

Temporal Muscle Ultrasound Reflects Nutritional Status and Bulbar Impairment in ALS

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BACKGROUND

Amyotrophic lateral sclerosis (ALS) is a rapidly progressive neurodegenerative disorder characterized by the degeneration of upper and lower motor neurons, leading to muscle weakness, atrophy, and ultimately respiratory failure. Despite growing insight into disease mechanisms, reliable biomarkers for disease severity and progression remain limited. Muscle wasting is a prominent feature in ALS, and temporal muscle thickness (TMT) has recently emerged as an indicator of muscle mass.

OBJECTIVE

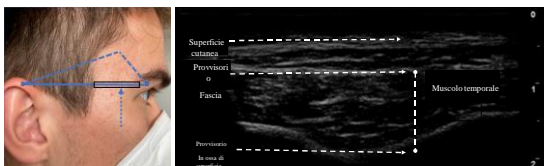
This study aimed to investigate TMT, assessed by ultrasound, as a potential biomarker of disease severity and functional status in ALS patients

PATIENTS AND METHODS

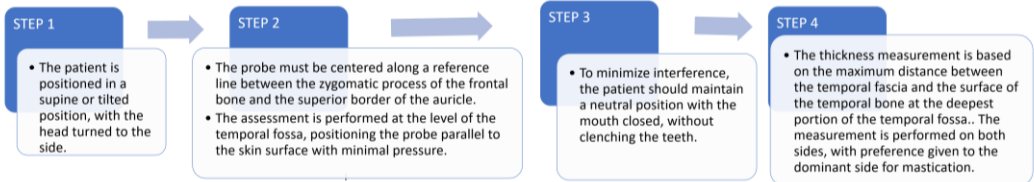
Patients: The study included 94 consecutive ALS patients diagnosed according to the revised El Escorial criteria.

Methods: This was a prospective observational study conducted in three tertiary ALS centers. TMT was bilaterally measured by ultrasound, and the mean value was used for analyses. Descriptive statistics were reported as median [Q1–Q3] for continuous variables and as n (%) for categorical variables. Correlations between TMT and clinical/nutritional parameters were assessed using Spearman coefficients.

Clinical Data: Clinical, nutritional, functional, anthropometric, and laboratory data were systematically collected



High-frequency (3–15 MHz) US was used to measure TMT bilaterally at the temporal fossa. TMT was defined as the maximum distance between the temporal fascia and the temporal bone.



RESULTS

Table 1: Descriptive Statistics of Population Characteristics (N=94)

Characteristic	Value
Sex n (%)	
Male	53 (56%)
Female	41 (44%)
Onset site n (%)	
Bulbar	27(29%)
Spinal	67 (71%)
Age, yrs	64 [56,70]
Disease duration , months	21 [12,34]
ALSFRS total score	31 [23,39]
Temporal Muscle Tickness (TMT) mm	14.18 [12.05,15.75]

The cohort included 94 patients (56% male and 44% female), with 27% presenting a bulbar onset. The median age was 64 years (Q1,Q3: 56,70), and the median disease duration was 21 months. The median ALSFRS-R total score was 31 (23, 39). TMT median value was 14.18 (12.05,15.75). **Table 1**

Table 2: Correlations between TMT and clinical data

Correlations	rho	p
TMT vs ASMM	0.433	0.010
TMT vs TBW	0.417	0.011
TMT vs FFM	0.391	0.018
TMT vs ASMI	0.340	0.033
TMT vs ALSFRS-R bulbar score	0.247	0.050

TMT positively correlated with body composition parameters, showing significant associations with appendicular skeletal muscle mass (ASMM) ($\rho = 0.433$, $p = 0.010$), total body water (TBW) ($\rho = 0.417$, $p = 0.011$), and fat-free mass (FFM) ($\rho = 0.391$, $p = 0.018$). In addition, TMT was positively related to the appendicular skeletal muscle mass index (ASMI) ($\rho = 0.340$, $p = 0.033$). Notably, a trend was also observed with the ALSFRS-R bulbar subscore ($r = 0.247$, $p = 0.050$). **Table 2**

CONCLUSIONS

TMT mirrors general muscle status and correlations with functional and body composition measures in ALS. The suggested lower risk of bulbar function worsening in patients with higher TMT, supports its prognostic utility. Temporal muscle thickness is a simple, non-invasive biomarker of for muscle status and disease progression in ALS. Its routine assessment may support patient stratification, prognosis, and tailored interventions.

References: Maskos, Andreas, et al. "Diagnostic utility of temporal muscle thickness as a monitoring tool for muscle wasting in neurocritical care." *Nutrients* 14.21 (2022): 4498.



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