

## Introduction

- Subclinical hypothyroidism (SH) is defined as an elevated serum concentration of thyroid stimulating hormone (TSH) when serum free thyroxine (fT4) concentration is within its reference range.
- In children and adults, treatment of SH with L-T4 is still a matter of debate, and there is no consensus on this issue yet.
- Depending on the duration of disease, neuropathic changes associated with demyelination and axonal degeneration can be observed in hypothyroidism.
- Although subclinical hypothyroidism is reported to have adverse effects on neuromuscular system in adults, there is no study on neuromuscular effects of childhood subclinical hypothyroidism in the literature.

## Aim

To evaluate nerve conduction findings with ENMG in children with subclinical hypothyroidism.

## Materials and Methods

- SH and euthyroid healthy children (control group) were enrolled in the study. SH was diagnosed on the basis of elevated serum TSH levels (TSH, 4.94-20  $\mu$ IU/L) and serum fT4 levels within the normal range.
- Only patients with elevated TSH and normal fT4 levels in at least two measurements 4-6 weeks apart were included in the study.

### Exclusion criteria;

- Cardiovascular and respiratory diseases, hepatic or renal dysfunction, diabetes mellitus, malignancy and obesity were excluded in both SH and the control groups
- Drug using that could alter thyroid functions.
- Obese subjects

### Electroneuromyography (ENMG) Evaluation

- Nerve conduction studies of all patients were examined by ENMG.
- In sensory and motor nerve conduction studies, left upper and lower limbs were used.
- Of the motor nerves, the median, ulnar, peroneal, and tibial nerves and of the sensory nerves, the median, ulnar, and sural nerves were examined
- The combined muscle action potential in the motor nerves, the amplitudes in the sensory nerves and the distal latency and nerve transmission rates in the motor and sensory nerves were assessed.
- Results of the measurements were compared with normal values according to age.
- Abnormal results were classified as axonal or demyelinating.

## Results

- 26 children (mean age: 12.4 $\pm$ 4.1 years, 11 male, 13 prepubertal) were enrolled in the study.
  - Mean TSH: 7.32 $\pm$ 2.0 IU/L, fT4: 0.87-1.6 ng/dL.
  - In six patients, the etiology was autoimmune thyroid disease.
- In ENMG,**
- **Motor axonal involvement** was observed in 10 patients
    - ✓ Peroneal involvement in 5 patients (19.2%)
    - ✓ Tibial involvement in 2 patients (7.6%)
    - ✓ Ulnar involvement in 2 patients (7.6%)
    - ✓ Median involvement in 1 patient (%3,8),
  - **Sensory axonal involvement**
    - ✓ No sensory axonal involvement was observed in any of the patients.
  - 2/10 (%20) patients with motor axonal involvement were symptomatic (other cases were asymptomatic).
  - In one of the symptomatic patients, motor axonal involvement in three regions (ulnar, peroneal, and tibial) was observed.
  - Nerve conduction values were normal in all patients.

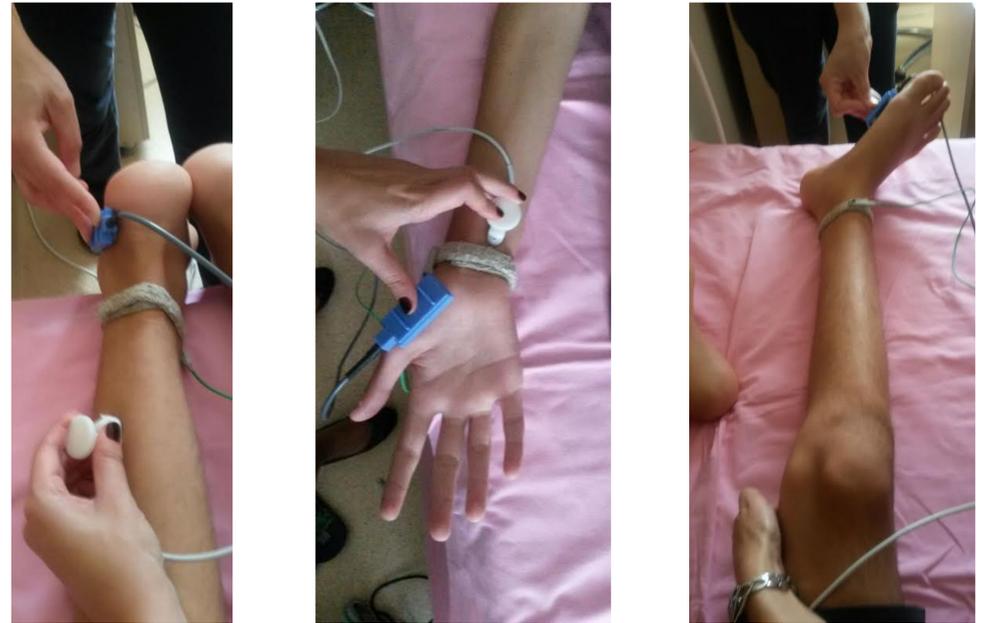


Figure 1. Electroneuromyography

## Discussion-Conclusion

- Hypothyroidism can cause a variety of signs and symptoms reflecting the involvement of central nervous system, peripheral nerves, and muscles. Clinical findings can be manifested as mononeuropathy or sensory-motor polyneuropathy along with neuropathic pain..
- Neuromuscular changes in overt hypothyroidism is detected in varying rates (up to 87.5%) with ENMG, while there were only two studies with controversial results about SH in adults. One of these studies showed axonal neuropathy, increased motor distal latencies and low sensory amplitudes in sural nerve in adults with SH. However, the other study did not find any abnormality in peripheral nerves.
- This is the first study in which nerve conduction studies were evaluated in childhood SH in literature, and motor axonal involvement was shown using ENMG in 38.5% of the cases (10/26 cases).

## Conclusion

According to our ENMG results, subclinical or clinical axonal involvement can occur in children with SH. These results can be important since they provide pros for the treatment of SH, which is still a matter of debate.

