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Techniques

Plantar Plate Provocation Test

A Clinical Sign for Identification of Plantar Plate Lesion

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Plantar plate lesions are being increasingly identified due to heightened clinical suspicion, thorough physical examination, and advances in medical imaging, particularly in magnetic resonance imaging (MRI) techniques.¹⁻⁵ By virtue of their anatomic proximity, plantar plate lesions are often mistaken for Morton's neuropathy, and as the treatment of these entities is quite different, accurate differential diagnosis is paramount. Furthermore, both lesions may occur concomitantly, and surgical treatment of only one condition will lead to only partial improvement of symptoms. This report describes a clinical finding that can assist in the specific identification of plantar plate lesion, particularly in the early stages, when diagnosis is most challenging. All the patients with positive provocative test had a positive MRI for plantar plate lesion (Figure 1), and those who underwent surgery had the lesion confirmed during the procedure.

Clinical Diagnosis

In view of their similar histories and location of symptoms, plantar plate

lesions are often difficult to distinguish from Morton's neuropathy, particularly in the early stages, when there is no displacement of the involved toe. In later stages, claw-toe deformity and valgus or (most commonly) varus deformity are usually present to some degree, making the diagnosis of plantar plate lesion more readily apparent.

A positive Mulder's test, although suggestive of Morton's neuropathy, is not pathognomonic, and in the author's experience, some patients with plantar plate injury may have a positive test due to the anatomic proximity of these lesions.⁶

The Lachman test, described by Thompson and Hamilton, should be performed in all patients with metatarsophalangeal joint pain of the smaller toes and is highly sensitive in the presence of instability.^{2,5} The test can be graded in terms of how much the proximal phalanx can translate vertically. In stage 0, there is no laxity to dorsal translation. In stage 1, the proximal phalangeal base can be subluxated, but

not dislocated. In stage 2, the phalangeal base can be dislocated, but also manually reduced. Finally, in stage 3, the phalangeal base is fixed in a dislocated position because of the tightness of the extensor tendons and cannot be reduced manually.⁵

The test proposed herein is particularly useful in stage 0, when there is no overt instability. With the patient in a seated position and the

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affected foot hanging free or supported by the examiner's knee, the midfoot is grasped with one hand while the other hand grasps the desired toe so that the examiner's index finger is placed over the dorsal base of the proximal phalanx (Figure 2). The examiner then applies moderate dorsiflexion while pushing the phalanx in the plantar direction, thus

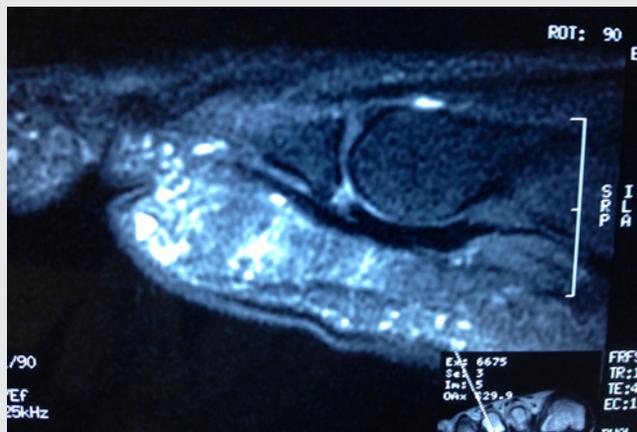
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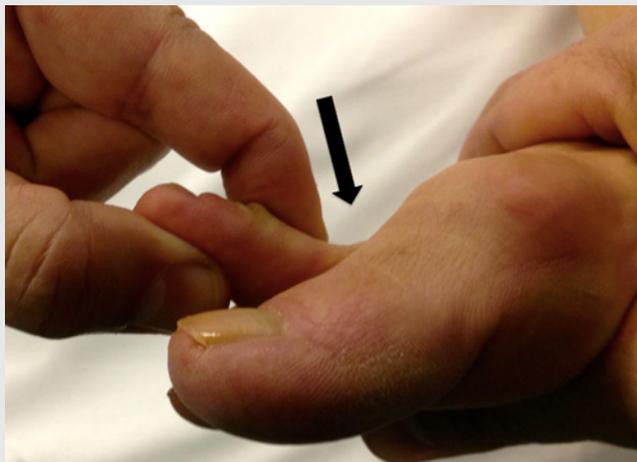
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Figure 1.

MRI of patient with positive test demonstrating plantar plate lesion of second metatarsophalangeal joint.

**Figure 2.**

Photograph depicting the plantar plate provocation test performed on the second toe.



tioning the plantar plate. If pain is elicited in the plantar region of the metatarsophalangeal joint, despite no pressure being applied on the joint itself, the test is positive. In the author's experience, this is a simple method of diagnosing plantar plate lesion even at its earliest stages and is extremely useful in distinguishing these lesions from Morton's neuropathy.

In the early stages, the clinical examination of patients with lesions of the plantar plate is scarce, and this test proved useful since it was positive in all cases that had the injury confirmed by MRI. [FAS](#)

References

1. Coughlin MJ, Baunfeld DS, Nery C. Second MTP joint instability: grading of the deformity and description of surgical repair of capsular insufficiency. *Phys Sportsmed*. 2011;39:132-141.
2. Klein EE, Weil K Jr, Weil LS Sr, Coughlin MJ, Knight J. Clinical examination of plantar plate abnormality: a diagnostic perspective. *Foot Ankle Int*. 2013;34:800-804.
3. Nery C, Coughlin MJ, Baumfeld D, Mann TS, Yamada AF, Fernandes EA. MRI evaluation of the plantar plates compared with arthroscopic findings: a prospective study. *Foot Ankle Int*. 2013;34:315-322.
4. Sanhudo JAV, Gomes JLE. Pull-out technique for plantar plate repair of the metatarsophalangeal joint. *Foot Ankle Clin*. 2012;17:417-424.
5. Thompson FM, Hamilton WG. Problems of the second metatarsophalangeal joint. *Orthopedics*. 1987;10:83-89.
6. Mulder JD. A causative mechanism in Morton's metatarsalgia. *J Bone Joint Surg Br*. 1951;33:94-95.