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СТРУКТУРА ПОПЕРЕЧНОГО НЕБНОГО ШВА У МУЖЧИН РАЗНОГО ВОЗРАСТА ПО ДАННЫМ КЛКТ

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THE STRUCTURE OF TRANSVERSE PALATINE SUTURE IN MALES OF DIFFERENT AGES ACCORDING TO CBCT DATA

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Резюме. Для достижения ортопедического эффекта в виде стимуляции роста верхней челюсти при лечении пациентов с мезиальным прикусом важно знать степень оссификации поперечного небного шва в каждом клиническом случае. Структура поперечного небного шва изучена с использованием метода КЛКТ у лиц мужского пола от 6 до 20 лет.

Ключевые слова: поперечный небный шов, КЛКТ, оссификация.

Resume: To achieve an orthopedic effect in the form of stimulation of the growth of the upper jaw in the treatment of patients with mesial bite, it is important to know the degree of ossification of the transverse palatine suture in each clinical case. The structure of the transverse palatal suture was studied using horizontal CBCT scans in males aged 6 to 20 years.

Keywords: transversal palatine suture, CBCT, ossification.

Relevance. Transverse palatine suture connects the palatine processes of the maxilla and the horizontal plates of the palatine bones [1, 2]. The palatal suture plays an important role in the growth and development of the maxilla [3]. To achieve an orthopedic effect in the form of stimulation of the growth of the upper jaw in the treatment of patients, it is important to know the degree of ossification of the transverse palatine suture in each clinical case. The ossification process in the midpalatal suture starts with bone spicules from suture margins along with «islands» in the middle of the sutural gap [4, 5, 6, 7]. According to literary sources, the most favorable age for orthopedic intervention on the transverse suture is up to 10 years [8]. However, due to individual characteristics, these timeframes may vary. Therefore, knowing the CT signs of transverse palatine suture maturity can help plan orthodontic treatment.

Aim: to determine the structural features of the transverse palatine suture in males of different ages.

Objectives:

1. To determine the palatine suture shape.
2. To study age of ossification of the transversal palatine suture.
3. To determine the position of the lateral parts of the palatine suture by first upper molars.

Material and methods. The structure of the transverse palatine suture over a wide range in horizontal CBCT sections in 54 males aged 6 to 20 years. The suture shape, the location of

its lateral parts relative to the first maxillary molars, and the maximum and minimum bone density of the suture were determined. Descriptive statistics were used. The significance of differences between groups was determined using nonparametric methods (Kruskal-Wallis test, z-test, χ^2 test).

Results and their discussion. When studying the shape of the transverse palatal suture using CBCT data, we identified three main types: straight (13.8%), stepped (71.3%), and arched (14.9%) (Fig. 1). No relationship was found between suture shape and age, which may be explained by individual structural differences.



Fig. 1 – The suture shape

An assessment of the position of the lateral parts of the transverse palatine suture relative to the first maxillary permanent molars revealed that in subjects aged 6, 10, 12, and 14, this structure was most often located anteriorly; in those aged 11, 13, 15, and 16, it was at the level of the tooth; and in those aged 19 and 20, it was located posteriorly. This may be related to the formation and eruption of the molars, as well as the longitudinal growth of the hard palate (Fig. 2).

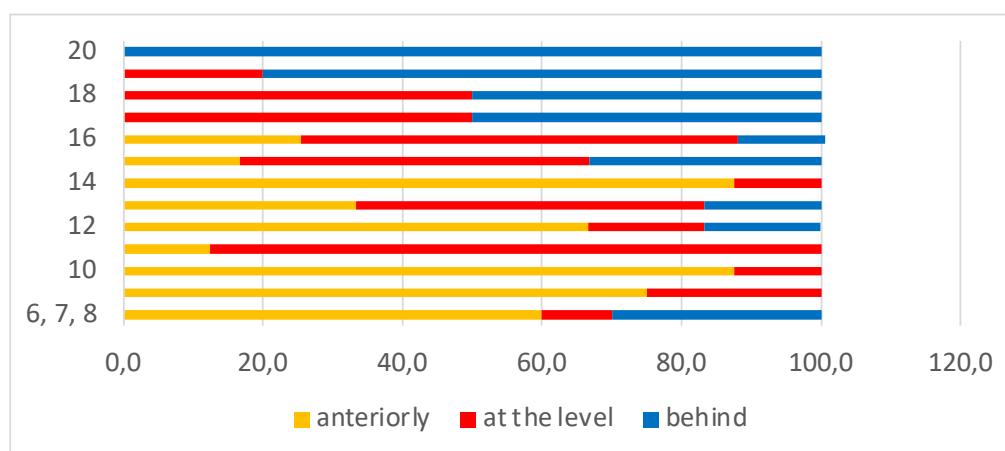


Fig. 2 – The position of the lateral part of the transverse palatine suture in relation to the first maxillary molars, %

Age affects the bone density in the transverse palatine suture area: its minimum ($H=25.2$; $p<0.05$) and maximum ($H=27.4$; $p<0.01$) values. Statistically significant differences in the minimum value of this parameter were found in the groups of 6-8-year-old boys (170.0 (141.0-240.0)) and 18-year-old boys (346.5 (272.0 – 660.0)) ($z=3.49$; $p<0.05$). Statistically significant differences in the maximum value of bone density in the transverse palatine suture area were

also found in the groups of 9-year-old boys (515.0 (472.5 - 565.0)) and 12-year-old boys (731.0 (728.0 – 732.0)) ($z_{9-12}=3.43$; $p<0.05$) (Tbl. 1).

Tbl. 1. Bone density in the area of the transverse bone suture in individuals of different age groups, HU

Age, years	Minimum density	Maximum density
6, 7, 8	170,0 (141,0-240,0)	610,0 (569,0 – 660,0)
9	190,0 (157,0-257,0)	515,0 (472,5 - 565,0))
10	273,0 (246,5-353,0)	609,5 (532,5 – 734,0)
11	261,5 (122,0-394,5)	700,5 (500,0 - 854,5)
12	180,0 (120,0-433,0)	731,0 (728,0 – 732,0)
13	221,0 (170,0 – 289,0)	507,0 (459,0 - 569,0)
14	263,5 (170,0-367,0)	585,0 (551,5 - 723,5)
15	223,0 (192,5-270,0)	549,5 (478,0 - 630,0)
16	252,5 (235,0 - 357,0)	562,5 (442,0-704,5)
17	274,0 (239,0 - 342,5)	595,5 (565,5 - 733,0)
18	346,5 (272,0 - 660,0)	811,5 (624,0 – 1102,0)
19	316,0 (315,0 – 336,0)	636,0 (589,0 – 640,0)
20	281,0 (247,0 - 333,0)	532,0 (506,0 – 644,0)

Conclusions:

1. Three main shapes of transverse palatal suture were identified according to CBCT data: straight, stepped and arched. Age does not affect the shape of the transverse palatine suture.

2. There is an age-related dynamics of the distal displacement of the level of the lateral parts of the transverse palatine suture in relation to the upper first molars.

3. The minimum value of bone density of the transverse palatine suture was recorded in boys aged 6–9 years. The average bone density value increases statistically significantly after 9 years.

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