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MORPHOGENETIC AND TOPOGRAPHIC PECULIARITIES OF THE MALE PERINEUM DURING THE PRENATAL PERIOD OF ONTOGENESIS

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For the first time, modern methods of morphological research will elucidate the features of development and spatio-temporal dynamics of topographic and anatomical changes in the structures of the perineum during the prenatal period of human ontogenesis. The sources and sequence of occurrence of rudiments of structures and organs of the pelvic and urogenital areas of the perineum will be determined. The peculiarities of age and individual anatomical variability of the shape and structure of the perineal tissues of human fetuses depending on the coefficient of the constitutional type during the three critical periods of fetal development will be clarified.

According to the WHO, today congenital malformations (CHD) are a major factor in neonatal morbidity, disability, and mortality. There is also an increase in cases of cancer and injuries in the study area (industrial injuries, injuries). In-depth study of the sequence of rudiments of structures and organs of the pelvic and urogenital areas of the perineum during the critical period of fetal development allows us to track etiopathogenetic aspects in the development of congenital malformations of the perineum and contributes to the improvement and development of anatomically sound and optimal pathologies.

Our main purpose is to determine the morphological features of development and spatio-temporal dynamics of topographic and anatomical changes in the structures of the perineum during the prenatal period of human ontogenesis.

The tasks of the research are: to define sources of a anlage of structures and bodies of pelvic and urogenital sites of perineum; to determine the morphogenetic and anatomical variability of perineal tissues according to the critical periods of fetal development; to find out the features of different variants of the structure of the perineum according to age and constitutional features; to find out the projection-syntopic relations of vascular-nervous structures of the perineum; to track the dynamic and morphometric changes and correlations between the structures of the pelvic and urogenital areas of the perineum.

The expected results are: previously unknown data on morphological features of development and spatio-temporal dynamics of topographic and anatomical changes of perineal structures during the prenatal period of human ontogenesis will be determined. The obtained data will contribute to the tracking of etiopathogenetic aspects in the development of congenital malformations of the perineum and the improvement and development of anatomically sound and optimal methods of surgical correction of both congenital pathology and other pathological conditions.

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ENDOTHELIUM OF THE HEART VENTRICLES IN HUMAN: ITS MORPHOLOGICAL CHARACTERISTICS AND METHODS OF ITS INVESTIGATION

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Heart disease is a significant contributor to cardiovascular deficiencies and a strong predictor of mortality. Nowadays, much attention in the study of the pathogenesis of ischemic heart disease is paid to endothelial dysfunction. Endothelial cells play an essential role in the human heart because they are critical mediators of haemodynamic forces within the heart. Mechanical stimuli in front of the endothelium can initiate any endothelial dysfunction and cardiac disease progression. The results of morphological studies can significantly improve the quality and the outcome of therapeutic strategies and surgical treatments of the different cardiac pathologies.

The purpose of this investigation was to study and determine the morphological characteristics of the endothelium of the ventricles of the human heart in the norm.

The study was performed on 27 hearts of adults using light microscopy, electron microscopy, immunohistochemical method. Hearts of adults were obtained from autopsy cases. Biological materials were formalin-fixed, paraffin-embedded, and stained with hematoxylin and eosin, immunohistochemically for CD31, CD34 cytoplasmic markers.

Examination of the histological sections using light microscopy showed endothelium itself consists of a single layer of flattened-shaped cells which are simply attached or interlocked with each other or show “roof tile”-like overlaps. In some of the endothelial cells, the cell margins have a wavy outline where were found marginal outgrowths and folds. Marginal folds were predominantly found at the edges of cells. Electron microscopy showed that the endothelial cells are separated by the basement membrane from the underlying collagen and elastic fibers of a subendothelial layer. The basement membrane is bilaminar, and it is composed of lamina densa and lamina rara. The endothelial lining looks like a “cobblestone appearance” due to the nuclei protuberance into the chamber of the ventricles. An endothelial cell has a large pale-stained nucleus with a few marginally located heterochromatin. The nucleus usually contains one nucleolus. A nuclear envelope has numerous invaginations in it. The nucleus was localized in the center of the cell and occupied almost the entire volume of the cell. This region of a cell where the nucleus is found is named a nuclear zone. Cytoplasmic organelles such as mitochondria with a light matrix, rough endoplasmic reticulum with large-sized ribosomes, and a few complexes of dictyosomes were concentrated around the nucleus. The numerous vacuoles and vesicles were identified around of Golgi complex cisternae. These general organelles were mainly concentrated in the organelle zone of the cell. Pinocytic vesicles and transendothelial channels were found in the peripheral zone of the cell. In some endothelial cells, the cell margins have a wavy outline where marginal outgrowths and folds were found. Marginal folds were predominantly found at the edges of cells. The endothelial cells showed finger-like projections – microvilli on their luminal surface, which project into the chambers of ventricles. We supposed that these special organelles increase the overall surface area for an increased exchange of substances between the blood of the heart chambers and endothelial cells. Probably some of these projections may be artifacts and derived from fibrin in the blood, but there is no doubt that most are true ultrastructural features of the surface of the endothelial cell. During the immunohistochemical method of the investigation we detected that the endocardial endothelium was strongly stained for CD31 but irregularly and less intensely for CD34.

Thus, the data of this investigation determined that the innermost layer of the endocardium is the endothelium. It consists of a single layer of epithelial cells that are flattened in shape. The endothelial cell contains one centrally placed nucleus with one nucleolus in it. Three functional zones are determined in every endothelial cell. These zones are the nuclear zone, organelle zone, and peripheral zone. The basement membrane supports endothelial cells and separates them from the underlying connective tissue elements. It is bilaminar. CD31 and CD34 markers are effective markers for the detection of endocardial endothelial cells.

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MORPHOMETRIC CHARACTERISTICS OF THE TEMPOROMANDIBULAR JOINT IN HUMANS DURING THE 4TH MONTH OF INTRAUTERINE DEVELOPMENT

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Despite certain progress and intensive development of dental technologies, there are several unsolved issues concerning the dentoalveolar system structures. One of its important structures is the temporomandibular joint (TMJ). Impaired development of the TMJ provokes changes of the facial contour and defects, degeneration or hypertrophy of the masticatory and mimic muscles, disorders of swallowing and chewing, and occlusion.

The aim was to determine anatomical peculiarities of the TMJ in the third trimester of intrauterine development. The study was conducted on 4 samples of fetuses 161,0-183,0 mm of the parietal-calcaneal length through the methods of morphometry and craniometry, macro- and micropreparation, computed tomography, and statistical analysis.