

## Case Description

A previously healthy 19-year-old woman with no significant medical history sustained an injury to her right lower leg after a fall. She required right knee arthroscopic surgery including, right knee partial lateral meniscectomy, prepatellar bursectomy, and lateral release. She developed dystonic posturing of her right foot including, inversion/plantarflexion at the ankle, as well as CRPS-2. Electrodiagnostic studies would show possible deep peroneal nerve injury with reduced amplitude of the right peroneal motor nerve.

Despite multiple attempts at treating her acquired equinovarus deformity, including MUA, serial casting, spinal cord stimulator, sympathetic nerve block, tendon release, physical therapy, and various AFOs, her deformity persisted which significantly impacted her mobility. Additionally, her treatment included three series of botulinum toxin injections to her calf muscles which did not provide any relief.

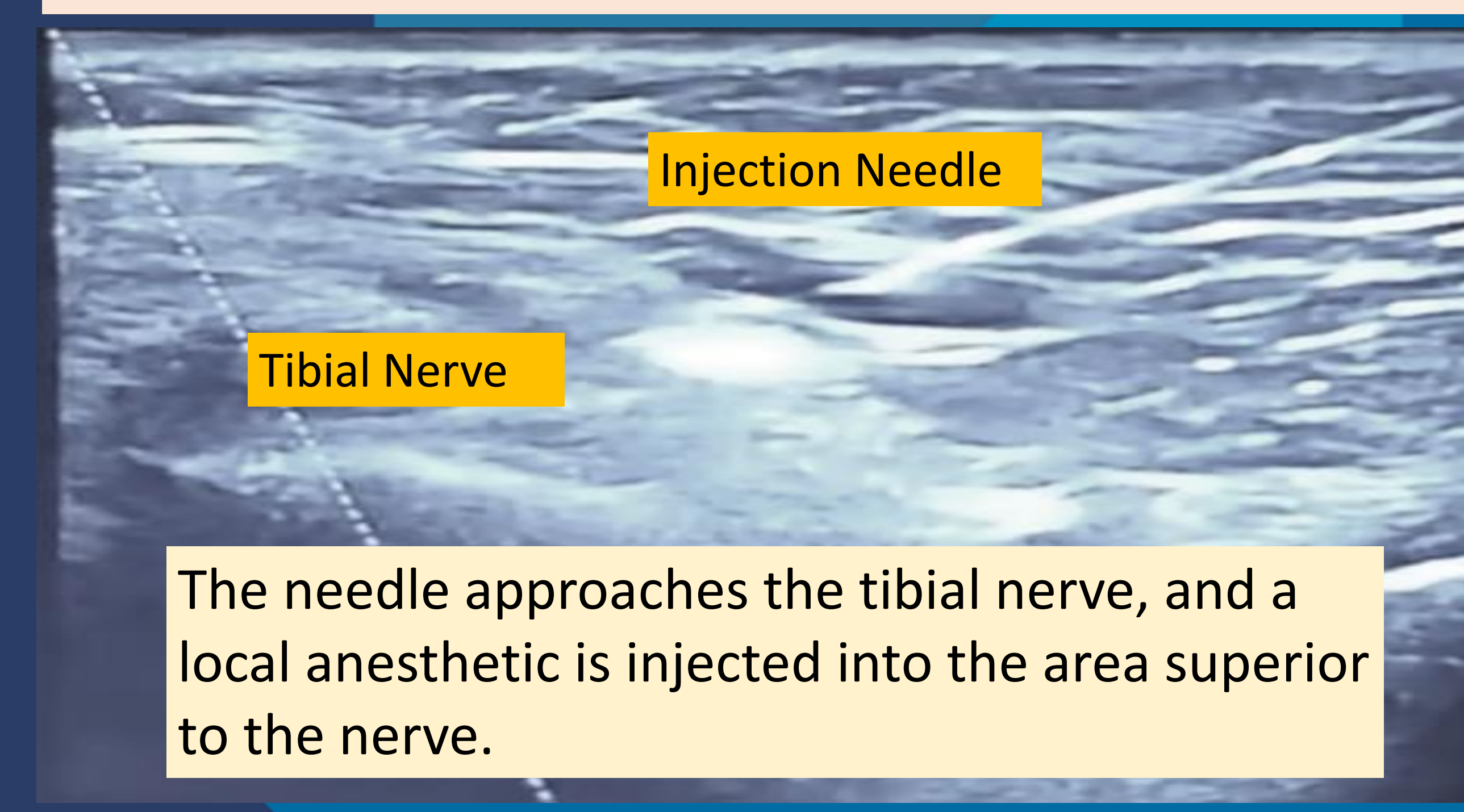
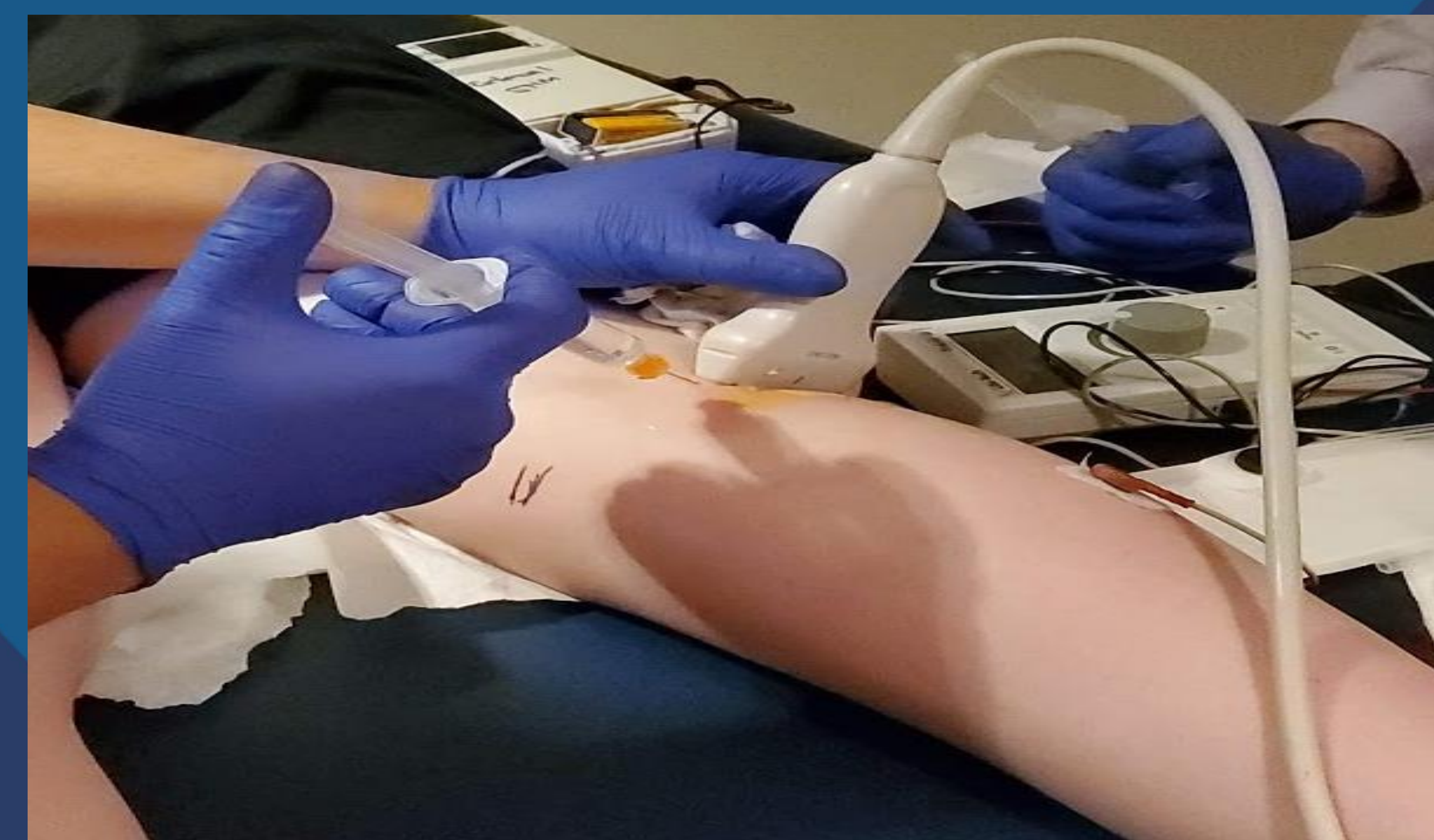
During our initial evaluation, we performed a diagnostic tibial nerve block which resulted in significant tone reduction and pain relief. It was also noted that the intrinsic foot muscles were a significant contributor to the patient's equinovarus. As such, a tailored injection approach was implemented, resulting in improved joint position, mobility and function that was previously not seen.



Medial View of equinovarus deformity of right foot.



The tibial nerve was first localized using electrical stimulation and ultrasound



Injection Needle

Tibial Nerve

The needle approaches the tibial nerve, and a local anesthetic is injected into the area superior to the nerve.

## Results

After successful pain relief and tone improvement with the diagnostic tibial nerve block it was believed the patient would indeed benefit from botulinum toxin injections. Previous botulinum toxin injections to the gastrocnemius and soleus were unsuccessful in treating the patient's acquired foot deformity. However, by instead targeting the quadratus plantae, FHB, FDB, FDL posterior tibialis and anterior tibial muscles a greater degree of mobility and proper joint position was achieved. The patient also reported being able to better maintain a neutral position while donning her AFO with minimal discomfort or skin breakdown.

## Discussion

This unique case exemplifies the complex nature of post traumatic dystonia, characterized by maladaptive reorganization within the nervous system following peripheral injury, often refractory to surgical correction<sup>1</sup>. It also points out how important clinical judgement and functional evaluation of the cause of the deformity help to provide optimal response in difficult cases. Peripheral nerve blocks may help to assess treatment efficacy. In the treatment with botulinum toxin injections, the lesser-known contributors to an equinovarus deformity were targeted to ensure maximal benefit and response for this complex pathological process. By carefully considering botulinum toxin treatment more invasive and less effective treatments may be avoided.

## Conclusion

Post traumatic dystonia has a poorly understood pathophysiology which can make treatment elusive. It is important for treatment to be patient centered which includes considering less common approaches to provide better outcomes when other treatments have failed.

## References

1. Kumar H, Jog M. Peripheral trauma induced dystonia or post-traumatic syndrome? *Can J Neurol Sci.* 2011 Jan;38(1):22-9. doi: 10.1017/s0317167100011057. PMID: 21156425
2. Pont-Sunyer C, Martí MJ, Tolosa E. Focal limb dystonia. *Eur J Neurol.* 2010 Jul;17 Suppl 1:22-7. doi: 10.1111/j.1468-1331.2010.03046.x. PMID: 20590804.