

Spinal Accessory Nerve Transfer to Suprascapular Nerve through a Posterior Approach

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INTRODUCTION

Nerve transfer surgery provides a reliable method of restoring motor function to a paralysed group of muscles after a neurological insult.

A redundant motor fascicle from within a named mixed nerve supplying a non-expendable muscle OR a motor branch from an expendable muscle in the vicinity is microsurgically coapted end-to-end close to the motor point of the denervated muscle.

Following a C5 nerve root avulsion, there is a loss of axillary nerve and supraspinatus nerve function. This results in paralysis of shoulder abduction and external rotation.

Surgical options include spinal cord reimplantation; however, this does not confer meaningful motor recovery. Nerve transfers to the suprascapular and axillary nerves provide a means for reinnervation in upper trunk ruptures and isolated direct nerve injuries. Reinnervation is rapid and robust.

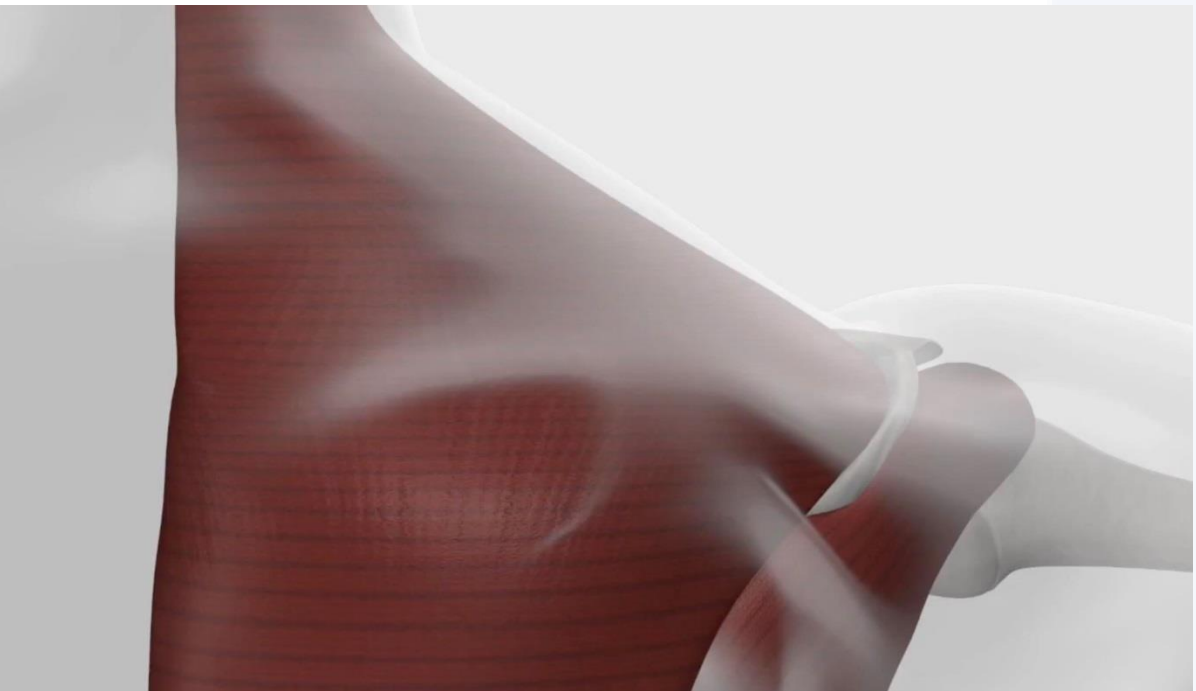
ANATOMY

The suprascapular nerve (SSN) arises in the posterior triangle of the neck as a branch of the upper trunk.

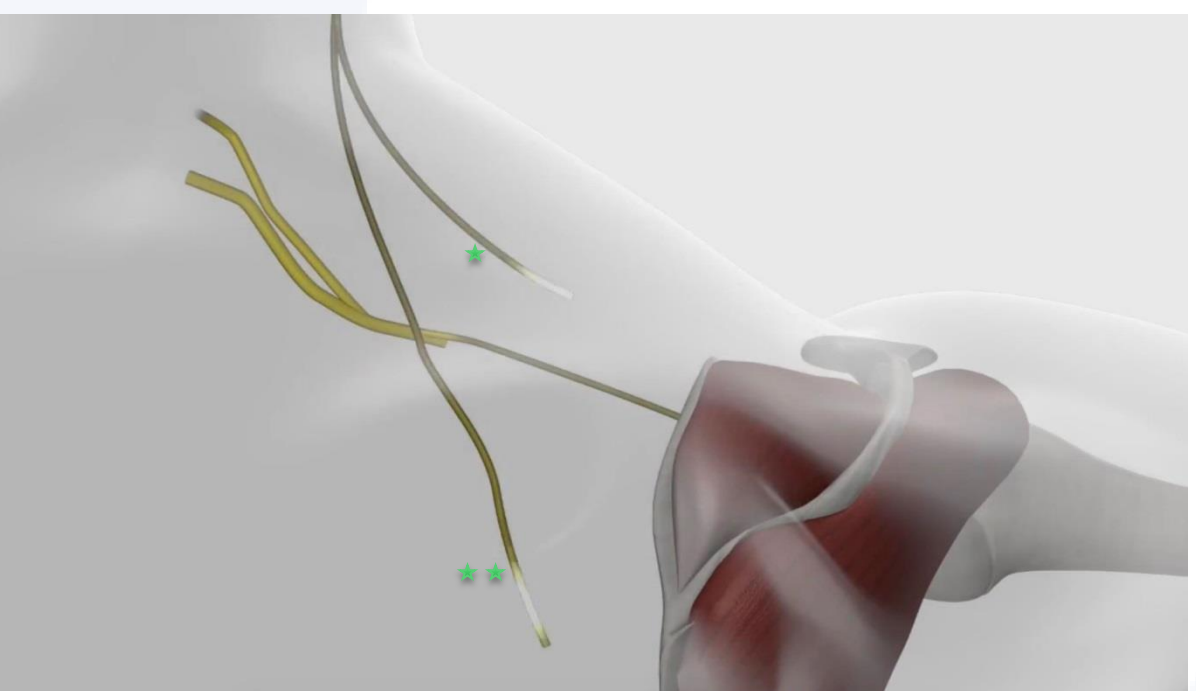
It courses towards the suprascapular notch, passing under the suprascapular ligament exiting into the supraspinatus fossa of the scapula. The first branch supplied the supraspinatus muscles.

The main trunk courses laterally, medial to the glenoid, through the spinoglenoid notch to the infraspinatus fossa, where it innervates the infraspinatus muscle.

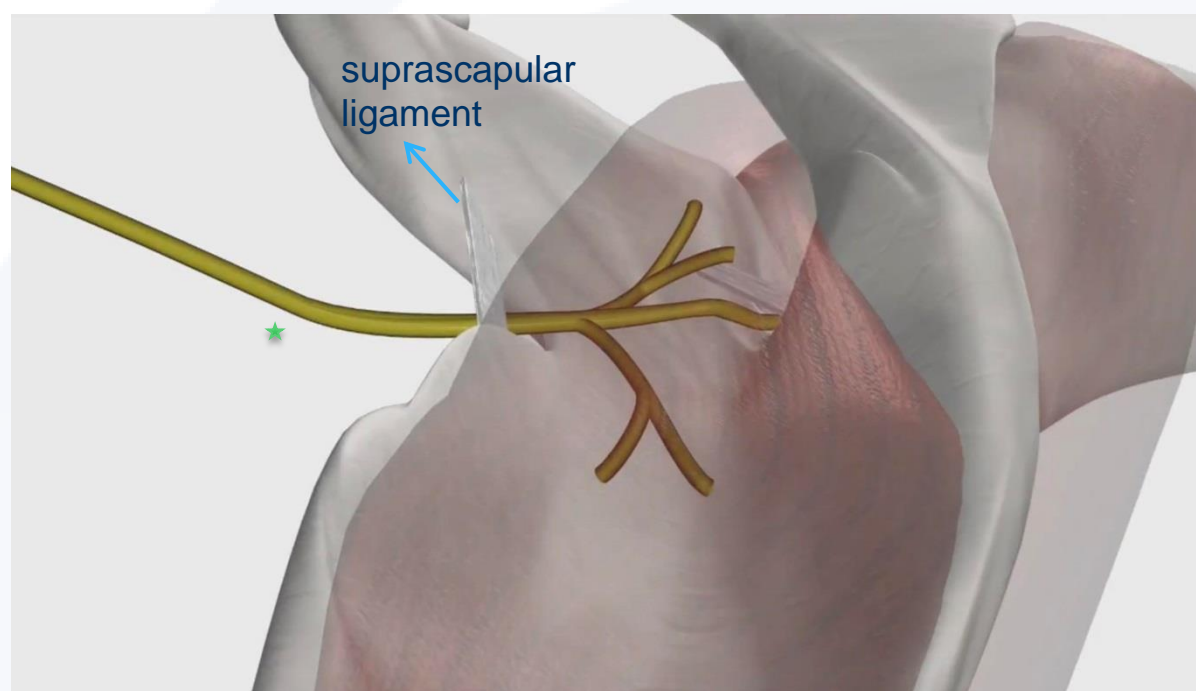
SURGICAL APPROACH



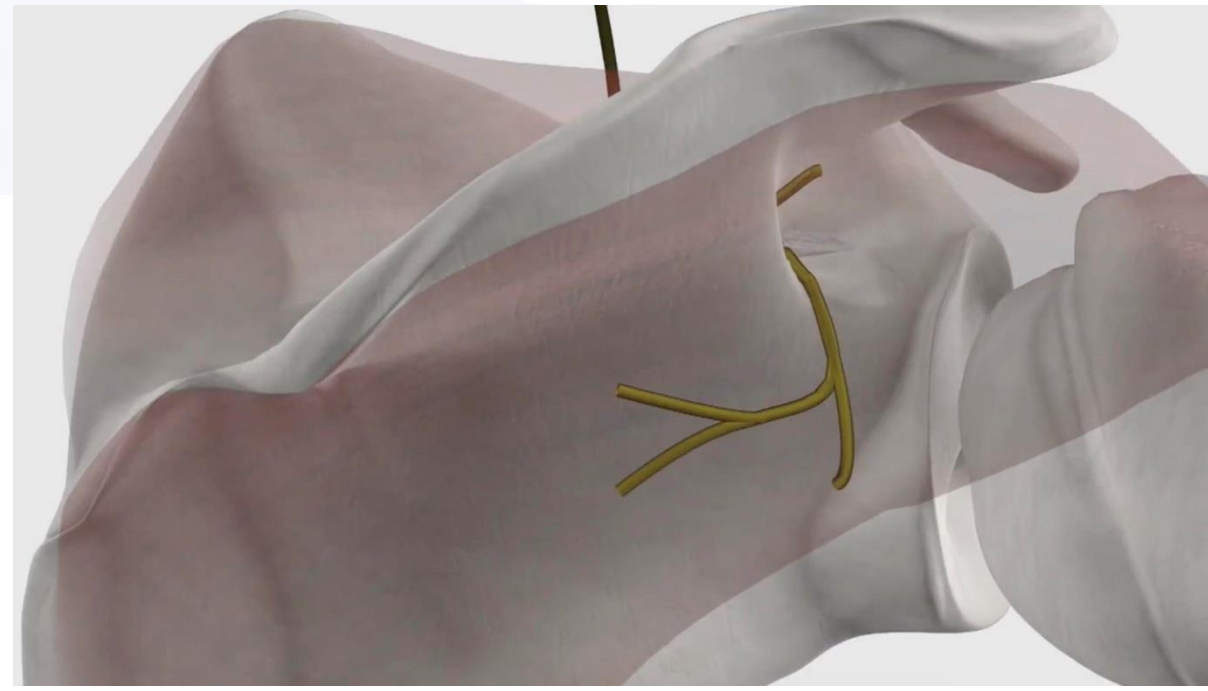
Right shoulder with Trapezius intact
Posterior View



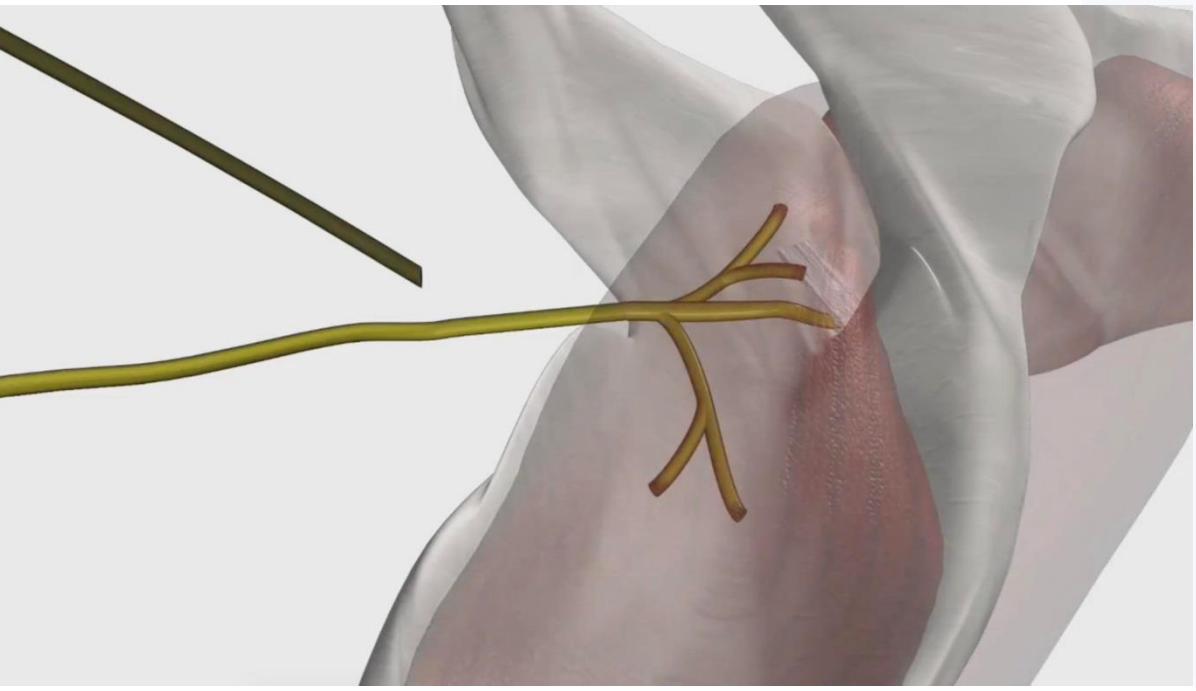
* Lateral branch of XI
** Medial branch of XI
Trapezius divided.



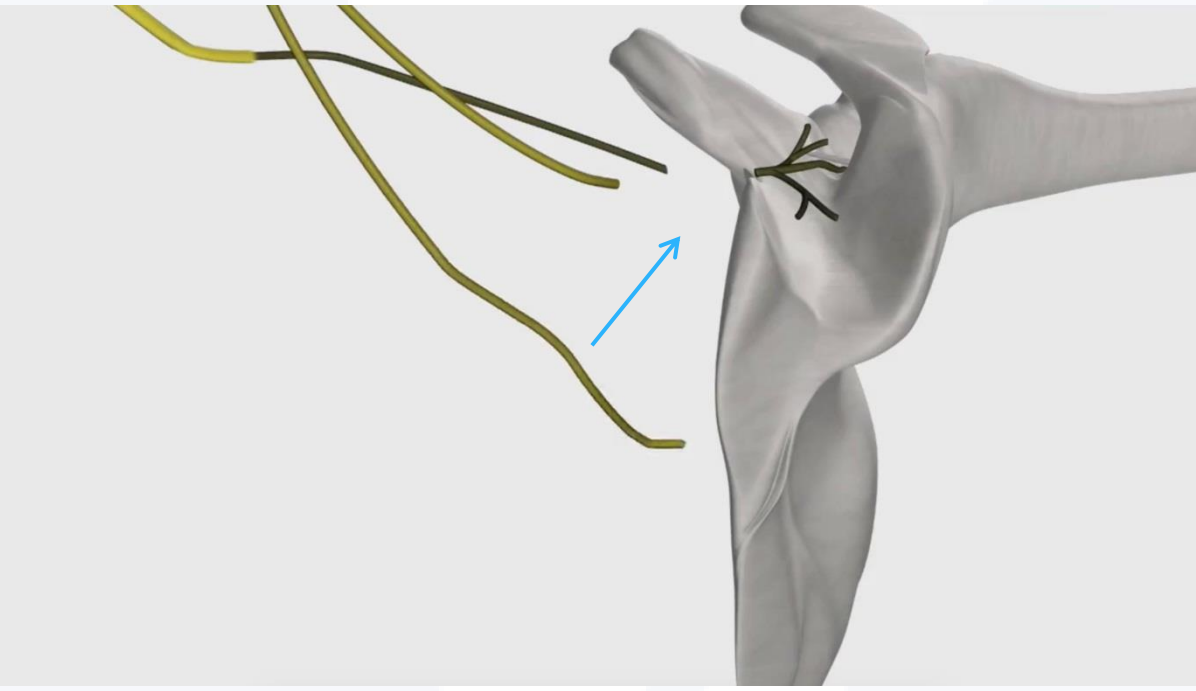
* Suprascapular nerve running through
suprascapular notch to supply
supraspinatus identified



Suprascapular nerve running through
spinoglenoid notch to supply
infraspinatus



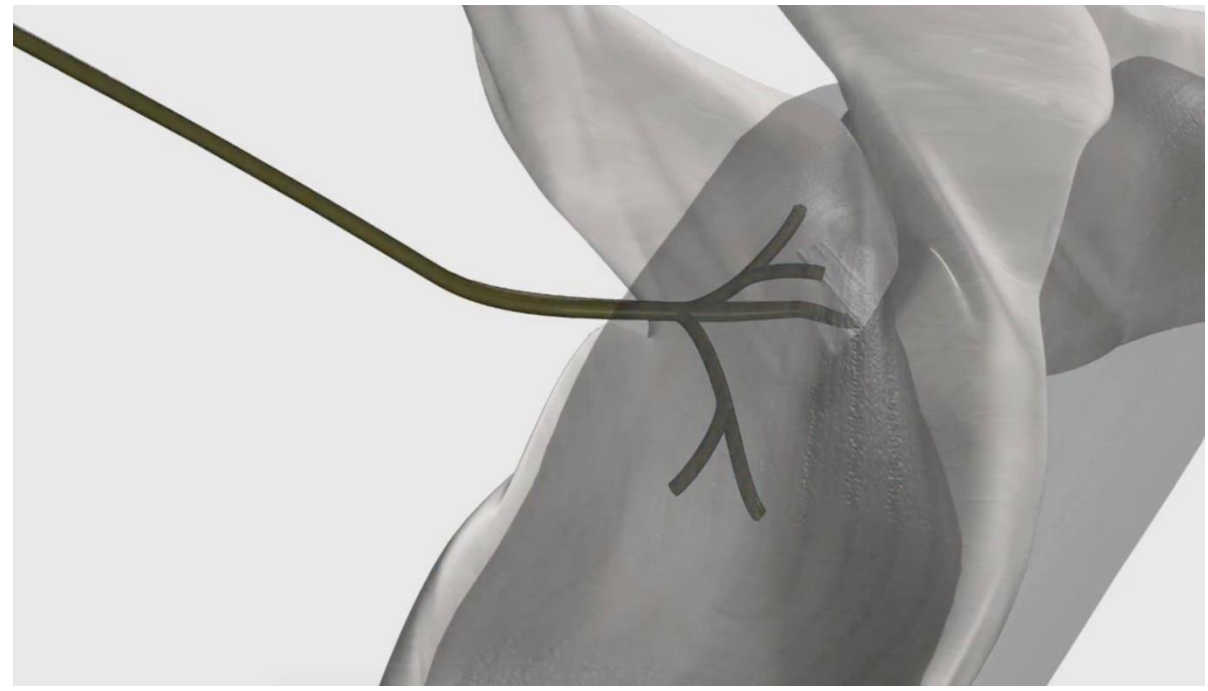
Medial branch of XII nerve reinnervates
supraspinatus and infraspinatus



Medial branch of XI nerve used for
transfer distal to the notch



Suprascapular nerve sectioned



Suprascapular ligament released

CLINICAL OUTCOME

198 patients, 301 Nerve Transfers reviewed

- 28 patients with posterior approach to XI to SSN transfer
- 20 patients with high energy trauma

35% with an abnormality at the suprascapular notch:

- 15% ossified ligament
- 10% SSN Ruptures
- 10% Neuroma-in-continuity (Figure 2.)

Advantages Of The Posterior Approach To The Spinal Accessory (XI) To Suprascapular Nerve (SSN) Transfer

- Lower morbidity from the medial XI donor
- Co-aptation closer to the denervated muscles
- Release of the suprascapular ligament
- Identification of a concomitant injury to the SSN at the notch
- No need for neck exploration in a scar in late presenting cases
- Distal transfer can salvage a non-recovering proximal reconstruction
- Distal transfer can salvage a late presentation

CLINICAL IMPLICATION

Posterior approach identified an additional pathology which could have affected functional outcome in 35% of high energy trauma cases.

The posterior approach to SAN to SSN nerve transfers is recommended in traumatic cases of brachial plexus injury

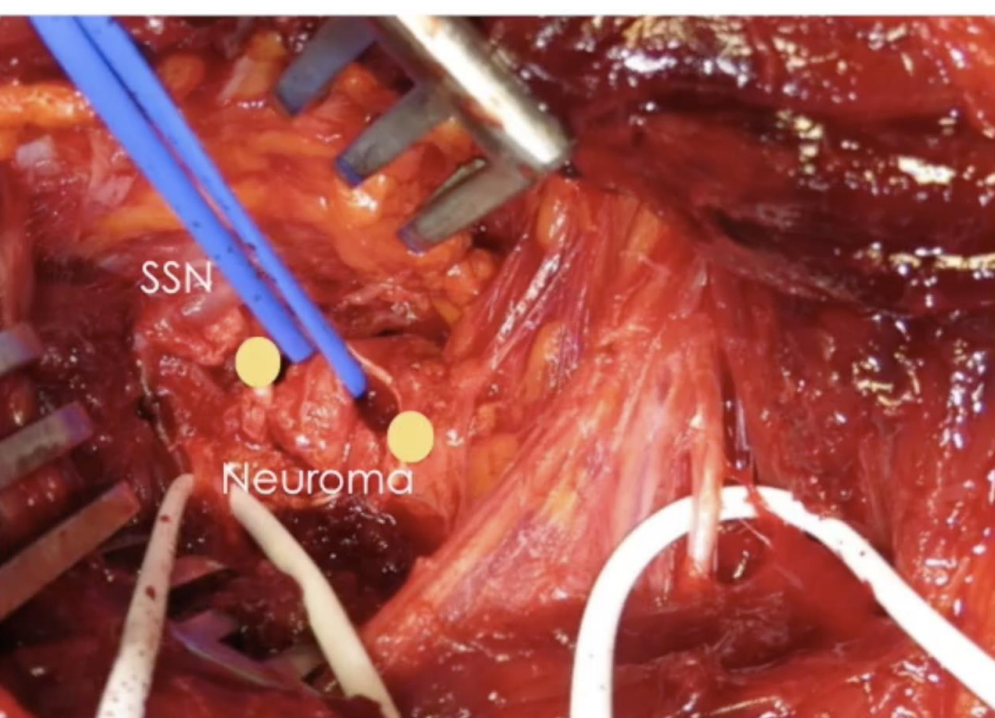


Figure 2.
Suprascapular nerve
Neuroma-in-continuity
at suprascapular notch

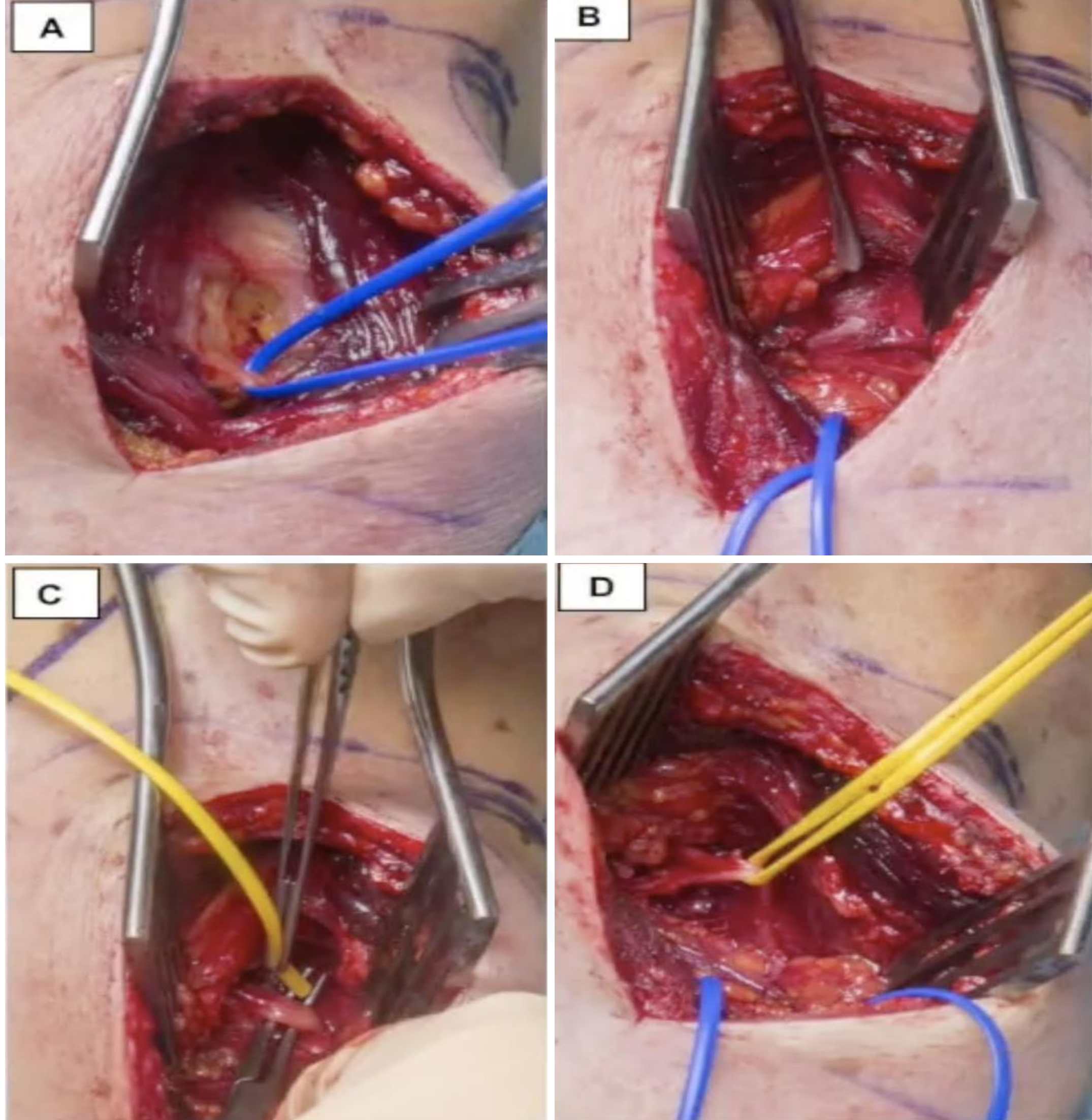


Figure 1. Left shoulder (posterior view) with trapezius muscle split

- A. Medial branch of SAN identified in blue sloop
- B. SSN identified after release of suprascapular ligament
- C. SSN in the yellow sloop
- D. SSN mobilised to surgical field in preparation for nerve transfer

REFERENCES

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- Garg R, Merrell GA, Hillstrom HJ, Wolfe SW. Comparison of nerve transfers and nerve grafting for traumatic upper plexus palsy: a systematic review and analysis. J Bone Joint Surg Am. 2011 May 4;93(9):819-29