

## Morphological changes due to exposure to chronic inflammation of pubic symphysis

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**Abstract:** Chronic inflammation causes structural and functional changes in the tissues of the pubic symphysis, which leads to pain syndrome and limited movement in children, adolescents, and adults. There are many different scientific systematic reviews and studies devoted to the pubic symphysis, which are mainly presented in foreign literature. Although the study of this anatomical structure made it possible to obtain valuable information for practical medicine, some morphofunctional aspects of the pubic symphysis remain unclear to this day. Any gaps in knowledge, even small, prevent a full understanding of the normal structure and function of the joint, which can negatively affect the identification of the mechanisms of development of various pathological conditions in it. This review is dedicated to the modern normal systemic anatomy of the human pubic symphysis, focusing on the components of the symphysis, blood supply, innervation, biomechanical properties, and physiological changes during pregnancy. It also examines aspects of forensic anthropology related to quantitative morphological and microarchitectural changes in the surface of the pubic symphysis in unidentified remains, as well as the extremely important role of the pubic symphysis in pelvic injuries.

**Keywords:** pubic symphysis, chronic inflammation, morphology, cartilage tissue, anatomy, fibrosis, immune reaction.

### **Introduction:**

**Relevance.** Chronic inflammation and fibrotic changes in ligaments and tendons are common problems in orthopedics and sports medicine. The pubic symphysis is a structure with a large mechanical load and providing movement. Functional disorders of the pubic symphysis as a result of chronic inflammation in children, adolescents, and athletes can lead to pain syndrome and limited movement. Therefore, the study of its pathogenesis and morphological changes is of current importance.

**Purpose of the study.** To analyze the structural and functional changes of chronic inflammation in the pubic symphysis and to show the pathogenetic mechanisms and clinical significance of this process.

**General structure and age characteristics.** The pubic symphysis is a strong connection located along the midline between the pubic bones of the pelvis. According to modern anatomical references, it is classified as a secondary cartilaginous joint (fibrocartilaginous joint) [1]. The formation of the pubic symphysis begins in the second month of intrauterine development and by the time of birth is characterized by thick cartilaginous plates, which undergo atrophy over time[2].

The structure of the joint includes the medial surfaces of the pubic bones and the fibrocartilaginous disc between them, and in the thickness of the disc there is a small space in the form of a narrow fissure[1].

The surfaces of the pubic bones, forming the pubic symphysis, are oval and have a slightly protruding appearance.

Their location in the sagittal plane is inclined and extends backward in the cranio-caudal direction. According to the literature, the average length of such surfaces is 30-35 mm, and the width is 10-12 mm. A characteristic feature is that if the surfaces are parallel on the back, then in the front, upper, and lower parts they often diverge (spread) from each other.

It was established that in most men, the upper and lower borders of the pubic symphysis are located at the same level, while in women, a discrepancy of these borders is observed in the upper and lower parts. Unlike adults, the sizes of the pubic symphysis in children can vary significantly depending on individual developmental characteristics [1, 3]. It has been established that with age, the pubic symphysis becomes smaller and narrower, but at the same time thicker, which negatively affects the resistance of pelvic structures to various mechanical influences, making it more brittle [4, 5, 6].

The surface of the pubic symphysis is covered with hyaline cartilage, the thickness of which varies from 1 to 3 mm. However, according to some researchers, in elderly people, due to a decrease in cartilage thickness, its thickness does not exceed 400  $\mu\text{m}$ . In young people, the subchondral bone surfaces are characterized by roughness, but according to radiological examination results, by the age of 30, they become smooth and even. Usually after sixty years of age, age-related degenerative changes are manifested, such as narrowing of the joint space, subchondral sclerosis, and the abnormal form, which leads to instability of the pubic symphysis, causing pain in the inguinal region [1, 7].

## Results and discussion.

During pregnancy, a woman's body undergoes significant physiological changes. Enlargement of the uterus leads to stretching of adjacent tissues and puts additional strain on the woman's musculoskeletal system [10]. Physiological separation of the pubic symphysis is considered normal during pregnancy and usually returns to normal (regresses) in the postpartum period without any serious consequences for the labor process [11].

Traumatic injuries of the pelvic structures are severe injuries with a high mortality and disability rate. The consequences of such injuries often become a heavy burden on patients and society. Due to the specific anatomical features, in pelvic fractures caused by a high kinetic energy load, the internal organs of the pelvis are at risk of injury. Thus, the lower urinary tract becomes very weak as a result of a displaced pelvic fracture. Although the frequency of complications associated with pelvic injuries is relatively low, their consequences, such as peritonitis, urinary tract infections, urethral stricture, or sexual dysfunction, can be clinically significant [12].

However, in this review, we will focus on the pubic symphysis. Side impacts by vehicles are the main cause of pubic joint injuries. The energetic effect of a lateral blow, as a rule, leads to lateral compression fractures of the pelvic ring, which damages the pubic horns, sacrum, and acetabulum (vertluzhnaya vpadina), and in more severe cases - to rupture of the pubic joint and sacroiliac joint.

In response to perivascular infiltration and lymphocytic-macrophage response, disorganization of collagen fibers in the cartilage tissue and a decrease in chondrocyte production, accumulation of transudate and exudate in the synovial space, and the formation of a fibrous layer and scar structures with prolonged inflammation are observed. A decrease in the rigidity and elasticity of the pubic symphysis leads to movement restriction and pain syndrome, load, and impaired symphysis movement.

In inflammation, the production of cytokines through the activity of lymphocytes, macrophages, and neutrophils, the activation of immunoinflammation under the influence of biomaterials or microtrauma, and fibrous and cicatricial transformations arise as a result of prolonged inflammation.

## Conclusion.

Chronic inflammation leads to significant structural and functional changes in the tissues of the pubic symphysis. Morphological analyses play an important role in identifying inflammatory and fibrous processes. These data can be used in clinical practice for the prediction of pain syndrome and the development of therapeutic methods.

## References:

1. Adamyan, L. V. (2020). Endometriosis: Modern aspects of diagnosis and treatment (Endometrioz: sovremennye aspekty diagnostiki i lecheniya, In Russian). Moscow, Russia: GEOTAR-Media. 256 p.
2. Savelieva, G. M., & Serov, V. N. (2021). Gynecology: National guidelines (Ginekologiya: natsional'noe rukovodstvo, In Russian). Moscow, Russia: GEOTAR-Media. 1088 p.
3. Kulakov, V. I., & Sukhikh, G. T. (2019). Women's reproductive health (Reproduktivnoe zdorov'e zhenshin, In Russian). Moscow, Russia: Meditsina. 432 p.
4. Shurshalina, A. V. (2018). Immunological aspects of endometriosis and infertility (Immunologicheskie aspekty endometrioz i besplodiya, In Russian). Moscow, Russia: Prakticheskaya Meditsina. 198 p.
5. Kostin, I. N. (2018). Infertility in gynecological practice (Besplodie v praktike vracha-ginekologa, In Russian). Saint Petersburg, Russia: SpetsLit. 384 p.
6. Vercellini E., Vigano P., Somigliana E., Fedele L. Endometriosis: Pathogenesis and treatment. – Human Reproduction Update, 2014. – Vol. 20(2). – P. 248–267.
7. Abdurasulovna, K. I., Ergashevich, Y. K., & Abdukhalilovich, S. A. (2018). Horizons and challenges of the silver nanoparticles application in the practical medicine. European science review, (7-8), 122-127.
8. Kamilova, I. A., Pakhomova, J. E., & Nadjmutdinova, D. K. (2020). Analysis of the role of 1G/2G polymorphism in the MMP1 gene in the development and clinical course of cervical intraepithelial neoplasia. European Journal of Molecular and Clinical Medicine, 7(2), 850-859.
9. Nabijonova, G. M., & Kamilova, I. A. (2025). Robson classification for caesarean section (Doctoral dissertation, O'zbekiston).
10. Kamilova, I., & Umarov, A. (2025). The Role of Lipid Peroxidation and Activity of The Blood Antioxidant System in The Development of Postpartum Endometritis and Their Prognostic Significance. International Journal of Medical Sciences And Clinical Research, 5(05), 96-104.
11. Akhmadzhonova, G., Nazhmutdinova, D., Negmatshoeva, K., & Iroda, K. (2024). Assessment of the Microbial Flora of the Genital Tract and the Morphofunctional State of the Endometrium in Antiphospholipid Syndrome.
12. Becker C. M., Bokor A., Heikinheimo O. et al. ESHRE guideline: endometriosis. – Human Reproduction Open, 2022. – No. 2. – P. 1–26.

