First Metatarsophalangeal Joint Implant Hemiarthroplasty for Hallux Limitus/Rigidus: A Retrospective Review of Consecutive Cases

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STATEMENT OF PURPOSE

Hallux limitus/rigidus is a painful condition impacting the first metatarsophalangeal (MTP) joint. Many patients with advanced disease to this joint must decide with their surgeon between a joint preserving and joint destructive procedure. Patients often have a primary fusion, and subsequently lose ROM. The purpose of this retrospective study was to evaluate the overall success and satisfaction of patients who had undergone first MTP joint cheilectomy with implant hemiarthroplasty

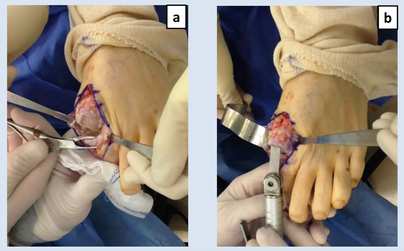
LITERATURE REVIEW

Hallux limitus rigidus (HL/HR) has been found to have an incidence of 2.5% in those older than 50 years old [1]. Patients with advanced disease often have a 1st MPJ fusion. Several studies have been done comparing 1st MPJ hemiarthroplasty vs. primary fusion. Shields et al. reported a statistically significant improvement in VAS pain scores and patient satisfaction in the hemiarthroplasty group compared to fusion group. The same study also found a reoperation rate 3 times higher in the fusion group [2]. Supportive long term results of this procedure have been documented as well. Hilario et al. evaluated 45 patients with a 10 year follow up, finding 44/45 patients were happy with there procedure, with only 1/45 requiring conversion to fusion and no post op complications [3]. Our aim was to evaluate if our short term results were comparable to those described in the literature with regards to pain patient satisfaction after 1st MPJ hemiarthroplasty.

METHODOLOGY

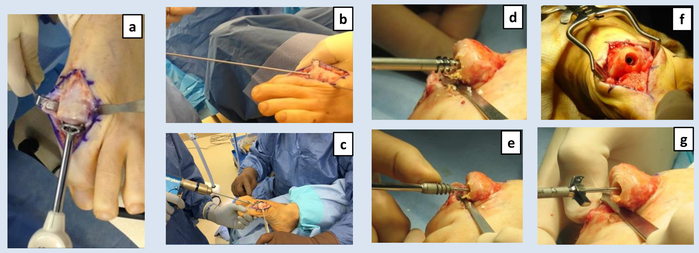
An IRB approved level 4 retrospective study of consecutive cases was performed. Age, sex, adjunctive procedures, pain levels pre and post-operatively, and satisfaction were evaluated through chart review. 16 feet on 16 patients who underwent 1st MPJ implant hemiarthroplasty were included in the study. All procedures were performed by one surgeon (KWA). Inclusion criteria for this study consisted of patients with mid-late stage hallux limitus/hallux rigidus who underwent implant hemiarthroplasty and had six weeks or greater of follow up. Patients who had adjunctive procedures that altered postop protocol or had less than six weeks follow up were excluded. Statistical significance was set at $p \leq 0.5$ for comparison and pre operative pain scores, 6 week post operative pain scores, and 10 week post operative pain scores. HL/HR stage was determined by clinical and radiographic findings based on Drago, Oloff, and Jacobs classification system by one observer (KWA). We hypothesized that implant hemiarthroplasty would show improved postoperative pain at 6 and 10 weeks and would yield a high patient satisfaction.

Figure 1. Cheilectomy of Proximal Phalanx and 1st Metatarsal Head



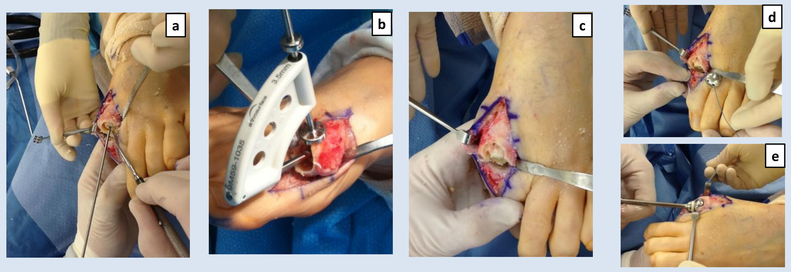
(a) Plantar adhesions are freed with McGlamry elevator followed by cheilectomy of proximal phalanx. (b) This is followed by limited dorsal cheilectomy of 1st met head

Figure 2. Insertion of Guide Wire, Step Drill, and Post Placement



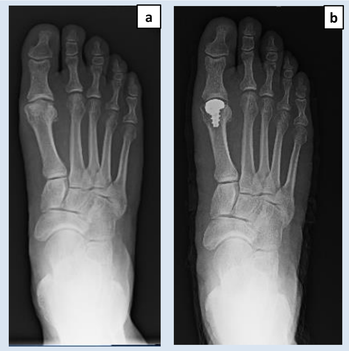
(a,b) Insertion of guide wire. (c) Step drill until flutes are flush with bone. (d,e) Tap until laser line is flush with bone followed by insertion of post. (f) Final view of post placement in metatarsal head. (g) Surface reamer inserted in post as a guide; reamer has a hard stop.

Figure 3. Reaming, Trial Implant Remodeling, and Implant Impaction



(a) Following surface reaming. (b,c) Dorsal champfer reamer construct and visual following surface reaming. Dorsal ream must be strait dorsal, as this sets the rotation of the implant. (d) Trial implant sizing and placement. Once trial implant is placed, power rasp is used to remodel around implant (not pictured). (e). Insertion of final implant with implant impactor. The joint is then taken through range of motion. and stress imaging to assure proper alignment and satisfactory range of motion

Figure 4. Fixation Construct for 1st MPJ Hemi-implant



(a) Preop AP x-ray with significant 1st MPJ arthritis. (b) 10 week postop x-ray of hemi implant intact.

PROCEDURE

Cheilectomy performed at the base of the proximal phalanx, as well as the osteophytes on the dorsal, medial, and lateral aspects of the 1st metatarsal head. Next, a guidewire is placed down the metatarsal shaft. After confirmation of proper guidewire placement with fluoroscopic imaging, the 1st metatarsal is reamed and tapped. The post for the hemi implant is then placed. Distal reaming of the metatarsal head is preformed followed by dorsal chamfer reaming. Sizing with trial implant is completed and metatarsal head is remodeled around the trial implant. Joint surface is thoroughly irrigated followed by hemi implant placement and impaction. The hallux is then placed through range of motion to assure proper fit and increased dorsiflexion. Stress imaging applied to assure proper alignment and satisfactory implantation. Postoperative recovery involved full weight bearing in a surgical shoe for 2 weeks followed by aggressive ROM exercises , return to athletic shoes and normal daily activates for 4 weeks, and released to full impact activities at 6 weeks.

Table 1. Summary of Results (N = 16 Feet)

Gender (M: F)	5:11
Mean Age (years)	53.5 (range 24-76)
Pre Operative Pain	5.7/10
6 Weeks Postop Pain	0.22/10
10 Week Postop Pain	0.33/10
"Happy" With Outcome	9/16
"Very Happy" With Outcome	7/16
"Unhappy" With Outcome	0/16
Would Recommend to a Friend	16/16

RESULTS

There were 16 patients at an average age of 53.5 years. All 16 patients stated they were happy with their outcome, 7/16 stating they were "very happy" with their outcome and zero patients reporting dissatisfaction with their outcome. Of the 16 patients, 13 reported a numeric score for pre-operative pain averaging 5.7 on a scale of 1-10. At 6 weeks post-op the average pain for all 16 patients was 0.22. Ten out of 16 patients presented for >10 week post-op with an average pain score of 0.30. Improvement in pain scores at 6 weeks and 10 weeks post-op were found to be statistically significant

ANALYSIS & DISCUSSION

This retrospective study was undertaken to assess the success, satisfaction, and pain of patients who underwent implant hemiarthroplasty for hallux limitus/rigidus. There has been much discussion as to if this surgical option is a viable alternative when compared to fusion for advanced disease. Many patients do not like the idea of losing ROM of this joint. When considering implant hemiarthroplasty, patient selection is important. Limitations of this study include the relatively small number of patients, although all were consecutive which decreases exclusion bias. All procedures were performed by a single surgeon, which could be seen as a benefit because this removes the inter-surgeon variability with patient selection and procedure technique. We also had a relatively short follow-up period of 10 weeks. In conclusion, the present study of consecutive patients supports a high satisfaction rate of patients who underwent 1st MPJ implant hemiarthroplasty with short term follow up. Long term data is needed to verify continued successful long-term outcomes and satisfaction.

REFERENCES

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