

Modern Aspects of the Results of Surgical Treatment of Haglund's Deformity and Achilles Bursitis

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Summary: Data in recent years have noted the demand for solutions to the problem of posterior carpal tunnel pain in Haglund's deformity and Achillobursitis. The etiopathogenesis and findings of other authors are reviewed. 126 clinical cases with this pathology are described, and a comparative evaluation of the efficacy of endoscopic and open calcaneoplasty at 3, 6, and more than 12 months postoperatively is performed. The results of the study evaluated by AOFAS scale preoperative and postoperative periods indicate better results in the main group. The improved method of endoscopic calcaneoplasty gives good results of 95.2%.

Keywords: Haglund's deformity, Achilles bursitis, endoscopy, calcaneal bone, calcaneal tendon, calcaneoplasty.

Introduction. According to the World Health Organization, heel pain is observed in 42.1% of the population and is an important problem of modern traumatology and orthopedics [1,5,6,13]. Such factors as mechanical overload, joint biomechanics disorders, and peculiarities of professional activity can lead to the development of pathology in the heel area [2,8,10,18].

In the development of impingement syndrome caused by collision of the protruding calcaneal tuberosity with the Achilles tendon, accompanied by deep bursitis, P. Haglund recommended surgical intervention in case of ineffectiveness of conservative treatment. In particular, it consists of surgery to smooth the posterior surface of the calcaneal tubercle [3,13,16].

In the absence of treatment, the progression of the disease significantly reduces the quality of life due to constant pain and discomfort. In some cases, Haglund's disease can lead to cyst formation,

degenerative changes, and an increased risk of Achilles tendon rupture due to the constant increase in load from the bony prominence [4,9,18,19].

According to numerous studies, treatment of Haglund's deformity and Achilles bursitis is recommended to start with conservative methods. Surgical intervention is indicated in patients in whom conservative treatment lasting 3 to 6 months has failed [5,11,18].

When analyzing open techniques for the treatment of Haglund's deformity, the authors used different approaches, and in all but one study, excision of the retrocalcaneal pouch was performed. G.M. Kavalersky and A.P. Sereda compare open surgeries for the treatment of Haglund's syndrome and their results [2,3]. Marginal resection and excision of the pouch by medial access has been performed by Kardanova, Angermann, Brunner, Leitze, Sella, and Schneider [6,7,8,9,10]. Sammarco described a marginal resection technique with partial Achilles tendon severance and refixation using anchor fixators [11]. Anderson used lateral and central trans tendon access with refixation of the tendon with anchor fixators at 50% entheses separation, resection of the tuberosity, and excision of the retrocalcaneal pouch. The choice of approach for the correction of Haglund's deformity usually depends on the localization of the deformity, which is most often found in the posterolateral part of the calcaneal tuberosity [12].

Endoscopic correction of Haglund's deformity has been described by Van Dijk, Leitze, Jerosch, Morag, Scholten, and Sterkenburg; two portals were used for the procedure, with the patient positioned on the abdomen or on the back. In the studies, the Van Dijk technique was used, including a two-portal technique at the border of the upper edge of the calcaneus and the distal part of the Achilles tendon. The criterion for sufficient resection was the absence of impingement between the Achilles tendon and the calcaneal tubercle [13,14,15,16,17].

Comparison of open and endoscopic resection has been performed by many scientists. According to the AOFAS scale, the results of treatment and duration of rehabilitation in both groups were similar (87.5 vs. 79.3 points, $p = 0.115$). Also, according to the authors, the endoscopic technique allowed to reduce the risk of complications: the incidence of superficial infections was 3% in the endoscopic group versus 12% in the open group, sensitivity disorders - 10% and 18%, hypersensitivity of the postoperative scar - 7% and 18%, respectively.

The purpose of the study is to compare the results of endoscopic and open calcaneoplasty with Haglund's deformity and Achillobursitis.

Material and Methods.

The subject of the study was a retrospective and prospective comparative analysis of the efficacy of different methods of treatment of Haglund's deformity and Achilles bursitis, with clinical and functional evaluation and determination of risk factors for specific complications and recurrences of the disease. The study is based on treatment data from 126 patients with Haglund's deformity and Achilles bursitis. The comparison group included 64 patients who underwent open calcaneoplasty and the main group included 62 patients who underwent endoscopic calcaneoplasty. The mean age of the patients in the total group was 47.7 ± 6.7 years (32 to 65 years), 46.3 ± 6.8 years in the main group, and 49.0 ± 6.2 years in the comparison group ($p=0.769$). In both groups, the majority of patients were women. Bilateral foot lesions were observed in 88.9% (112 of 126) of cases, and pain syndrome on the left side was observed in 74.6% (94 of 126) of patients.

All patients underwent the following methods of investigation: clinical examination, standard lateral radiography and MRI examination of the ankle joint; endoscopic method of diagnosis.

To determine the osteotomy angle of the exostosis, the calculation according to Y. Tourne, where X is the total length of the calcaneus from the most anterior to the most posterior point (excluding

calcifications), Y is the length of the tuberosity from the most posterior edge of the talus articular surface to the apex of the Haglund's tuberosity. The X/Y ratio was found to be 2.70 in normal and 2.07 in deformity. An X/Y ratio of less than 2.5 is a reliable sign of Haglund's deformity.

MRI studies in coronal and sagittal slices determine the shape of the heel tendon attachment area and measure linear dimensions. Based on the results of measurements on coronal slices, the area of enthesitis is calculated, the condition of the calcaneal tendon is assessed, including in the area of its attachment, its structure disorders, swelling of the surrounding soft tissues, inflammation of the posterior carpal sac, and Haglund's exostosis were detected.

Clinical assessment of foot and ankle disorders using the scale developed by the American Orthopaedic Foot & Ankle Society (AOFAS, The American Orthopaedic Foot & Ankle Society) showed that preoperative scores ranged from 42 to 82 points in the comparison group, with an average of 65.9 ± 13.3 points. In the main group, the mean AOFAS score was 65.9 ± 11.6 (35 to 80), which was not statistically different ($p=0.993$).

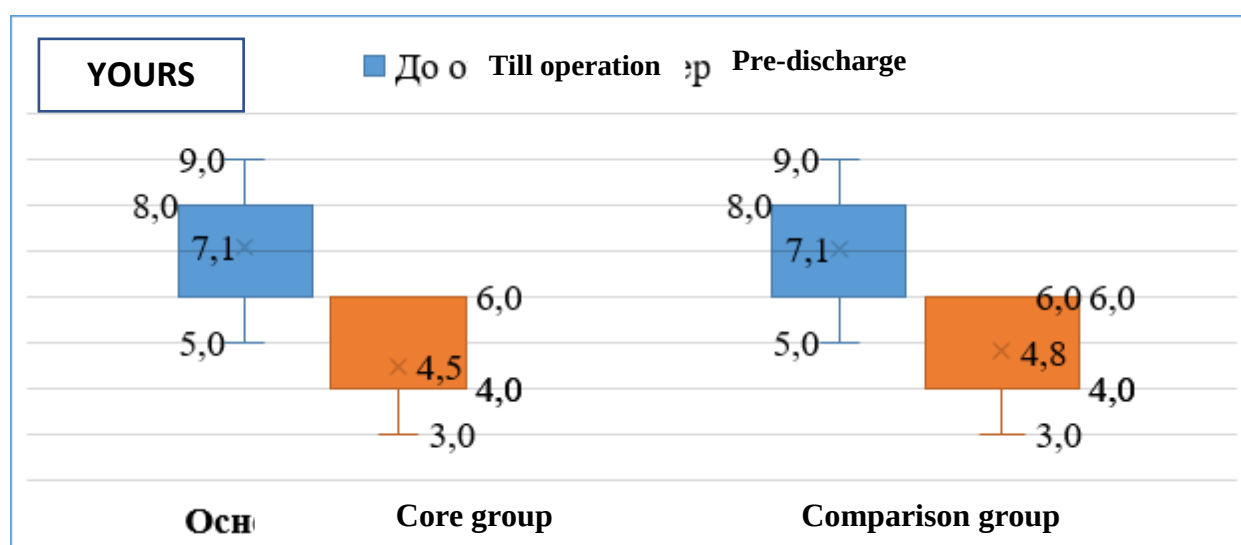
Open calcaneoplasty involves resection of the protruding part of the calcaneus through external or posterior-external access. In turn, endoscopic calcaneoplasty is performed through 2 portals, which allows evaluation of the entire posterior carpal region, allowing to determine the state of the deep pouch. Both calcaneoplasty techniques involve the use of different soft tissue techniques, which include excision of the calcaneal tendon pouch in the area prone to inflammation and naturally resection of the deformity itself.

Results and their discussion.

Clinical and functional results were collected in all 126 patients both preoperatively and in the early and late postoperative periods.

In the comparison group, the mean VAS score decreased from 7.06 ± 1.45 to 4.81 ± 1.10 . Patients reported pain in the heel area from 3 to 6 points, which was statistically significantly lower than before surgery (Fig.1).

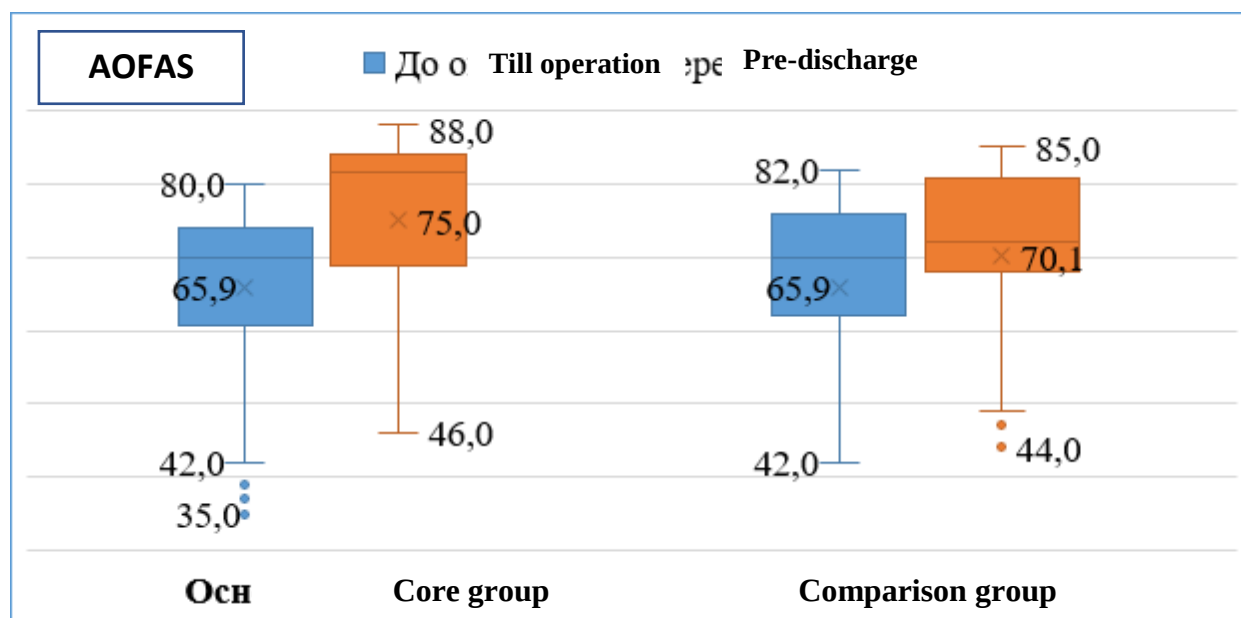
Dynamics of regression of pain sensations according to the VAS scale in the early postoperative period. Fig.1.



The main group showed more favorable dynamics of pain reduction associated with Haglund's deformity and Achilles bursitis, which was confirmed by statistical analysis when comparing the data with the comparison group ($t=2.09$, $p=0.0351$).

Analysis of the results of the assessment of the functional state of the foot and ankle joint in the early period after surgical treatment of Haglund's deformity and Achilles bursitis showed that each of the studied groups showed positive dynamics with a significant difference between preoperative and postoperative AOFAS scores.

Dynamics of regression of functional limitations according to the AOFAS scale. Fig.2



It should be noted that in the main group using the developed endoscopic method there were statistically significant differences from the AOFAS scores of the comparison group (Fig. 2). Thus, while in the comparison group the AOFAS scores increased from an average of 65.91 ± 13.31 to 70.14 ± 13.09 points, in the main group the assessment before discharge of the patients showed a higher score - 75.02 ± 12.16 ($t=2.41$, $p=0.016$).

Thus, the functional state of the foot and ankle joint according to the AOFAS scale immediately after surgery in most cases were assessed by the patients as satisfactory, with the frequency of good results being higher in the main group.

Before the patients were discharged from the hospital, we evaluated the condition of the foot and ankle joint using the specialized Groulier scale, which also includes the patient's functional activity with measurement of walking distance.

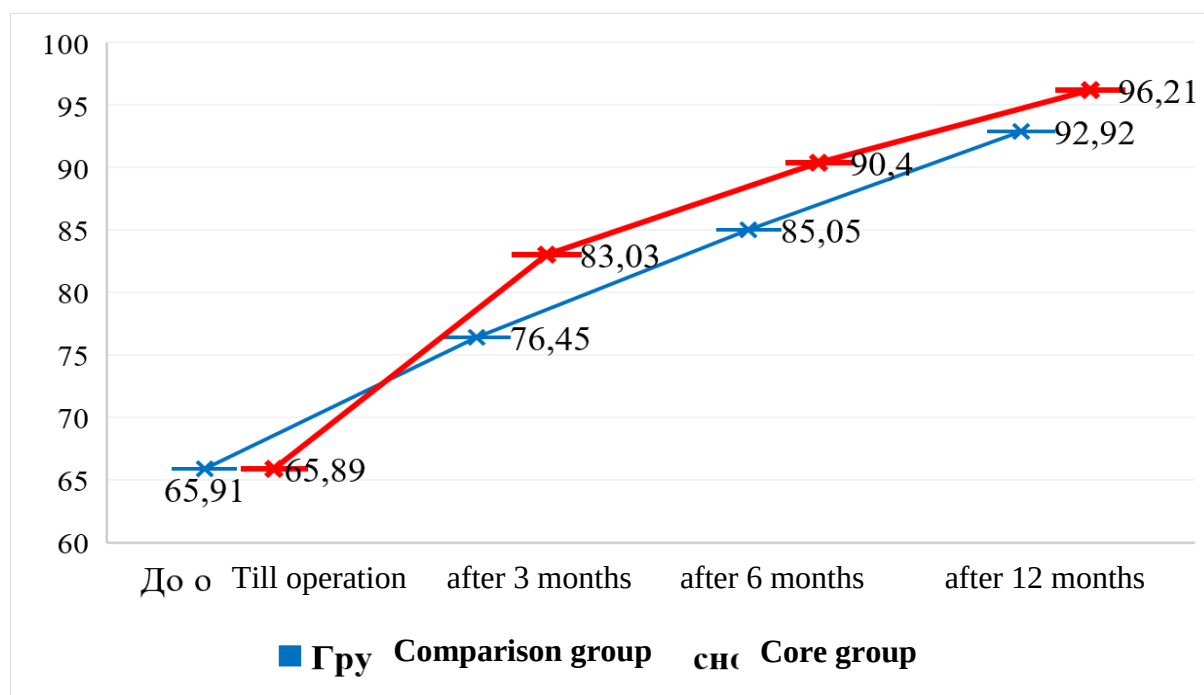
The mean values of the obtained results differed between the study groups, with statistically significant better results in the main group - 57.23 ± 13.83 points against 51.19 ± 14.58 points in the comparison group ($t=2.5$, $p=0.0093$).

In the comparison group, i.e. after open interventions, the incidence of cases with complications in the early postoperative period was 18.8%. Reported complications included transient paresthesia around the wound (9.4%), superficial infection (4.7%), marked soreness at the incision site (3.1%), delayed wound healing (4.7%), heel numbness (1.6%), hematoma (1.6%), complex regional pain syndrome (1.6%), and calf nerve neuropathy (3.1%). There were no cases of repeat or revision surgeries.

The incidence of early postoperative complications in the main group, i.e., endoscopic calcaneoplasty, surgery was 4.8% (3 of 62), which included a case of calf nerve neuropathy (1.6%), heel numbness (1.6%), and marked soreness at the port site (1.6%). There were also no cases of repeated or revision surgeries during the hospital follow-up period.

Analysis of the dynamics of mean AOFAS values in the study groups showed that 3 months after surgery, the mean AOFAS in the comparison group was 76.45 ± 17.06 points, which was statistically significantly lower than in the main group - 83.03 ± 15.8 points ($t=6.62$, $p=0.027$). Also, from Fig. 4.7 it can be traced that both at 6 months postoperatively and at 12 months were statistically significantly better scores in the main group. This in turn indicated a high proportion of excellent and good results of endoscopic surgery (Fig.3).

Dynamics of regression of functional limitations according to the AOFAS scale. Fig.3



Findings. Application of the proposed therapeutic and diagnostic algorithm for the management of patients with Haglund's deformity and Achilles bursitis, with active use of endoscopic calcaneoplasty according to the developed technique, shows better results at all terms of the study, which led to a decrease in the incidence of early complications from 18.8% to 4.8% ($p=0.025$). This also contributed to an improvement in the functional status of the foot and ankle joint, reflected in an increase in the AOFAS score from 70.1 ± 13.1 to 75.0 ± 12.2 ($t=2.41$, $p=0.016$) and in the general condition scale from 51.2 ± 14.6 to 57.23 ± 13.83 points ($t=2.5$, $p=0.0093$).

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