

# To Study the Possibilities of an Arthroscopic Method for Diagnosis and Treatment of Deforming Osteoarthritis of the Ankle Joint

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**Abstract** The important medical and socio-economic importance of the problem of treating patients with degenerative-dystrophic joint diseases is due to the significant frequency of this pathology and a high degree of disability, and therefore continuous improvement of its treatment methods is important. Deforming osteoarthritis of the ankle joint is a disease that occupies one of the leading places among the causes of permanent disability and disability.

**Keywords** Treatment methods, Deforming osteoarthritis, Degenerative-dystrophic

## 1. Introduction

Most researchers regard this pathology as a polyetiological process, and the following are considered the most significant etiological factors: biomechanical, inflammatory, metabolic, endocrine, and ischemic. However, the most common cause of the development of deforming osteoarthritis of the ankle joint is the consequences of acute or chronic injury. Injuries to the ankle joint with a violation of the congruence of the articular surfaces - ankle fracture with rupture of the distal tibial syndesmosis, separation of large fragments of the anterior and posterior edges of the tibia, destruction of the distal epiphysis of the tibia, occupy a leading place in this group in terms of severity of injuries. With such an injury, unsatisfactory treatment outcomes, with the development of deforming osteoarthritis, according to literature data, reach 25%. Deforming arthrosis of the ankle joint is still one of the most difficult to treat diseases affecting the musculoskeletal system. At the same time, intraarticular changes serve as a starting point in the mechanism of development of interrelated anatomical and functional disorders, initially at the level of the ankle joint, and then in the overlying structures of the limbs, pelvis and spine. Treatment and rehabilitation of patients with deforming osteoarthritis of the ankle joint still presents certain difficulties. Traditionally used conservative treatment methods include drug therapy, physiotherapy, kinesotherapy, various rehabilitation measures aimed at slowing or stopping the progression of degenerative changes in cartilage and subchondral bone, reducing pain and

inflammation, and improving joint function. However, the entire arsenal of conservative measures makes it possible to stop the progression of deforming osteoarthritis and subjectively improve the patient's condition only for a certain, sometimes very short time [1,3,5,7,8].

Treatment undertaken without taking into account the nature and severity of the pathological process does not significantly affect the improvement of the quality of life of patients with deforming arthrosis of the ankle joint. Among modern technologies that make it possible to approach the problem of diagnosis and treatment of ankle joint pathology at a qualitatively new level, arthroscopy is of particular interest, which allows not only accurate diagnosis and detailed characterization of degenerative-dystrophic changes affecting the ankle joint, but also a set of therapeutic measures to normalize the intra-articular environment. Thus, despite the prevalence of deforming osteoarthritis of the ankle, no clear treatment strategy has been developed to date, and the capabilities of modern medicine in relation to minimally invasive technologies are not being fully utilized. In this regard, it is very relevant to develop a system of therapeutic, diagnostic and rehabilitation measures for osteoarthritis of the ankle, based on an integrated approach, taking into account the etiology, stages of the pathological process, the degree of damage to intra-articular structures, using the possibilities of arthroscopy, step-by-step control over the restoration of joint function, allowing to improve the quality of life of patients.

## 2. The Purpose of the Study

To develop tactics of surgical treatment of deforming osteoarthritis of the ankle using arthroscopy, allowing to improve treatment results and improve the quality of life of

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patients. The use of arthroscopy makes it possible to improve the treatment results of patients with deforming osteoarthritis of the ankle and achieve a significant improvement in the quality of life. Arthroscopy of the ankle joint in deforming osteoarthritis can be performed using standard equipment. Being a highly effective and safe method, it allows you to avoid postoperative complications, reduce the duration of rehabilitation and hospital stay. The use of arthroscopy in the treatment of deforming osteoarthritis of the ankle joint can significantly improve the effectiveness of treatment with minimal hospital stays. The combination of the arthroscopic method with rational drug therapy and rehabilitation measures makes it possible to restore the function of the ankle joint in a short time or significantly improve the quality of life of patients. Pain syndrome (all patients in the study group repeatedly underwent conservative treatment without effect), restriction of motor activity. The average score in this group was 31.7, which is in the "satisfactory" range. X-ray examination in this group of patients revealed deforming osteoarthritis of the I - II stage, which allowed us to hope for an improvement or restoration of the function of the ankle joint. When performing rehabilitation arthroscopy, we used the methods of manual and loop distraction. During rehabilitation arthroscopy, correction of articular surfaces, removal of chondromic bodies, excision and removal of adhesions and hypertrophied synovial membrane, and tunneling of cartilage defects were performed.

### 3. Results and Analyzes

These measures have improved the condition of the intraarticular environment of the ankle joint. Subsequently, the patients underwent a course of rehabilitation treatment. External immobilization was not used, passive movements in the joint were allowed on the 2nd day after surgery, active on the 7th day, full load in the presence of chondropathy of 1-2 degrees 2 weeks after surgery, in the presence of chondropathy of 3-4 degrees and performed tonelization - 5 weeks after surgery. In order to further correct the synovial environment of the joint in the postoperative period, hyaluronic acid preparations (ostenil, fermatron, duralan) were administered intra-articularly according to the recommended regimen. Evaluation of the results of ankle joint function in patients of group 1 showed that already 8 weeks after surgery, the average improved 1.3 times, moving into the range of "good", and after 6 months - 1.46 times, moving into the range of "excellent". The results of treatment of patients in group 1 showed that the integrated approach used using rehabilitation arthroscopy, intraarticular injections of hyaluronic acid preparations in the postoperative period and early development of movements in the ankle joint allowed achieving excellent results. The second group included b patients with anterior impingement syndrome on the background of deforming arthrosis of stages 1-11, while in 5 patients the cause of the development of pathological changes was trauma. The indications for surgery were: pain syndrome (all patients in the study group repeatedly

underwent conservative treatment without effect), restriction of motor activity. The average score in this group was 32.4, which indicates a significant impairment of function. X-ray examination in this group of patients revealed deforming arthrosis of stage I - II, with the presence of osteophyte of the anterior edge of the tibial epiphysis. The revealed clinical and radiological changes allowed us to hope for the restoration or improvement of the function of the ankle joint. The main objective of surgical treatment was considered to be resection of the anterior osteophyte in order to increase the volume of movement in the joint and eliminate the mechanical limiting and irritating factors [2,4,6,8].

To determine the optimal level of resection, a comparison was performed with radiographs of the opposite ankle joint. After performing surgical approaches, diagnostic arthroscopy of the ankle joint was performed. Examination of the joint cavity was usually difficult due to severe arthrofibrosis of the anterior region, due to chronic synovitis and the presence of osteophyte. At that time, debridement of the anterior joint and resection of the osteophyte were performed first, and then the revision was continued. Resection of the exostoses was performed with a motorcycle shaver or arthroscopic osteotomy. After resection, a detailed examination of the joint cavity was performed to identify possible loose bodies or the presence of concomitant intraarticular pathology, which determined the further course of the operation and subsequent treatment tactics. In three cases, the presence of exostosis caused reactive inflammation of the synovial membrane of the joint, which necessitated partial synovectomy. The assessment of ankle function in patients of the second group showed that 8 weeks after surgery, the average improved 1.3 times (by 9.9 points), moving into the "good" range, and after 6 months of follow-up 1.45 times (by 14.7 points), moving the overall score into the "excellent" range. The length of hospital stay ranged from 2 to 3 days. The results of the treatment of patients in group 2 showed that the integrated approach used, including arthroscopic resection of the osteophyte, debridement of articular surfaces and rehabilitation measures, intra-articular injections of gnaluronic acid preparations in the postoperative period and the early development of osteoarthritis in the ankle joint, achieved excellent results. 6 months of follow-up and individual assessments of each patient were transferred to the "excellent" range. The 3rd group included 16 patients with stage III deforming arthrosis of the ankle joint. The indications for surgery were: severe pain syndrome with significant impairment of function (the average score in the group according to the functional assessment scale was 27.4), severe restriction of activity (all patients in this group moved with the help of crutches or in a wheelchair), severe limitation of the range of motion in the ankle joint, radiological signs of deforming osteoarthritis stage III. We performed arthrodesis of the ankle joint using the arthroscopic method in these patients.

Distraction was performed with the help of invasive devices due to the pronounced rigidity of the ankle joint in stage III of the disease. The distractor was applied over the

lateral surface. Next, arthroscopy was performed with revision and debridement of the joint cavity. After treatment of the articular surfaces until bleeding areas appeared throughout all the touching surfaces, two guide spokes were used for the subsequent insertion of polished 7mm screws percutaneously into the body of the talus, one through the metaphyseal area of the fibula, the other through the metaphyseal area of the tibia. Next, the length of the screws was determined and, under the control of the EOP, they were inserted along the spoke, providing compression and some medial displacement. The wounds were sutured with synthetic material, an aseptic bandage, a back splint with a soft backing, or an orthosis were applied. The immobilization was continued for up to 8 weeks. A staged X-ray check was performed after 4 weeks. If there were radiological signs of developing ankylosis, a metered load on the limb was allowed in an orthosis or bandage. The load was increased gradually to full by the 8th week of follow-up, after which the following X-ray monitoring was performed. If there were signs of ankylosis, immobilization was stopped and the patient was transferred to walking without additional support. All patients were recommended a standard course of physical therapy aimed at preventing hypotrophy of the muscles of the lower extremity. Patients who underwent arthrodesis had a pronounced dysfunction of the ankle joint before surgery, but after surgery this function was absent. Therefore, in this group, we applied an objective assessment of the viability of ankylosis according to X-ray examination data. In addition, we assessed such parameters as gait, the condition of the soft tissues of the ankle joint, the presence of edema and its relationship to physical activity, motor activity, the need to use support when walking, the need to use orthopedic shoes, and the maximum walking distance. Each of the indicators was evaluated on a five-point scale. According to the obtained scores, the treatment result was defined as "unsatisfactory", "satisfactory", "good" and "excellent". The length of hospital stay ranged from 3 to 5 days. An analysis of the treatment results showed that the applied method of arthroscopic arthrodesis is minimally traumatic, relatively to this pathology, highly effective, economically advantageous surgical aid, taking into account the cost of medications for treatment, the length of hospital stay and the subsequent rehabilitation period. Arthroscopy of the ankle joint makes it possible to fully and non-traumatically perform a wide range of effects - from revision and rehabilitation to arthrodesis, and the stay of these patients in the hospital is minimized. Rehabilitation arthroscopy, performed for deforming osteoarthritis of the ankle joint of the 1st stage, allowed achieving 90% of excellent and good results with full recovery of working capacity in all patients. In anterior impingement syndrome of the ankle joint, arthroscopic correction is the method of choice and allows achieving excellent and good results in the

first and second stages of osteoarthritis. Arthrodesis is indicated for deforming arthrosis of the ankle joint of stage III. The use of arthroscopic techniques of arthrodesis makes it possible to achieve bone ankylosis in all patients for up to 8.5 weeks.

## 4. Conclusions

The combination of arthroscopy with intraarticular administration of hyaluronic acid preparations and early rehabilitation allows achieving excellent and good results in 93.8% of cases and significantly improving the quality of life in all patients. The most common cause of deforming osteoarthritis of the ankle is mechanical injury combined with irrational treatment tactics in the acute period and inadequate rehabilitation.

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