

Abstract

The dissertation evaluates the results of a first metatarsophalangeal (MTP) joint replacement. The PH-Flex MTP joint replacement was developed at the 1st Department of Orthopaedics, the first faculty of medicine in conjunction with the Medin s.r.o. company. The clinical trials ran between 2007 and 2011. Between 2011 and 2016, the implant was used in clinical practice, where the indication criteria of its use were gradually adjusted. This work summarises publications originating in our department, evaluating the 5-year period during which the implant was used and the results of its use.

In the first part of the dissertation, we present the retrospective study evaluating a group of 31 patients after the implantation of 35 MTP joint replacements was published in 2017. Bilateral surgery was performed on 4 patients. A minimum follow-up of 6 months was required for inclusion in the study. In 30 cases, the indication was 1st MTP joint arthritis of grades 3 and 4 according to the Coughlin classification. A conversion from hemiarthroplasty to total arthroplasty was performed in 4 patients, and in 1 case, the surgery was performed as a revision from a failed silastic 1st MTP joint replacement. The evaluation was performed not only radiographically but also according to the American Orthopaedic Foot and Ankle Society Hallux Metatarsophalangeal (AOFAS) scoring system. The AOFAS scores showed a significant improvement in our patient cohort from preoperatively to postoperatively. The mean preoperative AOFAS score was 55.6 (33-65), with a mean postoperative score of 80.8 (65-95).

The second part of the dissertation is based on evaluating 15 implanted prostheses in 12 patients. The obtained results were processed and analysed using the integrated dynamic pedobarograph software Footscan RS scan International. The study evaluated parameters suitable for assessing the function of the forefoot after implantation of the prosthesis, namely hallux stiffness evaluating the stiffness of the I. MTP joint and forefoot balance considering the load distribution between the lateral and medial half of the forefoot. The results of the pedobarographic study demonstrate the ability of the prosthesis to improve the function of the forefoot after the implantation of a total replacement of the first MTP joint and bring it closer to the function of the forefoot in healthy patients, although it cannot completely restore the physiological biomechanics of the forefoot.

Based on the result of this study, we adjusted our indication criteria and operative technique. We stopped indicating patients with grade 4 osteoarthritis according to the Coughlin classification, where there is a marked limitation of the range of movement and the sesamoid bones are affected. It is challenging to achieve an improvement in the range of motion in these

cases. An ideal indication is grade 3 osteoarthritis, according to the Coughlin classification, with a painful but acceptable range of motion of the 1st MTP joint.

Key words:

First metatarsophalangeal joint arthritis, Metatarsalgia, First metatarsophalangeal joint fusion, First metatarsophalangeal joint replacement, Dynamic pedobarography, Hallux rigidus

