

Abstract and Background

Abstract Objective: This study examines the rare case of a closed traumatic tear in the sagittal band of the extensor hood retinaculum corresponding with the 3rd finger of a male collegiate baseball athlete. The sagittal band is an essential component of the extensor mechanism, with disruption causing frequent tendon dislocations and reduced function. Few case studies have been published regarding specific individuals of this population; therefore, this study will report on the interventions and updates of the injury.

Background: Sagittal extensor hood injuries typically occur in boxers due to repetitive blunt trauma applied to the Metacarpophalangeal (MCP) joint. In the collegiate baseball player's case, the exact mechanism of injury or MOI is unknown. Still, the athlete, an outfield position player, describes diving for a ball with his left forearm supinated and shoulder extended. The injury occurred to his gloved catching hand. This caused the 3rd digit to deviate with apparent tendon displacement radially. It initially appeared that the patient laterally dislocated his MCP joint, but further examination revealed that the joint was intact. Two theories of exact mechanism are the common blunt trauma or a traction force in the radial direction. The patient presented with localized swelling over the dorsum of the hand concentrated at the 3rd MCP joint and pain with active MCP flexion and extension.

Introduction and Research Question

The extensor hood is a retinacular system responsible for stabilizing the dorsal aspect of the MCP joint. The sagittal band of the extensor hood stabilizes the extrinsic extensor tendons to prevent subluxation and dislocation during normal range of motion, especially MCP flexion. Traumatic tears of this structure typically affect the middle finger in 48% of cases. The sagittal radial band is usually torn, leading to tendon subluxation or dislocation in the ulnar direction. A grade III sagittal band rupture is characterized by dislocation or displacement of the extensor digitorum tendon without spontaneous relocation. Research conducted in the 1990s and early 2000s indicates the immediate need for surgical fixation once detected, but several current cases have found success in conservative management.

Methods

The 19-year-old male patient reported an initial injury to the team Athletic Trainer who noted disruption of the dorsal 3rd finger extensor tendon. The Athletic Trainer clinically diagnosed the patient with a grade 3 tear in the sagittal band of the extensor hood structure. This conclusion was made through subjective information reported by the patient, visual observations, and clinician palpation of the region. All data was gathered through clinician observation, examination notes, and patient self-reports. After one week of immobilization and rest, the patient was referred to a physician.

Conclusions

Tearing the sagittal band of the extensor hood structure leads to tendon subluxation/dislocation, pain, and swelling. Many of these cases are managed with surgical fixation of the corresponding extensor tendon. This specific case of a grade 3 extensor hood tear in a collegiate baseball athlete was successfully treated through conservative methods. The team physician cleared the patient to begin light activity after one week of initial rest, immobilization, and treatment. The patient fully participated in practices and activities in just over three weeks without reoccurring symptoms. Further could compare functional outcomes of surgical versus non-surgical management of extensor hood tears in athletic populations. How do the timelines compare?

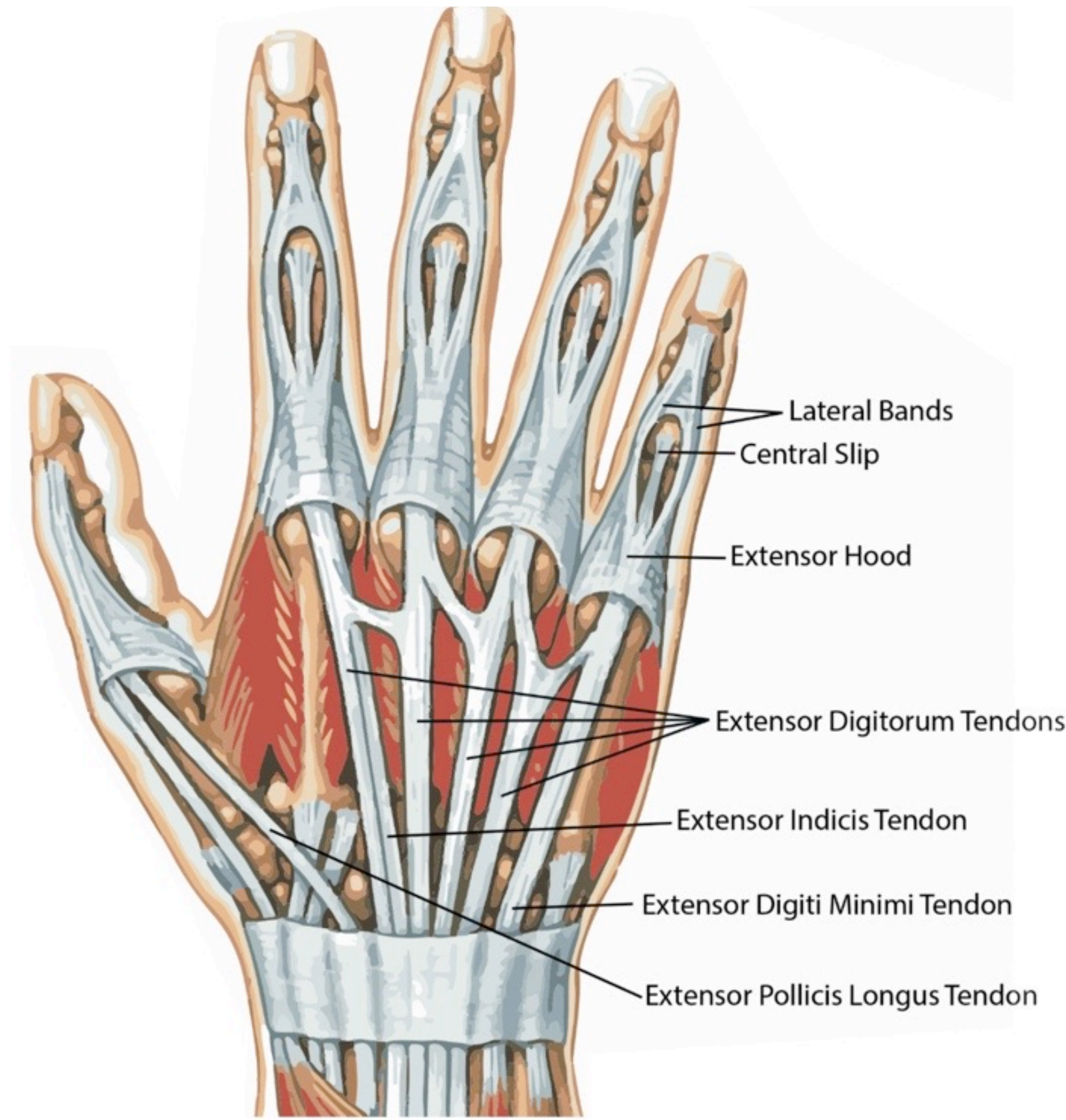


Figure 1. Dorsal hand anatomy⁵ "Extensor Tendon Injuries. Fife Virtual Hand Clinic. Published May 17, 2020. Accessed March 13, 2023. <https://fifevirtualhandclinic.co.uk/extensor-tendon-injuries/>

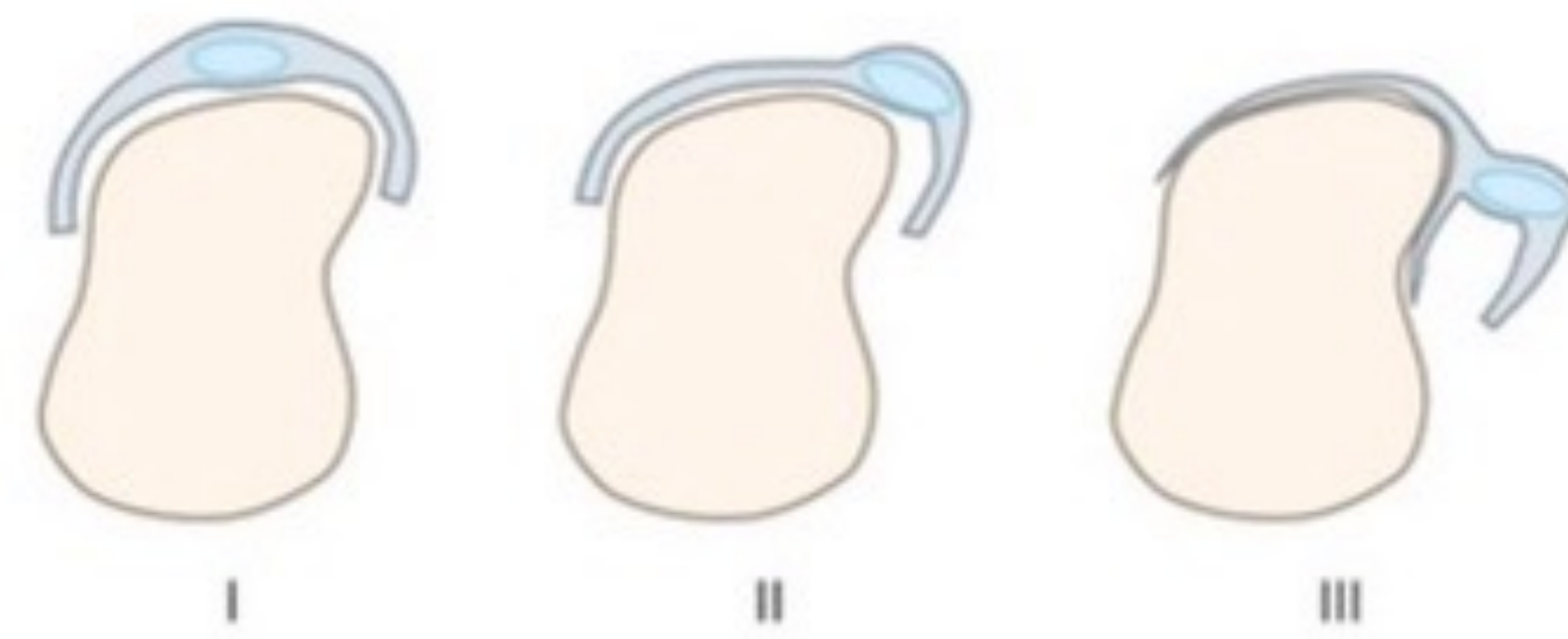


Figure 3. Sagittal band tear grades⁶ This diagram shows the degree of tendon displacement based off the grade severity "Themes UFO. Sagittal Band Injuries—Primary and Secondary Management". Plastic Surgery Key. Published March 5, 2016. Accessed March 13, 2023. <https://plasticsurgerykey.com/sagittal-band-injuries-primary-and-secondary-management/>



Figure 4. External view of visual tendon displacement⁸ "Sagittal Band Injury: Everything You Need to Know." n.d., retrieved from <https://www.youtube.com/watch?v=wgIXGeR2Hk4>

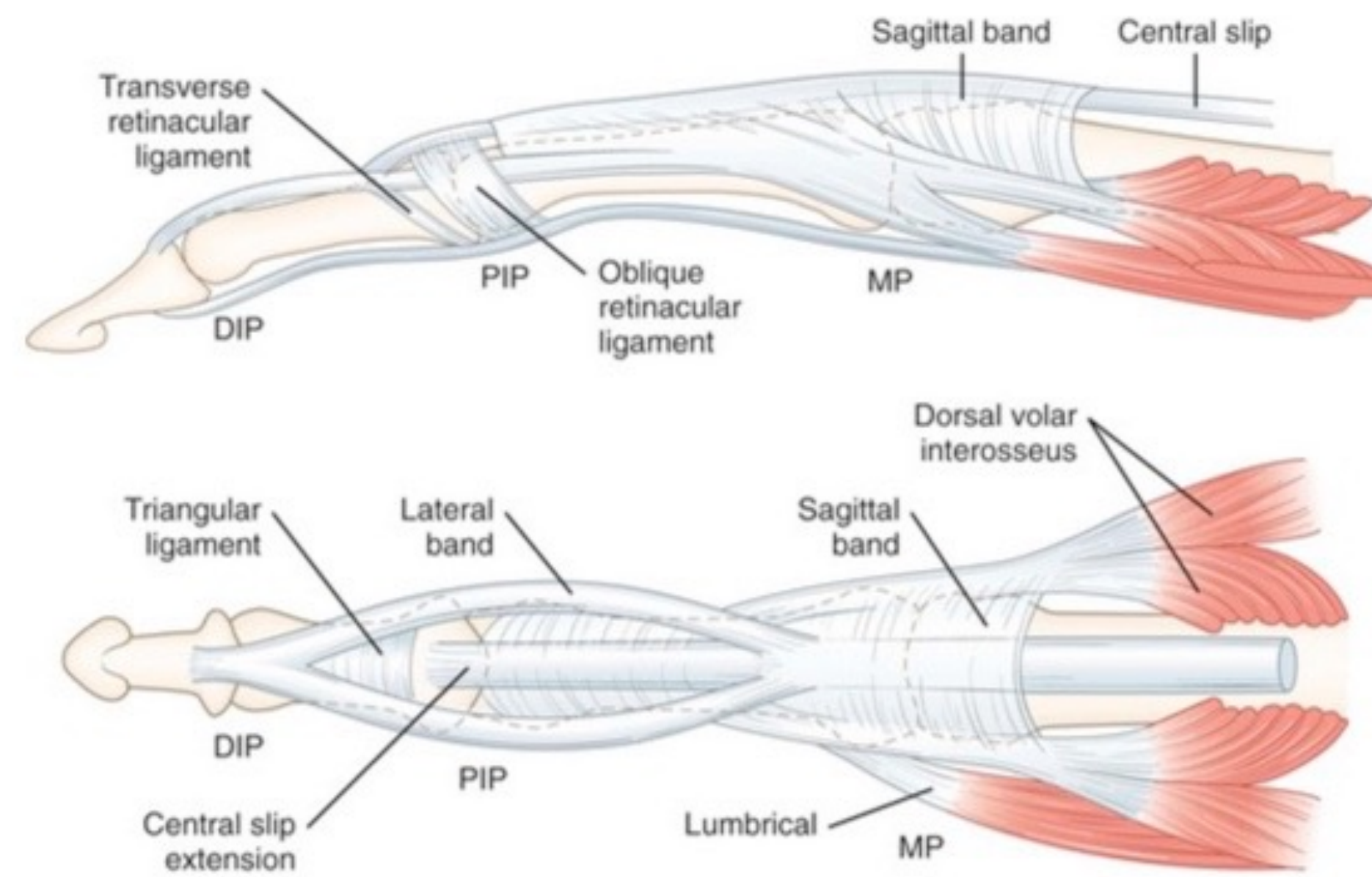


Figure 2. Extensor retinaculum and tendon anatomy⁶ Anatomical diagrams of the phalangeal retinaculum and tendon from the dorsal and sagittal points of view. "Themes UFO. Sagittal Band Injuries—Primary and Secondary Management". Plastic Surgery Key. Published March 5, 2016. Accessed March 13, 2023. <https://plasticsurgerykey.com/sagittal-band-injuries-primary-and-secondary-management/>

Treatment Log	
Date	Therapeutic Modality
2/11/2023	Ice Pack
2/12/2023	HIVAMAT Microcurrent ESTIM Ice Pack
2/13/2023	Non-Thermal Ultrasound HIVAMAT Microcurrent ESTIM
2/14/2023	Non-Thermal Ultrasound HIVAMAT Microcurrent ESTIM
2/15/2023	Non-Thermal Ultrasound HIVAMAT Microcurrent ESTIM
2/21/2023	Thermal Ultrasound Microcurrent ESTIM Ice Pack
2/23/2023	Thermal Ultrasound HIVAMAT
2/27/2023	Thermal Ultrasound HIVAMAT Microcurrent ESTIM Ice Pack
2/28/2023	Thermal Ultrasound HIVAMAT Microcurrent ESTIM Ice Pack
3/2/2023	Thermal Ultrasound HIVAMAT Microcurrent ESTIM
3/6/2023	Thermal Ultrasound HIVAMAT Microcurrent ESTIM
3/8/2023	Thermal Ultrasound HIVAMAT

Table 1. Recorded treatment log with corresponding dates

Therapeutic Modality	Parameters
Ice Pack	20 Minutes
Non-Thermal Ultrasound	5 - 7 Minutes: 20 - 50% Duty Cycle, 3 MHz, 0.8 W/cm ²
Thermal Ultrasound	5 Minutes: 100% Duty Cycle, 3 MHz, 1.0 - 1.2 W/cm ²
Microcurrent ESTIM	10 Minutes: Alternating current, 70 Hz, 400 uA 10 Minutes: Alternating current, 0.4 Hz, 40 uA
HIVAMAT	2 Minutes: 50 Hz 5 Minutes: 180 Hz 5 Minutes: 130 Hz

Table 2. Parameters of the applied therapeutic modalities.

Clinician Notes

The initial injury occurred on 2/11/23. An ice pack was applied to the injury for 20 minutes. After icing, the clinician provided buddy tape to the 2nd and 3rd fingers to provide support for the joints involved. *ice application

2/12/2023: Tenderness and swelling increased over the dorsal aspect of the affected hand. Patient-reported several incidences of tendon dislocation during simple tasks such as opening containers and grabbing small objects.

2/13/2023: There was no significant improvement regarding tenderness and incidents of recurrent dislocations. Swelling over the dorsum of the hand became slightly more diffuse.

2/14/2023: Injury is showing improvement in the swelling. The swelling has decreased over the dorsum of the hand, and only trace swelling remains over the MCP joint. The patient reports decreased tenderness over injury with decreased incidents of tendon dislocation during ADLs. The patient describes remaining discomfort with gripping and squeezing movements. A thermoplastic splint was molded to keep the 2nd and 3rd MCP, PIP, and DIP joints in a neutral to an extended position. In addition, this splint keeps the distal wrist joint in a neutral position to minimize excess movement. The patient was instructed to keep the splint on during any activities or periods of movement.

2/20/2023: The patient had a physician's examination today. Swelling is minimal, and tendon instability is minor. The physician approved the athlete to begin light activity with progressing intensity. Follow up appointment will be scheduled within two weeks if pain, swelling, or instability significantly increases.

2/21/2023: Patient began light hitting and fielding drills. The patient did not report any soreness or instability of the tendon or surrounding region.

2/22/2023: The Patient-reported two incidents of tendon dislocation. One during ADLs and the other during batting practice.

2/23/2023: Patient had batting practice today and reports no tendon dislocations

2/27/2023: No issues were reported over the weekend. The patient batted, fielded ground balls, and weight lifted.

2/28/2023: The patient fully participated in all practice activities today and did not report any issues.

3/6/2023: The patient has participated in all activities without any tendon dislocation incidents in the past 7-10 days.

References and Acknowledgments

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