Neuropathy and Neuropathic Pain in Patients with EDS

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The Coalition Against Pediatric Pain
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Pain in EDS

- A survey of 44 patients with EDS
- Nociceptive
  - Ongoing stimulation of nociceptors
  - Related to ongoing joint trauma
- Neuropathic
  - Caused by primary lesion or dysfunction of nervous system
- Types of pain
  - Burning (superficial)
  - Pressing (deep)
  - Paroxysmal pain
  - Evoked pain
  - Paresthesia/dysesthesia

J Pain Symptom Manage, Camerota, 2010

Pain in EDS

- Use McGill Pain Questionnaire survey 273 pt.
- Results:
  - Chronic pain highly prevalent and associated with regular use of analgesics
  - Pain is more prevalent and more severe in EDS-HT when compared to classic and vascular types
  - Pain severity related hypermobility, dislocations and previous surgeries
  - Pain is related to sleep disturbances
  - Pain is related to functional impairment in daily life independent of the level of fatigue

J Pain Symptom Manage Voermans 2010

Treatment for Neuropathic Pain

- OTC analgesics
  - NSAIDs
  - Acetaminophen
- Opioids
  - tramadol
  - oxycodone
- At times corticosteroids

Treatment for Neuropathic Pain

- Antidepressants
  - Tricyclic antidepressants
    - Amitriptyline
    - Doxepin
  - Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs)
    - Venlafaxine
    - Duloxetine

Treatment for Neuropathic Pain

- Anticonvulsants
  - Gabapentin
  - Pregabalin
  - Carbamazepine
  - Lamotrigine

Treatment for Neuropathic Pain

- NMDA antagonists
  - Dextromethophan
  - Ketamine
- Others
  - Intravenous lidocaine
  - Low dose naltrexone
  - Cognitive behavior therapy
  - Topical agents
  - Transcutaneous nerve stimulation (TENS)
  - Acupuncture
  - Restorative sleep

Type of Neuropathic Injury in EDS

- Stretch injury and compression injury
- Peripheral neuropathy
- Complex regional pain syndrome
  - Related to recurrent stretch injury ?
- Tethered cord

Stretch and Compression Injury

- Brachial and lumbosacral plexus injury
  - Case reports
  - Some with recurrent episodes of weakness
- Compression injury
  - Ulnar neuropathy
    - Evaluated with U/S and EMG
    - Association with subluxation and luxation ulnar nerve
    - Did not correlate with EMG
      - NCS/EMG do not look at small fiber neuropathy
      - Pain is a symptom of small fiber neuropathy

Clinical Neurophysiology Granata Aug., 2013

Peripheral Neuropathy

- Sensory nerve dysfunction
  - Small fiber
    - Light touch
    - Temperature
    - Pain
  - Large fiber
    - Vibration
    - Proprioception

Autonomic Symptoms in Patients with Small Fiber Peripheral Neuropathy

98% of patients with SFPN had symptoms consistent with SFPN dysautonomia

- 90% cardiovascular
- 82% gastrointestinal
- 34% urological

Pediatrics, Oaklander, 2013

Other Symptoms in Patients with SFPN

- 83% chronic fatigue
- 63% chronic headache

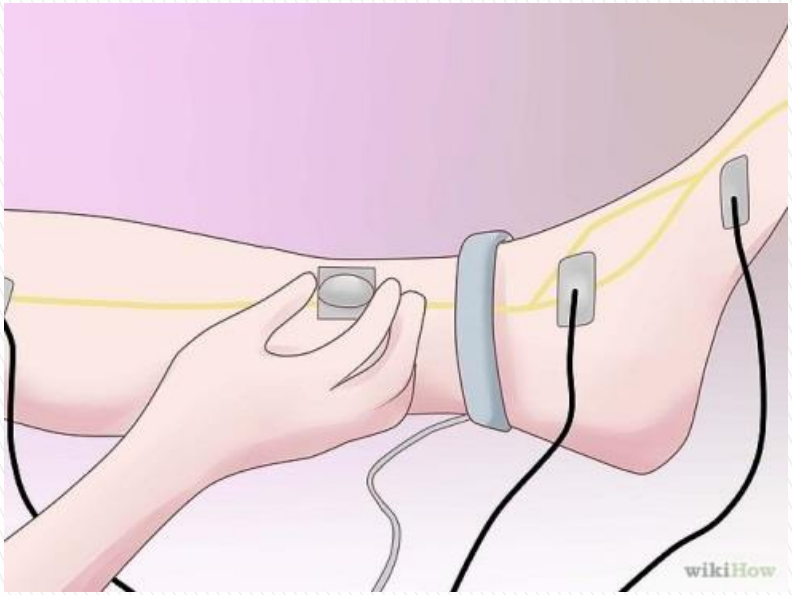
Evaluation

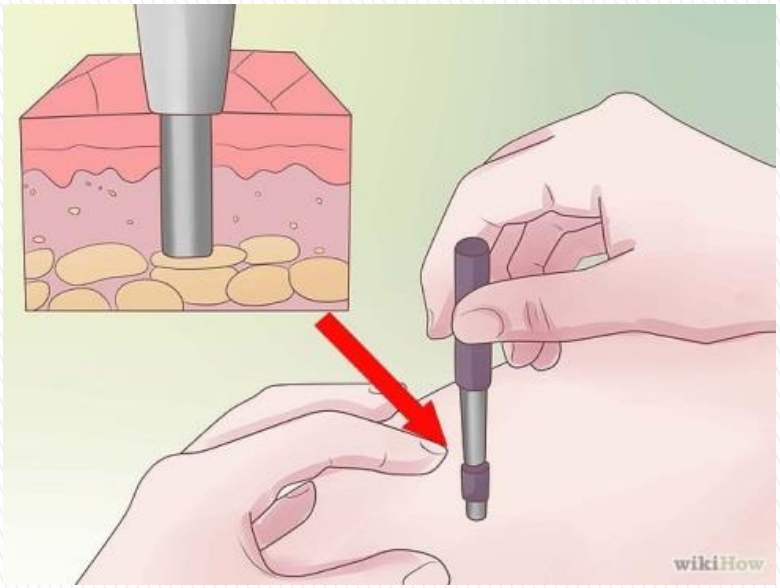
- If axonal neuropathy considered
  - Evaluate for treatable causes neuropathy
    - HgbA1c
    - Vitamin B12/folate
    - Vitamin E
    - Vitamin B6 (toxicity)
    - ANA
    - ESR
    - Serum protein electrophoresis

Evaluation

- If axonal neuropathy considered
  - Nerve conduction studies
  - Electromyography
  - Punch biopsy for small fiber nerve density

Testing for Neuropathy





Nerve conduction studies

Punch biopsy

Treatment Axonal Neuropathy

- Treat underlying etiology
- Nonspecific symptomatic treatment
- Treatment directed to neuropathology
  - Antidepressants
  - Anticonvulsants
  - NMDA antagonists

Tethered Cord

- Bowel/bladder dysfunction
- Back pain
- Leg pain

Treatment Tethered Cord

- Conservative treatment
  - PT
  - Analgesics
  - Medications for neuropathic pain
  - Follow closely
- Surgery

Complex Regional Pain Syndrome

- Etiology in EDS
  - Stretch injury to nerves with joint dislocation or hyperextension
  - Increased exposure to medical procedures such as surgery

- Pain, Stoler 2006

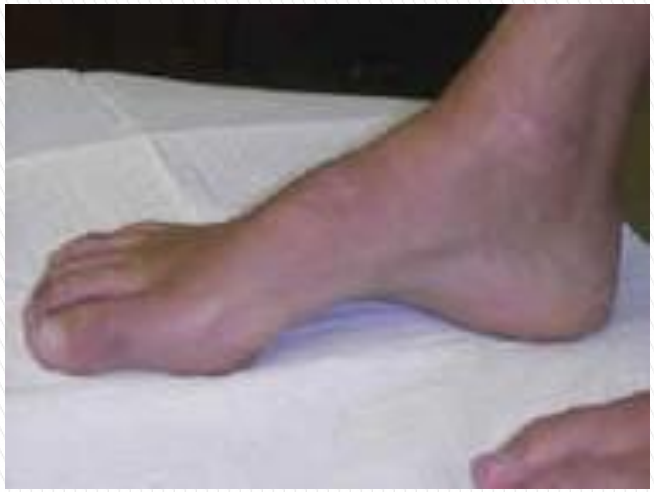
Treatment of CRPS

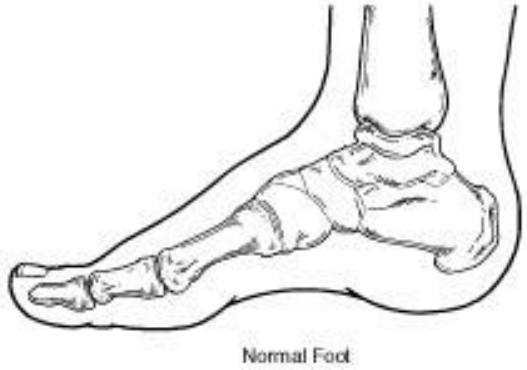
- PT, OT and psychological therapy
- Medications for short term use
  - opioids
  - Corticosteroids
- Chronic medications
  - NSAIDs
  - Anticonvulsants
    - Gabapentin
    - Pregabalin
  - Antidepressants
    - Tricyclics
    - Serotonin and norepinephrine reuptake inhibitors

Etiology of Acquired Pes Cavus

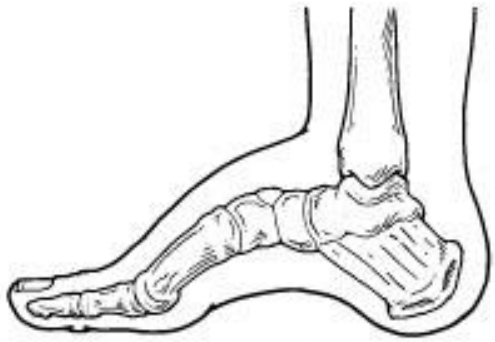
- Neuropathic
  - Peripheral neuropathy
  - Other spine pathology (not tethered cord)
- Tethered cord
- CRPS

Acquired Pes Cavus





Normal Foot



Cavus Foot

Signs of Acquired Pes Cavus

- Axonal neuropathy
  - Hammer toes
  - Pes cavus
  - Footdrop
  - Loss of Achilles DTRs

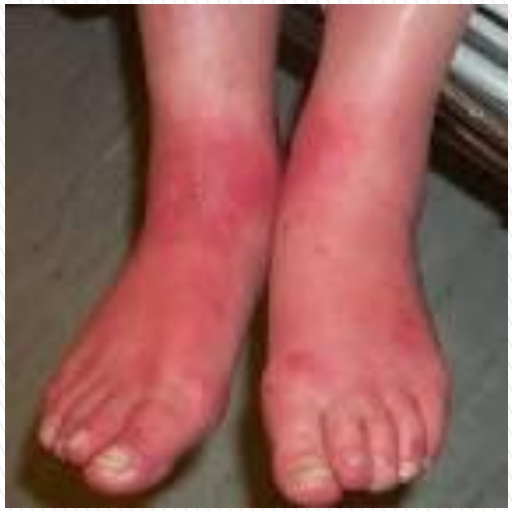
Signs of Acquired Pes Cavus

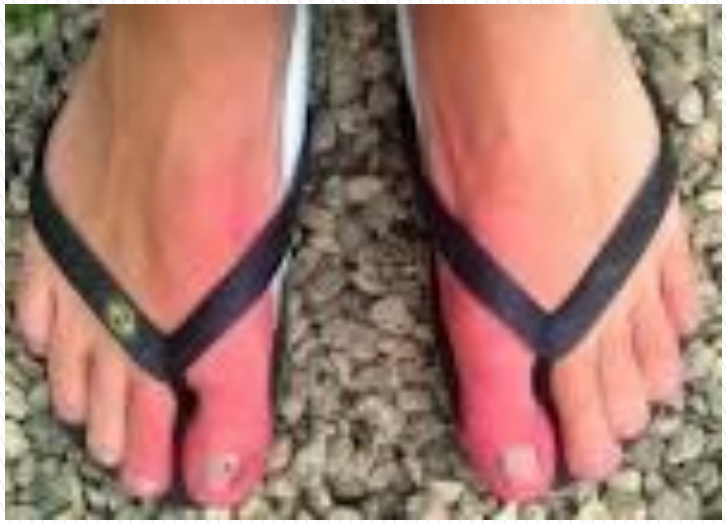
- Complex regional pain syndrome
  - Skin changes
  - Color changes
  - Temperature changes
  - Muscle hypotrophy
    - May lead to fixed contractures (pes cavus)
  - Maintain DTRs until chronic with disuse and muscle wasting
    - Fixed contractures can interfere with obtaining DTRs

Signs of Acquired Pes Cavus

- Tethered cord
  - Hammer toes
  - Pes cavus
  - Increased DTRs
  - Extensor plantar response

Neuropathic Symptoms and Red Feet

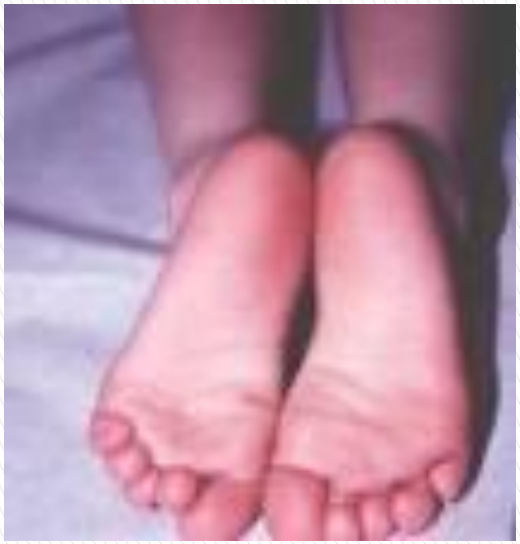




Erythromelalgia

Complex regional pain syndrome

Lower Extremities in Patients with Tethered Cord



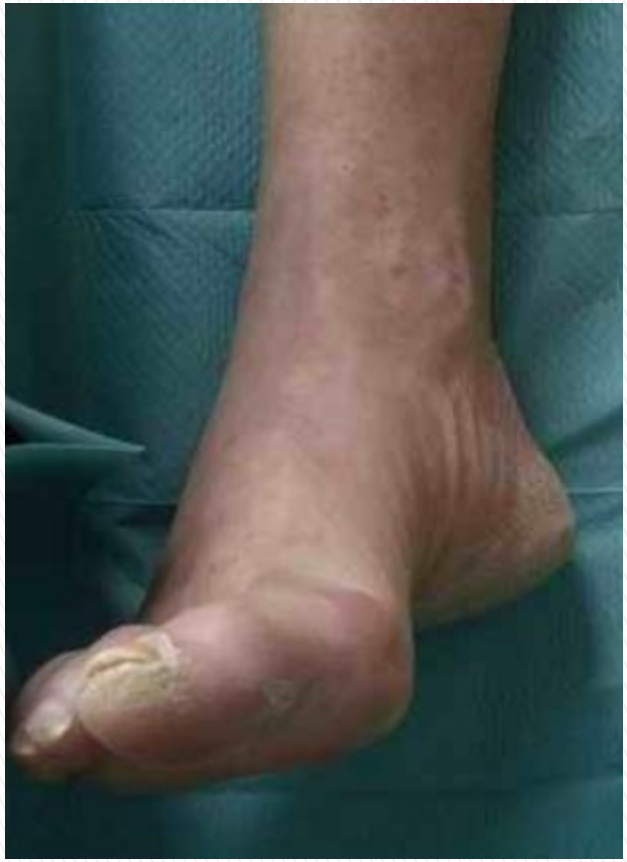
Size asymmetry

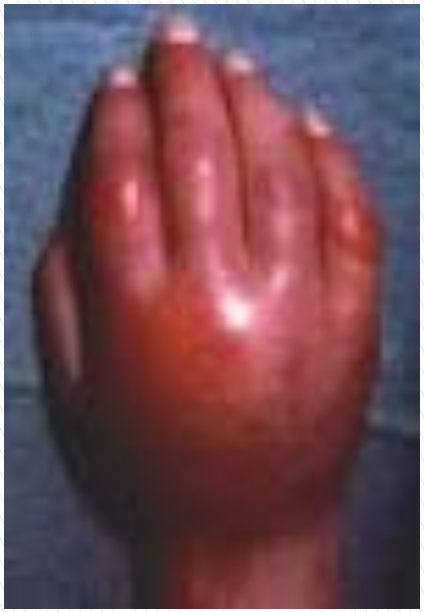
Size asymmetry and abnormal position

Evaluation Tethered Cord

- L-S spine
  - Prone and supine
- Urology consult
  - Urodynamics

Evaluation CRPS

- 



Budapest Criteria

Continuing pain, which is disproportionate with any exciting event

Must report at least one symptom in three of the four following catogories

- Sensory
- Vasomotor
- Sudomotor/edema
- Motor/trophic

Must report at least one sign at time of evaluation in two or more following categories

- Sensory
- Vasomotor
- Sudomotor/edema
- Motor/trophic

There is no other diagnosis that better explains the symptoms and signs

Major nerve injury must not be found for the diagnosis of RSD

Etiology Of Dysautonomia in EDS

- Neuropathy
- Connective tissue laxity
- Medications
- Sympathetic dysregulation
  - Resting sympathetic overactivity
  - Decreased sympathetic reactivity to stimuli

- Seminars in Arthritis and Rheumatism, De Wandele, 2014

Connective Tissue Laxity and Dysautonomia in EDS

- Vessels in patients with EDS have increased distensibility allowing for venous pooling
- Orthostatic intolerance correlated with Beighton score and skin extensibility

Medications and Dysautonomia in EDS

- Vasoactive medications
  - Opiates
  - Trazadone
  - Blood pressure lowering agents
  - Tricyclic antidepressants

Neuropathy & Dysautonomia in EDS

- Quantitative sudomotor axon reflex testing (QSART) as part of dysautonomia testing
  - Abnormal values compared to controls
  - Suggestive of peripheral sympathetic nerve dysfunction

Thanks

- TCAPP
- All those who teach me