

Timing of Established Dental Home and Oral Health Outcomes

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ABSTRACT

Purpose: The purpose of this project was to evaluate timing of established dental homes at the Holyoke Health Center and its subsequent effect on DMFT at age 6.

Methods: This quality improvement project was conducted by collecting data from the charts of patients at the Holyoke Health Center in Holyoke, Massachusetts between the years of 2011-2023. Patients were divided into groups by age of first dental visit: 0-11, 12-23, 24-35, 36-47, 48-59 months of age. Data analysis was conducted comparing DMFT scores at initial visit and at 72-83 months of age visit.

Results: The results of this QI project revealed that in this population there was a trend toward higher DMFT scores the later the first dental visit occurred. The results revealed that regardless of first visit dental age, the average DMFT at age 6 was not significantly different. The average difference in DMFT between first visit and age 6 was significantly higher in the 12-23 month group. It was also significant that the younger the patient at their first dental visit the less likely they were to follow up with consistent preventive care.

Conclusion: This project provides helpful information regarding the trends related to establishment of a dental home at Holyoke Health Center and demonstrates that this population may not respond positively toward traditional efforts in this area. There needs to be higher emphasis on regular follow up and oral health education for improved at home care that may reduce dental disease.

INTRODUCTION

The American Academy of Pediatric Dentistry (AAPD) has published guidelines on the definition and benefits of the dental home. It recommends that children establish a dental home by 12 months of age. ¹ The idea of the dental home was initially modeled on the medical home concept put forth by the American Academy of Pediatrics (AAP). Historically the dental home was often recommended by age 3, however in recent years the age one dental visit has become the standard recommendation. ² A dental home is to include comprehensive and continuous dental care that is characterized by evidence based practice. This definition flows into more specific guidelines including comprehensive assessment of oral diseases and conditions, caries risk assessments, anticipatory guidance, management of infection and trauma, education regarding home care and diet, and continued monitoring and updating of each of these areas throughout childhood and adolescence. ¹ Early childhood caries (ECC) continues to be the greatest challenge to oral health for children. It is defined as “the presence of one or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of six.” ³ The dental home is hypothesized to be one of the important tenants to combating this disease. While the medical home may have significant research associated with its importance and beneficial health outcomes, more evidence surrounding the efficacy of the dental home is necessary. The existing research regarding the early dental home all have one thing in common: Their method was defined by using billing and insurance company expenditures. ^{4,5,6} Our quality improvement project will provide a fresh approach to the data utilizing DMFT instead of cost expenditures. Using this analytical measure will present another angle to consider as we investigate the effectiveness of the early establishment of a dental home. This approach will remove reliance on the third-party insurance companies and focus on dental specific diagnoses and treatment that can be more directly applied to oral health outcomes.

The results of this project, after considering its limitations, may add to the pool of evidence supporting early dental visits for the population at Holyoke Health Center. Discussing the specific results may help when educating parents and caregivers who may question the importance of early dental visits and establishment of a dental home. This project looks to identify if there is a significant difference in DMFT scores at age 72-83 months of age when comparing children who established their dental home at Holyoke Health Center at 0-11, 12-23, 24-35, 36-47, 48-59 months of age. Our hypothesis was that the earlier a dental home is established the better the oral health outcome. We anticipated that children who establish their dental home at a younger age will have lower DMFT scores as well as less change by 83 months of age. This could be attributed to anticipatory guidance, nutritional counseling, oral hygiene instructions, regular dental checkups, professional cleanings, and fluoride application. The earlier these topics are discussed and services rendered, the less time and likelihood children have to be susceptible to ECC prior to education and preventive treatment. Furthermore, if a dental home is established early, disease can be treated earlier and regular follow up can be employed, leading to less extensive treatment and fewer untreated caries.

METHODS

This is a retrospective chart review quality improvement project in which patients were grouped by age of first dental visit and compared to each other utilizing DMFT scores at their initial visit and follow up visit at age 6. This study was conducted at the Holyoke Health Center Pediatric Dental Department utilizing data gathered over the last 12 years of records through the NextGen dental charting software.

The sample size of 182 was calculated using a power analysis with the following criteria: Alpha value of 0.05 and an 80% power percentage. This estimation is based on previous research conducted by Nowak et. al. in the article titled “Do Early Dental Visits Reduce Treatment and Treatment Costs for Children.” ⁶ This research related most closely to the topic surrounding the timing of the establishment of a dental home and its subsequent effect on DMFT.

The population was patients at Holyoke Health Center Pediatric Dental Department who presented to the clinic for a new patient appointment between November 1, 2011 and November 1, 2022. The target population was children under the age of 7 who presented and followed up at the clinic. A chart review was conducted to consider DMFT scores at the patient’s first visit and at the 72-83 month old recall visit.

Inclusion Criteria:

- Patients who presented for their first dental visit between 0 and 59 months of age
- Patients who presented for a periodic evaluation between 72-83 months of age
- Patients with at least one set of quality bitewings between 72-83 months of age
- Patients who presented to HHC as their first and only dental home

Exclusion Criteria:

- Patients with incomplete dental records
- Patients who did not have at least one set of quality bitewings by 83 months of age
- Patients who presented for the first time in our clinic, but are coming from a previous dental home

FIGURE 1: Demographics

	Overall (N=121)	First Visit 0-11 Months of Age (N=2)	First Visit 12-23 Months of Age (N=25)	First Visit 24-35 Months of Age (N=27)	First Visit 36-47 Months of Age (N=38)	First Visit age 48-59 Months of Age (N=29)	P-Value
Gender:							
A. Male	62	1	11	15	21	14	0.898
B. Female	59	1	14	12	17	15	
Race:							
A. American Indian or Native Alaskan	3	1	0	0	1	1	
B. Asian	4	0	0	1	1	2	
C. Black	4	0	0	2	0	2	0.004
D. No Response	54	0	18	10	17	9	
E. White	55	1	7	14	19	14	
Ethnicity:							
A. Hispanic	92	1	20	20	30	21	
B. No Response	11	0	3	2	3	3	0.876
C. Non-Hispanic	17	1	2	5	5	4	
Language:							
A. English	62	1	14	14	18	15	
B. No Response	1	0	0	1	0	0	0.882
C. Other	3	0	2	0	1	0	
D. Spanish	55	0	9	12	19	14	
Insurance:							
A. Medicaid	118	2	25	26	37	28	
B. None	1	0	0	1	0	0	0.036
C. Private	2	0	0	0	1	1	
None							
Periodic Exam Yearly:							
A. No	54	2	19	11	13	9	0.002
B. Yes	67	0	6	16	25	20	

FIGURE 2: Change in DMFT within each first visit age group

	Average DMFT at First Visit	Average DMFT at Age 72-83 Months	P-Value
First Visit 0-11 Months of Age	0	2.5	0.423
First Visit 12-23 Months of Age	0.32	5.8	<0.0001
First Visit 24-35 Months of Age	1.48	4.93	0.006
First Visit 36-47 Months of Age	1.34	4.37	0.0002
First Visit at age 48-59 Months of Age	2.72	4.31	0.138

FIGURE 3: Comparing DMFT scores at first visit and age 72-83 month visit between first visit age groups

	First Visit 0-11 Months of Age	First Visit 12-23 Months of Age	First Visit 24-35 Months of Age	First Visit 36-47 Months of Age	First Visit 48-60 Months of Age	P-Value
Average DMFT at First Visit	0	0.32	1.48	1.34	2.72	0.06
Average DMFT at Age 72-83 months	2.5	5.8	4.93	4.37	4.31	0.64
Difference in DMFT	2.5	5.48	3.44	3.03	1.59	0.003

RESULTS

- The average first visit DMFT was higher in the 48-60 month age group (2.72) than the average DMFT of all the other groups (Average: 1.15). The difference was present and relevant but not statistically significant (p-value: 0.06).
- When considering DMFT at age 72-83 months the difference was found to not be statistically significant across all age groups with a mean of 4.74 (p-value 0.64).
- The change in DMFT from first dental visit to age 72-83 months across all groups was statistically significant with an average change of 3.2 (p-value 0.003).
- When broken down by each group the change was only statistically significant in the 12-23 month group (.32-5.8; p-value <.0001), the 24-35 month group (1.48-4.93, p-value 0.006), and the 36-47 month group (1.34-4.37; p-value 0.0002).

Limitations:

- The data surrounding race revealed a statistically significant difference between the included groups which could lead to some incorrect assumptions regarding the impact race had on the results (p-value 0.004). Furthermore,
- The type of insurance utilized was also statistically significant (p-value 0.036). However, this may be attributed to the fact that only 2 patients had private insurance and 1 had no insurance; the rest of the patients had Medicaid. Finally,
- 54 patients were categorized as not having consistent follow up while 67 were categorized as having consistent regular follow up. This was a statistically significant difference and may reveal that the consistency of follow up may have an impact on the resulting DMFT between groups (p-value 0.002). Specifically, 76% of patients in the 12-23 month group did not have consistent follow up as compared to an average of only 36% in all the other groups.

CONCLUSIONS

- Within this population there was a trend toward higher DMFT scores the later the first dental visit occurred. This is not surprising for multiple potential reasons. If parents are not bringing their children in from a young age, the child is not benefiting from early diagnosis and intervention, preventive care including cleanings and fluoride, and oral health education. Concurrently, if they come in when they are older the teeth have had a longer time to be exposed to cariogenic dietary practices and bacteria.

- Regardless of first visit dental age, the average DMFT at age 72-83 months was not significantly different. This is a particularly discouraging finding because it reveals that regardless of the providers’ efforts to prevent dental disease early on, in the population at Holyoke Health Center it did not make a difference in terms of presence of disease by age 72-83 months. The average difference in DMFT between first visit and age 72-83 months was significantly higher in the 12-23 month age group. This is self-evident as these patients have the longest amount of time between this age and age 72-83 months for the dentition to be exposed to cariogenic diets and bacteria.

- The younger the patient was at their first dental visit the less likely they were to follow up with consistent preventive care. This contributes to our understanding of all of the previous statistics in this project. It is interesting to note that often parents will bring in a 1 year old for a visit. Perhaps, because they do so at that age and, if everything is healthy and normal, they then do not see the importance of future preventive visits. They then bring their child in closer to age 6 due to the presence of caries and the pain that may be associated with it. This is one possible explanation for the lack of follow up in that age group, but there may be an important lesson here related to the importance of emphasizing consistent follow up even at a very young age.

- Further investigation may be beneficial to help eliminate confounding variables related to race, insurance, and other demographic information. This QI project presents and reveals that the trend in the literature relating early establishment of a dental home and its subsequent effect on positive oral health outcomes may not be the case in this population. Further study could be conducted into the reasons for this. This project provides us with a deeper understanding of the challenges this particular population may face in overall oral health care and its relation to the early establishment of a dental home.

REFERENCES

¹ American Academy of Pediatric Dentistry. Policy on the dental home. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry; 2021:43-4.

² American Academy of Pediatrics. The medical home. Pediatrics 2002;110(1Pt1):184-6.

³ American Academy of Pediatric Dentistry. Policy on early childhood caries (ECC): Classifications, consequences, and preventive strategies. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry; 2020:79-81.

⁴ Kolstad, C., Zavras, A., & Yoon, R. K. (2015). Cost-Benefit Analysis of the Age One Dental Visit for the Privately Insured. *Pediatric dentistry*, 37(4), 376–380.

⁵ Savage MF, Lee JY, Kotch JB, Vann WF, Jr. Early preventive dental visits: effects on subsequent utilization and costs. Pediatrics 2004; 114:e418-e423.

⁶ Nowak, A. J., Casamassimo, P. S., Scott, J., & Moulton, R. (2016). Do Early Dental Visits Reduce Treatment and Treatment Costs for Children?. *The Journal of the Michigan Dental Association*, 98(1), 36–42.