Issue 7 at a Glance >>>

The Egyptian Neuromuscular Ultrasound Society
'Affiliated with the Egyptian Society of Electrodiagnosis Medicine & Clinical Neurophysiology'
الجمعية المصرية للموجات فوق الصوتية الأعصاب و العضلات
' منتسبة الى الجمعية المصرية لطب التشخيص الكهربائى و فسيولوجيا الأعصاب الاكلينيكية '

A Periodical insight into the Neuromuscular Ultrasound field & the Egyptian Neuromuscular Ultrasound **Society**

ENMUS Bulletin

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Practical tip >>>

In nerve disorders even in cases of focal mononeuropathies (entrapments & traumatic nerve injuries)

>> Always trace the nerve along its entire course

- It gives you a general idea about the normal nerve size and appearance in your patient.
- Ensures that you do not miss tandem lesions elsewhere
- Helps you excludes generalized disorders and confirms a focal lesion.

..Do not expect the findings, you will never know what you are going to find

Quote of the issue >>>

Always believe that something wonderful is about to happen

Topic of the issue

Neuromuscular Ultrasound to optimize NCS & EMG techniques

By Dr. Eman Tawfik, Professor of PMR, Faculty of Medicine, ASU & the President of the Egyptian Neuromuscular Ultrasound Society

Neuromuscular ultrasound utilities in the EMG labs are unlimited. NMUS is not only important as a part of the diagnostic workup of different neuromuscular disorders, but it can also help to optimize nerve conduction and needle EMG techniques in specific situations. Examples of these situations are as follows:

I. **NMUS to optimize NCS**

- Nerve mapping prior to NCS to identify the optimum stimulation & recording sites as in:
  - Difficult nerves like the lateral femoral cutaneous & saphenous nerves
  - Nerves exhibit anatomic variation of their courses like the sural nerve and ulnar nerve.
  - Altered nerve anatomy secondary to surgery
  - Obscured landmarks due to body habitus
- Guidance of near nerve stimulation
- Prior to inching technique as in cases of ulnar neuropathy at the elbow to identify the site of focal of finding abnormalities in inching studies.
- Prior to NCS in suspected CIDP & multifocal motor neuropathy to predict the site of conduction block.

II. NMUS to optimize EMG study

A. Pre-EMG scan to:

- Identify the depth of deeply located muscles & choose the needle length accordingaly.
- Identify neurovascular structures in the vicinity of injection site to avoid their injuries especially in patients receiving anticoagulants
- Choose the optimum muscle for the EMG study in muscle diseases based on muscle echotexture (e.g., if you find the muscle fibrotic then EMG of this muscle will be useless).

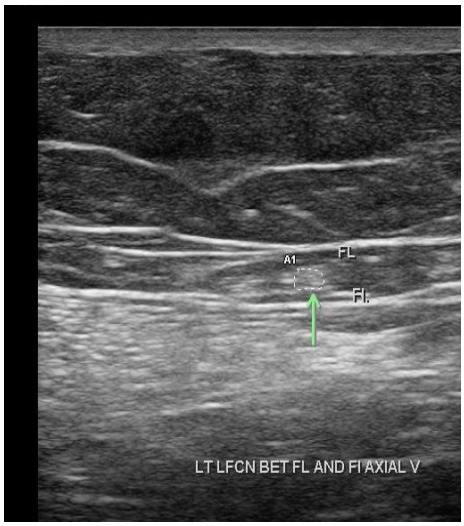
B. US-guided EMG: for very difficult muscles or risky muscles as the diaphragm

C. Post-EMG scan:

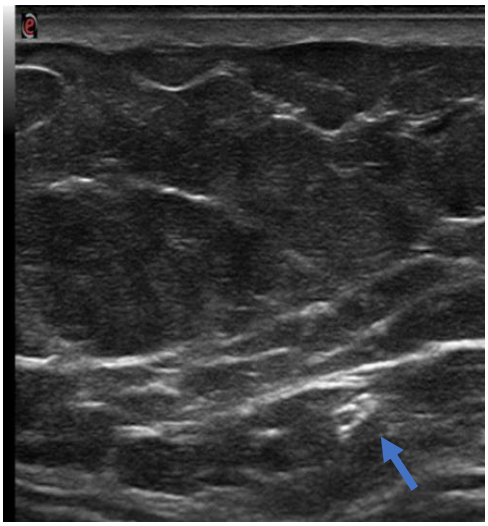
- If you find the muscle inactive in EMG study.
- To identify muscle hematoma if suspected.

References

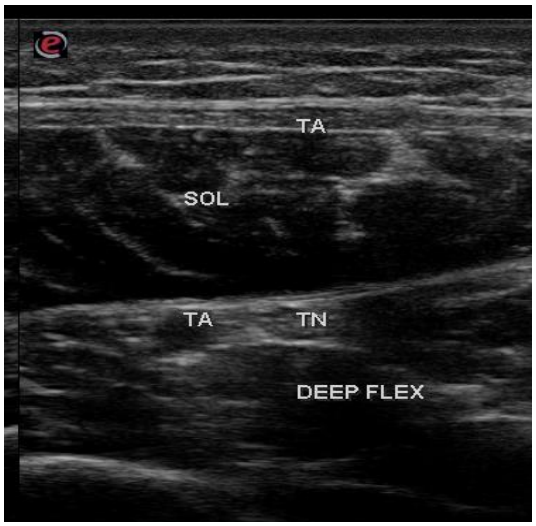
1. *Evangelopoulos et al. Ultrasound-Guided Electrodes for Conduction Studies of the Saphenous Nerve. J Clin Neurophysiol. 2017;34:243-247.*
2. *Kim KH et al. Sonography-guided recording for superficial peroneal sensory nerve conduction study. Muscle Nerve. 2018;57:628-633.*
3. *Choi et al. Could Ultrasound Guided Stimulation of Sural Nerve Affect Nerve Conduction Study? Ann Rehabil Med. 2019 ;43:74-80.*
4. *Sarwal et al. Neuromuscular Ultrasound for Evaluation of the Diaphragm. Muscle Nerve. 2013;47: 319–9*
5. *Sarwal A, et al. Guiding intramuscular diaphragm injections using real-time ultrasound and electromyography. Muscle Nerve. 2015 ;51:287-9.*



Localization of the LFCN for optimum positioning of the recording electrodes



Localization of the saphenous nerve at the leg prior to NCS



Identifying tibial nerve and artery prior to EMG of the deep plantar flexors

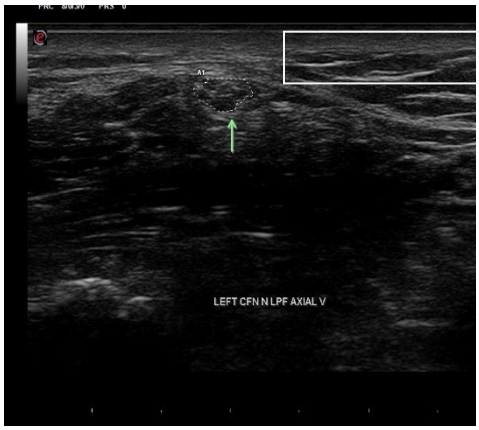
Case of the Issue

By Prof. Eman Tawfik

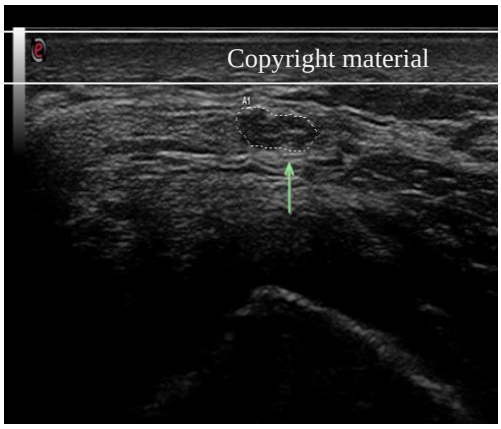
A 50 years' old man was referred for neuromuscular ultrasound of the left common peroneal nerve because of chronic left foot drop and swelling at the lateral proximal aspect of the leg. Electrodiagnostic studies done elsewhere revealed chronic partial axonal lesion of the nerve. The nerve was traced along its entire course from its bifurcation point from the sciatic nerve down to the fibular tunnel level.

Just distal to the fibular head and before the nerve enters the fibular tunnel, the anterior group of the nerve fascicles (which forms the deep fibular nerve) was replaced by a well-defined hypoechoic swelling with posterior acoustic enhancement and appeared displacing the posterior nerve fascicles. The swelling was non-compressible, non-pulsating, and does not show Doppler signal. Pressure by the probe on the swelling triggered numbness and tingling along the fibular nerve distribution (positive Ultrasound Tinel's sign). Distal to the swelling level at the fibular tunnel, the fibular nerve acquired normal appearance and its terminal branches were readily visualized. In the longitudinal view, the swelling appeared continuous with the nerve confirming that is intraneural. The sonographic findings are suggestive of intraneural ganglion cyst.

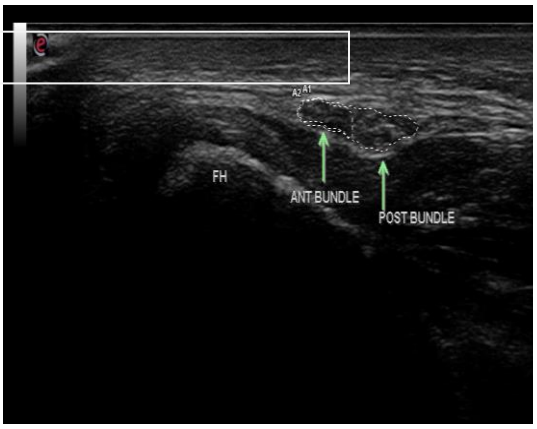
NMUS added value: NMUS identified the structural factor causing the chronic axonal lesion of the left fibular nerve, determined its relationship with the nerve (being intraneural ganglion not extra-neural ganglion), identified its origin from the anterior nerve fascicles, and determined its size and extent.



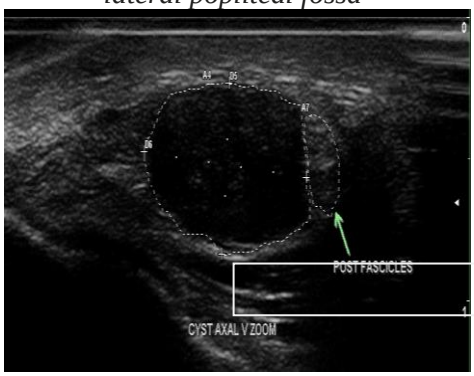
Left common fibular nerve at the lateral popliteal fossa



Left common fibular nerve at between popliteal fossa & fibular head

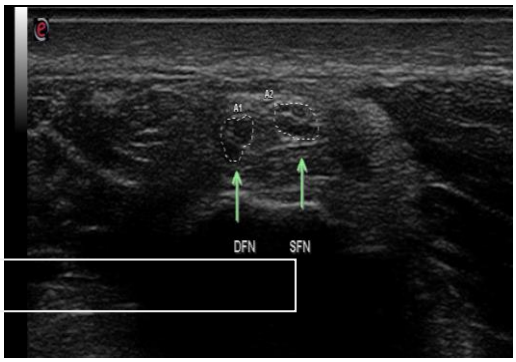


Left common fibular nerve at the fibular head



Just distal to the fibular head: Transverse view of the cyst emerging from the anterior nerve fascicles & displacing the post fascicles

Intraneural cyst the longitudinal view



Distal to the cyst level, the terminal branches of the nerve appeared acquired normal appearance at the fibular tunnel

ENMUS news >>>>

1. Previous NMUS training activities

Snapshots of the two neuromuscular ultrasound hands-on workshops held during the past few months

* Basic-level NMUS/UL workshop: a collaboration between the ENMUS and Zagazig University Musculoskeletal US unit/Rheumatology & Rehabilitation Department, Zagzig, March 7.
* Muscle US & cross-sectional neuromuscular sonoanatomy/UL workshop: a collaboration between the ENMUS and Ain Shams Physical Medicine, Rheumatology & Rehabilitation Department, Cairo, March 17.

2. An upcoming hands-on neuromuscular ultrasound training

"Two-days course on lower limb nerves & muscles"

Our courses offered by the society are unique & characterized by

- *Hands-on training involving > 90 % of the course time*
- *Small group training*
- *Standardized professional training conducted according to international consensus-based published guidelines for NMUS training 'Tawfik et al. Guidelines for neuromuscular ultrasound training. Muscle Nerve 2019:60:361-366'*

Follow the educational activities on Fb through >>>>

- *Neuromuscular ultrasound group*: www.facebook.com/groups/1612728358760236
- *The ENMUS page* www.facebook.com/EGYPTIANNMUS