibers over the crestal alveolar bone**, no matter how severe or advanced the periodontitis lesion or the level of alveolar destruction”
 - Page 538, second paragraph under “Periodontal Ligament”

Moskow B, Polson A. Histologic studies on the extension of the inflammatory infiltrate in human periodontitis. J Clin Periodontol 18:534-542, 1991.

Bottom line: Transseptal fibers are always found, regardless of the inflammatory status of the surrounding gingival. It is postulated that this fiber group comprises a protective mechanism for the crestal alveolar bone.

141. Which of the following is an indication for osseous resective therapy?

- A. Minimal horizontal bone loss
- B. Three-wall bony defects
- C. Implant position in unesthetic area
- D. All of the above are indications for osseous resective surgery

Answer: C. Implant position in unesthetic area

The following are indications for osseous resective therapy:

- Moderate to severe horizontal bone loss
- One- and two-wall bone defects
- Implant position in unesthetic area

Newman, Takei, Carranza. *Carranza's Clinical Periodontology*, 9th edition.

142. Systemic antibiotics have more advantages than local antibiotics in the treatment of periodontal disease except:

- A. Systemic antibiotics can affect organisms outside the reach of cleaning instruments or topical anti-infective chemotherapeutics
- B. Systemic antibiotics suppress periodontal pathogens residing on the tongue and other oral surfaces
- C. Systemic antibiotics delay subgingival recolonization of pathogens and ensure prolonged prophylactic benefits
- D. Systemic antibiotics may lead to the decreased levels of streptococci or *Actinomyces*

Answer D

Systemic antibiotics enter the periodontal tissues and the periodontal pocket via serum and **can affect organisms outside the reach of cleaning instruments or topical anti-infective chemotherapeutics**. Systemic antibiotic therapy can also potentially **suppress periodontal pathogens residing on the tongue or other oral surfaces thereby delaying subgingival recolonization** of pathogens and ensuring **prolonged prophylactic benefits**. The tetracyclines have the **additional advantage of inhibiting collagenases**.

In addition to reducing levels of periodontopathologic bacteria, **systemic antibiotic therapy may lead to increased levels of antibiotic-resistant, innocent beneficial bacteria such as streptococci or Actinomyces**. Metronidazole for 7 days increased subgingival proportions of *Streptococcus sanguis* and *Streptococcus mutans* and of *Actinomyces naeslundii*, *Actinomyces odontolyticus* and *Actinomyces viscosus*. Also following treatment with azithromycin, numbers of oral streptococci increased. However overgrowth of mutans streptococci on exposed root surfaces might also increase the risk of dental caries and argue for prophylactical application of topical fluoride concomitant with anti-infective periodontal therapy

Since periodontitis often harbor a mixture of pathogenic bacteria, **drug combination therapies** have gained increased importance. The combination of metronidazole (250mg) and amoxicillin (375mg), three times daily for 8 days comprises an effective and low-cost therapy against *A. actinomycetemcomitans* in localized juvenile periodontitis, Papillon-Lefevre syndrome periodontitis, adult-type periodontitis, generalized advanced periodontitis and refractory periodontitis

In advanced adult periodontitis, Loeshce et al. Showed that systemic metronidazole for **7 days reduced the number of teeth assigned to surgery** more than in control groups with or without the use of a placebo.

Slots J, Ting M. *Systemic antibiotics in the treatment of periodontal disease. Periodontology 2000 2002;28:106-176*

143. Restoring the continuity of the diseased marginal gingiva and re-establishing a normal gingival sulcus at the same level on the root as the base of the pre-existent periodontal pocket is termed:

- A. Re-attachment
- B. New attachment
- C. Repair
- D. Regeneration

Answer: C. Repair

Regeneration growth and differentiation of new cells and intercellular substances to form new tissues or parts (a continuous physiological process)

Reattachment used only to refer to repair in areas of the root not previously exposed to the pocket, such as after surgical detachment of the tissues

New attachment the embedding of new periodontal ligament fibers into new cementum and the attachment of the gingival epithelium to a tooth surface previously denuded by disease

Repair growth and differentiation of new cells and intercellular substances to form new tissues or parts

M. Newman, H. Takei, F. Carranza, "Carranza's Clinical Periodontology", Ninth edition, 2002.

144. CO₂ Lasers are well suited for which types of procedures in modern day Periodontics?

- a. soft tissue incision and ablation; subgingival curettage
- b. subgingival bacterial elimination
- c. osteoplasty and ostectomy procedures
- d. removal of contaminated cementum
- e. a and b

ANSWER a. soft tissue incision and ablation; subgingival curettage

Laser Type	Common Abbreviation	Wavelength	Waveform	Delivery Tip	Reported Periodontal Applications
<u>Carbon dioxide</u>	<u>CO₂</u>	<u>10.6 mm</u>	<u>Gated or continuous</u>	<u>Hollow waveguide; beam focused when 1 to 2 mm from target surface</u>	<u>Soft tissue incision and ablation; subgingival curettage</u>
Neodymium:yttriumaluminum-garnet	Nd:YAG	1.064 mm	Pulsed	Flexible fiber optic system of varying diameters; surface contact required for most procedures	Soft tissue incision and ablation; subgingival curettage and bacterial elimination
Holmium:yttriumaluminum-garnet	Ho:YAG	2.1 mm	Pulsed	Flexible fiber optic system; surface contact required for most procedures	Soft tissue incision and ablation; subgingival curettage and bacterial elimination
Erbium:yttrium aluminum-garnet	Er:YAG	2.94 mm	Free-running pulsed	Flexible fiber optic system or hollow waveguide; surface contact required for most procedures	Soft tissue incision and ablation; subgingival curettage; scaling of root surfaces; osteoplasty and ostectomy
Erbium, chromium:yttrium selenium-galliumgarnet	Er,Cr:YSGG	2.78 mm	Free-running pulsed	Sapphire crystal inserts of varying diameters; surface contact required for most procedures	Soft tissue incision and ablation; subgingival curettage; osteoplasty and ostectomy
Neodymium:yttriumaluminum-perovskite	Nd:YAP	1,340 nm	Pulsed	Flexible fiber optic system; surface contact required for most procedures	Soft tissue incision and ablation; subgingival curettage and bacterial elimination
Indium-galliumarsenide - phosphide; gallium-aluminumarsenide; galliumarsenide	InGaAsP (diode) GaAlAs (diode) GaAs (diode)	Diodes can range from 635 to 950 nm	Gated or continuous	Flexible fiber optic system; surface contact required for most procedures	Soft tissue incision and ablation; subgingival curettage and bacterial elimination
Argon	Ar	488 to 514 nm	Gated or continuous	Flexible fiber optic system	Soft tissue incision and ablation

Cobb CM. AAP-Commissioned Review Lasers in Periodontics: A Review of the Literature. J Periodontol 2006.

145. The following is true regarding scaling and root planing:

- a. Scaling is the process by which residual embedded calculus and portions of cementum are removed from the roots to produce a smooth, hard, clean surface
- b. Root planing is the process by which plaque and calculus are removed from both supragingival and subgingival tooth surfaces
- c. The primary object of scaling and root planing is to restore gingival health by completely removing elements that provoke gingival inflammation from the tooth surface.
- d. Instrumentation alone has no effect in reducing the numbers of subgingival microorganisms.

Answer C

Scaling is the process by which plaque and calculus are removed from both supragingival and subgingival tooth surfaces. No deliberate attempt is made to remove tooth substance along with the calculus. **Root planing** is the process by which residual embedded calculus and portions of cementum are removed from the roots to produce a smooth, hard, clean surface.

The primary objective of scaling and root planing is to restore gingival health by completely removing elements that provoke gingival inflammation (i.e., plaque, calculus, and endotoxin) from the tooth surface. Instrumentation has been shown to dramatically reduce the numbers of subgingival microorganisms and produce a shift in the composition of subgingival plaque from one with high numbers of gram-negative anaerobes to one dominated by gram-positive facultative bacteria that are compatible with health.

Newman, Takei, Carranza. Carranza's Clinical Periodontology, 9th edition. 631

146. Which of the following is not true concerning the relationship between Smoking and Periodontal Disease?

- A. GCF volume is decreased with smoking.
- B. smokers have decreased amounts of salivary antibodies (IgA and IgG.)
- C. Smoking impairs neutrophils' ability to combat periodontal microorganisms.
- D. Smokers have higher levels of bacterial pathogens (*B forsythus* and *P gingivalis*.)

ANSWER: D. Smokers have higher levels of bacterial pathogens (*B forsythus* *P gingivalis*.)

Smoking is known to have a negative influence on connective tissue metabolism and wound healing.

In general, two types of changes in the host response due to smoking could lead to increased periodontal destruction: (1) tobacco smoking could impair the normal function of the host response in neutralizing infection and (2) tobacco smoking could overstimulate the host to destroy the surrounding healthy tissue.

Socransky and Haffajee have now clarified this important relationship by showing that current smokers do not have higher levels of bacterial pathogens such as *B forsythus* or *P gingivalis*, but that the pathogens are found in more subgingival sites than in subjects who never smoked or who stopped smoking. Smokers generally had periodontal pathogens present at 10% to 25% more sites than nonsmokers.

Factors such as smoking and genetic influences on cytokine expression, which are capable of modifying critical aspects of the PMN-antibody protection and/or fibroblast function, alter the protective-destructive balance of the systems.

With gingival health, GCF volume is decreased with smoking, although no differences are noted in a variety of inflammatory mediators in the GCF. Cigarette smoking resulted in lowered elastase and neutrophil levels in the oral

cavity, suggesting a lack of correlation of these measures with the severity of periodontitis in smokers. In contrast, PGE₂ and matrix metalloproteinase-8 levels were increased with probing depth in periodontitis, and elastase levels were increased in diseased sites of smokers.

For example, smokers have decreased amounts of salivary antibodies (immunoglobulin A, or IgA, which is necessary to neutralize bacteria in the mouth) and a decreased serum IgG antibody response to *Prevotella intermedia* and *Fusobacterium nucleatum*.

Smoke exposure may impair the neutrophils' ability to combat periodontal microorganisms.

Wilson, Thomas G.. *Fundamentals of Periodontics, 2nd Edition. Quintessence Publishing (IL), 2003.*

147. The following are ideal properties of a barrier membrane:

- A. Biocompatibility
- B. Space maintenance
- C. Cell-occlusiveness
- D. Good handling properties
- E. All of the above are ideal properties

Answer: E. all of the above

Guided Tissue Regeneration (GTR) – consists of placing barriers of different types to cover the bone and PDL, thus temporarily separating them from gingival epi. Excluding the epi and gingival connective tissue (CT) from root surface during the postsurgical healing phase not only prevents epi migration into the wound but also favors repopulation of the area by cells from the PDL and bone.

Clinical case reports showed GTR results in gain in attachment level, which is not necessarily associated with a buildup of alveolar bone.

Goals of GTR:

- Prevention of epithelial migration along cemental wall of the pocket
- Regeneration (bone, cementum, PDL)
- Increase clinical attachment
-

Nonresorbable barrier membranes:

- Latex
- Teflon – ePTFE

Resorbable barrier membranes:

- Co-polymers of polylactide and polyglycolide (PLA/PGA)
- Collagen

Osteogenesis – formation or development of new bone by cells contained in the graft

Osteoinduction – chemical process by which molecules contained in the graft (BMP's) convert neighboring cells into osteoblasts, which in turn form bone (DFDBA)

Osteoconduction – physical effect by which matrix of graft forms a scaffold that favors outside cells to penetrate the graft and form new bone (FDBA)

Graft	Osteoconductive	Osteoinductive	Osteogenic
Alloplast	Yes	No	No
Xenograft	Yes	No	No
Allograft	Yes	Yes/No	No
Autograft	Yes	Yes	Yes

Newman, Takei, Carranza. Carranza's Clinical Periodontology, 9th edition.

148. Which of the following is not one Armitage's seven major classifications of Periodontal Disease.

- A. Periodontitis Associated With Endodontic Lesions
- B. Periodontitis as a Manifestation of Medications/ Hormones
- C. Developmental or Acquired Deformities and Conditions
- D. Periodontitis as a Manifestation of Systemic Diseases

ANSWER: B. Periodontitis as a Manifestation of Medications/ Hormones

I. Gingival Diseases

- A. Dental plaque-induced gingival diseases
- B. Non-plaque-induced gingival lesions

II. Chronic Periodontitis

- A. Localized
- B. Generalized

III. Aggressive Periodontitis

- A. Localized
- B. Generalized

IV. Periodontitis as a Manifestation of Systemic Diseases

- A. Associated with hematological disorders
- B. Associated with genetic disorders

V. Necrotizing Periodontal Diseases

- A. Necrotizing ulcerative gingivitis (NUG)
- B. Necrotizing ulcerative periodontitis (NUP)

VI. Abscesses of the Periodontium

- A. Gingival abscess
- B. Periodontal abscess
- C. Pericoronal abscess

VII. Periodontitis Associated With Endodontic Lesions

- A. Combined periodontic-endodontic lesions

VIII. Developmental or Acquired Deformities and Conditions

- A. Localized tooth-related factors that modify or predispose to plaque-induced gingival diseases/periodontitis
- B. Mucogingival deformities and conditions around teeth
- C. Mucogingival deformities and conditions on edentulous ridges
- D. Occlusal trauma

Armitage GC. Development of a Classification System for Periodontal Diseases and Conditions. Ann Periodontol, 1999, 4:1-6.

149. Which statement concerning periodontal probing is true?

- a. A probing force of 0.25 N is well tolerated and accurate
- b. Variation from examiner to examiner is an average of 0.5mm
- c. Penetration into connective tissue is seen when probing a healthy sulcus
- d. In a sulcus with a long junctional epithelium, the probe should penetrate about one third to one half of the junctional epithelium

ANSWER d. . In a sulcus with a long junctional epithelium, the probe should penetrate about one third to one half of the junctional epithelium

Probe penetration can vary depending on the force of introduction, the shape and size of the probe tip and the degree of tissue inflammation. Several studies have been made to determine the depth of penetration of a probe in a sulcus or pocket. Armitage and colleagues used beagle dogs to evaluate the penetration of a probe using a standard force of 25 grams. They reported that in healthy specimens, the probe penetrated the epithelium to about two thirds of its length; in gingivitis specimens, it stopped 0.1mm short of its apical end; and in periodontitis specimens, the probe tip consistently went past the most apical cells of the junctional epithelium. In humans, the probe tip penetrates to the most coronal intact fibers of the connective tissue attachment. **In a normal sulcus with a long junctional epithelium, the probe penetrates about one third to one half the length of the junctional epithelium.** In a periodontal pocket with a short junctional epithelium, the probe penetrates beyond the apical end of the junctional epithelium. **The depth of penetration of the probe in the connective tissue apical to the junctional epithelium in a periodontal pocket is about 0.3mm.** This is important in evaluating differences in probing depth before and after treatment, as the reduction in probe penetration may be a result of reduced inflammatory response rather than gain in attachment. The probing forces have been explored by several investigators; **forces of 0.75 N have been found to be well tolerated and accurate. Interexaminer error (depth discrepancies between examiners) was reported to be as much as 2.1mm, with an average of 1.5mm in the same areas.**

M. Newman, H. Takei, F. Carranza, "Carranza's Clinical Periodontology", Ninth edition, 2002.

150. According to Gargiulo, biologic width is the dimension of space that the healthy gingival tissue occupy above the alveolar bone and is measured as:

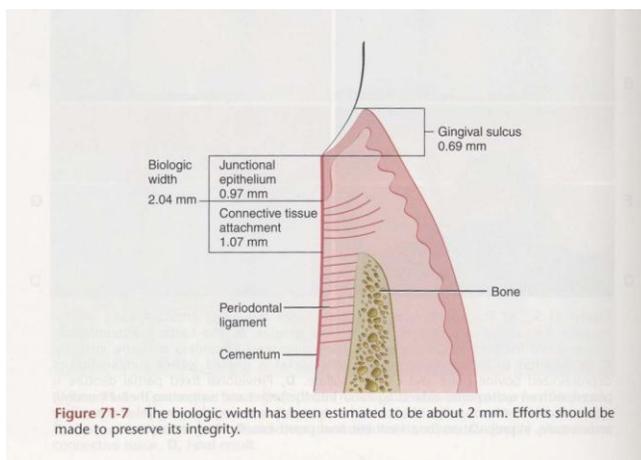
- A. 1.07 mm of CT and 0.97 mm of JE
- B. 0.97 mm of CT and 1.07 mm of JE
- C. 1.07 mm of CT and 0.69 mm of JE
- D. 0.69 mm of CT and 1.07 mm of JE

Answer: A. 1.07 mm of CT and 0.97 mm of JE

Gargiulo, Wentz, Orban (1961)

Connective Tissue attachment 1.07 mm above the crest of the alveolar bone

Junctional Epithelium 0.97 mm below the base of the gingival sulcus (above CT)



Newman, Takei, Carranza. *Carranza's Clinical Periodontology*, 9th edition.

151. Which of the following statements concerning free gingival grafts and subepithelial connective tissue grafts is false?

- a. Free gingival grafts are often used as part of a two-stage approach, providing adequate keratinized tissue for subsequent coronal advancement.
- b. In free gingival grafts both epithelium and underlying connective tissue is taken and sutured into position in a recipient site prepared using a full-thickness flap
- c. In free gingival graft the donor site must heal by secondary intention
- d. In connective tissue grafts, healing of the donor site is by primary intention

Answer B.

Free gingival grafts effectively widen the attached gingiva. The placement of a gingival graft does not, per se, improve the status of the gingiva. Therefore the indication for a free gingival graft should be based on the presence of progressive gingival recession and inflammation.

The connective tissue technique was originally described by Edel and is based on the fact that the connective tissue carries the genetic message for the overlying epithelium to become keratinized. Therefore only connective tissue from a keratinized zone can be used as a graft. The technique has the advantage that the donor tissue is obtained from the undersurface of the palatal flap which is sutured back in primary closure; therefore healing is by first intention. There is less discomfort for the patient postoperatively at the donor site. In cases where respective flap surgery is planned for the palate, the connective tissue removed to thin the palatal flap can be used as the graft tissue to augment areas of recession. Another advantage is that better esthetics can be achieved because of a better color match of the grafted tissue to adjacent areas.

The success of the graft depends on survival of the connective tissue. Sloughing of the epithelium occurs in most cases, but the extent to which the connective tissue withstands the transfer to the new location determines the fate of the graft. Fibrous organization of the interface between the graft and the recipient bed occurs within 2 to several days.

The fact that heterotopically placed grafts maintain their structure (keratinized epithelium), even after the grafted epithelium has become necrotic and has been replaced by neighboring areas of nonkeratinized epithelium, suggests that there exists a genetic predetermination of the specific character of the oral mucosa that is dependent on stimuli that originate in the connective tissue. This is the bases for the technique that uses grafts composed only of connective tissue obtained from areas where it is covered by keratinized epithelium.

The following is a list of techniques used for gingival augmentation coronal to the recession(root coverage):

1. Free gingival autograft
2. Free connective tissue autograft
3. Pedicle autografts
 - a. Laterally (horizontally) positioned
 - b. Semilunar pedicle (Tarnow)
4. Subepithelial connective tissue graft (Langer)
5. Guided tissue regeneration
6. Pouch and tunnel technique

Newman, Takkei, Carranza, "*Carranza's Clinical Periodontology*" 9th edition. *Periodontal plastic and esthetic surgery*.

Alghamdi, H. Baby N, Sukumaran A, *Surgical management of gingival recession: A clinical update* , *The Saudi Dental Journal* (2009) 21, 83-94

152. Which of the following absorbable suture products is matched with the correct material?

- A. Vicryl - Polyester / Dacron
- B. Plain Gut - Beef Serosa or Sheep Submucosa
- C. Prolene - Polypropylene
- D. Monocryl - Polyglactin 910

ANSWER: B. Plain Gut - Beef Serosa or Sheep Submucosa

ABSORBABLE SUTURES

	Material	Construction	Strength Retention
VICRYL RAPIDE* Suture	Polyglactin 910	Braided	5-14 days
Coated VICRYL* Suture	Polyglactin 910	Braided / Monofilament	2-4 weeks
MONOCRYL* Suture	Poliglecaprone 25	Monofilament	1-2 weeks
PDS* II Suture	Polydioxanone Polydioxanone and Irgacare MP	Monofilament	2-6 weeks
Surgical Gut Suture – Chromic	Beef Serosa or Sheep Submucosa	Monofilament (Virtual)	21-28 days
Surgical Gut Suture – Plain	Beef Serosa or Sheep Submucosa	Monofilament (Virtual)	7-10 days

<http://www.ecatalog.ethicon.com/sutures-absorbable>; 03 Oct 2010.

NON-ABSORBABLE SUTURES

ETHIBOND EXCEL* Polyester Suture	Polyester / Dacron	Braided
ETHILON* Nylon Suture	Nylon 6	Monofilament
MERSILENE* Polyester Fiber Suture	Polyester / Dacron	Braided
NUROLON* Nylon Suture	Nylon 6	Braided
PERMA-HAND* Silk Suture	Silk	Braided
PROLENE* Polypropylene Suture	Polypropylene	Monofilament
Surgical Stainless Steel Suture	316L Stainless Steel	Monofilament

<http://www.ecatalog.ethicon.com/sutures-non-absorbable>; 03 Oct 2010.

153. In which of the following lesions is the pulpal etiology addressed first:

- A. Endodontic-Periodontal Lesion
- B. Periodontal-Endontic Lesion
- C. Combined Lesion
- D. All of the above

Answer: D. All of the above

In endo-perio lesions, pulpal necrosis precedes periodontal changes.

In perio-endo lesions, bacterial infection from a perio pocket associated with loss of attachment and root exposure may spread through accessory canals to the pulp, resulting in pulpal necrosis

Combined lesions occur when pulpal necrosis and a periapical lesion occur on a tooth that also is periodontally involved. A radiographically evident intrabony defect is seen when infection of pulpal origin merges with infection of periodontal origin.

Newman, Takei, Carranza. Carranza's Clinical Periodontology, 9th edition.

154. Which of the following local antimicrobial agents is not resorbable?

- A. Arestin
- B. Atridox
- C. PerioChip
- D. Actisite

Answer: D. Actisite

Product	Antimicrobial Agent	Dosage Form
Actisite	Tetracycline	<i>Nonresorbable</i> fiber
Arestin	Minocycline	Biodegradable powder in syringe
Atridox	Doxycycline	Biodegradable mixture in syringe
Dentamycin, Perio Cline	Minocycline	Biodegradable mixture in syringe
Elyzol	Metronidazole	Biodegradable mixture in syringe
PerioChip	Chlorhexidine	Biodegradable device

Newman, Takei, Carranza. Carranza's Clinical Periodontology, 9th edition.

155. Occlusal forces which have deleterious effects on the periodontium because of preexisting periodontal disease is termed

- a. Primary occlusal trauma
- b. Trauma from occlusion
- c. Secondary occlusal trauma
- d. Pathological tooth migration

ANSWER C. Secondary occlusal trauma

Forces that exceed the adaptive capacity of the periodontium produce injury called trauma from occlusion.

Pg. 53

Histologic features of the periodontium for a tooth subjected to traumatic occlusion include a widened subcrestal periodontal ligament space, a reduction in collagen content of the oblique and horizontal fibers, an increase in vascularity and leukocyte infiltration, and an increase in the number of osteoclasts on bordering alveolar bone.

Pg.192

Osseous changes seen in occlusal trauma include a thickening of the cervical margin of alveolar bone or a change in the morphology of the bone (e.g. angular defects and buttressing bone) pg. 362

Newman, Takei, Carranza. Carranza's Clinical Periodontology, 9th edition.

Occlusal trauma is described as trauma to the periodontium from functional or Parafunctional forces causing damage to the attachment apparatus of the periodontium by exceeding its adaptive and reparative capacities. Generally, two forms of occlusal trauma are recognized:

1. Primary occlusal trauma is a condition in which the pathologic occlusal forces are considered the principal etiology for observed changes in the periodontium.
2. Secondary occlusal trauma occurs when the periodontium is already compromised by inflammation and bone loss. Consequently, occlusal forces which might otherwise be well tolerated in a healthy periodontium now have deleterious effects because of preexisting periodontal disease. Teeth with a reduced adaptive capacity and compromised periodontium may then migrate when subjected to certain occlusal forces. Factors such as the frequency, duration, and velocity of those occlusal forces, not just their magnitude, may be of greater significance in the development of tooth hyper mobility. This mobility is a common clinical sign of occlusal trauma.

G Bernal, JC Carvajal, CA Munoz, J contemp dent pract, 2002 –Vol3 Num 4

156. Substantivity of 0.12% Chlorhexidine Gluconate in saliva after rinse is:

- A. Up to 5 hours
- B. Up to 7 hours
- C. Up to 9 hours
- D. Up to 12 hours

Answer: A. Up to 5 hours

Substantivity is the ability of drugs to adsorb onto and bind to soft and hard tissues

Reference: <http://healthmantra.com/ypb/mouthwash.htm>

- Antibacterial effect 0.2% CHX up to 7 hrs after rinse
 0.12% CHX up to 5 hrs after rinse
- Comparing the two concentrations , significantly higher percentages of bacterial vitality were observed in the saliva after the use of 0.12% CHX than after 0.2% CHX
- Differences observed with respect to the influence of the concentration on its immediate antimicrobial activity and Substantivity
- Significantly higher percentages of live bacteria were observed in the saliva after single rinse compared with the double rinse

Cousido, Carmona, Caballero, Limeres. In vivo substantivity of 0.12% and 0.2% chlorhexidine mouthrinses on salivary bacteria. Clin Oral Investigations, 2009. Volume 14, Number 4, 397-402.

157. Triclosan is an antimicrobial compound. In long-term clinical studies it has been shown to accomplish the following when added to toothpaste.

- A. Act as an antifungal agent
- B. Reduce caries
- C. Reduce dental plaque
- D. Prevent calculus formation

Answer C

Triclosan is an antibacterial and antifungal agent. It is a polychloro phenoxy phenol. Despite being used in many consumer products, beyond its use in toothpaste to prevent gingivitis, there is no evidence according to the American Food and Drug Administration (FDA) that triclosan provides an extra benefit to health in other consumer products. Triclosan safety is currently under review by the FDA

C van Loveren, JF Buijs JM ten Cate. The effect of triclosan toothpaste on enamel demineralization in a bacterial demineralization model. J. Antimicrob. Chemother. (2000) 45 (2): 153-158.

Over the last two decades many toothpastes have been formulated to contain antimicrobial compounds with the aim of preventing or reducing plaque, calculus, gingival inflammation and dental caries. One of these compounds is triclosan. Triclosan in toothpaste has been proven to reduce regrowth of dental plaque in 4 day plaque regrowth experiments. In long-term clinical studies the use of triclosan toothpastes at home reduced the amount of dental plaque and improved gingival health.

In conclusion, this systematic review indicates that a dentifrice containing triclosan/copolymer provides a more effective level of plaque control and periodontal health than a conventional fluoride dentifrice

R. M Davies, R.P. Ellwood. The effectiveness of a toothpaste containing Triclosan and polyvinyl-methyl ether maleic acid copolymer in improving plaque control and gingival health: A systematic review. J Clin Periodontal 2004;31:1029-1033

158. When restoring a furcation exposed tooth with a crown, what factors should be considered?

- A. Nothing, restore as normal.
- B. Prepare into the furcation but restore with full contour.
- C. Don't prepare into the furcation and restore with full contour.
- D. The preparation occlusal to the finish line must also have flutes.

ANSWER: D. The preparation occlusal to the finish line must also have flutes.

Sometimes the crown margins on a molar must extend far enough apically that the preparation finish line approaches the *furcation*, where the common root trunk divides into two or three roots. The designs of both the tooth preparations and the crowns for these teeth must be different from those customarily used. This is caused by the intersection of the preparation finish line with the vertical *flutes* or concavities in the common root trunk, extending from the actual furcation in the direction of the cemento-enamel junction. When that occurs, the axial surface(s) of the tooth preparation occlusal to the inversion of the gingival finish line must also have vertical concavities or flutes.

The artificial crown should recreate the contours of the furcation flute and not follow the original crown contours. The facial surface should be invaginated into a concavity above the bifurcation that extends occlusally until it meets the facial groove in the occlusal one-third of the facial surface. The concavities usually merge with features originating on the occlusal surface. There must be no interruption in the vertical concavity rising at the margin of the restoration. Any horizontal ridge on the facial or lingual surface of the tooth that intersects with this concavity and blocks it will result in a plaque-retaining area.

Shillingburg, H.. Fundamentals of Fixed Prosthodontics, 3rd Edition. 1997; 14.1.2.

159. Which of the following is not an indication for root amputation?

- A. Severe vertical bone loss involving one root of a mandibular molar or one to two roots of a maxillary molar
- B. Furcation involvement that is treatable by odontoplasty-osteoplasty
- C. Unfavorable root proximity that precludes treatment by conservative means
- D. Inability to treat one root canal successfully

Answer: B. Furcation involvement that is treatable by odontoplasty-osteoplasty

Contraindications to root resection

- Closely approximated or fused roots
- Significantly decreased general osseous support or increased crown:root ratio
- Inability to treat endodontically

Indications for Root amputation

- Severe vertical bone loss involving one root of a mandibular molar or one to two roots of a maxillary molar
- Furcation involvement that is **not** treatable by odontoplasty-osteoplasty
- Unfavorable root proximity that precludes treatment by conservative means
- Inability to treat one root canal successfully
- Strategic removal of a root to improve the prognosis of an adjacent tooth
- Severe caries or resorption
- Vertical or horizontal fractures of roots or teeth as a result of trauma or endo procedures
- Severe dehiscence and sensitivity of a root that precludes grafting procedures
- Failure of an abutment in a long-span splint or FDP

Surgical problems with root resection

- Root fracture
- Loss of root tip in maxillary sinus
- Root proximity
- Lack of keratinized tissue

Rosentiel, Land, Fujimoto. Contemporary Fixed Prosthodontics. 4th edition, 2006.

If necessary, odontoplasty is performed to remove portions of the developmental ridges and prepare a furcation that is free of any deformity that would enhance plaque retention

Newman, Takei, Carranza. Clinical Periodontology. 9th edition, 2002.

160. In conjunction with local mechanical therapy, which medication should be prescribed for a patient who presents with local aggressive periodontitis?

- a. Penicillin
- b. Amoxicillin
- c. Tetracycline
- d. Clindamycin

ANSWER: c. Tetracycline

Patients who are diagnosed as having an early form of aggressive periodontitis may respond to standard periodontal therapy. In general, the earlier the disease is diagnosed (as determined by less destruction), the more conservative the therapy may be and the more predictable the outcome.

In almost all cases, systemic tetracycline (250mg 4X/day for a minimum of 1 week) should be given in conjunction with local mechanical therapy. If surgery is indicated, systemic tetracycline should be prescribed, with the patient instructed to begin taking the antibiotic approx 1 hour before surgery. Doxycycline 100 mg/day may also be used. Chlorhexidine rinses should also be prescribed and continued for several weeks to aid healing and augment plaque control.

M. Newman, H. Takei, F. Carranza. Carranza's Clinical Periodontology, Ninth edition, 2002 pg.561:

A number of antibiotics have been shown to be effective in special types of periodontal disease. Additionally, sequential therapy has been shown to be of value in severe cases of chronic periodontitis with studies focusing on doxycycline followed by augmentin or metronidazole (Aitken et al. 1992, Matisko & Bissada 1992).

Table 1. Antibiotics: effectiveness in periodontitis

Tetracyclines	Aggressive localized and generalized periodontitis
Metronidazole	Severe chronic periodontitis, non-AA; generalized aggressive periodontitis
Clindamycin	Generalized aggressive periodontitis
Augmentin	Generalized aggressive periodontitis
Metronidazole + amoxicillin,	Aggressive localized periodontitis
metronidazole + augmentin,	Aggressive generalized periodontitis

However, reviewing the evidence for the value of antibiotics, the evidence is strongest in the treatment of aggressive localized periodontitis (Slots et al. 1979, Pavicic et al. 1991, Saxen & Asikainen 1993). Moderate evidence for the value of antibiotics is in aggressive generalized periodontitis (Rams & Keyes 1983, Gordon et al. 1985, McCulloch et al. 1989, 1990) and periodontal abscesses (Hafstrom et al. 1994).

- 161.** Which bacterial group is most commonly found in periodontal sites exhibiting bleeding on probing?
- a. *A. naeslundii*, *A. viscosus*
 - b. *Strep* spp
 - c. *Fusobacterium*, *Prevotella*, *Campylobacter*
 - d. *P. gingivalis*, *B. forsythus*, *T. denticola*

ANSWER **d. *P. gingivalis*, *B. forsythus*, *T. denticola* (red complex)**

Initial colonizers of pellicle are gram + facultative are *A. viscosus* and *Strep sanguis*.

As the biofilm matures, there is a transition from the early aerobic environment to a highly Oxygen deprived environment in which gram negative anaerobic microorganisms predominate.

M. Newman, H. Takei, F. Carranza. Carranza's Clinical Periodontology, Ninth edition, 2002, 105-107

Early colonizers

Independent of complexes = *A. naeslundii*, *A. viscosus*

Yellow complex = *Strep* spp

Purple complex = *A. odontolyticus*

Secondary Colonizers

Pathogens in perio and non perio infections

Green complex = *E. corrodens*, *A. actinomycetemcomitans* serotype a, *Capnocytophaga* spp.

Orange complex = *Fusobacterium*, *Prevotella*, *Campylobacter*

Pathogens associated with bleeding on probing, which is an important clinical parameter of destructive periodontal diseases.

Red complex = *P. gingivalis*, *B. forsythus*, *T. denticola*

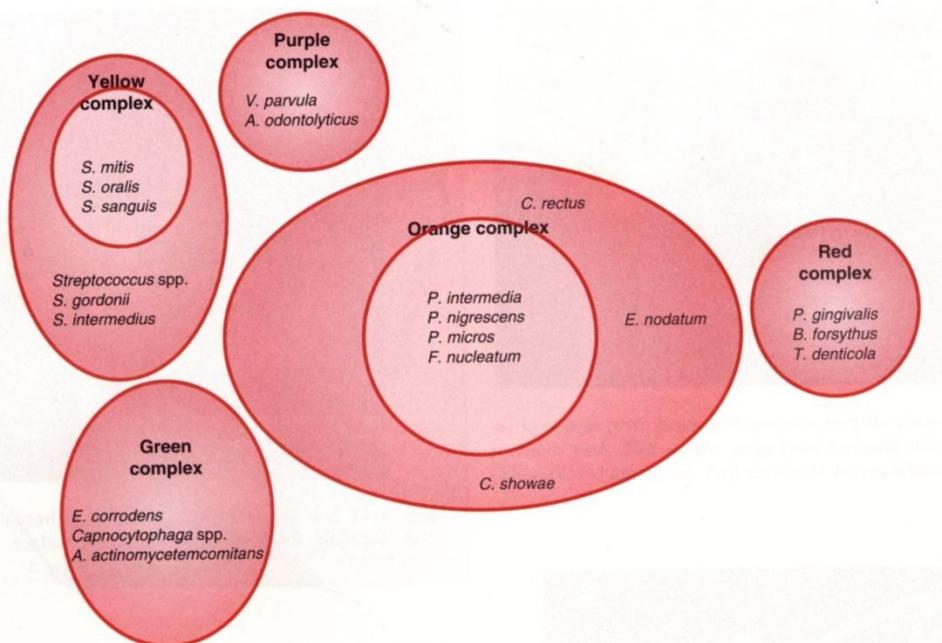


Fig. 6-13 Diagrammatic representation of selected species in the microbial complexes identified in the subgingival microbiota. Each defined grouping is identified by a color. The red complex species, as a group and individually, are found more often in periodontal sites demonstrating bleeding on probing. (Adapted from Socransky et al: Microbial complexes in subgingival plaque. J Clin Periodontol 1998; 25:134.)

162. Features of a Modified Widman flap design include all of the following except:

- A. a crevicular incision from the bottom of the pocket to the alveolar bone
- B. an internal bevel incision to the alveolar crest
- C. a flap is reflected and then an incision is made coronal to the alveolar bone
- D. The pocket lining is removed with the internal bevel incision

Answer: D. The pocket lining is removed with the internal bevel incision

- **Modified Widman (1974)**

- Provides an intimate post-operative adaptation of healthy collagenous CT to tooth
- Provides access for adequate instrumentation of root surfaces and immediate closure

Initial incision	internal bevel to alveolar crest starting 0.5-1.0 mm from gingival margin
Second incision	a crevicular incision made from bottom of pocket to bone, contains pocket lining
Third incision	after flap is reflected, an incision is made in the interdental spaces coronal to the bone and gingival collar removed

- Based on management of the papilla, flaps are classified to:

1. Conventional flaps
 - ✓ splitting interdental papilla for buccal & lingual flaps
 - ✓ flap for regeneration, Modified Widman, apically repositioned
 - ✓ when interdental papilla space is too narrow
 - ✓ when a flap is to be displaced
2. Papilla preservation flaps
 - ✓ Incorporates the entire papilla in one of the flaps
 - ✓ accomplished by crevicular interdental incisions to sever CT attachment

163. Vertical releasing incisions should not be placed

- A. Beyond the Mucogingival line to allow release
- B. Over the radicular surface of a tooth
- C. At the line angles of a tooth
- D. At both ends if the flap is apically displaced.

Answer B

Vertical or oblique releasing incisions can be used on one or both ends of the horizontal incision, depending on the design and purpose of the flap. Vertical incisions at **both ends are necessary if the flap is to apically displaced**. Vertical incisions **must extend beyond the Mucogingival line**, reaching the alveolar mucosa, to allow for the release of the flap to be displaced.

In general, vertical incisions in the lingual and palatal areas are avoided. **Facial vertical incisions should not be made in the center of an interdental papilla or over the radicular surface of a tooth**. Incisions should be made **at the line angles of a tooth** either to include the papilla in the flap or to avoid it completely. The vertical incision should also be designed so as to avoid short flaps (mesiodistal) with long, apically directed horizontal incisions because these could jeopardize the blood supply to the flap.

Several investigators proposed the so-called interdental denudation procedure, which consists of horizontal, internal bevel, nonscalloped incisions to remove the gingival papillae and denude the interdental space. This technique completely eliminates the inflamed interdental areas, which heal by secondary intention, and results in excellent gingival contour. It is contraindicated when bone grafts are used.

164. All of the following are indications for orthodontic extrusion EXCEPT:

- A. subgingival caries
- B. defective restorations
- C. Poor crown:root ratio
- D. periodontal defects

ANSWER: C. Poor crown:root ratio

Orthodontic extrusion of teeth with short clinical crowns, subgingival caries, defective restorations, fractures, perforations, and periodontal defects was advocated initially by Ingber. It has the advantages of not having to sacrifice attachment from adjacent teeth and possibly a more esthetic overall result. However, a disadvantage is that the coronal gingiva and alveolar crest move coronally. This may require a flap and osseous surgical procedure to achieve functional and esthetic architecture. Kozlovsky et al demonstrated that the coronal movement of the alveolar crest and gingiva could be prevented by a circumferential supracrestal fiberotomy and root planing to the alveolar crest every 2 weeks during the orthodontic extrusion. Other disadvantages of orthodontic extrusion include added costs, longer treatment time, and possibly unfavorable esthetic results. A root that is significantly narrower mesiodistally will create esthetic problems because the restored crown will be narrower in the cervical area than will the contralateral tooth. Also, the adjacent gingival embrasures may become wider, possibly creating recession of the gingival papilla and subsequent dark triangles.

Wilson, Thomas G.. Fundamentals of Periodontics, 2nd Edition. 2003

165. Of the following grafts, which has the most potential BMP activity?

- A. Xenograft
- B. Allograft
- C. Alloplast
- D. All of the above have approximately the same BMP activity

Answer: B. Allograft

Graft	Osteoconductive	Osteoinductive	Osteogenic
Alloplast	Yes	No	No
Xenograft	Yes	No	No
Allograft	Yes	Yes/No	No
Autograft	Yes	Yes	Yes

GTR – prevention of epithelial migration along cemental wall of the pocket. Based on assumption that only PDL cells have the potential for regeneration of the attachment apparatus by placing barriers to cover the bone and PDL, thus temporarily separating them from the gingival epithelium. Applied to alveolar bone defects to regenerate new bone.

Objective of GBR is to regenerate a single tissue, namely bone, it is theoretically easier to accomplish than GTR, which strives to regenerate multiple tissues in a complex relationship. Same principles as GTR with soft tissue exclusion but was not associated w/ teeth.

Newman, Takei, Carranza. Carranza’s Clinical Periodontology, 9th edition.

166. Which of the following is not correct regarding leukocytes:

- They are not present in clinically healthy gingival sulci
- They are found predominantly as PMNs
- They appear in small numbers extravascularly in CT adjacent to sulcus
- They are present in sulci even when tissue is free of inflammatory infiltrates

Answer: A. They are not present in clinically healthy gingival sulci

- Leukocytes have been found in clinically healthy gingival sulci
- Leukocytes found are predominantly as PMNs
- They appear in small numbers extravascularly in the CT adjacent to the bottom of the sulcus
- From there, they travel across the epithelium to gingival sulcus, where they are expelled
- They are present in sulci even when histologic sections of adjacent tissue are free of inflammatory infiltrate
- Differential counts from healthy gingival sulci is 91.5%
- Their migration may be independent of an increase in vascular permeability

M. Newman, H. Takei, F. Carranza. Carranza’s Clinical Periodontology, Ninth edition, 2002.

167. In the spectrum of periodontal individual tooth prognosis, which clinical finding supports a poor prognosis?

- tooth mobility with slight bone loss
- grade II furcation involvement
- grade III furcation involvement
- tooth mobility with advanced bone loss

ANSWER b. grade II furcation involvement

Prognosis	Bone loss	Tooth mobility	Furcation involvement	Patient cooperation	Systemic/environmental
Excellent	none	none	none	good	none
Good	slight	none	none	adequate	controlled
Fair	<adequate	slight	Grade I	acceptable	limited
Poor	Mod-adv	Mod	Grade II	doubtful	impacting
Questionable	Advanced	Advanced	Grade III	Too late	impacting
Hopeless	Advanced	Advanced	Grade III	Too late	uncontrolled

Excellent prognosis:

No bone loss, excellent gingival condition, good patient cooperation, no systemic/environmental factors

Good prognosis: (One or more of the following)

Adequate remaining bone support, adequate possibilities to control etiologic factors and establish a maintainable dentition, adequate patient cooperation, no systemic/environmental factors or if systemic factors are present, they are well controlled

Fair prognosis: (One or more of the following)

Less than adequate remaining bone support, some tooth mobility, **grade I furcation** involvement, adequate maintenance possible, acceptable patient cooperation, presence of limited systemic/environmental factors

Poor prognosis: (One or more of the following)

Moderate to advanced bone loss, tooth mobility, **grade I and II furcation involvements**, difficult to maintain areas and/or doubtful patient cooperation, presence of systemic/environmental factors

Questionable prognosis: (One or more of the following)

Advanced bone loss, **grade II and III furcation involvements**, tooth mobility, inaccessible areas, presence of systemic/environmental factors

Hopeless prognosis: (One or more of the following)

Advanced bone loss, non-maintainable areas, extraction (s) indicated, presence of uncontrolled systemic/environmental factors

M. Newman, H. Takei, F. Carranza. Carranza's Clinical Periodontology, Ninth edition, 2002.

168. Functional integration of the CT graft occurs:

- A. Within the first 2 days
- B. In 7 days
- C. In 17 days
- D. In 4 weeks

Answer: C. In 17 days

- Fibrous organization of the interface between graft and recipient bed occurs within 2 to several days
- Graft is initially maintained by a diffusion of fluid from the host bed, adjacent to gingiva, and alveolar mucosa

- Day 1 CT becomes edematous and disorganized, undergoes degeneration. As healing progresses, the edema is resolved and the degenerated CT is replaced by granulation tissue
- Day 2-3 Revascularization of graft starts, central section of surface is the last to vascularize by day 10
- Day 4 A thin layer of new epithelium from the borders of the recipient site is present
- Day 7 Rete pegs developing
- Day 10 Healing of a graft with intermediate thickness (0.75 mm) is completed
- Day 17 Functional integration of the CT graft occurs

M. Newman, H. Takei, F. Carranza. Carranza's Clinical Periodontology, Ninth edition, 2002.

169. When the measurement between natural teeth from the contact point to the crest of bone is 6mm, the papilla is present:

- a. 100% of the time
- b. 56% of the time
- c. 27% of the time
- d. 80% of the time

ANSWER: B. 56% of the time

Tarnow DP, Magner AW, Fletcher P. The effect of the distance from the contact point to the crest of bone on the presence or absence of the interproximal dental papilla. J Periodontol. 1992 Dec;63(12):995-6.

This study was designed to determine whether the distance from the base of the contact area to the crest of bone could be correlated with the presence or absence of the interproximal papilla in humans. A total of 288 sites in 30 patients were examined. If a space was visible apical to the contact point, then the papilla was deemed missing; if tissue filled the embrasure space, the papilla was considered to be present. The results showed that when the measurement from the contact point to the crest of bone was 5 mm or less, the papilla was present almost 100% of the time. When the distance was 6 mm, the papilla was present 56% of the time, and when the distance was 7 mm or more, the papilla was present 27% of the time or less.

Background: As patient demand increases for more natural restorations in the esthetic zone, clinicians must have the highest level of skill and knowledge to maintain or reform the interdental papilla between teeth, between implants and teeth, and between adjacent implants. To date, there are no reports that have measured the distance from the contact point to the bony crest between implants. One reason for this may be the fact that, with two adjacent implants, the contact point of the crown can be established at any distance from the gingival margin according to the restorative dentist's specifications. Therefore, in this study, the height of the soft tissue to the crest of bone was measured between two adjacent implants independent of the location of the contact point. The purpose of this study was to determine the range and average height of tissue between two adjacent implants.

Methods: A total of 136 interimplant papillary heights were examined in 33 patients by eight different examiners in five private dental offices. After administration of appropriate local anesthesia, a standardized periodontal probe was placed vertically from the height of the papilla to the crest of bone. The measurements were rounded off to the nearest millimeter.

Results: The mean height of papillary tissue between two adjacent implants was 3.4 mm, with a range of 1 mm to 7 mm.

Conclusions: Clinicians should proceed with great caution when placing two implants adjacent to each other in the esthetic zone. In most cases, only 2, 3, or 4 mm of soft tissue height (average 3.4 mm) can be expected to form over the interimplant crest of bone. These results showed that modification of treatment plans may be necessary when esthetics are critical for success. *J Periodontol 2003;74:1785-1788.*

KEY WORDS

Dental esthetics; dental implantation; dental papilla/anatomy and histology; soft tissue/anatomy and histology.

When an implant is placed adjacent to a tooth, a <5 mm distance between the contact point and the crest of bone shows similar results regarding presence or absence of papilla to that between two adjacent teeth. Grunder presented 10 case reports of single-tooth implants and stated that all the papillae reformed after the final crowns were placed on the implants.² The critical factors in all 10 cases were 1) the existence of healthy bone on the adjacent tooth and 2) the location of this bone at a distance of 5 mm or less from the contact point. Grunder's study agreed with earlier research findings of the existence of the papillae between two teeth. It was interesting to note that the vertical position of the implants did not determine the

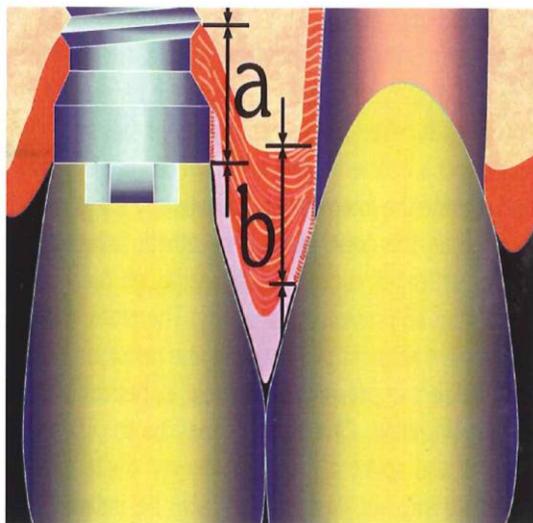


Figure 3.

Interdentary tissue does not have the same level of support on an implant (a) as it does on a tooth (b).