

Changes in the Face-Jaw System of Experimental Hypothyroidism

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Annotation. The article describes experimentally induced hypothyroidism and the changes in the face-jaw system as a result of its development. In particular, the morphological changes in the teeth are studied. The article provides a lot of information about the morphological changes in the teeth as a result of the spread and development of hypothyroidism in many countries around the world, and their negative consequences.

Key words: hypothyroidism, enamel, cement, control, experiment.

One of the problems of modern clinical dentistry is the growth of inflammatory periodontal diseases that occur against the background of secondary immunodeficiency [1,2,6,]. An endocrine system that influences immunity is the endocrine system, which is involved in the neurocrine regulation of homeostasis [3,4,]. The endocrinological aspects of dental disease have been reflected in a number of fundamental scientific studies. The complex multifunctional relationship between the immune, nervous, and endocrine systems plays an important role in the etiopathogenesis of various dental diseases [5,7,].

The purpose of the study. Study of changes in the face-jaw system against the background of experimental hypothyroidism.

Research materials and methods. The object of the study was the teeth of 45 rats during the first postnatal ontogeny. We divided the white laboratory rats into 2 groups. In the experimental group, 25 white laboratory rats were given 0.5 mg of mercazolyl per 100 g body weight for 14 days to induce experimental hypothyroidism, and blood was taken from the tail vein on different days of the experiment to test for hormones. When it became clear that a hypothyroidism model had been called, we gave the rats mercazolyl 0.25 mg (retainer) per 100 g body weight for 1 month. Group 2 consisted of rats from a control group of 20 rats, and these rats were given a starch suspension through a probe in a 1.0 ml 1% midoride. Rats were anesthetized on days 3, 7, 14, 21, and 30. The rats' teeth were extracted, histological specimens were prepared, and their morphological structure was studied.

Research results. In order to substantiate the experimental hypothyroidism in rats, triiodothyronine (T3), unbound thyroxine (T4) and thyroid-stimulating hormone (TTG) levels were determined in rats' blood on different days of the experiment (see Table 1).

Table 1
Hormone levels in the blood of rats in the control and experimental groups.

Days	Hormone levels in the blood (M ± m)					
	Control group			1 experimental group		
	TTG (mkME / ml)	Triiodothyronine (T3)	Thyroxine (UnboundT4) (pmol / l)	TTG (mkME / ml)	Triiodothyronine (T3)	Thyroxine (Bound) T4 (pmol / l)
3 days	0.13±0.02	8,1±0,09	13,00±0,3	0,11±0,7	7,1±0,05	9,2±0,02
7 days	0.15±0.2	8,4±0,07	13,00±1,3	0,17±0,7	7,8±0,2	10,2±0,1
14 days	0,2±0,01	9,5±1,1	12,00±1,1	0,3±0,02	5,00±0,8	6,00±0,7
21 days	0,21±0,03	9,9±±0,2	12,00±0,9	0,41±0,03	4,9±0,4	4,2±0,3

30 days	0,2±0,18	10,3±0,2	13,00±1,0	0,43±0,01	4,3±0,3	3,2±0,4
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Analysis of the data showed that on day 7 of the experiment, the hormones T3 and T4 in hypothyroidism and rats in the control group were almost indistinguishable from each other. On the 14th day of the experiment, the T4 value was clearly visible and the T3 value was not significantly reflected. On day 21 of the experiment, the level of T4 decreased by 2 times and T3 by 1. Thyroid hormones in the blood of 30-day-old rats changed as follows: T4 decreased by 4 times and T3 by one and a half times. Thus, the analysis of hormone levels showed a reliable decrease in the level of thyroxine (T4) in the blood of rats in the case of experimental hypothyroidism. The decrease in T4 hormone was evident from day 14, and by the last 30, 60, and 90 days of the experiment, the reliability was reduced to 4 times. The amount of thyroid hormones in the blood is regulated by thyroid hormone. A decrease in the amount of T3 and T4 hormones in the blood led to an increase in the hormone TTG. On days 3 and 7 of the experiment, the amount of TTG was the same as in the control group. By the 14th day of the experiment, a gradual increase in TTG was observed, and by the 21st day, a 2-fold increase was observed compared to the control group.

When studying the morphological structure of rat teeth in the control group, the thickness of the enamel layer was $3620.1 \pm 3.6 \mu\text{m}$, the thickness of the dentin was $684.2 \pm 27.6 \mu\text{m}$, the thickness of the predentine was $25.83 \pm 1.0 \mu\text{m}$, and the pulp was $926.8 \pm 37.4 \mu\text{m}$. , the thickness of the cement was $208.8 \pm 3.8 \mu\text{m}$, and the thickness of the dentinal tubules was $5.82 \pm 0.06 \mu\text{m}$. From the 7th day of the experiment, a tumor was observed in the pulp of the tooth. The results of morphological examination showed that the thickness of the enamel layer of the teeth of rats with hypothyroidism was $3232 \pm 4.2 \mu\text{m}$, the thickness of the dentin was $616.4 \pm 27.6 \mu\text{m}$, the thickness of the predentine was $22.6 \pm 1.1 \mu\text{m}$, the pulp was $805.9 \pm 34.4 \mu\text{m}$. thickness was $184.8 \pm 14.5 \mu\text{m}$, and the thickness of the dentinal tubules was $5.2 \pm 0.07 \mu\text{m}$. The morphometric thickness of the tooth was found to be smaller than that of the control group, with enamel thickness 12%, dentin thickness 11%, predentine thickness 14%, pulp thickness 15%, cement thickness 13% and dentin canal thickness 12%. By the 14th day of the experiment, circulatory signs and swelling were observed in the pulp of the rat teeth. Decreases in tooth enamel thickness by 15%, dentin thickness by 17%, predentine thickness by 18%, pulp thickness by 15%, cement thickness by 16%, and dentin canal thickness by 14% were observed. By the 21st day of the experiment, the pulp of the teeth was swollen and hemodynamic changes were intensified. Decreases in tooth enamel thickness by 18%, dentin thickness by 21%, predentine thickness by 16%, pulp thickness by 27%, cementum thickness by 23%, and dentin canal thickness by 17% were observed. By the 30th day of the experiment, there was an increase in swelling in the pulp of the teeth, signs of minor bleeding. The thickness of the enamel layer of the tooth decreased by 21%, dentin thickness by 18%, predentine thickness by 19%, pulp thickness by 22%, cement thickness by 17% and dentin canal thickness by 17%. 20%, predentine thickness 16%, pulp thickness 21%, cement thickness 18%, and dentin duct thickness 15%. During this period, swelling of the pulp of the teeth and increased hemodynamic changes were found. By the 90th day of the experiment, the pulp of the teeth was swollen and hemodynamic changes were intensified. Decreases in tooth enamel thickness by 22%, dentin thickness by 29%, predentine thickness by 19%, pulp thickness by 28%, cementum thickness by 25%, and dentin canal thickness by 17% were observed.

Conclusion. 1. Changes in the hardness of the tooth against the background of hypothyroidism are manifested by swelling of the pulp, enlargement of the canals, the appearance of defects in the enamel, the appearance of signs of lysis on the cement part.

2. The changes on the 14th day of the first postnatal ontogeny are manifested by a decrease in the thickness of the elements of the hard part of the tooth.

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