

# MORPHOLOGICAL CHANGES IN KNEE MENISCUS CYSTS

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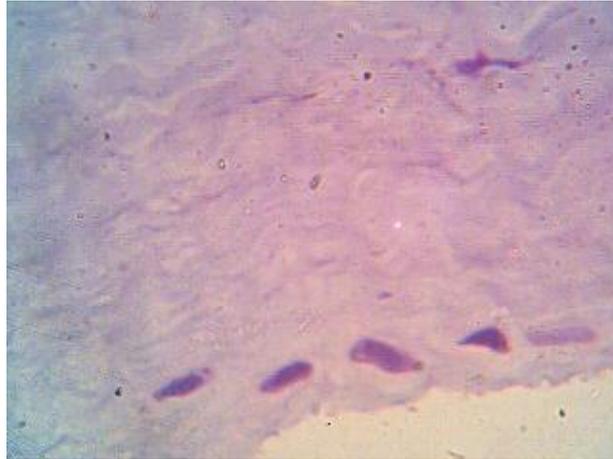
The cystic degeneration of the meniscus, or the so-called meniscus cyst, is an independent nosological unit with well-defined symptoms and a characteristic pathological anatomical picture [1,2]. Information about this disease is almost not found in the educational literature, and only a few works have been published in the periodical foreign literature. The question of the nature of pathomorphological changes in meniscus cysts is still under discussion [3,4].

## Material and methods.

In the sports injury department of the Republican Specialized Scientific and Practical Medical Center for Traumatology and Orthopedics of the Ministry of Health of the Republic of Uzbekistan from 2006 to 2020 treatment was performed in 220 patients with cysts of the meniscus of the knee. All 220 patients underwent surgery. The choice of surgical treatment depended on their location, size. We examined about 50 cyst preparations together with the meniscus, removed during surgery in 18 patients aged 16 to 65 years. The duration of the disease is from 3 months to 7 years.

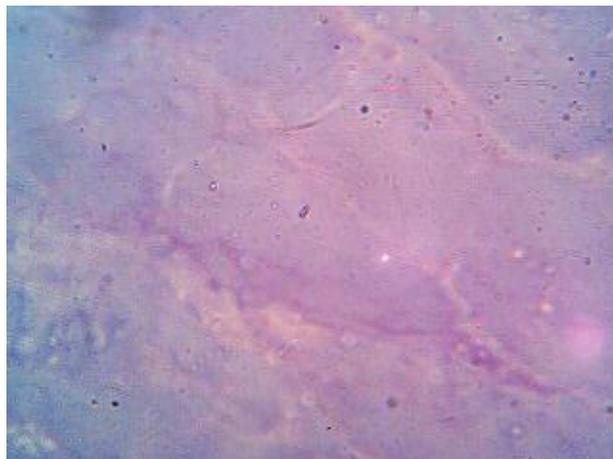
## Manifestations of morphological changes in menisci depending on the causes and severity of cystic transformations

Types	I degree	II degree	III degree	Cyst phorm
Posttraumatic	Minor hemorrhages destructive changes in the matrix, foci of necrobiosis of chondrocytes in the isolated zone	Separation of the cavity with the surrounding tissue, the formation of a dense membrane, homogenization of the contents of the cyst.	Destructive changes are observed in neighboring areas, an increase in the cavity, due to the accumulation of intercellular fluid and partial isolation of the environment	Small in size but multiple cameras in one meniscus area (multi-chamber)  Localization: The precapsular meniscus
Dystrophic	Violation of blood circulation, venous or lymphatic outflow, zonal violation of cartilage trophy	The decay of swollen fibers, the destruction of cell membranes, the formation of borders and cavities.	The growth of fibrin fibers (fibrotic change) in the cavity, the appearance of fibroblasts, an increase in the size of the cyst	It is larger in size (it covers the whole meniscus), but it is isolated. Localization: Horn of the lateral, anterior horn of the medial meniscus
Смещенная Biased	Changes in parameniscal tissue, growth of coarse fibrous tissues, impaired cell metabolism	Penetration of the zone of vascular cysts and connective tissue. Disintegration of the contents of the cyst before homogenization	Generalized destructive changes, swelling of the matrix of neighboring zones, growth of reticular tissue, a sharp increase in cysts	Multi-chamber of various sizes The posterior horn of the medial, the anterior horn of the lateral meniscus



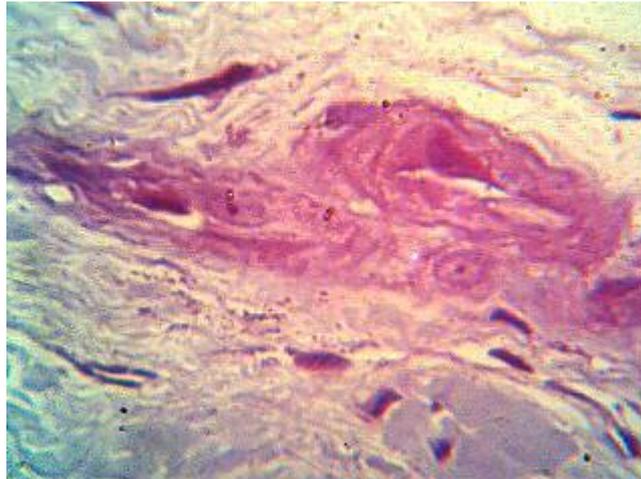
1. The surface layer of the meniscus.

The normal meniscus of the surface layer does not contain dead chondrocytes. In addition to this, histological changes in this fragment were not detected. Throughout the preparation, collagen and elastic fibers are distributed periodically and parallel bundles are closely connected by the stroma of the matrix. In the articular surface of the meniscus hyaline cartilage, edema, swelling and destruction of fibers directed to the periphery are noted.



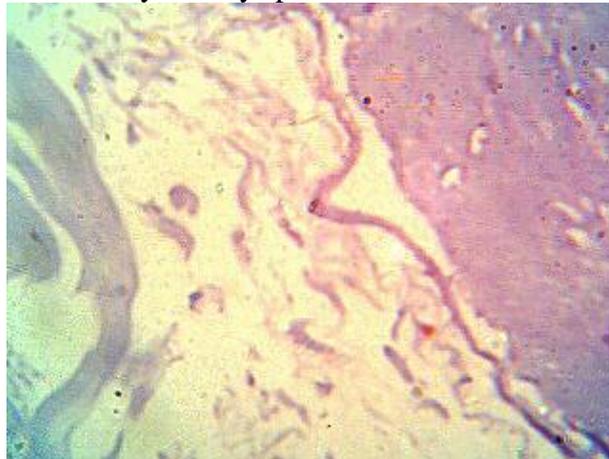
2. The surface layer of the meniscus.

The architectonics of the matrix of the surface layer of hyaline cartilage consists of parallel bundles of collagen fibers adjacent to each other. The entire intercellular space is orthochromatic in color; persistent homogenization is observed. Single cell elements are determined in places, despite the fact that this layer is cell-free. Deeper hyaline cartilage was replaced by fibrous, some of whose cells were in a state of necrobiosis. The deep layers of articular cartilage were hyaline cartilage with numerous foci of unmasking matrix fibers, necrobiosis of chondrocytes and small foci of necrosis. In places in the cartilage cracks containing vessels were revealed.



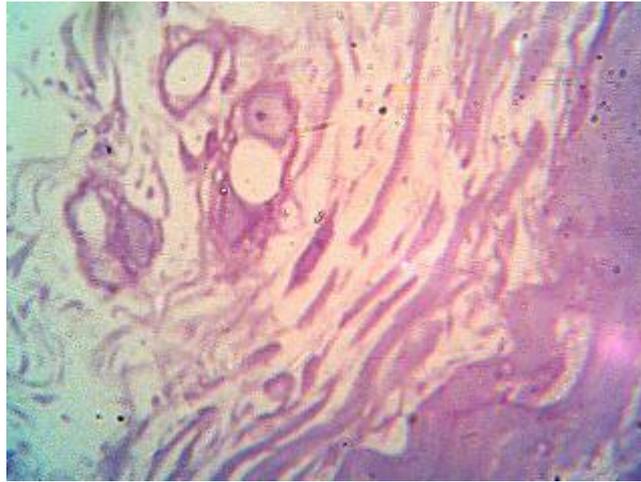
### 3. Dystrophically altered part of the meniscus

In some preparations, degenerative-dystrophic altered zones are found. The fibrous structures around the altered zone are characterized by an uneven distribution of collagen fibers. Deeper hyaline cartilage was replaced by fibrous, some of the cells of which were in a state of necrobiosis. In places, the pronounced decay of the tissue structure is determined and they are surrounded on all sides by closely spaced fibers.



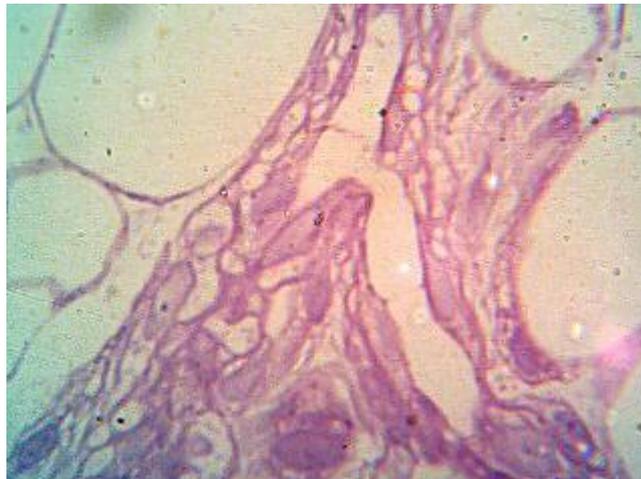
### 4. The border of the changed zone.

Loose areas are visible. The vacuolization of cells is determined by the generalized type. At the border, the fibrous structures are coarse, but parallel. The intermediate part visualizes the angular distribution of powerful collagen fibers, which form a clear boundary. Hyaline cartilage of the anterior section is moderately expressed by vacuolization of chondrocytes with focal necrosis of cartilage cells. Collagen fibers are loosened, homogenized.



5. Cells of the intermediate zone of the deep layer.

Between oppositely directed coarse collagen and loosened elastic fibers, an accumulation of chondrocytes of various sizes is visible. Most chondrocytes have vacuolization. In some, which are closer to the center, the structure is still preserved, but has an uneven membrane. The loosened zone gradually passes to the densified structures.



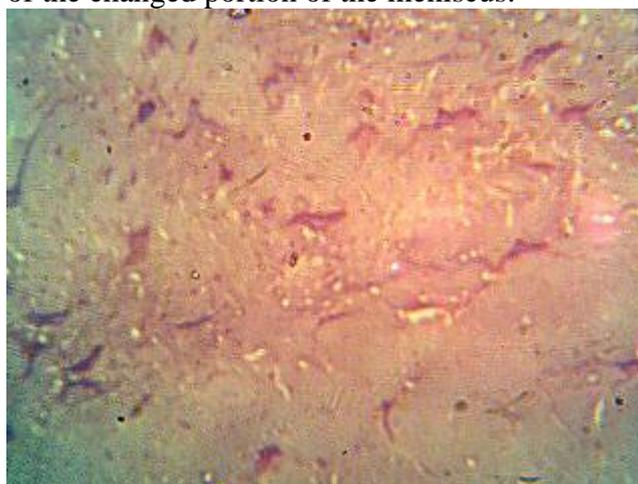
6. Cystic changes in the intermediate zone of the meniscus hyaline cartilage.

The microscopic structure of the cystic space is alveolar in nature. Loose connective tissue structures penetrate between the vacuolated parts, of which the cellular composition of the latter is mainly fibroblasts. The border region of connective tissue fibroblasts is evenly distributed, forming two layers. This picture indicates an early period of cyst formation, the cellular mechanism of chondroreparation begins.



#### 7. Polycystic cartilage matrix phenomena.

Preparations of this group of patients determined by the cavity of the changed areas. They have various shapes and sizes. Limited to coarse fiber collagen. Coarse fibers form a formed tight border. In places, sharply altered chondrocytes are determined, which undergo a significant decrease in density. The adjacent areas are determined by a multitude of newly formed abdominal structures. In the thick section with cystic phenomena of the cartilage matrix is determined by deep dystrophic changes with an irreversible character. This position indicates the removal of the changed portion of the meniscus.



#### 8. Omnidirectionality of the fibrous structures of hyaline cartilage.

In a histological examination of biopsy specimens of the border of the cyst, complete destruction of the cartilaginous plates, foci of matrix splitting, which due to loosens often located near empty gaps. A clear boundary is defined between the changed and unchanged zones.

Macroscopic examination revealed that the cyst comes from the outer edge of the meniscus. Small cystic formations of dense elastic consistency, large-elastic, soft, sometimes fluctuations are clearly defined.

In meniscus were cut a large number of cavities of various sizes, filled with viscous, transparent or slightly yellowish mucous fluid, were determined. Cystic cavities were located both in the parameniscal tissue and in the meniscus tissue, capturing the outer and middle third of it.

Microscopic examination of meniscus preparations determined typical structural changes, which, apparently, precede tissue rupture and are localized in the middle part of it, between the upper and lower surfaces.

Morphologically, the pattern of changes was manifested in loosening of the meniscus

tissue. Collagen bundles of fibers in this zone turned into thin networks of fibers. With more pronounced changes in the areas of loosened meniscus tissue, small cavities and cracks were determined. Here, there were areas of proliferation of cellular elements and the formation of isogenic groups, indicating the restructuring of the meniscus fibrous tissue and hyaline cartilage.

In the marginal zones of the meniscus, where there are no areas of similar loosening of the tissue, moderate proliferation of cells was observed. Sometimes in the outer third of the meniscus tissue there was an overgrowth of capillaries with hyperplasia of cellular elements around them.

On the meniscus preparations, where there were tissue tears, the described changes were more pronounced. These changes occupied the entire middle third and even the inner third of the meniscus. The gap gap, starting on the bottom surface, reached the middle zone, and sometimes to the outer edge of the meniscus, stratifying the latter horizontally into two parts. The walls of the slit were uneven, the meniscus tissue along the slit acquired the character of a young hyaline sprouting, its round cells formed small isogenic groups. The unevenness of the gap gap walls was explained by the appearance of small cartilaginous villi on them. In some preparations, a layer of cells resembling a layer of integumentary cells of the synovial membrane was found deep in the gap of the gap.

#### ***Conclusions***

A morphological study of menisci and parameniscal tissue in patients with a meniscus cyst suggests that the process of mucous metamorphosis is the beginning of the formation of cysts as a compensatory-adaptive process in response to chronic trauma.

#### ***Literature.***

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