

# CHEILECTOMY FOR THE TREATMENT OF HALLUX RIGIDUS

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Hallux rigidus is a painful affliction of the great toe metatarsophalangeal (MTP) joint that results in a marked limitation of dorsiflexion. This limits function in the great toe and can restrict activity in the entire foot. The operation of cheilectomy involves radical removal of osteophytes and a significant portion of normal bone and articular cartilage from the dorsum of the head of the great toe metatarsal to allow improved dorsiflexion at the metatarsophalangeal joint. Simultaneously this results in long-lasting relief of pain. It is a simple procedure with few complications and allows rapid return to greater activity than was previously possible. In the rare event that symptoms are not improved or recur, an arthrodesis of the MTP joint can easily be performed as a salvage procedure.

**KEY WORDS:** great toe MTP joint, degenerative arthritis, surgical management

Cheilectomy is now the most common surgical procedure for the treatment of hallux rigidus. It has evolved from earlier, more radical joint resection procedures, and today occupies the conservative end of the surgical spectrum, with implant resection arthroplasty and arthrodesis at the more radical end. The earliest procedures consisted of resection of the base of the proximal phalanx,<sup>1-3</sup> the head of the first metatarsal,<sup>4-6</sup> or both,<sup>7-10</sup> osteotomy of the metatarsal,<sup>11,12</sup> proximal phalanx,<sup>13,14</sup> or arthrodesis.<sup>16-19</sup> Wedge resection at the base of the proximal phalanx is still a favored surgical option in young patients,<sup>20</sup> but for most patients who must have surgery the choice lies between cheilectomy and arthrodesis. Implant resection arthroplasty<sup>21-26</sup> is generally not advised in patients under 50 years of age because of the risks of fragmentation of the implant, although this risk is greatly reduced with preservation of the weight-bearing portion of the condyles and use of the titanium grommets.<sup>27,28</sup>

## INDICATIONS FOR AND RATIONALE OF CHEILECTOMY

When degenerative joint disease in the metatarsophalangeal joint of the great toe results in pain and restriction of dorsiflexion is unrelieved by conservative measures, such as antiinflammatory medication, shoe modification, and orthoses, one should consider surgical treatment. Both the pain and restriction of motion are considerably relieved following debridement of the joint, including removal of osteophytes and resection of a liberal portion of

the dorsal head of the first metatarsal to allow free passive dorsiflexion of the great toe proximal phalanx. There is the possibility that pain relief is the result of denervation of the dorsal joint from the surgical approach; however, it seems logical to expect that debridement of the arthritic joint and removal of osteophytes does contribute to the relief of pain. If this procedure fails to give satisfactory or long-lasting relief, an arthrodesis can still be performed at a later date without compromise to the available bone stock. Cheilectomy preserves the weight-bearing function in the first ray and avoids introduction of foreign material.

## RADIOGRAPHIC ASSESSMENT OF HALLUX RIGIDUS

Radiographic assessment of hallux rigidus should be performed in the anteroposterior (AP), lateral, and 45° oblique projections. The amount of dorsal spurring is readily apparent in the lateral projection.<sup>7</sup> The amount of joint space narrowing on the plantar two thirds of the joint is best appreciated in the 45° oblique view (Fig 1). Only those patients with preserved joint space as noted in this view should be selected for cheilectomy. Those with no residual joint space would be better served with arthrodesis.

## ALTERNATIVES TO CHEILECTOMY FOR HALLUX RIGIDUS

Cheilectomy is the most conservative of the surgical options for the treatment of hallux rigidus. When performed properly, it provides excellent relief from pain and great improvement in range of motion in the majority of patients and is, overall, one of the most satisfying sur-

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**Fig 1. (A) AP, (B) lateral, and (C) oblique projections demonstrating the ability to assess the amount of preserved joint space on the oblique view. The lateral projection clearly demonstrates the presence of dorsal osteophytes.**



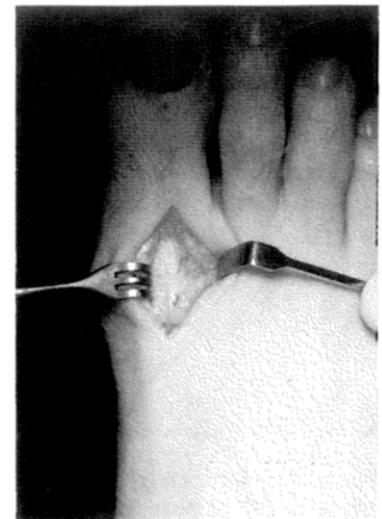
gical procedures in the orthopaedic foot surgeon's repertoire. Occasionally the relief is inadequate or temporary, in which case other surgical options can be considered. In this situation the best alternative is an arthrodesis of the first metatarsophalangeal (MTP) joint. In those few older patients who insist on mobility of the great toe and who have very low demands on their feet, one may consider the flexible hinge silastic implant in conjunction with the titanium grommets or a Keller procedure.

## THE OPERATION OF CHEILECTOMY

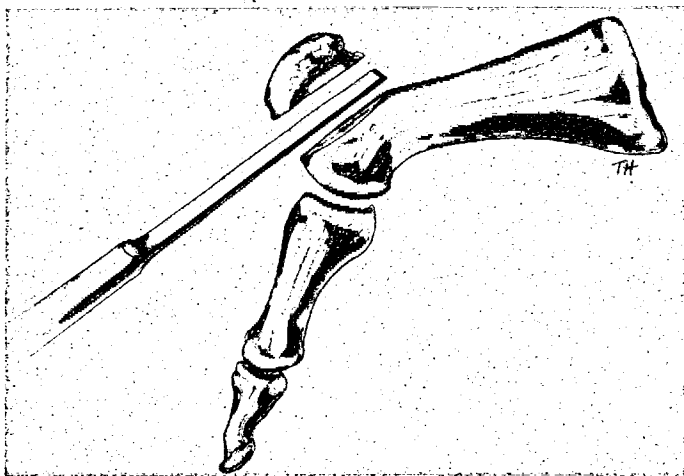
The modern form of the operation was first described by DuVries<sup>29</sup> and modified by Mann,<sup>30,31</sup> although components of the operation were included in many of the earlier procedures. The operation is usually performed under ankle block anesthesia and a lower leg tourniquet. However, an epidural or spinal block or even general anesthesia can be used with a thigh tourniquet if preferred. A dorsal longitudinal incision is made, centered over the MTP joint of the great toe. The site of the predominant osteophyte formation, as determined on the preoperative radiograph, allows a decision to be made to place the incision just medial or lateral to the extensor hallucis longus tendon. The dissection is carried down through the subcutaneous tissues with care taken to identify and preserve the cutaneous branches of the superficial and deep peroneal nerves (Fig 2). The incision is carried down to bone and the capsule is opened. A limited synovectomy is performed. In the rare event that there is an associated hallux valgus, the procedure can be modified to encompass this. If there is a large medial eminence, the same approach is used and a subperiosteal resection of the eminence performed with an oscillating saw. If the hallux valgus is the primary problem, it is approached in the standard fashion, usually via a medial incision, and the dorsal spurring is removed through this approach.

The critical part of the procedure is the removal of the osteophytes from the base of the proximal phalanx and the head of the first metatarsal, plus resection of the dorsum of the metatarsal head. This usually involves removal of one quarter to one third of the metatarsal head on the dorsal surface (Fig 3) and lesser amounts as necessary on the medial and lateral sides of the metatarsal head. Although this may seem an excessive amount of bone, it is essential to the clinical success of the procedure. The articular cartilage is preserved on the more distal and plantar aspects of the first metatarsal head. Loose articular cartilage is removed and chondral defects smoothed as far as possible (Fig 4). Small drill holes have been made in these areas of chondral deficiency in the past; however, the result was not appreciably changed.

The correct amount of bone has been removed if pas-



**Fig 2. Incision is directly over the tendon of EHL on the dorsum of the great toe MTP joint. Dissection can proceed on the medial or lateral side of the tendon, but care must be taken to avoid the deep peroneal nerve.**



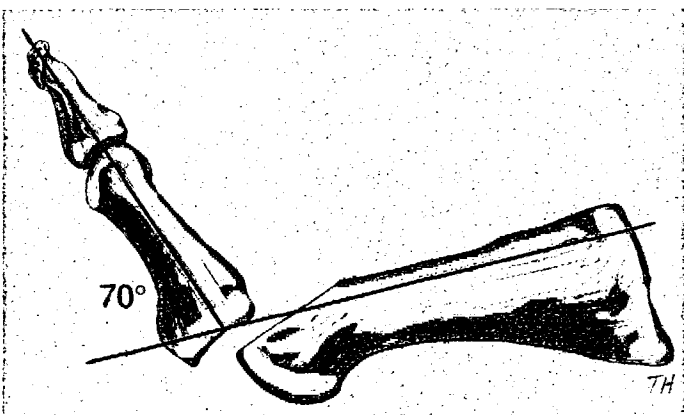
**Fig 3.** One quarter to one third of the dorsal portion of the metatarsal head is removed with a straight osteotome. This is the critical step in the procedure that allows restoration of dorsiflexion of the great toe.



**Fig 4.** Appearance of metatarsal head after removal of dorsal osteophytes.

sive dorsiflexion of the proximal phalanx to 70° can be achieved (Fig 5). Occasionally this amount of dorsiflexion cannot be achieved, even after resecting a significant amount of bone from the dorsal metatarsal head. In such an event, a freer elevator can be passed between the sesamoids and the plantar aspect of the metatarsal head to partially free the plantar plate from its proximal attachment.

The bone edges are rounded off with a rongeur or burr to minimize grating on the base of the proximal phalanx or catching on the capsule. Bone wax may be applied to the bare cancellous surfaces to assist hemostasis and reduce scarring. The joint is freely irrigated and the cap-



**Fig 5.** Appearance of metatarsal head after bony resection allowing 70° of dorsiflexion at the time of surgery.

sule carefully repaired. If resection of osteophytes from the base of the proximal phalanx has weakened the attachment of the extensor hallucis brevis tendon, it must be formally reattached. This is essential if the smooth gliding action of the proximal phalanx over the metatarsal head is to be restored. A compressive dressing is applied before release of the tourniquet.

Postoperatively, the dressing is changed at 6 to 8 days and the patient allowed to ambulate in a wooden shoe. Active and passive motion of the MTP joint is commenced immediately and the patient is strongly encouraged to maintain the range of motion gained intraoperatively. Sutures are removed at 10 to 14 days and the wooden-soled shoe discarded as soon as the patient can fit into a flexible yet supportive sports shoe.

## RESULTS OF CHEILECTOMY

The operation is usually dramatically successful in relieving pain and improving the range of motion in the MP joint within 2 to 3 months of surgery. Ninety percent of patients notice complete or substantial relief of pain and 75% notice an increase in range of motion of approximately 70%. There is little correlation between the severity of the arthritis as portrayed radiologically and the clinical outcome of surgery.<sup>30</sup> Shoe wear is largely unaffected, although a stiffer soled shoe may be necessary in the long term. Return to sports participation is usually possible after 3 to 6 months.

Serious complications are rare. Failure to relieve symptoms or recurrence of symptoms can require secondary surgery but this is surprisingly uncommon. In such cases the choice is between arthrodesis, excisional arthroplasty, and implant resection arthroplasty. Arthrodesis is usually preferred because it is a definitive procedure that provides relief of pain and long-term stability.

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