

THE USE OF DRY NEEDLING IN THE MANAGEMENT OF THE SPASTIC FOOT - PAEDIATRIC CASE SERIES

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DRY NEEDLING

- Dry needling is a minimally invasive therapeutic procedure that involves the insertion of a thin filiform no-bore needle into MTrP without the addition of solutions or local pharmacological agents.

- The needle is inserted until it causes a LTR and is then removed. Though the mechanism of action of dry needling is debated, it is thought that dry needling offers relief through the gate control theory of pain.



DRY NEEDLING – DO WE INJECT ANYTHING?

NO!!!



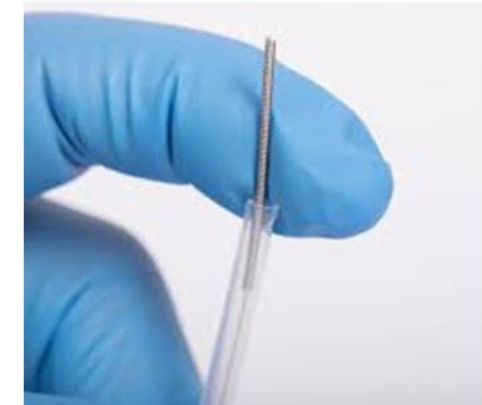
NEEDLES

- **producer (Seirin, Orca, Soma, etc)**
- **type (cu/ fără ghidaj)**
- **dimensions (Ø/ L mm).**



Gauge/Ø	1" 30 mm	1.5" 40 mm	2.0" 50 mm
00/0.12mm	Sl.12x30	Sl.12x40	
0/0.14mm	Sl.14x30	Sl.14x40	
1/0.16mm	Sl.16x30	Sl.16x40	
2/0.18mm	Sl.18x30	Sl.18x40	
3/0.20mm	Sl.20x30	Sl.20x40	Sl.20x50
5/0.25mm	Sl.25x30	Sl.25x40	Sl.25x50
6/0.30mm	Sl.30x30		Sl.30x50

Diameter mm	Japanese or Korean Gauge	Chinese Gauge	Handle or Tail Color
0.12	00 (02)	40	Dark Green
0.14	0-001	42	Light Green
0.16	1	40	Red
0.18	2	38	Ivory
0.20	3	36	Blue
0.25	5	32	Purple
0.30	6	30	Brown
0.35	10	28	
0.40	12	26	





DryNeedling Kit



DRY NEEDLING – WHAT CAN WE TREAT?

- MUSCLES
- FASCIA
- PERIFERAL NERVES –THROUGH THE FASCIA



SPASTIC FOOT – CAUSES AND CHARACTERISTICS

- CEREBRAL PALSY,
- STROKE,
- NEURODEGENERATIVE DISEASE,
- SPINAL CORD INJURY,
- TRAUMATIC BRAIN INJURY

EQUINOVARUS

HALLUX VALGUS



SPASTIC FOOT – CAUSES AND CHARACTERISTICS OF DN TREATMENT

EQUINOVARUS

- TRICEPS SURALIS,
- FLEXOR DIGITORUM BREVIS LENGTHENING

HALLUX VALGUS

- LOMBRICALIS,
- ADDUCTOR HALUCIS



MECHANISTIC RATIONALE FOR DN IN THE SPASTIC FOOT

Dry needling targets **myofascial trigger points** and hyperactive motor units. Proposed mechanisms include:

- ↓ **alpha motor neuron excitability**
- ↓ abnormal reflex activity (stretch reflex)
- ↑ cortical reorganization and motor control
- ↓ muscle stiffness and passive resistance,

These mechanisms are directly relevant to **spastic equinovarus foot** (e.g., tibialis posterior, gastrocnemius, soleus).

Evidence: DN has been shown to influence **motor neuron excitability and ROM** in spastic muscles after stroke.

Babazadeh-Zavieh SS, Ansari NN, Ghotbi N, Naghdi S, Jafar Haeri SM, Shaw BS, Shaw I. Effects of dry needling and exercise therapy on post-stroke spasticity and motor function- protocol of randomized clinical trial. Contemp Clin Trials Commun. 2022 May 5;28:100921. doi: 10.1016/j.conctc.2022.100921. PMID: 35586475; PMCID: PMC9108468.

Relevant muscles:

- gastrocnemius,
 - soleus,
 - tibialis posterior,
 - tibialis anterior.
-
- Overactivity of gastrocnemius & soleus
→ equinus deformity
 - Contributes to reduced dorsiflexion
 - Impaired gait and stance phase



Muscles commonly treated in DN studies overlap with spastic foot pathology:

- Tibialis posterior → inversion deformity
- Gastrocnemius/soleus → equinus
- Tibialis anterior → dorsiflexion control

👉 Therefore, indirect evidence is strong, even if “foot-specific RCTs” are limited.



Expert consensus on the application of dry needling in stroke patients: A modified delphi method - Jorge Velázquez-Saornil, Vanesa Abuín-Porras, and Zacarías Sánchez-Milá, Clinical Rehabilitation, Volume 39, Issue 7, Sage Journals,

<https://doi.org/10.1177/02692155251342071>

TRICEPS SURALIS

Gastrocnemius:

- Origin: - Lateral head: lateral femoral condyle
- Medial head: medial femoral condyle, popliteal surface
- Action: plantar flexion, knee flexion

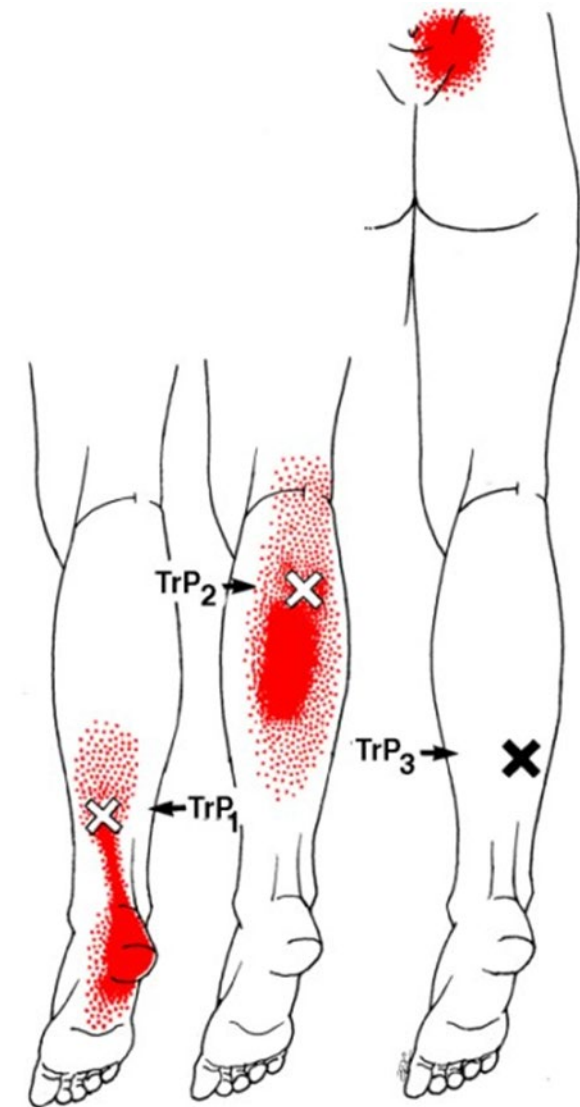
Soleus:

- Origin: - soleal line (tibia), fibular head
- Action: plantar flexion

Insertion: calcaneus via Achilles tendon

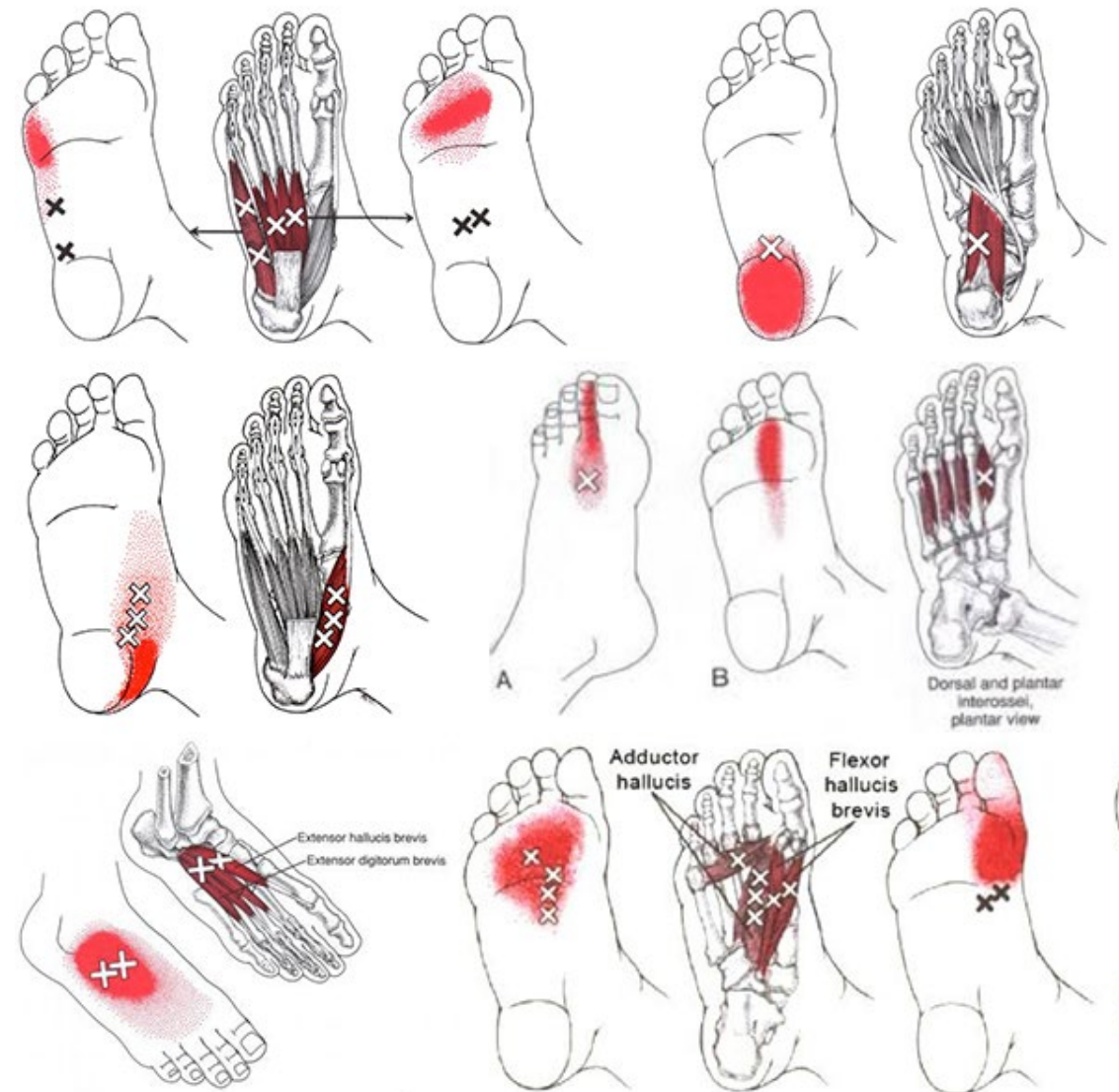
Innervation: tibial nerve (S1–S2)

Blood supply: posterior tibial artery



Intrinsic muscles of the foot

- use the same TP as for “common” pain;
- gain access through the dorsal plane, not the plantar plane.



PEDIATRIC CASE SERIES

7 pacs, 4 males, 3 females, ages 11-16

Inclusion criteria

- Age above 10,
- No Cognitive impairment
- Spastic diplegic cerebral palsy
- ASH scale value above 2
- Possible independent gait
- Informed consent from child and parent



WORKING TECHNIQUES

DN techniques were aimed at muscle and fascia, muscle trigger points (MTrP) and micro-fenestration for the fascia.

3 session in 14 days

1 needle per muscle/ site – “in-out” technique

40/0,25 mm needle size

The muscles that were needed are as follows:

- Tibialis Posterior bilateral,
- Flexor Digitorum Longus bilateral,
- Flexor Hallucis Longus bilateral,
- Lumbricalis bilateral.

Fascia needed:

- plantar fascia bilateral.

	Age	Sex	VASi	VASf	6MWTi	6MWTf	ROMi °	ROMf °
A.R.T.	15	M	8	2	250 m	450 m	72	80
P.D.E.	12	M	8	2	268 m	389 m	71	79
C.S.	11	M	8	4	321 m	511 m	77	85
R.D.	15	F	6	2	402 m	689 m	67	80
G.G.	16	F	8	3	203 m	308 m	70	75
S.I.O.	14	F	6	2	376 m	502 m	70	79
H.I.	12	M	7	3	401 m	605 m	68	76

Conclusions

DN is a safe and useful intervention for spastic patients with CP.

DN can offer a window of opportunity for other therapies in the case of children with CP.

The results obtained with these patients justify the use of this minimally invasive technique.

A follow-up after the intervention is needed for patients with gait pattern modification.

More studies and/ or case reports need to be done in order to insure that DN is included in treatment protocols for spastic patients.



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