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CHANGE OF COMPACT SUBSTANCE OF SHOULDER BONE DURING POSTNATAL ONTOGENESIS OF DIFFERENT BREEDS OF SHEEP

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Annotation
The dynamics of changes in the absolute parameters of the dorsal and palmar compact substances of the humerus in the postnatal ontogenesis of the sheep of the Hissar breeds and jaidar was studied, and specific morphometric features were determined depending on the effect of gravity on various anatomical parts of the bone.

Keywords: hissar, jaidar, humerus, dorsal, palmar, compact substance, postnatal ontogeny, growth factor, morphometric, absolute index.

Introduction

In addition to performing the basic and mechanical function of the body, bones also play an important vital role in the normal metabolism of mineral substances. Bones are one of the main organs that provide the exchange of calcium, phosphorus and many other macro- and microelements in the body. The strength of the bone wall is primarily related to the amount of the above elements, it is formed under the influence of many factors during the development of the animal after birth, and it shows certain characteristics according to age and breed.

In order to determine the changes in the morphometric indicators of long tubular bones depending on the period, the internal structures and strength of these bones of people of different ages were different from each other, that is, the decrease of the compact substance in the wall of the bone diaphysis, the increase of the marrow cavity, the decrease in the level of mineralization and strength was observed [4]. The author explains that this is the result of adaptive reconstruction in the bone system in relation to physical activity, nutrition, lifestyle and environmental conditions.

The mechanism of bone participation in calcium metabolism is based on the accumulation of calcium in the form of hydroxyapatite crystals in the organic matrix of newly formed bone tissue by osteoblasts. Depot calcium is stored in bone until its corresponding part is resorbed by osteoclasts. During osteoclastic resorption of bone, calcium is released, and when the organic matrix of bone tissue is formed, calcium is stored [6, 7]. The author says that bone tissue is a reliable depot of not only calcium, but also peptides, glycoproteins and many other proteins in the body.

Independent indicators of different parts of the skeleton can give some real information about the age structure of a particular species [1]. The author emphasizes that the quantitative assessment of morphological and pathological changes in the bone is of great importance in the use of the animal and in the reconstruction of the ecological living conditions.

The researcher studied the morphofunctional properties of the compact substance of the diaphyseal part of the femur of animals with different types of movement, and it was determined that the weight of the supporting force falls on different areas of the compact substance. That is, in sheep belonging to the group of phalanx walkers, it is noted that the weight of the supporting force falls more on the caudal area of the compact substance of the bone [3].

Minerals play an important role in all metabolic functions of the body. They are a part of tissues and body fluids, directly involved in the synthesis of complex organic compounds necessary for good growth and development of animals and birds [2, 5, 8]. Most of the calcium compound and its free ions react with the acid residue of phosphoric acid in the small intestine. Then they form water-insoluble compounds with palmitic, stearic and oleic fatty acids. Micelles have the feature of easy access to the cell membrane and transport calcium into the bloodstream, where fat cells are separated and participate in the process of resynthesis in the wall of the small intestine [9].

The goal was to determine specific features in the microanatomical structure of the humerus at various physiological stages of postnatal ontogeny of Hisori and Jaidari sheep.

Inspection Methods and Materials

Scientific research work was carried out on the humerus bones of the foreleg skeleton of Hisori and Jaidari sheep, which were kept under the conditions of Qamashi district of Kashkadarya region. The bones of the forelimbs of animals at the stages of 3, 6, 12, 18, 36, 48, 60 months of postnatal development were taken for scientific examinations. General morphological methods used and introduced by N.P. Chirvinskiy were used in processing bones and determining their morphometric parameters.

All numerical data obtained as a result of scientific investigations were subjected to mathematical processing according to the method of E.K. Merkureva.

To determine the dynamics of bones depending on age, the growth coefficient was developed by K.B. Svechin $K = \frac{V_t}{V_0}$ determined by the formula:

K – growth factor;

W is the absolute index of the bone of an adult animal;

Vo is the initial index of the bone.
Mathematical-statistical analysis was performed using Student's and Fisher's criteria in Microsoft Excel computer spreadsheet.

The Obtained Results and its Discussion

As a result of research, it was found that the microanatomical structures of the homers of sheep of different breeds at different physiological stages of postnatal ontogenesis show specific dynamics of change. The absolute index of the thickness of the dorsal compact material of the Jaidari sheep in the first 3 months of postnatal development is 0.316±0.03 cm, and from the next 6 months, this index gradually decreases, that is, it is 0.267±0.02 cm in 6 months, growth and the coefficient was equal to 0.84 times. The absolute thickness of the dorsal compact substance of the humerus in 12-month-old animals was sharply reduced compared to 6-month-old animals, by 0.194±0.02 cm, and the growth coefficient decreased by 0.72 times. This index of bone increased significantly at the 18-month stage of postnatal ontogenesis compared to 12-month-old, by 0.296±0.02 cm, and the growth coefficient was equal to 1.5 times ($p<0.05$), the absolute thickness of the dorsal compact substance in 36- and 48-month-old animals. almost unchanged, making this indicator equal to 0.299±0.04 cm (K=1.01), 0.299±0.01 cm (K=1.0), respectively, the absolute thickness of the dorsal compact substance of the bone at the 60-month stage of postnatal development is 36 It was noted that the rate of increase of this indicator was equal to 0.94 times during the studied stages.

The absolute index of the thickness of the dorsal compact substance of the humerus of Hisori sheep at the 3-month stage of postnatal ontogenesis is equal to 0.318±0.05 cm ($p<0.05$), from 6 months it is 0.314±0.02 cm, and at 12 months it is 0.228± 0.02 cm, and the growth factor was found to be 0.73 times. This bone index gradually increases from the 18-month stage of postnatal development of sheep, that is, it is 0.329±0.06 cm at 18 months (K=1.45; $p<0.05$), at 36 months it is 0.344±0.03 cm. (K=1.05), at 48 months - 0.367±0.02 cm (K=1.06), at 60 months - 0.369±0.04 cm (K=1.01). It was observed that the coefficient of growth of the absolute indicator of the thickness of the dorsal compact substance of the humerus of Hisori sheep was equal to 1.16 times during the period from 3 months to 60 months of the studied postnatal ontogeny.

The absolute thickness of the palmar compact substance of the humerus is equal to 0.274±0.01 cm ($p<0.03$) in the first 3 months of the postnatal ontogeny of Jaidari sheep, and in the next 6 months its imperceptible thickening occurs, i.e. 0.284±0.03 cm. and the growth factor was 1.03 times. This bone index was slightly reduced at the 12th and 18th months of postnatal development compared to 6 months, i.e. 0.261±0.03 cm at 12 months (K=0.92), and 0.258±0.03 cm at 18 months (K=0.98; $p<0.05$) was observed. At the 36-month stage of postnatal development, the absolute thickness of the palmar compact substance of the bone is 0.272±0.03 cm, the growth

coefficient is equal to 1.06 times, and at the age of 48 months, it increases imperceptibly, i.e. 0.281±0.03 cm (K=1.03). organization was noted. At the 60-month stage of postnatal development, the absolute thickness of the palmar compact substance of the scapula was found to be 0.227±0.04 cm, the growth coefficient decreased to 0.8 times, and during the period from 3 months to 60 months, the growth coefficient decreased to 0.78 times.

The absolute thickness of the palmar compact substance of the humerus of Hisori sheep was equal to 0.309±0.05 cm ($p<0.04$) at 3 months of age, and at the stages of 6 and 12 months of postnatal development, this indicator gradually increased, that is, at 6 months, it was 0.306±0.02 cm. (K=0.99), decreased to 0.287±0.04 cm (K=0.93) at 12 months. From the 18th month of postnatal ontogenesis to the 48th month, this index of the bone gradually increases, that is, it is 0.305±0.06 cm at 18 months (K=1.06; $p<0.05$), at 36 months it is 0.309±0.03 cm. (K=1.01) and 0.308±0.03 cm (K=0.99) at 48 months. In 60-month-old sheep, the absolute thickness of the palmar compact substance of the bone is significantly reduced compared to that of 48-month-old sheep, that is, it was 0.271±0.03 cm ($p<0.03$), and the coefficient of growth was 0.87 times compared to the lower age. During the studied stages of the postnatal ontogeny of animals, the growth coefficient of this indicator of the bone decreased to 0.88.

Conclusion

- The absolute linear dimensions of the thickness of the dorsal and palmar compact substance of the humerus show specific dynamics of change at different physiological stages of postnatal ontogenesis of sheep, and these indicators are observed to be higher in Hisori sheep than in Jaidari sheep in all periods of development;
- In relation to the extent of the weight force falling on different anatomical parts of the bones and the functional state, the absolute indicators of the thickness of the dorsal compact substance were found to be higher than those of the palmar compact substance at all studied stages of postnatal development.

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