

A Survey of Periodontal Disease Diagnosis and Treatment Patterns by Pediatric Dentists

Short Title: Periodontal Disease Diagnosis and Treatment in Pedodontics

Samantha Resnick¹, Danny Kalash¹, Andrea Vovk¹, Linda Behar-Horenstein^{2,3}, Cynthia Garvan⁴, and Luciana Shaddox^{1*}

¹Department of Periodontology, UF College of Dentistry, 1395 Center Dr., Room D10-6, PO Box 100434, Gainesville, FL 32610, United States

²School of Human Development and Organizational Studies in Education, UF College of Education, Norman Hall Room 1212, PO Box 110746, Gainesville, FL 32611, United States

³Department of Community Dentistry and Behavioral Science, UF College of Dentistry, 1395 Center Drive, Room D9-26, PO Box 100415, Gainesville, FL 32610, United States

⁴College of Nursing, 1395 Center Dr., HPNP 2210C, PO Box 100197, Gainesville, FL 32610, United States

*Corresponding author: Luciana Shaddox, Department of Periodontology, University of Florida College of Dentistry 1600 SW Archer Rd, Room D10-6A, P.O. Box 100434, Gainesville, FL 32610-0434, USA, Tel: 352-273-8368, E-mail: lishaddox@dental.ufl.edu

Received date: 05 Jan 2016; Accepted date: 18 Feb 2016; Published date: 24 Feb 2016.

Citation: Resnick S, Kalash D, Vovk A, Behar-Horenstein L, Garvan C, et al. (2016) A Survey of Periodontal Disease Diagnosis and Treatment Patterns by Pediatric Dentists Short Title: Periodontal Disease Diagnosis and Treatment in Pedodontics. Int J Dent Oral 2(3): doi <http://dx.doi.org/10.16966/2378-7090.183>

Copyright: © 2016 Resnick S, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

Objectives: This survey was created to determine pediatric dentists' familiarity with diagnosis and effective treatments of periodontal diseases in children and adolescents.

Methods: A 21-item questionnaire was mailed or e-mailed to the 308 members of the Florida Academy of Pediatric Dentists (FAPD) and distributed at the FAPD annual meeting. Responses were analyzed using the chi-square statistical method.

Results: Two hundred and nineteen questionnaires were returned. Most respondents worked in private practice (86%), reported assessing patients' periodontal status every 6 months (99%) by radiographs and visual assessments, and 21% reported including a periodontal probe in their examination kit. Gingivitis was diagnosed daily, while periodontitis was seen more frequently in non-private practices once every few months. Most pediatric dentists showed familiarity with risk factors implicated in the development of periodontal diseases. Approximately half of the pediatric dentists used oral hygiene instructions (OHI), scaling and root planning, and prophylaxis for treatment of aggressive periodontitis, while only 24% use an antibiotic regimen. Enhanced knowledge of parameters for diagnosis of periodontal disease was correlated with increased referral rates. Most dentists were confident about diagnosis/evaluation of treated periodontitis, but less confident about treatment planning. Confidence in treatment planning/therapy was associated with correct treatment choices.

Conclusions: Most pediatric dentists assessed periodontitis often and were familiar with its risk factors, but less familiar/confident with its treatment and the use of important tools for its proper diagnosis.

Clinical significance: Recent studies show chronic periodontitis affects 47% of American adults and up to 24% in children/adolescents. Due to its painless progression, the disease must be diagnosed and treated early. This study shows common practices among pediatric dentists regarding diagnosis and treatment of periodontal diseases in young individuals.

Keywords: Periodontal disease; Pediatric dentistry; Diagnosis; Treatment; Periodontal probe; Survey

Introduction

The American Academy of Pediatric Dentistry (AAPD) and the American Academy of Periodontology (AAP) recommend that each child receive a comprehensive dental examination with a periodontal evaluation component [1]. An extra and intraoral assessment is recommended to detect non-periodontal oral diseases and conditions. A general periodontal exam is also suggested to evaluate the gingiva and related structures (i.e., assess probing depth, recession, and attachment level), evaluate the clinical signs of sub-gingival inflammation (bleeding on probing, and suppuration), and to detect endodontic-periodontal lesions [2]. Due to the painless progression of periodontal diseases [3], early diagnosis and treatment in children is critical before it progresses into adulthood. Thus, pediatric dentists play an essential role in this process.

Children can be affected by many forms of periodontal disease including: gingivitis, aggressive periodontitis, chronic periodontitis, and necrotizing periodontitis [4]. Signs of periodontitis consist of alveolar bone loss, attachment loss of the periodontal connective tissues to cementum, and apical migration of the junction epithelium (JE) beyond the cementum-enamel junction (CEJ) [5]. Aggressive periodontitis, which can be either localized or generalized, includes a history of rapid attachment and bone loss with familial aggregation [1]. Localized aggressive periodontitis (LAGP) patients present attachment/bone loss on first molars and incisors (Figure 1), while generalized aggressive periodontitis (GAGP) patients exhibit generalized interproximal attachment loss including at least three teeth other than first molars and incisors (Figure 2) [1]. Aggressive periodontitis can also affect primary dentition with similar patterns, which was previously called pre-pubertal periodontitis (Figure 3) [6,7].

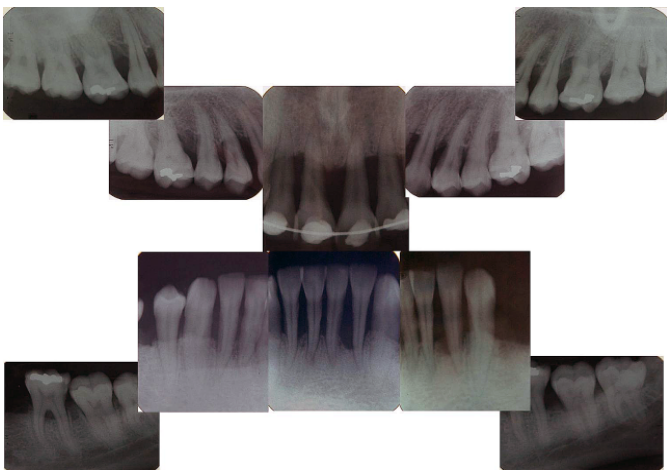


Figure 1: Patient with GAgP- Radiographic characteristics of a 28 years old African-American female diagnosed with generalized aggressive periodontitis. Note generalized bone loss.

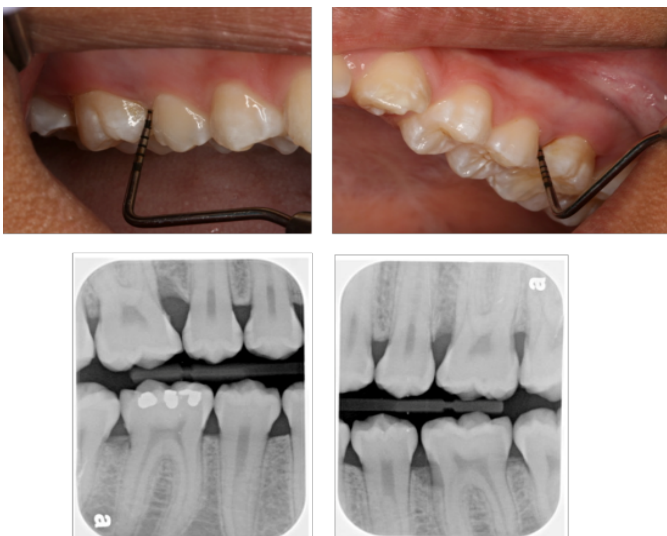


Figure 2: Patient with LAgP- 14 year old African-American male diagnosed with localized aggressive periodontitis. Note deep probing depths and bone loss on mesial of teeth #3 and 14 and also bone loss on distal of 30 and mesial of 19.

Familiarizing pediatric dentists with the risk factors and signs for each of these diseases is essential for an effective early diagnosis and treatment.

Periodontal disease has long been recognized in children but, because of its incipient nature, painless and slow progression [3], it has not received the same attention that is given to dental caries [8]. However, prevalence rates of chronic periodontal disease are higher than initially estimated. A recent report shows a 47% prevalence of chronic periodontitis in adults over 30 in the United States [9]. Albandar and Tinoco report the estimated prevalence of this disease in children and young reaching up to 24% in north-America [10], although screening methods vary among studies. For instance, from a clinical and radiographic assessment, primarily of 12-17 year old Hispanics residing in San Antonio, the rate of chronic periodontitis was found at 24% [11]. Prevalence rates, as high as 50%, have been reported following a clinical examination only [12]. Adolescents experiencing puberty, specifically African-American males, showed higher rates of periodontal disease [10,14]. LAgP, on the other

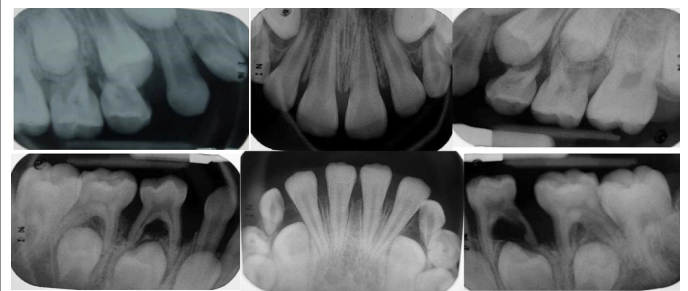


Figure 3: Patient with Pre-pubertal Periodontitis- 10 year old African-American female with localized aggressive periodontitis in primary dentition. Note severe bone loss on primary molars.

hand, in geographically diverse adolescent populations ranges from 0.1% in white Americans to 6.9% in Africans [13-15], while GAgP was reported to be 0.02% in Iran and 4.3% in Morocco [13]. In the US, the reported prevalence of GAgP in adolescents aged 14-17 is 0.13% [14]. Rates were higher in individuals of African descent and lower in those of Caucasian lineage [13].

To the best of the authors' knowledge, this is the first study to evaluate the routine practices in pediatric dental offices regarding the diagnosis and treatment of periodontal diseases in the children. Currently, there are only guidelines regarding diagnosis and treatment of periodontal diseases, notably those put forth by the AAP and the British Society of Periodontology (BSP) [2,5]. Therefore, the objective of this study was to evaluate the routine practices and methods that pediatric dentists in Florida use in the diagnosis and treatment planning of periodontal diseases in children and adolescents.

Materials and Methods

Three hundred and eight members of the Florida Academy of Pediatric Dentists (FAPD) were mailed, e-mailed, or asked to complete an online questionnaire. Completed online surveys were administered through Survey Monkey, a web based evaluation system. Questionnaires distributed to the attendees of the FAPD meeting on October of 2013 were completely anonymously. Additionally, surveys were mailed twice to dental pediatric professionals associated with the FAPD. The institutional review board at the University of Florida approved this study, #2013-U-1190.

The survey included 21 questions that asked participants to provide demographic information and information regarding methods of diagnosis and preventive treatments for periodontal diseases, knowledge about disease diagnosis and risk factors, referral patterns and confidence levels of different diagnosis and treatment approaches (Appendix A). Data was analyzed using the chi-square method. The analysis also explored potential associations regarding participants' knowledge basis, diagnosis, treatment and referral patterns, and confidence levels.

Results

Demographics

Two hundred and nineteen questionnaires were returned, a 71% response rate. Of the dentists surveyed, 86% work in private practice and 14% work in a non-private setting. The majority of dentists (88%) see 21 patients or more per day, 3% treat 6-10 patients, 3% treat 11-15 patients, and 6% treat 16-20 patients in a typical day. A typical work week ranges 31-40 hours for 76% of responders, 0-10 for 2%, 11-20 for 3%, 21-30 for 10%, and over 40 for 9% (Figure 4).

Diagnosis

The results showed that 21% of pediatric dentists include a periodontal probe as part of their dental exam kit (Figure 5). They consistently use radiographic images and visual assessments to diagnose periodontal diseases in children/adolescents 0-21 (>88%). Ninety-nine percent of the pediatric dentists assess periodontal health/disease status in their patients every 6 months.

The use of a periodontal probe for diagnosis is used 51% of the time in 0-12 year olds and 67% of the time in 13-21 year olds (Figure 5). The use of a probe in 0-12 years old was negatively associated with the reported prevalence of periodontal disease ($p=0.0004$). Alternatively, the use of a probe was associated with greater reported prevalence of periodontal disease diagnosis among 13-21 years old ($p=0.0044$).

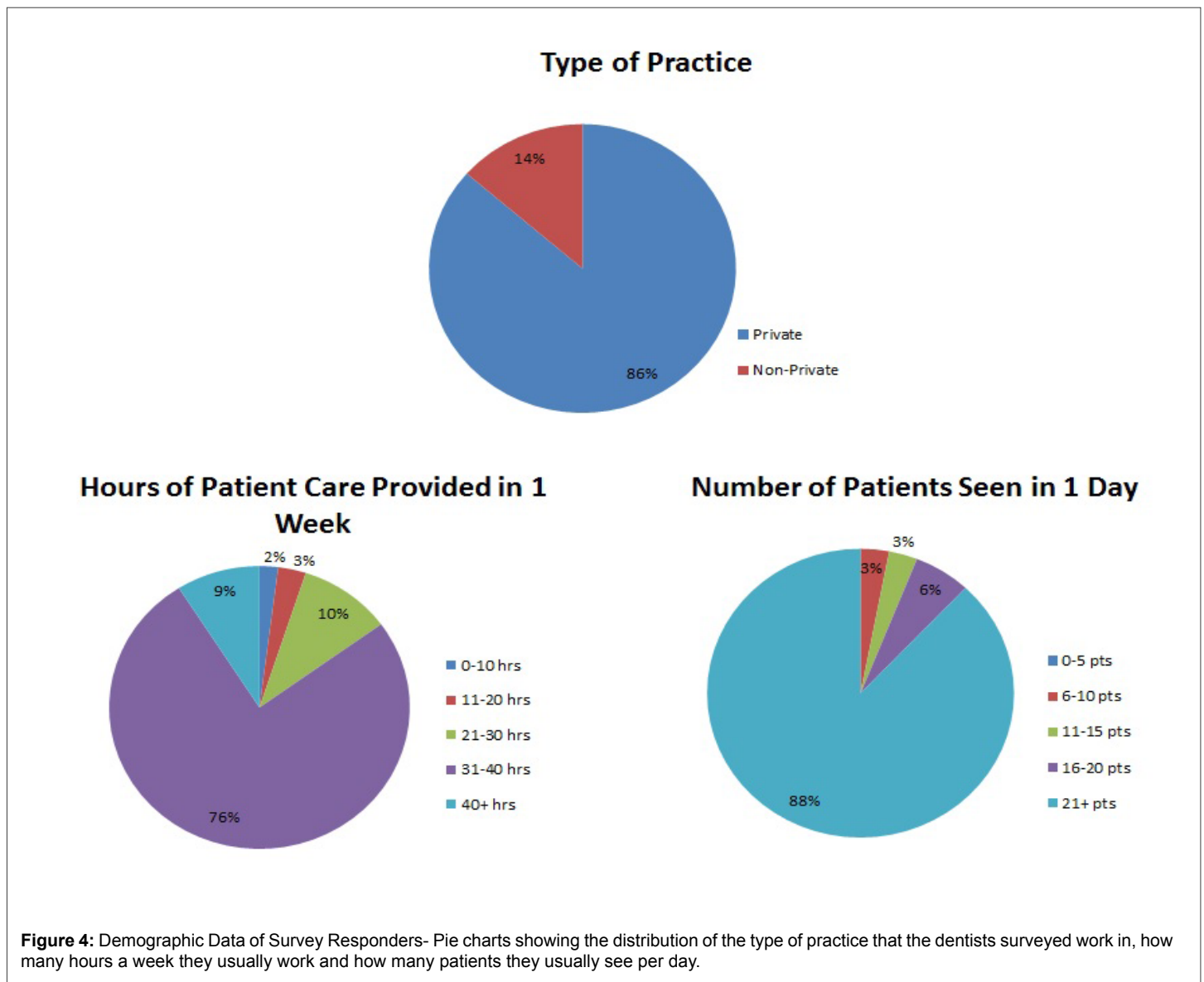
Gingivitis was often diagnosed in pediatric offices of Florida. Approximately 72% of dentists reported diagnosing a case of gingivitis one or more times per day. Additionally, 22% reported diagnosing a case a few times per week. However, periodontitis is less frequently diagnosed. Only once every few months in the 13-21 aged patients was a case of periodontitis diagnosed (Figure 6).

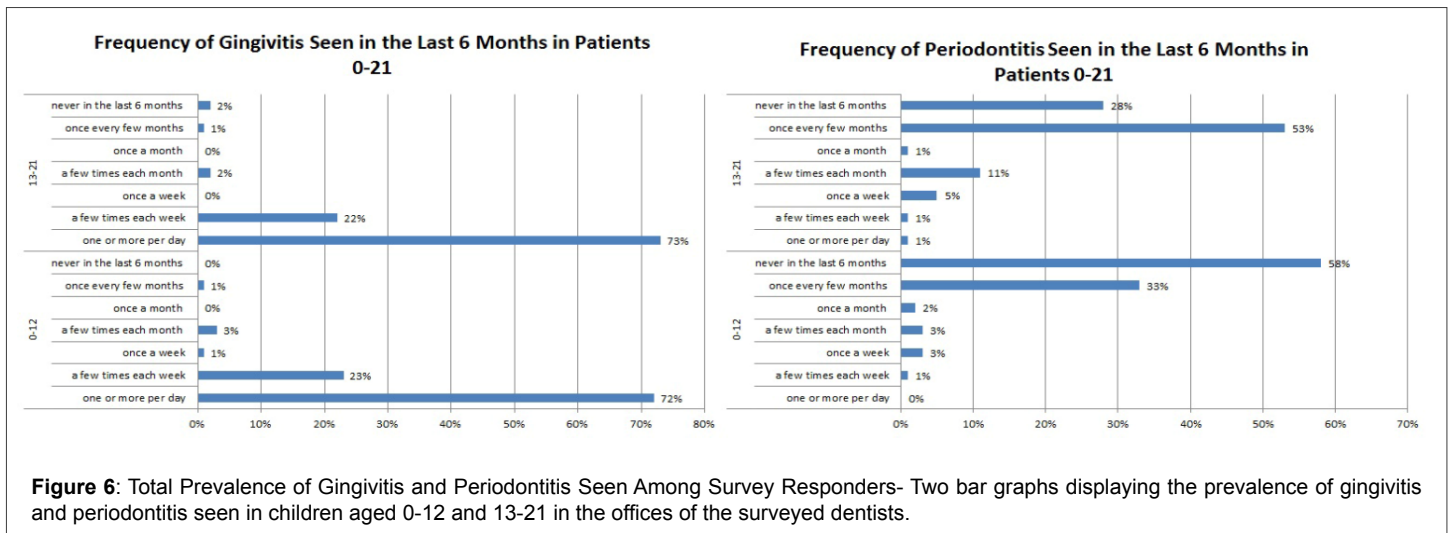
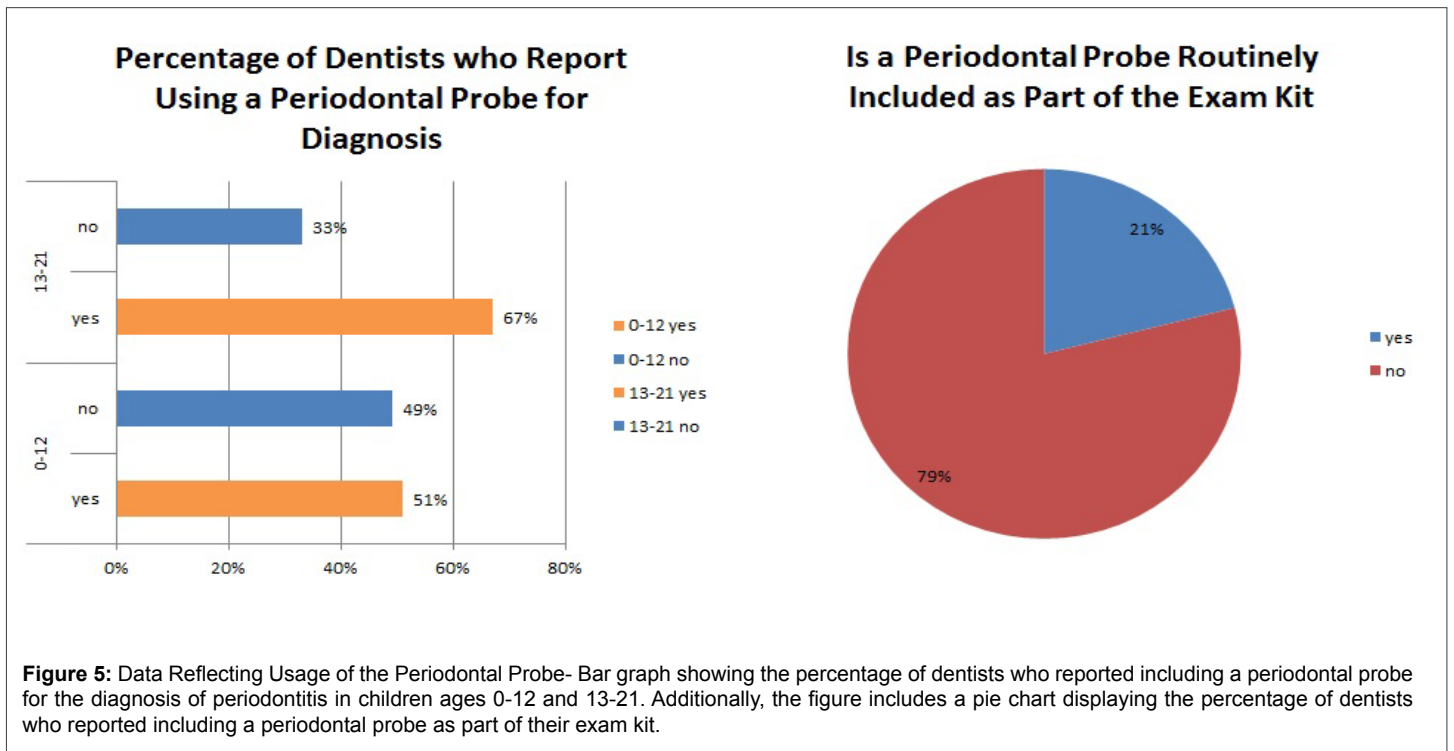
Knowledge

Ninety-six percent of surveyed pediatric dentists correctly identified the normal distance of the CEJ to the bone crest to be between 1-2 mm. Most of the participants correctly identified risk factors for periodontitis to be family history of periodontitis (90%), African-American race (70%) and lower family income (72%). Most of the pediatric dentists correctly identified the most susceptible teeth for aggressive periodontitis to be the first molars (92%) and the incisors (75%). However, 14% and 21% of responders also incorrectly identified canines and second molars, respectively.

Treatment

Pediatric dentists reported they included prophylaxis (46%), scaling and root planning (47%) and oral hygiene instructions (51%) for the treatment of aggressive periodontitis and 24% reported the use of antibiotic regimen (Figure 7). However, 90% of the participants reported that they referred patients with aggressive periodontitis at some point. Forty-six percent reported having referred more than one case to a periodontist in the last 6 months.





Confidence levels and associations

Results indicate that most pediatric dentists report being mostly confident in performing periodontal diagnosis (74%) and evaluating treated cases (59%) and less confident in performing non-surgical (52%) and surgical therapies (1%) and treatment planning (32%) (Table 1). Non-private practitioners tended to be more confident in making periodontal diagnosis ($p < 0.001$) than private practitioners. Additionally, pediatric dentists who were more confident in treatment planning ($p = 0.0051$) and in non-surgical periodontal therapy ($p = 0.0105$) indicated the correct combination of required treatments for periodontitis. Lower confidence levels with treatment planning ($p = 0.0006$) and non-surgical periodontal therapy ($p < 0.0001$) were associated with a greater desire to attend a continuing education (CE) course on periodontal diseases in children. With regard to those wishing to attend a CE course, 77% said “yes” while 4% said “no” and the other 19% were undecided.

Discussion

In 2003 the AAP stated that all patients are required to receive a periodontal evaluation as a component of their routine exam [2]. Our study shows that among those who responded, almost all of the pediatric dentists in Florida assess periodontal health in children/adolescents every 6 months (99%). Our findings also indicate there is an increase in the diagnosis of both gingivitis and periodontitis in patients aged 13-21 compared to those in the age range of 0-12. Puberty is known to increase inflammation and gingivitis levels [16]. Thus, this could explain the higher frequency of periodontitis diagnosis in older children reported by the pediatric dentists in the present study.

Several methods used in the assessment of periodontal disease severity include radiographic analysis, visual assessments, and pocket depth measurements, with the use of a periodontal probe [5]. Periodontal Screening and Recording (PSR), a system endorsed by the AAP, provides

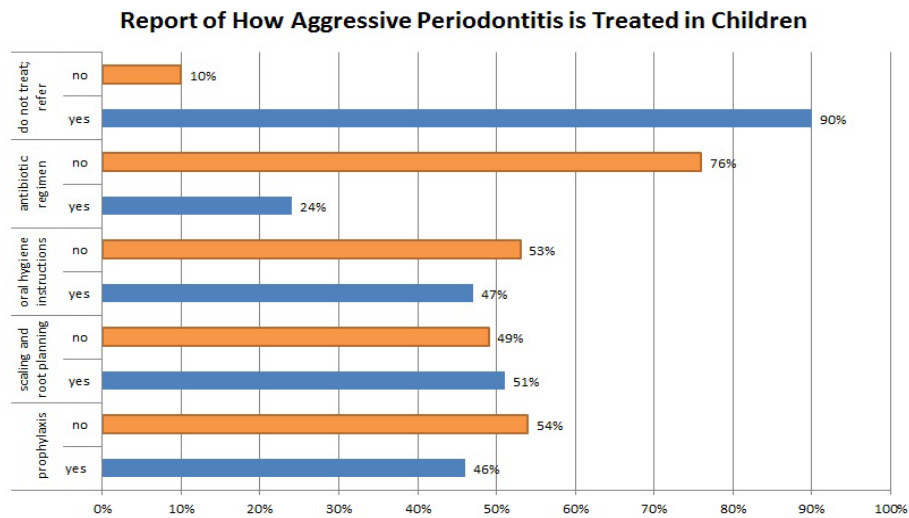


Figure 7: Treatments Used by Survey Responders- Bar graph displaying treatment options chosen by surveyed dentists for aggressive periodontitis cases.

early disease detection, includes a complete evaluation of all sites of periodontal disease risk, and simplifies record keeping, induces time effective screenings, aids in patient education, and is a motivational tool. Additionally, it requires no expensive equipment, and ensures greater patient comfort. Measuring probing depths is a key component of the PSR method [8]. Greater than 88% of the pediatric dentists in this study reported using radiographs and visual assessment for diagnosis of their pediatric patients. However, although most dentists surveyed here reported they use a periodontal probe to diagnose periodontal disease in their patients, only 21% report including a probe as part of their examination kit. Interestingly, in younger children/adolescents (aged 0-12) the use of a probe was negatively associated with finding periodontal disease, likely because these children are less prone to be affected by this disease. However, it is still important to properly screen children for periodontal disease in order to prevent progressive chronic disease later in life. For instance, the use of a probe in older adolescents/young adults, aged 13-21, was positively correlated with the diagnosis of periodontal disease. Thus, the use of a periodontal probe is helpful to detect and/or confirm periodontal diagnosis, as it allows for accurate measurements of pocket depth, bleeding, and attachment levels [8]. The underutilization of proper periodontal diagnosis tools during examination could lead to a lower rate of early diagnosis of periodontal disease in the younger population, and ultimately contribute to higher prevalence of this disease in the adult population. In fact, a recent report on the adult prevalence of periodontitis in the US is an alarming 47% [9], thus prevention at earlier stages is essential.

Research has shown that treatment of periodontitis in primary teeth is very effective [7] and can also affect the periodontal status of permanent dentition [15], thus it is important to early diagnose and treat periodontitis. For instance, a study has shown that treatment of periodontitis in primary teeth led to alveolar bone regeneration and permanent teeth with a healthy periodontium [16]. Together these studies provide an excellent indication that early treatment of this disease in primary dentition could be beneficial later in life. In fact, our results indicate that approximately half of dentists surveyed provided treatment to their patients with aggressive periodontitis through prophylaxis, scaling and root planning, and OHI. Interestingly, roughly a quarter reported providing an antibiotic regimen as part of treatment plan for this disease. Evidence has consistently shown that aggressive periodontitis patients benefit from the use of a systemic

antibiotic regimen accompanied with scaling and root planning when compared to mechanical therapy alone [7,17-21]. However, most dentists did report referring their patients to a specialist for treatment of this disease.

Extensive work has been completed on the risk factors for periodontal diseases. Risk factors include: lifestyle choices, common diseases such as diabetes, low calcium and vitamin D status, genetic factors, ethnicity, and educational level [22]. In the current study, correct risk factors that pediatric dentists identified were African-American race, low socioeconomic status, and familial disease history. A little over half correctly identified the first two, while 90% identified the latter. Family history is an important factor, especially for early identification with children of parents with a history of periodontal disease. Additionally, pediatric dentists should be aware of which teeth are generally susceptible to each form of periodontitis. For instance, first molars and incisors are more susceptible to disease in LAgP, while the entire dentition is equally susceptible to generalized chronic and aggressive forms [1]. Respondents in the current study correctly identified the teeth that are generally involved in localized aggressive periodontitis.

Regarding confidence levels, many dentists felt confident in making a diagnoses and evaluating cases that were previously treated. Many of the pediatric dentists referred patients and therefore were less likely to be confident in treatment planning, performing non-surgical or surgical periodontal therapy. However, those most confident in treatment planning and performing non-surgical periodontal therapy were those who correctly identified the most effective treatment regimen for patients with periodontal disease. Additionally, those who were less confident in treatment planning and non-surgical therapy were more interested in a CE course on periodontal disease in children/adolescents. Thus, more education and awareness of proper diagnosis and treatment of periodontal disease in children/adolescents seem to be warranted for pediatric dentists.

Conclusions

Periodontal disease is significant among the adult population. Recent reports indicate that its high prevalence among young population warrants greater attention at the pediatric level. In order to make a large impact in the future prevention of periodontal disease in this age group, all pediatric dentists need to properly recognize and treat each type of periodontal

disease affecting children. This survey showed that although pediatric dentists show good knowledge on periodontal disease risk factors and diagnosis in children/adolescents, a low number actually reported including a periodontal probe in their examination kit. Additionally, although pediatric dentists showed good confidence levels on diagnosis of periodontal disease, they are much less confident in its treatment. Thus, more education and awareness of proper diagnosis and treatment of periodontal disease in children/adolescents is warranted for pediatric dentists. This observation is supported by the majority of the surveyed dentists (77%) who report an interest in CE courses offering information on periodontal disease affecting this age group.

Acknowledgements

The authors would like to report no conflicts of interest in this study and also would like to acknowledge the assistance of Drs. Robert Primosch and Marcio Guelmann in the input on the questions of this survey as well as facilitating the distribution of these surveys. This study was supported by internal funds of the Department of Periodontology at the University of Florida College of Dentistry.

References

1. Califano JV, Research, Science and Therapy Committee American Academy of Periodontology (2003) Position paper: periodontal diseases of children and adolescents. *J Periodontol* 74: 1696-704.
2. Greenwell H; Committee on Research, Science and Therapy. American Academy of Periodontology (2001) Position paper: Guidelines for periodontal therapy. *J Periodontol* 72: 1624-8.
3. Coventry J, Griffiths G, Scully C, Tonetti M (2000) ABC of oral health: periodontal disease. *BMJ*. 321: 36-39.
4. Armitage GC (1999) Development of a classification system for periodontal diseases and conditions. *Ann Periodontol* 4:1-6.
5. Clerehugh V, Kindelan S (2012) Guidelines for periodontal screening and Management of children and adolescents under 18 years of age.
6. Oh TJ, Eber R, Wang HL (2002) Periodontal diseases in the child and adolescent. *J Clin Periodontol* 29: 400-410.
7. Merchant SN, Vovk A, Kalash D, Hovencamp N, Aukhil I, et al. (2014) Localized aggressive periodontitis treatment response in primary and permanent dentitions. *J Periodontol* 85: 1722-1729.
8. Piazzini LF (1994) Periodontal screening & recording (PSR) application in children and adolescent. *J Clin Pediatr Dent* 18:165-171.
9. Eke PI, Dye BA, Wei L, Slade GD, Thornton-Evans GO, et al. (2013) Self-reported measures for surveillance of periodontitis. *J Dent Res* 92: 1041-1047.
10. Albandar JM, Tinoco EM (2002) Global epidemiology of periodontal diseases in children and young persons. *Periodontol* 29: 153-176.
11. Cappelli DP, Ebersole JL, Kornman KS (1994) Early-onset periodontitis in Hispanic-American adolescents associated with *A. actinomycetemcomitans*. *Community Dent Oral Epidemiol* 22: 116-21.
12. Sheiham A (1969) The prevalence and severity of periodontal disease in Surrey schoolchildren. *Dent Pract Dent Rec* 19: 232-238.
13. Susin C, Haas AN, Albandar JM (2014) Epidemiology and demographics of aggressive periodontitis. *Periodontol* 2000 65: 27-45.
14. Löe H, Brown LJ (1991) Early onset periodontitis in the United States of America. *Journal of Periodontology* 62: 608-616.
15. Sjödin B, Matsson L, Unell L, Egelberg J (1993) Marginal bone loss in the primary dentition of patients with juvenile periodontitis. *J Clin Periodontol* 20: 32-36.
16. Bimstein E, Ram D, Irshied J, Naor R, Sela MN (2002) Periodontal diseases, caries, and microbial composition of the subgingival plaque in children: a longitudinal study. *ASDC J Dent Child* 69: 133-137.
17. Haffajee AD, Socransky SS, Gunsolley JC (2003) Systemic anti-infective periodontal therapy. A systematic review. *Ann Periodontol* 8: 115-81.
18. Walker C, Karpinia K (2002) Rationale for use of antibiotics in periodontics. *J Periodontol* 73: 1188-96.
19. Beliveau D, Magnusson I, Bidwell JA, Zapert EF, Aukhil I, et al. (2012) Benefits of early systemic antibiotics in localized aggressive periodontitis: a retrospective study. *J Clin Periodontol* 39: 1075-1081.
20. Guerrero A, Griffiths GS, Nibali L, Suvan J, Moles DR, et al. (2005) Adjunctive benefits of systemic amoxicillin and metronidazole in non-surgical treatment of generalized aggressive periodontitis: a randomized placebo-controlled clinical trial. *J Clin Periodontol* 32: 1096-107.
21. American Academy of Periodontology--Research Si, and Therapy Committee, Dentistry AAoP (2005) Treatment of plaque-induced gingivitis, chronic periodontitis, and other clinical conditions. *Pediatr Dent* 27: 202-211.
22. Genco RJ, Borgnakke WS (2013) Risk factors for periodontal disease. *Periodontol* 2000. 62: 59-94.