Management and Prevention of Complications in Hallux Valgus Surgery

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Hallux valgus consisting of lateral subluxation of the first metatarsophalangeal joint, metatarsus primus varus, and lateral deviation of the sesamoids, is a common foot deformity, particularly in women. Symptomatic hallux valgus is initially treated conservatively. If conservative treatment fails, surgical intervention may be required. Surgical treatment for hallux valgus to correct the valgus deformity of the great toe and the metatarsus primus varus deformity, to restore the normal mechanics of the first metatarsophalangeal joint, and to relieve pain over the medial eminence of the first metatarsal and/or metatarsalgia. Metatarsal osteotomy of the first metatarsal combined with a distal soft-tissue procedure was among the most popular procedures for correction of a hallux valgus deformity. Distal metatarsal osteotomy was generally recommended for mild-to-moderate deformity, and shaft or proximal metatarsal osteotomy for moderate-to-severe deformity.

Numerous investigators have reported good outcomes of these procedures and high patient satisfaction rates. However, complications of hallux valgus surgery, including recurrence of hallux valgus, hallux varus, malunion of the first metatarsal, stiffness or and osteoarthritis of the MTP joint, transfer lesions, nerve injury, painful hardwear, are still reported with various rates and can be associated with the deterioration of surgical outcomes. The potential for complications comes with the increased popularity of hallux valgus surgery. Appropriate surgical treatment and recognition of potential risk factors are essential for reducing complication rates. Therefore, the identification of risk factors for complications is useful for evaluating operative indications, for selecting surgical procedures, and for identifying the need for preventative management.

When a complication occurs, it can present difficult and challenging problems. In some patients with postoperative complication, salvage operation is required. If a salvage operation is indicated, surgical procedure should be carefully selected based on the condition of complication and the patient expectation.

Since 1989, we have performed a proximal crescentic osteotomy combined with a distal soft tissue procedure for correction of moderate and severe hallux valgus deformities. We would like to provide
information on the management and prevention of complications in hallux valgus surgery, especially a proximal crescentic osteotomy, through our clinical experience and knowledge from recent articles.

Complications of a proximal and shaft osteotomy

1. Recurrence of hallux valgus
   There are various definitions of recurrence among the articles.
   a. Rate: 0 – 41%
   b. Causes
      Undercorrection of HA angle and/or IM angle
      Increased distal metatarsal articular angle
      Postoperative positive round sign of the 1st metatarsal head (due to residual pronation deformity of the 1st metatarsal)
      Incomplete reduction of the sesamoids
      Pre- or post-instability of the 1st TMT joint
   c. Prevention
      Postoperative dorsoplantar and lateral radiographs or fluoroscopic views are taken in order to confirm HV angle≦15°, IM angle<10°, negative round sign, complete reduction of the sesamoids.
   d. Management
      Comfortable footwear
      Salvage operations; a distal soft tissue procedure, metatarsal osteotomy, Akin procedure, arthrodesis of the 1st MTP joint, and arthrodesis of the 1st TMT joint.

2. Hallux varus (HV angle<0°)
   a. Rate: 0 - 12%
   b. Causes
      Overcorrection of HV angle and/or IM angle
      Excessive release of the lateral collateral ligament
      Excessive resection of the medial eminence
      Resection of the lateral sesamoids
   c. Prevention
      Dorsoplantar and lateral radiographs or fluoroscopic views are intraoperatively taken in order to confirm HV angle>7°, IM angle>0°
   d. Management
      Comfortable footwear for painful hallux varus
      Salvage operation; tendon transfer, medial capsule release, metatarsal osteotomy, and arthrodesis of the 1st MTP joint.

3. Malunion of the first metatarsal (dorsiflexion deformity)
   a. Rate: 0 – 28%
   b. Causes
      Inadequate internal fixation
      Excessive weightbearing load until bone union
   c. Prevention
      Rigid internal fixation

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Cast and later weightbearing after surgery
(non-weightbearing for 3 weeks after surgery)
d. Management
  Comfortable footwear for transfer metatarsalgia
  Salvage operation; corrective osteotomy of the 1st metatarsal, and rigid internal fixation

4. Delayed union or nonunion
   a. Rate: 0 - 9.7%
   b. Causes
      Inadequate internal fixation
      Excessive weightbearing load until bone union
c. Prevention
   Adequate preparation of the bone surface
   Rigid internal fixation
   Cast and later weightbearing after surgery
d. Management
   Casting and non- or partial-weightbearing
   Salvage operation; debridement, correction for shortening or deformity of the 1st metatarsal, bone graft and rigid internal fixation.

5. Stiffness of the 1st MTP joint or OA (hallux rigidus)
   a. Rate: 0 – 28%
   b. Causes
      Excessive tightness of soft tissues around the MTP joint
      Postoperative incongruity of the MTP joint
      Preoperative osteoarthritis
      Preoperative cartilage damage of the 1st metatarsal head
c. Prevention
   Appropriate release and plication of the soft tissues
   Obtaining congruent MTP joint
d. Management
   Modified footwear
   Salvage operation; Cheilectomy, resection arthroplasty, and arthrodesis.

6. Transfer lesions
7. Nerve injury
8. Infection
9. Delayed wound healing
10. Hardwear problems
11. Others