

### **Implant Choice, Spending, and Postoperative Complications: Exploring the Variability in an Orthopaedic Trauma Group**

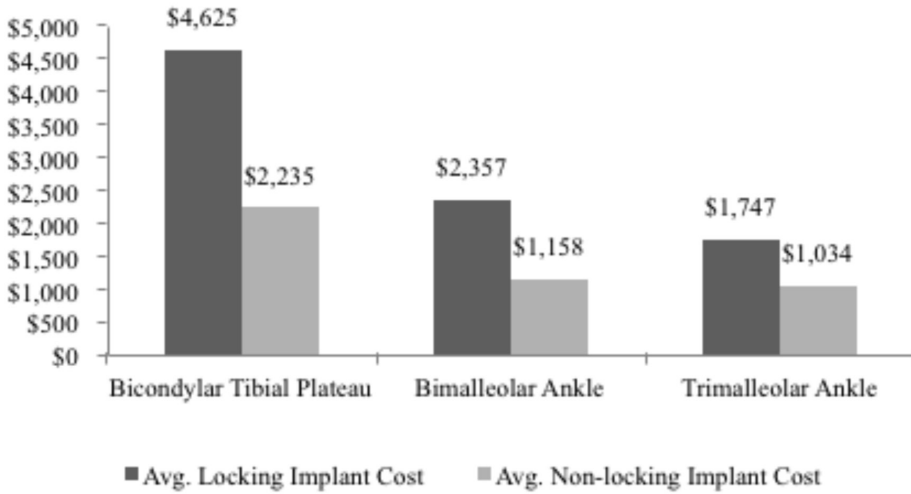
*Thomas J. An, BA; Vasanth Sathiyakumar, BA; Harrison F. Kay, BS;  
Michael Gerasimopoulos, MBA; Young M. Lee, BS; Rachel V. Thakore, BS;  
William T. Obremsky, MD, MPH, MMHC; Manish K. Sethi, MD;  
Vanderbilt University, Nashville, Tennessee, USA*

**Purpose:** The future of health-care reform will potentially involve bundled payment, where physicians and hospitals are paid a single amount for orthopaedic trauma injuries. It is therefore critical for surgeons to evaluate their utilization of implants and seek ways to reduce cost. Furthermore, it is important to explore the relationship between implant spending and complications. The purpose of our study is to determine if locking plate utilization, and in turn increased implant spending, leads to reduced complication rates.

**Methods:** We reviewed isolated bicondylar tibial plateau (BTP) fractures, bimalleolar ankle (BA), and trimalleolar ankle (TA) fractures for six orthopaedic trauma surgeons for 1 year at a single Level I trauma center. Reoperations for wound infection, hardware failure, and nonunion were recorded. We reviewed implant records, radiographs, and operating notes to determine if locking (L) versus non-locking (NL) implants were utilized. Implant cost information was given from financial services. Fisher's exact  $\chi^2$  analysis and Mann-Whitney *U* tests of means were used to compare complication rates.

**Results:** We reviewed 77 patients with isolated fractures (26 with BTP fractures, 33 with BA fractures, and 18 with TA fractures) for six surgeons. There was a significant difference in costs between locking and non-locking plates (Figure 1). There was no significant relationship between implant choice and complication rates (Table 1). There was a wide variability in utilization of locking implants (ranging from 0% to 100% of cases) and in turn average total implant spending per case ranged from \$1998 to \$4856 among the six surgeons for BTA; for BA fractures, surgeon use of locking constructs ranged from 29% to 50% of cases, reflecting a range in average cost of case per physician from \$1392 to \$2144. For TA fractures, surgeon use of locking constructs ranged from 33% to 67% of cases, reflecting an average cost per case per physician from \$823 to \$1843.

**Figure 1. Implant costs.**



**Table 1. Complication Rates**

| Fracture                           | Locking Complication Rate | Non-Locking Complication Rate | <i>P</i> |
|------------------------------------|---------------------------|-------------------------------|----------|
| Bicondylar tibial plateau (n = 26) | 31% (n = 5)               | 20% (n = 2)                   | 0.55     |
| Bimalleolar ankle (n = 30)         | 21% (n = 3)               | 16% (n = 3)                   | 0.69     |
| Trimalleolar ankle (n = 18)        | 33% (n = 3)               | 0% (n = 0)                    | 0.06     |

**Conclusion:** This study is the first to investigate the relationships between utilization of locking / non-locking plates and complications. Our results demonstrate that while surgeon implant choice and, in turn, spending varies greatly, there is no relationship to complications.

• The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an “off label” use). For full information, refer to page 600.