

Pterygoid-Inclusive Craniofacial Area Associates with Swallowing Trajectories After Stroke

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Purpose

To determine whether pterygoid-inclusive craniofacial muscle composites can better reflect sarcopenic muscle wasting and provide additional prognostic value for post-stroke dysphagia compared to conventional muscle measurements.

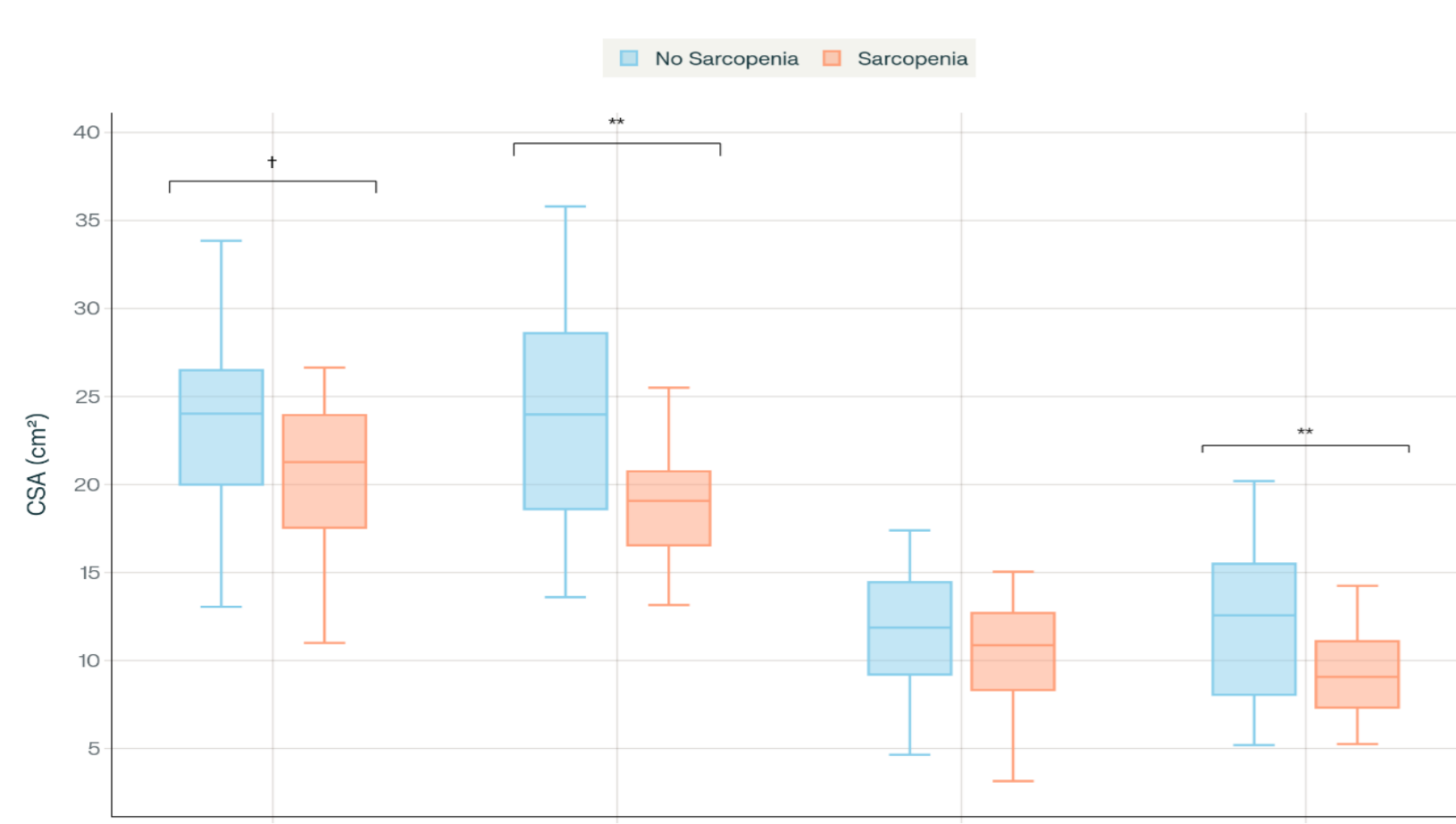
Subjects & Methods

- Secondary analysis of a prospectively collected cohort of stroke patients (age ≥ 65 years), stratified by sarcopenia status and sex using bioelectrical impedance analysis (InBody S10; appendicular skeletal muscle mass/height² with 2019 AWGS criteria: <7.0 kg/m² men, <5.7 kg/m² women)
- Bilateral temporalis and masseter muscle thickness and cross-sectional area (CSA), as well as medial and lateral pterygoid CSA on 3T MRI were measured by three blinded raters.
- Swallowing function was assessed using the Functional Oral Intake Scale (FOIS) at baseline and 6 months.
- Ordinal logistic regression and linear mixed-effects models were performed to examine bidirectional relationships between muscle measures and swallowing outcomes, adjusted for age, NIHSS, Charlson Comorbidity Index, infection, sex, and stroke side.

Results

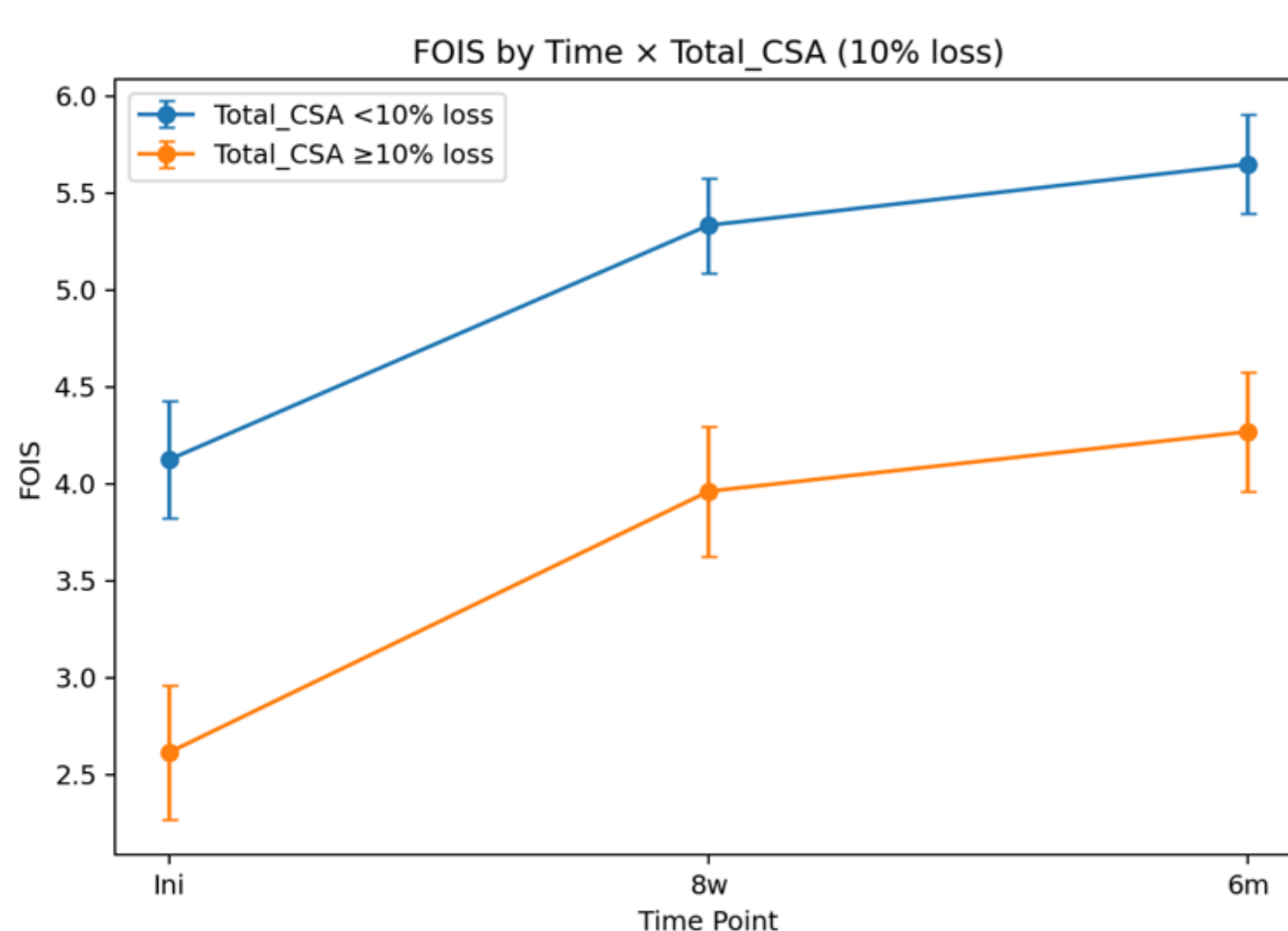
Sarcopenic patients show progressive craniofacial muscle cross-sectional area (CSA) loss over 6 months

- Box plots of masticatory muscle CSA at baseline and 6-month follow up in sarcopenia vs nonsarcopenic patients, compared using Wilcoxon rank-sum tests, data shown as median (interquartile range). †p < 0.10; **p < 0.01



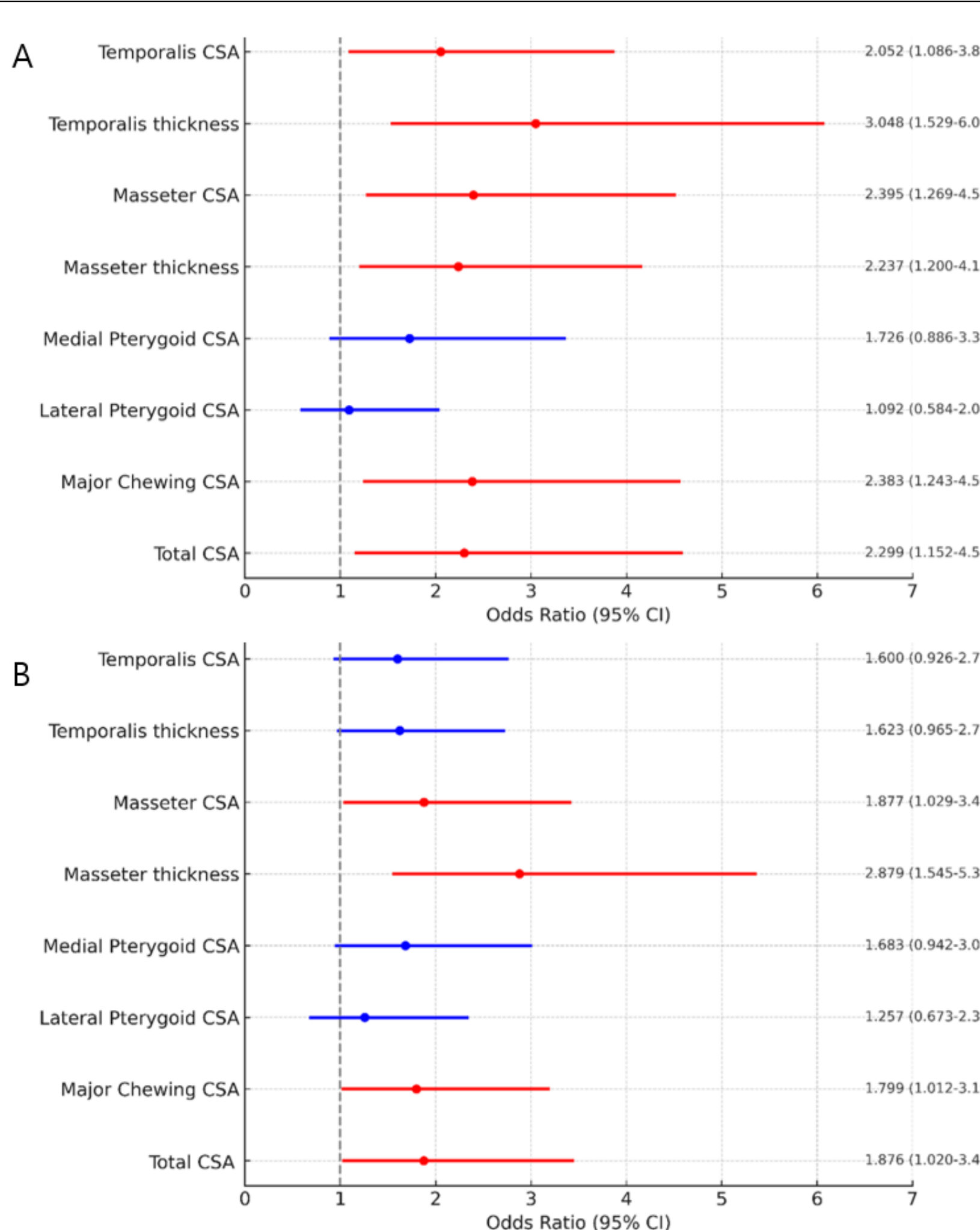
$\geq 10\%$ craniofacial muscle CSA loss predicts worse FOIS trajectories.

- Linear mixed-effects models of FOIS trajectories for patients with $\geq 10\%$ vs $<10\%$ CSA loss across baseline, 8 weeks, and 6 months.
- Sarcopenic patients exhibited markedly higher rates of $\geq 10\%$ total CSA loss (62.5% vs 17.6%, p=0.001), which predicted poorer FOIS recovery trajectories.



Craniofacial muscle parameters predict swallowing outcomes at 6 months.

- Forest plots from ordinal logistic regression models showing adjusted odd ratios and 95% confidence intervals for favorable FOIS scale scores. Bars are colored red for statically significant correlations (p<0.05) and blue for non-significant correlations (p>0.05).
- Total Craniofacial CSA independently predicted favorable 6-month FOIS outcome (aOR 2.30, 95% CI 1.15–4.59, p=0.018; A), while baseline FOIS scores predicted subsequent CSA loss (OR 1.88 per unit, p=0.05; B)



Conclusion

Pterygoid-inclusive total craniofacial CSA on standard brain MRI associates with FOIS trajectories comparably to single-muscle measures. The finding that baseline dysphagia predicts subsequent craniofacial muscle loss underscores the need for early interventions. Composite measures incorporating the pterygoids may enhance imaging-based sarcopenia assessment and prognostication in stroke patients.