
ROLE OF THE CHEILECTOMY IN HALLUX RIGIDUS

Robert P. Taylor, DPM

INTRODUCTION

Hallux rigidus is a painful and often disabling condition characterized by decreased range of motion, decreased function and a dorsal eminence of the first metatarsal and metatarsophalangeal joint (MPJ). The condition was first described in the literature in 1887, however Cotterill is credited for later coining the term hallux rigidus. It is a common pathology of the first ray and has been described as second only in incidence to hallux valgus in conditions affecting the great toe joint (1, 2).

CLASSIFICATIONS

There is no paucity of literature or classification systems to describe hallux rigidus (Table 1.) These classification systems all utilize different radiographic and clinical parameters as well as grading systems. While the purpose of these classification systems is to aid in the development of surgical algorithms and standards for comparison between preoperative and postoperative findings, it is clear from the literature that no consistency exists in their construction, as authors have used a variety of criteria (3).

Commonly taught etiologies of hallux rigidus are a long first metatarsal, elevated first ray, hypermobile first ray, trauma, angular deformity, pes planus, and equinus. Coughlin and Shurnas evaluated 19 years of a single surgeon's data of patients with hallux rigidus that were treated with either cheilectomy or arthrodesis. Excluded from the study were patients with diabetes mellitus, gout, neuromuscular disease, or inflammatory arthritic disease. Inclusion criteria were met by 114 of the patients, and 110 of the 114 (96.5%) returned for follow-up. A cheilectomy was performed on 80 patients (93 feet), and an arthrodesis on 30 patients (34 feet). Coughlin and Shurnas found a mean age at onset of 43 years (range 13-70 years, only 6 patients were <20 years). They used a 5-grade clinical and radiographic classification system. The mean follow-up was 8.9 years. Significant findings were 95% had a positive family history of bilateral disease, 11% had pes planus, and 73% had a flat metatarsal head. Other findings were a long first metatarsal (which is the same as the general population), first ray elevatus was within normal limits (5.5 mm), and first ray mobility was 5 mm in the arthrodesis group and 5.8 mm in the cheilectomy group. They concluded that hallux

rigidus was not associated with elevatus, first ray hypermobility, a long first metatarsal, Achilles or gastrocnemius tendon tightness, abnormal foot pressure, symptomatic hallux valgus, adolescent onset, footwear, or occupation. They did find an association with hallux valgus interphalangeus, bilateral involvement in those with a familial history, unilateral involvement with a history of trauma, and the female sex (1).

Surgical options for hallux rigidus can be categorized as either joint destructive or joint salvage procedures. Joint destructive procedures are Keller arthroplasty, implant arthroplasty, and arthrodesis procedures while joint salvage procedures include metatarsal osteotomies, phalangeal osteotomies, and cheilectomies. Surgical algorithms commonly suggest joint destructive procedures for advanced stage hallux rigidus while limiting joint salvage procedures to milder forms or very selective advanced cases.

Cheilectomy gets its name as a procedure that excises the lip (cheil in Greek) of bone on the dorsal metatarsal head commonly found in hallux rigidus. While previously described in the literature, the modern day cheilectomy is attributed to Duvries, who in 1959 described a dorsal

Table 1

CLASSIFICATION SYSTEMS FOR HALLUX RIGIDUS

- Kellgren & Lawrence
 - Giannestras
 - Drago
 - Hatrup & Johnson
 - Karasick & Wapner
 - Hanft et al.
 - Schweitzer et al.
 - Roukis et al.
 - Coughlin & Shurnas
 - McMaster
 - Ronza et al.
 - Felson & Anderson
 - Regnault
 - Vanore et al.
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incision, synovectomy, removal of loose bodies, resection of dorsal osteophytes from the first metatarsal head and proximal phalanx, resection of medial and lateral osteophytes and release of the medial and lateral capsular restraints (4).

CASE STUDIES

Case 1 is a 63-year-old college professor who presented with a progressively enlarging painful bump on the top of her foot, which significantly limited her activity level and had reduced her ability to find any comfortable shoes. Examination showed a very large dorsal prominence that was very tender to palpation as well as significant limited range of motion, particularly dorsiflexion to the first MPJ. Surgical and nonsurgical options were discussed, and the patient opted for and underwent a cheilectomy (Figure 1).

Case 2 is a 67-year-old salesman who presented with a >20-year history of a painful stiff great toe joint. In years past, he had declined previous recommendations for an arthrodesis. Surgical and nonsurgical options were discussed with the patient ranging from cheilectomy to first MPJ arthrodesis. The patient opted for a cheilectomy (Figure 2).

Case 3 is a 45-year-old homemaker who presented with a progressively worsening painful right great toe joint. She had undergone a cheilectomy procedure 10 years ago that had given her good relief until the previous year. Examination showed significant pain with palpation dorsally at the first MPJ and pain with range of motion to the first MPJ both at midrange and end dorsiflexion. Surgical options were discussed and joint destructive procedures were recommended because of the pain at mid-range of motion as well as not having a large dorsal spur or lip to reduce. The patient opted for implant arthroplasty over arthrodesis (Figure 3).

Purported disadvantages of the cheilectomy are decreased predictability as compared to other surgical options, short term relief with advanced hallux rigidus, and many surgical algorithms recommend it only for Grade I and II hallux rigidus. Published studies however propose otherwise. Easley et al studied 57 patients with hallux rigidus who underwent surgical treatment utilizing a cheilectomy procedure. There was a minimum follow-up of 3 years (average 63 months), and 52 returned for follow-up (91.2%). The AOFAS Score went from an average preoperative rating of 45 to 85. On average, dorsiflexion increased from 19° to 39°, and total range of motion increased from 34° to 64°. Preoperative evaluation showed 17 feet rated as Grade I, 39 feet as Grade II, and 12 feet as Grade III. Follow-up evaluation showed that 32 feet worsened by one grade, 6 feet worsened by 2 grades, and 28 had no change (12 of which were Grade III). Dorsal spur recurred in 21 feet, but only 9 were symptomatic. They

concluded that pain at midrange of motion seems to correlate with less predictable satisfactory outcome, and dorsal cheilectomy can effectively provide relief of pain and improve function at intermediate to long-term despite progression of generalized first MTP joint arthritic degeneration (5).

Mulier et al studied cheilectomy as a treatment of hallux rigidus in high-level athletes. They looked at 20 professional or high level athletes (22 feet). There were 10 men and 12 women, the average age was 31 years, and the mean follow-up was 5.1 years. All athletes had a Regnault classification of Grade I or II. The results were 14 patients rated their improvement as excellent, 7 rated it good, and 1 rated it fair (6). In another study, Coughlin and Shurnas reported 92% of the patients who underwent cheilectomy had a successful outcome with Grade I, II, and selective Grade III hallux rigidus (7).

Roukis performed a systematic review of published literature dealing with surgical treatment of hallux rigidus utilizing a cheilectomy (23). Studies met the inclusion criteria, which included isolated cheilectomy, follow-up of at least 12 months, and details of complications. Those 23 studies consisted of 706 cheilectomies, of which 62 (8.8%) underwent revisional arthrodesis (19% Grade I, 40.6% Grade II, 36.6% Grade III, and 2.9% Grade IV). Roukis concluded the “results make clear the low incidence of revisional surgery after cheilectomy for hallux rigidus. Therefore, cheilectomy should be considered a first-line surgical treatment for hallux rigidus” (8).

DISCUSSION

Advantages of the cheilectomy are the technical straight forwardness of the procedure, relatively quick recovery, low complication rate, and it can serve as a good staging procedure for joint destructive procedures. Purported disadvantages are the decreased predictability, short-term relief with advanced hallux rigidus, and limited use in early or Stage I hallux rigidus, however per the limited previous discussion from the previous published literature, a cheilectomy can provide a very good prognosis even in selective advanced cases of hallux rigidus.

There are several key elements that can increase the success of the cheilectomy with hallux rigidus. Performing a true Duvries cheilectomy versus a simple “bumpectomy” can increase the likelihood of success. Another important factor is aggressive resection of the dorsal exostosis of the first metatarsal head. Up to 30% of the dorsal first metatarsal head can be resected and still preserve joint function. Passive range of motion exercises can be started almost immediately post-operatively and after the surgical wound has stabilized, more aggressive exercises should be employed. It is important to



Figure 1A. Case 1, preoperative anteroposterior radiograph.



Figure 1B. Preoperative lateral radiograph.



Figure 1C. 6-month postoperative anteroposterior radiograph.



Figure 1D. 6-month postoperative lateral radiograph.

discuss with patients that have true rigidus that the motion that they gain from the procedure might in fact cause increased pain but will usually subside within 6-12 weeks.

As previously mentioned, a cheilectomy can serve as a great staging procedure for joint destructive procedures. There are times the clinical and radiographic findings for certain patients clearly point to joint destructive procedures, but regardless of how well the surgeon presents the

advantages of a joint destructive procedure such as an arthrodesis, the patient declines. It is often difficult for patients to understand how fusing a joint will benefit them. Because of this, the surgeon often does not offer other surgical treatment options, and the patient essentially suffers with their condition. It is the author's opinion that many patients are living with almost debilitating hallux rigidus because they have not been offered a cheilectomy. The



Figure 2A. Case 2, preoperative antero-posterior radiograph.



Figure 2B. Preoperative lateral radiograph.



Figure 2C. 6-month postoperative antero-posterior radiograph.



Figure 2D. 6-month postoperative lateral radiograph.

author believes it makes more sense to these patients to start with a “clean up” procedure first, and see how they do, and if their symptoms return or do not improve to a satisfactory level, then do a joint destructive procedure at a later time. These patients tend to do remarkably well with the cheilectomy procedure and the literature tends to suggest they can expect a significant amount of moderate to long-term improvement.

Cheilectomy is a technically straight forward joint salvage procedure in which the surgeon can expect good to excellent results even in some cases of advanced degenerative changes. With advanced degenerative changes it can serve as an excellent first step or stage for patients that qualify for arthrodesis or implant arthroplasty but are not ready for these procedures.



Figure 3A. Case 3, preoperative antero-posterior radiograph.



Figure 3B. Preoperative lateral radiograph.



Figure 3C. 6-month postoperative antero-posterior radiograph.



Figure 3D. 6-month postoperative lateral radiograph.

REFERENCES

1. Coughlin MJ, Shurnas PS. Hallux rigidus: demographics, etiology, and radiographic assessment. *Foot Ankle Int* 2003;24:731-43.
2. Yee G, Lau J. Current concepts review: hallux rigidus. *Foot Ankle Int* 2005;44:185-9.
3. Beeson P, et al. Classification system for hallux rigidus: a review of the literature. *Foot Ankle Int* 2008;29:407-14.
4. DuVries HV. *Surgery of the Foot*. St. Louis: Mosby Year Book;1959; p.292-9.
5. Easley ME, Davis WH, Anderson RB. Intermediate to long term followup of medial approach dorsal cheilectomy for hallux rigidus. *Foot Ankle Int* 1999;20:173-80.
6. Mulier T, et al. Results after cheilectomy in athletes with hallux rigidus. *Foot Ankle Int* 1999;20:232-7.
7. Coughlin MJ, Shurnas PS. Hallux Rigidus. Grading and long-term results of operative treatment. *J Bone Joint Surg Am* 2003;85:2072-88.
8. Roukis TS. The Need for surgical revision after isolated cheilectomy for hallux rigidus: a systematic review. *J Foot Ankle Surg* 2010;49:465-470.