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The Effect of Vitamin Use During Pregnancy on First Tooth Eruption Time in Postpartum Period

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Abstract

Objective: Vitamin supplements are commonly used to support the nutritional status of pregnant women during gestation. In this multidisciplinary study, we discussed the relationship between the three most used vitamin supplements in the Turkish population (vitamin D, vitamin B complexes, and multivitamins prepared for pregnant women) during pregnancy and tooth eruption time in babies.

Methods: The data of approximately 1,000 patients who gave birth in the obstetrics and gynecology clinic of our university were retrospectively reviewed. The babies of 145 patients who could be reached and who met the inclusion criteria were followed up in their postnatal period. Babies' first tooth eruption time, presence of caries, use of breast milk, and number of missing or excess teeth according to the month were determined.

Results: No statistically significant differences were found between the groups regarding maternal age, infant age, number of caries, breast milk use, or the number of missing/excessive teeth. However, it was found that patients who took vitamin D + B and patients who took only vitamin B had significantly earlier first tooth eruption times than those who used all three vitamins. The patients who used three vitamins had the latest tooth eruption time. There was no statistically significant difference between first tooth eruption time and maternal age or breast milk use.

Conclusion: The use of vitamins in pregnant women can affect babies' oral–dental systems, which develop while they are still in their mother's womb. More detailed information on the use of vitamins is needed in the future.

Keywords: Vitamins, tooth, pregnancy, health.

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INTRODUCTION

Tooth development and eruption in infants is affected by many biological factors (1). The earliest histological symptom of tooth development starts with the thickening of the oral epithelium on Day 11 of pregnancy and permanent dentition begins in week 20 of gestation, but the enamel matrix secretion for permanent teeth begins after birth (2). Micronutrient deficiencies at these two key time points can directly affect matrix secretion in hard dental tissues. These deficiencies can also impair tooth formation, mineralization, and the eruption process (3).

Vitamins are also micronutrients. In the literature, there are lots of studies about vitamins and dental development. However, its role in oral health or tooth eruption is not clear yet (4). It is generally known that an imbalance of vitamins leads to malnutrition, and they have great impact on dental health. Also, their deficiency causes oral problems and diseases (5). Vitamins greatly affect the nutritional status of hard dental tissues during developmental stages and, therefore, vitamin deficiency (6).

It is known that the time of the first tooth eruption is multifactorial and is affected by many variables. Besides personal characteristics such as genetics, ethnicity, and gender, other factors affect the time of first tooth eruption, including smoking and excessive caffeine consumption during pregnancy, birth weight, nutritional status of the baby at birth, gestational week, socioeconomic status, systemic diseases, obesity, and the environmental factors (7,8).

Vitamins are essential substances and we can only supply small amounts from food, so they are often provided through food supplements (5,9). Today, vitamin supplements are commonly used to support the nutritional status of pregnant women during gestation. Since the use of vitamin D and multivitamins in pregnancy period is supported by the Ministry of Health, it is very common in the Turkish population. Other vitamin supplements most commonly used during pregnancy are pyridoxine and other B complex vitamin supplements to reduce pregnancy-related nausea and vomiting, especially hyperemesis gravidarum (10). In this multidisciplinary study, we discussed the relationship between the three most used vitamin supplements in the Turkish population (vitamin D, B and multivitamins) during pregnancy and tooth eruption time in babies. We aimed to discern whether there is a relationship between vitamin supplements used during pregnancy and the baby's teething time.

METHODS

Design of the Study

This study, numbered 9/17(05.11.2020), was planned with the permission of the ethics committee of our university's faculty of medicine. The files of approximately 1,000

patients who gave birth in the obstetrics and gynecology clinic of our university between 2019–2020 were retrospectively reviewed, and their information on the pregnancy process was accessed for our study. The babies of 145 patients who could be reached, met the inclusion criteria, and accepted to participate, were followed up in the postnatal period. Babies' first tooth eruption time, presence of caries, use of breast milk, and number of missing or excess teeth according to the month were determined. First tooth eruption time is accepted as the day when the tooth appeared by piercing the gum and recorded as the baby' age at the time of eruption by month. Missing or excess teeth is determined by dental examination and accepted by determining how many teeth are missing or extra according to the number of teeth that should be at the age of the baby. Oral and written consent was obtained from all patients.

The inclusion criteria in the study were to have given birth in our obstetrics and gynecology clinic; for mothers to be between 18 and 45 years old without chronic systemic disease, gestational diabetes, diabetes mellitus, or a disease that could cause malabsorption; and to have a body mass index between 18 and 25.

Each baby was examined by a pedodontist with 10 years of professional experience. Babies older than 2.5 years were not included in the study. The data obtained from the mother and child were recorded in a computer environment and collected by obstetrician and two dentists.

Statistical Analysis

The analyses were performed with the IBM SPSS 20 (Statistical Package for and Social Sciences 20) statistical analysis program (SPPS Inc., Chicago, IL, USA). The data were prepared as the mean, standard deviation, median, minimum, maximum, percentage, and number. The normal distribution of continuous variables was analyzed with the Shapiro–Wilk and the Kolmogorov–Smirnov test. The ANOVA test was used for normal distribution, and the Kruskal–Wallis test was used for non-normal distribution to compare continuous variables with more than two independent groups. Following the ANOVA test, post-hoc tests were performed using the Tukey test when the variances were homogeneous. If the variances were not homogeneous, post-hoc tests were conducted using Tamhane's test. The Kruskal–Wallis one-way ANOVA (k samples) test was used for post-hoc tests, following the Kruskal–Wallis test. Statistical significance was $p < 0.05$.

RESULTS

A total of 145 patients were divided into seven groups: those who took only vitamin D (D vit, n:24), only vitamin B (B vit, n:41), only a multivitamin (Multi vit, n:13), vitamins D and B (D + B vit), vitamin D and a multivitamin (D + multi vit, n:9), vitamin B and a multivitamin (B + multi vit, n:9), and vitamins B and D and

a multivitamin together (D + B + multi vit, n:14) during their pregnancies. The demographic characteristics of the patients are shown in Table 1.

No statistically significant difference was found between the groups in maternal age (P = 0.561), infant age (P = 0.056), and the number of missing/excessive teeth (P = 0.448) according to age in the statistical study. There was also no statistically significant difference between the groups regarding the number of caries and breast milk use. Considering the first tooth eruption time of the babies, it was found that patients who took vitamins D + B and patients who took only vitamin B had significantly earlier first tooth eruption times than those who used all three vitamins, as shown in Table 2 (P = 0.009).

Table 1. Demographic characteristics of patients by groups

	D vit (n:24)	B vit (n:41)	Multi vit (n:13)	D+B vit (n:35)	D+Multi vit (n:9)	B+Multi vit (n:9)	D+B+Multi vit (n:14)
Mother age (year) Min-max mean±SD	23-39 30±4	22-40 30±5	16-40 31±7	23-44 30±4	19-36 28±6	23-34 28±4	18-36 28±4
Baby age (month) Min-max mean±SD	3-30 19±7	3-32 13±8	3-37 14±9	2-25 14±7	3-26 14±9	4-24 13±6	7-30 17±6
less/more number of teeth Min-max mean±SD	0-8 3±3	0-10 3±3	2*-8 3±3	0-16 4±3	0-6 4±2	0-10 5±4	2*-9 4±3
First tooth eruption time(month) Min-max mean±SD	4-12 7±4	5-13 5±4	4-12 7±5	3-11 5±4	2-10 6±4	4-13 6±5	5-12 10±2
Presence of caries No-yes (N-N)	21-3	39-2	12-1	34-1	9-0	9-0	13-1
Breast milk use No-yes (N-N)	11-13	17-24	5-8	16-19	4-5	3-6	5-9

SD: standard deviation
Min-max: Minimum-maximum
*: One patient each from the Multi vit group and the D+B+Multi vit group had two more teeth for their age.

Table 2. First tooth eruption times (month) according to the groups

Groups	First tooth eruption time (month)				Post-hoc test results
	Minimum	Maximum	Median	Mean ± Standart deviation	
D vit (n:24)[a]	4	12	8	7 ± 4	B vit – D+B+Multi vit (p=0.009) D+B vit – D+B+Multi vit (p=0.038)
B vit (n:41)[b]	5	13	6	5 ± 4	
Multi vit (n:13)[a]	4	12	7	7 ± 5	
D+B vit (n:35)[b]	3	11	7	5 ± 4	
D+Multi vit (n:9)[a]	2	10	7	6 ± 4	
B+Multi vit (n:9)[a]	4	13	8	6 ± 5	
D+B+Multi vit (n:14)[a,c]	5	12	10	10± 2	
p value = 0.009 (Anova)					

Similar letters demonstate no statistical significance

DISCUSSION

This retrospective study of a limited population demonstrated that vitamins B and D and multivitamins used by the expectant mother during pregnancy and their combination may influence babies' first tooth eruption time. The literature reports that this situation influenced tooth eruption in babies of pregnant women whose vitamin D levels were measured. Therefore, vitamin D is known to be related to bone biology and affects dentofacial development (11). Milk tooth movement through the alveolar bone is a complex issue about which there are only hypotheses. Many known and unknown factors, such as hormonal conditions, systemic diseases of the mother and baby, viral diseases in pregnancy and the baby, syndromes, systemic disorders, and hereditary and genetic factors, can affect the eruption of the first tooth (12). No relationship was found between maternal age and tooth eruption time in this study. One study found a relationship between maternal age and tooth eruption time (13). The small sample size of this research may have caused an unspecific relationship between maternal age and tooth eruption. The uncertainty of the mechanisms underlying the various first months of primary toothing in infants has been noted in some research (14). Many studies have examined the effects of smoking during pregnancy, low birth weight, breastfeeding, and vital effects on tooth eruption and have found divergent results (15,16). This study did not find a proportional relationship between breast milk use and tooth eruption. The literature examines the effects of metabolic and systemic diseases, hormonal problems, and obesity on tooth eruption (17). However, this study did not include these groups in its sample. This work found no relationship between vitamin use and early childhood caries. However, unlike this research, some studies have found a relationship between vitamin D levels and caries in infants (17). But this study did not include these groups in its sample. This study found no relation between vitamin use and early childhood caries. However, contrary to this study, there are studies that found a relationship between vitamin D levels and caries in infants (18).

There are studies in the literature stating that vitamin D supports the acceleration of tooth movement, in local applications. Again, there are also studies stating that tooth movement slows down due to vitamin D deficiency (19.20). In a study conducted by Xaviyer et al., it has been found that the serum level of vitamin D in the group with persistence of primary teeth was considerably lower than the control group. They determined a considerable delay in eruption in the group with vitamin D deficiency (12).

A literature search reveals that limited studies have evaluated the relationship between the vitamin supplements used in pregnancy and

the first tooth eruption time. Vitamins are steroid compounds that act like hormones because of their capacity to function far from where they are synthesized. The effects of the use of vitamin B and multiple vitamins on tooth eruption are not known, and there are hardly any studies on this subject (21).

This study evaluated the first tooth eruption time of newborns in the cases of using vitamin D, vitamin B, and multivitamins alone or together during pregnancy, and determined that tooth eruption occurs earlier in those who use only vitamin B and those who use vitamins D and B together compared to patients who use vitamins D + B + multivitamin together. However, no disparity was observed between the other groups. Consequently, it can be said that the time of tooth eruption is delayed if vitamin D and multivitamins are used together.

This study has some limitations. In this research, which evaluates the use of vitamins in pregnant women and the first tooth eruption time in babies, the vitamin levels of pregnant women before and after vitamin use are missing. The study, conducted with a small sample group, presented only preliminary information about the use of vitamins and first tooth eruption. The genetic pathways of vitamin synthesis in the patients were not included in the study. Nonetheless, this study attempts to illuminate the multifactorial nature of first tooth eruption in the use of vitamins.

CONCLUSİON

According to the outcomes acquiered from this study, the use of vitamins in pregnant women can affect babies' oral–dental systems that develop while they are still in the mother's womb. This retrospective study of a limited population depicted that the vitamins B and D, as well as multivitamins used by the expectant mother during pregnancy and their combination, may affect the eruption time of the first tooth in babies.More detailed information on the use of vitamins is needed for the problems that pregnant women and their babies may encounter. Simultaneously, it can be an important parameter to monitor in pregnant women and their babies.

Ethics Committee Approval: Ethics committee approval was received for this study from 9/17 (05.11.2020) Clinical Research Ethics Committee of Ataturk University

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REFERENCES

1. Townsend G, Bockmann M, Hughes T, Brook A. Genetic, environmental and epigenetic influences on variation in human tooth number, size and shape. Odontology. Jan 2012;100(1):1-9. doi:10.1007/s10266-011-0052-z
2. Townsend G BA. Genetic, epigenetic and environmental influences on dental development. Ortho Tribune 2008;3:4-6.
3. Bei M. Molecular genetics of tooth development. Curr Opin Genet Dev. Oct 2009;19(5):504-10. doi:10.1016/j.gde.2009.09.002
4. Varela-López A, Navarro-Hortal MD, Giampieri F, Bullón P, Battino M, Quiles JL. Nutraceuticals in Periodontal Health: A Systematic Review on the Role of Vitamins in Periodontal Health Maintenance. Molecules. May 20 2018;23(5)doi:10.3390/molecules23051226
5. Cagetti MG, Wolf TG, Tennert C, Camoni N, Lingström P, Campus G. The Role of Vitamins in Oral Health. A Systematic Review and Meta-Analysis. Int J Environ Res Public Health. Feb 3 2020;17(3)doi:10.3390/ijerph17030938
6. Psoter WJ, Reid BC, Katz RV. Malnutrition and dental caries: a review of the literature. Caries Res. Nov-Dec 2005;39(6):441-7. doi:10.1159/000088178
7. Aktoren O, Tuna EB, Guven Y, Gokcay G. A study on neonatal factors and eruption time of primary teeth. Community Dent Health. Mar 2010;27(1):52-6.
8. Wu H, Chen T, Ma Q, Xu X, Xie K, Chen Y. Associations of maternal, perinatal and postnatal factors with the eruption timing of the first primary tooth. Sci Rep. Feb 25 2019;9(1):2645. doi:10.1038/s41598-019-39572-w
9. Dickinson A, Blatman J, El-Dash N, Franco JC. Consumer usage and reasons for using dietary supplements: report of a series of surveys. J Am Coll Nutr. 2014;33(2):176-82. doi:10.1080/07315724.2013.875423
10. Abramowitz A, Miller ES, Wisner KL. Treatment options for hyperemesis gravidarum. Arch Womens Ment Health. Jun 2017;20(3):363-372. doi:10.1007/s00737-016-0707-4
11. Tyszkowski M. Is There a Relationship between Nutrition, Facial Development, and Crowding of the Teeth? Int J Orthod Milwaukee. Spring 2016;27(1):15-7.
12. Xavier TA, Madalena IR, da Silva RAB, et al. Vitamin D deficiency is a risk factor for delayed tooth eruption associated with persistent primary tooth. Acta Odontol Scand. Nov 2021;79(8):600-605. doi:10.1080/00016357.2021.1918762

13. Un Lam C, Hsu CS, Yee R, et al. Influence of metabolic-linked early life factors on the eruption timing of the first primary tooth. Clin Oral Investig. Nov 2016;20(8):1871-1879. doi:10.1007/s00784-015-1670-6
14. Choi NK, Yang KH. A study on the eruption timing of primary teeth in Korean children. ASDC J Dent Child. Jul-Aug 2001;68(4):244-9, 228.
15. Alnemer KA, Pani SC, Althubaiti AM, Bawazeer M. Impact of birth characteristics, breast feeding and vital statistics on the eruption of primary teeth among healthy infants in Saudi Arabia: an observational study. BMJ Open. Dec 15 2017;7(12):e018621. doi:10.1136/bmjopen-2017-018621
16. Pavičin IS, Dumančić J, Badel T, Vodanović M. Timing of emergence of the first primary tooth in preterm and full-term infants. Ann Anat. Jan 2016;203:19-23. doi:10.1016/j.aanat.2015.05.004
17. Żądzińska E, Sitek A, Rosset I. Relationship between pre-natal factors, the perinatal environment, motor development in the first year of life and the timing of first deciduous tooth emergence. Ann Hum Biol. 2016;43(1):25-33. doi:10.3109/03014460.2015.1006140
18. Ali N, Rahim A, Ali S, Iqbal MH. Impact of vitamin D on development of early childhood caries. PAFMJ. 2017;67(3):429-33.
19. Nimeri G, Kau CH, Abou-Kheir NS, Corona R. Acceleration of tooth movement during orthodontic treatment--a frontier in orthodontics. Prog Orthod. Oct 29 2013;14:42. doi:10.1186/2196-1042-14-42
20. Meikle MC. The tissue, cellular, and molecular regulation of orthodontic tooth movement: 100 years after Carl Sandstedt. Eur J Orthod. Jun 2006;28(3):221-40. doi:10.1093/ejo/cjl001
21. Whyte MP, Zhang F, Wenkert D, et al. Hypophosphatasia: Vitamin B(6) status of affected children and adults. Bone. Jan 2022;154:116204. doi:10.1016/j.bone.2021.116204