

Prognosis of Periodontal Disease-A Dilemma

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Abstract

Prognosis is a statistical measure of the likely outcome for an individual who undergoes periodontal treatment. Determining prognosis at an early stage before treatment planning would help the clinician to render the periodontal treatment in confidence. The prognosis is determined by assessing the factors which could make the outcome of rendered treatment favorable as well as the factors which can negatively affect the outcome. Therefore, it is crucial for the clinician to judge the prognosis with his knowledge, expertise and patient's compliance. This review outlines all the factors which could possibly affect the prognosis and the clinical application of the same.

Keywords: Periodontal Disease; Prognosis; Periodontal Treatment; Risk factors.

Introduction

Periodontics is one of the areas of dentistry that is especially directed to the total-mouth concept, which means that, success or failure is not measured on a tooth-by-tooth basis, such as is the case in operative dentistry. The prime objective of therapy is to maintain the mouth in health throughout the life of the individual. Prognosis is defined as a prediction of the probable course, duration and outcome of a disease based on a general knowledge of the pathogenesis of the disease and the presence of risk factors for the disease.⁽¹⁾ It is a statistical measure of the likely outcome for an individual who undergoes treatment. Prognosis is determined before the treatment plan after the diagnosis of the condition is made. The determinants of prognosis include the nature of disease/condition, severity of the disease, the type of treatment it requires (influenced by clinician's expertise and

it). Prognosis can be classified into: Overall prognosis (dentition as a whole) and Individual tooth prognosis (more specific, and determined after the overall prognosis and is affected by it).⁽²⁾

Factors Affecting Overall Prognosis: The factors affecting overall prognosis include Type of periodontitis, Age, Systemic background, Malocclusion, Assessment of periodontal status and prosthetic possibilities, Plaque control, Smoking, Cooperation of the patient, Individual tooth prognosis, Genetic factors and Stress

1. Type of Periodontitis:

- i. **Slowly progressing periodontitis:** Onset is in the 3rd and 4th decade and progresses slowly. It responds to conventional treatment if not severe. Prognosis is directly related to severity of inflammation and height of remaining bone.
- ii. **Rapidly progressing periodontitis:** It occurs in second decade and exhibit rapid bone loss. Either slight inflammation not suggestive of underlying osseous defect or extensive inflammatory reaction may be present. They have a hopeless prognosis, however some cases respond to conventional therapy and antibiotics.
- iii. **Refractory periodontitis:** Patients are resistant to treatment due to impaired defense

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mechanism, resistant bacteria, untreatable morphologic problems or combination of these factors.

- iv. **Prepubertal periodontitis:** This type of periodontitis is associated with systemic disease in children, most cases prognosis is poor.
- v. **Juvenile periodontitis:** It starts at puberty, limited initially to 1st molars and incisors. It is associated with specific flora; patient may have leukocyte defect. Prognosis is poor, but administration of systemic tetracycline in conjugation with surgical pocket therapy has good results.⁽³⁾
2. **Patient's age:** Prognosis is better in older patients with comparable levels of remaining bone. Prognosis is not good in younger patients because of rapid periodontal destruction in a short period of time and they may suffer from aggressive periodontitis.
3. **Systemic background:** Prevalence and severity of periodontitis is higher in patient with systemic disorders like diabetes, hyper parathyroidism, and nutritional deficiency. Incapacitating conditions like Parkinson's disease adversely affects the prognosis. Newer automated oral hygiene devices are useful for these patients to improve prognosis.
4. **Malocclusion:** Irregularly aligned teeth, malformation of jaws, abnormal occlusal relationships interfere with plaque control. Orthodontic or Prosthetic correction is essential for success of periodontal treatment. Overall prognosis is poor for the patients with occlusal deformities that cannot be corrected.
5. **Smoking:** Smoking plays an important element and considered to be one of the environmental risk factor in pathogenesis of periodontal disease. Smokers do not respond well to conventional method of treatment. Patients (smokers) with slight to moderate periodontitis have fair to poor prognosis. Patients (smokers) with severe periodontitis have poor to hopeless prognosis.⁽⁴⁾
6. **Patient cooperation and compliance:** Prognosis critically depends on patient's behaviour, perception, desire to retain his natural teeth, attitude and oral hygiene maintenance. The patient's cooperation in following the prescribed treatment protocols and post treatment instructions also affect the prognosis.
7. **Plaque control:** Bacterial plaque plays an important

role in initiation and progression of periodontal disease and is considered as the primary etiologic factor. Effective removal of plaque either during treatment procedure or patient's approach to follow plaque control on a daily basis is critical for successful periodontal therapy and for prognosis.⁽⁵⁾

8. **Genetic factors:** IL-1 gene polymorphisms leads to production of increased IL-1 β which is believed to associated with pathogenesis of chronic periodontitis.⁽⁶⁾ Prior knowledge and diagnosis of patient's IL-1 genotype and smoking status would help the clinician to judge the prognosis and comment on the survival rate.
9. **Stress:** Physical, mental, emotional and environmental stress may affect the patient's response rate to the periodontal therapy. Proper identification of these factors on the patient's behalf would give a clear picture about the overall prognosis of the patient.

Factors Affecting Individual Tooth Prognosis:

Factors affecting individual tooth prognosis include percentage of bone loss, probing pocket depth, Bone loss patterns and its location, presence of furcation involvement, tooth mobility, tooth morphology, crown to root ratio, root concavities and its forms, caries, non vital teeth, occlusal relationship, developmental grooves, enamel projections, teeth adjacent to edentulous area, relation to adjacent teeth.

1. **Percentage of bone loss:** Greater the bone loss, poorer the prognosis. As bone loss exceeds 50% the prognosis worsens rapidly. More irregular the bone loss, the poorer is the prognosis.
2. **Distribution and type of bone loss:** Horizontal bone loss, pocket elimination is easier. When vertical/trough like bone defects are present, the feasibility of osteoplastic, new attachment attempts or bone grafting must be considered. (7) Vertical bone loss with 1 or 2 walled infrabony defects or interproximal bony craters have worse prognosis than horizontal type. However, considering vertical defects, three walled infrabony defects and two walled defects have better prognosis than One walled defects for bone regeneration.⁽⁸⁾
3. **Periodontal pocket:** Pocket depths, clinical attachment, degree of bone loss, and nature of pocket are important in determining prognosis.⁽⁹⁾ The extent, location, depth and complexity should

be taken into consideration.

4. **Mobility:** Teeth with 4–5mm remaining bone or grade 3 mobility has doubtful prognosis. Teeth that can be rotated or depressed is much more seriously involved than a tooth with horizontal mobility. Mobility due to occlusal trauma has favorable prognosis.
5. **Furcation involvement:** The problems associated with furcation involvement are, difficulty of access to surgical area, inaccessibility of the area to plaque removal by the patient.⁽¹⁰⁾ The divergence of the root, the accessibility to the clinician for better instrumentation, the trunk of the tooth are to be considered when determining prognosis.
6. **Relation to adjacent teeth:** In dealing with teeth of questionable prognosis, the chances of successful treatment should be weighed against any benefits that would serve to adjacent teeth if the tooth under consideration was extracted. Heroic attempts to retain a hopelessly involved tooth may jeopardize the adjacent teeth.
7. **Caries, Non-vital teeth, Tooth resorption:** In teeth with extensive caries, feasibility of adequate endodontic therapy should be considered before undertaking periodontal therapy. The resorption of root (internal or external) leads to mobility of the tooth and this can affect the treatment outcomes therefore jeopardizing the instrumentation, maintenance of oral hygiene and success of any periodontal therapy rendered to the tooth in question. Vitality of the tooth also plays an important role in deciding the prognosis of the periodontal therapy. The non-vital tooth behaves differently than vital ones. It is believed that new attachment can occur in cementum of both non-vital and vital teeth, however the nature of attachment is not even close to regeneration.
10. **Tooth morphology:** Root form and morphology, Crown root ratio, Root concavities, Developmental grooves, Enamel projection are to be considered. Prognosis poor for teeth with short, tapered roots and relatively large crowns. Developmental grooves which sometimes appear in the maxillary lateral incisor (palate-gingival groove) or in the lower incisors, create an accessibility problem. (5.6% maxillary lateral incisors and 3.4% maxillary central incisor). Cervical enamel projections on the root surface interfere with the attachment apparatus and

may prevent regenerative procedures from achieving their maximum potential. Therefore, their presence may have a negative effect on the prognosis for an individual tooth.

Clinical Applications: Careful analysis of the factors determining individual and overall prognosis, will allow the clinician to assess the type of prognosis.⁽¹⁾ The below mentioned criteria are used to determine the type of prognosis in a patient suffering from periodontal disease:

1. **Excellent prognosis:** The prognosis is considered excellent when the patient presents with no evident bone loss, however, the gingival condition is maintained at an excellent condition. The patient is cooperative and complaint with no history of systemic or any environmental risk factors.
2. **Good prognosis:** The prognosis is considered to be good when there is adequate amount of remaining bone support along with the periodontium, and the patient as well as the clinician has adequate possibilities to control etiologic factors and establish a maintainable dentition. The patient is cooperative with no history systemic or any environmental risk factors. And systemic factors if present, it should be well to moderately controlled.
3. **Fair prognosis:** The prognosis is considered fair in case of patient presents with less than adequate remaining bone support along with weak periodontal support and tooth mobility. There may be presence of Grade I furcation involvements. The patient cooperation may be acceptable and can take adequate maintenance and plaque control measures. There also may be presence of limited systemic or any environmental risk factors.
4. **Poor prognosis:** The prognosis is considered fair in case of patient presents with moderate-to-advanced bone loss, weakened periodontal support, tooth mobility along with Grade I and II furcation involvements. There may be presence of difficult-to-maintain areas. The patient's cooperation and compliance may be doubtful and there is always presence of systemic or any environmental risk factors.
5. **Questionable prognosis:** The prognosis is considered fair in case of patient presents with advanced bone loss, weakened periodontal support, tooth mobility along with Grade II and III furcation

involvements. There may be presence of inaccessible areas. The patient's cooperation and compliance may be doubtful and there is always presence of systemic or any environmental risk factors.

- 6. Hopeless prognosis:** The prognosis is considered fair in case of patient presents with advanced bone loss, weakened periodontal support, Grade III tooth mobility. There may be presence of non maintainable areas. The patient's cooperation and compliance may be doubtful and there is always presence of uncontrolled systemic or any environmental risk factors. Extraction is indicated in such a scenario.

Excellent, good and hopeless prognoses are the only prognoses that can be interpreted with a reasonable degree of accuracy. Fair, poor and even questionable prognosis depends on a large number of factors that can interact in an unpredictable number of ways. In many of these cases, it may be advisable to establish a provisional prognosis until phase I therapy is completed and evaluated.

Prognostic Judgement and Treatment Planning:

Treatment can alter prognosis. The severity and distribution of the lesions, the ADA classification type and complicating factors of the diseases must be assessed to determine the effect of the therapy. Severity distribution of inflammatory and traumatic factors, severity depends on pocket depth, degree of bone loss, tooth mobility, crown root ratio. Distribution of disease may be generalized or localized. Inflammatory and traumatic factors must be considered and may produce variation in prognosis of individual teeth.

Conclusion

Periodontal prognosis, a fascinating aspect of periodontal therapy, requires experience and judgment as well as a keen attention to meticulous detail. The fate of the dentition sometimes rests on the decision of the therapist. Patients almost always ask for reassurance on the chances of retaining natural teeth and usually express their questions in the form of an expressed doubt on the advisability of proceeding with therapy. Hence, the determination of prognosis is a vital and essential step in periodontal treatment planning.

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