Early Weight Bearing Protocol in Open Reduction and Internal Fixation of Acute Jones Fractures

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STATEMENT OF PURPOSE

Given the delicate blood supply to the proximal fifth metatarsal, Jones fractures have been a controversial subject as far as nonoperative versus operative management given the high incidence of nonunions.1,10 This case series aims to evaluate an early weight bearing protocol in acute Jones fractures following open reduction and internal fixation.

PROCEDURE

All acute Jones fractures were fixated with a titanium partially-threaded solid screw. All instrumentation was cannulated. The surgical procedure is performed in the lateral position with the ability to manipulate the operative extremity to achieve appropriate intraoperative images. A 2 cm incision was made just proximal and superior to the fifth metatarsal base. Under fluoroscopy, a guide wire was inserted down the intramedullary canal past the fracture site. Multiple views are needed to ensure proper placement of the guide wire. Next the cannulated drill bit is used and advanced just distal to the fracture site under fluoroscopy. Based on the width of the intramedullary canal, the appropriately sized cannulated tap is used and the screw length can be measured off this device. The threaded aspect of the screw should be distal to the fracture. The screw is then inserted at this point. Reduction of the fracture site should be observed on immediate postoperative imaging prior to closure. Postoperative protocol as described in methodology was initiated at this point. Figure 1 to 3.

RESULTS

All 31 patients achieved radiographic union. The union rate was 100 percent with a mean time of 5.7 weeks (range of 4 to 10 weeks). The study population was made up of 24 males and 7 females with an average age of 37.5 years and average body mass index of 25.7. Two patients experienced painful hardware, which required hardware removal at mean postoperative time of 5 months. Of those two patients, one experienced sural neuritis which later resolved with hardware removal. No other complications were noted in retrospective review.

DISCUSSION

Fragile fracture types such as a Jones fracture are typically treated with an extended period of non-weight bearing with either nonoperative or operative treatment. The retrospective review of patients undergoing our early weight bearing protocol following Jones fracture open reduction and internal fixation demonstrated similar or better union rates compared to traditional postoperative protocols. Hunt et al.11 found that a CAM boot is more sufficient at offloading the fifth metatarsal with reduced peak pressures and contact pressure in normal walking and heel walking gait compared to a postoperative shoe and heel walking gait compared to an athletic shoe. Interestingly the findings were not significant when comparing an athletic shoe and CAM boot in normal walking. Manecke et al.12 demonstrated similar findings to our study with 89% union rates with immediate weight bearing in a CAM boot for 6 weeks following surgical repair. Several other studies with early weight bearing have demonstrated high union rates which are consistent with our findings as well.13-15 Our study is unique in that patients return to shoes at 2 weeks post-op and can begin return to all activities as early as 6 weeks. Early weight bearing can avoid joint stiffness, muscle atrophy, decreased bone density, and deficiencies in functional outcomes. Our study had several limitations, our study was retrospective and had small sample size. In addition we did not have a comparative group in our study. Numerous questions remain in the debate of nonoperative and operative treatment of acute Jones fractures as well as the postoperative protocols required for any surgical management. A large multicenter study comparing treatment options or postoperative protocol is necessary to address these questions. It has been shown that solid screws are superior to cannulated screws and the size of screw plays an important factor in surgical management.1,4

In conclusion, we have demonstrated a safe and effective early weight bearing protocol following open reduction and internal fixation of acute Jones fractures. We experienced no nonunions with a mean of 5.7 weeks until radiographic union. Early weight bearing likely promotes micromotion at the fracture site, which is attributed to the high union rate. Additionally our protocol can be applied to the general population, not just high-level athletes.

REFERENCES


Figure 1. Preoperative Radiographs

Figure 2. Intraoperative Technique

Figure 3. Immediate Postoperative Imaging

Preoperative left foot radiographs consisting of three views demonstrate an acute Jones fracture pattern (yellow arrow) at the meta-diaphyseal junction of the fifth metatarsal. Weight bearing radiographs are preferred if able. (a) AP radiograph, (b) Medial oblique radiograph, (c) Lateral radiograph.

The surgical procedure is performed in the lateral position with a 2 cm incision parallel to the weight bearing surface made proximal and superior to the base of the fifth metatarsal. The hardware system utilizes cannulated instrumentation and a solid screw. Under intraoperative fluoroscopy, the guide wire is inserted down the intramedullary canal. Bridge wire placement is confirmed on multiple views. A cannulated drill bit is used, passing the fracture site (c). Next a cannulated tap is used to cut (c) A partially threaded solid screw and washer are inserted. Screw is dependent on the width of the intramedullary canal. Use of intraoperative imaging is used to ensure position and advancement of the screw (f).

Immediate postoperative images of the left foot are obtained with intraoperative fluoroscopy to confirm placement of hardware and reduction of the fracture with varying oblique views (a) and lateral view (c).