

RADIOCOBLATION THERAPY FOR TREATMENT OF THE FLEXOR PLATE STRUCTURES

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INTRODUCTION

The diagnosis of predislocation syndrome was first popularized by Gerard Yu in 1995. Yu showed many case histories of patients who had previously been diagnosed with and treated for Morton's neuroma, frequently of the second interspace, with conservative and surgical means who ultimately failed to respond. This was presumably based on the fact that the diagnosis was incorrect to begin with. He described and taught about the acute and chronic inflammation of the second toe joint. He encouraged the use of PO steroids, discouraged injections and described tape splinting of the toe, or use of a Budin Splint as a diagnostic and therapeutic measure.

More recently, Camasta has shown a fairly lengthy case series of patients with flexor plate instability with or without demonstrable tear apparent on magnetic resonance imaging (MRI). His treatment is really a delayed primary repair of a chronically attenuated flexor plate. The author has used this technique with good results; however was in search of another option for the patient with pain but without the larger degree of instability or MRI demonstrable tear.

Critical analysis should be conducted of the patient's foot type, including length of the second ray, presence or absence of first ray pathology, which affects the second ray such as hallux abducto valgus, elevated or shortened first metatarsal, and hammertoe contracture of the second ray. When structural abnormalities are identified, these must be addressed, however the more difficult situation arises when there is no significant structural abnormality, no or only minor MRI changes are noted, and pain persists despite all conservative means. In these situations the authors have begun to evaluate the efficacy of radiocoblation therapy for treatment of the flexor plate structures. This has been performed via direct plantar incision and from a dorsal approach through the joint as well.

The dorsal approach is quite convenient if other dorsal work is also to be undertaken, such as repair of a hammertoe and/or a Weil osteotomy. When undertaken

with concomitant metatarsal osteotomy, access to the flexor plate from above is quite easy. The topaz wand can easily be introduced and the plate treated after the osteotomy is cut but before it is fixated.

Without osteotomy the dorsal approach is much more challenging. The authors have attempted this with mixed results. Even the small joint scope (2.9-mm) is difficult to pass through a lesser metatarsophalangeal joint (MPJ) and visualization is limited. The direct plantar approach still seems to be the simplest way of approaching this problem. Although the required incision is somewhat large for adequate visualization, excellent exposure is achieved and a generous area of treatment can be delivered.

TECHNIQUES

Dorsal Approach

The dorsal approach is undertaken through a dorsal midline incision over the second MPJ. If digital work is to be undertaken, this incision is extended out onto the digit as needed (Figure 1). Dissection is carried directly down to the extensor retinaculum (Figure 2). If transverse plane deviation is present, then the extensor hood can be released on the side of the deviation to aid in realignment.

Once the extensor is reflected, the MPJ capsule is opened through a longitudinal incision and deep retraction



Figure 1. Dorsal incisional approach to the second metatarsophalangeal joint.

inserted. In this example, retraction is in place for metatarsal osteotomy for realignment of the MPJ (Figure 3).

After the osteotomy is cut, the joint is decompressed, which allows easy access to the plantar plate with the Topaz wand (Figure 4). The treatment wand is then passed through the joint and radiocoblation treatment undertaken (Figure 5). The dorsal approach can be combined with a small joint arthroscope to further aid visualization and guide placement of the wand for treatment (Figure 6).

After treatment, the metatarsal head is aligned in the desired position and fixation is undertaken (Figure 7). Closure is then undertaken in a typical layered fashion and dressing applied. If no bone work has been performed, then immobilization is limited to 2-3 weeks, otherwise the time in dressings is dictated by the bone work. All normal post Topaz protocols should be followed, specifically avoiding anti-inflammatories during the first 6 to 8 weeks.

Plantar Approach

In cases where the patient has intractable plantar plate pain, but no instability, consideration can be given for a direct plantar approach Topaz treatment. This can also be combined with plantar plate repair to stimulate neovascular repair with the mechanical reefing.

The plantar approach entails a long linear plantar incision extending from the flexural sulcus of the toe to the area in the arch proximal to the metatarsal fat pad. Thus, this extends from nonweightbearing to nonweight-bearing areas (Figure 7).

Dissection is then deepened sharply through the plantar fat taking care to minimize spreading and resultant disruption to the fat pad. The flexor sheath is then incised and the tendon slip retracted. The Topaz wand is then introduced and treatment undertaken (Figure 8). The plantar approach is then closed in anatomic fashion.

SUMMARY

Treatment of plantar plate pathology is a developing arena at this time. Although no single method is universally applicable, the authors feel that the biologic effect of radiocoblation therapy, combined with structural interventions as required may likely provide the best and most predictable outcomes long term.



Figure 2. Extensor retinaculum exposed.



Figure 3. Exposed second metatarsophalangeal joint following release of collateral ligaments and insertion of deep retractor.



Figure 4. Weil osteotomy cut and metatarsal head displaced proximally enhancing access for dorsal approach to the plantar plate.

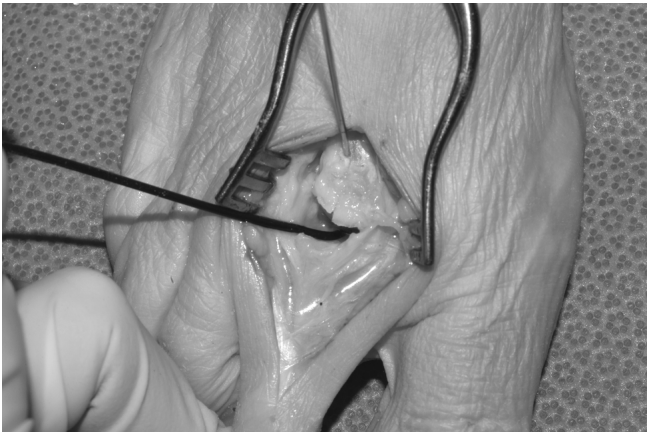


Figure 5. Topaz wand being applied to the plantar plate.



Figure 6. Arthroscopic assisted view of Topaz wand in use. Note the inflammatory appearance of the tissues (crabmeat synovial appearance).



Figure 7. Plantar incisional approach for direct access to the plantar plate.

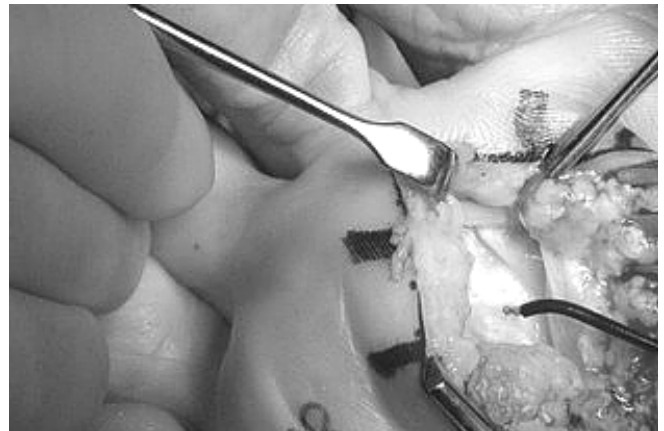


Figure 8. FDL slip retracted medially allowing application of the Topaz treatment wand.