

Comprehensive Assessment, Diagnosis and Treatment Planning of Severe Periodontal Disease: A Clinical Case Report

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Abstract: *This paper attempts to describe the clinical and radiographic diagnostic features and the current treatment options along with a suggested protocol for comprehensive management of severe periodontal disease with case report and a brief review. In this report, periodontal treatment of a 56-year-old female patient with generalized severe chronic periodontitis is presented. The long-term success of the treatment of the complex cases with severe chronic periodontitis depends significantly upon the proper control of the periodontal infection and the achievement of a stable periodontal status. In this case apart from non-surgical approach, a surgical approach is necessary for the treatment plan for regenerating the lost periodontal tissues as there is advanced attachment loss.*

Keywords: severe periodontitis, hopeless teeth, alveolar bone loss, attachment loss

1. Introduction

Periodontitis is a disease characterized by progressive destruction of the periodontium which is caused by relatively small group of microorganisms inhabiting the subgingival biofilm⁽¹⁾. The goal of the treatment is to create proper oral environment which hampers the further colonization of periodontal pathogens. The consensus opinion is that the mechanical cleaning of the root surfaces (scaling and root planning) combined with meticulous oral hygiene is the proper treatment of the periodontitis.⁽²⁾ However, in advanced cases the progression of the disease could lead to different problems including gingival recessions, insufficiency of attached gingiva, tooth mobility and tooth loss which require complex treatment.^(3,4)

History of presenting complaints

A 56 year old female came with the chief complaint of pain and mobility in the lower front teeth which started two months ago. She reports a loose tooth, bad breath, and bleeding gingivae since long time. Her last visit was several years ago. She also complains that eating has become more difficult or uncomfortable. The pain was dull in character, and intermittent. The patient informed that years before she used to have gingival bleeding when brushing or eating. She feels now her teeth have become loose and it is worsening day by day. She would prefer to have them extracted rather than continuing with existing state. Usually painless but occasionally pain is present and also sensitive to cold, heat or both in some of her upper teeth.

Previous medical history

- No significant past medical history.

Previous dental history

- Previous visit to dentist were only for relief of pain.
- Patient has an improper and vigorous brushing technique.
- No dental phobia or anxiety.

Social history

- She works long hours and admits to having very stressful periods of work activity
- The patient is a heavy smoker for about 10 years and would smoke about 6 to 8 cigarettes per day.
- She likes sweets and ice creams and takes tea with sugar and milk 5 – 6 times a day.

Dental hygiene and oral care

- She likes sweets and ice creams.
- Patient has vigorous brushing techniques.

2. Examination & Records

2.1 Extra-oral

TMJ examination TMJ – Even opening with no clicks
Full and wide range of jaw movements
No other skin swellings
No facial asymmetry
No deviation of the mandible on opening and closing
No extra-oral lesions on face neck or lips
No lymphadenopathy
No tenderness to palpation around TMJ
No discomfort from the muscles of mastication
The patient has a low to average smile line at her widest smile.

2.2 Intra oral

Swellings or gland enlargement: - Salivary function – good.
Able to elicit saliva from both parotid and both submandibular ducts
Saliva of good quantity and quality.

Pocket Charting

BPE score:

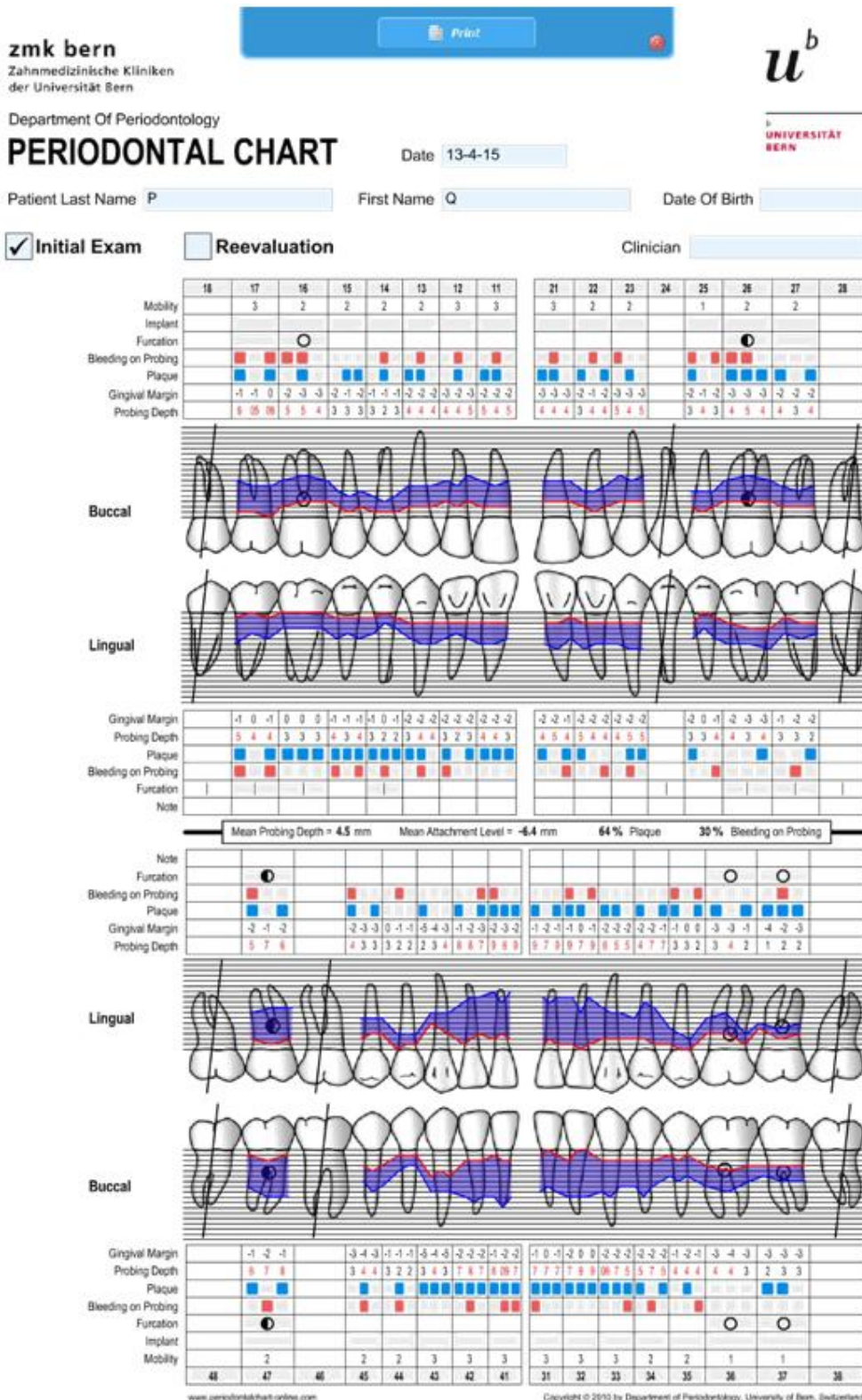
4	4	4
4	4	4

Teeth present

Missing teeth:-18,24,28,38,46,48
 Unerupted teeth: None
 Existing restorations: None
 Existing prostheses: None
 Mobility: in almost all the teeth
 Tooth surface loss/tooth wear: abrasion 13, 14,15,16,17, 23, 24,25,26,27.
 Which is more severe in the upper dentition.

Occlusion

Class I skeletal base with class I canine relationship. Missing lower right 1st molars and upper left fist premolar Anterior edge to edge relationship and cross bite 12 and 42
 Supraerupted:-21, 16, 26
 Tooth 12 is tilted palatally out of the arch
 Lateral excursions –In group function.
 Dento alveolar compensation 32 to 42
 Secondary occlusal trauma.



The key findings from the periodontal charting were:

- Pockets of 6mm and over in most of the teeth
- Furcation involvement in 16,26,2,36,37,47
- Recession is generalized
- The plaque score was high at 64%, -most plaque was on the lingual surfaces of lower anterior region
- The bleeding score was 30%, with most bleeding areas located at interproximal sites.
- Pathological mobility was found in almost all the teeth.



Abrasion: biomechanical frictional processes.

These lesions are provoked by tooth brushing.



Patient's smile



Right Buccal view



Anterior View teeth in occlusion



Left buccal view



Anterior View teeth apart



Maxillary occlusal view



Mandibular occlusal view

Sensibility tests: - sensibility test with ethyl chloride was done

These were undertaken for all affected teeth i.e.: 13, 14,15,16,17, 23, 24,25,26,27 All of these teeth provided a delayed but positive response. Loss of vitality is often seen amongst teeth which display signs of severe wear. It is important to establish the health status of the dental pulp prior to embarking upon any complex prosthodontic rehabilitation.

Radiograph



Generalized chronic periodontitis in a 55-year-old female. There is generalized recession, plaque, calculus. The radiograph shows generalized advanced bone loss which is mostly horizontal. Furcation involvement in all the molars except 17.

Full arch Analysis

Maxillary arch:

- 17:- No existing restoration and no caries detected Maximum probing depth- 7. Grade 3 mobility.60% HBL – Poor Prognosis
 16:- No existing restoration and no caries detected supraeruption, furcation involvement, Grade 2 mobility. 60% HBL- poor prognosis
 15:- No existing restoration and no caries detected maximum probing depth- 5, 20%HBL, grade 2 mobility- guarded prognosis
 14:- No existing restoration and no caries detected maximum probing depth 3, 20% HBL, grade 2 mobility-fair prognosis

13:- No existing restoration and no caries detected 20% HBL, maximum probing depth 4, grade 2 mobility-guarded prognosis

12:- No existing restoration and no caries detected 75%HBL, maximum probing depth5, grade 3 mobility- poor prognosis

11:- No existing restoration and no caries detected 75% HBL, maximum probing depth5, grade 3 mobility- poor prognosis

21:- No existing restoration and no caries detected 50%HBL, overerupted and interferes with occlusion maximum probing depth 5, grade 3 mobility- poor prognosis

22:- No existing restoration and no caries detected 50%HBL, overerupted, maximum probing depth 5, grade 2 mobility- guarded prognosis

23:- No existing restoration and no caries detected 60%HBL, overerupted, maximum probing depth 5, grade 2 mobility- guarded prognosis

25:- No existing restoration and no caries detected 30% HBL, maximum probing depth4, grade 1 mobility- good prognosis

26:- No existing restoration and no caries detected FURCATION 50% HBL, maximum probing depth5, mobility grade 2- guarded prognosis

27:- No existing restoration and distal caries, FURCATION 50% HBL, maximum probing depth 4- , grade 2 mobility – poor prognosis

Mandibular Arch

31:- No existing restoration and no caries detected 80% HBL maximum probing depth 9, grade 3 mobility- poor prognosis

32:- No existing restoration and no caries detected 80% HBL maximum probing depth 9, grade 3 mobility- poor prognosis

33:- No existing restoration and no caries detected 60% HBL maximum probing depth 7, grade 3 mobility- poor prognosis

34:- No existing restoration and no caries detected 40% HBL maximum probing depth 5, grade 2 mobility- poor prognosis

35:- No existing restoration and no caries detected 15% HBL, maximum probing depth 5, grade 2 mobility- guarded prognosis

36:- Furcation involvement 25% HBL, maximum probing depth 4, grade 1 mobility- guarded prognosis

37:-No existing restoration and no caries detected, furcation involvement 30%HBL, maximum probing depth 41:- No existing restoration and no caries detected 80% HBL, maximum probing depth -9, grade 3 mobility- poor prognosis

42:- No existing restoration and no caries detected 80% HBL, maximum probing depth- 8, grade 3 mobility- poor prognosis

43:- No existing restoration and no caries detected 60%HBL, maximum probing depth- 4, grade 3 mobility- poor prognosis

44:- No existing restoration and no caries detected 25%HBL, maximum probing depth-3, grade 2 mobility- fair prognosis

45:- No existing restoration and no caries detected 30%HBL, maximum probing depth 4, grade 2 mobility- fair prognosis

47:- No existing restoration and no caries detected Furcation involvement. 40% VBL, maximum probing depth 8, mobility grade 2- poor prognosis

3. Diagnosis

Type IV (severe) Periodontal Disease (ADA code 4800)

Based on the patient's symptoms, clinically and radiographically: - Generalized chronic severe periodontitis in a 55-year-old female. The radiograph shows generalized advanced bone loss which is mostly horizontal.

The diagnosis was described as chronic as loss of attachment has occurred gradually over a period of time, Severe- as 5mm or greater of attachment loss and generalized as more than 30% of sites were affected. Major loss of alveolar bone support usually accompanied by an increase in tooth mobility with possible furcation involvement. Probing depth are generalized 6mm and above.

Tooth Surface Loss.

Secondary occlusal trauma.

Dento alveolar compensation 32 to 42

Local risk factors

Smoking: - The most important known risk factor for this case is cigarette smoking. She is long term heavy smoker. Many studies have shown that persistent smoking leads to greater tooth loss and reduced response to periodontal therapy.

Other risk factors were

- Inadequate plaque control
- Poor compliance to dental treatment in the past
- Poor oral hygiene with improper technique of brushing
- Stress
- High periodontal disease risk

Therapeutic Goals

The primary goal is elimination of gingival inflammation and correction of the conditions that cause and perpetuate it. This includes not only elimination of root irritants but also pocket eradication and reduction, establishment of gingival contours and mucogingival relationships conducive to preservation of periodontal health, restoration of carious areas and correction of existing restorations. The goals of periodontal therapy are to alter or eliminate the microbial etiology and contributing risk factors for periodontitis, thereby arresting the progression of disease and preserving the dentition in a state of health, comfort, and function with appropriate esthetics; and to prevent the recurrence of periodontitis.

Patient discussion

The disease process was explained to the patient in detail, but at a level that was suitable⁽⁵⁾. The importance of risk factors like smoking, stress was explained and about the importance of oral hygiene. The causes of periodontal disease were discussed, and the patient was warned regarding the risks should periodontal disease progress (further loss of attachment, tooth mobility and ultimately tooth loss). The importance regarding the harmful effects of improper brushing techniques were explained to the patient. Patient was also made understand that their role in managing their periodontitis is fundamental to the success of treatment. It was made very clear to the patient that unless this first stage of treatment was successful and that she responds well to treatment, more advanced periodontal and restorative treatment options would be unsuccessful. If patients can experience improvements in their gingival health as a result of their own actions, this can be a very powerful symbol which will help them develop self-efficacy⁽⁶⁾. Patient was also advised to consult a periodontist for further treatment.

Concrete plans were made with patients for how they will manage their condition, particularly in respect to plaque control. We need to establish a time of day when it will be convenient for the patient to spend the required time performing oral hygiene techniques. It doesn't necessarily need to be just before bed, but ideally it should be at the same time every day, so that it becomes a routine.

Risk factors

Smoking has multiple negative impacts on aspects of immune functioning and inflammation, leading to increased periodontal tissue destruction, and more limited outcomes following periodontal treatment compared to non-smokers⁽⁷⁾. Given the harmful effects of smoking on the periodontal tissues, we should feel confident in asking questions about smoking status, and we can make things easier by using non-threatening forms of words such as 'I wouldn't be doing my job properly if I didn't ask you about whether you are still smoking'⁽⁸⁾. Informing patients of the consequences of tobacco use is an ethical, medical and legal obligation.⁽⁹⁾

The effect of plaque on the progression of periodontal disease was explained.⁽¹⁰⁾ The patient was shown pictures in a flipchart of the effect of plaque accumulation on the gingival tissues causing gingival inflammation

Stress: -Patient was explained about the consequences of stress and how it effects the periodontal health. Stress level were discussed. Stress affects the immune system, which fights against the bacteria that causes periodontal disease, making a person more prone to gum infection." Patients with inadequate stress behaviour strategies are at greater risk for severe periodontal disease⁽¹¹⁾ Stress is associated with poor oral hygiene, increased glucocorticoid secretion that can depress immune function, increased insulin resistance, and potentially increased risk of periodontitis⁽¹²⁾

Patient Expectations and Assessment of Compliance

The patient's past poor compliance with dental treatment was discussed. she accepted that a significant amount of

destruction has been caused in the past, mainly through his own lack of motivation and now felt ready to address the causes. Patient was advised success closely dependent upon compliance with Oral hygiene and enrolment on long-term maintenance program. Patient seemed to be motivated about taking care of her oral hygiene and quit smoking.

The chronic nature of periodontal disease was discussed and the patient understood the requirement for long term compliance (oral hygiene/smoking) and maintenance treatment/review for life.

Teeth with Poor Prognosis

The teeth with a poor prognosis were discussed i.e.: 17, 16,43,12,11,21,31,32,33,34,41,42. These teeth were identified in a mirror and using the patient's radiographs to explain the reasons for their poor prognosis were outlined to the patient – namely the extent of the attachment loss already, and the mobility. The patient was warned that these areas may act as a reservoir for bacteria to reside – potentially re-infecting other sites.

Treatment options

After the diagnosis and prognosis was established, the treatment was planned. The treatment plan was explained and discussed to the patient. It included all procedures required for the establishment and maintenance of oral health. The patient's treatment options were outlined, including a discussion on what the treatment would involve, the risks/benefits, and long-term success.

Option 1

Do nothing

Explained that if periodontal disease is not addressed, there is a high likelihood that it will progress further, resulting in further loss of attachment, mobility and ultimately tooth loss. Therefore this is not a viable option. Explaining that doing nothing or holding onto hopelessly diseased teeth as long as possible is inadvisable.

Option 2

Cause-related therapy.

Oral hygiene instruction to optimize patients own plaque control regime. Instruction, reinforcement, and evaluation of the patient's plaque control should be performed. Proper tooth brushing technique i.e.: modified bass technique

- Smoking cessation.
- Non-surgical Management – sub-gingival scaling and root surface instrumentation.
- Discussion about the extraction of hopeless teeth i.e.: 11, 12,21,22,31,32,41,42. Explained that due to extent of attachment loss and mobility, the teeth has to be extracted.

Surgical phase Regenerative therapy

- Flap surgery

- Bone replacement grafts;
- Guided tissue regeneration;
- Combined regenerative techniques

Restorative Considerations

In addition to the periodontal treatment, the restorative considerations were discussed. The tooth surface loss due to improper brushing as the patient reports vigorous brushing

Was discussed and the reason for her sensitivity to cold and hot. The option for composite restoration in 13 to 17, 23 to 27 was given.

Restoration with RPD/FPD:

In this case the anterior bone loss has been severe due to the periodontal disease and there is ridge defect, so a partial RPD should be considered, since the FPD generally replaces only the missing tooth structure and not the supporting tissue.

Treatment Plan

The following treatment plan was agreed:

- 1) Prevention
 - Individually tailored oral hygiene regime
 - Smoking cessation:- motivation performed to get patient to stop smoking - Given oral hygiene instruction.
- 2) Non-surgical Management
 - Instruction, reinforcement, and evaluation of the patient's plaque control should be performed.
 - Supra- and subgingival scaling and root planning should be performed to remove microbial plaque and calculus.
 - Extaction of hopeless teeth.
- 3) Restorative treatment
 - Composite restorations 13, 14,15,16,17, 23, 24,25,26,27.
 - Treatment partial denture followed by cast partial denture 11,12,21,22,31,32,33,41,42,43,46
 - Splinting 16,17,26,27, 33,34,35,36,37,43,44,45,47
- 4) Surgical phase Regenerative therapy:
 - Flap surgery
 - Bone replacement grafts;
 - Guided tissue regeneration
- 5) Maintenance therapy

4. Sequence of Treatment

Initial Inspection Appointment

At the inspection appointment, a full history, extra-oral, intra-oral soft/hard tissue assessment and OPG was taken

Further Diagnosis Appointment

At the further diagnosis appointment patient's periodontal indices, including periodontal pocket depths, recession, bleeding and plaque scores were. An OPG was taken and it

was at this appointment that a periodontal diagnosis was made and the above discussions and treatment planning options were discussed with the patient in detail.

- Instruction in oral hygiene were given and explained thoroughly. To create a “dynamic dialogue”, specific skills in communication were required and therefore methods of MI were included. MI is characterized by reflective listening and is used in an attempt to understand the meaning of statements. Initiation and analysis of knowledge, expectations, and motivation
- Initially, an interview with open-ended questions ascertained the patient's knowledge of periodontal disease, self-care habits, and attitude towards oral hygiene, as well as outcome expectations and experiences from earlier treatment
- Disclosing solution was used to illustrate any current oral biofilm and to initiate a discussion related to oral hygiene aids that might support the patient's oral health goal. The patient's motivation to use various oral hygiene aids was explored
- Instruction sessions on “what to do” and “how to do it” were performed by the wash basin in front of a mirror to make the circumstances as near to a home routine as possible
- The choice of toothbrush and toothpaste can be enormous factors in influencing a patient's oral health. Choosing the right toothbrush and toothpaste can help halt tooth wear and symptoms for the patients.
- Advice to stop using abrasive tooth brushes and whitening paste Advise on brushing teeth gently and avoid sawing motion. Recommending the use of brushes with small heads and soft bristles & explaining her modified bass technique and that too not more than 2 minutes. Using of floss & interdental brushes.
- At the end of session, the patient's self-efficacy and readiness to change an oral hygiene habit was explored through a direct question. Subsequently, the oral hygiene procedures, how, when, and where to use the desired oral hygiene aid or aids, and which area should be given particular attention to until the next session were discussed and agreed upon. The action plan for oral self-care to the next session was formulated in writing. Patients were encouraged to start using the oral hygiene aid they deemed to have the best chance of being successful in reaching the intermediate goal.
- The patient was informed that relapses are common during behavioural change Strategies for maintaining already achieved goals for oral hygiene were discussed. Specific risk situations for inter-dental cleaning relapse were identified and problem-solving strategies were discussed. The discussions focused on situations in which oral hygiene was facilitated and how to find solutions to the problems the patient encountered
- Scaling and root surface debridement was done. Non-surgical root surface debridement was integrated during the initial dental hygiene treatment mainly performed with combination with hand instruments LM® Gracys curette and ultrasonic.

Extraction of hopeless teeth was also done in this phase. Extraction of the teeth 31, 32, 41 and 42. The treatment was

done under local anaesthetic (1.8ml articaine 4% with 1:200000 adrenaline. Debridement of cavity was done thoroughly. The socket was carefully examined for bony fragments, pieces of roots into the socket. The diseased interradicular bone was removed to promote healing. Gelatamp" colloidal silver gelatine sponge was implanted into the socket. The buccal and lingual plates were firmly pressed between thumb and index finger. The wound was covered with gauze as a pressure pack for obtaining a good clot. Patient was given post extraction instructions. Patient was not willing for pictures after extraction.

- Temporary prosthetic replacements with removable immediate denture.

Re-evaluation

The patient is due to attend her first post-treatment review. At this appointment a full periodontal charting will be completed to assess the healed areas and persistent areas of disease. A bleeding index will be taken to assess absence of bleeding (a strong indicator of absence of disease) and a plaque index will be taken to ensure OH compliance is maintained.

Additional (corrective) therapy

- Extraction of the teeth that have poor prognosis
- Periodontal surgery
- Regenerative therapy:
- Flap surgery
- Bone replacement grafts
- Guided tissue regeneration;
- Combined regenerative techniques

Supportive (or maintenance) therapy

- A detailed history in particular with regards to established risk factors for periodontitis and possibilities for controlling them
- A thorough periodontal examination including assessment of oral hygiene,
- Re-motivation and re-instruction when necessary
- Supragingival scaling and polishing; subgingival scaling under local anesthesia in areas with persistent pockets (5 mm or more) which have bled upon probing

The suggested recall interval mainly depend on the overall risk, in this case patients having a high risks will be seen after 3 months. In a few cases, patients may continue to present with periodontal problems in spite of practicing good oral hygiene and without any obvious local causes. In such cases, bacteriological sampling from involved sites, identification of possible 26 pathogens and antibiotic therapy may be indicated.

The importance of periodontal maintenance care is clear from studies which show that patients who receive appropriate maintenance lose very few teeth⁽¹³⁾

Prognosis

The long term success of the treatment of the complex cases with severe chronic periodontitis depends significantly upon the proper control of the periodontal infection and the achieving of a stable periodontal status. These are the major prerequisites for successful further implant and prosthetic rehabilitation⁽¹⁴⁾. In this patient with more severe disease, as evidenced by furcation involvements and increasing mobility or if the patient is noncompliant with oral hygiene practices, the prognosis is poor. Studies on the survival characteristics of periodontally involved teeth have indicated that the combination of severe alveolar bone destruction and increased mobility in teeth with furcation disease is associated with a poor prognosis^(15,16,17)

5. Summary

A 55 year old woman was diagnosed with chronic generalized severe periodontitis with bone destruction and mobility. Mobility was seen in almost all the teeth. Studies suggest that tooth mobility may be associated with adverse effects on the periodontium and affect the response to therapy with respect to gaining clinical attachment^(18,19). With regards to treatment, occlusal therapy aids in reducing tooth mobility and gaining some bone lost due to traumatic occlusal forces. Once periodontal health is established, occlusal therapy can be used to reduce mobility, to regain bone lost owing to traumatic occlusal forces, and to treat a variety of clinical problems related to occlusal instability and restorative needs⁽²⁰⁾. So splinting was suggested in this case to reduce mobility and regain bone loss.

During her appointment, oral hygiene instruction, smoking cessation advice, and non-surgical management (sub-gingival scaling and RSI) were completed. At her 2nd visit the patient's motivation has been deemed to be good and the patient has reported her smoking cessation attempt is going well so far.

Over the long-term, if compliance is poor, there is a high risk of disease progression and the prognosis for the dentition is guarded, particularly for 15, 13, 22, 23, 26, 27, 35, 36, 47 and poor for 17, 16, 43, 12, 11, 21, 31, 32, 33, 34, 41, 42. In this scenario it is likely the patient will require extraction of the worst affected teeth and palliative periodontal treatment to attempt to slow the progression of disease. If the patient's compliance with Oral hygiene, smoking cessation and attendance for review can be maintained and with non-surgical and surgical management then the long-term prognosis for the majority of the dentition is fair.. Her home care is key to the maintenance of health and this has been emphasised to the patient. In this case apart from non-surgical approach, a surgical approach is necessary for the treatment plan for regenerating the lost periodontal tissues as there is advanced attachment loss.

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