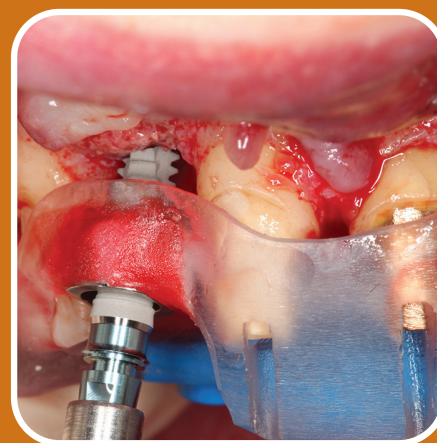


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Clinical Cases in Periodontics

Edited by Nadeem Karimbux

Second Edition



WILEY Blackwell

Clinical Cases in Periodontics

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Clinical Cases in Periodontics

SECOND EDITION

Edited by

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Tufts University School of Dental Medicine
Boston, MA, USA

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DEDICATION



The authors would like to dedicate this book to Dr. Ricardo Teles. Dr. Teles was an excellent periodontist, an inspiring teacher, and a gifted clinical scientist. In fact, he was a teacher, mentor, colleague, and friend to many of the contributors to this publication. His charisma, passion, brilliance, and enthusiasm were at the core of his excellence.

Ricardo loved teaching periodontology and considered the students his colleagues, just with less experience, and was genuinely happy with the success of his students and peers. He really wanted to make an impact in the field and ultimately improve the way we treat patients. And he wanted to do that by better understanding the biology of periodontal diseases and shaping the next generation of periodontists. We hope that this book bring us one step closer to his goals.

Flavia Teles

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PREFACE

A dental student at Tufts University School of Dental Medicine (TUSDM) recently asked me about why I chose a career in “academics.” I told the student that as I progressed through the early years of my education I was not only exposed to topics in medicine and dentistry (basic knowledge and clinical skills) but was also required to conduct a research project and obliged to present clinical cases to my fellow students. My research experiences honed skills that have served me throughout my career: the ability to ask questions (curiosity), the intellect to review the literature (interpreting the scientific evidence), and the background needed to apply research methods (quantitative and qualitative) to answer my questions. My early experiences in presenting cases to classmates and faculty allowed me the good fortune of teaching others and learning from others. It is these collective experiences that led to an academic career in clinical care, teaching and research.

As my career has progressed, that ability to balance all three aspects (the triple threat) is no longer viable in a world that is fast-paced and much more complex. As a Dean of TUSDM I find myself involved in much administration. However, it is efforts such as editor of the second edition of *Clinical Cases in Periodontology* that take me back to my roots: connecting with my fellow clinicians (faculty, colleagues, and residents), taking a problem-based approach to clinical cases, and using an evidence-based approach to answer the clinical questions posed by the clinical cases.

I thank my current and past faculty and residents for the care they provide to their patients and for allowing me to stay connected to my roots.

Nadeem Karimbux
Tufts University School of Dental Medicine

ABOUT THE COMPANION WEBSITE

The companion website for this book is at

www.wiley.com/go/karimbux/periodontics



The website contains –

- Videos from within the book as downloadable PowerPoint slides
- Figures from within the book as downloadable PowerPoint slides

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Case 1

Examination and Documentation

CASE STORY

A 44-year-old Caucasian female presented with chief concern “I have pain on my upper left molar, which has gradually increased. I would like to fix my gum diseases. I would like to receive dental implants to replace my missing teeth also.”

LEARNING GOALS AND OBJECTIVES

- The patient’s chief complaint
- Medical and dental history
- Soft tissue and gingival examination
- Periodontal charting
- Radiographic interpretations
- Periodontal diagnosis

Medical History

- ASA classification 1
- Vital signs: blood pressure 130/80 mmHg
- Medication: none
- Supplement: daily multivitamin
- Allergy: none

Dental History

- The patient brushed three times daily and flosses daily.
- The patient had received routine dental prophylaxis at her general dental practitioner’s office. Recently, the patient underwent extraction of her mandibular left first and second molars due to severe periodontal

disease, and she would like to replace them with dental implants.

- The patient denied any smoking habit and had never smoked.
- The patient’s father suffered from periodontal disease and ended up receiving complete maxillary and mandibular removable dentures.
- Patient was extremely motivated for dental treatment.

Soft Tissue and Gingival Examination

Extraoral examination did not reveal any significant findings. Intraorally, generalized gingival edema and erythema were noted (Figure 1.1.1), which were more pronounced on #3 buccal, #8 buccal, #8 palatal, interproximal papilla between #8 and #9, interproximal papilla between #9 and #10, buccal gingival margin and interproximal papillae in mandibular incisors; rolled buccal gingival margins were noted on #3 mesiobuccal and #8 mesiobuccal aspect.

Comprehensive Periodontal Examination

A comprehensive periodontal examination (Figure 1.1.2) revealed localized deep probing depths of 10–12 mm on tooth #3 mesial aspect with grade I mobility and grade II mesiopalatal furcation involvement. Tooth #14 exhibited localized deep probing depths of 7 mm on its distal aspect with grade II distopalatal furcation involvement. Teeth #2, #8, #10, and #15 also exhibited localized probing depths of 5 mm. Teeth #2 and #15 exhibited Class I mesiopalatal furcation involvement. Otherwise, the remaining dentitions exhibited generalized probing depths of 1–4 mm. There was generalized bleeding on probing. Furthermore, localized areas with gingival recession were noted in some posterior teeth.



Figure 1.1.1 Complete series of intraoral photographs.

CASE 1 EXAMINATION AND DOCUMENTATION

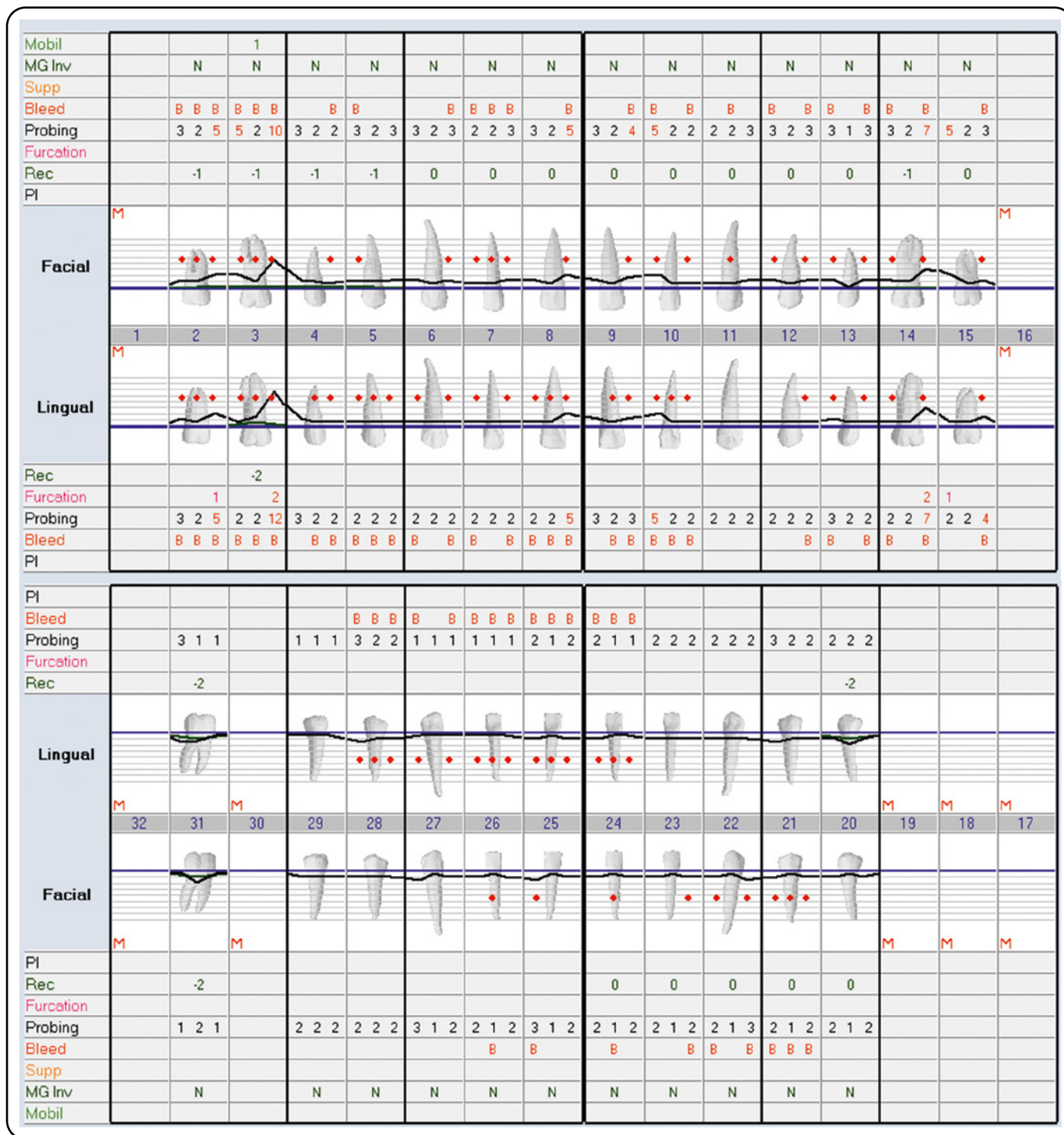


Figure 1.1.2 Complete periodontal charting.

Radiographic Examination

A full-mouth series of intraoral radiographs revealed generalized horizontal bone loss (Figure 1.1.3). There was localized moderate horizontal bone loss on teeth #2 and #15. Tooth #3 exhibited vertical bone loss on its mesial aspect while tooth #4 exhibited vertical bone loss on its distal aspect. An open interproximal contact was evident on #3 mesial aspect. Vertical ridge deficiency was noted on edentulous teeth #18, #19 and

#30, areas with slight radiolucency indicating possible horizontal ridge deficiency as well.

Diagnosis

According to the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions by the American Academy of Periodontology and the European Federation of Periodontology [1], the patient exhibited stage III grade C periodontitis (localized).

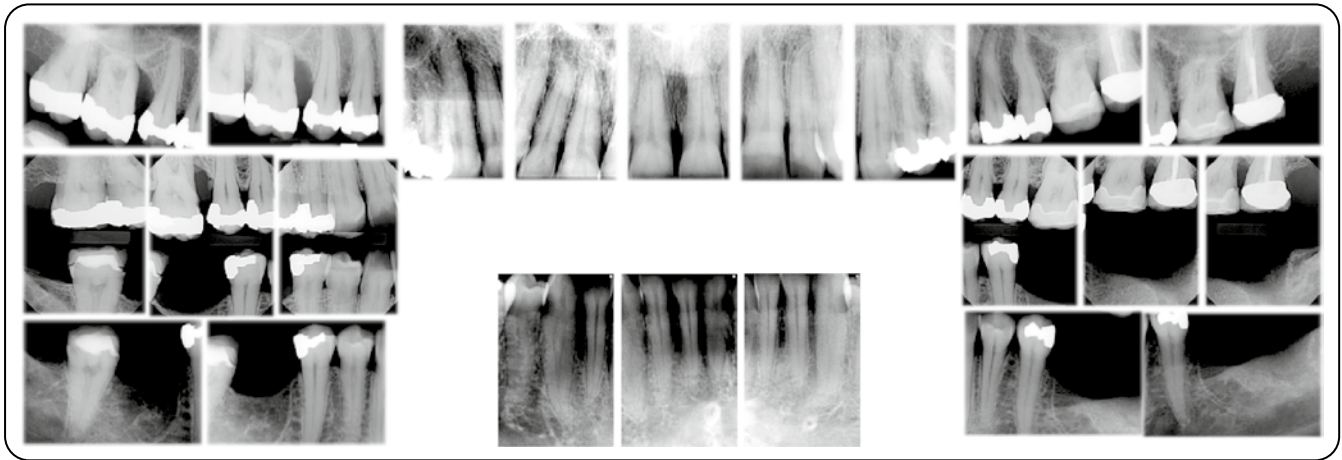


Figure 1.1.3 Complete series of intraoral radiographs.

Self-Study Questions

A. What is the significance of obtaining medical and dental history in treating a patient with periodontal conditions?

B. Aside from conventional parameters such as probing depth, recession, mobility and bleeding on probing, what are the additional parameters that should be obtained during a comprehensive periodontal evaluation?

C. How did we derive periodontal diagnosis for this case of interest?

D. What is the importance of conducting a comprehensive periodontal evaluation for a patient who needs a dental implant?

E. Aside from periodontal charting, are there any other clinical findings that clinicians should record during their routine comprehensive examinations?

Answers located at the end of the chapter.

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TAKE-HOME POINTS

A. The pathogenesis of periodontal diseases is multifactorial in nature, involving dental plaque, susceptible host, and environmental factors (Figure 1.1.4) [2]. Thus, during medical and dental history-taking, clinicians should obtain information related to these factors.

Susceptible Host

Patients with diabetes may be at greater risk for developing periodontal diseases compared to healthy counterparts, especially when the diabetic

condition is not under control (HbA_{1c} >7.0%) [1,3]. If necessary, medical consultation with the patient's physician should be considered. Furthermore, some patients may be susceptible to periodontal diseases genetically. Thus, under family history-taking, the patient should be asked about the periodontal conditions of his or her family members.

Environmental Factor

Cigarette smoking is a risk factor for developing periodontal diseases [1,4,5]. Under social history-

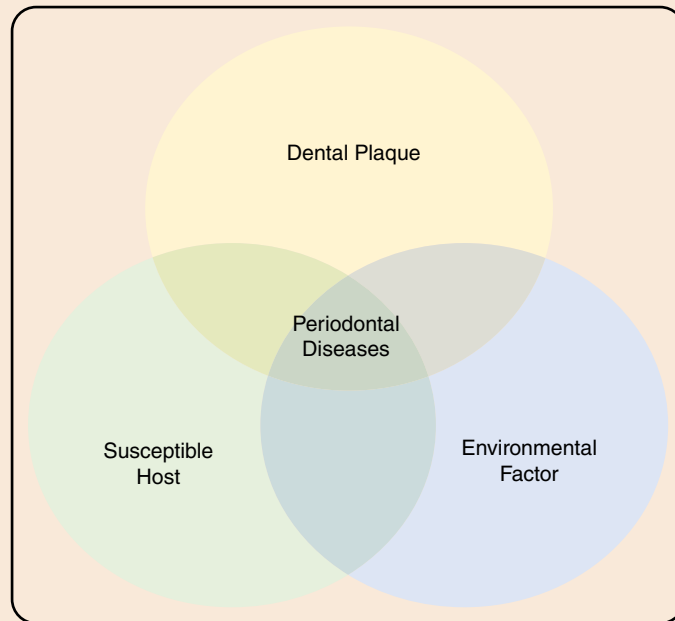


Figure 1.1.4 Pathogenesis of periodontal diseases. Source: modified from Kwon and Levin [2].

taking, the patient should be asked about their smoking habit (i.e. never smoked, past smoker, or active smoker). Smoking habit should be recorded as number of cigarettes consumed per day as well as number of years of active smoking.

Dental Plaque

Dental plaque is the etiologic factor for periodontal diseases [6]. Under dental history-taking, patients should be asked about their routine home oral care or dental plaque control. Their daily frequency of toothbrushing as well as interproximal cleaning (i.e. floss, interdental brush, interdental toothpick) should be recorded. During clinical evaluation, a plaque disclosing tablet may be used to objectively record the patient's plaque control as well.

Furthermore, patients should be asked about their previous periodontal treatment as well as its outcome, all of which should be recorded. If necessary, a consultation with the patient's previous dental or periodontal provider may be considered.

B.

Furcation Involvement

According to previous studies, furcated molars have a significantly greater chance to be lost than nonfurcated molars [7–9]. Thus clinicians should proactively evaluate molars (or any other multirooted



Figure 1.1.5 Nabers probe (Hu-Friedy, IL, USA).

teeth) for furcation involvement, which would ensure their treatment in a timely manner, improving their periodontal prognosis. For easier detection of furcation involvement, a Nabers probe (Figure 1.1.5) may be used instead of a regular periodontal probe.

Glickman’s Furcation Classification

Grade I	Incipient suprabony lesion. Radiographic changes are rarely found.
Grade II	Furcation bone loss with a horizontal component. Radiographs may not show bone loss in the furcation.
Grade III	A through-and-through lesion that is not clinically visible because it is filled. Radiographs show a radiolucency in the furcation.
Grade IV	A through-and-through lesion that is clinically visible. The soft tissue has receded apically. Radiolucency is clearly visible in the furcation area.

Mucogingival Deformity

In general, to maintain gingival health (Figure 1.1.6), the presence of at least 2 mm width of remaining keratinized gingiva is preferred [10]. Mucogingival deformity may be recorded as present for any tooth with less than 2 mm width of remaining keratinized gingiva.

Pathologic Migration

A tooth with a significant periodontal breakdown with severe bone loss may undergo pathologic migration (Figure 1.1.7) [11]. In the case presented above, tooth #3 showed evidence of pathologic migration resulting in supraeruption as well as acquired open interproximal contact between tooth #3 and tooth #4. Clinicians should also evaluate any possible acquired pre-mature occlusal contact in these teeth with pathologic migration, resulting in occlusal trauma or fremitus.

C. Stage [1] (Tables 1.1.1 and 1.1.2)

The greatest interdental clinical attachment loss of 14 mm (probing depth of 12 mm + gingival recession of 2 mm) was noted on tooth #3 mesiopalatal aspect, with bone loss extending beyond the apical third of the root. Tooth #3, as well as tooth #14 with interdental clinical attachment loss >5 mm, were assigned to stage III. Considering only two of 25 teeth were affected to the same severity, the extent and distribution descriptor “localized” was assigned. *Grade [1]*

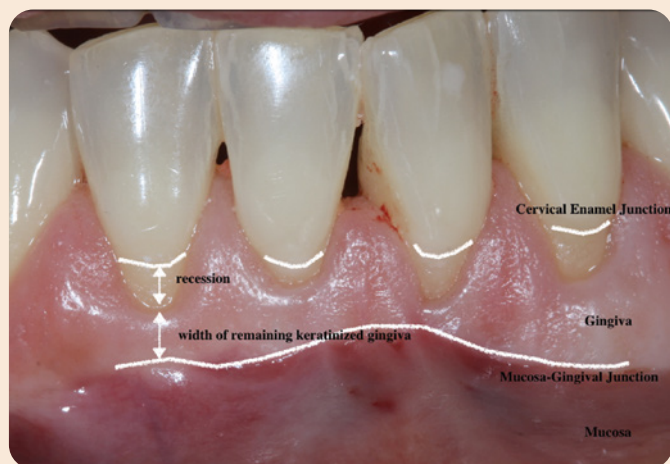


Figure 1.1.6 Mucogingival anatomy.



Figure 1.1.7 Resolution of pathologic migration after successful periodontal treatment, resulting in reduction in acquired diastema between the maxillary central incisors.

Table 1.1.1 Classification of periodontitis based on stages defined by severity (according to the level of interdental clinical attachment loss [CAL], radiographic bone loss and tooth loss), complexity and extent and distribution.

Periodontal stage		Stage I	Stage II	Stage III	Stage IV
Severity	Interdental CAL at site of greatest loss	1–2 mm	3–4 mm	≥5 mm	≥5 mm
	Radiographic bone loss	Coronal third (<15%)	Coronal third (15–33%)	Extending to middle or apical third of root	Extending to middle or apical third of root
	Tooth loss	No tooth loss due to periodontitis		Tooth loss due to periodontitis of ≤4 teeth	Tooth loss due to periodontitis of ≤5 teeth
Complexity	Local	Max. probing depth ≤4 mm Mostly horizontal bone loss	Max. probing depth ≤5 mm Mostly horizontal bone loss	In addition to stage II complexity: <ul style="list-style-type: none"> • Probing depth ≥6 mm • Vertical bone loss ≥3 mm • Furcation involvement Class II or III • Moderate ridge defect 	In addition to stage III complexity, need for complete rehabilitation due to: <ul style="list-style-type: none"> • Masticatory dysfunction • Secondary occlusal trauma (tooth mobility degree ≥2) • Severe ridge defect • Bite collapse, drifting, flaring • Less than 20 remaining teeth (10 opposing pairs)
	Extent and distribution	Add to stage as descriptor	For each stage, describe extent as localized (<30% of teeth involved), generalized, or molar/incisor pattern		

Source: Papapanou et al. [1].

Table 1.1.2 Classification of periodontitis based on grades that reflect biologic features of the disease including evidence of, or risk for, rapid progression, and anticipated treatment response, and systemic health.

Periodontitis grade		Grade A: slow rate of progression	Grade B: moderate rate of progression	Grade C: rapid rate of progression	
Primary criteria	Direct evidence of progression	Longitudinal data (radiographic bone loss or CAL)	Evidence of no loss over 5 years	<2 mm over 5 years	≥2 mm over 5 years
	Indirect evidence of progression	% bone loss/age	<0.25	0.25–1.0	≥1.0
		Case phenotype	Heavy biofilm deposits with low levels of destruction	Destruction commensurate with biofilm deposits	Destruction exceeds expectation given biofilm deposits; specific clinical patterns suggestive of periods of rapid progression and/or early-onset disease (e.g. molar/incisor pattern, lack of expected response to standard bacterial control therapies)
Grade modifiers	Risk factors	Smoking	Nonsmoker	Smoker <10 cigarettes/day	Smoker ≥10 cigarettes/day
		Diabetes	Normoglycemic/no diagnosis of diabetes	HbA _{1c} <7.0% in patients with diabetes	HbA _{1c} ≥7.0% in patients with diabetes

Source: Papapanou et al. [1].

As direct evidence of progression was not available, indirect evidence was used instead. The percentage bone loss/age was calculated as follows: 80% of alveolar bone loss on #3/44 years old = 1.82. Thus, grade C was assigned.

D. According to the latest 2017 World Workshop on the topic of peri-implantitis [12,13], there is strong evidence indicating a higher risk of peri-implantitis development in patients who have a history of periodontitis, poor oral plaque control, and lack of regular periodontal maintenance therapy after implant placement. Furthermore, patients with active periodontal diseases or deep periodontal pockets may be at greater risk of developing peri-implant diseases than periodontally healthy patients [14,15]. Thus, prior to proceeding with dental implant therapy, clinicians should carefully examine the periodontal conditions carefully and ensure that the patient does not have any active periodontal diseases. Oral hygiene habits need to be developed and meticulous home care abilities should be achieved prior to dental implant planning [16].

E. Clinical signs of occlusal trauma are often overlooked by clinicians; however, the following findings can provide valuable diagnostic information and help formulate the proper treatment plan for patients. According to the 2017 World Workshop on Classification of Periodontal and Peri-Implant Diseases and Conditions on the topic of occlusal trauma [17], the following list of clinical/radiographic indicators could help identify occlusal trauma: fremitus, progression of mobility, occlusal discrepancies, wear facets, tooth migration, fractured tooth, thermal sensitivity, discomfort/pain on chewing, widening PDL space, root resorption, and cemental tear (Figure 1.1.8). It is important to understand that occlusal trauma by itself does not initiate periodontitis; however, there is evidence suggesting that it alters progression of the disease when combined with dental plaque [18]. It is also important to perform proper occlusal analysis when performing

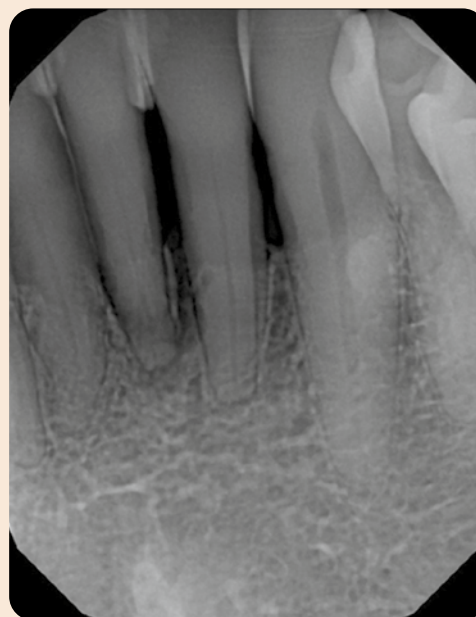


Figure 1.1.8 Cemental tear on tooth #24 resulting in localized alveolar bone loss and increase in mobility. Secondary occlusal trauma was noted during clinical evaluation.

regenerative periodontal surgery, as there evidence to support the view that tooth mobility plays a role in the regenerative outcome [19].

Edentulous alveolar ridge width/height should be recorded during the initial comprehensive examination [20]. This would ensure proper execution of dental implant therapy (implant size selection, depth/angulation of implant fixture, distance between adjacent tooth and implant, prosthetic emergence profile, screw vs. cement retained prosthesis and prosthetic occlusal form).

Esthetic plastic periodontal therapy is also a component of periodontal specialty; therefore, proper documentation of the patient's smile line (low, average, high) and gingival margin harmony plays a crucial role in treatment planning. When a patient presents with high smile line, it is important to determine the main causative reason (altered passive eruption, vertical maxillary excess, hypermobile lip or combination) [21,22].