

# **UNILATERAL VS. BILATERAL FIRST RAY SURGERY: A PROSPECTIVE STUDY OF 186 CONSECUTIVE CASES COMPLICATIONS, PATIENT SATISFACTION, AND COST TO SOCIETY**

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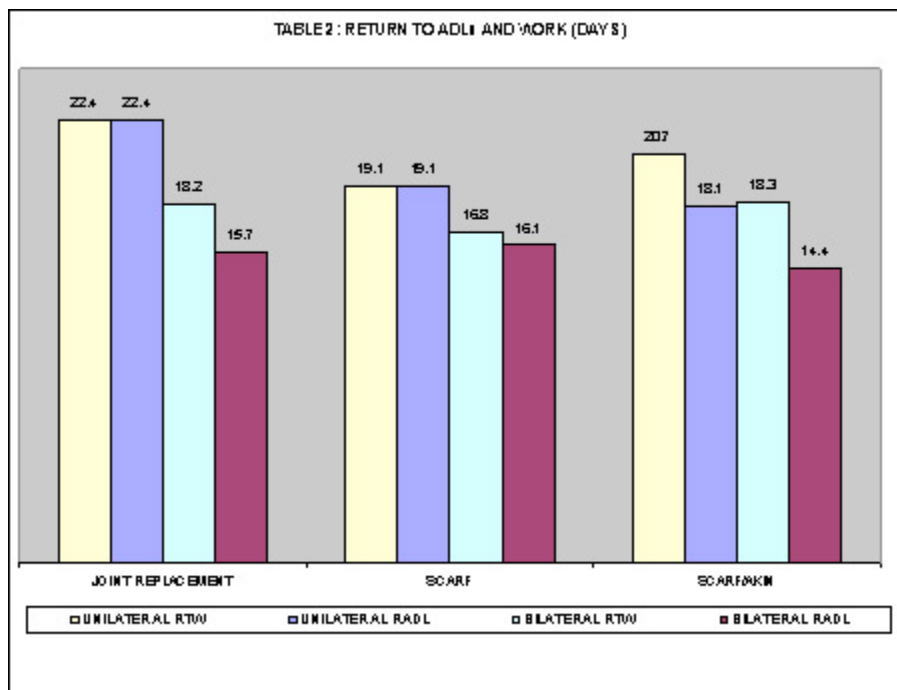
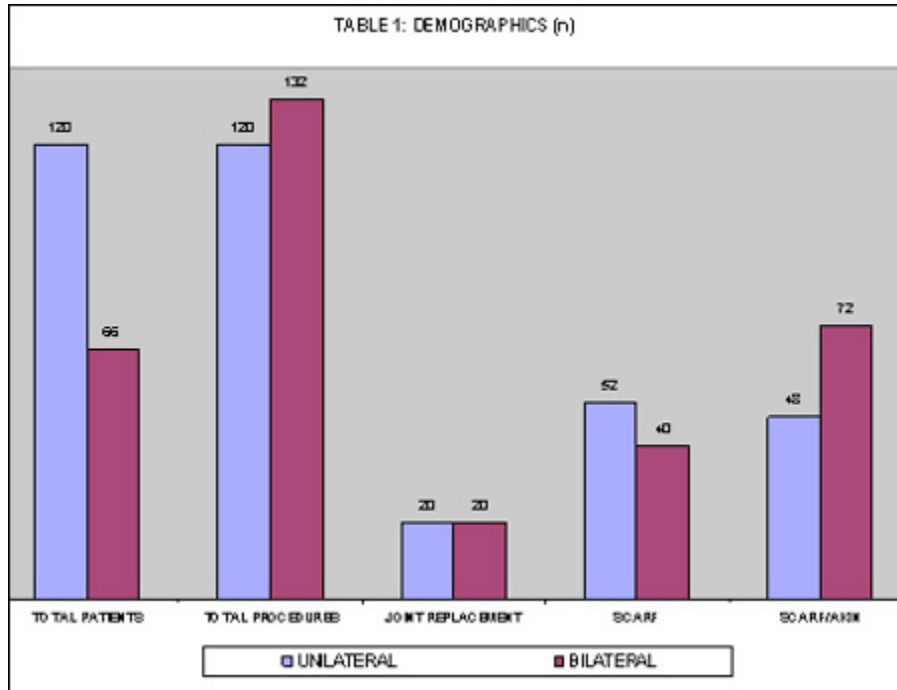
## **BACKGROUND**

Single session, bilateral foot surgery for the correction of hallux valgus and hallux limitus is a controversial subject for foot and ankle specialists. Proponents for bilateral surgery state that there is significant benefit to patients, with respect to convalescence time and financial obligations (insurance co-pays, loss of work, etc.). Those opposed commonly cite an anecdotal increased rate of peri-operative complications with bilateral procedures and inability to function independently in the perioperative timeframe. Numerous studies have evaluated bilateral versus unilateral surgery in large joints, such as the knee and hip, however, limited research is available to compare outcomes of bilateral-staged hallux surgeries versus synchronous-bilateral hallux surgery. The purpose of this study is to compare the rates of early complications between unilateral and bilateral surgeries, identify the reasons why patients would select single session, bilateral over staged-bilateral surgery, and measure the rate of recovery with respect to return to activities of daily living (RADL) and work (RTW).

## **MATERIALS AND METHODS**

From March 1, 2005 to December 31, 2005, 252 procedures on the first MTP were performed at the Foot & Ankle Surgery Center, an affiliate of the Weil Foot and Ankle Institute. 106 were unilateral, 7 were staged-bilateral (total 120 feet) and 66 were single session-bilateral operations (total 132 feet). Patients were excluded from the study if they had an additional procedure done under the same anesthesia, if there was a revision surgery rendered, or there was an additional complicating diagnosis. 200 consecutive patients with a clinical history of either painful hallux valgus or limitus were prospectively included in this study. If bilateral pathology was present, the patient was given the choice of having either a staged- bilateral procedure or having both done at the same time. 120 patients had unilateral first MTP surgery (Scarf bunionectomy, Scarf-Akin bunionectomy, Silastic total joint arthroplasty) without any other procedures performed on that foot. Within this group, 7 patients had staged-bilateral procedures (range 40-311 days). 66 had bilateral first MTP surgery performed in one operating room session by the same surgeon (Table 1). 1)186 of the 200 originally-enrolled patients complied with the protocol and were ultimately included in the data. 14 patients (7%) were unavailable for follow-up, and were thus excluded from the data pool. Patients were evaluated at 6 weeks and 3 months for early complications that have been associated with first MTP surgery: infection, wound dehiscence, stress fracture, swelling +2 or greater, pain greater than 7 on the Visual Analog Scale (VAS), and return to the operating room within 3

months of surgery. At 3 months, patients were interviewed either in person or via the telephone by a surgeon other than the one who performed the operation, in order to limit a Type-I error or bias. The interview consisted of questions related to return to ADLs and work, return to shoe gear, reasons for choosing one treatment group over the other, if possible, and overall satisfaction with the early results of the surgery.



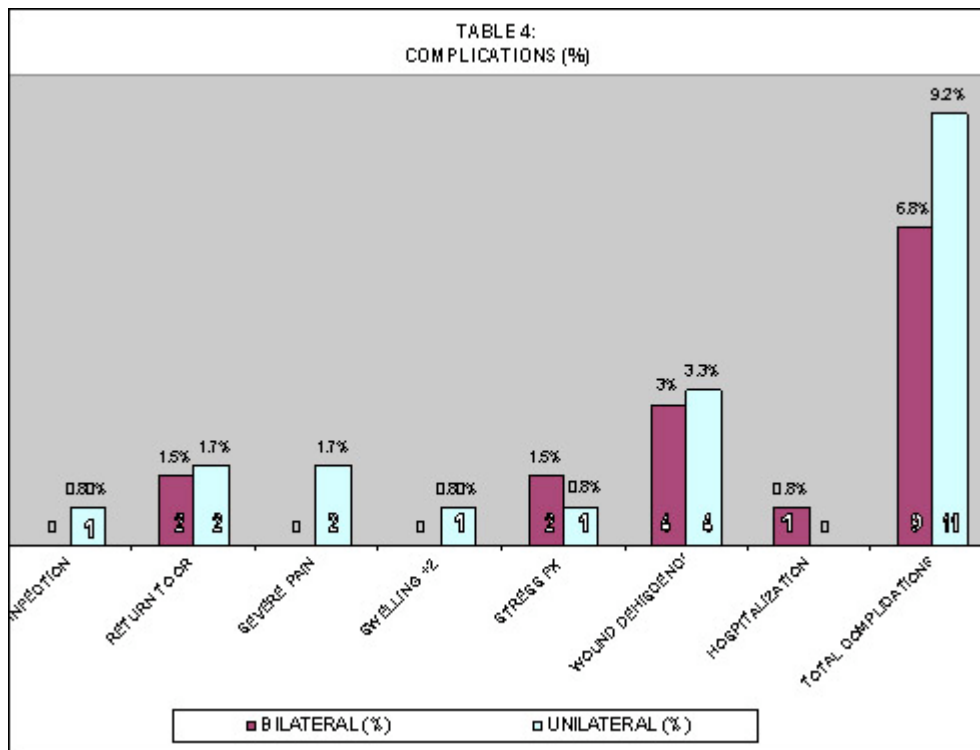
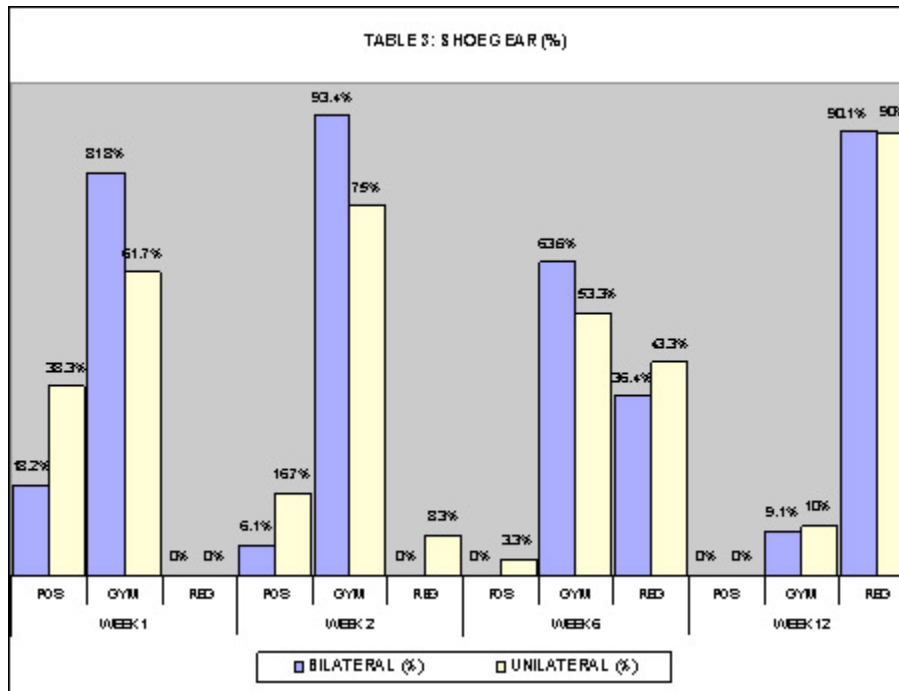


TABLE 5:  
PHYSICAL THERAPY SESSIONS (n)

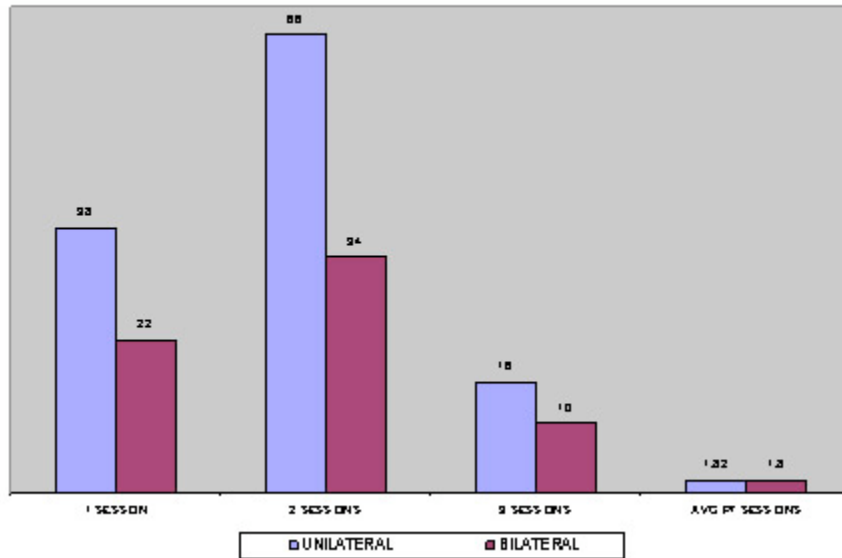
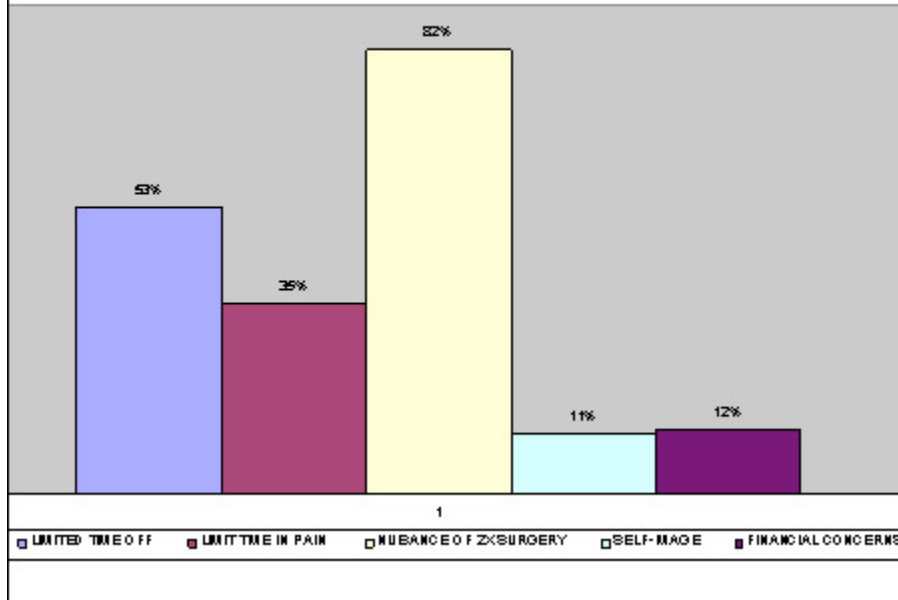


TABLE 5: REASONS FOR CHOOSING BILATERAL SYNCHRONOUS SURGERY



SHEET #1: STATISTICAL ANALYSIS B/L VS. U/L 1ST RAY SURGERY

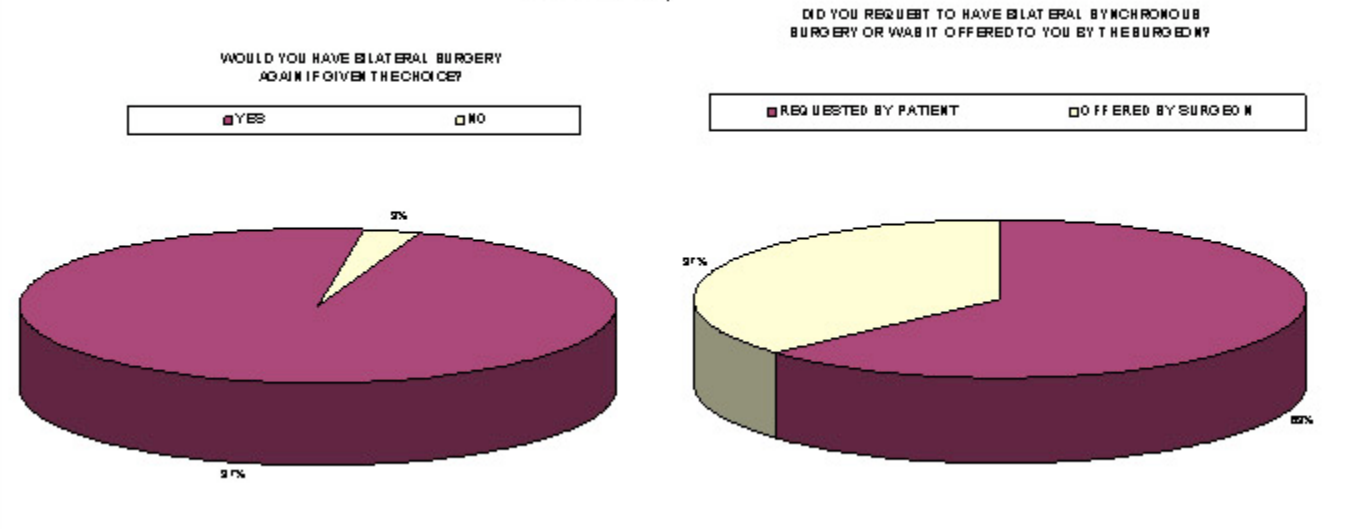
GROUP	B/L TJR RTW	U/L TJR RTW	B/L TJR RADL	U/L TJR RADL
MEAN	16.8	22.4	18.2	22.4
SD	13.3	21.97	12.52	23.56
SEM	2.98	4.91	2.8	5.27
N	20	20	20	20
P VALUE	0.3754		0.5163	
CI	95%		95%	

GROUP	B/L SCARF RTW	U/L SCARF RTW	B/L SCARF RADL	U/L SCARF RADL
MEAN	16.8	19.12	16.1	19.06
SD	11.07	13.87	11.45	12.79
SEM	1.75	1.92	1.81	1.74
N	40	52	40	52
P VALUE	0.2557		0.2666	
CI	95%		95%	

GROUP	B/L SCARF/AKIN RTW	U/L SCARF/AKIN RTW	B/L SCARF/AKIN RADL	U/L SCARF/AKIN RADL
MEAN	18.28	20.71	14.39	18.08
SD	12.01	16.27	6.42	10.4
SEM	1.42	2.35	0.76	1.5
N	72	48	72	48
P VALUE	0.4753		0.031	
CI	95%		95%	

SEM = STANDARD ERROR OF THE MEAN  
 N = NUMBER PARTICIPANTS  
 CI = CONFIDENCE INTERVAL  
 SD = STANDARD DEVIATION  
 TJR - TOTAL JOINT REPLACEMENT  
 RTW - RETURN TO WORK  
 RADL - RETURN TO ACTIVITIES OF DAILY LIVING

PIE CHART 1,2



SHEET #2: COST ANALYSIS OF HALLUX VALGUS SURGERY

Procedure	Surgeon Cost	Anesthesia Cost	Hospital Cost	Total Cost of Surgery
Unilateral HAV	\$1,000	\$500	\$1,600	\$3,100
Staged Bilateral HAV	$\$1,000 \times 2 = \$2,000$	$\$500 \times 2 = \$1,000$	$\$1,600 \times 2 = \$3,200$	\$6,200
Simultaneous Bilateral HAV	$\$1,000 + \$500 = \$1,500$	\$625	$\$1,600 + \$800 = \$2,400$	\$4,525

RESULTS

Statistical analysis using a two-tailed student-t test was performed to analyze the difference between unilateral and bilateral surgery with respect to RADL and RTW. There was no statistical significant difference between any of the groups with a 95% confidence interval (Table 2, Sheet #1). The most common complication was dehiscence, with 4 cases in each group. Two cases of stress fracture of the 2nd metatarsal were documented in the bilateral group, and one stress fracture of the 5th metatarsal occurred in the unilateral series. The unilateral group had 2 instances

of severe pain with a VAS greater than 7 and one case of increased swelling. One superficial skin infection happened in the unilateral group, which was treated with oral antibiotics, uneventfully. One hospital admission occurred in the bilateral group for an acute deep venous thrombosis, which was resolved with anti-coagulants without any complication (Table 4). Both groups were identical to number of physical therapy sessions at 1.8 sessions per patient (Table 5). 97% of the patients stated that they would have bilateral surgery again, if given that choice (Pie Chart 1).

Two participants stated that they would elect to do a staged procedure because they had "difficulty getting around with two bad feet." Of the bilateral set, 63% of patients polled requested to have synchronous bilateral surgery prior to discussion with the surgeon. 37% elected to have both feet operated on simultaneously after consultation and informed consent was obtained by their surgeon (Pie Chart 2). The most common reasons for patients to choose single session vs. staged-bilateral surgery are listed in Table 6, with "wanting to get the entire problem over with sooner" the most popular rationale at 82% .

## **DISCUSSION AND CONCLUSION**

### **COMPLICATIONS AND PATIENT SATISFACTION:**

Our research has shown that there was no statistical significant difference between unilateral and bilateral foot surgery with respect to RADL and RTW. Additionally, complication rates were few and similar in both groups, with a lower incidence in the bilateral group. These rates correlate well with other similar studies in the orthopedic knee literature. Patient satisfaction was very high, with 97% of patients in the single session-bilateral set choosing to have repeat surgery the same way. 93.4% of the bilateral and 75% of the unilateral patients were in athletic shoes at 1 week post-operatively, and 90% were in their typical shoes at 12 weeks in both groups (Table 3). It is apparent that patients would prefer bilateral single session surgery, as they request it 63% of the time without any surgeon recommendation. An expeditious return to ADLs and work is the main motivation behind these requests, and given the data shown, this is effectively achieved through bilateral simultaneous surgery.

### **COST COMPARISON:**

Finally, a cost comparison analysis was undertaken between single session bilateral hallux valgus surgery and staged hallux surgery (Sheet #2). Amounts used for calculation were the following: average surgeon's cost to insurance companies for a hallux valgus surgery = \$1000; average anesthesiologist cost to insurance carriers = \$500/hour; average hospital outpatient or surgery center cost to insurance companies for hallux valgus surgery = \$1600. The average anesthesia time calculated for unilateral surgery is 45 minutes, and 1.25 hours for bilateral simultaneous hallux valgus surgery. With bilateral synchronous foot surgery, both the surgeon and facility fee are reduced by half for the second foot. Using this data, the average total unilateral surgery cost is \$3100, or \$6200 for staged surgery, and the average total cost for simultaneous bilateral surgery is \$4525. In contrast to many current opinions, bilateral single session hallux valgus foot surgery is a viable and safe option for those patients who would like a more rapid return to activities of daily living and work. The procedures may be performed with high patient satisfaction and associated low morbidity. The economic costs to the health system average 25% greater when patients undergoing hallux valgus surgery have the procedure performed one foot at a time. Combined with the time lost from work, this reveals a significant economic cost to both society and patient.

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