UNIWERSYTET OPOLSKI

Instytut Nauk Medyczny

ABSTRACT

Imię i nazwisko

lek. Andrzej Bobiński

Comprehensive assessment of patients after surgical treatment of flat foot using the Spherus implant

Praca napisana pod kierunkiem

Dr hab.n.med.Piotr Morasiewicz, prof. UO

OPOLE 2024r

Abstract

Pes planovalgus is a common issue in orthopedics, occurring in both asymptomatic and symptomatic forms. Its prevalence varies and can range from 2.7% to 59%, depending on the studied population. Lack of treatment for symptomatic pes planovalgus can lead to serious future problems, such as limping, pain and foot deformities, Morton's neuroma, or degenerative changes in the ankle joint. There have been no studies evaluating the use of the Spherus screw in the treatment of symptomatic pes planovalgus.

Objectives

A comprehensive clinical, functional, and radiological assessment of patients before and after surgery for symptomatic pes planovalgus using the Spherus screw. A prospective analysis of gait in patients before and after surgical treatment with the Spherus screw for symptomatic pes planovalgus.

Material and Methods

From 2021 to 2022, 35 arthroereisis procedures using the Spherus screw were performed at our clinic. Ultimately, 27 patients (11 females and 16 males) aged 7 to 14 years (mean age 10.5 years) were included in the study. In patients with limited dorsal foot flexion of 5-10 degrees, simultaneous Achilles tendon lengthening (the so-called "Z" plasty) was performed, affecting 37% of patients. Various parameters were assessed, including the level of physical activity, radiological parameters (Meary’s angle, Costa-Bartani angle, calcaneal pitch angle), surgery duration, hospital stay length, patient satisfaction, postoperative complications, pre- and postoperative use of painkillers, and biomechanical gait analysis (gait cycle duration, step length, stance and swing phases, cadence, and walking speed).

Results

Meary’s angle decreased from 18.63° preoperatively to 9.39° at the last follow-up visit. The Costa-Bartani angle significantly decreased from 154.66° preoperatively to 144.58° postoperatively. There was a statistically significant improvement in the UCLA activity scale, with a mean score of 4.78 before surgery and a mean score of 6.05 at the distant follow-up. There was a significant improvement in physical activity scores on the VAS scale, from a mean preoperative score of 5.47 to 7 at follow-up. Pain levels also showed improvement, decreasing from a mean VAS score of 4.73 preoperatively to a mean score of 2.73 at follow-up. Functional results assessed by the FFI-R scale also showed significant improvement from a mean score of 140 points preoperatively to 97.75 points at distant follow-up. Dorsiflexion of the ankle joint increased from an average of 22° preoperatively to an average of 25.33° at

follow-up. Comparison of preoperative and follow-up values for plantar flexion, adduction, and abduction of the ankle joint in the operated limb showed no significant changes in the respective parameters.

Discussion

Arthroereisis, as a minimally invasive procedure, involves temporarily blocking the subtalar joint by placing a movable implant into the sinus tarsi. These implants also affect proprioception, which is significant due to the mechanical action on the numerous proprioceptors located in the sinus tarsi. The best surgical outcomes are achieved in patients aged 7-14 years. Due to the minimally invasive nature of the procedure, low costs, and low risk of complications, arthroereisis is an accepted method of treating symptomatic pes planovalgus. There is no consensus on the technique of arthroereisis; some authors recommend the use of mobile sinus tarsi implants, while others prefer heel screws. However, a systematic review has shown that heel implants have a slightly lower complication rate and better outcomes. The introduction of the Spherus screw into the talus stabilizes its base, distributes body weight over a larger area, and reduces the risk of implant migration. My study results showed improvements in radiological, clinical, and functional parameters after treatment of symptomatic pes planovalgus with the Spherus screw.

The study evaluated and analyzed the level of physical activity in patients before and after surgery. The results indicate an increase in walking speed, cadence values, and a shortening of the gait cycle time on the operated limb. Biomechanical gait parameters also improved, which may indicate normalized foot anatomy, increased range of motion, and reduced pain after treatment with the Spherus screw. The significant improvement in physical activity levels after treatment was associated with reduced pain and less foot deformation.

Conclusions

The study results indicate the effectiveness of arthroereisis using the Spherus screw in the treatment of symptomatic pes planovalgus. This procedure improves gait biomechanics, reduces pain, and increases patients' physical activity levels. Despite the lack of consensus on the best arthroereisis technique, the use of the Spherus screw yields promising results, stabilizing the talus and distributing body weight, which may contribute to better treatment outcomes and patient satisfaction.