Omni™ Mini
Case Series

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Enhancing First MTP Fusion: A Retrospective Review of the Omni Mini™ Plating System

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Background

The first metatarsophalangeal (MTP) joint plays a pivotal role in foot biomechanics, influencing weight distribution, gait, and balance. Pathologies such as arthritis and hallux abducto valgus (HAV) deformities can severely impair this joint, causing pain and reduced mobility. In this retrospective review, 13 patients presented with first MTP joint pain secondary to arthritis or significant HAV deformities and had failed conservative management, including orthotics, nonsteroidal anti-inflammatory drugs (NSAIDs), physical therapy, bunion straps, and activity modifications. Surgical arthrodesis of the first MTP joint remains the gold standard treatment for great toe joint arthritis, severe angular deformities of the joint, and also as a revision option for failed index surgeries. Historically, the 1st MTP arthrodesis procedure has a low nonunion rate - typically on average less than 5-10%, regardless of the fixation construct selected. A few studies have suggested higher nonunion rates, but these studies included unusual revision cases, or patients that had known autoimmune diseases. This study aimed to evaluate the union rates associated with a novel miniature plating system that utilizes a dynamic locking technology; SlotLock™. Secondarily, the study wanted to observe how the plates handled the stress of early weight bearing given the low profile design of the Omni Mini™ plating system. All 13 patients included in the retrospective study underwent the 1st MTP arthrodesis as an index procedure. None of the 13 patients included in the study had a known history of an autoimmune disease.

Surgical Management

A dorsal-medial incision approach was utilized for surgical access. Neurovascular structures were meticulously preserved, and an aggressive release of peri-articular tissues was performed to enhance joint exposure. A small osteotome was used to release the plantar capsule at the phalanx base, allowing full exposure and facilitating the use of cup-and-cone reamers.

Joint preparation began with the reaming system to correct angular deformities, where care is taken to ream in the correct orientation to address any angular deformity that may present, such as the 1st metatarsal being angled in varus. Once all cartilage was removed and flushed, a sagittal saw was utilized to plane down the plantar 1st metatarsal crista to offload the 1st MTP. A 2.0-mm solid core drill with a trocar tip was used for appropriate joint surface preparation. Provisional fixation was achieved with a 1.4-mm guide wire placed across the joint. This wire was driven from the medial proximal phalanx base across the joint, and out the plantar lateral 1st metatarsal. The toe was positioned against a flat surface to simulate weight-bearing forces, after which a 3.5-mm headless cannulated lag screw was placed for compression.

Additional stabilization was achieved using a multi-hole locking plate with SlotLock™ technology. Locking screws were placed in the proximal phalanx first, immediately followed by a screw in the SlotLock hole on the proximal aspect of the joint line. The utilization of SlotLock™ allows for additional compression, as well as the ability to implement a locking screw in the compression slot to minimize screw backout. The remaining screw holes were filled with locking or non-locking screws, and then fluoroscopic imaging was taken to confirm construct integrity and screw positioning. An example of the standard construct can be observed in Figures 3 and 4.

The surgical site was closed in a layered fashion, and a postoperative nerve block using 27 cc of 0.5% Marcaine with 12 mg of dexamethasone was administered to prolong the duration of the local anesthetic.

Postoperative Recovery Protocol

Following the 1st MTP joint arthrodesis, the below structured recovery plan was implemented to ensure proper healing and optimal outcomes for all 13 patients.

- Initial Recovery (Weeks 0–4): Patients were restricted to HWB only, using a cam walking boot to protect the surgical site.
- Intermediate Recovery (Weeks 4–8): Full weight-bearing was introduced as tolerated, continuing the use of the cam walking boot. Following week 6, a gradual transition out of the boot was encouraged, with complete transition by week 8. Rigid supportive shoes were recommended during this period to prevent excessive ground reactive forces across the arthrodesis site.
- Advanced Recovery (Weeks 8–14): Low-impact activities were resumed, with patients transitioning to regular footwear once union was confirmed radiographically at week 10. High-impact activities were reintroduced gradually.

Results

Pt #	Construct	Age / Gender	Laterality	Union in 10 weeks	Ancillary Procedures	BMI
1	3.5 headless screw & L-plate	65, F	Left	Yes		24
2	3.5 headless screw & straight plate	70, F	Left	Yes		25
3	3.5 headless screw & L-plate	63, F	Left	Yes	2nd PIPJ arthrodesis w/ HammerFiX	33.5
4	3.5 headless screw & L-plate	70, F	Right	Yes	5th met osteotomy with Mini straight plate	32
5	3.5 headless screw & L-plate	68, F	Left	Yes, CT confirmation at 12 wks	Neuroma excision	27
6	3.5 headless screw & L-plate	81, F	Right	Yes	2nd Hammertoe repair w/ k-wire	22
7	3.5 headless screw & L-plate	73, F	Left	Yes		27
8	3.5 headless screw & L-plate	45, F	Left	Yes		31
9	3.5 headless screw & L-plate	75, M	Right	Yes		31
10	3.5 headless screw & L-plate	69, F	Left	Yes		33
11	3.5 headless screw & L-plate	69, F	Left	Yes		30
12	3.5 headless screw & L-plate	66, F	Right	Yes	2nd PIPJ arthrodesis with HammerFiX	34
13	Bi-planar plating, no lag screw	71, F	Left	Yes	2nd crossover toe amp	27

The study cohort consisted of 13 patients with an average BMI of 28.96, categorizing them as overweight. Seven participants were classified as obese. Immediate postoperative heel weight-bearing (HWB) in a walking boot was permitted for all patients unless contraindicated by ancillary procedures. One patient (Case 4) required a knee scooter for mobility due to secondary procedures. By 10 weeks, all patients achieved radiographic evidence of bony union. One patient (Case 5) with persistent pain underwent computed tomography (CT) at 12 weeks, confirming union and reporting favorable outcomes.

No cases of hardware failure, fatigue, or soft tissue irritation were observed. The plating system demonstrated robustness across a range of patient body types and conditions. X-rays were obtained at 1, 6, and 10 weeks to monitor bony union progression.

Pre-Op

1

2

Post-Op

3

4

Figures 1 and 2 are pre-op images for patient 2. A 70-year-old female with a severe HAV deformity. Figures 3 and 4 are examples of her post-op weight bearing x-rays taken at 10 weeks, demonstrating healthy unions and acceptable alignment.

Discussion

The Omni Mini™ Plating System demonstrated excellent clinical outcomes in this review. There was no incidence of hardware failure, skin dehiscence or infection. All 13 patients had a bony union evident on plain film by 10 weeks. All patients were released from our care by 12-16 weeks due to bony union being obvious on x-ray in all cases but 1, where a CT was used to confirm the union and rule out non-union as a source of pain. The low-profile plate design (1.2 mm thickness) minimized soft tissue irritation without compromising mechanical stability. The integration of SlotLock™ technology enabled robust compression, facilitating union while mitigating the risks of hardware fatigue and construct failure.

Despite the industry's tendency to design larger, bulkier, anatomic shaped dorsal locking plates, this smaller low profile system proved to be equally durable and yield good union rates, even in larger body habitus individuals.

When observing the union rates in the last 10-20 years of literature that has been produced for the 1st MTP arthrodesis procedure, most studies show numbers between 92-97% union rates. In a study done by Hyer et al, in 2012, they noted that a dorsal locking plate and lag screw provided the best union rate. Our findings in our retrospective review coincided with these past studies, but proved a better complication profile due to the miniaturized hardware and instrumentation.

Conclusion

The Omni Mini™ Plating System offers a reliable and innovative solution for first MTP arthrodesis, delivering high union rates and reducing the risk of soft tissue complications. This system represents a valuable option for surgeons aiming to optimize patient outcomes through enhanced construct stability, and reduced hardware prominence.

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