ISSN 2509-4327 (print)
ISSN 2510-4780 (online)

Deutscher Wissenschaftsherold
German Science Herald

№ 4/2017

Die Zeitschrift „Deutscher Wissenschaftsherold" ist eine Veröffentlichung mit dem Ziel ein breites Spektrum der Wissenschaft allgemeinverständlich darzustellen. Die Redaktionsleitung versteht sich als Vermittler zwischen Wissenschaftlern und Lesern. Durch die populärwissenschaftliche Bearbeitung wird es möglich unseren Lesern neue wissenschaftliche Leistungen am besten und vollständigsten zu vermitteln. Es werden Untersuchungen, Analysen, Vorlesungen, kurze Berichte und aktuelle Fragen der modernen Wissenschaft veröffentlicht.

Impressum
Deutscher Wissenschaftsherold – German Science Herald
Wissenschaftliche Zeitschrift
Herausgeber:
InterGING
Sonnenbrink 20
31789 Hameln, Germany
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Gestaltung:
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Auflage: № 4/2017 (September) – 30
Redaktionsschluss September, 2017
Erscheint vierteljährlich
Editorial office: InterGING
Sonnenbrink 20
31789 Hameln, Germany
Tel.: + 49 51519191533
Fax.:+ 49 5151 919 2560
Email: info@dwherold.de
Deutscher Wissenschaftsherold - German Science Herald is an international, German/English language, peer-reviewed, quarterly published journal.
№ 4/2017
Passed in press in September 2017
Druck: WIRmachenDRUCK GmbH
Mühlbachstr. 7
71522 Backnang
Deutschland

INDEXING: Google Scolar, WorldCat, Index Copernicus, InfoBase Index, Journal Index, Citefactor, International Scientific Indexing, JIFACTOR, Scientific Indexing Services, International Institute of Organized Research.

REDAKTIONSKOLLEGIUM / INTERNATIONAL EDITORIAL BOARD:

Lists of references are given according to the Vancuver style

DDC-UDC 611.314+611.716.1/.4]-013-053 DOI:10.19221/2017421

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MORPHOGENESIS OF THE DENTOGNATHIC APPARATUS DURING THE EARLY TIMES OF THE HUMAN ONTOGENESIS

Abstract. *The maxillary and mandibular processes, as well as vestibular and dental laminas appearance, have been forming during the embryonic period of the human ontogenesis. Differentiation of the mandibular processes with Meckel's cartilage development is under the way. In the pre-fetuses, the considerable changes undergo in the mandibular, and developmental processes of the oral cavity structures are in their continuous growth. The study of the dentognathic apparatus maintenance regards to be of important practical significance; as far as in this area frequently encounters structure variants and developmental anomalies required surgical correction.*
Key words: *a jaw, dental lamina, vestibular lamina, the oral cavity.*

Introduction. The actual problem of the present-day morphology deals with searching of special structures in the digestive apparatus and providing them with an adequate functioning [3]. The dentists are used to be interested in the state of the oral cavity: such as palatal tonsils, teeth, mucous membrane, the tongue state at different diseases, thus they consider the oral cavity to be "a small window". Looking at this small window, you may suppose to detect the disease which is present in a certain organ or a system, and predict its clinical course [6]. The study of the dentognathic apparatus maintenance regards to be of important practical significance; as far as in this area frequently encounters structure variants and developmental anomalies required surgical correction [1, 2].

The specimen of 21 embryos and 23 pre-fetus were selected to be the materials of the research. The following methods of investigation have been used: macroscopy, microscopy of the series of gradual histological sections, an ordinary and fine dissection.

Germs of the maxillary and mandibular processes in embryos of 5,0-5,5mm in TCD are introduced by an accumulation of homogeneous cell mass of the mesenchyme. In embryos of 6,8-7,9 mm in TCD the process of gnathic processes differentiation starts, especially of their caudal segments. In embryos of 8,0-8,5 mm in TCD the maxillary processes move to lateral ones, but on this particular stage of development, there is no joining between them. They are separated only by small fissure directed to the eye germ. In embryos of 11,0-12,5 mm in TCD the maxillary processes continue their growth. Their fusion with lateral nasal processes arises. The first signs of the beginning of the teeth development are observed at the 6^{th} week when the length of the embryonic body is 11 mm. Multilayers epithelium, lining longwise the oral cavity of the future upper and lower jaws, make a thickening resulted from an active reproduction of their cells and changes in the plane of cell division. This thickening (a primarily epithelial band) divides into two laminas – alveolar and dental ones. In the alveolar regions of the oral cavity, these epithelial laminas initially insert in the mesenchyme separately one from another. The vestibular lamina is characterized by a rapid proliferation of cells and their submergence into the mesenchyme with the following degeneration in the central regions, and resulting in the beginning of the buccolabial furrow formation. The dental lamina takes the arch shape or horseshoe shape and is located in the adjacent to the mesenchyme in almost a vertical position with some inclination backward. In embryos of 12,0-14,0 mm in TCD the mandibular processes are completely merged with each other by their front endings. This

process assists the mandibular arch formation. It results in the differentiation of the mandibular processes with gradual Meckel's cartilage formation.

In the pre-fetuses of 16,5-17,5 mm in TCD the development of the lower jaw starts. The germ formation and growth appear in the caudal segments with a formation of 3-4 thickenings, which have globular or prolate spheroid form. The primordium of the jaw has the appearance of the plate with vertically prolate form. It is located outer of the Meckel's cartilage. The oral cavity is covered with two layers of epithelium and has the shape of the fissure. It is bounded by maxillary and mandibular processes. In the pre-fetuses of 27,0-29,0 mm in TCD the germ of the maxilla appears. The size of the mandibular arch increases rapidly. The germs of the both jaws join together and form the framework of the future jaw. At transversal sections, the mandible transforms into the horseshoe shape lamina, to the middle of which the Meckel's cartilage located. Outer and inner laminas are the germ of the alveolar processes. On the sagittate sections, the mandible replicates the line of the Meckel's cartilage. The angle of the mandible at this particular stage of its development in not determined yet. In the caudal segments, the thickening appears, which presents the lamina oriented in the sagittate plane – the germ of the coronal processus. From behind, the thickening has the spheroid form and becomes the germ of the articular processes. In this particular stage, the dental plate manifests itself alongside the arch. The formation of the caliciform accumulation, on the thin stalk, appears on the back surface of the plate, which are the germs of the enamel organs of the deciduous teeth. In the pre-fetuses of 34,0-42,0 mm alveolar plates widely diverge approaching to the surface of the mandibular arch from the top, enclosing the germs of the teeth, and reaching the epithelial lining of the mandibular arch. At this particular stage, the place of the mandibular angle location may be defined, revealing its body and a ramus. The vertical size of the mandible considerable predominates to the transversal one. At the same time on its free ending, in the middle segments, the prominences appear, formed as a result of muscles fixation such as mandibulolingualis and digastic muscles. The body of the mandible is inclined approaching to the Meckel's cartilage. The enamel body firstly acquires the cap shape enclosing the compact accumulation of the mesenchyme cells – dental papilla.

The mesenchyme surrounding the enamel organ condenses making the dental sac. The dental plate keeps the connection with enamel organ with the assistance of the epithelial band – cervix of the enamel organ. This band gradually becomes thin, and to the end of the 3 month resolve, as far as the mesenchyme germinates via it.

Due to the result of this process, the enamel organ completely separates from the epithelial lining of the oral cavity. Soon the enamel organ becomes bigger in size and extends acquiring the bell shape, and the dental papilla filled inside becomes longer. At this stage the destruction of the dental plate into isolated epithelial cells appears. Intact areas of the dental plate are preserved only in the segments where the formation of the enamel organ of the permanent teeth arises – at its lower edge and in the back segments. The epithelial cells remained as a result of disintegration of the dental plate become the part of the Malassez islets [4]. In pre-fetuses of 42,0-56,0 mm in TCD the oral cavity is completely constructed. The vestibule and the oral cavity are represented. It is covered with a plane epithelium which is located on basal membrane. In the place of the dental plates appearance, the number of the epithelial layers becomes considerably larger in comparison with other segments of the oral cavity. The germs of the upper and lower teeth are already defined. The enamel organ, the dental papilla, and the dental sac form the dental germ [5].

Ascertainment of the precise and complete facts concerning regularity of the chronological succession of the topographic-anatomical relationships of the gnathic structures with others, and with adjacent formations in the prenatal period of the human development, as well as time establishment and morphological premises of the probable variant development of their structure and congenital anomalies appear to be the most important direction of morphology [7]. The received results may be used in the pediatric dentistry, facio-gnathic surgery as the standard for normal and abnormal defects.

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Deutscher Wissenschaftsherold
German Science Herald

Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet athttp://dnb.dnb.de

№ 4/2017 – 30
Passed in press in September 2017