

Periodontal Literature Reference List



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Periodontal Literature Reference List

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The Periodontal Literature Reference List Introduction

A fundamental aspect of post-graduate training is the thorough review of classic and contemporary literature. Institutions employ various resources to educate residents, faculty, and private practitioners. "Periodontal Literature Reviews: A Summary of Current Knowledge," published in 1996, was a widely utilized resource for decades. Subsequently, in 2010, faculty and students at the University of Toronto developed a web-based document on the American Academy of Periodontology's website. This resource allows Academy members to input and continuously update information as new research emerges. These resources play a crucial role in educating post-graduate residents, providing historical and current perspectives on evolving topics. However, the information contained within becomes static over time and may not reflect the latest developments in the field.

Therefore, in April 2023, the American Academy of Periodontology's Postdoctoral Program Directors Committee established a working group under the guidance of education consultant Nicolaas Geurs from the University of Alabama. The primary objective was to develop an updated Periodontal Literature Reference List for distribution to faculty, residents, and practicing periodontists. A planning group was formed with four volunteers from the Committee: Carlos Parra from Texas A&M University, Monica Gibson from Indiana University, Sejal Thacker from the University of Connecticut, and myself as the Chair of the Committee. This group organized topics based on the blueprint of the American Academy of Periodontology's In-Service Examination and the American Board of Periodontology's Qualifying Examination, aligning with the standards of the Commission on Dental Accreditation.

The topics were selected by 12 volunteers from the Committee based on their interest and expertise, resulting in a preliminary list of relevant references. The volunteers included Guo-Hao Lin from UCSF, Harlan Shiao from the University of Maryland, Arif Salman from West Virginia University, Srinivas Ayilavarapu from the University of Texas Houston, Yoon-Jeong Kim from Loma Linda University, Pin-Chuang Lai from the University of Missouri-Kansas City, Elio Reyes Rosales from Saint Louis University, and Srinivas Myneni from Stony Brook University, in addition to the 4 members of the planning group.

Various web-based platforms including Google Scholar, PubMed, Scopus, and others were employed to search for articles based on citation index, usage metrics, clinical relevance, impact factors, and overall historical value. This rigorous approach ensured that the selected references were comprehensive and up-to-date. Next, the volunteers exchanged

their assigned topics from the preliminary list to undergo a cross-examination process, confirming accuracy and comprehensive coverage.

Before the Educational Workshop at the American Academy of Periodontology's Annual Meeting on November 8, 2023, a survey was distributed to program directors, chairs, and other educators to gather insights on how they conduct literature reviews in their programs and to identify topics of interest. The preliminary list was shared with attendees prior to the workshop. At the meeting, participants were assigned their chosen topics to review and update the preliminary list. Subsequently, the volunteers further refined and finalized the updated list.

The Committee aimed to develop a comprehensive list of relevant literature with minimal omissions. This Periodontal Literature Reference List serves as a foundation from which programs or individuals can select articles tailored to their specific needs. It's important to note that this reference list is not exhaustive, and additional literature may also be beneficial.

Finally, as the Chair of the Committee, I want to express my heartfelt gratitude and acknowledgments to all volunteers from the Committee, participants at the Educational Workshop, members of the Education Committee, and Ms. Tameisha Williams, Manager of Academic Affairs for the American Academy of Periodontology, along with other staff involved. Their significant time and effort contributed immensely to the completion of this project. Thank you all for your dedication and support.

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1. Gross anatomy, ultrastructural anatomy, and histology

1.1 Gingival epithelium and oral mucosa

Questions to be answered from this section:

- What is the characteristic of the gingiva?
- What is the variation in the width of gingiva?
- How do you measure the thickness of gingiva?
- What are the different periodontal phenotypes?
- Is stippling an indicator of periodontal health?
- What is retrocuspid papilla?

General anatomical features:

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Width of attached gingiva:

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Thickness of attached gingiva:

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Stippling:

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Pigmentation:

Ho DK, Ghinea R, Herrera LJ, Angelov N, Paravina RD. Color Range and Color Distribution of Healthy Human Gingiva: a Prospective Clinical Study. *Sci Rep.* 2015; 22;5:18498. DOI: 10.1038/srep18498. PMID: 26691598.

Gingival characteristics in children:

Wyrębek B, Orzechowska A, Cudził D, Plakwicz P. Evaluation of changes in the width of gingiva in children and youth. Review of literature. *Dev Period Med.* 2015;19(2):212-6. PMID: 26384125.

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1.2 Dentogingival Complex

Questions to be answered from this section:

- What is the microscopic anatomy of gingival epithelium?
- What is the microscopic structure of dentogingival complex?
- What comprises gingival vasculature?

Epithelia:

1. Schroeder H, Theilade J. Electron microscopy of normal human gingival epithelium. *J Periodont Res* 1966;1:95-119. DOI: 10.1111/j.1600-0765.1966.tb01850.x. PMID: 4225000
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1.3 PDL

Questions to be answered from this section: What is the microstructure of PDL?

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1.4 Cementum

Questions to be answered from this section:

- What is the microstructure of cementum?
- What are age-related changes in cementum?

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1.5 Alveolar Bone

Questions to be answered from this session:

- What is the microstructure of alveolar bone?
- How common are dehiscence and fenestrations in alveolar bone?
- How does alveolar bone heal?

Alveolar Bone Anatomy

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Alveolar Bone Remodeling

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2. Microbiology, etiology, risk factors, histopathology, and pathogenesis

Questions to be answered from this section:

- What are the main differences in composition of subgingival microbial flora between periodontally healthy and diseased sites?
- Describe different methods for identifying bacteria associated with periodontal diseases. What are their advantages and disadvantages?
- What are the predominant periodontal pathogens identified in the classic literature? Is there unique bacteriology associated with pregnancy and necrotizing periodontal diseases?
- What is the difference between plaque (biofilm) and microbiome? What does dysbiosis mean?
- Describe the nature history of periodontal diseases in man in terms of progression rate and pattern.
- Do periodontal therapy and maintenance change the clinical course of periodontal disease?
- What is the primary etiology of periodontal disease?
- What are the roles of bacteria in the pathogenesis of periodontal disease?
- What are the roles of host response in the pathogenesis of periodontal disease?
- Which enzymes and cytokines are involved in periodontal disease progression?
- What is the role of histopathology in diagnosis and prognosis of periodontal disease?
- Describe the local factors that could contribute to the pathogenesis of periodontal disease.
- What are the mechanisms of action of cigarette smoking in periodontal diseases? Are they dose-dependent?
- What is the impact of cigarette smoking on periodontal therapy?
- What are the benefits of smoking cessation? Does the length of smoking cessation matter?
- What are the association of other environmental factors such as stress and alcohol consumption with

periodontal diseases?

- What are the potential mechanisms by which diabetes mellitus affects periodontal diseases?
- What are the potential mechanisms by which periodontal disease affects diabetes mellitus?
- Does patient's glycemic control influence the outcome of periodontal therapy? Does periodontal therapy influence glycemic control?
- What are the association between periodontal disease and other systemic factors such as obesity, pregnancy/hormonal change, medication, CVD, osteoporosis, rheumatoid arthritis, age, and metabolic syndrome?
- How can genetics contribute to periodontal disease?
- What is genotype? What are single nucleotide polymorphisms (SNPs)? How do they contribute to pathogenesis of periodontal disease?
- What is epigenetics and how does it contribute to pathogenesis of periodontal disease?
- What are the differences between infection and inflammation?
- What are the differences between innate and adaptive immunity?
- Provide some examples of the protective and destructive roles of host immune system in the periodontal disease.

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2.3 Histopathology

Questions to be answered in this session:

- What is the molecular mechanism of periodontal disease?
- Which enzymes and cytokines are involved in periodontal disease progression?
- What is the role of histopathology in diagnosis and prognosis of periodontal disease?

Introduction

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Enzymes

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Calculus:

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10. Johnson RB, Wood N, Serio FG. Interleukin-11 and IL-17 and the pathogenesis of periodontal disease. *J Periodontol*. 2004;75:37-43.

Reviews:

1. Genco RJ. Host responses in periodontal diseases: current concepts. *J Periodontol*. 1992;63:338-355.
2. Ebersole JL, Taubman MA. The protective nature of host responses in periodontal diseases. *Periodontol 2000*. 1994;5:112-141.
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3. Examination, disease activity, and diagnostic tools

3.1 Probing, mobility, bleeding on probing

Questions to be answered in this section:

- What are the different causes for probing depth errors?
- What are different types of periodontal probes?
- How is bleeding on probing (BOP) as an indicator of periodontal disease?
- What is the effect of tooth mobility on disease progression?

Periodontal probing

Terminology:

1. Listgarten MA. Periodontal terminology. *J Periodontol* 1993;64:918. PMID: 8229631

Angulation and position:

2. Persson G. Effects of line-angle versus midproximal periodontal probing measurements on prevalence estimates of periodontal disease. *J Periodont Res* 1991;26:527-529. PMID: 1837057 DOI: 10.1111/j.1600-0765.1991.tb01805.x

Probing force:

3. Listgarten MA, Mao R, Robinson PJ. Periodontal probing and the relationship of the probe tip to periodontal tissues. *J Periodontol* 1976;47:511-513. PMID: 1067404 DOI: 10.1902/jop.1976.47.9.511

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6. Mombelli A, Muhle T, Frigg R. Depth-force patterns of periodontal probing. *J Clin Periodontol* 1992;19:295-300. PMID: 1517472 DOI: 10.1111/j.1600-051x.1992.tb00647.x
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Effect of inflammation:

8. Robinson PJ, Vitek RM. The relationship between gingival inflammation and resistance to probe penetration. *J Periodont Res* 1979;14:239-243. PMID: 158084 DOI: 10.1111/j.1600-0765.1979.tb00229.x
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Types of probes:

11. Pihlstrom BL. Measurement of attachment level in clinical trials: probing methods. *J Periodontol* 1992;63:1072-1077. PMID: 1479528 DOI: 10.1902/jop.1992.63.12s.1072
12. Grossi SG, Dunford RG, Ho A, Koch G, Machtei EE, Genco RJ. Sources of error for periodontal probing measurements. *J Periodontal Res* 1996;31:330-6. PMID: 8858537 DOI: 10.1111/j.1600-0765.1996.tb00500.x

Tooth mobility:

Classification and measurement of mobility:

1. Miller SC, *Textbook of Periodontia*, 1950, Blackston: Philadelphia. p. 125
2. Yankell SL. Review of methods for measuring tooth mobility. *Compendium* 1988;(l2) Suppl:S428-32. PMID: 3078270
3. Weatherford T. Tooth mobility: mechanisms and treatment. *Ala J Med Sci* 1977;14:32-38. PMID: 848692
4. Anderegg CR, Metzler DG. Tooth mobility revisited. *J Periodontol* 2001;72(7):963-967 PMID: 11495147 DOI: 10.1902/jop.2001.72.7.963

Tooth mobility and diagnosis/prognosis/therapy:

5. Greenstein G, Polson A. Understanding tooth mobility. *Compendium* 1988 Jun;9(6):470-1, 473-9. PMID: 3073858
6. Giargia M, Lindhe J. Tooth mobility and periodontal disease. *J Clin Periodontol* 1997;24:785-95 PMID: 9402498 DOI: 10.1111/j.1600-051x.1997.tb01190.x

Bleeding on probing:

1. Lang NP, Adler R, Joss A, Nyman S. Absence of bleeding on probing. An indicator of periodontal stability. *J Clin Periodontol.* 1990 Nov;17(10):714-21. doi: 10.1111/j.1600-051x.1990.tb01059.x. PMID: 2262585.
2. Lang NP, Joss A, Tonetti MS. Monitoring disease during supportive periodontal treatment by

- bleeding on probing. *Periodontol 2000* 1996; 12:44-8. PMID: 9567993 DOI: 10.1111/j.1600-0757.1996.tb00080.x
3. Armitage GC. Periodontal diseases: diagnosis. *Ann Periodontol* 1996;1:37-215. Pages 46-53 PMID: 9118264 DOI: 10.1902/annals.1996.1.1.37

3.2 Indices

Questions to be answered in this session:

- What are the different types of plaque, gingival and bleeding indices used during complete periodontal examination?
- What is the relevance of periodontal indices in periodontal disease diagnosis and progression?

Periodontal indices

Plaque indices:

1. Silness J, Löe H. Periodontal disease in pregnancy II. Correlation between oral hygiene and periodontal condition. *Acta Odontol Scand* 1964;22:121-135. PMID: 14158464 DOI: 10.3109/00016356408993968
2. Turesky S, Gilmore N, Glickman I. Reduced plaque formation by the chloromethyl analogue of vitamin C. *J Periodontol* 1970;41 :41-43. PMID: 5264376 DOI: 10.1902/jop.1970.41.41.41

Gingival indices:

1. Löe H, Silness J. Periodontal disease in pregnancy I. Prevalence and severity. *Acta Odontol Scand* 1963;21:533-551. PMID: 14121956 DOI: 10.3109/00016356309011240
2. Lobene RR, Weatherford T, Ross NM, Lamm RA, Menaker L. A modified gingival index for use in clinical trials. *Clinical Preventive Dentistry* 1986;8:3-6. PMID: 3485495

Bleeding indices:

3. Newbrun E. Indices to measure gingival bleeding. *J Periodontol* 1996;67:555-561. PMID: 8794964 DOI: 10.1902/jop.1996.67.6.555

CPITN:

4. Ainamo J, Barnes D, Beagrie G, Cutress T, Martin J, Sardo-Infirri J. Development of the World Health Organisation (WHO) community periodontal index of treatment needs (CPITN). *Int Dent J* 1982;32:281-292. PMID: 6958657
5. Almas K, Bulman J, Newman H. Assessment of periodontal status with CPITN and conventional periodontal indices. *J Clin Periodontol* 1991;18:654-659. PMID: 1960234 DOI: 10.1111/j.1600-051x.1991.tb00106.x

Relevance of indices to clinical practice:

6. Barnes G, Parker W, Lyon T, Fultz R. Indices used to evaluate signs, symptoms and etiologic factors associated with diseases of the periodontium. *J Periodontol* 1986;57:643-651. PMID: 3464735 DOI: 10.1902/jop.1986.57.10.643
7. Chaves E, Wood R, Jones A, Newbold D, Manwell M, Komman K. Relationship of "bleeding on probing" and "gingival index bleeding" as clinical parameters of gingival inflammation. *J Clin Periodontol* 1993;20:139-143. PMID: 8436633 DOI: 10.1111/j.1600-051x.1993.tb00328.x

3.3 Host Biomarkers

Questions to be answered in this session:

- Is GCF a reliable marker of gingival health?
- What are varying diagnostic biomarkers present in GCF?
- How can components of saliva be used in assessment of disease status?

Gingival crevicular fluid:

1. Orban JE, Stallard RE. Gingival crevicular fluid: A reliable predictor of gingival health? *J Periodontol.* 1969;40:231-235. PMID: 5253991 DOI: 10.1902/jop.1969.40.4.231
2. Hancock EB, et al. The relationship between gingival crevicular fluid and gingival inflammation - A clinical and histologic study. *J Periodontol.* 1979;50:13-19. PMID: 368310 DOI: 10.1902/jop.1979.50.1.13
3. Lamster I, Grbic T. Diagnosis of periodontal disease based on analysis of the host response. *Periodontology 2000.* 1995;7:83-99. PMID: 9567932 DOI: 10.1111/j.1600-0757.1995.tb00038.x
4. Armitage GC. Periodontal diseases: diagnosis. *Ann Periodontol.* 1996;1:37-215. Pages 97-169 PMID: 9118264 DOI: 10.1902/annals.1996.1.1.37
5. Chapple ILC. Periodontal disease diagnosis: current status and future developments. *J Dent.* 1997;25:3-15. PMID: 9080734 DOI: 10.1016/s0300-5712(95)00118-2
6. Griffiths GS. Formation, collection and significance of gingival crevice fluid. *Periodontol 2000.* 2003;31:32-42. PMID: 12656994 DOI: 10.1034/j.1600-0757.2003.03103.x
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8. Reinhardt R, Stoner J, et al. Association of GCF biomarkers during periodontal maintenance with subsequent progressive periodontitis. *J Periodontol.* 2010;81:251-259. PMID: 20151804 DOI: 10.1902/jop.2009.090374

Saliva:

Zhang L, Henson BS, Camargo PM, Wong DT. The clinical value of salivary biomarkers for periodontal disease. *Periodontol 2000.* 2009;51:25-37. doi: 10.1111/j.1600-0757.2009.00315.x. PMID: 19878467.

3.4 Radiology

Questions to be answered in this session:

- What is the normal radiographic appearance of periodontal structures?
- What is the association between radiographic bone loss and disease progression?
- How is the accuracy of different types of radiographs in predicting bone loss?

Limitations and usefulness of radiographs:

1. Prichard J. Interpretation of radiographs in periodontics. *Int J Periodontics Restorative Dent* 1983;3:8-39. PMID: 6574120
2. Manson JD. The lamina dura. *Oral Medicine, Oral Surgery and Oral Pathology* 1963;16:432-438.
3. Greenstein G, Polson A, Iker H, Meitner S. Associations between crestal lamina dura and periodontal status. *J Periodontol* 1981;52:362-366. PMID: 6942152 DOI: 10.1902/jop.1981.52.7.362
4. Hausmann E, Allen K, Clerehugh V. What alveolar crest level on a bite-wing radiograph represents bone loss? *J Periodontol* 1991;62:570-2. PMID: 1941497 DOI: 10.1902/jop.1991.62.9.570

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Radiographs in relation to clinical parameters - Comparison of conventional radiographic techniques:

6. Buchanan S, Jenderseck R, Granet M, Kircos L, Chambers D, Robertson P. Radiographic detection of dental calculus. *J Periodontol* 1987;58:747-751. PMID: 3480347 DOI: 10.1902/jop.1987.58.11.747
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10. Persson RE, Tzannetou S, Feloutzis AG, Bragger U, Persson GR, Lang NP. Comparison between panoramic and intra-oral radiographs for the assessment of alveolar bone levels in periodontal maintenance population. *J Clin Periodontol* 2003;30:833-9. PMID: 12956660 DOI: 10.1034/j.1600-051x.2003.00379.x

Digital imaging and Digital Subtraction Radiography:

11. Deas D, Pasquali L, Yuan C, Komman K. The relationship between probing attachment loss and computerised radiographic analysis in monitoring progression of periodontitis. *J Periodontol* 1991;66:135-141. PMID: 2027061 DOI: 10.1902/jop.1991.62.2.135
12. Reddy MS. Radiographic methods in the evaluation of periodontal therapy. *J Periodontol* 1992;63:1078-1084. PMID: 1479529 DOI: 10.1902/jop.1992.63.12s.1078

Review:

13. Jeffcoat MK, Chung Wang I, Reddy MS. Radiographic diagnosis in periodontics. *Periodontology 2000* 1995;7:54-68. PMID: 9567930 DOI: 10.1111/j.1600-0757.1995.tb00036.x

3.5 Furcation Assessment

Questions to be answered in this section:

- How is the assessment of furcation achieved?
1. Zappa U, Grosso C, et al. Clinical furcation diagnoses and interradicular bone defects. *J Periodontol* 1993; 64:219-227. PMID: 8463945 DOI: 10.1902/jop.1993.64.3.219
 2. Mealey, B, et al.: Use of furcal bone sounding to improve accuracy of furcation diagnosis. *J Periodontol* 1994;65:649-57. PMID: 7608840 DOI: 10.1902/jop.1994.65.7.649
 3. Hou G-L, Chen Y-M, et al. A new classification of molar furcation involvement based on the root trunk and horizontal and vertical bone loss. *Int J Periodontal Rest Dent* 1998;18:257-65. PMID: 9728108
 4. Muller H-P, Eger T. Furcation diagnosis. *J Clin Periodontol* 1999;26:485-98. PMID: 10450808 DOI: 10.1034/j.1600-051x.1999.260801.x

3.6 Mucogingival considerations

Questions to be answered in this session:

- Is keratinized gingiva important in maintaining gingival health?
- What are varying widths of keratinized gingiva and their effects on gingival health?

- How is the diagnostic accuracy of various periodontal measurements?
 1. Lang N, Löe H. The relationship between the width of keratinized gingiva and gingival health. *J Periodontol* 1972; 43:623-627. PMID: 4507712 DOI: 10.1902/jop.1972.43.10.623
 2. Miyasato M, Crigger M. Gingival condition in areas of minimal and appreciable width of attached gingiva. *J Clin Periodontol* 1977; 4:200-209. PMID: 330574 DOI: 10.1111/j.1600-051x.1977.tb02273.x
 3. Wennstrom J, Lindhe J. Plaque-induced gingival inflammation in the absence of attached gingiva in dogs. *J Clin Periodontol* 1983; 10:266-276. PMID: 6575981 DOI: 10.1111/j.1600-051x.1983.tb01275.x
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 5. Tenenbaum H, Tenenbaum M. A clinical study of the width of attached gingiva in the deciduous, transitional and permanent teeth. *J Clin Periodontol* 1986; 13:270-275. PMID: 3458723 DOI: 10.1111/j.1600-051x.1986.tb02221.x
 5. Wennstrom J. Lack of association between width of attached gingiva and development of soft tissue recession. *J Clin Periodontol* 1987; 14:181-184. PMID: 3470324 DOI: 10.1111/j.1600-051x.1987.tb00964.x
 6. Freedman, A.L., Green, K., Salkin, L.M., Stein, M.D. and Mellado, J.R.: An 18-year longitudinal study of untreated mucogingival defects. *J Periodontol* 1999; 70:1174-1176. PMID: 10534071 DOI: 10.1902/jop.1999.70.10.1174
 7. Rasperini G, et al. Decision making in gingival recession treatment: Scientific Evidence and Clinical Experience. *Clin Adv Periodontics* 2011;1:41-52. PMID: 32698553 DOI: 10.1902/cap.2011.100002
 8. Agudio G, Cortellini P, Buti J, Pini Prato G. Periodontal Conditions of Sites Treated With Gingival Augmentation Surgery Compared With Untreated Contralateral Homologous Sites: An 18- to 35-Year Long-Term Study. *J Periodontol.* 2016 Dec;87(12):1371-1378. PMID: 27523520 DOI: 10.1902/jop.2016.160284
 9. Agudio G, Chambrone L, Pini Prato G. Biologic Remodeling of Periodontal Dimensions of Areas Treated With Gingival Augmentation Procedure: A 25-Year Follow-Up Observation. *J Periodontol.* 2017 Jul;88(7):634-642. PMID: 28338390 DOI: 10.1902/jop.2017.170010

3.7 Sensitivity, specificity, and predictability of diagnostic tools

Questions to be answered in this session:

- How is the diagnostic accuracy of various periodontal measurements?
 1. Goodson J, Haffajee A. The relationship between attachment level loss and alveolar bone loss. *J Clin Periodontol.* 1984;11:348-359. PMID: 6585374 DOI: 10.1111/j.1600-051x.1984.tb01331.x
 2. Hardekopf J, et al. The "furcation arrow" - A reliable radiographic image? *J Periodontol.* 1986;58:258. PMID: 3473221 DOI: 10.1902/jop.1987.58.4.258
 3. Badersten A, Nilveus R, Egelberg J. Scores of plaque, bleeding, suppuration and probing depth to predict probing attachment loss. Five years of observation following non-surgical periodontal therapy. *J Clin Periodontol.* 1990;17:102-107. PMID: 2406291 DOI: 10.1111/j.1600-051x.1990.tb01070.x
 4. Claffey N, Nylund K, Kiger R, Garrett S, Egelberg J. Diagnostic predictability of scores of plaque, bleeding, suppuration and probing depth for probing attachment loss. 3.5 years of observation following initial periodontal therapy. *J Clin Periodontol.* 1990;17:108-114. PMID: 2406292 DOI: 10.1111/j.1600-051x.1990.tb01071.x
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4. Epidemiology, risk assessment, and prognosis

4.1 Epidemiology of periodontal disease

Questions to be answered in this section:

- What is the prevalence of periodontal diseases ?
- What is the epidemiological association of periodontal disease and systemic diseases?

1. Albandar JM. Epidemiology and risk factors of periodontal diseases. *Dent Clin North Am.* 2005 Jul;49(3):517-32, v-vi. doi: 10.1016/j.cden.2005.03.003. PMID: 15978239.
2. Borgnakke WS, Ylöstalo PV, Taylor GW, Genco RJ. Effect of periodontal disease on diabetes: systematic review of epidemiologic observational evidence. *J Clin Periodontol.* 2013 Apr;40 Suppl 14:S135-52. doi: 10.1111/jcpe.12080. PMID: 23627324.
3. Demmer RT, Papapanou PN. Epidemiologic patterns of chronic and aggressive periodontitis. *Periodontol 2000.* 2010 Jun;53:28-44. doi: 10.1111/j.1600-0757.2009.00326.x. PMID: 20403103; PMCID: PMC3406186.
4. Dye BA. Global periodontal disease epidemiology. *Periodontol 2000.* 2012 Feb;58(1):10-25. doi: 10.1111/j.1600-0757.2011.00413.x. PMID: 22133364.
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7. Kinane DF, Stathopoulou PG, Papapanou PN. Periodontal diseases. *Nat Rev Dis Primers.* 2017 Jun 22;3:17038. doi: 10.1038/nrdp.2017.38. PMID: 28805207.
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4.2 Risk assessment and prognosis

Questions to be answered in this section:

- What are the tools of risk assessment in periodontal diseases?
- How do we predict the risk of periodontal disease progression?
- What is prognosis and how do we assess periodontal prognosis
- How accurate are our periodontal prognosis systems ?

1. Axelsson P, Nyström B, Lindhe J. The long-term effect of a plaque control program on tooth mortality, caries and periodontal disease in adults. Results after 30 years of maintenance. *J Clin Periodontol.* 2004 Sep;31(9):749-57. doi: 10.1111/j.1600-051X.2004.00563.x. PMID: 15312097.
2. Chambrone L, Chambrone D, Lima LA, Chambrone LA. Predictors of tooth loss during long-term periodontal maintenance: a systematic review of observational studies. *J Clin Periodontol.* 2010 Jul;37(7):675-84. doi: 10.1111/j.1600-051X.2010.01587.x. Epub 2010 May 26. PMID: 20528960.
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5. Diagnosis and Treatment Planning

Questions to be answered in this section:

- What are the histological and clinical criteria in defining gingival health?

5.1 Gingival Health

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5.2 – Gingivitis- Biofilm induced and non-biofilm induced

Questions to be answered in this section:

- What are the histological and clinical criteria in defining gingivitis?
- What are the different histological stages of gingivitis ?

Biofilm-induced

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Non-Biofilm Induced

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5.3. Gingival Enlargement

Questions to be answered in this section:

- What is the prevalence and etiopathogenesis of drug induced gingival enlargements?
- What is the gingival fibromatosis and its etiology?

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Review:

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5.4 Necrotizing Periodontal Diseases

Questions to be answered in this section:

What are etiological, histological and clinical findings for necrotizing periodontal diseases?

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5.5 Molar-Incisor Pattern/ Aggressive Periodontitis

Questions to be answered from this section:

- Describe the criteria which classifies aggressive periodontitis as a distinct entity. (1999 International Workshop for a Classification of Periodontal Diseases and 2017 World Workshop)
- Discuss the characteristics of the patient population most prone to aggressive periodontitis and the frequency, severity and progression of the disease process.
- Describe the clinical features of localized and generalized aggressive periodontitis.
- Describe the clinical features of the previously reported “prepubertal and rapidly progressive periodontitis” and determine where these entities fall in the classification of “aggressive periodontitis”³⁴
- Discuss the microbiology and immunology associated with the pathogenesis of aggressive periodontitis.

- Explain the rationale for treatment of patients with aggressive periodontitis. Include scientific evidence for the use of antibiotics.
- What is the definition of a “refractory periodontitis” case? How are these cases classified according to the 1999 International Workshop?
- Describe the microbiology, immunology, and socioeconomics associated with these cases.
- What treatment options are available to treat these patients? How predictable are these therapies?

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CClinical features; etiology; pathogenesis:

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Epidemiology:

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Microbiology/immunology:

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Treatment:

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Refractory periodontitis:

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5.6 Periodontitis Staging and Grading

Questions to be answered in this section:

What is the Staging and Grading criteria for periodontitis according to the 2017 World Workshop on Periodontal Disease Classification System?

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5.7 Acute Periodontal Lesions

Questions to be answered in this section:

- What are the different acute periodontal lesions?
- What are the signs and symptoms of acute periodontal lesions?
- How do you treat acute periodontal lesions?

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5.8 Mucogingival deformities and conditions, gingival phenotype, gingival recessions, altered eruption pattern, aberrant frenal attachment.

Questions to be answered in this section:

- What are the case definitions and criteria to diagnose mucogingival conditions?
 - How do we classify gingival recessions?
 - What criteria of gingival recessions are utilized in developing treatment plans for root coverage?
1. Pierpaolo Cortellini, Nabil F Bissada. Mucogingival conditions in the natural dentition: Narrative review, case definitions, and diagnostic considerations. *J Periodontol*. 2018;89 Suppl 1:S204-S213. PMID: 29926948, DOI: 10.1002/JPER.16-0671.
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6. Biofilm Control & Mechanical Therapy

6.1 Oral Physiotherapy

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6.2 Non-Surgical Therapy

Questions to be answered:

- What are the limitations of Scaling and Root planning
- How do the tissues heal after non-surgical periodontal therapy?
- How long do the effects of non-surgical therapy last?
- What are the microbiological changes that result from non-surgical therapy?
- What is the most appropriate recall maintenance protocol for periodontal patients?

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6.3 Mechanical Debridement: manual and powered devices

Questions to be answered:

- What are the advantages and disadvantages of the use of powered devices for periodontal therapy?
- What are the differences between the different types of powered scalers used in periodontics?
- Is there an advantage in using air polishing devices during non-surgical periodontal therapy?

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6.4 Treatment of periodontitis with lasers

Questions to be answered:

- What laser systems have documented effectiveness in the non-surgical treatment of periodontal disease?
- What is the evidence supporting surgical periodontal therapy for different laser types and protocols?
- What are the side effects of lasers applied on bone, soft tissues, and root surfaces?

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7. Systemic and Local Adjunctive Therapy & Chemotherapeutics

7.1 Systemic Antibiotics & Host Modulators

Questions to be answered:

- What antibiotics have evidence of benefit in the management of patients with periodontitis?
 - What are the indications for the systemic use of antibiotics in periodontal patients?
 - What is the impact of host modulation therapy on the progression of periodontitis?
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7.2 Local agents: chlorhexidine chip, tetracycline fiber, minocycline, doxycycline

Questions to be answered:

- What are the indications for the different local delivery agents used in periodontal patients?
- What is the evidence of the effectiveness of the various local delivery agents?
- Do local delivery agents provide additional therapeutic benefit when combined with Scaling and Root Planing?

Chlorhexidine Chip

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Tetracycline Fiber

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8.1 Occlusal Traumatism: history, human and animal studies

Questions to be answered:

- What is the role of occlusal traumatism in the progression of periodontal disease?
- What is the impact of occlusal adjustment on the periodontal clinical parameters?
- What are the results of the research in the different animal models?

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8.2 Selective adjustment, splinting, and removable appliances

Questions to be answered:

- What are the indications for occlusal adjustment?
- What are the effects of splinting on the periodontal tissues?
- What is the relevance of mobility in the progression of periodontal disease?

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14. Ericsson I, Giargia M, Lindhe J, Neiderud AM. Progression of periodontal tissue destruction at splinted/non-splinted teeth. An experimental study in the dog. *J Clin Periodontol.* 1993;20:693-698. doi: 10.1111/j.1600-051x.1993.tb00693.x.
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3. Fan J, Caton JG. Occlusal trauma and excessive occlusal forces: Narrative review, case definitions, and diagnostic considerations. *J Clin Periodontol.* 2018;45 Suppl 20:S199-S206. doi: 10.1111/jcpe.12949.
4. Dommisch H, Walter C, Difloë-Geisert JC, Gintaute A, Jepsen S, Zitzmann NU. Efficacy of tooth splinting and occlusal adjustment in patients with periodontitis exhibiting masticatory dysfunction: A systematic review. *J Clin Periodontol.* 2022;49 Suppl 24:149-166. doi: 10.1111/jcpe.13563.

9. General Surgical Principles

9.1 Anatomic considerations

Questions to be answered in this session:

- What are some general anatomic considerations in periodontal surgery?
 - What are tooth-specific anatomic considerations for periodontal surgery?
 - What is the anatomy of the lingual nerve?
 - What is the expected blood loss after surgery?
 - What is the incidence of postoperative infections in periodontal surgeries?
1. Clarke M, Bueltman K. Anatomic considerations in periodontal surgery. *J Periodontol.* 1971;42:610-625. PMID: 5285836 DOI: 10.1902/jop.1971.42.10.610
 2. Hunt P. Safety aspects of mandibular lingual surgery. *J Periodontol.* 1976;47:224-229. PMID: 1083904 DOI: 10.1902/jop.1976.47.4.224
 3. Baab D, Ammons W. Blood loss during periodontal flap surgery. *J Periodontol.* 1977;48:693-698. PMID: 303287 DOI: 10.1902/jop.1977.48.11.693
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 9. De Andrade E, Otomo-Corgel J, Pucher J, Ranganath KA, St George N Jr. The intraosseous course of the mandibular incisive nerve in the mandibular symphysis. *Int J Periodontics Restorative Dent.* 2001;21:591-597. PMID: 11794570
 10. Kuzmanovic DV, Payne AG, Kieser JA, Dias GJ. Anterior loop of the mental nerve: a morphological and radiographic study. *Clin Oral Implants Res.* 2003;14:464-471. PMID: 12869009 DOI: 10.1034/j.1600-0501.2003.00869.x

Tooth anatomy considerations:

1. Bower RC. Furcation morphology relative to periodontal treatment. Furcation entrance architecture. *J Periodontol.* 1979;50:23-27. PMID: 283222 DOI: 10.1902/jop.1979.50.1.23
2. Bower RC. Furcation morphology relative to periodontal treatment. Furcation root surface anatomy. *J Periodontol.* 1979;50:366-374. PMID: 288913 DOI: 10.1902/jop.1979.50.7.366
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4. Joseph I, Varma BR, Bhat KM. Clinical significance of furcation anatomy of the maxillary first premolar: a biometric study on extracted teeth. *J Periodontol.* 1996;67:386-389. PMID: 8708964 DOI: 10.1902/jop.1996.67.4.386

9.2 Incisions and flap designs

Questions to be answered from this session:

- What are the different incision designs used in periodontal surgery?
- What is the curtain flap technique?
- How do partial and full thickness flaps differ?
- What is an apically positioned flap?
- What are some various flap designs?

Incisions:

1. Cattermole A, Wade A. A comparison of the scalloped and linear incisions as used in the reverse bevel technique. *J Clin Periodontol.* 1978;5:41-49. PMID: 353086 DOI: 10.1111/j.1600-051x.1978.tb01905.x
2. Kalkwarf KL, Krejci RF, Wentz FM, Edison AR. Epithelial and connective tissue healing following electrosurgical incision in human gingiva. *J Oral Maxillofac Surg.* 1983;41:80-85. PMID: 6571885 DOI: 10.1016/0278-2391(83)90212-4
3. Litch J, O'Leary T. Pocket epithelium removal via crestal and subcrestal scalloped internal bevel incisions. *J Periodontol.* 1984;55:142-148. PMID: 6584589 DOI: 10.1902/jop.1984.55.3.142
4. Kon S, Caffesse RG, Castelli WA, Nasjleti CE. Vertical releasing incisions for flap design: clinical and histological study in monkeys. *Int J Periodontics Restorative Dent.* 1984;4:48-57. PMID: 6590522
5. Smith BA, Echeverri M, Caffesse RG. Mucoperiosteal flaps with and without removal of the pocket epithelium. *J Periodontol.* 1987;58:78-85. PMID: 3546671 DOI: 10.1902/jop.1987.58.2.78
6. Lynch TJ, Ficara AJ, Ekvall WM, Raulin LA, Rossmann JA, Scheidt MJ. A comparison of mandibular lingual surgical flaps with and without a vertical releasing incision. *J Periodontol.* 1988;59:12-17. PMID: 3422288 DOI: 10.1902/jop.1988.59.1.12
7. Deschner J, Wolff S, Hedderich J, Kreusch T, Jepsen S. Dimensional changes of periodontal soft tissues after intrasulcular incision. *Clin Oral Investig.* 2009;13:401-408. PMID: 19172314 DOI: 10.1007/s00784-009-0251-y

Curtain Procedure and Related Procedures for Maxillary Anterior Area:

1. Frisch J, Jones RA, Bhaskar SN. Conservation of maxillary anterior esthetics: A modified surgical approach. *J Periodontol.* 1967;38:11-17. PMID: 5225805 DOI: 10.1902/jop.1967.38.1.11

2. Nordenram A, Landt H. Evaluation of a surgical technique in the periodontal treatment of maxillary anterior teeth. *Acta Odontol Scand*. 1969;27:283-289. PMID: 5257034 DOI: 10.3109/00016356909008957
3. Levine HL. Periodontal flap surgery with gingival fiber retention. *J Periodontol*. 1972;43:91-98. PMID: 4501913 DOI: 10.1902/jop.1972.43.2.91
4. Dello Russo NM. Use of the fiber retention procedure in treating the maxillary anterior region. *J Periodontol*. 1981;52:208-213. PMID: 6939840 DOI: 10.1902/jop.1981.52.4.208
5. Takei H, Hahn T, Carranza F Jr., Kenney EB, Lekovic V. Flap technique for periodontal bone implants. Papilla preservation technique. *J Periodontol*. 1985;56:204-210. PMID: 3889270 DOI: 10.1902/jop.1985.56.4.204
6. Newell DH, Brunsvold MA. A modification of the “Curtain Technique” incorporating an internal mattress suture. *J Periodontol*. 1985;56:484-487. PMID: 3915014 DOI: 10.1902/jop.1985.56.8.484
7. Lie T. Periodontal surgery for the maxillary anterior area. *Int J Periodontics Restorative Dent*. 1992;12(1):72-81. PMID: 1526713
8. Michaelides PL, Wilson SG. A comparison of papillary retention versus full-thickness flaps with internal mattress sutures in anterior periodontal surgery. *Int J Periodontics Restorative Dent*. 1996;16:388-397. PMID: 9242106

Split Thickness Flap:

Clinical

Staffileno H. Significant differences and advantages between the full thickness and split thickness flaps. *J Periodontol* 1974;45:421-425. PMID: 4525958 DOI: 10.1902/jop.1974.45.6.421

Histological

1. Staffileno H, Wentz FM, Orban BJ. Histologic study of healing of split thickness flap surgery in dogs. *J Periodontol* 1962;33:56-69.
2. Kon S, Caffesse RG, Castelli WA, Nasjleti CE. Revascularization following a combined gingival flap-split thickness flap procedure in monkeys. *J Periodontol* 1984;55:345-351. PMID: 6588191 DOI: 10.1902/jop.1984.55.6.345

Flap position:

Clinical:

3. Friedman N. Mucogingival surgery: the apically repositioned flap. *J Periodontol* 1962;34:328-339.
4. Pritchard JF. Present state of the interdental denudation procedures. *J Periodontol* 1977;48:566-569. PMID: 333089 DOI: 10.1902/jop.1977.48.9.566
5. Machtei EE, Ben-Yehouda A. The effect of post-surgical flap placement on probing depth and attachment level: A 2-year longitudinal study. *J Periodontol* 1994;65:855-858. PMID: 7990022 DOI: 10.1902/jop.1994.65.9.855

Histological

6. Kohler CA, Ramfjord SP. Healing of gingival mucoperiosteal flaps. *Oral Surg* 1960;13:89-103. PMID: 14410539 DOI: 10.1016/0030-4220(60)90400-x
7. Costich ER, Ramfjord SP. Healing after partial denudation of the alveolar process. *J Periodontol* 1968;39:127-134. PMID: 5240004 DOI: 10.1902/jop.1968.39.3.127

Reviews:

8. Johnson RH. Basic flap management. *Dent Clin N Am* 1976;20:3-21. PMID: 765173
9. Barrington EP. An overview of periodontal surgical procedures. *J Periodontol* 1981;52:518-528. PMID: 7026757 DOI: 10.1902/jop.1981.52.9.518

9.3 Sutures, dressing, techniques

What questions are answered in this session:

- Is the use of surgical dressing in periodontal surgery beneficial?
- What are some different suture materials and their use in periodontal surgery?
- What are material properties of varying suture materials?
- What are some common suturing techniques used in periodontal surgery?

Dressing:

1. Allen D, Caffesse R. Comparison of results following modified Widman flap surgery with and without surgical dressing. *J Periodontol* 1983; 54:470-475. PMID: 6352896 DOI: 10.1902/jop.1983.54.8.470

Suture materials:

2. Castelli WA, Nasjleti CE, Caffesse RE, Diaz-Perez R. Gingival response to silk, cotton, and nylon suture materials. *Oral Surg Oral Med Oral Pathol* 1978;45:179-85. PMID: 415276 DOI: 10.1016/0030-4220(78)90083-x
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4. Charbit Y, Hitzig C, Bolla M, Bitton C, Bertrand MF. Comparative study of physical properties of three suture materials: silk, e-PTFE (Gore-Tex), and PLA/PGA (Vicryl). *Biomed Instrum Technol* 1999;33:71-5. PMID: 10067182
5. Leknes KN, Roynstrand IT, Selvig KA. Human gingival tissue reactions to silk and expanded polytetrafluoroethylene sutures. *J Periodontol* 2005;76:34-42. PMID: 15830635 DOI: 10.1902/jop.2005.76.1.34

Suturing technique:

6. Morris ML. Suturing techniques in periodontal surgery. *Periodontics* 1965;59:84-9. PMID: 14261517
7. Kramer GM, Nevins M, Kohn JD. The utilization of periosteal suturing in periodontal surgical procedures. *J Periodontol* 1970;41:457-62. PMID: 4915978 DOI: 10.1902/jop.1970.41.8.457
8. Nelson EH, Funakoshi E, O'Leary TJ. A comparison of the continuous and interrupted suturing techniques. *J Periodontol* 1977;48:273-81. PMID: 323453 DOI: 10.1902/jop.1977.48.5.273
9. Newell D, Brunsvold M. A modification of the "curtain technique" incorporating an internal mattress suture. *J Periodontol* 1985; 56:484-487. PMID: 3915014 DOI: 10.1902/jop.1985.56.8.484

10. Moore RL, Hill M. Suturing techniques for periodontal plastic surgery. *Periodontol 2000* 1996;11:103-11. PMID: 9567962 DOI: 10.1111/j.1600-0757.1996.tb00188.x
11. Griffin T, Yong H, Bu J. Basic Suture Techniques for Oral Mucosa. *Clin Adv in Perio* 2011; 1:221-232.

9.4 Complications

Questions to be answered in this session:

- What are common post-operative complications after surgery?
 - How is the duration of surgery associated with potential complications?
 - What is the effect of mouth rinse on soft tissue healing?
 - How does soft tissue craters form after periodontal surgery?
1. Levine MP, Grower MF, Cutright DE, Getter L. The effects of length of surgery on healing of full and partial thickness flaps. *J Oral Pathol.* 1977;6:152-160. PMID: 405466 DOI: 10.1111/j.1600-0714.1977.tb01876.x
 2. Baab DA, Ammons WF, Selipsky H. Blood loss during periodontal flap surgery. *J Periodontol.* 1977;48:693-698. PMID: 303287 DOI: 10.1902/jop.1977.48.11.693
 3. Pack P, Haber J. The incidence of clinical infection after periodontal surgery. *J Periodontol.* 1983;54:441-443. PMID: 6577181 DOI: 10.1902/jop.1983.54.7.441
 4. Knapp JF, Fiori T. Oral hemorrhage associated with periodontal surgery and hypertensive crisis. *J Am Dent Assoc.* 1984;108:49-51. PMID: 6607271 DOI: 10.14219/jada.archive.1984.0204
 5. Buckley JA, Ciancio SG, McMullen JA. Efficacy of epinephrine concentration in local anesthesia during periodontal surgery. *J Periodontol.* 1984;55:653-657. PMID: 6594502 DOI: 10.1902/jop.1984.55.11.653
 6. Jenkins WMM, Wragg PF, Gilmour WH. Formation of interdental soft tissue defects after surgical treatment of periodontitis. *J Periodontol.* 1990;61:564-570. PMID: 2213466 DOI: 10.1902/jop.1990.61.9.564
 7. Shahan MH, Chuang AH, Brennan WA, Dirksen TR, Van Dyke TE, McPherson JC. The effect of chlorhexidine irrigation on tensile wound strength. *J Periodontol.* 1993;64:719-722. PMID: 8410610 DOI: 10.1902/jop.1993.64.8.719

10. Gingivectomy & Gingivoplasty

10.1 Wound healing after gingivectomy

Questions to be answered in this session:

- How does the wound heal after gingivectomy?
- What are some available histology of soft tissue healing after gingivectomy?

Animal studies

1. Engler WO, Ramfjord SP, Hiniker JJ. Healing following simple gingivectomy. A tritiated thymidine radioautographic study. I. Epithelialization. *J Periodontol.* 1966;37:298-308. PMID: 4287364 DOI: 10.1902/jop.1966.37.4.298
2. Ramfjord SP, Engler WO, Hiniker JJ. A radioautographic study of healing following simple gingivectomy. II. The connective tissue. *J Periodontol.* 1966;37:179-189. PMID: 4956575 DOI: 10.1902/jop.1966.37.3.179
3. Listgarten M. Ultrastructure of the dentogingival junction after gingivectomy. *J Periodont Res.* 1972;7:51-160. PMID: 4272041 DOI: 10.1111/j.1600-0765.1972.tb00640.x

Reviews:

Waite IM. The present status of the gingivectomy procedure. *J Clin Periodontol.* 1975;2:241-249. PMID: 1061722 DOI: 10.1111/j.1600-051x.1975.tb01748.x

10.2 Techniques

Questions to be answered in this session:

- What is the detailed description of gingivectomy procedure?
- What are the healing outcomes after gingivectomy?

Conventional gingivectomy

1. Glickman I. The Results Obtained with an Unembellished Gingivectomy Technique in a Clinical Study in Humans. *J Periodontol.* 1956;27:247-255.
2. Ramfjord SP, Costich ER. Healing after simple gingivectomy. *J Periodontol.* 1963;34:401-415.
3. Donnenfeld OW, Glickman I. A biometric study of the effects of gingivectomy. *J Periodontol.* 1966;37:447-452. PMID: 5224011 DOI: 10.1902/jop.1966.37.6.447
4. Stahl SS, Witkin GJ, Cantor M, Brown R. Gingival healing. II. Clinical and histologic repair sequences following gingivectomy. *J Periodontol.* 1968;39:109-118. PMID: 4171465 DOI: 10.1902/jop.1968.39.2.109
5. Afshar-Mohajer K, Stahl SS. The remodeling of human gingival tissues following gingivectomy. *J Periodontol.* 1977;48:136-139. PMID: 264962 DOI: 10.1902/jop.1977.48.3.136
6. Wennstrom J. Regeneration of gingiva following surgical excision. A clinical study. *J Clin Periodontol.* 1983;10:287-297. PMID: 6192155 DOI: 10.1111/j.1600-051x.1983.tb01277.x
7. Proestakis G, Soderholm G, Bratthall G, et al. Gingivectomy versus flap surgery: the effect of the treatment of infrabony defects. A clinical and radiographic study. *J Clin Periodontol.* 1992;19:497-508. PMID: 1430286 DOI: 10.1111/j.1600-051x.1992.tb01163.x
8. Rossmann J, Ingles E and Brown R. Multimodal treatment of drug-induced gingival hyperplasia in a kidney transplant patient. *Compend Cont Ed Dent.* 1994;15:1266-1274. PMID: 7987892
9. Pilloni A, Camargo PM, Carere M, Carranza Jr FA. Surgical treatment of cyclosporine A- and nifedipine-induced gingival enlargement: gingivectomy versus periodontal flap. *J Periodontol.* 1998;69:791-797. PMID: 9706857 DOI: 10.1902/jop.1998.69.7.791
10. Zitzmann NU, Berglundh T, Lindhe J. Inflammatory lesions in the gingiva following resective/non-resective periodontal therapy. *J Clin Periodontol.* 2005;32:139-146. PMID: 15691342 DOI: 10.1111/j.1600-051X.2005.00649.x

Electrosurgery gingivectomy

Kalkwarf KL, Krejci RF, Wentz FM, Edison AR. Epithelial and connective tissue healing following electrosurgical incision in human gingiva. *J Oral Maxillofac Surg* 1983;41:80-85. PMID: 6571885 DOI: 10.1016/0278-2391(83)90212-4

11. Surgical Techniques

11.1 Flap Curettage and ENAP

Questions to be answered in this session:

- What are various flap and curettage procedures?
 - What is ENAP?
 - How do tissues heal after flap and curettage procedures?
1. Frisch J, Jones R. Conservation of maxillary anterior esthetics. A modified surgical approach. *J Periodontol.* 1967;38:11-17. PMID: 5225805 DOI: 10.1902/jop.1967.38.1.11
 2. Ammons WF, Smith DH. Flap curettage: rationale, technique, and expectations. *Dent Clin N Am.* 1976;20:215-225. PMID: 1061690
 3. Yukna RA, Bowers GM, Lawrence JJ, Fedi PF Jr. A clinical study of healing in humans following the excisional new attachment procedure. *J Periodontol.* 1976;47:696-700. PMID: 1069122 DOI: 10.1902/jop.1976.47.12.696
 4. Yukna RA. A clinical and histologic study of healing following the excisional new attachment procedures in rhesus monkeys. *J Periodontol.* 1976;47:701-709. PMID: 825631 DOI: 10.1902/jop.1976.47.12.701
 5. Yukna RA. Longitudinal evaluation of the excisional new attachment procedure in humans. *J Periodontol.* 1978;49:142-144. PMID: 288901 DOI: 10.1902/jop.1978.49.3.142

11.2 Modified Widman Flap

Questions to be answered from this session:

- What is a modified widman flap?
- How do tissues heal after modified widman flap?

Clinical

1. Kirkland O. The suppurative periodontal pus pocket; its treatment by the modified flap operation. *JADA* 1931;18:1462-1470.
2. Ramfjord SP, Nissle RR. The modified Widman flap. *J Periodontol* 1974;45:601–607. PMID: 4529305 DOI: 10.1902/jop.1974.45.8.2.601
3. Smith BA, Echeverri M, Caffesse RG. Mucoperiosteal flaps with and without removal of the pocket epithelium. *J Periodontol* 1987;58:78-85. PMID: 3546671 DOI: 10.1902/jop.1987.58.2.78

Histological (Animal)

1. Caton J, Nyman S. Histometric evaluation of periodontal surgery. I. The modified Widman Flap procedure. *J Clin Periodontol* 1980;7:212-223. PMID: 6933162 DOI: 10.1111/j.1600-051x.1980.tb01964.x
2. Caffesse RG, Castelli WA, Nasjleti CE. Vascular response to modified Widman flap surgery in monkeys. *J Periodontol* 1981;52:1-7. PMID: 6162939 DOI: 10.1902/jop.1981.52.1.1

11.3 Apically Positioned Flap

Questions to be answered from this session:

- What is an apically positioned flap?
- What does repositioning the flap do after apically positioning the flap?
- Where is the position of the mucogingival junction after APF?

1. Nabers C. Repositioning the attached gingiva. *J Periodontol* 1954;25:38-39. DOI: 10.1902/jop.1954.25.1.38
2. Ariaudo A, Tyrrell H. Repositioning and increasing the zone of attached gingiva. *J Periodontol* 1957;28:106-110. DOI: 10.1902/jop.1999.70.9.1110
3. Friedman N. Mucogingival surgery: The apically repositioned flap. *J Periodontol* 1962;33:328-340. DOI: 10.1902/jop.1962.33.4.328
4. Donnenfeld W, et al. The apically positioned flap: A clinical study. *J Periodontol* 1964;35:381-387. DOI: 10.1902/JOP.1964.35.5.381
5. Tavtigan R. The height of the facial radicular alveolar crest following apically positioned flap. *J Periodontol* 1970;41:412-418. PMID: 5269975 DOI: 10.1902/jop.1970.41.7.412
6. Fagan F, Freeman E. Clinical comparison of the free gingival graft and the partial thickness apically positioned flap. *J Periodontol* 1974;45:3-8. PMID: 4588355 DOI: 10.1902/jop.1974.45.1.3
7. Holmes C, Strem B. Location of flap margin after suturing. *J Periodontol* 1976;47:674-675. PMID: 1068276 DOI: 10.1902/jop.1976.47.11.674
8. Lindhe J, Nyman S. Alterations of the position of the marginal soft tissue following periodontal surgery. *J Clin Periodontol* 1980;7:525-530. PMID: 6163795 DOI: 10.1111/j.1600-051x.1980.tb02159.x
9. Pippin D. Fate of pocket epithelium in an apically positioned flap. *J Clin Periodontol* 1990;17:385-391. PMID: 2398136 DOI: 10.1111/j.1600-051x.1990.tb00035.x
10. Jenkins W, et al. Formation of interdental soft tissue defects after surgical treatment of periodontitis. *J Periodontol* 1990;61:564-570. PMID: 2213466 DOI: 10.1902/jop.1990.61.9.564
11. Ainamo A, et al. Location of the mucogingival junction 18 years after apically repositioned flap surgery. *Clin Periodont* 1992;19:49-52. PMID: 1732309 DOI: 10.1111/j.1600-051x.1992.tb01148.x

11.4 Retromolar Procedures

Questions answered in this session:

- What is the rationale for distal wedge procedure?
- What are some common distal wedge designs?

1. Robinson R. The distal wedge operation. *Periodontics* 1966;4:256-264. PMID: 5223126
2. Braden R. Deep distal pockets adjacent to terminal teeth. *DCNA* 1969;13:161-168. PMID: 5249427
3. Sussman HI, Simring M. The distal wedge operation in periodontal therapy; a two-year evaluation. *J Oral Med* 1972;27:106-109. PMID: 4507660
4. Pollack RP. Modified distal wedge procedure. *J Periodontol* 1980;51:513-515. PMID: 6932505 DOI: 10.1902/jop.1980.51.9.513
5. Saadoun AP. Surgical management of the maxillary tuberosity area. *Compend Contin Educ Dent* 1984;5:34-40. PMID: 6586392

11.5 Osseous Surgery

Questions to be answered from this session:

- What is the rationale for osseous surgery?

- Are there different approaches to osseous surgery?
- How is the healing after osseous surgery?

Clinical studies

1. Schluger S. Osseous resection; a basic principle in periodontal surgery. *Oral Surg Oral Med Oral Pathol*. 1949 Mar;2(3):316-25. doi: 10.1016/0030-4220(49)90363-1. PMID: 18112168.
2. Friedman, N. Periodontal osseous surgery: Osteoplasty and osteoectomy. *J. Periodontol.* 1955;26:257-269. DOI: 10.1902/JOP.1955.26.4.257
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Histological (animal) studies

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11.6 Longitudinal Studies

Questions to be answered from this session:

What are the long-term outcomes for different periodontal procedures?

Michigan Studies

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Nebraska Studies

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Minnesota Study

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12. Crown-lengthening Surgery

12.1 Indications for crown-lengthening surgery

Questions to be answered from this section

- What is the relationship between restorative and periodontal health?
- Is there a specific dimension of periodontium to maintain health?

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12.2 Gingivectomy

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12.3 Functional crown lengthening surgery

Questions to be answered from this section:

- What is the surgical technique to lengthen the clinical tooth structure for restoration
 - What is the timeline for the healing after crown lengthening procedure
 - What is the dimensional change of supracrestal attachment after crown lengthening procedure
 - How does the wound heal after crown lengthening procedure in histologic evaluation?
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12.4 Excessive gingival display

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- Robbins JW. Differential diagnosis and treatment of excess gingival display. *Pract Periodontics Aesthet Dent.* 1999 Mar;11(2):265-72; quiz 273. PMID: 10321231.

12.5 Esthetic crown lengthening surgery

Questions to be answered from this section:

- How do we diagnose and plan treatment to enhance gingival aesthetics ?
- What is the surgical technique to lengthen the clinical tooth structure for restoration?
- What is patients' assessment of outcomes of crown lengthening procedure?

- Sonick M. Esthetic crown lengthening for maxillary anterior teeth. *Compend Contin Educ Dent.* 1997 Aug;18(8):807-12, 814-6, 818-9; quiz 820. PMID: 9533339.
- Reddy MS. Achieving gingival esthetics. *J Am Dent Assoc.* 2003 Mar;134(3):295-304; quiz 337-8. doi: 10.14219/jada.archive.2003.0158. PMID: 12699043.
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- Deas DE, Mackey SA, Sagun RS Jr, Hancock RH, Gruwell SF, Campbell CM. Crown lengthening in the maxillary anterior region: a 6-month prospective clinical study. *Int J Periodontics Restorative Dent.* 2014 May-Jun;34(3):365-73. doi: 10.11607/prd.1926. PMID: 24804287.
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12.6 Lip repositioning surgery

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- Jacobs PJ, Jacobs BP. Lip repositioning with reversible trial for the management of excessive gingival display: a case series. *Int J Periodontics Restorative Dent.* 2013 Mar-Apr;33(2):169-75. doi: 10.11607/prd.1483. PMID: 23484172.
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13. Furcation Management

13.1 Anatomy

Questions to be answered in this section:

- What is the furcation anatomy of molars?
- What are different furcation classification and management?

1. Goldman HM, et al. Management of the partial furcation involvement. *Periodontics.* 1968;6:197-206. PMID: 4879264
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13.2 Root Amputation & Hemisection: Rationale, Clinical Indications, & Prognosis

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Reviews:

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13.3 Tunneling: Rationale, Clinical Indications, & Prognosis

1. Hellden LB, Elliot A, Steffensen B, Steffensen JE. The prognosis of tunnel preparations in treatment of class III furcations. A follow-up study. *J Periodontol.* 1989 Apr;60(4):182-7. doi: 10.1902/jop.1989.60.4.182. PMID: 2724031.
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14. Periodontal Regeneration

Questions to be answered from this topic:

- What is the definition of periodontal regeneration?
- Describe osteogenesis, osteoinduction, osteoconduction, and bone fill.
- What are the objectives of osseous grafting?
- What are potential advantages and limitations of osseous grafting?
- What makes autogenous grafts the “gold standard”?
- Compare the different types of allografts currently used.
- What makes xenografts grafting materials unique?
- What are the most common types of alloplasts, and their indications?
- Describe the evidence on utilizing biologic agents in periodontal regeneration.
- What are the factors to consider when attempting periodontal regeneration in furcation defects?

14.1 Principles of Periodontal Regeneration: Epithelial Retardation & Guided Tissue Regeneration

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Reviews:

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14.2 Flap Designs & Suturing Techniques

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15. Periodontal Plastic Surgery

Questions to be answered from this topic:

- What are the potential etiologies for gingival recessions?
- How to make a diagnosis for gingival recessions?
- Is there a minimum amount of attached gingiva required to maintain gingival health?
- What is Miller's classification of soft tissue recession?
- What is Sullivan and Atkins classification of gingival recession?
- How much shrinkage can occur after placing the gingival graft on denuded bone and periosteum?
- What is the influence of root conditioning on root coverage outcomes?
- Why is "connective tissue graft" considered the gold standard for root coverage procedures?
- What is the currently available evidence of using allograft, xenograft or biologic agents for root coverage procedures?
- What is the classification and proposed treatments for non-carious cervical lesions?

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16. Wound healing

16.1 Wound healing: non-surgical therapy

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16.2 Wound healing: periodontal resective surgery

Questions to be answered from this topic:

- What happens to the osseous crest level after the resective surgical procedure?
 - What type of healing happens after osseous surgery in histologic evaluation for epithelial attachment?
 - What type of healing happens after osseous surgery in histologic evaluation for connective tissue attachment?
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16.3 Wound healing: periodontal regenerative surgery

Questions to be answered from this topic –

- Is there any difference in healing potential between cell types in periodontium?
 - What happens after the autogenous bone graft into the periodontal intrabony defects in histologic evaluation?
 - How does the wound heal after the autogenous bone graft was placed into the periodontal intrabony defects in histologic evaluation?
 - How does the wound heal after the allogeneic bone graft was placed into the periodontal intrabony defects in histologic evaluation?
 - How does the wound heal after the xenogeneic bone graft was placed into the periodontal intrabony defects in histologic evaluation?
 - How does the wound heal after a barrier membrane was placed in the periodontal intrabony defect in histologic evaluation?
 - How does the wound heal after enamel derivatives was placed into the periodontal intrabony defects in histologic evaluation?
 - How does the wound heal after platelet derived growth factor was placed into the periodontal intrabony defects in histologic evaluation?
 - How does the wound heal after a barrier membrane was placed in the supra-alveolar defect in histologic evaluation?
 - What is the effect of wound stability on the healing after a barrier membrane was placed in the supra-alveolar defect in histologic evaluation?
 - Does a type of barrier affect the wound healing after a barrier membrane was placed in the supra-alveolar defect in histologic evaluation?
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16.4 Wound healing: periodontal plastic surgery

Questions to be answered from this topic –

- How does the free gingival graft heal in overall histologic evaluation?
- How does the free gingival graft revascularize in histologic evaluation?
- Does a recipient site preparation affect the wound healing after the free gingival graft in histologic evaluation?
- Does a recipient site preparation affect the wound healing after the connective tissue graft in histologic evaluation?
- How does the wound heal after a barrier membrane was placed over the root surface to treat the gingival recession in histologic evaluation?
- How does the wound heal after a gingival graft was placed over the root surface to treat the gingival recession in histologic evaluation?
- How does the wound heal after a connective tissue graft was placed over the root surface to treat the gingival recession in histologic evaluation?
- How does the wound heal after platelet derived growth factor was placed over the root surface to treat the gingival recession in histologic evaluation?
- How does the wound heal after allogenic tissue graft was placed over the root surface to increase the soft tissue in histologic evaluation?
- How does the wound heal after xenogenic tissue graft was placed over the root surface to increase the soft tissue in histologic evaluation?

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Questions to be answered from this topic:

- Why is supportive periodontal therapy necessary?
 - What is the importance of patient compliance in treating periodontal diseases?
 - What is the prevalence of tooth loss during maintenance?
 - What are the results of when patients are not maintained?
 - What is the ideal maintenance frequency after periodontal treatment?
 - How can one manage patients who do not respond well to periodontal therapy?
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18. Current Concepts of Other Dental Disciplines

18.1 Periodontal-Restorative Considerations

Tissue-restorative interactions: subgingival margin, marginal ridge relationships, open contacts

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18.3 Periodontal-Orthodontic Considerations

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19. Principles of Implant Therapy: Examination, Diagnosis, and Treatment Planning

19. 1 Implant Tissue Interface & Wound Healing

Questions to be answered from this session:

- What is the peri-implant anatomy?
- Is the tissue interface around implant different than around teeth?
- What is the effect of implant position on tissue/bone level?
- What is osseointegration?
- How do dental implants heal with surrounding tissues?

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19.2 Peri-implant examination

Questions to be answered from this section:

- How do you compare periodontal and peri-implant probing depths?
- What is the ideal distance and bone height required around implants?
- What are the dimensions of peri-implant mucosa?
- What is the role of keratinized gingiva around implants?

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Questions to be answered from this section:

- How important is occlusion on implants?
- Does occlusion have any effect on peri-implant health?
- Does occlusion play any role on the treatment of peri-implant mucositis and/or peri-implantitis?

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19.4 Cement vs Screw-Retained Prosthesis

Questions to be answered from this section:

- Does cemented or screwed retained restorations have any impact on peri-implant mucositis/peri-implantitis?

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19.5 Implant Loading Time Protocols

Questions to be answered from this section:

- When can an implant be loaded?
- What is immediate loading, and when should it be used?
- What are the tissue responses to immediate loading?

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2. Cochran DL. The evidence for immediate loading of implants. *J Evid Based Dent Pract*. 2006;6(2):155-163.

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19.6 Implant-Abutment Connection & Platform Switching

Questions to be answered from this section:

- What are the tissue responses to the implant-abutment connection?
- What is platform switching, and how does it affect peri-implant hard and soft tissues?

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19.7 Implant-Supported Prosthetic Considerations

Questions to be answered from this section:

- What are some of the possible implant prosthetic complications?
- What are the long-term survival/success rates of implant-supported prostheses?
- What is the influence of the crown-to-implant ratio?

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19.9 Implant Designs (macro- and micro-designs)

Questions to be answered from this section:

- What are the implant surface modification methods?
- What is the goal of an implant surface modification method?
- How does the implant macro or micro-design affect its success/survival rates?
- Are some implant macro or micro-designs superior in certain clinical scenarios?

Surface modifications: additive vs. subtractive methods

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19.14 Submerged vs. non-submerged approach

Questions to be answered from this section:

- What are the differences in healing of peri-implant tissues between submerged and non-submerged unloaded implants?
- Does one-step (non-submerged) implant placement lead to a higher failure rate and/or a high probability of other complications as compared to two-step approach?

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19.15 Delayed vs. immediate vs. early placement

Questions to be answered towards the end of this section:

- What are the definitions of immediate, early, and delayed implant placement?
- What are the average soft and hard tissue alterations after immediate implant placement? What are the factors that could influence those alterations?
- What are the critical factors determining the timing of implant placement?
- Are these three implant placement protocols leading to similar long-term outcomes?

Immediate placement

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Early placement

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19.16 Implant esthetics

Questions to be answered towards the end of this section:

- What are the indices available to evaluate the esthetics of implant-supported single crowns and peri-implant soft tissue?
- What are the factors affecting implant esthetics?

Esthetic indices:

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Reviews:

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19.17 Management of completely edentulous patients

Questions to be answered towards the end of this section:

- What are the surgical and restorative options for fully edentulous patients seeking implant therapy?
- What are the long-term outcomes in terms of marginal bone loss and survivals of the implants supporting the full-arch prosthesis?
- What are the surgical considerations for the full-arch rehabilitation by implant therapy?
- How many implants are needed for full-arch fixed prostheses? Does the number of implants play a critical role?

1. Malo P, Rangert B, Nobre M. "All-on-Four" immediate-function concept with Branemark System implants for completely edentulous mandibles: a retrospective clinical study. *Clin Implant Dent Relat Res* 2003;5 Suppl 1:2-9.
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20. Implant Site Development

20.1 Implant Site Evaluation

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20.1 Alveolar Ridge Preservation

Questions to be answered from this topic:

- Describe the dimensional changes of the ridge following tooth extraction.
- Provide an overview of the histological changes in the healing extraction socket.
- How do dimensional changes differ in sites with socket preservation compared to unassisted socket healing?
- Are there superior materials to be used in alveolar ridge preservation?

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20.3 Guided Bone Regeneration

Questions to be answered from this topic:

- What are the principles needed to achieve a successful outcome in guided bone regeneration?
- What are some known complications of GBR procedures?
- What is the survival rate of implants in augmented ridges?

Classification of edentulous ridges:

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Horizontal and vertical ridge augmentation, barrier membranes; particulate vs block grafts: autogenous, allografts, xenografts, alloplasts, biologics, growth factors, or combination

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20.4 Sinus Augmentation

Questions to be answered from this topic:

- How do maxillary sinus anatomic considerations affect the outcome of sinus augmentation procedures?
- Provide an overview of materials and approaches utilized in lateral approach sinus augmentation.
- What is the rate of complications in sinus augmentation?

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20.5 Peri-implant Soft Tissue Evaluation & Augmentation

Questions to be answered from this topic:

- What is the role of the peri-implant mucosa in establishing implant health?
- What are some available clinical evidence for establishing a minimal width and/or thickness of the peri-implant tissues?
- What are the surgical modalities and materials described in the literature for peri-implant tissue phenotype modification?
- Are non-autogenous materials/approaches used in peri-implant tissue augmentation comparable to traditional autogenous grafts?

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21. Immediate implant placement and provisionalization

Questions to be answered from this topic:

- What factors are taken into consideration when deciding whether to place an implant via an immediate, early, or delayed approach?
- What are the success rates of anterior and molar immediate implants?
- How successful are immediate implants when compared to early and delayed implant placement?
- What is the ideal site morphology for immediate implant placement?
- Can immediate implants be placed in sites with infections/periapical pathologies?
- What are the average alterations in ridge dimensions following immediate implant placement?
- What factors affect hard tissue alterations following immediate implant placement?

- Do bone grafting or regenerative procedures at the time of immediate implant placement reduce changes in ridge dimensions?
- What are the esthetic outcomes and concerns related to immediate implants
- Do we need provisionalization of immediate implants for better outcomes?

21.1 Classification of implant placement timing

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23. Management of peri implant mucositis and peri-implantitis

Questions to be answered towards the end of this seminar

- Does non-surgical management help with management of peri implant mucositis and peri implantitis?
- What are the various tools used for non-surgical debridement and how do they compare with each other?
- How can an implant be decontaminated? How do these modes compare with respect to efficacy of decontamination?
- How can you classify the severity of the peri-implantitis?
- What is the most common form of defect morphology seen in peri-implantitis?
- What type of defects are amenable to resective surgery?
- What is the effect of implantoplasty?
- What type of defects are amenable to regenerative therapy?
- What is the success of implants in reimplantation sites?
- What is the long-term outcome of implants treated with various methods for peri-implantitis?

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Er,Cr,YSGG

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Nd:YAG

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24. *Implant Maintenance*

Questions to be answered from this topic:

- Why is maintenance therapy necessary?
- What is the importance of patient compliance in maintaining implants?
- What are the results of when patients are not maintained?
- What is the ideal maintenance frequency?
- How can one manage full-arch prosthesis?

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