

Successfull Treatment of Plantar Fasciitis with Perineural Dextrose Injection

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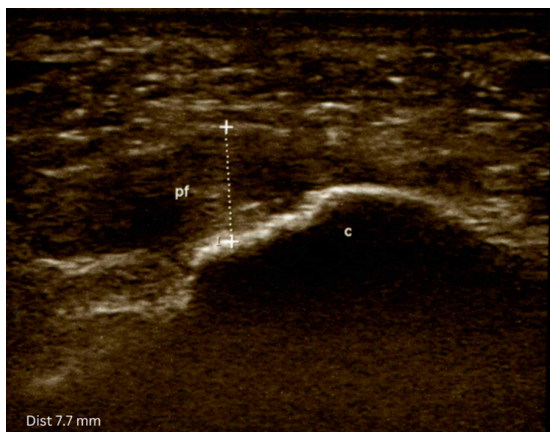


Figure 1. Longitudinal ultrasound showing increased thickness of left plantar fascia. PF, plantar fascia; c, calcaneus

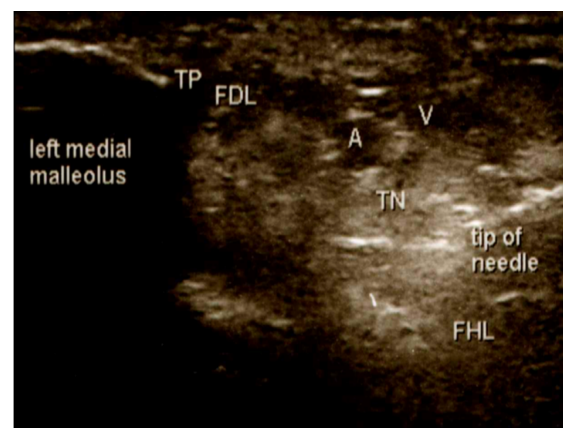


Figure 2. In-plane perineural injection of the tibial nerve. TP, tibialis posterior tendon; FDL, flexor digitorum longus tendon; FHL, flexor hallucis longus tendon; TN, tibial nerve; A, artery; V, vein

Plantar fasciitis, one of the most frequent causes of heel pain, occurs in approximately 11-15% of the general population.¹ Up to now, there are various stepwise treatment options, including stretching, orthotic insoles, strapping of the foot, anti-inflammatory drugs, corticosteroid injection, extracorporeal shockwave therapy, and surgery. However, the results are varied, and no study yet strongly supports the effectiveness of any modalities.² Therefore, any new innovative treatment strategies are still required to relieve the pain. In this report, we present an interesting case of dextrose perineural injection in plantar fasciitis resistant to conservative treatment.

A 62-year-old active career woman came to the clinic with a chief complaint of left heel pain for 7 months without numbness. She had previously sought consultation at several clinics and was prescribed oral nonsteroidal anti-inflammatory and opioid analgesic drugs with no improvement in symptoms. She was offered plantar corticosteroid injection therapy but refused due to fear of corticosteroid's possible side effects. She had a medical history of dyslipidemia and no other comorbid diseases. She was obese with a body mass index of 27.3 kg/m². There was tenderness at the plantar medial calcaneal tuberosity, rated as 7/10 on

the pain scale. Tinel tests were negative on both feet. Musculoskeletal ultrasound examination demonstrated a 7.7 mm thickness of left plantar fascia (**Figure 1**). In comparison, her right plantar fascia thickness was 2.8 mm. Three milliliters of dextrose 5% were injected perineural to the tibial nerve, posteriorly to the left medial malleolus (**Figure 2**). The patient reported a significant reduction of pain to 3. The second session of perineural dextrose injection was performed after one week, resulting in a pain severity reduction to 1. The patient was also advised to consult a dietician for weight loss management and avoid barefoot walking.

The successful pain alleviation after perineural dextrose injection in our case demonstrated a mix of nociceptive and neuropathic pain might contribute to plantar fasciitis. Perineural dextrose 5% injection was firstly introduced by John Lyftogt for treating peripheral neuropathy in 2005.³ Although no massive publications yet of perineural dextrose injection, some studies reported the effectiveness in ulnar neuropathy, and radial nerve palsy.^{4,5} Previously, one study by Conaway reviewed the outcomes of perineural dextrose weekly injection from 9 intervention and 9 control subjects. The dextrose 5% was weekly injected perineural to the saphenous nerve at the adductor canal and deep tibial nerve at the bifurcation of the gastrocnemius muscles in a total of 8 weeks study period. There was significant pain reduction in the intervention group.⁶ This finding is interesting since both Conaway and our case targeted perineural of tibial nerve with different sites of injection. We chose the site of injection based on the proximity to the plantar fascia and before the branching of the tibial nerve.

It is proposed that dextrose 5% exerts a downregulatory effect on capsaicin-sensitive calcium channel receptors (transient receptor potential vanilloid receptor-1, TRPV1). The downregulation of TRPV1 disrupts the release of nociceptive substance P and calcitonin gene-related peptides, resulting in the attenuation of neuroinflammation pain.⁷ Moreover, it is

proposed that chronic pain might be attributed to glycopenic microenvironment at the peripheral nerve. Perineural glycopenia yields hyperexcitability of the nociceptive nerve fibers. Thus, dextrose injection may promptly correct the glycopenia and provide pain reduction.⁸ No study yet compares the efficacy between conventional corticosteroid injection and perineural dextrose injection in treating plantar fasciitis. In addition, dextrose 5% is less harmful than steroid injection.⁹

REFERENCES

1. Rasenberg N, Bierma-Zeinstra S, Bindels P, van der Lei J, Middelkoop Mv. Incidence, prevalence, and management of plantar heel pain: a retrospective cohort study in Dutch primary care. *Br J Gen Pract.* 2019;69(688):e801-8.
2. Latt L, Jaffe D, Tang Y, Taljanovic MS. Evaluation and treatment of chronic plantar fasciitis. *Foot Ankle Orthop.* 2020;5(1):2473011419896763.
3. Lyftogt J. Prolotherapy and Achilles tendinopathy: a prospective pilot study of an old treatment. *Australas Musculoskelet Med.* 2005;10(1).
4. Mansiz-Kaplan B, Nacir B, Pervane-Vural S, Tosun-Meric O, Duyur-Cakit B, Genc H. Effect of perineural dextrose injection on ulnar neuropathy at the elbow: A randomized, controlled, double-blind study. *Arch Phys Med Rehabil.* 2022;103(11):2085-91.
5. Chen SR, Shen YP, Ho TY, Chen LC, Wu TY. Ultrasound-guided perineural injection with dextrose for treatment of radial nerve palsy: A case report. *Medicine (Baltimore).* 2018;97(23):e10978.
6. Conaway E, O'Donnell A, Pepe J, Pena M. Lyftogt perineural injection therapy® as a primary treatment for plantar fasciitis: a randomized, controlled pilot with crossover. *Scholar Pilot and Validation Studies.* 2020;1(1):4-10.
7. Iftinca M, Defaye M, Altier C. TRPV1-targeted drugs in development for human pain conditions. *Drugs.* 2021;81(1):7-27.
8. Maniquis-Smigel L, Reeves K, Rosen H, et al. Analgesic effect and potential cumulative benefit from caudal epidural D5W in consecutive participants with chronic low-back and buttock/leg pain. *J Altern Complem Med.* 2018;24(12):1189-96.
9. Wu Y, Ke M, Ho T, Li T, Shen Y, Chen L. Randomized double-blinded clinical trial of 5% dextrose versus triamcinolone injection for carpal tunnel syndrome patients. *Ann Neurol.* 2018;84(4):601-10.