



EUROPEAN SOCIETY OF NEUROSONOLOGY
AND CEREBRAL HEMODYNAMICS



5th Congress of the European Academy of Neurology

Oslo, Norway, June 29 - July 2, 2019

Hands-on Course 14

**EAN/ESNCH: Neurosonology - contemporary and
future developments (Level 2)**

Diagnosis and management of traumatic nerve lesions

Daniele Coraci
Rome, Italy

Email: danielecoraci@aol.com

Conflict of Interest



In relation to this presentation and manuscript:

the Author has no conflict of interest in relation to this manuscript.



DIAGNOSIS AND MANAGEMENT OF TRAUMATIC NERVE LESIONS

Daniele Coraci, MD

Clinical exam

Diagnostic hypothesis

Neurophysiological exam

Function assessment

Ultrasonographic exam

Morphology assessment



TUFF

SICILY



MARBLE

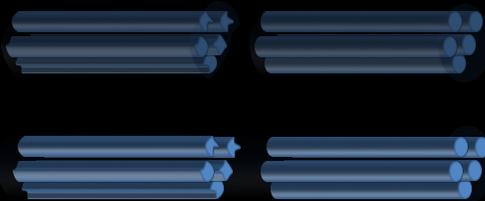
GREECE

COMPARISON

MULTIDISCIPLINARY APPROACH

NEUROPHYSIOLOGICAL TESTS

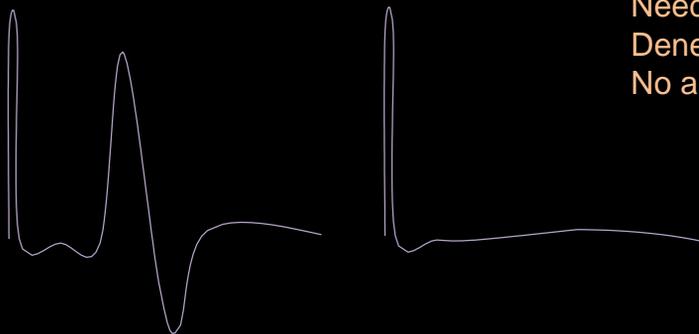
- Motor conduction study
- Sensory conduction study
- Needle electromyography
- F wave
- Motor evoked potentials
- Sensory evoked potentials
- Laser evoked potentials



NO muscle recruitment

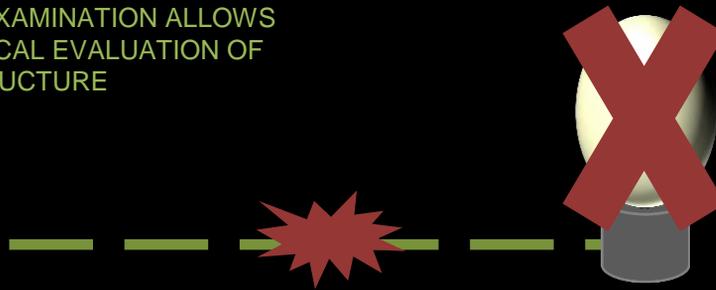
Motor conduction
Absent cMAP

Needle EMG
Denervation potentials
No activity



WHY NERVE ULTRASOUND?

ULTRASOUND EXAMINATION ALLOWS
A MORPHOLOGICAL EVALUATION OF
THE NERVE STRUCTURE

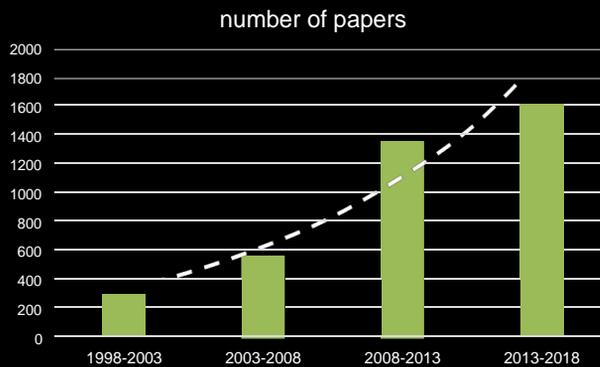


Severity?
Cause?
Prognosis?

...

LITERATURE

(peripheral nerve[MeSH Terms]) AND ultrasound[MeSH Terms]





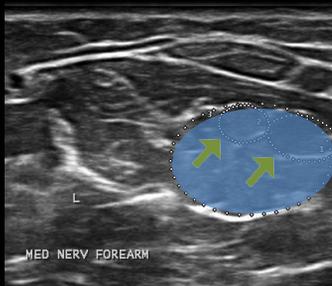
ment. Furthermore,
 improving the accuracy of the needle placing and EMG examination and pro-



CONCLUSIONS: The ulnar nerve CSA measured by ultrasound imaging is useful for the diagnosis of CuTS and is most significantly different between patients and participants without CuTS at the medial epicondyle. Because the ulnar nerve CSA in healthy participants, at various locations, rarely exceeds 10mm², this value can be considered as a cutoff point for diagnosing ulnar nerve entrapment at the elbow region.

➤ Measuring the nerve

- Nerve dimension
 Cross Sectional Area (CSA)

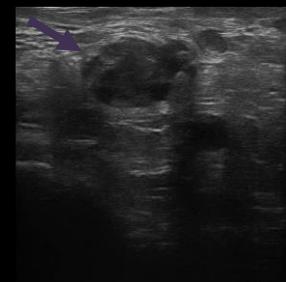


- Fascicular pattern

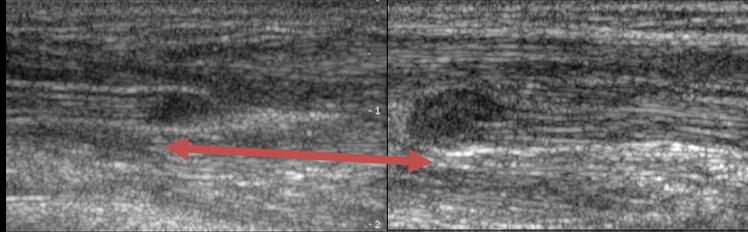


- Echogenicity

- Continuity



Extension of the portion of the nerve pathological
 (Distance between the stumps in case of neurotmesis)



**ULTRASOUND CAN
 DISTINGUISH
 AXONOTMESIS FROM
 NEUROTMESIS**



➤ Main nerve structures

Nerves that you can assess: potentially all the structures above the bone

- Median
- Ulnar
- Radial
- Fibular
- Tibial
- Sciatic
- Sural

- Cervical roots
- Brachial plexus

Explore the nerve structure
 even where it is not easily
 viewable

Dynamic evaluation

CLINICAL APPLICATIONS

Entrapment/Compression

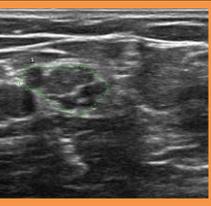
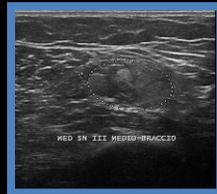
Tumors



Trauma



Inflammatory neuropathies



Hereditary neuropathies

MUSCLE & NERVE

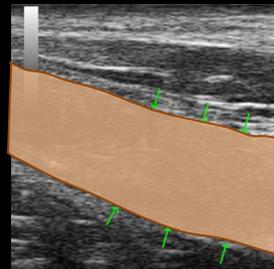
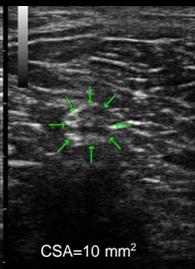
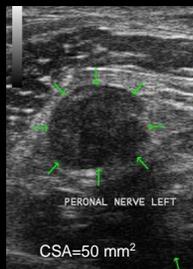
Research Article

Fibular nerve damage in knee dislocation: Spectrum of ultrasound patterns

Daniele Coraci MD, Hiroshi Tsukamoto MD, PhD, Giuseppe Granata MD, Chiara Briani MD, Valter Santilli MD, PhD, Luca Padua MD, PhD

First published: 07 October 2014 | <https://doi.org/10.1002/mus.24472> | Cited by: 15

Precise localization of nerve lesion



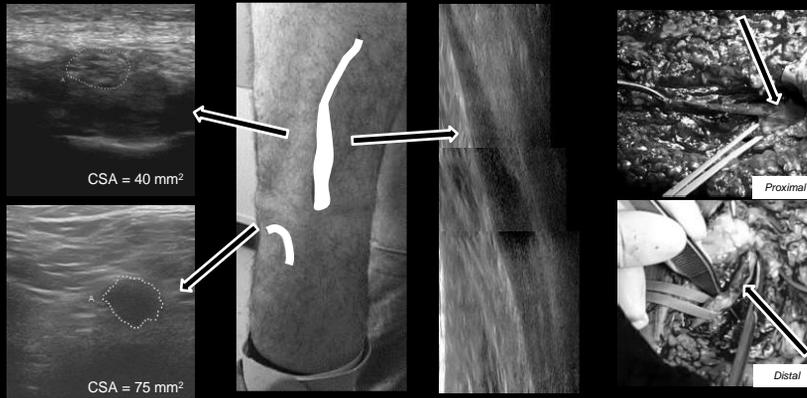
Larger the involved fibular nerve worse the prognosis

Fibular nerve neurotmesis after knee dislocation: Ultrasonographic findings

Daniele Coraci MD, Andrea Faiola MD, Ilaria Paolasso MD, PhD, Valter Santilli MD, PhD, Luca Padua MD, PhD

First published: 27 June 2016 | <https://doi.org/10.1002/mus.25228>

US essential for deciding the treatment approach



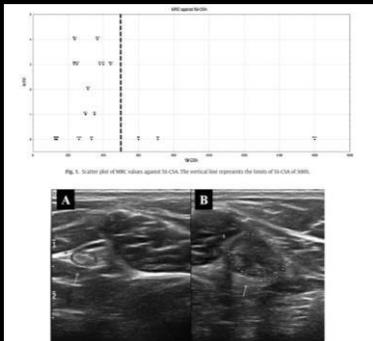
Post-traumatic neuroma due to closed nerve injury. Is recovery after peripheral nerve trauma related to ultrasonographic neuroma size?

Daniele Coraci ^{a, *}, Costanza Pazzaglia ^b, Pietro Emiliano Doneddu ^c, Carmen Erra ^d, Ilaria Paolasso ^b, Valter Santilli ^{a, *}, Luca Padua ^{b, c, d, e}

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<https://doi.org/10.1016/j.clineuro.2015.10.034>

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Prognostic value of US

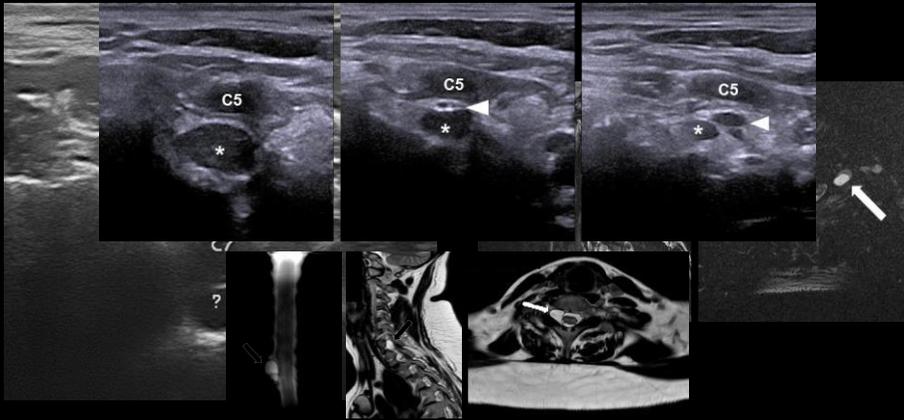
larger the neuroma
lesser the clinical recovery

Neurological Sciences
August 2016, Volume 37, Issue 8, pp 1369-1372 | [Cite as](#)

High-resolution ultrasound may depict pseudomeningocele

Authors Authors and affiliations

Daniele Coraci, Iliaria Paolasso, Pietro Emiliano Doneddu, Valter Santilli, Luca Padua ✉

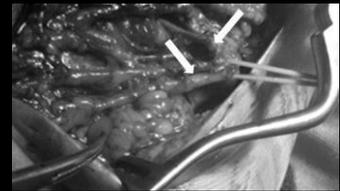
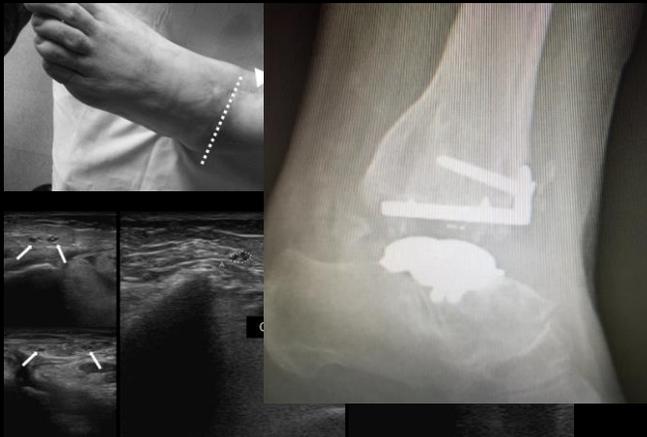


Clinical Neurophysiology
Volume 127, Issue 10, October 2016, Pages 3298-3300

Letter to the Editor

Ultrasonographic assessment of superficial fibular nerve branches

Daniele Coraci, Andrea Faiola, Iliaria Paolasso, Alberto Battaglia, Valter Santilli, Luca Padua ✉



Useful for very little nerve branches

Surgical support

In PNS trauma and diseases, is US simply a morphological evaluation?

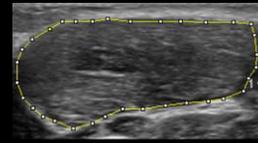
Joint Bone Spine
 Available online 3 October 2018
 In Press, Corrected Proof

Correspondence
 Reply to the comment of Misirlioglu et al. "Periscapular muscle ultrasound as a diagnostic aid in scapular winging secondary to long thoracic nerve lesion"

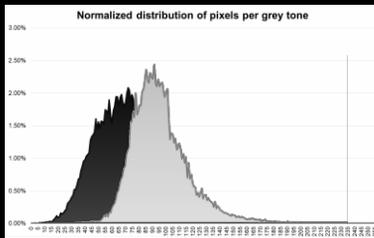
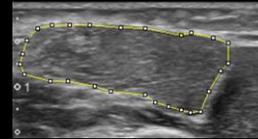
Daniele Coraci ^{*}, Silvia Giovannini ^{*}, Marcello Romano ^{*}, Cristiano Pecchioli ^{*}, Luca Padua ^{*}

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<https://doi.org/10.1016/j.jbspin.2018.09.020> Get rights and content



Frequency:	18 MHz	ApI/Pure:	5
Depth:	3.5 cm	Dynamic Range:	75
Focus:	1	Gain:	69
Focus position:	2 cm	Gamma:	11
Acoustic Power:	100%	Map:	2
TGC:	neutral	Persistence:	3
		Precision:	6



Quantitative evaluation of muscle echogenicity to study the severity of axonal damage

Clinical Neurophysiology
 Volume 129, Issue 11, November 2018, Pages 2446-2447

Editorial
 Electrodiagnosis and nerve ultrasound: "Castor and Pollux" in the management of neuropathies

Luca Padua ^{*}, Costanza Pazzaglia, Daniele Coraci

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<https://doi.org/10.1016/j.clinph.2018.08.013> Get rights and content

MORPHO-FUNCTIONAL ASSES



US in traumas

- Ultrasound is a tool able to locate PNS lesion
- Nerve ultrasound evaluation completes clinical and neurophysiological ones
- Nerve ultrasound provides useful information for diagnosis, prognosis, therapeutic and rehabilitative approach and follow-up
- Ultrasound provides morphological information, useful for surgical treatment

THANKS