First Metatarsophalangeal Joint Arthrodesis is Associated with a Greater Rate of Secondary Procedures compared to Cheilectomy in Patients with Hallux Rigidus

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INTRODUCTION: First metatarsophalangeal (MTP) joint arthritis, also known as hallux rigidus, causes considerable morbidity to affected patients resulting in lower activity levels and a reduced quality of life. Conservative treatment continues to be the mainstay of treatment, but after failing this, both joint-preserving and joint-sacrificing surgical options are available. Cheilectomy, a joint-preserving technique, has the benefit of maintained 1st MTP joint motion but a risk of osteoarthritic and symptomatic progression. First MTP joint arthrodesis, a joint-sacrificing technique, compromises motion and may lead to complications if not fused in appropriate position or in at-risk patients. There is a paucity of literature that compares complication and reoperation profiles of these two procedures. Therefore, the primary outcome of this study was to compare the rates and types of secondary procedures following first MTP joint arthrodesis as compared to cheilectomy, as well as investigate a temporal relationship of reoperations. The secondary outcomes include the comparison of rates of complications following cheilectomy to arthrodesis.

METHODS: A retrospective cohort of patients with hallux rigidus from 2015 to 2022 was queried using the PearlDiver All Payer Claims Database. CPT, ICD-9/10 diagnosis, and ICD-9/10 procedure codes were used to identify the study cohorts, comorbidities, secondary procedures, and complications. This cohort was separated into those that underwent cheilectomy as their primary surgery and those that underwent first MTP joint arthrodesis. Patients were included if they underwent either of these procedures with at least 2 years of follow-up. Univariate analysis using chi squared tests and student t-tests were used to compare demographics, secondary procedure rate, and complication rate between groups.

RESULTS: A total of 25,270 patients with hallux rigidus were identified with half of the patients undergoing cheilectomy as the index surgery and the other half of patients undergoing first MTP joint arthrodesis. Patients who underwent MTP joint arthrodesis as their primary surgery had a 17.6% rate of secondary procedures compared to a 13.5% rate of secondary procedures in the cheilectomy group ($P<0.001$). Specifically, patients in the first MTP joint arthrodesis group had a 12.4% rate of undergoing a revision MTP arthrodesis after the initial arthrodesis. On the other hand, patients in the cheilectomy group had a higher rate of undergoing subsequent first ray metatarsal osteotomy (2.5%), first ray phalangeal osteotomy (1.5%), and subsequent cheilectomy (7.9%) compared to the arthrodesis group ($P<0.05$). Only 1.1% of the cheilectomy patients required a revision to an arthrodesis. For the cheilectomy group, a majority of the patients who underwent subsequent metatarsal osteotomy or phalangeal osteotomy received surgery within the first three months after cheilectomy (59.7% and 69.2%, respectively). . Higher rates of transfer metatarsalgia was noted in the arthrodesis group (7.8%) compared to the cheilectomy group (3.2%) ($P<.001$). Furthermore, higher rates of deformity after surgery were seen in the arthrodesis group compared to the cheilectomy group ($P<0.001$).

DISCUSSION AND CONCLUSION: Higher rates of secondary procedures were seen in patients who underwent first MTP joint arthrodesis, compared to those that underwent cheilectomy. If a cheilectomy patient does require a secondary procedure, a revision to an arthrodesis is very rare. A majority of the secondary procedures were performed within three months after surgery, particularly for either osteotomies or arthrodesis after cheilectomy. Revision arthrodesis is the most common secondary procedure following index procedure. Higher rates of overall complications, like transfer metatarsalgia and deformity, were seen in patients who underwent first MTP joint arthrodesis compared to cheilectomy.