Efficacy of Long-Term Oral Nutritional Supplementation With Dietary Counseling on Growth, Body Composition and Bone Mineralization in Children With or At Risk for Undernutrition: A Randomized Controlled Trial[1]

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BACKGROUND

Childhood undernutrition is linked to impaired growth, low lean mass and poor bone mineralization, leading to adverse health outcomes. Oral nutritional supplements (ONS) promote catch-up growth, but their impact on lean mass and bone mineralization is not well studied.

OBJECTIVE

To compare the efficacy of long-term ONS with dietary counseling (DC) versus DC alone on growth, body composition, bone mineralization and health outcomes in children with or at risk of undernutrition.

METHODS

- **Participants:** 330 children aged 24–60 months with WHO Growth Standard *z*-scores indicating undernutrition or risk for undernutrition. (weight-for-age <–1, height-for-age <–1 and weight-for-height <0).
- **Design:** Randomized controlled trial across multiple sites with two groups: ONS+DC and DC-only, over 240 days.
- **Measurements:** Anthropometric measurements, dietary intake, parent-reported health outcomes, DXA-assessed body composition and bone mineralization, nutritional blood biomarkers.

RESULTS

ONS PLUS DC SHOWED:

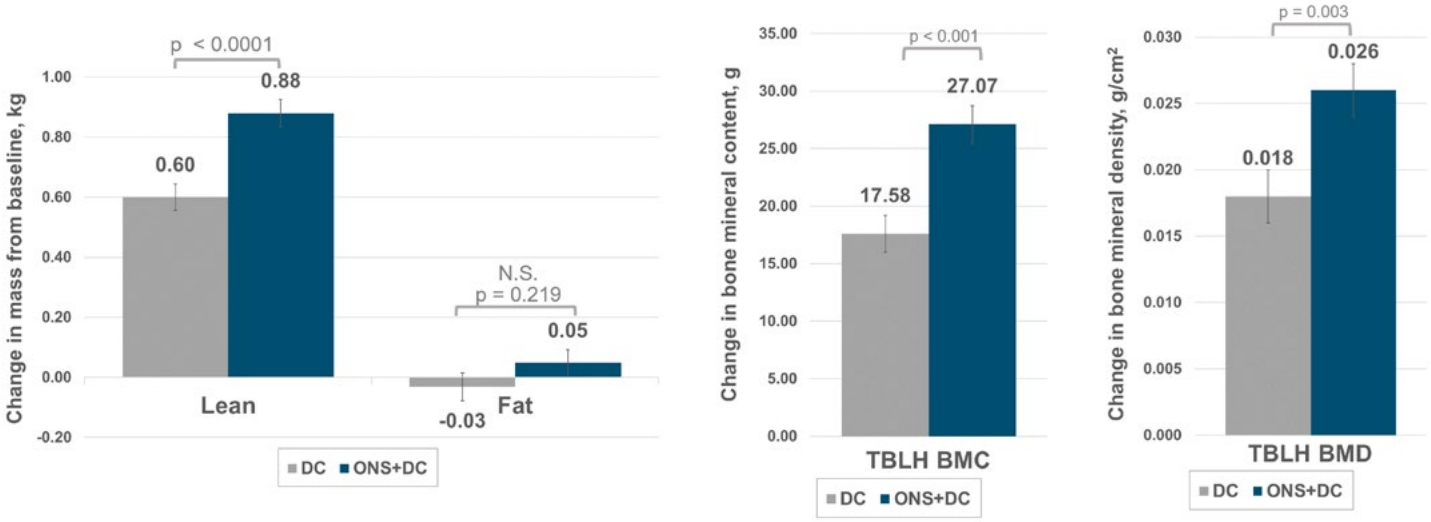
Growth: Significant improvements in height and weight measures (height, weight, height-for-age and weight-for-age *z*-scores) compared to DC-only group, with increasing differences over time (P<0.01).

Body Composition: Higher lean mass index (11.06 kg/m^2 vs. 10.92 kg/m^2, P=0.048) and total body less head bone mineral density (0.407 g/cm^2 vs. 0.399 g/cm^2, P=0.03) compared to the DC-only group at 240 days. There were no significant differences in fat mass index between the groups (P=0.48).

Dietary Intake: Energy and protein intake levels were significantly higher in the ONS+DC group compared to the DC-only group at day 240 (both P<0.001).

Health Outcomes: Better serum vitamin D and K status, fewer sick and missed school days, improved sleep habits, appetite, energy and physical activity levels in ONS+DC group (all P<0.05).

Change in DXA-assessed measurements from baseline to day 240 by treatment group



TBLH = total body less head
BMC = bone mineral content
BMD = bone mineral density

CONCLUSION

Long-term ONS supplementation combined with DC improved linear catch-up growth and supported quality growth, indicated by increased lean mass accretion and bone mineralization alongside parent-reported improvements in child health.

RELEVANCE TO CLINICAL PRACTICE

The study highlights the importance of addressing not only weight gain but also the quality of growth in children with or at risk of undernutrition. Adding ONS to dietary counseling not only improves linear catch-up growth, but also helps to address deficits in lean mass and bone mineralization associated with undernutrition in children. Beyond improving nutritional status, supporting quality growth with the right nutrition helps to lay the foundation for life-long metabolic and bone health.

Reference

1. Ow et al. Efficacy of long-term oral nutritional supplementation with dietary counseling on growth, body composition and bone mineralization in children with or at risk for undernutrition: a randomized controlled trial. Nutrition Journal (2025). Read the full article: https://doi.org/10.1186/s12937-025-01133-5.

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