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Association between Parenting Styles and Dental Caries in Preschool Children

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Abstract

This study aimed to evaluate the relationship between parenting styles and childhood dental caries using a sample of 3 to 6 years old children in Korea.

The subjects were 158 children aged 3 to 6 years old and their parents in Korea. The parenting styles were divided into three groups (authoritative, authoritarian, and permissive) using a translated version of the Parenting Styles and Dimensions Questionnaire (PSDQ).

Among the 353 parents/child dyads, 158 questionnaires were returned. Authoritative parenting style was the majority (95.6%), followed by authoritarian (3.8%), and permissive (0.6%). There were no statistically significant differences between dental caries and parenting styles. The mean of dft index in authoritative group was lower than others. In the authoritative domain, the higher the authoritative tendency, the lower the dft index.

Overall, authoritative parenting styles resulted in low rates of dental caries for the children. The stronger the authoritative tendency of the parents, the lower the experience of dental caries in the children. Therefore, parenting styles were likely to affect the oral health of a child, but it seemed necessary to supplement the evaluation tool to evaluate the parenting styles.

Key words : Dental caries, ECC, Parental Style, PSDQ

Ⅰ. Introduction

Parenting styles were known to influence the well-being of children[1]. Three types of parenting styles, authoritative, authoritarian, and permissive, had been described by Baumrind[1]. Authoritative parents were controlling, but were also warm and receptive to the child. Authoritarian parents were less friendly and more controlling in their interactions with their child[1]. Permissive parents were non-controlling and nonresponsive toward their child and made few demands. The parenting style of caregiver could influence disease outcomes. The environment that they created for the child could change oral hygiene, dietary practices, and dental attendance patterns[2]. Since the parent was responsible for nearly all aspects of the child's oral health, it could be assumed that the parenting style of the caregiver could influence early childhood caries (ECC)[2].

Evidence supported a potential relationship between parenting styles, child behavior, and dental caries[3], but limited research has been performed on this topic. The most relevant and closely related publication was by Kumar *et al*.[4], who showed a correlation between parenting practices and children's

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dental caries experience. Children exhibited a higher dental caries experience when they were raised with more power assertion parenting practices[4]. Howenstein *et al*.[5] suggested that authoritative parenting styles were associated with few caries. This publication also indicated an association between authoritarian parenting practices and increased caries. On the other hand, Dabawala *et al*.[1] concluded that the association of parenting styles with ECC could not be confirmed. The conclusions about the relationship between parenting styles and dental caries had yet to be concluded and were mixed and controversial.

Biological and environmental factors related to early childhood caries have been well-established[6,7]. However, the relationship between parenting styles and ECC has not been clearly elucidated yet[7], and research on this topic has not been conducted in Korea. This study aimed to evaluate the association between parenting styles and childhood dental caries using a sample of Korean children 3 - 6 years of age.

Ⅱ. Materials and Methods

1. Subjects

A total of 353 children between 3 to 6 years of age from four kindergarten institutions in Korea were surveyed. Before samples were selected, Institutional Review Board (IRB) was received and informed consent from each subject was written (IRB approval number 2018-08-041). Among the kindergarteners, questionnaires were given in advance to the parents at each of the four institutions. The following situations resulted in subject exclusion from the sample size: if the PSDQ questionnaire was partially filled/unreturned, if the parents did not give informed consent for participation in the study, or if the child was absent on the day of the oral examination.

2. Methods

1) Parenting Styles Assessment Tool

The PSDQ contained 62 statements regarding different parent reactions to child behavior[8]. Translated version which was used in a study conducted in the department of education in Korea[9] was used in this study (Fig. 1). The questionnaire assessed the parenting style based on Baumrind's parenting types: authoritative, authoritarian, and permissive[5]. Each parent was asked to rank each statement on a Likert scale from 1 to 5 (1 equals never, 2 equals once in a while, 3 equals half the time, 4 equals very often, and 5 equals always) as to how regularly they and their spouse/significant other (if applicable) exhibited each behavior[5]. The scoring key of the PSDQ was used to classify the parents into one of the three specific parenting styles. Depending on the previous study[8], there were 27 items for the authoritative parenting style. The authoritarian style included 20 questions, while the permissive manner included 15 questions (Table 1). An overall mean score in each parenting style category was calculated, and this score determined the parent's particular style with the highest mean score placing the parent in the proper parenting category[5].

2) Demographic factors

The questionnaire as a second part involved individual data including gender, parent's educational level, and order of birth.

3) Oral examinations

A dentist performed oral examinations using dental mirrors and explorers with hand lights in the kindergarten classes. Before the oral examinations, the dentist was trained and calibrated on the WHO criteria of dental caries. Ten new patients who visited our hospital were examined at the time of initial visit and first visit for treatment without radiography. The intraclass correlation coefficient was 0.80 and demonstrated good to excellent correlation.

4) Analysis of data

The criteria for the diagnosis of dental caries was based on the requirements from the World Health Organization (WHO). The experience of dental caries was distinguished as dt (decayed primary tooth), ft (filled primary tooth), and mt (missing primary tooth). The dft index was the sum of decayed and filled primary teeth. As the primary tooth were not missing early physiologically, missing tooth especially posterior primary tooth contained to decayed or filled teeth under 5 years old.

To compare the dft index according to the parenting styles, the parenting styles were analyzed in two ways. The first method was to classify the parenting styles as previously described[5] and compare the dft index. The second method compared the dft index according to the subdomains of each parenting style. All subjects were summed and averaged the scores of the questionnaire items for each parenting style (Table 1). By this method, all subjects had three average values (authoritative domain, authoritarian domain, and permissive

II. <"양육방식"에 관한 질문지>

*감사합니다. 어머니의 양육방식에 관한 질문지입니다. 끝까지 응답해 주시길 부탁드립니다.
*다음은 자녀에 대한 부모님 자신의 행동입니다. 자신에게 가장 적합한 곳에 V표 해 주세요.

문항	거의 그렇지 않다 (1)	간혹 그렇다 (2)	보통 이다 (3)	자주 그렇다 (4)	거의 그렇다 (5)
1. 아이가 자기의 문제를 말하도록 격려한다.					
2. 아이가 잘못했을 때 논리적으로 설명하기보다는 벌을 주는 편이다.					
3. 아이 친구들의 이름을 안다.					
4. 아이를 훈육하는 것이 어렵다고 느낀다.					
5. 아이가 잘할 때 칭찬한다.					
6. 아이가 말을 듣지 않으면 때린다.					
7. 아이와 함께 농담을 하기도 하고 같이 놀기도 한다.					
8. 아이가 부모의 기대와 반대로 행동해도 잔소리하거나 꾸짖지 않는다.					
9. 아이가 상처 받거나 좌절했을 때 위로해주고 안아준다.					
10. 아이가 잘못하면 설명을 하기보다는 아이에게서 특권을 빼앗는 벌을 준다. (예를 들어 과자 못 먹기 같은)					
11. 아이가 버릇없이 하는 행동을 허용한다.					
12. 아이가 화가 났을 때 편안하게 해주고 이해하려고 한다.					
13. 아이가 잘못했을 때 고함을 지른다.					
14. 아이를 편안하고 긴장하지 않게 하려고 노력한다.					
15. 아이가 다른 누군가를 괴롭혀도 가만히 둔다.					
16. 아이가 어떤 일을 할 때 미리 어떻게 행동했으면 하는지 아이에게 충분히 설명해준다.					
17. 아이가 무엇이든 더 잘하도록 야단친다.					
18. 인내심을 가지고 아이를 대한다.					
19. 아이가 말을 듣지 않을 때 아이를 움켜쥐거나 엄하게 단속한다.					
20. 아이에게 벌을 주겠다고 말은 하지만 실제로 주지는 않는다.					
21. 아이의 감정이나 욕구를 잘 알고 반응해준다.					
22. 가족의 규칙을 정할 때 아이가 자기 의견을 말하게 한다.					
23. 아이와 언쟁을 할 때가 있다.					
24. 아이를 키우고 가르치는데 부모의 자질이 있다고 확신한다.					
25. 아이에게 규칙을 지켜야 하는 이유를 설명해 준다.					
26. 아이의 감정보다 내 감정에 더 신경을 쓴다.					
27. 아이가 노력한 것이나 성취한 것을 인정해주고 그것에 대해서 아이에게 말해준다.					
28. 아이가 잘못했을 때 설명을 하기보다는 어떤 곳에 혼자 있게 벌을 준다.					
29. 아이에게 행동의 결과를 이야기 하도록 격려하여 그 행동이 어떤 영향을 미치는지 알게 해준다.					
30. 아이가 잘못했을 때 처벌하면 부모를 싫어할까봐 걱정이 된다.					
31. 아이에게 어떤 것을 시키기 전에 아이가 원하는 것이 무엇인지 먼저 생각한다.					
32. 아이에게 분노를 폭발시키기도 한다.					
33. 유치원생활에서 아이가 안고 있는 문제와 아이의 관심사에 대해 알고 있다.					
34. 아이에게 실제로 벌을 주기보다는 말로만 벌을 주겠다고 엄포를 놓는다.					
35. 아이를 안아주고 뽀뽀해주며 손 잡아주는 등 애정을 표현한다.					
36. 아이의 잘못된 행동을 모른 체 한다.					
37. 아이를 야단칠 때 신체적인 벌을 사용한다.					

Fig. 1. Parenting Styles and Dimensions Questionnaire (PSDQ).

문항	거의 그렇지 않다 (1)	간혹 그렇다 (2)	보통 이다 (3)	자주 그렇다 (4)	거의 그렇다 (5)
38. 아이가 행동을 잘못했을 때 벌을 주거나 교육을 한다.					
39. 실수로 나의 처벌이 잘못되었을 때 아이에게 사과한다.					
40. 아이가 해야 할 것들을 말해준다.					
41. 아이가 억지를 무리며 떼를 쓰면 들어준다.					
42. 나는 아이가 잘못 행동했을 때 그것을 설명해주고 그 이유를 알아본다.					
43. 아이가 잘못 행동했을 때 찰싹 때린다.					
44. 나는 아이와 맞지 않는 것 같다.					
45. 아이가 다른 사람에게 폐가 되는 행동을 해도 그냥 둔다.					
46. 아이와 함께 따뜻하고 친밀한 시간을 가진다.					
47. 아이끼리 싸우면 먼저 야단치고 나서 그 이유를 물어본다.					
48. 아이가 내 의견에 동의하지 않는 경우에도 자신의 의견을 자유롭게 표현하도록 격려한다.					
49. 아이가 말을 잘 들으면 물질적 보상을 준다.					
50. 내가 지시한 것을 아이가 하지 않으면 꾸짖거나 야단을 친다.					
51. 아이가 의견을 표현하도록 격려함으로써 아이의 의견을 존중한다는 것을 보여준다.					
52. 아이를 위해 엄격하고 잘 만든 규칙을 정해놓고 있다.					
53. 아이에게 좋은 행동과 나쁜 행동에 대해 내가 어떻게 느끼는 지를 설명해 준다.					
54. 나는 아이에게 변명할 기회를 잘 주지 않고 벌을 준다며 위협한다.					
55. 가족이 어떤 계획을 세울 때 아이가 원하는 것이 무엇인지를 고려한다.					
56. 아이가 왜 부모의 말을 들어야 하는지 질문하면 "하라면 해, 난 네 부모야"라고 말한다.					
57. 나는 아이가 잘못된 행동을 했을 때, 어떻게 해야 할지 잘 모를 때가 있다.					
58. 아이가 한 행동의 결과가 어떻게 해서 그렇게 되었는지 설명 해준다.					
59. 나는 아이에게 자기가 할 일은 하라고 시킨다.					
60. 아이의 잘못된 행동을 더욱 바람직한 행동으로 바꾸어 준다.					
61. 아이가 말을 듣지 않을 때 밀쳐낸다.					
62. 아이에게 규칙을 지켜야 하는 이유를 강조한다.					

Fig. 1. Parenting Styles and Dimensions Questionnaire (PSDQ). (Continuation 1)

Table 1. Subdimensions for Parenting Style and Dimension Questionnaire (PSDQ)

Parenting Styles	Subdimensions	Items number
Authoritative	11 items - warmth/involvement	1, 3, 5, 9, 12, 21, 27, 33, 35, 39, 46
	7 items - reasoning/induction	16, 25, 29, 42, 53, 58, 62
	5 items - democratic participation	22, 31, 48, 55, 60
	4 items - good nature/easygoing	7, 14, 18, 51
Authoritarian	4 items - verbal hostility	13, 23, 32, 44
	6 items - corporal punishment	2, 6, 19, 37, 43, 61
	6 items - nonreasoning/punitivestrategies	10, 26, 28, 47, 54, 56
	4 items - directiveness	17, 40, 50, 59
Permissive	6 items - lack of follow-through	11, 20, 34, 38, 41, 49
	4 items - ignoring misbehavior	8, 15, 36, 45
	5 items - self-confidence	4, 24, 30, 52, 57

domain). Each parenting style subdomain was grouped into five groups according to the Likert scale. The higher the group number, the more the parent showed the characteristics of each parenting style. The dft index was compared between groups by each parenting domain.

5) Statistical Analysis

R language version 3.3.3 (R Foundation for Statistical Computing, Vienna, Austria) and T&F program ver. 1.0 (YooJin BioSoft, Korea) were used for all statistical analyses. Mean values of demographic characteristics were calculated and analyzed using Mann-Whitney analysis and Kruskal-Wallis test. Association between parenting styles and dft index were analyzed by Mann-Whitney analysis. Kruskal-Wallis test was conducted to compare the dft index according to each subdomain. Post-Hoc analysis was performed using Bonferroni algorithm.

Ⅲ. Results

The questionnaire was distributed to 353 children and their parents. A total of 158 questionnaires were returned (response rate of 44.7 percent), and these children underwent clinical examinations. Ninety boys made up 52.9 percent of the total subjects, while 80 girls made up 47.1 percent of the total number of subjects. Based on age, 23 children (3 years old) accounted for 14.6 percent of the study population, while 43 children (27.2 percent) were four years old. Fifty-four children (34.2 percent) were five years old, and 38 children (24.0 percent) were six years old (Table 2). Approximately, one half (55 percent) of the subjects had one or more decayed teeth with a mean dft index of 3.6.

The results of the survey on the demographic factors were as follows (Table 3). Differences according to gender were found in girls with an average dft index of 2.92 and boys with 2.84 with no statistically significant difference (p = 0.981). According to the parents' educational level, the dft index decreased as the educational level increased, but was statistically insignificant (p = 0.502). In the dft index difference, according to the birth order, the dft index increased as the birth order increased (p = 0.020).

Among the 158 parents/child dyads who completed both questionnaires and oral examinations, the results of the PSDQ were as follows: 151 parents (95.6 percent) exhibited authoritative parenting, 6 (3.8 percent) exhibited authoritarian parenting, and only 1 (0.6 percent) exhibited permissive parenting. The authoritative parenting style was dominant. The difference between the dft index, according to the three groups, was shown in Fig. 2, and the p value was not statistically significant at 0.068. The mean dft index in the authoritative group was 2.77 and the lowest dft index among all the groups. In the authoritarian group, the dft index was 5.00, the second highest. In the permissive group, the dft index was 7.00, the highest value among the three groups.

According to each subdomain, the dft index was compared. The distribution of mean scores in each subdomain of the parenting styles was 1 to 5, so it was divided into five sections. In the authoritative domain, the higher the authoritative tendency, the lower the dft index (Fig. 3A). Unlike the trend of the authoritative domain, the dft index increased as the authoritarian tendency became stronger (Fig. 3B). As parental tolerance increased, the child's dft index also increased (Fig. 3C).

Table 2. Distribution by age

Age (year)	Cases N (%)
3	23 (14.6)
4	43 (27.2)
5	54 (34.2)
6	38 (24.0)

Table 3. Comparison of demographic characteristics of children

	Cases N (%)	dft index	p value
Gender			0.981
Boy	83 (52.5)	2.84	
Girl	75 (47.5)	2.92	
Parents' education level†			0.502
High school	39 (24.7)	3.31	
College	110 (69.6)	2.75	
Graduate School	9 (5.7)	2.33	
Birth Order			0.020*
First	52 (41.6)	2.44	
≥ Second	73 (58.4)	3.55	
Presence of sibling			0.057
Only child	33 (20.9)	2.07	
Multi-child	125 (79.1)	3.06	

Mean difference test was performed using Mann-Whitney analysis
†: Kruskal-Wallis test was performed to test mean difference
p value from Mann-Whitney analysis
†: p value from Kruskal-Wallis test

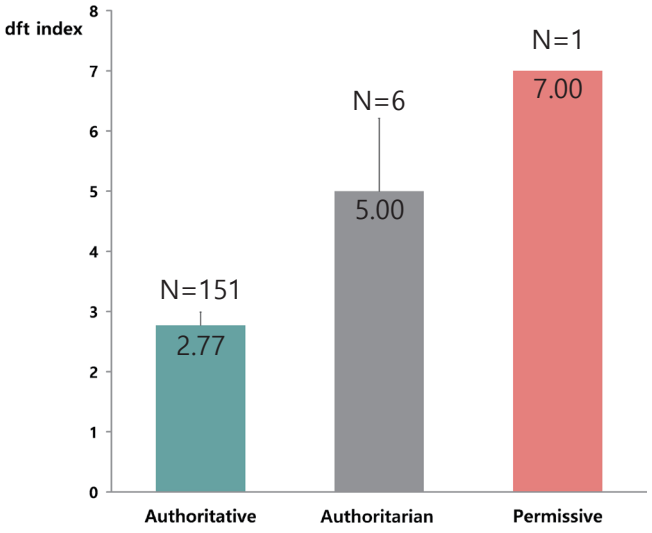

Fig. 2. Comparison of parenting style and dft index.
Mann-Whitney analysis was performed to test mean difference between authoritative and authoritarian group.
Mean values in each subgroup are presented above each figure.
Sample number is presented as N= in the top of each figure.
p value from Mann-Whitney test.
p values are computed using post hoc analysis algorithm of Bonferroni.

IV. Discussion

The association of parenting style with ECC would not be determined, as all the three types of parenting styles could not be differentiated in the sample. In a study of ECC risk factors in children aged below four years, Seow *et al*.[10] reported a tendency for increased laxness, verbosity, and the over-reaction type of parenting behavior among the parents of children with ECC compared to caries-free control children, but the difference was not statistically significant. In an earlier study carried out in children between the age group of 2 - 14 years by Seran *et al*.[11], no relationship could be established between oral health status and parenting style assessed with PSDQ. However, race/ethnicity, level of parents' education, and socioeconomic status were associated with oral health status[11]. Howenstein *et al*.[5] reported that the prevalence of dental caries was statistically significantly lower in authoritative

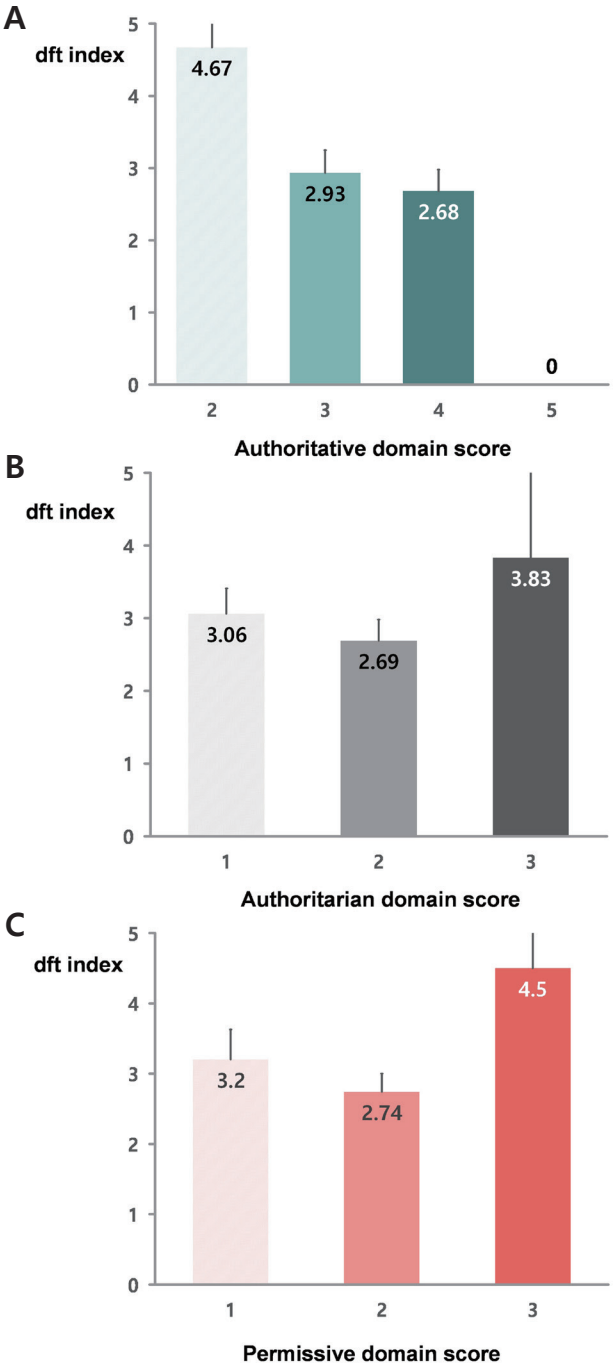

Fig. 3. dft index described by (A) Authoritative domain (B) Authoritarian domain (C) Permissive domain. (group 1: 1≤score<2, group 2: 2≤score<3, group 3: 3≤score<4, group 4: 4≤score<5, group 5: score=5)
Kruskal-Wallis test was performed to test mean difference.
Mean values in each subgroup are presented above each figure.
p value from Kruskal-Wallis test.
p values are computed using post hoc analysis algorithm of Bonferroni.

parental children. In the present study, compared to the other groups in the children of authoritative parents, the dft index was lower although not statistically significant. Besides, there was a tendency for the dft index to be lowered as the parenting style exhibited an authoritative trend.

In general, an authoritarian group with a strong dictatorial tendency might be considered to have a lower dft index. However, in this study, the dft index was lower in the authoritative group compared to the authoritarian group. Kumar *et al*.[4] showed that the more authoritative the parents were, the lower the risk of caries. They also demonstrated that parents who were coercive and authoritarian did not help improve their children's oral health[4]. Previous studies described that the authoritarian parenting style was generally oppressive, but oral hygiene was not the primary concern and resulted in a higher incidence of dental caries[5].

A systematic review by Hooley *et al*.[6] revealed that children with higher birth order and belonging to large size families are more prone to caries[12]. Wyne *et al*.[13] also reported that birth order was related to caries, with the first-born child presenting a higher experience of caries. This could be attributed to the relative lack of knowledge on the part of new parents in managing a child's behavior and lack of dental health education and dietary counseling[13]. In this study, multi-child families showed a higher dft index when compared to one-child families. However, unlike previous studies, the lower the birth order, the more likely caries were to occur (p = 0.020). This was because it might be related to show a tendency of two-income parents in recent years. The number for two-income parents had increased, the amount of time and resources invested in their children had decreased. Furthermore, as the number of children in a family increases, the time and effort of each child would be reduced, so they would not pay much attention to oral health care.

The following limitations existed in this study. Firstly, the PSDQ questionnaire had a limit on reliability as an assessment tool, especially for Korean parents. The reason why the PSDQ questionnaire was selected as an assessment tool of parenting style was that a lot of previous related studies used the PSDQ questionnaire, and review studies about the reliability and validity of PSDQ suggested that PSDQ exhibited high reliability and validity[14]. Although defining the parenting style as one tendency itself was limited, it was considered meaningful to typify the parenting style, so PSDQ was chosen. Nevertheless, in our study, the reasons why the results of PSDQ were biased towards one side were that Korean parents tended to be unfaithful to external research that must be submitted to the kindergarten class or school. Moreover, the parents tended to provide false statements in self-reported questionnaires.

Secondly, as a result of the survey, there was a possibility that the permissive parenting style appeared as one person and resulted in errors in statistical analysis. Therefore, the dft index according to the overall tendency of each subdomain of each parenting style was analyzed. To complement these points in future studies, they should be used to supplement and evaluate future research using other advanced parenting methods such as clustering to assess parenting styles[15].

Although the biological and environmental factors associated with early childhood caries were well established, the importance of parenting styles of preschoolers was undervalued compared to these factors. Therefore, the dentist must play a role in identifying and guiding the parenting style in the dental office. In fact, to prevent dental caries in children, a patient-centered approach is required in addition to the existing population-based approach.

V. Conclusions

There were no statistically significant differences between dental caries and parenting styles. Authoritative parenting styles resulted in children having low rates of dental caries (low dft index). The stronger the authoritative tendency of the parents, the lower the experience of dental caries in the children. The lower the birth order, the more likely caries were to be induced (p = 0.020). The dentist must recognize the parenting styles and their importance, and be aware of the importance of parent education.

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국문초록

미취학아동에서의 부모의 양육방식과 치아 우식 간의 상관 관계

이미소 전공의 • 탁민경 전공의 • 김재곤 교수 • 양연미 교수 • 이대우 교수

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이 연구의 목적은 3세에서 6세 사이의 한국 어린이를 대상으로 치아 우식과 부모의 양육방식 간의 상관 관계에 대해 평가하는 것이다. 3세에서 6세 사이의 어린이 158명과 그들의 부모를 대상으로 시행하였다. 부모의 양육방식은 권위있는 부모, 권위주의적인 부모, 허용적인 부모로 3가지로 분류할 수 있으며, Parenting Styles and Dimensions Questionnaire(PSDQ)를 번안하여 부모의 양육방식을 평가하는데 척도로써 사용하였다.

353명의 부모와 자녀 중 158개의 설문지가 완성되었고, 권위있는 부모가 95.6%로 대다수를 이루었으며 권위주의적인 부모가 3.8%, 허용적인 부모가 0.6%를 차지하였다. 부모의 양육방식과 치아 우식과의 관계는 통계학적으로 유의하지 않았다. 권위있는 양육방식에서의 평균 dft index 값이 다른 그룹에 비해 낮은 결과를 보였다. 권위있는 양육방식의 하위척도들에 따른 dft index를 비교하였을 때, 권위있는 경향 정도가 증가할수록 dft index가 감소하였다.

권위있는 양육방식의 자녀에서 우식 경험률이 낮게 나왔다. 또한 권위있는 경향이 강해질수록 자녀의 우식 경험률이 낮아졌다. 따라서 부모의 양육방식이 자녀의 구강 건강에 영향을 미칠 수 있기에 치과의사는 부모의 양육방식의 중요성을 인지하고 이에 대해 지도하는 역할을 수행해야 할 것이다.