Resection of the base of the proximal phalanx with interposition of some portion of the capsular tissues was first described in 1904 in the United States by Keller\(^1\) and later, in 1929, in Europe by Brandes.\(^2\)

Many techniques for capsular interposition have been described in the literature, from bunching of the capsule into the first metatarsophalangeal joint void to a box stitch or purse-string suturing of linear capsulotomies.\(^3,4\)

Also, the U-shaped medial capsular flaps across the metatarsal head are sutured dorsally and plantarly by folding the medial flap across the metatarsophalangeal joint and then suturing it to the periosteum of the proximal phalanx.\(^5\)

Kelikian\(^6\) described the interposition of dorsal and plantar flaps. McGlamry et al\(^3\) used a J-shaped medial capsular flap sutured to the lateral capsule of the first metatarsophalangeal joint. Ganley et al\(^7\) further modified the Keller-Brandes operation, reserved for hallux abducto valgus, by interposing a proximally based medial capsule-periosteum flap that encom-

passes the first metatarsal head and is sutured to the lateral capsule. A free segment of the extensor digitorum brevis tendon is then sutured to the medial joint line to provide additional stability.

Hamilton et al\(^8,9\) described tendon-capsule interpositional arthroplasty in conjunction with a Keller-Brandes procedure and standard cheilectomy. The extensor digitorum brevis tendon, extensor hood apparatus, and capsule are sectioned on the dorsal aspect of the first metatarsal, 3 to 4 cm proximal to the first metatarsophalangeal joint. The entire complex is then elevated and advanced over the first metatarsal head to reach the plantar joint line. The tendon-capsule flap is then sutured to the flexor hallucis brevis tendon just distal to the tibial and fibular sesamoid bones. Special emphasis is placed on completely freeing the base of the proximal phalanx from all soft-tissue attachments so that a "hanging toe" results at the time of surgery.\(^10\)

Mroczek and Miller\(^11\) described a modified version of the procedure by Hamilton et al\(^8,9\): preservation of the terminal insertion of the flexor hallucis brevis tendon. In 2005, Cook\(^12\) presented a simplified capsular interposition technique for the Keller bunionectomy that used soft-tissue anchors as an easy method for interposing the capsule into the first metatarsophalangeal joint. We present another simple capsular interposition technique for the Keller interposi-
tional arthroplasty that uses a Kirschner wire to interpose the capsule.

**Technique**

The first metatarsophalangeal joint is approached through a standard linear dorsomedial skin incision, and the dissection is carried down to the level of the joint capsule. Next, a longitudinal linear proximal-to-distal capsulotomy is performed over the dorsomedial aspect of the first metatarsophalangeal joint, extending distally to the base of the proximal phalanx (Fig. 1).

The capsule is freed and sectioned from distal to proximal, by creating lateral and medial flaps, which exposes the base of the proximal phalanx and the head of the first metatarsal (Fig. 2). The medial and lateral ligaments are sectioned. The medial exostosis of the first metatarsal bone is resected, and the base of the proximal phalanx is freed of all soft tissue and is resected in the usual manner.

After the exeresis of the base of the proximal phalanx, the Kirschner wire is inserted by the retrograde method from the center of the stump or remaining base to the distal phalanx (Fig. 3). The medial and lateral flaps of the capsule (Fig. 2) are interposed into the metatarsophalangeal joint space around the metatarsal head (Fig. 4). The medial and lateral capsules are held under tension and in the correct position by the assistant to prevent spinning around the Kirschner wire, and the surgeon passes the Kirschner wire through the interposed lateral and medial capsular flaps from the hallux into the first metatarsal head (Fig. 5). The proximal lateral and proximal medial aspects of the capsular flaps are sutured, and the wound is closed (Fig. 6).

**Conclusion**

Distally based capsule-periosteum interpositional arthroplasty is indicated for the treatment of symptomatic radiographic grades II, III, and IV hallux rigidus that has not responded to nonoperative treatment or previous surgical intervention, and it is being offered

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**Figure 1.** The longitudinal capsulotomy is outlined with a skin marker.

**Figure 2.** The lateral and medial capsular flaps showing the head of the first metatarsal bone and the stump of the proximal phalanx.

**Figure 3.** Insertion of the Kirschner wire by the retrograde method.
as an alternative to prosthetic implant arthroplasty or arthrodesis.\textsuperscript{13, 14}

We have presented a simplified capsular interpositional technique for the Keller bunionectomy that uses a Kirschner wire to interpose the capsule into the first metatarsophalangeal joint without requiring sutures. The capsule acts as a biologic spacer, allowing for fibrosis to fill the void created, with the Kirschner wire maintaining the distance between the metatarsal head and the stump of the proximal phalanx. This creation of a nonpainful pseudarthrosis prevents shortening of the hallux and retraction of the base of the proximal phalanx on the metatarsal head. This technique is inexpensive, can be performed bilaterally in the same sitting, and can be completed in a simple, timely manner through easily reproducible means. This will prevent shortening of the hallux and retrac-

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure4.png}
\caption{A, The medial capsular flap is pulled around the medial aspect of the first metatarsal head. B, The lateral capsular flap is pulled around the lateral aspect of the first metatarsal head.}
\end{figure}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure5.png}
\caption{A, The assistant is holding the medial and lateral capsule flaps under tension while the Kirschner wire is passing through to prevent spinning around the Kirschner wire. B, The Kirschner wire is maintaining the capsular flaps in the proper position.}
\end{figure}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure6.png}
\caption{Closure of the medial and lateral aspects of the capsular flaps.}
\end{figure}
tion of the base of the toe proximal phalanx on the metatarsal head. The insertion of a Kirschner wire is another technique for interposing the capsule into the first metatarsophalangeal joint. Finally, it is inexpensive, can be performed bilaterally in the same sitting, and can be completed in a simple, timely manner through easily reproducible means.

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**Conflict of Interest:** None reported.

**References**

12. **Cook KD:** Capsular interposition for the Keller bunionectomy with the use of soft-tissue anchors. JAPMA 95: 180, 2005.