Sapporo Medical Journal
Volume 56, Issue 02, February, 2022

A Review on Tooth Loss during Supportive Periodontal Therapy

Nur Sabrina AbdLatif[1], Haslina Taib[2], Akram Hassan[3]

School of Dental Sciences, UniversitiSains Malaysia, Health Campus
16150 KubangKerian, Kelantan
Malaysia[1, 2,3]

Abstract- This study was done to conduct a review on the occurrence of tooth loss and its associated factors during Supportive Periodontal Therapy (SPT) among periodontitis patients. A literature search was performed using four databases with multiple keywords within the interest of this research. Data collected from previous articles were from 2000 to 2019. Ten previous research from 2004 to 2019 were met the criteria. The occurrence of tooth loss in ten studies was 1587 teeth. The highest and the lowest occurrence were 12.26% and 0.38% respectively. The associated factors of tooth loss for each study showed different percentages and significances. Some studies have limited associated factors. Among all these factors, smoking, old age, male, and educational status were highly associated with the occurrence of tooth loss. The incidence of tooth loss during SPT among periodontitis patients in ten studies was 6.57 % and associated with age, sex, smoking status, and educational level. However, this study did not reach a definitive conclusion due to the heterogeneity among studies.

Keywords-SPT, tooth loss, occurrence

1. Introduction

1.1 Study background

Periodontal disease is one of major dental diseases which have high prevalence rates worldwide, after dental caries. [1] Dental caries and periodontal diseases are major causes of tooth loss. Severe tooth loss and edentulism was one of the leading ten causes of years lived with disability in some high income countries due to their aging populations. [2] Tooth loss is generally considered the final outcome of periodontitis. [3] Periodontitis is a chronic inflammatory disease, bacterially-induced that destroys the connective tissues including alveolar bone that support teeth. An active periodontal treatment aim to reduce the inflammatory response, through elimination of bacteria and its deposits and calculus. Following completion of treatment Supportive Periodontal Therapy (SPT) is conducted to reduce the probability of re-infection and to monitor the progression of the disease. It is also can be a medium to maintain teeth without pain, excessive mobility or persistent infection in the long term, and to prevent related oral diseases. Success of SPT has been reported in a number of long-term as well as retrospective studies. [4]

1.2 Dental plaque

Dental plaque is a soft layer of proteins and bacteria and also called a biofilm that accumulate on the surface of teeth. It is composed of organic, inorganic materials derived from saliva, gingival crevicular fluid and bacterial products. Dental plaque or biofilm can give rise to dental caries and periodontal problems such as

gingivitis and periodontitis. Plaque that is not removed daily between teeth by brushing and flossing can eventually harden into calculus. Brushing and flossing become more difficult as calculus collects at the gum line. As the calculus, plaque and bacteria continue to increase, the gum tissue can become red, swollen and possibly bleed when brushing teeth. This is called gingivitis, an early stage of gum (periodontal) disease. An efficient periodontal therapy able to lower the prevalence of one or more pathogenic bacterial species.[5]

1.3 Periodontal disease

Gum or periodontal disease is a pathological inflammatory condition of the gum and bone support surrounding the teeth. Prevalence of periodontal disease in the worldwide population was 90%. [6] In Malaysia, the prevalence of periodontal disease was 94 % with 48.5% of them with periodontitis. [7] The rate of progression of periodontal disease in an individual is dependent on the virulence of the bacterial plaque and on the efficiency of the local and systemic immunoinflammatory responses in the person.

1.4 Initial therapy

Initial Periodontal Therapy or the nonsurgical therapy is directed to the elimination of the etiologic factors of gingival and periodontal diseases. [8] It is the first step in the management of periodontal disease. Typically this involves the use of scaling, root debridement and the provision of oral hygiene instructions. The aim of initial periodontal therapy is to remove pathogenic microorganisms and their byproducts from the affected teeth, in order to promote cessation of periodontal inflammation and to halt the disease progression. Sufficient time must be given to allow for all tissue changes consequent to this fundamental periodontal therapy to occur fully, before conducting a periodontal re-evaluation, which forms the assessment stage for the planning of further phases of periodontal therapy. [9]

1.5 Supportive Periodontal Therapy

SPT is defined as the periodic assessment and preventive treatment of the periodontal apparatus. [10] Following completion of treatment and inflammation arrestment, SPT is conducted to reduce the probability of re-infection and to monitor the progression of the disease. [4] Furthermore, SPT or the maintenance phase of the periodontal treatment is vital since it has been shown that a long-lasting maintenance program can prevent tooth mortality. [11] SPT during the maintenance phase has to be based on the patient risk-profile and individualised to the patient. [12] However, ‘care’ implies more than ‘therapy’ in supporting periodontally susceptible patients in the retention of aesthetically and functionally acceptable periodontally affected dentitions for life. The highest aim of supportive periodontal therapy is the prevention of new or recurrent periodontitis lesions. [9] Success of SPT has been reported in a number of long-term as well as retrospective studies. [4]

1.6 Tooth loss during SPT

The retention of natural teeth can improve the quality of life by maintaining the ability to chew and digest food. [13] Tooth loss is one of the most visible results of development of periodontal disease and cause physiological and psychological impacts on patient’s life. Periodontitis has been singled out as one of the main cause of dental mortality after 45 years of age. [14] The clinical response of an individual tooth to treatment over time is difficult to predict accurately, especially if the tooth has been compromised by periodontal disease and the patient did not return periodically to maintenance therapy appointments. [15]

1.7 Association between smoking, systemic disease and tooth loss during SPT

Risk factors for individual patients must be taken into consideration in order to carry out SPT effectively, previous studies have addressed risk factors for the recurrence of periodontitis and for tooth loss. A systematic review reported that data regarding factors of influence on tooth loss during SPT is still heterogeneous, not allowing definitive conclusions. Some factors such as age, smoking and initial tooth prognosis were found to be related with tooth loss. [16] Another important finding from the regression model is that non-smokers lost fewer teeth than smokers, and no significant differences were observed between smokers and former smokers. These results are in accordance with previous findings. [17] A study also indicates that diabetes-induced changes in immune cell function produce inflammatory immune cell phenotype, predisposing to chronic inflammation in periodontal condition and diminished tissue repair capacity. [18] This periodontal condition of tooth can cause tooth loss if the SPT is not taken care properly.

Therefore, this study was aimed to conduct a review on the occurrence and its associated factors of tooth loss during SPT among periodontitis patients. Specifically the objectives were to identify the incidence of tooth loss during SPT among periodontitis patients and to determine the associated factors of tooth loss during SPT among periodontitis patients. The results of this study will serve as basis to determine the effectiveness of initial therapy and significant impact of SPT.

2. Methodology

This was a narrative overview of the literature from various previous research that retrieved from searches of computerized databases, hand searches and authoritative texts. Literature search was performed using “PubMed” to identify articles regarding occurrence of tooth loss during SPT patients with periodontal diseases. Different combinations of the following key words: “tooth loss”, “occurrence” “Supportive Periodontal Therapy”, “associated factors of tooth loss”, “smoking status” and “systemic diseases” was searched in the titles and abstracts fields. Relevant articles was identified, and duplicates was removed. Lists of identified articles were reviewed by the researcher and co-researchers for inclusion. Full text of literature which inclusion criteria were met and examined and the data of interest was extracted from the included studies.

The inclusion criteria for this study were patients with periodontitis. Articles were published from January 2000 to December 2019 with the key words of interest and published in English. In this study, we excluded patients with special needs or medically compromised patients. Those articles that were published before 2000, articles with other languages, review articles, editorials, commentaries, abstracts and case reports were also excluded.

Data extraction were conducted by the author and reviewed by two independent individuals. Any disagreement arising was resolved by consensus through discussion. The data extracted from each relevant article were the author, publication year, age of participant, number of tooth loss in SPT and associated factors. All extracted data and information were independently extracted by the author.

3. Results

From ten retrospective and clinical studies regarding tooth loss during SPT, the occurrence of tooth loss for each study was observed and the highest occurrence was seen in the study that was carried out by Pretzl et al. (2018) with 12.26%. [19] The number of tooth loss in this study was 201 teeth out of 1639 teeth present

at the initial SPT. The lowest occurrence of tooth loss was found in a study done by Chambrone at al. (2006) with percentage of 0.38%. [20] 11 teeth were lost out of 2927 teeth present at the initial SPT. 1597 teeth from approximately 24285 teeth presented at the completion of active periodontal treatment (APT) and during SPT were lost. The incidence of tooth loss during SPT was 6.57% (Table 1).

The associated factors of tooth loss during SPT were identified. The associated factors of tooth loss such as, socio-demographic factors, smoking status and systemic disease for each study showed different percentages and significance. Some studies have limited associated factors (Table 2).

Pretzl et al. (2018) reported that the number of total tooth loss in periodontally compromised patient's results 20 years after active periodontal therapy is 201 teeth out of 1639 teeth with percentage of 12.26%. [19] The associated factors that significant to tooth loss in this study were age, smoking status and systemic disease such as heart disease, hypertension and diabetes mellitus but sex was not significant. Graetz et al. (2017) concluded that the number of total tooth loss in generalized aggressive periodontitis after 17 years of supportive periodontal treatment was 134 teeth out of 1272 teeth with percentage of 10.53%. [21] The associated factors that significant to tooth loss in this study was smoking status. Sex and educational level were not significant. Schwendicke et al. (2018) revealed that the number of total tooth loss in periodontitis patients during SPT was 630 teeth out of 7,388 teeth with percentage of 8.53%. [22] The multivariable for predicting of tooth loss in this study that was significant to tooth loss comprised age and smoking status.

Bäumer et al. (2011a) found that the number of total tooth loss in aggressive periodontitis after active periodontal therapy and SPT was 166 teeth out of 2154 teeth with percentage of 7.71%. [23] The patient-related prognostic factor that significant to tooth loss in this study was educational level. Another study was also done by Bäumer et al. (2011b) recorded the number of total tooth loss in aggressive periodontitis after active periodontal therapy was 133 teeth out of 2154 teeth with percentage of 6.17%. [24] The patient-related risk factors for tooth loss that significant in this study was age, educational level and smoking status. De Wet et al. (2017) concluded that the number of total tooth loss recorded during SPT in this study was 103 teeth out of 1358 teeth with percentage of 7.58%. [25] The associated factors that significant to tooth loss in this study was smoking status but sex was not significant.

In a study done by Eickholz et al. (2008), the number of total tooth loss after active periodontal therapy in this study was 155 teeth out of 2301 teeth with percentage of 6.74%. [26] The patient-related factors for risk, prognosis, and quality of outcome of tooth loss in this study that significant were age, sex and smoking status. Díaz-Faes et al. (2016) did a study in relation to the number of total tooth loss recorded during SPT in patients with generalized aggressive periodontitis with follow-up of 8 to 15 years was 28 teeth out of 656 teeth with percentage of 4.27%. [27] The associated factors that significant to tooth loss in this study was smoking status. Age and sex were not significant. Fardal et al. (2004) found the number of total tooth loss during maintenance following periodontal treatment in a periodontal practice in Norway was 36 teeth out of 2436 teeth with percentage of 1.48%. [28] The frequency (%) of associated factors of tooth loss in 100 patients in this study were recorded. There were 15(15%) male and 21(21%) female patient who loss one or more teeth. 16(16%) of them were adults, and the remaining were elderly with 20(20%). For smoking status, 15(15%) of them were smoker and 20(20%) of them were non-smoker. For systemic disease, 13(13%) patients had family history of periodontal disease but another 23(23%) did not have any history of periodontal disease.

Chambrone et al. (2006) reported that the number of total tooth loss in well-maintained patients with chronic periodontitis during long-term SPT in Brazil was 11 teeth out of 2927 teeth with percentage of 0.38%. [16] The frequency (%) of associated factors of tooth loss in 120 patients in this study were recorded. There were

35(30%) male and 18(15%) female patient who loss one or more teeth. 12(10%) of them were adults, and the remaining were elderly with 41(34%). For smoking status, 24(20%) of them were smoker and 29(24%) of them were non-smoker.

4. Discussion

The highest frequency of tooth loss during SPT was revealed by Pretzl et al. (2018). [19] They recorded 12.36% of tooth loss in periodontally compromised patient results 20 years after Active Periodontal Therapy (APT). In these 70 patients, a tooth loss of 201 teeth out of 1639 teeth during SPT was observed. However, the lowest frequency of tooth loss during SPT was reported by Chambrone et al. (2006). [16] The frequency of tooth loss in well-maintained patients with chronic periodontitis during long-term SPT in Brazil was 0.38%. 11 teeth were loss during SPT out of 2927 teeth in 120 patients observed. Following the occurrence of tooth loss during SPT, there were few associated factors that were significant and might contribute to the number of tooth loss. Most of these risk factors were also identified in other long-term studies. Interestingly, the number of SPT was associated with more tooth loss. This might be caused by the fact that patients with more severe disease had more SPT visits than patients with milder disease. In this study, factors such as sociodemographic, smoking status and systemic disease were being observed. Each study showed different percentages and significance. Some studies had a limit of associated factors. Assessing these risk factors in combination rather than separately improved the accuracy with which tooth loss due to the recurrence of periodontitis could be predicted.

4.1 Sociodemographic factors

i. Age

According to Pretzl et al. (2018) a reason for the higher tooth loss could be the factor of the increased “age” of patients that play significant roles in other long-term studies reporting tooth loss. [19] The significance of tooth loss during SPT and age also mentioned in other studies done by Schwendicke et al. (2018), Bäumer et al. (2011a) andEickholz et al. (2008). [22, 23, 26] In a review byChambrone et al. (2010), age emerged to be associated with tooth loss during SPT with elderly has higher percentage of 34% of tooth loss compared to adult with 10%. [16] Similar to Fardal et al. (2004), this retrospective survey was mainly focused on tooth extraction due to periodontal reasons, in an attempt to identify possible risk factors. [28] Older patients recorded to be in higher percentage compared to adult with respectively 20% and 16%. In accordance to these studies, increased age could also be identified as a risk factor for tooth loss. However studies by Díaz-Faes et al. (2016) and Hirata et al. (2019) showed not significant. [27, 29] Other studies done by Graetz at al. (2017), Bäumer et al. (2011b)and De Wet et al. (2017) did not mention the significance of age and tooth loss during SPT. [21, 24, 25]

ii. Sex

For sex and gender role, the significant to tooth loss during SPT was questionable but overall, most of the studies did not mention the significance of sex in tooth loss during SPT. 4 studies denied the significance of sex and tooth loss during SPT. However, in study done by Eickholz et al. (2008), sex was considered as one of the risk factors for tooth loss after APT which affected the quality of outcome of APT. [26] Chambrone et al. (2010) showed higher percentage of male compared to female in tooth loss with 30% and 15% respectively. [20] Other 5 studies did not mention the significance or did not include in their study.

iii. Ethnicity

The associated factors of ethnicity were not included in all ten studies. Therefore, we could conclude that ethnicity variation did not have any significant to tooth loss during SPT.

iv. Educational Level

In this study, 2 previous studies mentioned the significant of educational level with tooth loss during SPT. These were studied by Bäumer et al. (2011a) and Bäumer et al. (2011b) noted that educational status were detected as prognostic factors for tooth loss during SPT. [23, 24] The patient-related factor educational status proved to influence tooth loss significantly at the tooth level as well: teeth in patients with low educational level showed a greater risk of being lost during SPT than those with high educational status or with moderate educational status. [30] Participants with a high education status lost significantly fewer teeth than patients with low and medium education status. [31] A reason for fewer tooth loss in highly educated patients might be their improved compliance. [32]However, Graetz et al. (2017) denied the significance of this factor. [21]Other 8 studies were either did not mention or include in the study.

v. Work Status

Socioeconomic status was known to affect periodontal health. [33]High socioeconomic status was related to better oral health. Socioeconomic status might be assessed by average annual income or education. However, the associated factors of working status were not included in all 10 studies. Therefore, we concluded that working status did not have any significant to tooth loss during SPT.

4.2.Smoking status

Smoking was a major risk factor for the development of periodontal disease and treatment failure. [34] The fact that smoking influenced periodontal treatment outcomes had been clearly established. [35] Smoking emerged as a factor in tooth loss during maintenance in agreement with other studies.[36] Some studies investigated influencing factors for tooth loss and disease progression during SPT to establish a basis for the prognosis of teeth in periodontally compromised patients. Thus, several patient- and tooth-levelled influencing factors could be determined so far was smoking. In this review study, 7 studies mentioned the significant of smoking status to the loss of tooth during SPT and three other findings were the opposite. Graetz et al. (2017) stated that on patient level, smoking was highly associated with tooth loss by quadrupling the risk. [21] In another study done by Schwendicke et al. (2018), a number of factors impact on tooth loss was smoking. [22] In this study, smoking status was only limitedly useful for predicting tooth loss. Smoking status at baseline was used as predictor to tooth loss. In the long term, smoking seemingly had a negative effect on the periodontal condition in adult periodontitis patients.

4.3. Systemic disease

Systemic disease of an individual is believe to be the contributing factor to tooth loss during SPT. In this study, only 2 studies showed significant of systemic disease to tooth loss. According to Pretzl et al. (2018) over 20 years of follow-up, teeth were lost in mostly severely compromised periodontal patients with systemic diseases like diabetes or cardiovascular diseases which negatively influence tooth loss on the long run. [19] History of cardiovascular disease was identified as a risk factor for tooth loss due to periodontal reasons but not total for the tooth loss. A study done by Hirata et al. (2019) mentioned that risk factors for individual patients must be taken into consideration in order to carry out SPT effectively, and previous studies have addressed risk factors for the recurrence of periodontitis and for tooth loss.[29] Risk factors in

this study at the tooth level include systemic conditions such as diabetes.

The aims of SPT are well established, minimise the recurrence of disease through periodic preventive interventions [37] and maintain the attachment apparatus in the most stable condition possible. [38]The success of SPT has been demonstrated in a number of long-term, retrospective, epidemiological studies, which have shown that, whether in university, hospital or specialist practice settings, only 2% to 5% of teeth in patients originally treated for chronic periodontitis are lost over a 5- to 10-year period. Additionally, tooth loss tends to cluster in a reduced population of high-risk patients.[16] Overall, SPT appears effective in preventing recurrence of periodontitis, although SPT cannot eliminate the increased risk of tooth loss. If disease recurs during SPT, only a small subgroup of individuals is affected and the risk of relapse is primarily affected by patient-specific factors, such as smoking. [39]

5. Conclusion

The incidence of tooth loss during SPT among periodontitis patients in ten studies was 6.57 % and highly associated with age, sex, smoking status and educational level. However, this study did not reach definitive conclusions due to the heterogeneity among studies.

6. Acknowledgements

This work was supported by a UniversitiSains Malaysia Short Term Grant (Grant Number: 304/PPSG/61313100) and School of Dental Sciences, UniversitiSains Malaysia.

7. References

[1] Petersen P. The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century-The approach of the WHO Global Oral Health Programme. Commun Dent Oral Epidemiol2003; 31(S1):3-24.

[2] Global Burden of Disease (GBD). Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: A systematic analysis for the Global Burden of Disease Study 2016. Lancet2017; 390(10100):1211-1259.

[3] Lee C, Huang H, Sun T, Karimbux N. Impact of patient compliance on tooth loss during supportive periodontal therapy. Journal of Dental Research2015; 94(6):777-786.

[4] Manresa C, Sanz-Miralles, EC, Twigg J, Bravo M. Supportive periodontal therapy (SPT) for maintaining the dentition in adults treated for periodontitis. The Cochrane Database of Systematic Reviews2018; 1(1):CD009376.

[5] Listgarten MA, Lindhe J, Hellden L. Effect of tetracycline and/or scaling on human periodontal disease. Clinical, microbiological and histological observations. Journal of Clinical Periodontology1978; 5:246-271.

[6] Pihlstrom BL, Michalowicz BS, Johnson NW, Periodontal diseases. The Lancet2005; 366(9499):1809-1820.

[7] Oral Health Division (OHD). National oral health survey of adults 2010 (NOHSA 2010). Ministry of Health Malaysia 2010.

[8] Azouni KG, Tarakji B. The trimeric model: A new model of periodontal treatment planning. Journal of Clinical and Diagnostic Research: JCDR 2014; 8(7):ZE17-ZE20.

[9] Corbet E, Smales R. Oral diagnosis and treatment planning: Part 6. Preventive and treatment planning for periodontal disease. British Dental Journal 2012; 213(6):277-284.

[10] American Academy of Periodontology (AAP). Position paper. Supportive Periodontal Therapy (SPT). Journal of Periodontology 1998;69:502-506.

[11] 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. Journal of Clinical Periodontology 2004; 31:749-57.

[12] Renvert S, Persson RG. Supportive periodontal therapy. Periodontology 2000 2004; 36:179-195.

[13] Drisko CH. Non-surgical periodontal therapy. Periodontology 20012001; 25:77-88.

[14] Lorentz T, Cota L, Cortelli J, Vargas A, Costa F. Tooth loss in individuals under periodontal maintenance therapy: Prospective study. Brazilian Oral Research2010; 24(2):231-237.

[15] Becker W, Becker B, Berg L. Periodontal treatment without maintenance. A retrospective study in 44 patients. Journal of Periodontology1984; 55:505-509.

[16] Chambrone LA, Chambrone L. Tooth loss in well-maintained patients with chronic periodontitis during long-term supportive therapy in Brazil. Journal of Clinical Periodontology2006; 33(10):759-764.

[17] Costa FO, Lages EJ, Cota LO et al. Tooth loss in individuals under periodontal maintenance therapy: 5-year prospective study. J Periodontal Res2014; 49 (1):121-128.

[18] Iacopino AM. Periodontitis and diabetes interrelationships: Role of inflammation. Annals of Periodontology2001; 6(1): 125-137.

[19] Pretzl B, El Sayed S, Weber D, Eickholz P, Bäumer A. Tooth loss in periodontally compromised patients: Results 20 years after active periodontal therapy. Journal of Clinical Periodontology 2018; 45(11):1356-1364.

[20] Chambrone L, Chambrone D, Lima LA, Chambrone LA. Predictors of tooth loss during long-term periodontal maintenance: A systematic review of observational studies. J ClinPeriodontol 2010; 37:675-684.

[21] Graetz C, Sälzer S, PlaumannA et al. Tooth loss in generalized aggressive periodontitis: Prognostic factors after 17 years of supportive periodontal treatment. J ClinPeriodontol2017; 44(6):612-619.

[22] Schwendicke F, Schmietendorf E, PlaumannA et al. Validation of multivariable models for predicting tooth loss in periodontitis patients. Journal of Clinical Periodontology2018; 45(6):701-710.

[23] Bäumer A, El Sayed N, Kim TS et al. Patient-related risk factors for tooth loss in aggressive periodontitis after active periodontal therapy. Journal of Clinical Periodontology 2011a; 38(4):347-354.

[24] Bäumer A, Pretzl B, Cosgarea R et al. Tooth loss in aggressive periodontitis after active periodontal therapy: patient-related and tooth-related prognostic factors. Journal of Clinical Periodontology 2011b; 38(7):644-651.

[25] De Wet LM, Slot DE, Van der Weijden GA. Supportive periodontal treatment: Pocket depth changes and tooth loss. International Journal of Dental Hygiene2018; 16(2):210-218.

[26] Eickholz P, Kaltschmitt J, Berbig J, Reitmeir P, Pretzl B. Tooth loss after active periodontal therapy: Patient-related factors for risk, prognosis, and quality of outcome. Journal of Clinical Periodontology2008; 35(2):165-174.

[27] Díaz-Faes L, Guerrero A, Magán-Fernández A, Bravo M, Mesa F. Tooth loss and alveolar bone crest loss during supportive periodontal therapy in patients with generalized aggressive periodontitis: Retrospective study with follow-up of 8 to 15 years. Journal of Clinical Periodontology2016; 43(12):1109-1115.

[28] Fardal O, Johannessen AC, Linden GJ. Tooth loss during maintenance following periodontal treatment in a periodontal practice in Norway. J Clin Periodontol2004; 31(7):550-555.

[29] Hirata T, Fuchida S, Yamamoto T, Kudo C, Minabe M. Predictive factors for tooth loss during supportive periodontal therapy in patients with severe periodontitis: A Japanese multicenter study. BMC Oral Health2019; 19(1):19.

[30] Bäumer A, Weber, D, Staufer S et al. Tooth loss in aggressive periodontitis: Results 25 years after active periodontal therapy in a private practice. Journal of Clinical Periodontology2020; 47(2):223-232.

[31] Kocher T, Schwahn C, Gesch D et al. Risk determinants of periodontal disease-An analysis of the study of health in Pomerania. Journal of Clinical Periodontology2005; 32:59-67.

[32] Demetriou N, Tsami-Pandi A, Parashis A. Compliance with supportive periodontal therapy in private periodontal practice. A 14-year retrospective study. Journal of Clinical Periodontology 1995; 66:145-148.

[33] Borrell LN, Crawford ND. Socioeconomic position indicators and periodontitis: Examining the evidence. Periodontology 20002012; 58:69-83.

[34] Jepsen S, Blanco J, Buchalla et al. Prevention and control of dental caries and periodontal diseases at individual and population level: Consensus report of group 3 of join EFP/ORCA workshop on the boundaries between caries and periodontal diseases. Journal of Clinical Periodontology2017; 44(Suppl 18):S85-S93.

[35] Hughes FJ, Syed M, Koshy B et al. Prognostic factors in the treatment of generalized aggressive periodontitis: Effects of smoking on initial outcome. Journal of Clinical Periodontology2006; 33(9):671-676.

[36] Konig J, Plagmann HC, Ruhling A, Kocher T. Tooth loss and pocket probing depths in compliant periodontally treated patients: A retrospective analysis. Journal of Clinical Periodontology 2002; 29:1092-1100.

[37] Armitage GC, Xenoudi P. Post-treatment supportive care for the natural dentition and dental implants. Periodontology 2000 2016; 71(1):164-184.

[38] Echeverría JJ, Manau GC, Guerrero A. Supportive care after active periodontal treatment: A review. Journal of Clinical Periodontology1996; 23(10):898-905.

[39] Matuliene G, Pjetursson BE, Salvi GE et al. Influence of residual pockets on progression of periodontitis and tooth loss: Results after 11 years of maintenance. Journal of Clinical Periodontology2008; 35(8):685–695.

Table 1: Incidence of tooth loss during SPT

Author (Year)	**Number of Tooth Loss**	**Incidence of Tooth Loss (%)**
Pretzl et al. (2018)	201	12.26
Graetz et al. (2017)	134	10.53
Schwendicke et al. (2018)	630	8.53
Bäumer et al. (2011a)	166	7.71
De Wet et al. (2017)	103	7.58
Eickholz et al. (2008)	155	6.74
Bäumer et al. (2011b)	133	6.17
Díaz-Faes et al. (2016)	28	4.27
Fardal et al. (2004)	36	1.48
Chambrone et al. (2006)	11	0.38
Total tooth loss for 10 studies was 1597 teeth		

Table 2: Associated factors of tooth loss during SPT

Author (Year)	Number of Population	Socio-demographic FactorsStatusDisease (Age, Sex, Ethnicity, Education Level, Work Status)	Smoking	Systemic
Pretzl et al. (2018)	70	Age: S Sex: NS Ethnicity: NIL Education Level: NIL Work Status: NIL	SHeart disease: S	Hypertension: S Diabetes Mellitus: S
Graetz et al. (2017)	57Age: NM	Sex: NS Ethnicity: NIL Educational Level: NS Work Status: NIL	S	NIL
Schwendicke et al. (2018)	301	Age: S Sex: NM Ethnicity: NIL Education Level: NIL Work Status: NIL	S	NIL
Bäumer et al. (2011a)	84	Age: NM Sex: NM Ethnicity: NIL Educational Level: S Work Status: NIL	NM	NIL
De Wet et al. (2017)	54	Age: NM Sex: NS Ethnicity: NIL Education Level: NIL Work Status: NIL	S	NIL
Eickholz et al. (2008)	100Age: S	Sex: S Ethnicity: NIL Education Level: NIL Work Status: NIL	S	NM
Bäumer et al. (2011b)	84Age: S	Sex: NIL Ethnicity: NIL Educational Level: S Work Status: NIL	S	NIL

Table 2: (Continued)

Author (Year)	Number of Population	Socio-demographic FactorsStatusDisease (Age, Sex, Ethnicity, Education Level, Work Status)	Smoking	Systemic
Díaz-Faes et al. (2016)	25	Age: NS Sex: NS Ethnicity: NIL Education Level: NIL Work Status: NIL	S	NIL
Fardal et al. (2004)	100	Age: S Sex: S Ethnicity: NIL Educational Level: NIL Work Status: NIL	S NS	
Chambrone et al. (2006)	120	Age: S Sex: NS Ethnicity: NIL Education Level: NIL Work Status: NIL	S NIL	

S: Significant, NS: Not Significant, NM: Not Mentioned, NIL: Not Included