

## Introduction

Isolated Posterior Interosseous Nerve (PIN) injury is rare and there is some debate in the way it should be treated. Incidence is approximately 0.003% and most often occurs in the dominant upper limb. (1)

There are 5 potential anatomical locations for PIN compression at the elbow: fibrous bands at the radial head, radial recurrent vessels (Leash of Henry), extensor carpi radialis brevis tendon origin, distal supinator margin, and the Arcade of Frose (fibrous band at the proximal edge of the supinator muscle) with the latter being the most common site. (1)

Initial management of PIN palsy secondary to entrapment etiologies typically begins with conservative management and surgery is deferred until conservative management fails. Prior studies have shown that 90% of patients who undergo surgical intervention have good to excellent recovery of function (2). However, delayed surgical intervention tends to result in a worse prognosis (3).

## Case Description

41-year-old right hand dominant male recreational weightlifter presented to the EMG lab with a 3 week history of an inability to extend all 5 fingers on his left hand and left forearm pain. Symptoms began 1 week after performing a routine workout consisting of chest and pronation-supination exercises with light-weighted dumbbells. Physical exam revealed a radially deviated wrist, 1/5 strength with long finger extension and index finger extension, and 0/5 strength with thumb extension. Sensation was intact to light touch and there was no notable muscle atrophy.

NCS/EMG demonstrated prolonged distal motor latencies and reduced CMAP amplitudes in the left radial nerve as well as acute denervation changes (fibrillations and positive sharp waves) in the left Extensor Indicis Proprius (EIP) and Extensor Digitorum Communis (EDC) muscles. No motor unit action potentials were elicited in these muscles.

MRI of the left elbow demonstrated muscular edema in the distribution of the posterior interosseous nerve without an identifiable lesion causing nerve compression.

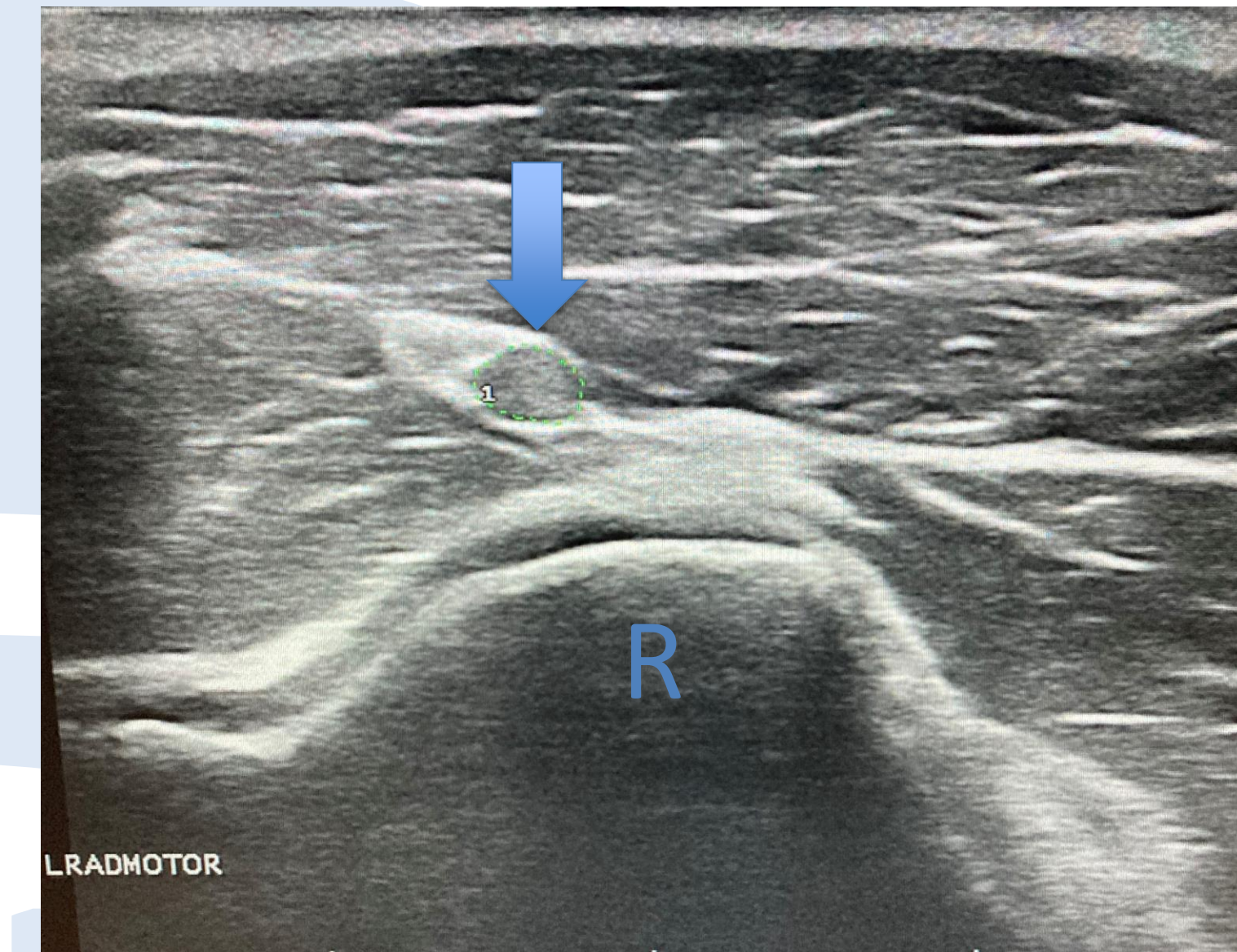


Figure 1. Short axis view of the deep branch of the radial nerve (arrow) shows hypoechoic enlargement just proximal to the Arcade of Frose. Cross Sectional Area = 5 mm<sup>2</sup>. Normal = 2.2 mm<sup>2</sup> (4). R = Radius.

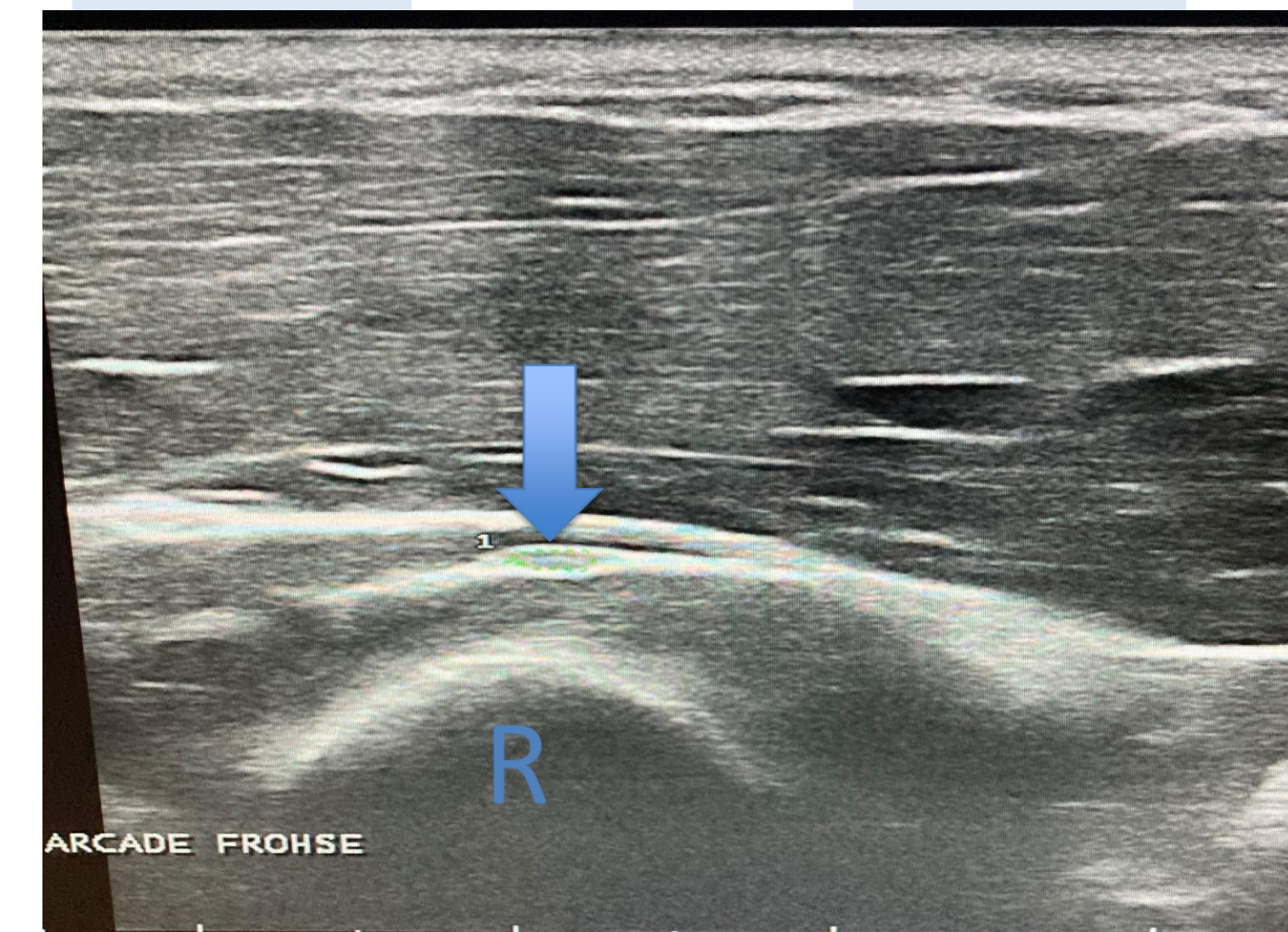


Figure 2. Short axis view of the PIN (arrow) in the Arcade of Frose. Cross Sectional Area = 2mm<sup>2</sup>. R = Radius

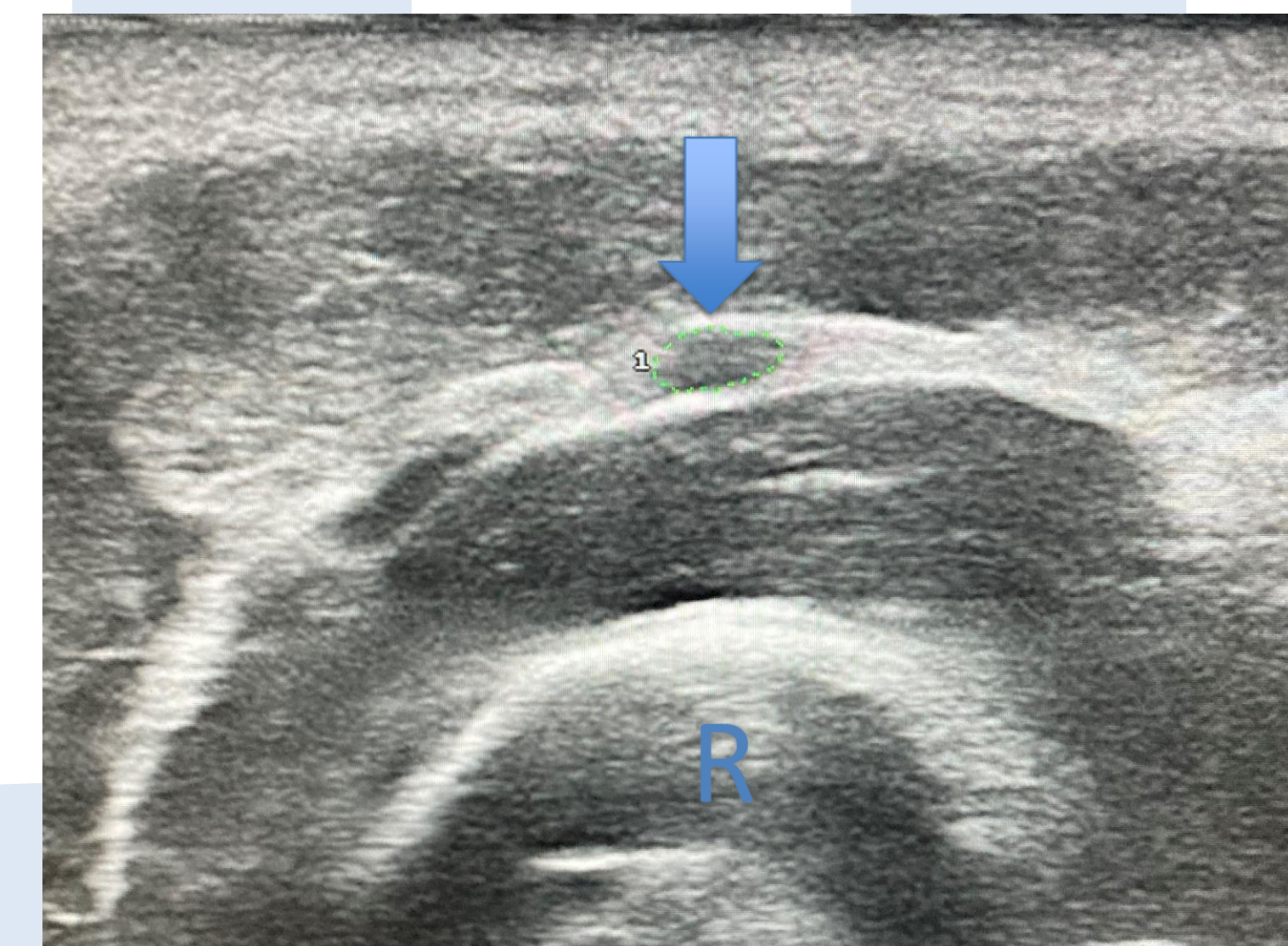


Figure 3. Short axis view of the PIN (arrow) distal to the Arcade of Frose. Cross Sectional Area = 2 mm<sup>2</sup>. Normal = 2.3 mm<sup>2</sup> (4). R = Radius

## Treatment

The patient trialed a course of occupational therapy but unfortunately did not regain finger extension strength or function. After failing conservative management, he underwent surgical decompression 8 months after symptom onset. 2 months after surgery, his EDC strength returned but he continued to have absent EIP and EPL (Extensor Pollicis Longus) function. 6 months after surgery, he has not regained full strength but he now has 4/5 strength in his EIP and EPL muscles.

## Conclusion

Posterior interosseous nerve palsy should be considered as a possible diagnosis in any individual who presents with finger extension weakness, including competitive and recreational weightlifters. Repetitive pronation-supination movements can cause a PIN compression along the nerve's course in the radial tunnel. EMG and ultrasound are useful tools in the diagnosis of PIN palsy and MRI is helpful in ruling out compressive etiologies. Surgery should be considered earlier in the treatment course of PIN palsy because prolonged deferment of decompression can result in poorer outcomes and potentially a worse quality of life.

## References

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