



Early Outcomes of Sleeve Gastrectomy, Semaglutide, and Tirzepatide on Weight, Fat Mass, and Muscle Preservation

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A propensity score-matched real-world cohort study

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**The Future of Obesity Management:
From Weight Loss to Health Gain**



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Disclosure



Nothing to disclose

No commercial logos, promotional materials, or marketing content are included.



Clinical question

Potency is not the only question: what about the quality of weight loss?

New clinical tension

- Incretin-based pharmacotherapy is now approaching surgery-level weight loss in some patients.
- Patients increasingly ask whether medications preserve muscle better than surgery.
- Direct comparative body-composition data across SG, semaglutide and tirzepatide remain limited.



Study objective

Compare early changes in body weight, fat mass, visceral fat area, and skeletal muscle mass among the three modalities.



Study design and cohort

Real-world propensity score–matched comparison with complete 6-month body-composition follow-up

1,375

Initial registry cohort

452

Matched analysis cohort

4 visits

Baseline, 1, 3, 6 months

InBody 770

Standardized BIA protocol

Matched treatment groups

SG

n = 252

38-Fr laparoscopic sleeve gastrectomy

Semaglutide

n = 100

Once-weekly titration to maximal approved
or tolerated dose

Tirzepatide

n = 100

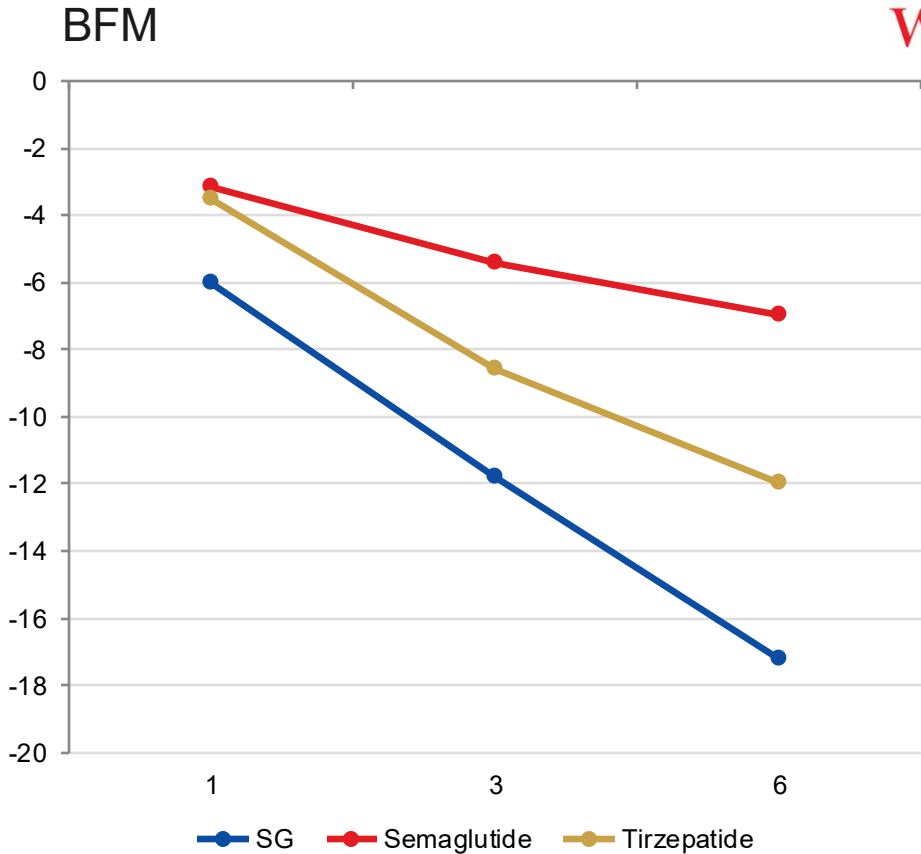
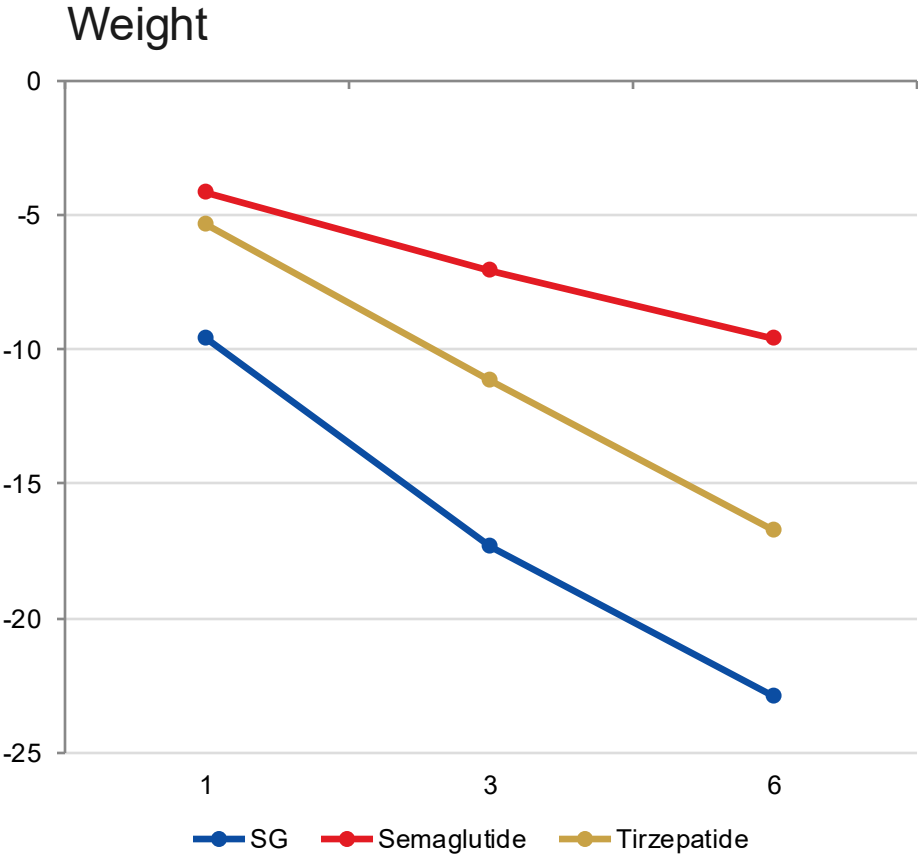
Once-weekly titration to 10–15 mg as
tolerated

PSM covariates: age, sex, BMI, smoking, alcohol, diabetes, hyperlipidemia and hypertension. Baseline characteristics were balanced after matching.



Magnitude of early weight and fat loss

SG produced the largest reductions; tirzepatide consistently exceeded semaglutide by 3–6 months



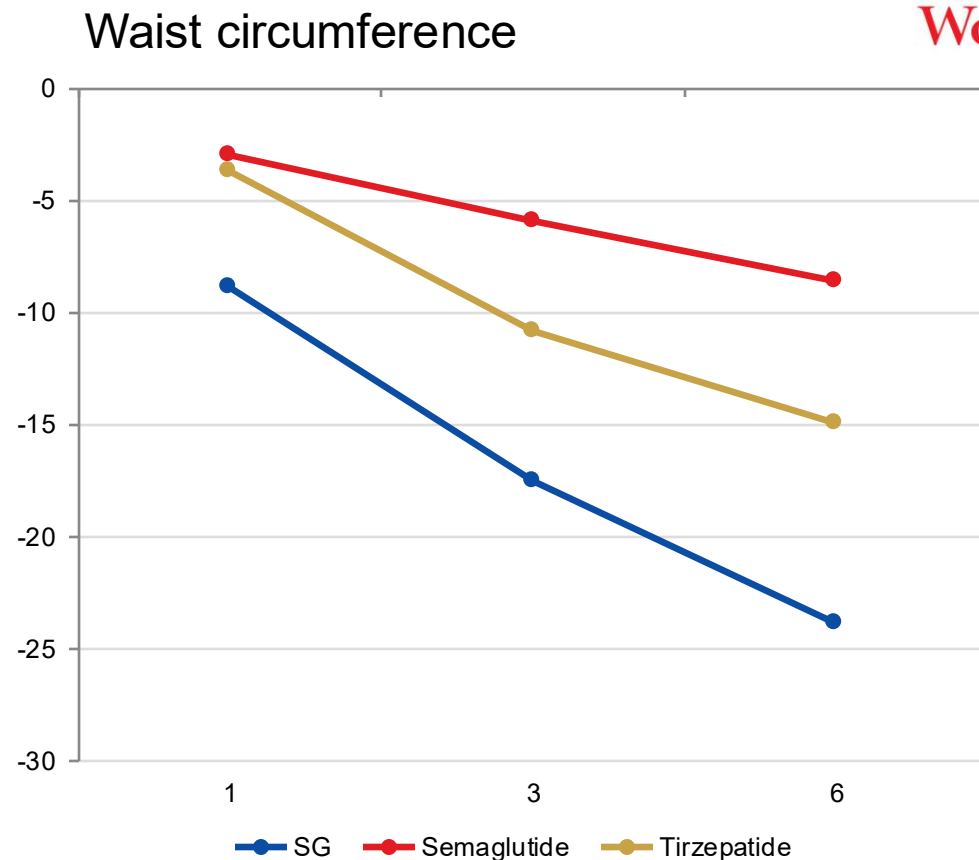
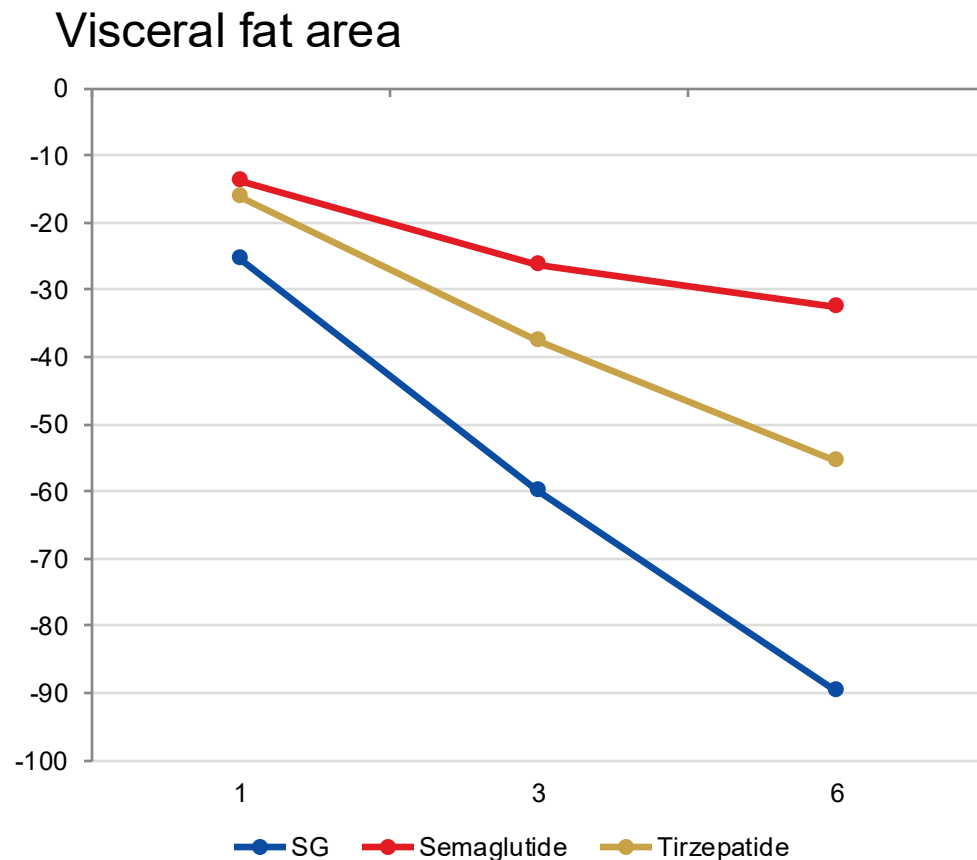
At 6 months:
SG -22.9 kg weight and -17.2 kg BFM;
tirzepatide -16.75 kg and -11.95 kg;
semaglutide -9.6 kg and -7.0 kg.



Visceral adiposity and waist circumference

The same graded response was observed for central adiposity

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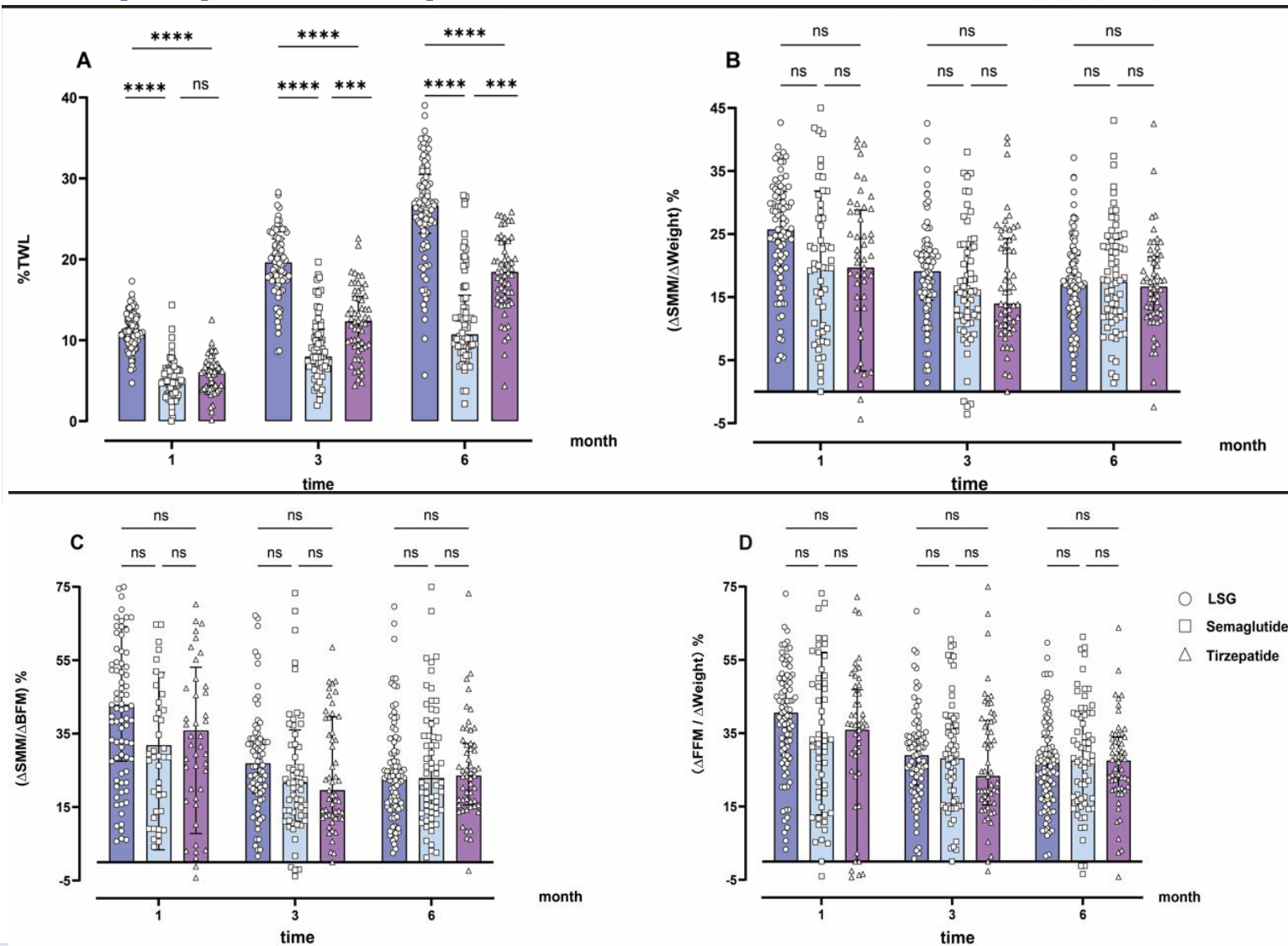
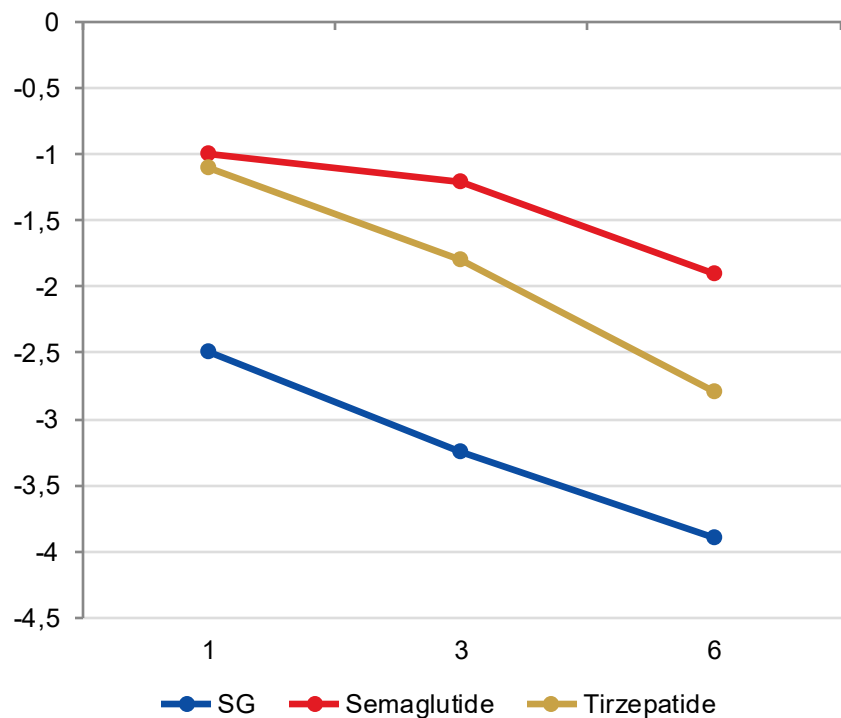


Clinical implication: SG remains the strongest rapid option for visceral adiposity reduction; tirzepatide provides a substantial pharmacologic effect.



Skeletal muscle: absolute loss versus proportional preservation

Muscle loss mainly tracked the magnitude of total weight loss



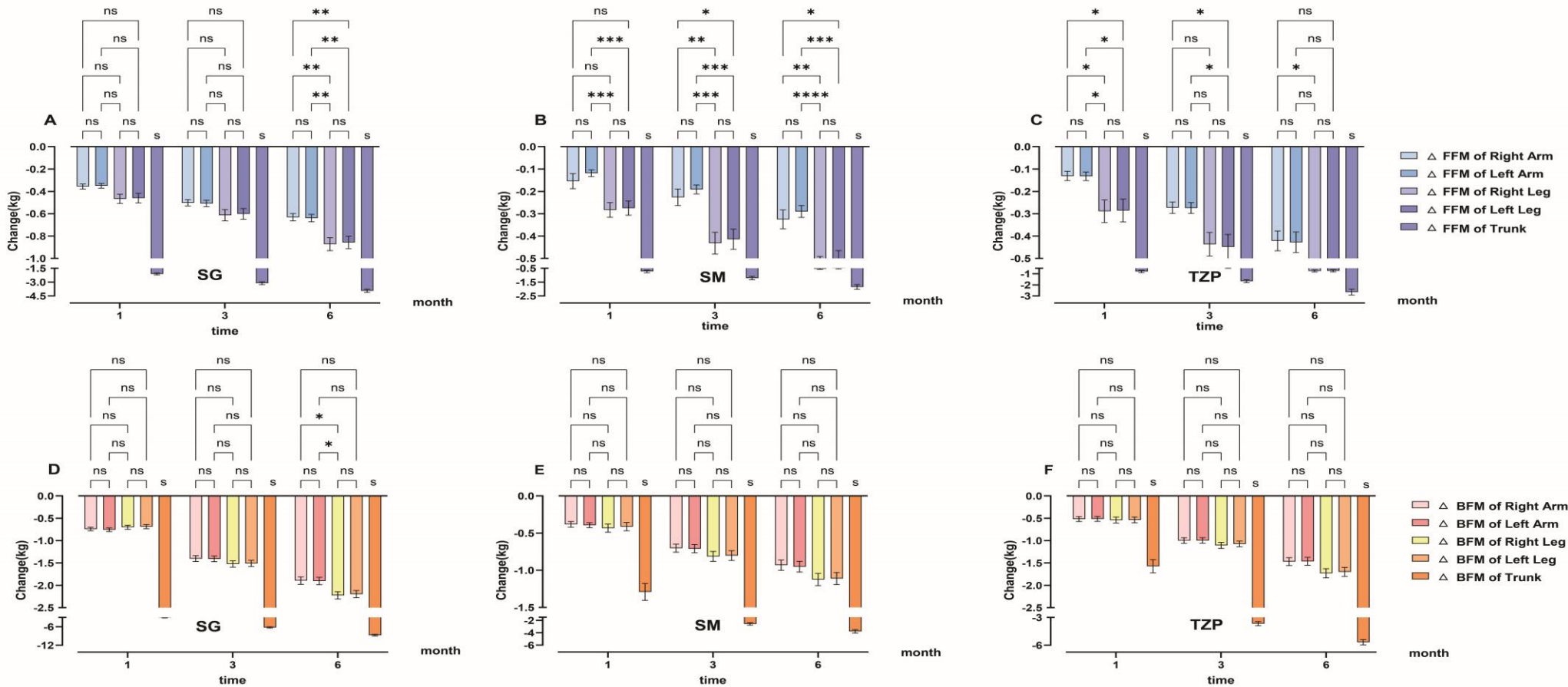
Key interpretation: although absolute SMM loss was larger after SG and tirzepatide, Δ SMM/ Δ Weight% and Δ SMM/ Δ BFM% were not significantly different among groups.

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Regional body-composition pattern

Central compartments changed more than limb compartments across all modalities



No signal of disproportionate limb muscle depletion was observed; the pattern appeared physiologic and centrally dominant.



Clinical interpretation

Different potency, comparable proportional muscle preservation

SG

Highest early efficacy
Largest weight, fat and visceral-fat reductions
Requires structured nutrition and resistance-exercise follow-up

Semaglutide

Modest early effect
Lower absolute SMM loss reflects smaller overall weight loss
Not clearly superior in proportional muscle preservation

Tirzepatide

Intermediate-to-high efficacy
Consistently exceeds semaglutide by 3–6 months
Potential role before surgery or after inadequate response



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Practical message: treatment choice should consider speed and magnitude of adiposity reduction, not the assumption that one modality uniquely preserves muscle.



Limitations and take-home message

Single-center real-world data with standardized but BIA-based body-composition assessment

Limitations

- Retrospective single-center analysis; residual confounding remains possible despite PSM.
- Body composition was measured by multifrequency BIA, not DXA or MRI.
- No muscle strength or physical performance endpoint.
- Follow-up was limited to 6 months.

Take-home message

SG delivered the greatest early reduction in weight and adiposity. Tirzepatide exceeded semaglutide and approached the surgical trajectory. However, proportional muscle preservation was comparable across all three modalities.

Thank you



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