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MORPHOLOGICAL CHANGES OF MUSCLE TISSUE IN LABORATORY ANIMALS WITH DENTITION INTEGRITY VIOLATION

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Dentition integrity violation is one of the most common dentition pathologies leading not only to a chewing dysfunction, but also to a complex change in the entire biomechanics of the muscular system of experimental animals.

The issue of reactive changes in the tissues of masticatory muscles in dentition integrity violation is still understudied.

The muscular system responds to the occlusal load change, but the morphological criteria for its adaptation or degeneration at the cellular level are described fragmentarily. Understanding these processes in animals will enable to deeper understand changes in the functions of muscle tissues making this study much needed for modern veterinary medicine.

Paper objective: to establish the nature and dynamics of morphological changes in the structure of the masticatory muscles of laboratory animals within the conditions of experimental dentition integrity violation.

Material and methods of the study. The experimental study material was 10 sexually mature outbred eight-month-old male rats. Prior to the experiment, the animals were divided into 2 groups – the main and control one.

The main group consisted of 5 rats, in which the dentition integrity violation – occlusal disharmony – was simulated. The oral cavity was opened and fixed under general anesthesia. Using nail clippers on one side (left), the anterior incisors of the upper and lower jaws were cut off, retreating from the cutting edge by 3 mm, and the integrity of buccal cusps of the first molar of lower jaw of the same side was violated.

During the next two weeks, the rats were on solid food, which included mainly hard cereals. At the end of the first week, due to regeneration (restoration) of the central lower jaw incisor, the cutting edge was re-cut off 2 mm high. After 14 days, the rats were removed from the experiment.

Histological examination. Pieces of the masticatory muscle tissue were fixed in 10% neutral formalin. After fixation, the material was washed, dehydrated in a series of ascending alcohols and embedded in paraffin. Tissue sections 7-10 μm thick were made on a sledge microtome MC-2, placed on glass and stained with hematoxylin and eosin.

Histological preparations were studied at magnification using a Leica DM 1000 microscope with subsequent microscopic image taking.

Results and their discussion. When magnifying, especially in the longitudinal section, the fibers of masticatory muscles of the control group animals, a cross-striated striation is clearly visible resulting from the alternation of dark and light fiber disks. Numerous flattened nuclei are positioned under the cell sarcolemma at more or less constant intervals. (Fig. 1).

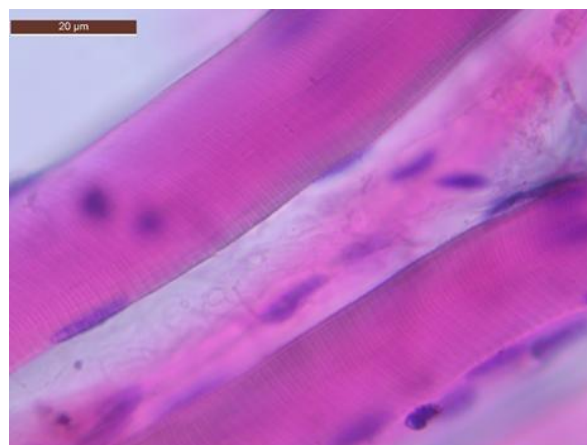


Fig. 1. **Transverse striation of muscle fibers. Control. Stained with hematoxylin and eosin. Magnification x100.**

Stromal edema, muscle fiber atrophy (Fig. 2, 3), loss of transverse striation, and small foci of dystrophy were detected in the masticatory muscle on the tooth damage side. (Fig. 4).

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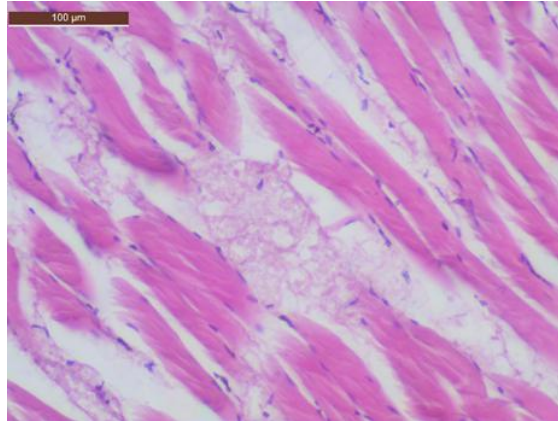


Fig. 2. **Stromal edema, muscle fiber atrophy. Stained with hematoxylin and eosin. Magnification x20.**

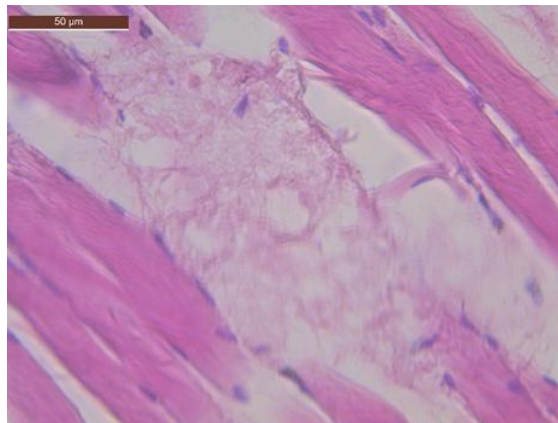


Fig. 3. **Stromal edema, muscle fiber atrophy. Stained with hematoxylin and eosin. Magnification x40.**

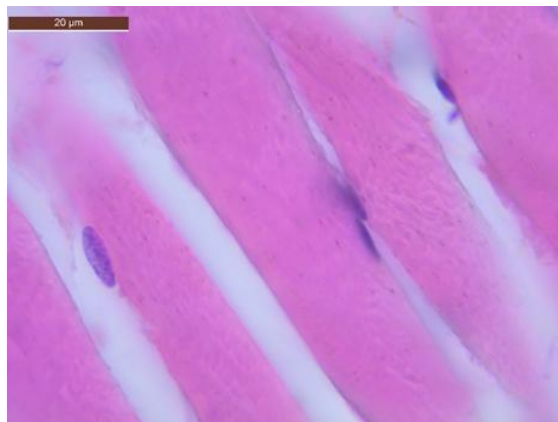


Fig. 4. **Muscle fiber dystrophy, loss of transverse striation. Stained with hematoxylin and eosin. Magnification x100.**

Conclusion.

1. Experimental simulation of the dentition integrity violation and the occlusal disharmony creation after 14 days leads to a pronounced structural change in the masticatory muscles on the affected side.

2. The main morphological signs of reactive changes in muscle tissue when the occlusal load changes are stromal edema and the development of atrophic processes in muscle fibers, which indicates the trophicity violation.

3. Occlusal disbalance is accompanied by destructive changes at the intracellular level manifested by muscle fiber dystrophy and loss of transverse striation.

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