



AGE-RELATED HISTOCHEMICAL CHANGES OF COCCIDAL BONE INJURIES

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Abstract

According to the results of histochemical examination of coccyx lesions, staining according to Van Gieson and Masson's trichrome was performed, mainly in the areas of coccyx damage, in order to clearly distinguish fuchsinophilic fibers, elastic fibers and muscle scar foci, altered foci of nerves and blood vessels in the areas of substitution of reparative regeneration, and to determine the specificity of morphological adaptation in the damaged areas.

Keywords: Coccyx, osteoporosis, histochemistry, Van Gison, trichrome Masson, morphology.

Introduction

The urgency of the problem

The average increase in obesity among the world population is 1.57-3.85 kg per year. In the USA, European countries, and South American people, the average increase in obesity is 3.57 kg per year for each year after the age of 40. This indicates an average body weight of 35 kg or more at the age of 40-59. This indicator is found in 23% of women over the age of 40 in the USA, Europe, and South American countries [1]. As a result, the development of osteochondrosis, osteoarthritis, and osteoporosis at a general level and, as a result, the development of a sedentary lifestyle. Specifically, in sedentary groups, injuries associated with the coccyx account for 3.47% of all injuries, indicating that an average of 25 million women aged 40-59 worldwide suffer from this disease. This, in turn, once again confirms the urgency of this problem. In the Russian Federation and the CIS countries, this indicator is most common among women aged 50-59, with an average annual obesity rate of 2.27-5.55 kg. One of the main reasons for the obesity rate among women aged 50-59 in Uzbekistan is the early cessation of sexual activity at an average age of 48-53, with a decrease in sexual activity, changes in the endocrine system and the development of diffuse osteoporosis. As a result, the average incidence of diseases related to the spine among women aged 48-59 in our





country's population is 42.85, of which 5.8% are diseases related to the coccyx. This requires the start of research work now.

Discussion and Results

According to the morphological aspects of chronic changes in the coccyx in histochemical methods, by staining fuchsinophil fibers with the Van Gieson staining method, the coarse collagen fibers formed in the coccyx are stained yellow, while the remaining areas are stained red. Fuchsinophil fibers are mainly type 1 and type 3 collagen fibers, which are first converted by fibroblasts into tropocollagen and then into fibrous collagen, which makes them well stained with fuchsin. It should be noted that as a result of chronic damage to the coccyx, the increase in the proliferative activity of fibroblasts increases the rate of collagen synthesis, which leads to the increase of these coarse fibers in all damaged areas of the coccyx, and the detection and completion of the process of damage to the coccyx that we are studying in our study. In particular, the group with the lowest number of fuchsinophilic fibers in terms of age-related damage to the coccyx was the 18-44-year-old group, where reparative regeneration in the damaged area was more pronounced than substitution, and the presence of a small number of branched fuchsinophilic fibers in the periosteum and pathologically formed fuchsinophilic collagen fibers around the coccyx was confirmed by the presence of pathologically formed fuchsinophilic collagen fibers around the coccyx. At the same time, the majority of

Group 1, 18-44-year-olds, had unbranched and small fuchsinophilic fibers when examined with Van Gieson. This indicates that reparative processes are fully completed and anabolic processes prevail in the body in terms of age-related damage. In the 2nd group of 45-59-year-olds in the coccyx injury, as a result of the detection of the proliferative activity of a large number of fibroblasts in the bones due to the acute damage of the vessel wall and the hypoxia process, the increase in the synthesis of tropocollagen to a large extent, as a result of the conversion of tropocollagenized collagen into fibers, confirms the appearance of rough scar connective tissue in the branches after the injury, rich in fuchsinophilic fibers.





Figure 31. The patient is 45 years old. A sharp increase in fuchsinophilic fibers and thickened tuatams are detected in the outer shell of the coccyx. Paint Van Gieson. The size is 10x10.

The presence of foci of metabolic and dystrophic calcification between the chaotically arranged bundles of collagen fibers of various thicknesses around the coccyx membrane, which are characterized by a coarse, branched arrangement of fuchsinophil fibers of various shapes, confirms the presence of numerous osteophytes formed in the areas of bone fusion, which, in turn, lead to the compression of nerve vessels.



Figure 32. The greater formation of fuchsinophil fibers in these 2 groups compared to group 1 indicates that the aging process predominates in age-related tissues and that reparative regeneration ends mainly with substitutional scarring.



60-74 In group 3, foci of increased coarse collagen fibers were detected along the perimeter of the coccyx in 60-74-year-olds, and an increase in fuchsinophil fibers was observed in most of the capsule and all surrounding soft tissues, indicating that the predominance of the main reparative regeneration in the morphological adaptation of the tissue with age continued with the formation of coarse scarred foci in the form of substitution.

The presence of a large number of massive fuchsinophil fibers around the joints along the body of the coccyx, confirming atrophic and sclerotic changes in the coccyx as a result of hemodynamic disturbances and morphological adaptation due to chronic injury, and the formation of synostoses in the form of clinical morphological arthrodesis on the movable articular surfaces of the coccyx confirming the completion of the process, as well as the absolute immobility after fractures of the coccyx, are confirmed by the above morphological examinations.

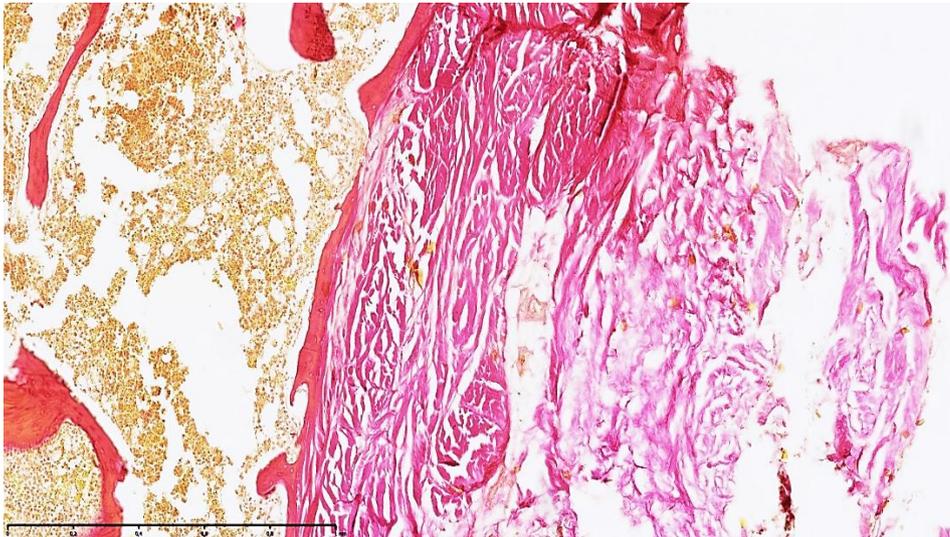


Figure 34. The patient is 49 years old. Borders of the coccyx periosteum and bone spongy substance. The increase of massive fuchsinophilic fibers at the border and the appearance of fibrous structures subjected to defragmentation and destruction in the interval. Paint Van Gieson. The size is 10x10.

In group 4, the main signs of coccyx damage in the 75-90 and 90-year-old and older contingent were the formation of foci of increased fuchsinophil fibers in the soft tissues surrounding the coccyx, surrounded by a solid fibrous collagen fiber capsule, and the supporting surfaces of the osteoporotic bone were mainly reinforced with fuchsinophil fibers. This, in turn, led to the development of an increase in fibrous tissue and foci of fuchsinophil fibers in the form of coarse connective tissue in the period after coccyx damage. These changes are mainly age-related, and are manifested



in Van Gieson's staining with coarse connective tissue along the perimeter of the coccyx and focal adhesions of muscles, ligaments, nerves, and blood vessels crossing this area, which allows for the prediction of the course of pain syndromes that may develop in this area in the future.



Figure 35. The patient is 70 years old. The coccyx is markedly thickened and striated with a composite arrangement of fuchsinophilic cells in the epichondrium, and in the interstitial space there are numerous edemas and destructive changes. Osteofibrosis in the form of pathological foci is detected at the borders of the bone marrow. Staining Van Gieson. Size 20x10.

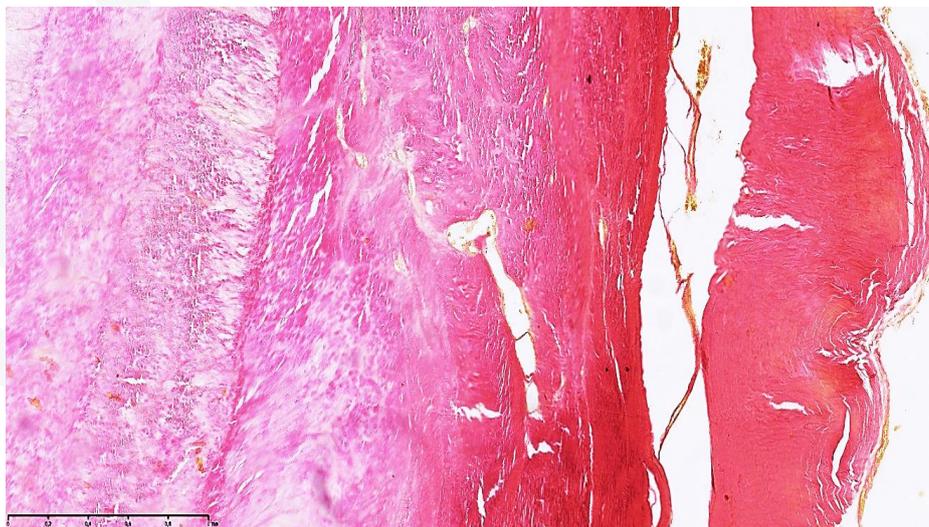


Figure 36. The patient is 59 years old. Borders of the coccyx periosteum and bone spongy substance. The increase of massive fuchsinophilic fibers at the border and the appearance of fibrous structures subjected to defragmentation and destruction in the interval. Paint Van Gieson. The size is 10x10.



Thus, according to the results of the above-mentioned microscopic examination, the intensity and distribution of fuchsinophilic fibers in the Van Gieson joint, and the analysis of age-related morphological changes in coccyx injuries, it is explained by the low formation of fuchsinophilic fibers in 18-44-year-olds and the predominance of the reparative regeneration process in the post-traumatic period, which mainly manifests itself in the form of restitution, which leads to the predominance of the assimilation index of tissues in this 18-44-year-old contingent of patients and the formation of coarse-fiber connective tissue.

In 45-59-year-olds, the main age-related characteristics of coccyx injuries are the presence of a large number of fuchsinophilic fibers in an irregular pattern along the perimeter of the injury line, one of the main features of which is the formation of a larger area of collagen fibers in the periosteum compared to group 1.

In 60-74-year-olds, foci of a sharp increase in fuchsinophilic fibers are detected in the period after coccyx injuries, just like in group 2. This, in turn, is accompanied by an increase in fuchsinophilic fibers and coarse collagen fibers in the direction of injury. The distribution of reparative regeneration foci of the same type in most damaged areas in the form of substitution indicates the superiority of tissue regeneration and high fibroblast proliferation.

In 75-90 years and $90 \leq$ years, the main features are the incompletely formed patchy appearance of fuchsinophilic fibers, where the age-related aspects of reparative regeneration reveal incompletely formed connective tissue components consisting of collagen fibers in the damaged area. One of the main aspects of reparative regeneration in the elderly and long-lived is the absence of a large number of fuchsinophilic fibers in the form of substitutability, the presence of a large number of damaged and defragmented foci, the understanding of the process in the form of age-related biological aging, and the low rate of regeneration in the existing fibrous structures is characteristic of age-related changes, 90 years and older it means that the proliferative activity of fibroblasts in the contingent decreased and the synthesis of tropocollagen decreased.

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