NUTRI-TCA - Optimization of Refeeding in Anorexia Nervosa

Preliminary Feasibility Study

Prospective interventional study guided by body composition

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Description of the initiative

Background: Anorexia nervosa (AN) causes severe malnutrition and major alterations in body composition (loss of muscle mass, reduced Body Cell Mass (BCM), impaired cell integrity). Up to 90% of patients present with decreased Bone Mineral Density (BMD). Current refeeding protocols rely on clinical criteria and primarily on weight/BMI, which neither distinguish fat-free mass recovery from fat mass recovery, nor assess the quality of cellular recovery — a dimension essential to prevent complications such as persistent muscle impairment or osteopenia.

Innovation: NUTRI-TCA replaces standardised protocols with precision nutritional medicine combining BIA/BIVA (BCM, phase angle, hydration), indirect calorimetry with reinforced frequency at refeeding onset, structured bone biology panel and targeted Dual-energy X-ray Absorptiometry (DXA) for at-risk patients.

Objectives: Primary: assess whether BIA-guided refeeding improves recovery quality. Secondary: model metabolic adaptation (calorimetry J0–J15–M1), identify bone loss risk profiles, correlate BIA markers with DXA results. Preliminary feasibility study, 20–30 female patients aged 13–24, 24 months, Clinique La Ramée (Epsylon), Belgium.

Planned activities & deliverables

Key steps: Ethics committee submission (M0–M2) → Recruitment (M2–M6) → Intensive follow-up: weekly BIA + calorimetry J0/J15/M1/M3/M6/M12 + bone panel + targeted DXA (M2–M24) → Statistical analysis & publication (M18–M24).
At 12 months: 15–20 patients enrolled, complete baseline dataset (BIA, calorimetry, bone biology, DXA), preliminary BCM/phase angle trajectories documented — protocol feasibility validated and mid-term report submitted to MNI.
At 24 months: Complete cohort (20–30 patients), publication of feasibility study (Clinical Nutrition / Nutrients), ESPEN congress presentation, final report to MNI.

Resources & enablers

- **Budget (40,000 €):** Indirect calorimeter 34,000 € ; BIA electrodes 800 € ; Bone blood panels 3,600 € ; DXA 1,600 € ; Total 40,000 €
- **Existing infrastructure (not charged):** Akern® BIA 101 BIVA® PRO, computer, Bodygram Cloud licence 2026–2028, medical scale and stadiometer already available.
- **Success factors:** Multidisciplinary team (dietitian, physician, psychologist) ; Validated non-invasive tools (BIA + calorimetry + DXA) ; Real-care conditions ; No pharmacological intervention ; Transferable to other eating disorder centres.

Abbreviations: AN: Anorexia Nervosa ; BCM: Body Cell Mass ; BIA: Bioelectrical Impedance Analysis ; BIVA: BIA Vector Analysis ; BMI: Body Mass Index BMD : Bone Mineral Densit ; DXA : Dual-energy X-ray Absorptiometry ; REE: Resting Energy Expenditure

Results, expected outcomes & impact

- **Expected results:** (J15 calorimetry); identification of at-risk bone loss patients; correlation between BIA markers and DXA results as early predictors of bone impairment; improved therapeutic adherence.
- **Impact on nutritional practice:** Advances clinical nutrition from weight-centric to precision-medicine approach; demonstrates effective implementation of individualised nutritional pathways; provides evidence of improved patient outcomes (BCM, REE, bone biology); Replicable model: non-invasive, controlled cost per patient, integrable into routine care.
- **Transferability:** Yes — methodology (BIA + calorimetry + bone biology) replicable in any eating disorder centre. Protocol, decision tools and data collection forms made publicly available. Results presented at ESPEN and published open-access.
- **Medium/long-term impact:** Contributes to the evidence base for updating refeeding guidelines in adolescents and young adults with AN; promotes integration of body composition monitoring as a standard of care in eating disorder units across Belgium and Europe.

X **Please tick to confirm the PEN letter of endorsement is attached. Incomplete submissions will not be considered.**