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ANATOMICAL FEATURES OF THE MAXILLARY SINUS IN PEOPLE WITH A LEPTOPROSOPIC FORM OF THE FACIAL SKULL

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АНАТОМИЧЕСКИЕ ОСОБЕННОСТИ ВЕРХНЕЧЕЛЮСТНОЙ ПАЗУХИ У ЛЮДЕЙ С ЛЕПТОПРОЗОПИЧЕСКОЙ ФОРМОЙ ЛИЦЕВОГО ЧЕРЕПА

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The material of this work was the data from computed tomography (CT) of the head of 63 people in the second period of mature age with a leptoprosopic form of the facial part of the skull. In the study, patients were ranked by gender. The height, depth, and width of the maxillary sinus (MS) were determined. A comparative analysis of the values of the linear dimensions of the MS on the right and left in men and women was carried out, and the gender characteristics of the MS were assessed. A correlation between the linear dimensions of the MS on each side, as well as similar parameters on the right and left, was revealed.

Keywords: second period of mature age, maxillary sinus, linear dimensions, computed tomography, 3D, leptoprosopic form, facial part of the skull, gender features

Материалом настоящей работы послужили данные компьютерной томографии головы 63 людей второго периода зрелого возраста с лептопрозопической формой лицевого отдела черепа. В исследовании пациентов ранжировали по полу. Установлены высота, глубина и ширина верхнечелюстной пазухи. Проведен сравнительный анализ значений линейных размеров верхнечелюстной пазухи у мужчин и женщин, оценены гендерные особенности гайморовой пазухи. Выявлена корреляционная зависимость линейных размеров верхнечелюстной пазухи с каждой стороны между собой, а также аналогичных параметров справа и слева.

Ключевые слова: второй период зрелого возраста, верхнечелюстная пазуха, линейные размеры, компьютерная томография, 3D, лептопрозопическая форма, лицевой отдел черепа, половые особенности

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CT – computed tomography

MS – maxillary sinus

The maxillary sinus (MS) is the largest air cavity in the skull. The dimensions, shape, and volume of this cavity vary greatly individually and with age [1–4]. According to current data, the incidence of maxillary sinusitis has doubled over the past ten years, maintaining a growth rate of [5–7]. Therefore, the search for optimal diagnostic methods and effective therapeutic manipulation, as well as anatomical prerequisites for the development of this pathology, retains the need to study the variation structure of multiple sclerosis.

The literature contains extensive information on the volume of MS, surface area, and wall thickness according to computed tomography (CT) [8–13], as well as on ground turtles [14–16].

Some author studies reveal features of multiple sclerosis in various forms of cerebral [17, 18] and facial skull, demonstrating the degree of pneumatics [19]. However, there has been little gender-specific consideration of the anatomy of multiple sclerosis in people with leptoprosopic form facial skulls.

The purpose of the study was to study the anatomical features of MS in men and women with a leptoprosopic form of the facial skull.

Material and Methods. The material of this work was the head CT of 63 people of the second maturity. All subjects have undergone CT using a digital X-ray diagnostic system with 3D tomography function «OP-300» («KaVo», Germany). In the study, patients were ranked by gender. Thirty-two female skulls and 31 male objects

were studied. The average age of the examined patients was 42.3 ± 4.1 years among females and 46.2 ± 4.5 years among men. The study included 3D models of skulls with a leptoprosopic shape of the facial region, determined based on pre-calculated values of the facial index [20].

Craniometry of the linear dimensions of the MS was carried out using the program for processing 3D data «OnDemand3D™ Dental» (KaVo, Germany). In the sagittal projection of the skull, the height and depth of the MS were measured (Fig. 1), and the maximum width of the cavity was determined on the frontal sections (Fig. 2).

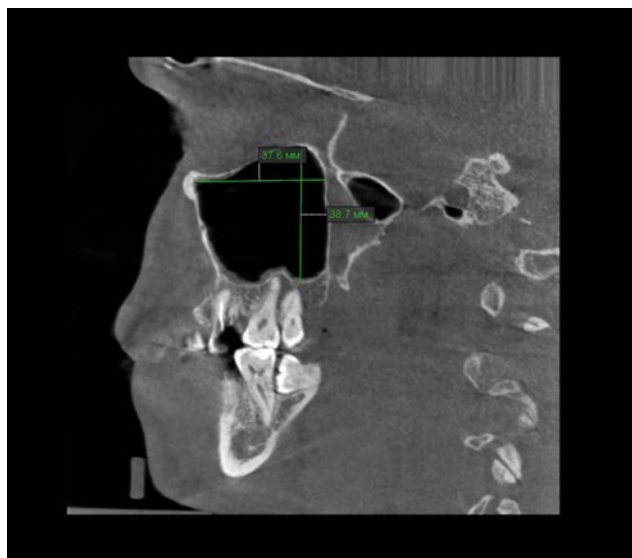


Fig. 1. Measurement of the height and depth of the MS

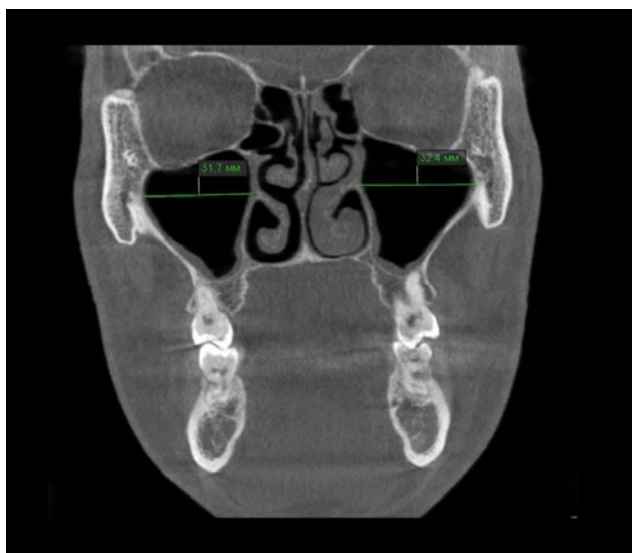


Fig. 2. Measurement of the width of the MS

Statistical data processing was carried out using the methods of variation statistics in the program SPSS 21.0 (IBM, USA). The correspondence of the normality distribution was determined using the Kolmogorov – Smirnov test. Statistical indicators were presented in the median (Me), upper and lower quartiles (Q1; Q3). Using the Mann – Whitney and Wilcoxon tests, a comparative analysis of the obtained data was carried out. Correlation analysis was carried out using Pearson's correlation coefficient. Statistical differences were considered significant at $p < 0.05$.

Results and Discussion. On male skulls, the height of the MS on the right side slightly exceeded this size on the left, amounting to 46.50 mm [43.45; 50.25] and 45.95 mm [45.53; 48.95], respectively, $p = 0.199$. The transverse diameter of the right sinus in males slightly prevailed (29.90 mm [28.25; 32.35]) compared to the left-sided cavity (29.20 mm [26.05; 31.05], $p = 0.080$). The depth of both MS had practically the same values, reaching 40.40 mm on the right and left [38.35; 43.00] and 40.90 mm [38.08; 42.20], respectively, $p = 0.649$.

Determination of the correlation coefficient between the corresponding linear dimensions of the right and left MS on male skulls showed an average direct relationship for height ($r = 0.61$), anteroposterior size ($r = 0.46$), and width ($r = 0.59$). A moderate correlation was found between different sinus sizes on one side. On the right, the height MS correlates with the depth ($r = 0.51$) and width ($r = 0.42$). The correlation coefficient of the height of the left-sided sinus with the width ($r = 0.60$) exceeds its value with depth ($r = 0.41$).

Morphometry of the MS in women showed a slight excess of linear dimensions on the left side. The height of the left sinus was 41.50 mm [37.04; 43.40], and on the right side, its value was 41.05 mm [39.00; 43.78], $p = 0.243$. A similar trend was noted for the values of the depth of the MS, which amounted to 38.25 mm on the left and right [36.10; 40.95] and 38.00 mm [36.58; 39.83], respectively, $p = 0.399$. The width of the MS on the left (27.80 mm [24.15; 31.10]) is 3.6 % greater than on the right (26.80 mm [24.60; 30.90]) $p = 0.459$.

On the skulls of women, a direct average correlation was found between the linear dimensions of the right-sided and left-sided MS when considering the height ($r = 0.66$), depth ($r = 0.60$), and width ($r = 0.67$). On the right, the same direct average correlation dependence ($r = 0.49$) between height and depth, height and width is determined. A direct average relationship was noted between the parameters of the left MS. However, the correlation coefficient of the height of the sinus with its depth ($r = 0.55$) is slightly higher than with the width ($r = 0.51$).

A review of the gender anatomical features of MS showed a statistically significant predominance of linear MS parameters in men on the right compared to women. The height of the right-sided sinus of men is 11.1 % (5.45 mm) higher than that of women ($U = 158.0$; $p < 0.0001$). The sinus width of male skulls exceeds this parameter in females by 10.4 % (3.1 mm) ($U = 257.5$; $p = 0.004$). The smallest predominance of values of 5.9 % (2.4 mm) on male skulls on the right was revealed when studying the anteroposterior size of the MS ($U = 231.5$; $p = 0.001$).

The left MS is large in male skulls compared to female skulls. At the same time, statistically significant differences were revealed only when comparing its height and depth. In men, the height of the MS is 9.7 % (4.45 mm) higher than this parameter in women ($U = 189.5$; $p < 0.0001$), and the anteroposterior sinus size on the left in men is more significant by 6.5 % (2.65 mm) compared with females ($U = 286.0$; $p = 0.015$). The width of the left MS in men is 4.8 % (1.4 mm) higher than in women ($U = 378.0$; $p = 0.287$).

The results of our study showed that among men and women, the differences between the values of the linear dimensions of the right and left cavities do not have statistically significant differences. This is confirmed by the work demonstrating the absence of differences in the volume of the left and right MS in people aged 8 to 51 years [10].

The linear MS values in this study are consistent with those of other authors. The depth and width of

multiple sclerosis in men and women on the right and left sides almost correspond to the data obtained by studying tomograms of people aged 32 to 59 living in the Krasnodar region [21]. The prevalence of linear sinus dimensions in men has been proven. However, fundamental differences in the values of the height of the MS in both men and women on each side of the skull were revealed [16, 21, 22]. This discrepancy is associated with the study in this work of people with a leptoprosopic form of the facial skull.

The information we obtained about the direct average correlation between the size of the right and left MS is consistent with the data of some scientists. In the MS study of people between the ages of 19 and 50, it was noted that the wider the right sinus, the wider the left sinus. The authors also found a similar relationship between sinus height [23, 24]. A strong correlation was

established between the volumes of the right and left MS [14].

Conclusions

1. There was no statistically significant difference between the CT values of height, width, and depth of the MC on the right and left. There was no statistically significant difference between the two sexes.

2. All linear dimensions of right multiple sclerosis statistically significantly predominate in male turtles over females.

3. The left MS is more significant for men than for women. However, differences in its height and depth reach statistical significance.

4. In people of both sexes, the corresponding linear measurements of the right and left MS have a direct average correlation. The average strength of each side is highly correlated between height, depth, and width.

Disclosures: The authors declare no conflict of interest.

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TREATMENT OF PATIENTS WITH UNCOMPLICATED CHRONIC FORM OF PILONIDAL SINUS INFLAMMATION

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ЛЕЧЕНИЕ БОЛЬНЫХ С НЕОСЛОЖНЕННОЙ ФОРМОЙ ХРОНИЧЕСКОГО ВОСПАЛЕНИЯ КОПЧИКОВОГО ХОДА

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The article contains the results of the surgical treatment of 96 patients with simple chronic inflammation of the pilonidal sinuses. The control group consisted of 47 patients who underwent surgical treatment using «pilonidal sinus removal with fixation of the edges of the wound at the bottom, taking into account the height of the buttocks». The main group consisted of 49 patients who underwent surgery using the new method proposed by the author (patent RU2775802), which significantly improved the outcome of the disease. This reduced complications in the early stage, recurrence of the disease by three times and the patient's stay in the coloproctological department of the hospital to 3 days with achieving sustainable functional results.

Keywords: pilonidal sinus, inflammation, type of surgery, complications

Приведены результаты лечения 96 больных, оперированных по поводу неосложненной формы хронического воспаления копчикового хода, которые были разделены на две группы. Группу сравнения составили 47 больных, которым выполняли операцию иссечения эпителиального копчикового хода с фиксацией краев раны к ее дну с учетом высоты стояния ягодич. Основную группу составили 49 больных, оперированных по предложенной автором методике (патент № 2775802), которая позволила значительно улучшить исходы заболевания: уменьшить осложнения в ранние сроки после операции в 2,4 раза, рецидивы заболевания – в 3 раза, сократить время пребывания больных в колопроктологическом отделении на 3 к/дня, получить хорошие функциональные результаты.

Ключевые слова: копчиковый ход, воспаление, способы операций, осложнения

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