

AQUATIC PHYSIOTHERAPY IN PERIPHERAL NEUROPATHIES: A REHABILITATIVE PROTOCOL

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Peripheral Neuropathies

➤ Different etiologies – Genetic, Systemic, Infectious, Toxic, Inflammatory, Compression

➤ Motor weakness

➤ Hyposensitivity



Inadequate proprioceptive feedback



Gait and balance impairment



High fall risk

➤ **Pain**






Peripheral Neuropathies - Rehab

- ▶ Goals:
 - ▶ Maintain a good quality of life
 - ▶ Maximize the patient's function (ADL, society)
 - ▶ Minimize secondary complications
- ▶ Conventional physiotherapy
 - ▶ Compensation of lost perception
 - ▶ Control of intensity
 - ▶ Personalization
 - ▶ Not standardized
- ▶ No data about effectiveness of hydrotherapy on Peripheral Neuropathies



Aims of the study

- Develop a standardized rehabilitation program for peripheral neuropathies, composed by exercises that would be practicable both in water and on land
- Basis for future efficacy studies



Methods - Patients

➤ **Inclusion criteria:**

- Patients affected by peripheral neuropathy (neurologist)
- Able to walk (even if with assistance)
- No fear of water

➤ **First and last evaluation**

- Functional Independence Measure (FIM)
- Berg Balance Scale (BBS) – Dynamic Gait Index (DGI)
- Functional Ambulation Classification (FAC)
- Overall Neuropathy Limitation Scale (ONLS)
- Neuropathic Pain Scale (NPS)



Methods - Rehabilitation

4-week inpatient rehabilitation program

- Daily conventional physiotherapy
(front-to-front, treadmill, cycloergometer, cyclette)
- **Hydrotherapy**
 - Heated swimming pool (32°C)
 - 30-min sessions
 - 3/week



Methods - Hydrotherapy

- **1- Water familiarization, relaxation and breath control.**
- **2- Balance and posture control exercises:** objects pushing with the four limbs; weight shifting with open/closed eyes and with water turbulence; sitting on floating bars and moving the four limbs; kneeling down and pushing down objects; standing up; postural changing.
- **3- Gait exercises:** one-foot loading and step phases training; assisted walk; walking forward, backward and sideways, with open/closed eyes; obstacle walking; dual task walking (with arms exercises).

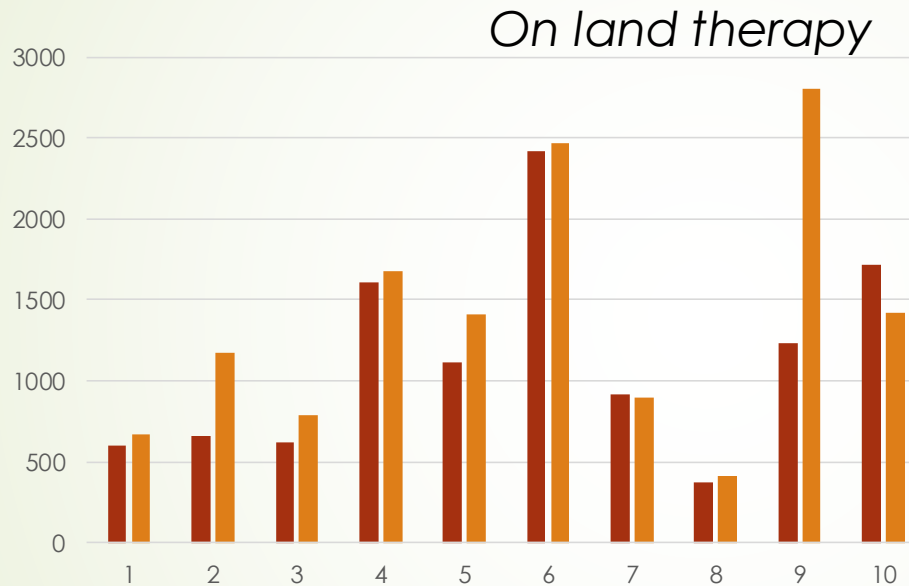


Future directions - our ongoing study

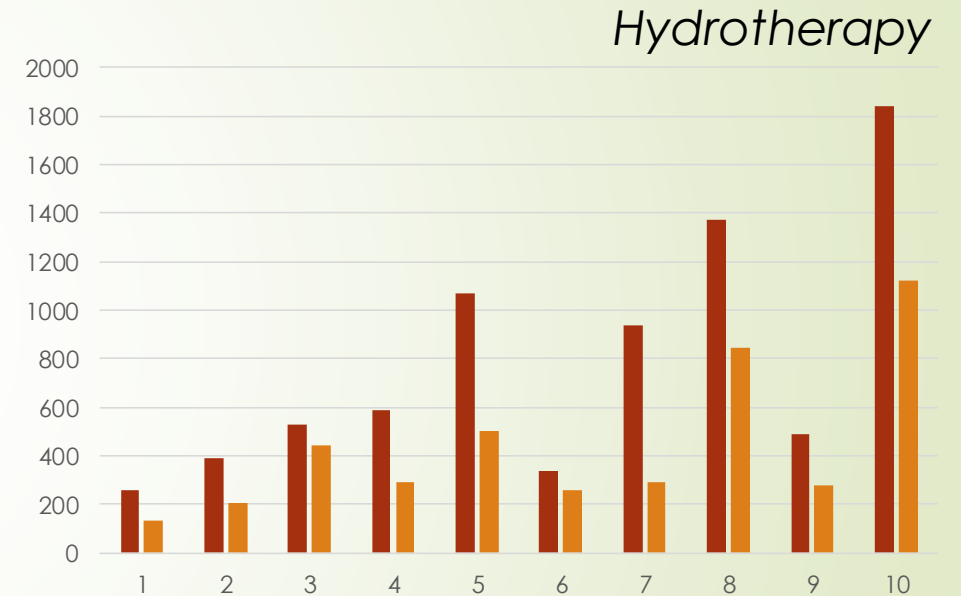
- Evaluation of efficacy of aquatic physiotherapy (in comparison to on-land exercises) on gait, balance and pain in patients with peripheral neuropathy.
- To date:
 - 20 pts → 50% polyneuropathy – 50% neuropathy in lumbar stenosis
 - 9 M, 11 F, 66.4±14.2 Y
 - Legs sensitivity: 80% hypo, 15% hyper, 5% normal
 - Normal muscle tone
 - Walking aid in 60%
 - 10 pts: *hydrotherapy*
10 pts: *on land therapy*

Preliminary results: Stabilometric platform

■ Eyes opened



t = 0.22

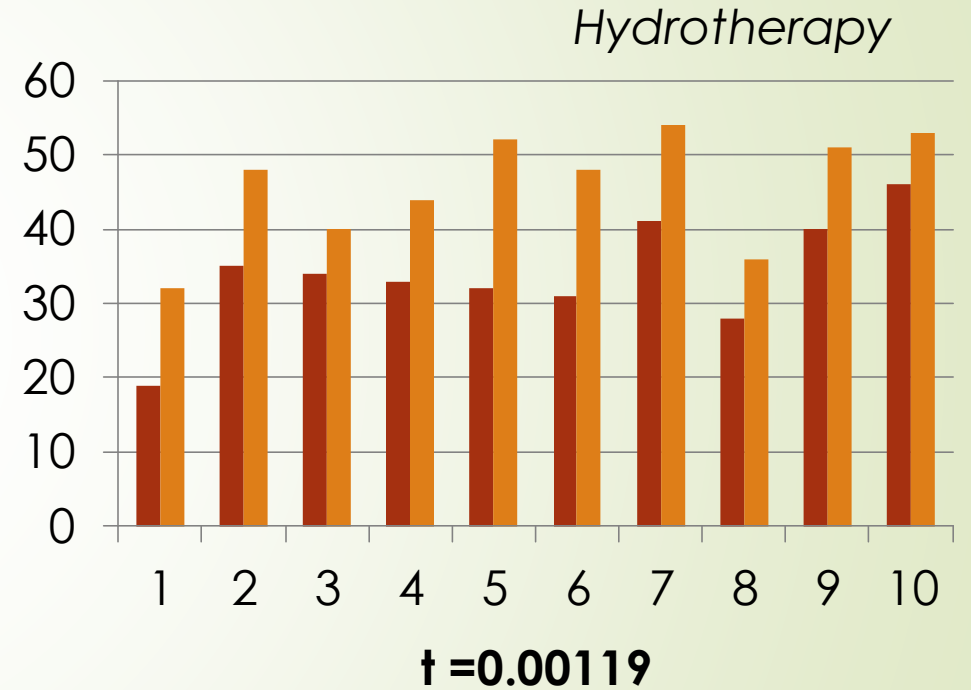
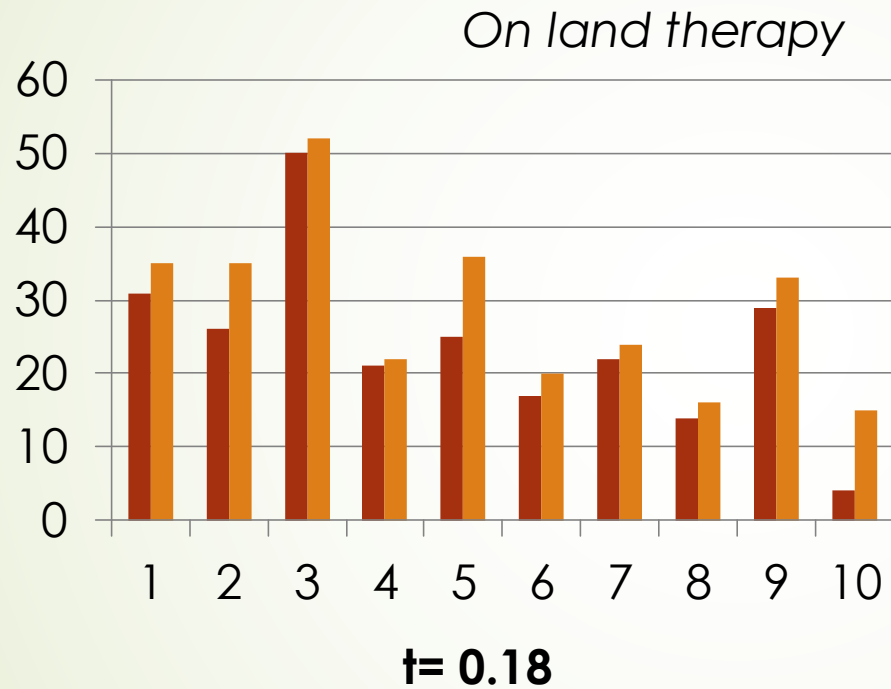


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■ Before treatment
■ After treatment

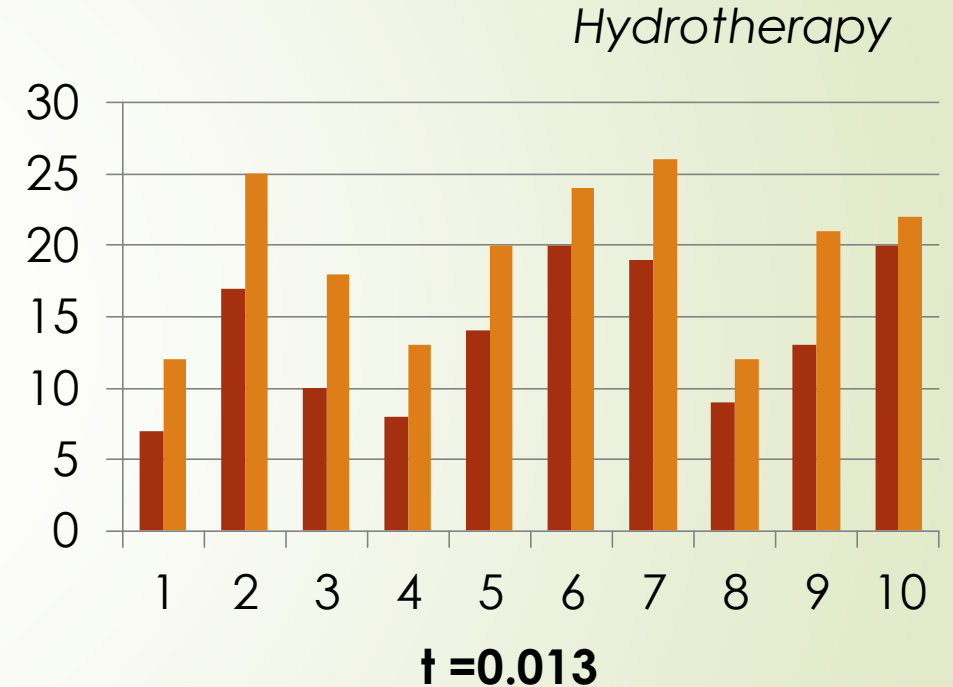
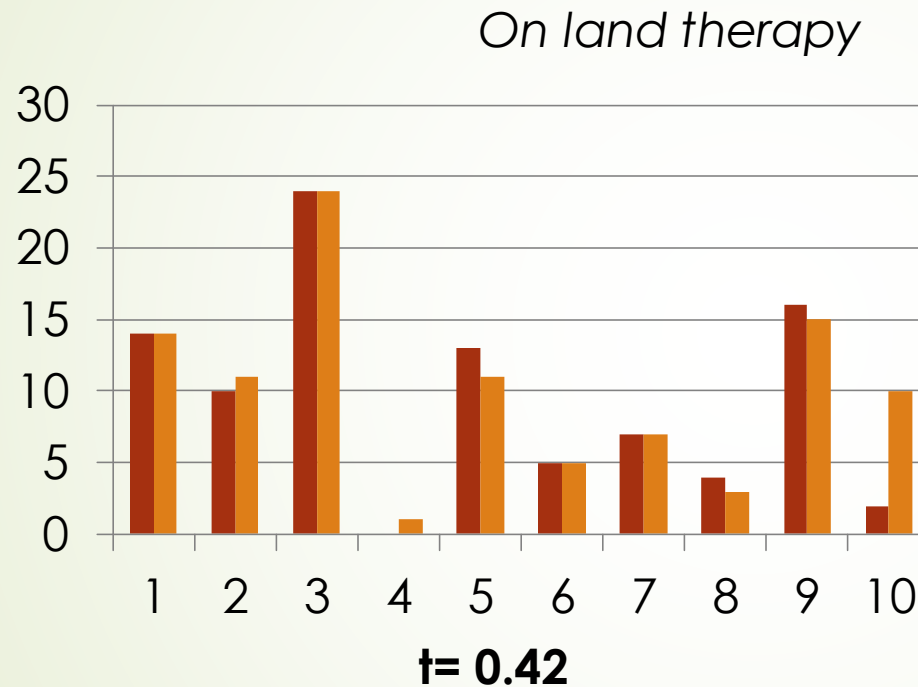
■ Eyes closed: no improvement in both groups

Preliminary results: BBS



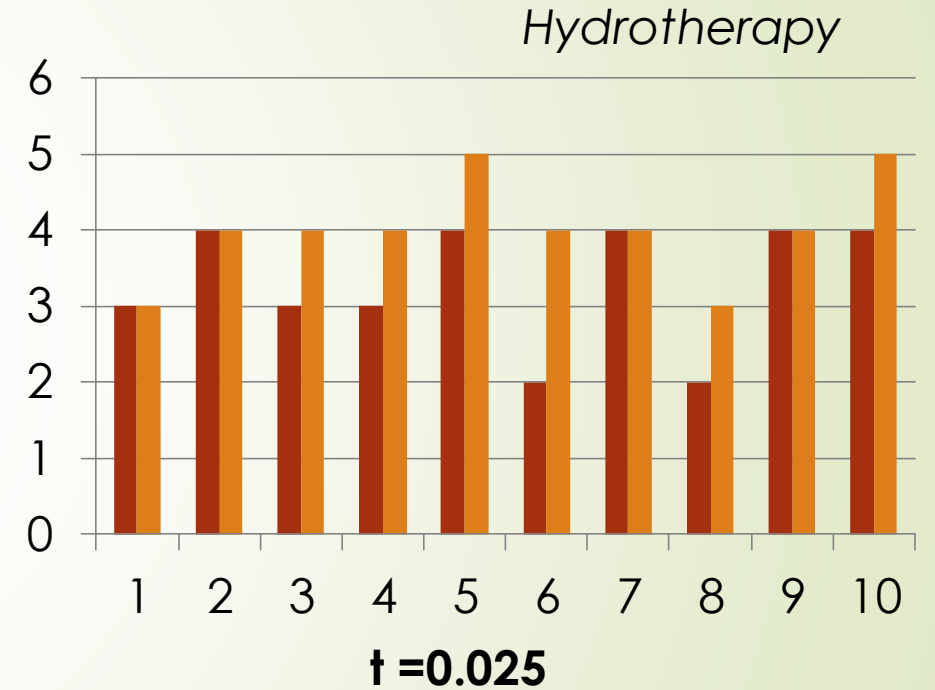
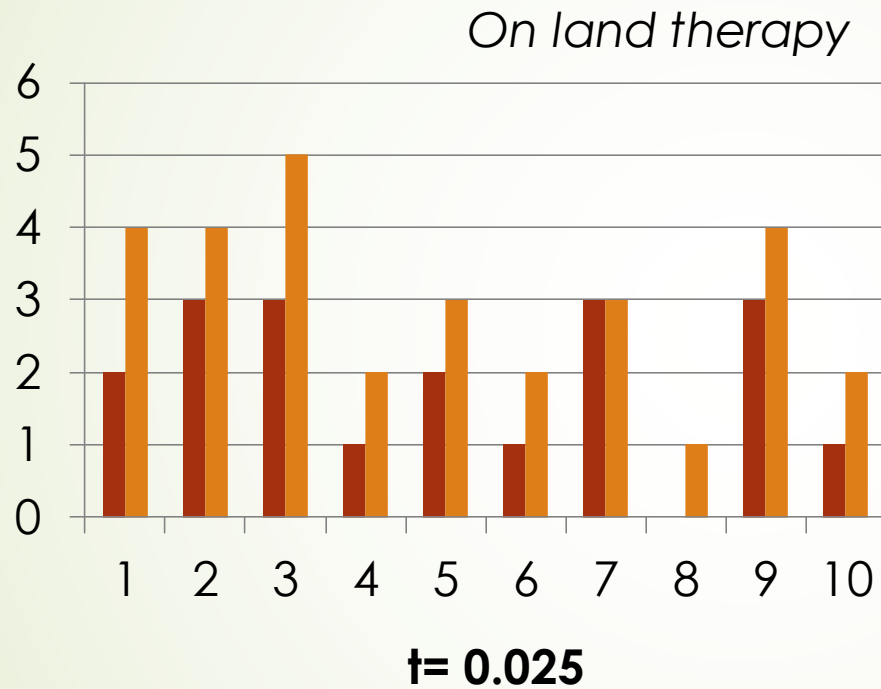
Before treatment
After treatment

Preliminary results: DGI



Before treatment
After treatment

Preliminary results: FAC



Before treatment
After treatment



Preliminary results: Others

- ▶ NPS: no significant improvement in both groups
- ▶ ONLS: no significant improvement in both groups
- ▶ No significant changes in muscular strength in both groups:
 - ▶ Hip flexors/estensors
 - ▶ Knee flexors/estensors
 - ▶ Ankle flexors/estensors



Preliminary conclusions

In neuropathic patients:

- Rehabilitative intervention improves the quality of ambulation (FAC)
- Rehabilitative intervention does not improve pain and quality of life (NPS, ONLS)
- Compared to on land therapy, hydrotherapy seems to improve static and dynamic balance (BBS, DGI, stabilometric platform)
- Further studies needed



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