**Blieden TM. Tooth-related issues. Ann Periodontol 1999; 4: 91-6.**

**Purpose:** To elucidate several conditions exist around teeth that may predispose the periodontium to disease.

**Materials and Methods:** The author’s opinion and a collection of articles.

**Findings:** 1) Tooth anatomic factor: a) cervical enamel projections: a flat ectopic deposits of enamel apical to the normal CEJ in molar furcation areas. They are more likely to be found on buccal surfaces of 2nd molars. There are no prospective studies that shows a cause-and –effect relationship between the projection and development of disease at furcation sites. b) enamel pearls: A larger, spheroid-shaped, ectopic deposits of enamel over the furcation area. Max. 3rd molar > Mand. 3rd molar and Max. 2nd molar. They are less frequently seen on maxillary 1st and mand. 2nd molars. c) Furcation anatomy and location: they are considered important in the diagnosis and management of the involved furcation site, they do not require special consideration in the classification of periodontal diseases. d) tooth position: it can be factors that predispose the periodontium to plaque accumulation and subsequent inflammation. No relationship between malalignment and periodontal disease could be found over a wide age range. In children, plaque and gingival inflammation scores area correlated with malalignment. A 20-year follow-up study demonstrated that malocclusion implied an increased risk of periodontal disease. Periodontal disease was significantly more frequent in the maxilla in connection with crowding extreme maxillary overjet and cross-bite. There was no association for mandibular sites. In most studies, a strong correlation exists between teeth positioned facially to the dental arch and recession defects. e) root proximity: it may present an impediment to self-performed or professionally applied plaque removal. f) Open contacts: significant trend toward open contacts and increased probing depth and attachment loss. Marginal ridge discrepancies have not been found to be a significant risk factor for development of disease at adjacent periodontal sites. 2) Root abnormality: palato-gingival grooves: reports show a prevalence of 8.5% in individuals and 4.6% of extracted maxillary lateral and central incisors. Grooves can occur on any tooth surface. The groove can impede the removal of plaque and allow plaque microorganisms access to the subgingival area. 3) Tooth restorations: a) restorative marginal discrepancies: in most cases, the severity of the marginal discrepancy, the ability of patients to maintain the areas free of plaque and the amount of time it is present influence the amount of damage to the periodontium. b) effects of restorative materials: damage to the periodontium can develop as a result of the hypersensitivity. 4) Endodontic considerations: endodontic infection can extend from the lateral canals to the periodontium. In most cases, early treatment of the endodontic infection causes a rapid resolution of the defect. 5) Tooth fractures: fractures of the tooth crown have not been shown to pose a risk for development of periodontal disease unless the fracture enhances plaque accumulation. While with a vertical root fracture, it is common to find accompanying periodontal lesions. Areas of the root surface cementum that have become either completely or partially detached are referred to as cemental tears. 6) External root resorption: external resorption of the root has the potential for destruction of the periodontium when the lesion is located coronally on the root.

**Purpose:** To assess (1) patient-related factors contributing to tooth loss and quality-of-treatment outcome 10 years after initiation of anti-infective therapy and (2) strategies to prevent tooth loss.

**Materials and Methods:** All patients who had received active periodontal treatment 10 years ago by the same examiner were recruited consecutively until a total of 100 patients were re-examined. Re-examination was performed by a second examiner and included comprehensive smoking history, medical history, dental status, gingival bleeding index, PPD and vertical attachment levels, bleeding on probing, suppuration on probing, at multi-rooted teeth, assessment of furcation involvement, test for IL-1 polymorphism, reason for loss of the teeth and were asked about satisfaction with the aesthetic aspects of their periodontal situation. Statistical analysis included Poisson and logistic regressions.

**Findings:** One hundred patients aged 15–67 years at initiation of therapy with a total of 2301 teeth at the beginning of SPT participated in the re-examination. Of the total of 100 re-examined patients 59 were females, 53 participated regularly in SPT, and 38 exhibited the IL-1 polymorphism, seventy patients had been diagnosed with early-onset and severe forms of periodontitis (aggressive or generalized severe chronic periodontitis), 27 were current smokers. Excluding the individual periodontal risk at the initiation of SPT, Poisson regression analysis identified mean PCR, regular participation in SPT, age initial diagnosis, IL-1 polymorphism, smoking, and sex as factors statistically significantly influencing tooth loss. Whereas regular SPT participation protected against tooth loss, higher PCR, positive test for IL-1 polymorphism, smoking, diagnosis of aggressive or severe chronic periodontitis, female sex, and higher age were associated with increased tooth loss. Without regular SPT the number of teeth lost was nearly fivefold. Poisson regression analysis failed to retain the prognosis index as a statistically significant predictor for tooth loss in the model. Patients compliant with regular SPT subjectively rated periodontal aesthetics with better scores than non-compliant patients.

**Conclusion:** In patients after systematic periodontal treatment, regular SPT and effective oral hygiene are effective tools to (i) prevent tooth loss and (ii) maintain a beneficial outcome on a long-term basis. After accomplishment of active periodontal therapy IL-1 polymorphism, ineffective plaque control, irregular supportive periodontal treatment, initial diagnosis, smoking, age and sex increase the risk for tooth loss.

**Purpose:** To review the previous prognostication system and propose a new classification system for diagnosis and treatment planning.

**Material and Methods:** The review of relevant literatures and authors’ point of view.

**Findings:** Traditional prognostication systems are based on tooth mortality. But the periodontal status of retained teeth is variable and uncertain. However, survival and stability need to be considered separately. Tooth loss usually does not occur naturally; it is merely the decision of the practitioner. Due to the dynamic change of the chronic periodontitis, examination of clinical attachment level measurements must be assessed periodically. By assessing the prediction accuracy of several studies, it may be logical to define long term as $\geq 5$ years and short term as $<5$ years. Prognosis need to be described at two levels: overall and individual tooth. An overall description of prognosis facilitates communication between professionals and patients. Many general factors may affect the whole dentition whereas local factors may affect only individual teeth. In Hirschfeld and Wasserman’s observation, patients classified as the downhill and extreme downhill groups were less predictable in this system. A possible reason will be the lack of consideration for systemic factors and local factors. Becker et al. used a more detailed criteria classification to follow two groups of patient with and without maintenance. The system predicted correctly most of the time during the study period in well-maintained patient but didn’t predict as well in poorly maintained patients. The study showed that the more detailed classification improved predictability in well-maintained patients and the prognosis can be determined effectively for the period of 5 to 6 years. Also, patient compliance is one of the general factors for long-term prognosis. In McGuire and Nunn’s study, the good prognosis category was the most predictable from baseline to 5 and 8 years. However, the poor and questionable categories were highly variable. A new periodontal prognostication system based on the probability of disease progression was proposed. Individual tooth prognosis is based on the prediction of future stability of the periodontal supporting tissues. Three primary classifications are proposed with a fourth, hopeless, signifying a tooth that must be extracted. Favorable: The periodontal status of the tooth can be stabilized with comprehensive periodontal treatment and periodontal maintenance. Future loss of the periodontal supporting tissue in unlikely if some of the systemic and local factors are met (list at bottom). Questionable: the periodontal status of the tooth is influenced by local and/ or systemic factors that may or may not be able to be controlled. The periodontium can be stabilized with comprehensive periodontal treatment and periodontal maintenance. Unfavorable: the tooth is influenced by local and/ or systemic factors that cannot be controlled and periodontal breakdown is likely to occur
even with comprehensive treatment and maintenance. **Hopeless:** the tooth must be extracted. General factors include patient compliance in an effective maintenance program, cigarette smoking, diabetes mellitus and several systemic diseases. Local factors include deep probing depth and attachment loss, other anatomic plaque-retentive factors, trauma from occlusion and parafunctional habits and mobility.

**Conclusions:** traditional prognostication systems are based on tooth mortality. This is useful in epidemiologic studies but less useful in patient management. Using periodontal stability as the endpoint of periodontal prognosis has more practical and clinical advantages.

**Purpose:** to compare the long-term effect of extracting or maintaining hopeless teeth on the alveolar bone height of the adjacent teeth following periodontal treatment and periodontal surgery.

**Materials and Methods:** Files of patients treated between 1990 and 2003 were screened for the study. Subjects were included in the study if: 1) a PA x-ray shows at least one hopeless tooth and its proximal neighbors, 2) follow-up radiographs were taken >2 years postoperatively, 3) non-smokers with no contributory systemic disease, 4) a pretreatment diagnosis of severe chronic periodontitis. Teeth with >70% bone loss were considered hopeless at either proximal sites. All patients received hygiene-phase therapy and those subjects with PD>6mm at re-evaluation were subjected to a surgical flap debridement procedure. Patients in the extracted group have the hopeless teeth extracted at the time of surgery. Subjects attended maintenance therapy every 3-6 months. All radiographs were digitized. Root length was measured from the root apex to the cemento-enamel junction; bone height was measured from the apex to the alveolar crest; radiographic bone distance (RBD) was calculated as the difference between the above measurement. Bone loss was defined as the difference between RBD preoperatively and RBD postoperatively. The percentage of RBD was calculated as \((\text{RBD/root length}) \times 100\%\).

**Findings:** Ninety-three subjects with 110 hopeless teeth were included in this study. The mean follow-up was 4.4 years. The retained group included 57 hopeless teeth; the extracted included 53 hopeless teeth. The preoperative mean RBD and the mean percentage of RBD for the extracted and retained groups did not differ significantly. The preoperative RBD of teeth adjacent to hopeless ones did not differ between groups. The postoperative RBD of the teeth adjacent to the hopeless teeth did not differ between groups. There was a mean radiographic bone gain (RBG) on the mesial \((1.1\pm0.35\text{mm})\) and distal \((0.83\pm0.33\text{mm})\) aspects of retained hopeless teeth. For the adjacent proximal teeth, there was a slight RBG compared to baseline, but not statistically significant. There was greater RBG for adjacent teeth in the extracted group compared to the retained group \((0.72\text{mm} \text{ and } 0.28\text{mm for the mesial teeth}; 1.14\text{mm} \text{ and } 0.29\text{mm for the distal teeth})\), however, not statistically significant. The percentage of RBG at the distal adjacent teeth was \(11.36\pm3.30\%\) in the extracted group compared to \(1.50\pm2.1\%\) in the retained group; the differences were statistically significant.

**Conclusions:** The retained hopeless teeth had slight bone gain following periodontal surgery. This study showed that periodontal surgery inhibited further bone loss and resulted in slight RBG for the hopeless teeth. The result showed that the retention of
hopeless teeth did not exert any detrimental effect on the adjacent proximal teeth. It seems that long-term preservation of hopeless teeth following periodontal surgery is an attainable goal with no detrimental effect on the neighboring teeth.

**Purpose:** To assess tooth-related factors contributing to tooth loss in the 10 years following initiation of anti-infective therapy.

**Materials and Methods:** Patient who had periodontal treatment (anti-infective therapy with subgingival debridement under local anesthesia and periodontal surgery if required) and an x-ray status obtained before periodontal treatment were consecutively recruited 10 years ± 6 months after initiation of treatment for this study (patients were recruited until 100 re-evaluations were completed). Examinations included test for interleukin-1 polymorphism, compliance to supportive periodontal therapy (SPT), mean plaque scores during SPT, assessment of baseline bone loss, tooth type, furcation status, and abutment status. Statistical analysis was then completed.

**Findings/Results:** A total of 100 patient contributing 2301 teeth at the end of active periodontal treatment were included into the analysis. 155 teeth were los over 10 years after APT. High plaque scores, irregular attendance of SPT and age were patient-related factors significantly associated with tooth loss. Baseline bone loss, furcation involvement and use as an abutment tooth were significantly associated with tooth loss as well. Patients that received regular SPT, 93% of teeth with 60-80% bone loss at baseline, survived 10 years.

**Conclusions:** In patients after active periodontal treatment, regular SPT and effective plaque control are strong patient-related factors to prevent tooth loss. The following tooth-related risk factors increase the risk for tooth loss: baseline bone loss, furcation involvement, and use as an abutment tooth.