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Variation in the surgical anatomy of the long thoracic nerve

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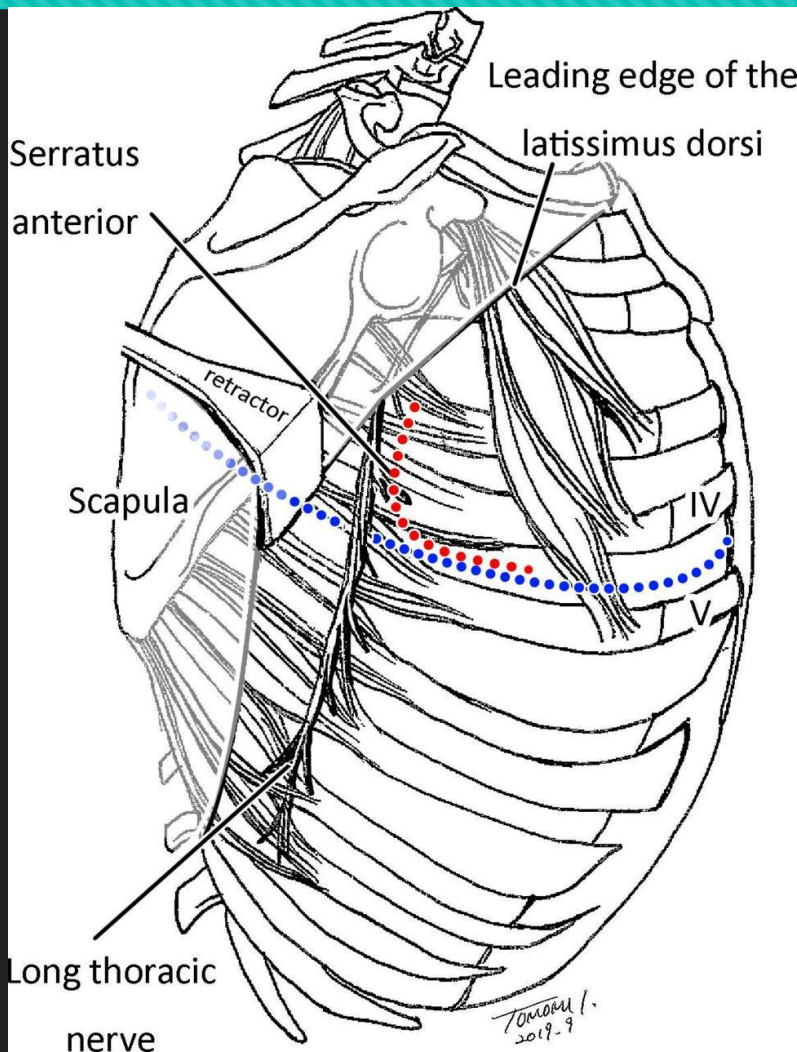
Background

- Long thoracic nerve first described by Bell in 1821
- Multiple cadaveric studies have since explored the anatomy in detail
- Until now the thoracic portion is described as:
  - Long, but small calibre nerve
  - traverses superficial to the SA at the junction between the anterior and middle third of the muscle
  - multiple small ramified branches suppling each muscle digitation



The study

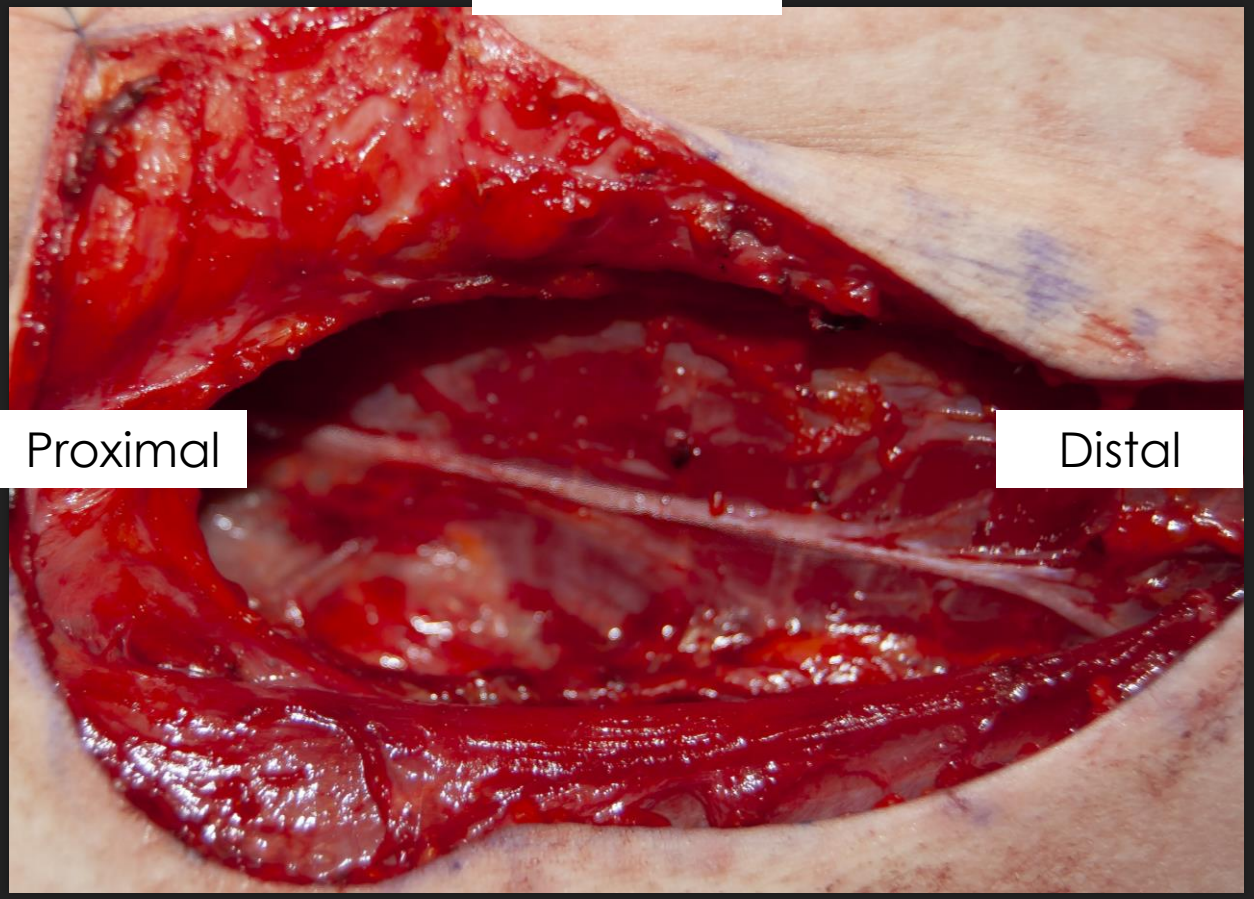
- Prospective data collection, and retrospective analysis
- 43 patients underwent exploration of the long thoracic nerve for recalcitrant scapular winging
  - 2 iatrogenic injuries were excluded due to the change in fundamental anatomy
- All patients had failed comprehensive non op. management and had EMG assessment
- Most common cause was closed (traction) trauma, followed by neuralgic amyotrophy
- The anatomy of the nerve was documented using high resolution photography

Results

- We identified a previously undescribed variation in the anatomy of the thoracic portion of the LTN
  - 78% had the typical single major nerve trunk, giving off small ramified branches to the muscle – Type I nerve
  - 22% had two equal major nerve branches – Type II nerve

Type I

Anterior



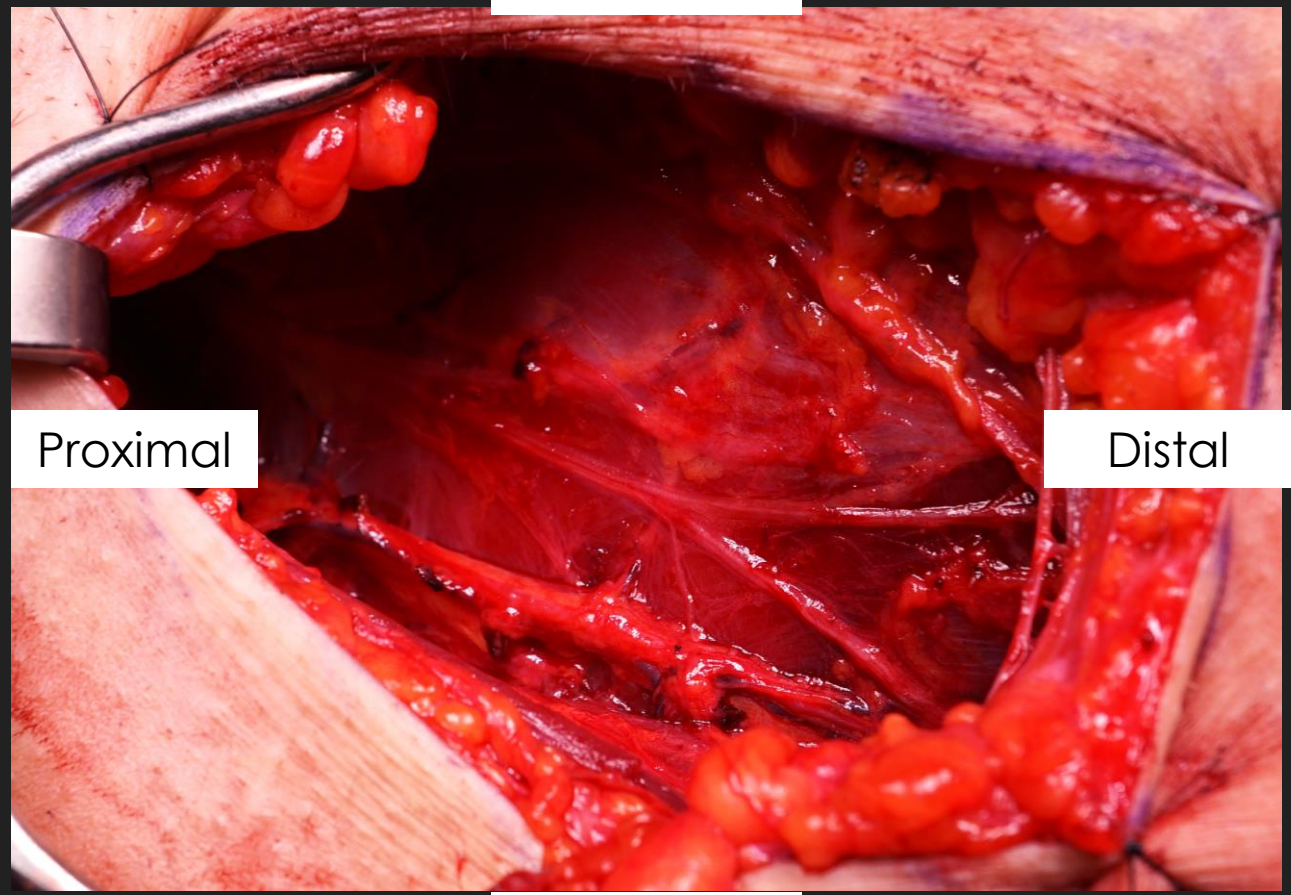
Proximal

Distal

Posterior

Type II

Anterior



Proximal

Distal

Posterior

Relevance?

- High rate of iatrogenic injury of LTN reported in literature following locally invasive procedures as high as 11%
  - Axillary lymphadenectomy
  - Thoracic or thoracoscopic surgery
  - Simple chest drain insertion
  - Relevant for plastic surgeons to prevent partial denervation with serratus flap harvest
  - Particularly relevant for peripheral nerve surgeons to ensure complete decompression achieved

- Knowledge of this anatomic variation could potentially reduce iatrogenic injury rates, and improve outcomes following neurolysis surgery