

XXVIII IFSO World Congress

9-12 September 2025 | Santiago, Chile



Minimizing weight regain after bariatric surgery: Role of Diet

IFSO 2025 Santiago

Combined Therapies, The Dawn of a New Era

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Disclosures

- Advisory Board: Dr. Bistro Healthy Food Co., Novo Nordisk, Tecnofarma, Saval, Boehringer Ingelheim.
- Speaker: Abbott, Adium, Boehringer Ingelheim, Merck, Novo Nordisk, Pasteur, Saval, TEVA.

Dietary factors to prevent weight regain after bariatric surgery



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- Caloric restriction
- Nutrients Composition
- Time of Feeding
- Supplementation: Protein, Creatine, HMB
- Behaviour eating
- Summary

Energy Content

- Some longitudinal data suggest that a successful weight maintenance after 12 months of bariatric surgery, is associated with a energy intake below 1500 Kcal/day.
- However, individualized energy intake should be the best approach, considering sex, age, physical activity, co-morbidities, clinical evolution and ideally measurement of resting metabolic rate.



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Hee-Sook L. Nutrients 2020
AACE/TOS/ASMBS/OMA/ASA 2019 guidelines. Endocrine Practice 2019

Nutritional and behavioral factors related to weight gain after bariatric surgery



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	Post-surgery weight gain \geq 15%		p-value ^b
	Yes (n = 54) n (%)	No (n = 50) n (%)	
Pre-operative BMI (kg/m ²)			0.004
<40	26 (48.1)	38 (76.0)	
>40	28 (51.9)	12 (24.0)	
% of excess weight loss after surgery			< 0.001
< 50%	11 (20.4)	50 (100)	
\geq 50%	43 (79.6)	0 (0)	
“Night eater”			0.017
No	37 (68.5)	44 (88.0)	
Yes	17 (31.5)	6 (12.0)	
“Sweet-eater”			< 0.001
No	21 (38.9)	45 (90.0)	
Yes	33 (61.1)	5 (10.0)	
“Grazer”			< 0.001
No	12 (22.2)	46 (92.0)	
Yes	42 (77.8)	4 (8.0)	
Drinks alcohol			0.143
No	28 (51.9)	33 (66.0)	
Yes	26 (48.1)	17 (34.0)	
Takes daily vitamin			< 0.001
No	43 (79.6)	21 (42.0)	
Yes	11 (20.4)	29 (58.0)	
Physically active ^c			<0.001
No	49 (90.7)	12 (26.0)	
Yes	5 (9.3)	37 (74.0)	
Intake alimentary			
Calorie intake, (calories)	1791 \pm 488.9	1317 \pm 191.0	< 0.001
Carbohydrates, (grams)	190.8 (64.4-365.0)	119.9 (49.0-191.0)	< 0.001
Carbohydrates, (%)	41.56 \pm 10.2	36.71 \pm 7.5	0.009

^aVariables expressed as number (%), median (interquartile range) or mean (standard deviation). ^bp-value for Fisher exact, t-test or Mann Whitney U test. ^cMissing = 1 from control group. BMI = body mass index. kg = kilograms. m = meters.

Multivariable logistic regression model of correlates of post-surgery weight gain

	OR	95% CI
“Sweet-eater”	9.7	1.1 - 83.2
“Grazer”	14.4	3.8 - 150.2
Daily calorie intake (per 100 Kcal)	1.3	1.1 - 1.9
Not physically active	25.3	3.9 - 162.0



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Nutrients composition to prevent weight regain

- **High protein intake:** 35% of total calories (80-100 g/day).
 - **Carbohydrate:** 45% of total calories; mostly complex carbohydrates with low glycemic index.
 - **Fat:** 20% of total calories, with restriction in saturated fat and minimal consumption of hydrogenated fat. Higher consumption of healthy fat (mono/polyunsaturated fat).
 - **Fiber:** Supplementation with soluble fiber (15 g/day).
-
- ✓ High protein diet, preserves muscle mass and could contribute to a lower decrease in resting metabolic expenditure
 - ✓ Low-glycemic, high-protein diets effectively control appetite, improve metabolic health, and increase insulin sensitivity.
 - ✓ Fiber intake enhances gut flora diversity, increasing short-chain fatty acid production, which reduces chronic inflammation.

Faria SL et al. Obes Surg 2010
Mechanick j et al. Obesity 2014
Hee-Sook L. Nutrients 2020





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Pattern diet: Health focused

- Consider positive metabolic effects: improvement in insulin resistance, body composition, microbiota, sleep quality and global health quality.
- **No “just scale focused”**.
- Mediterranean and DASH diet are recommended, but it should consider also culture, traditions, habits, allergies, and others.
- Evidence supports that adherence and individualized dietary recommendations are key factors for the long-term maintenance (>24 months).



Contreras F, Al-Najim W, le Roux C. Nutrients 2024.

Cheung HC et al Int J Obes 2023

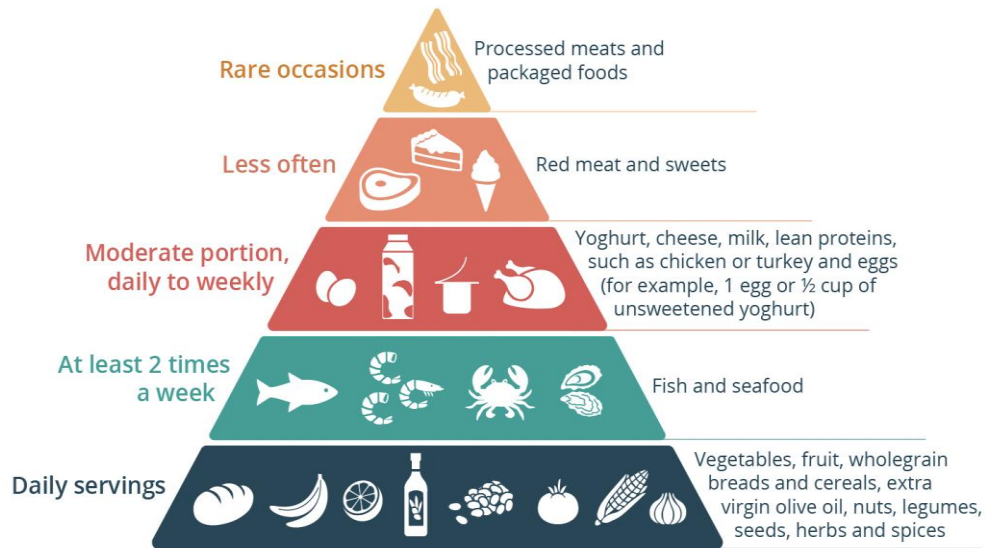


Mediterranean Diet is Associated with Greater Effectiveness and Sustainability in Weight Loss after Endoscopic Bariatric Therapy



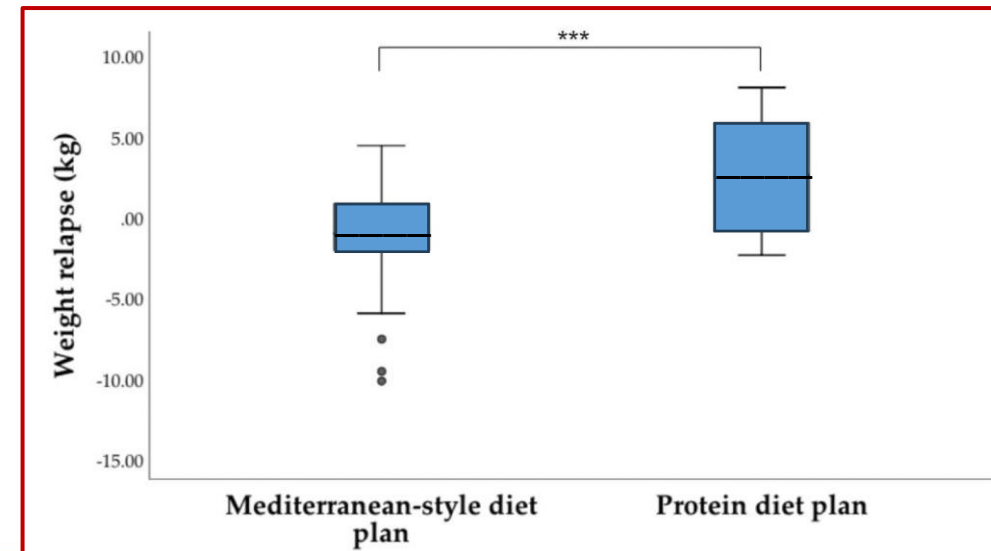
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BMI, body mass index;
BIB, BioEnterics intragastric balloon;
EBT, endoscopic bariatric treatment; POSE, primary obesity surgery endoluminal.

	Protein Diet Plan (n = 26)	Mediterranean Diet Plan (n = 52)	p-Value
Age, years	38.7 (12.2)	43.1 (11.9)	0.132
Gender, % female	22 (84.6)	48 (92.4)	0.095
Type of EBT			0.235
BIB, %	16 (61.9)	37 (72.2)	
POSE, %	10 (38.1)	15 (27.8)	
Initial BMI, kg/m ²	36.5 (5.0)	37.2 (4.6)	0.543
Total weight loss, %	13.5 (5.0)	18.7 (4.5)	<0.001



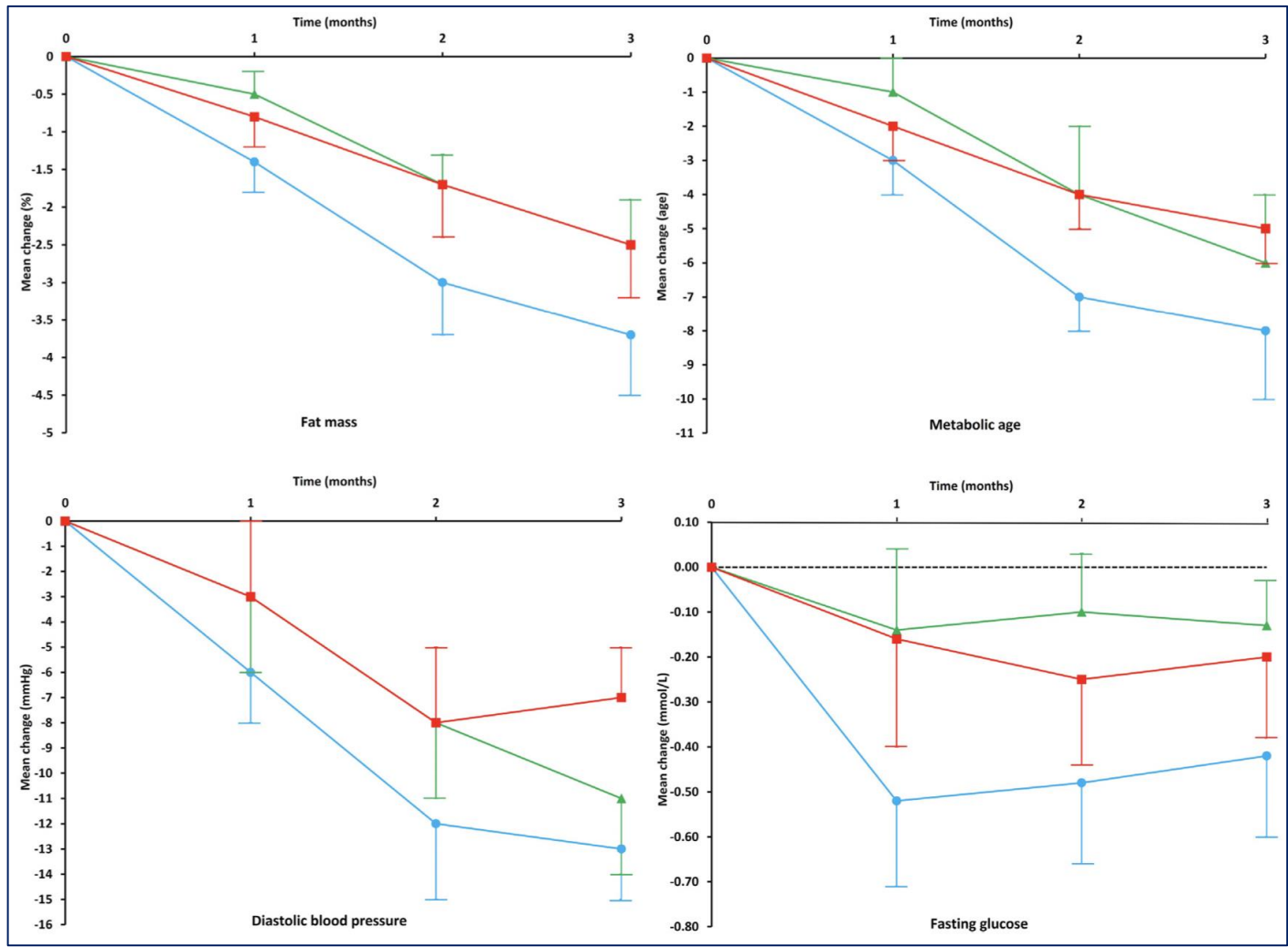
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Early versus Late Time Restricted Eating



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- eTRE + ER
- ▲ ITRE + RE
- RE



eTRE + ER showed a greater benefit for fasting blood glucose, fat mass and diastolic blood pressure compared to ITRE + ER and/or ER alone.



Early meal timing attenuates high polygenic risk of obesity



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- Participants (n = 1195, mean age 41.07 (SD 12.68) years, female 80.8%
Baseline mean BMI 31.32 (SD 5.53) kg/m², with overweight or obesity.



- ✓ Late eating as a risk factor for obesity, is more pronounced in individuals with a higher genetic predisposition to obesity, in whom late eating is linked to higher BMI values.
- ✓ Late eating is associated with poorer long-term weight maintenance after weight loss, and conversely, early late eating is associated with better weight-loss maintenance.

PRS: polygenic risk score
BMI: body mass index

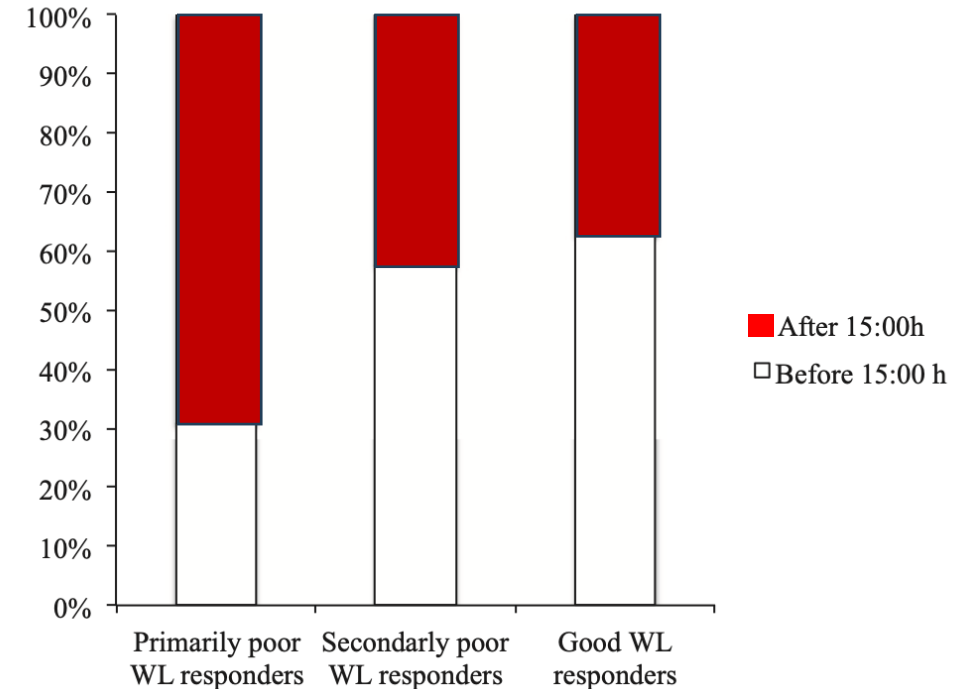
R De la Peña-Armada et al, *Obesity* (2025)

Time of Feeding



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- Some cohort studies and systematic reviews indicates that the timing of food intake, specifically consuming the main meal later in the day is associated with poorer weight loss outcomes and higher risk of weight regain after bariatric surgery, independent of total caloric intake, macronutrient distribution or type of surgery.
- In the same line, some studies suggest that earlier timing of food intake* may be beneficial for weight maintenance after bariatric surgery.



*Midpoint of meal intake





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Weight regain after BS: Role of Supplementation*

- **Protein Supplements:** increase satiety, maintain muscle mass and increase thermogenic food effect
- **Creatine**
- **Beta-Hydroxymethylbutyrate (HMB)**

*Other than those used to prevent deficiency complications.

Supplementation with Short Peptides versus (HMB) after bariatric surgery

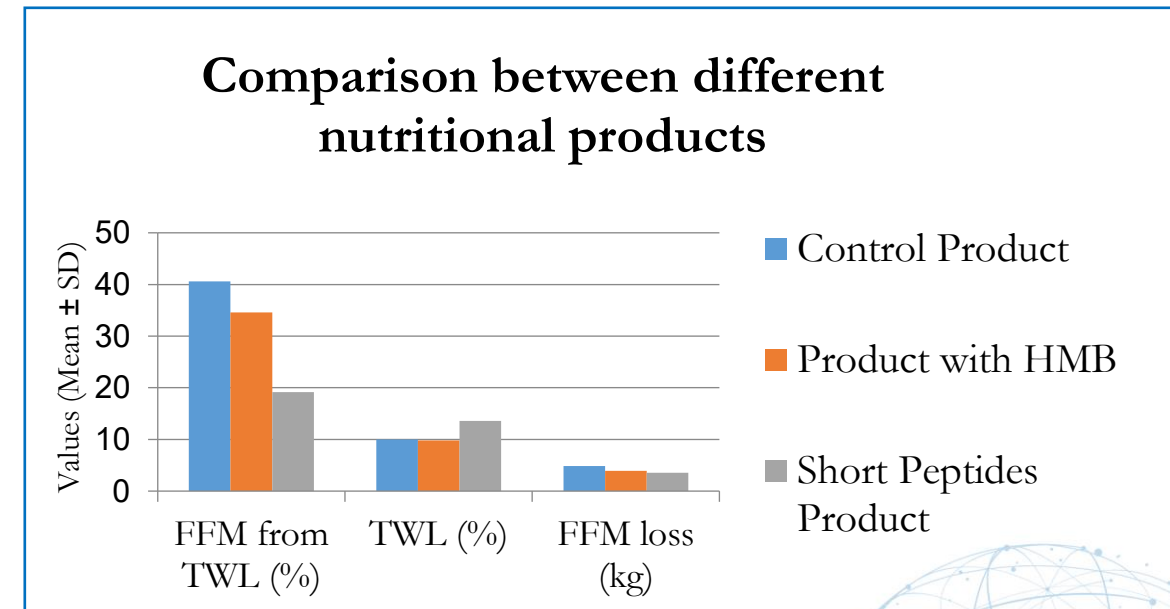


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Nutrients	Control Product (50 g with 200 mL of Water)	Short Peptide Product (200 mL)	Product with HMB (220 mL)
Energy (kcal)	210	300	330
Protein (g)	15	13.5	20
Carbohydrates (g)	27.4	36.8	37
Fat (g)	4.5	11	11
HMB (g)	-	-	1.5

N=60 patients, BMI 43.6 ± 4.1 Kg/m²
63 % women: mean age 43.1 ± 9.4 years



HMB: beta-hydroxy-methylbutyrate
FFM: Free Fat Mass
TWL: Total Weight Loss

Martínez MC. Et al Nutrients 2022

ifso2025.org

Creatine Supplementation on Body Composition

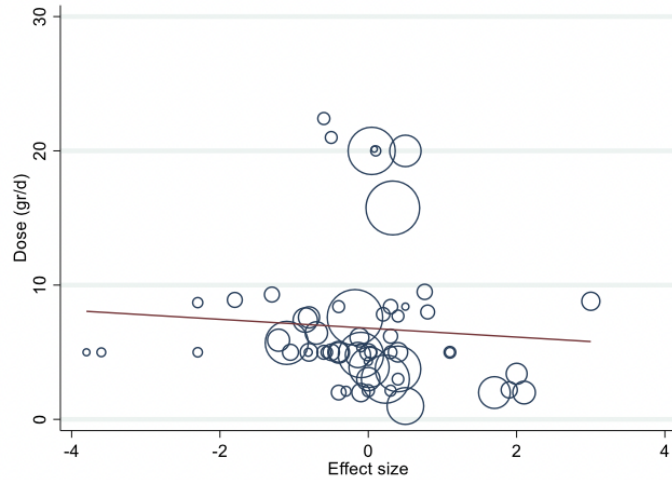
Systematic Review and Meta-Analysis



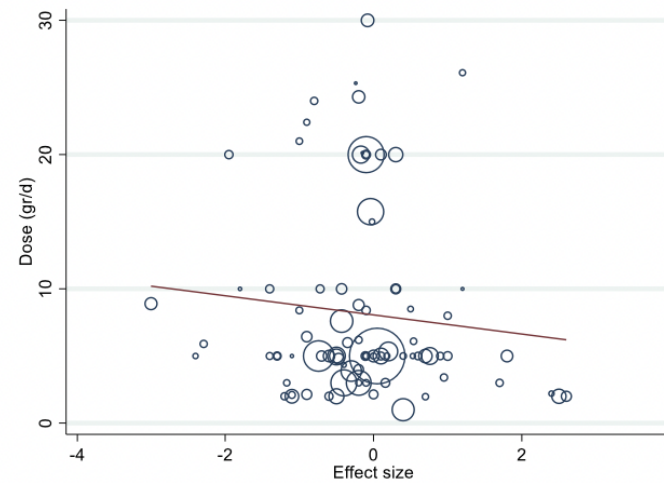
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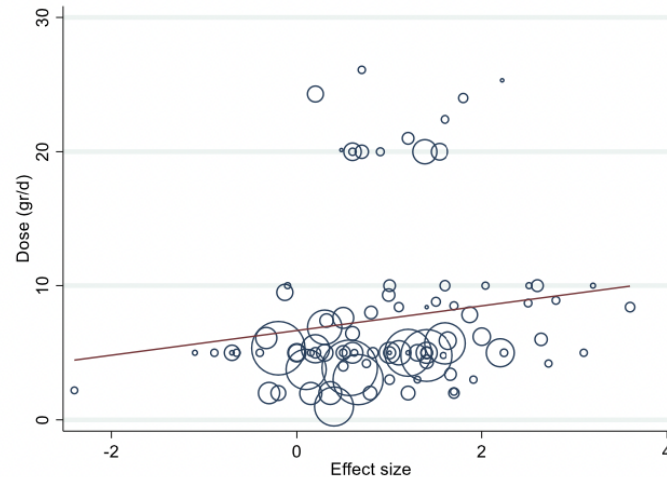
Body Fat
(Kg)



Percent of
Body fat (%)



e)



Free Fat Mass
(Kg)



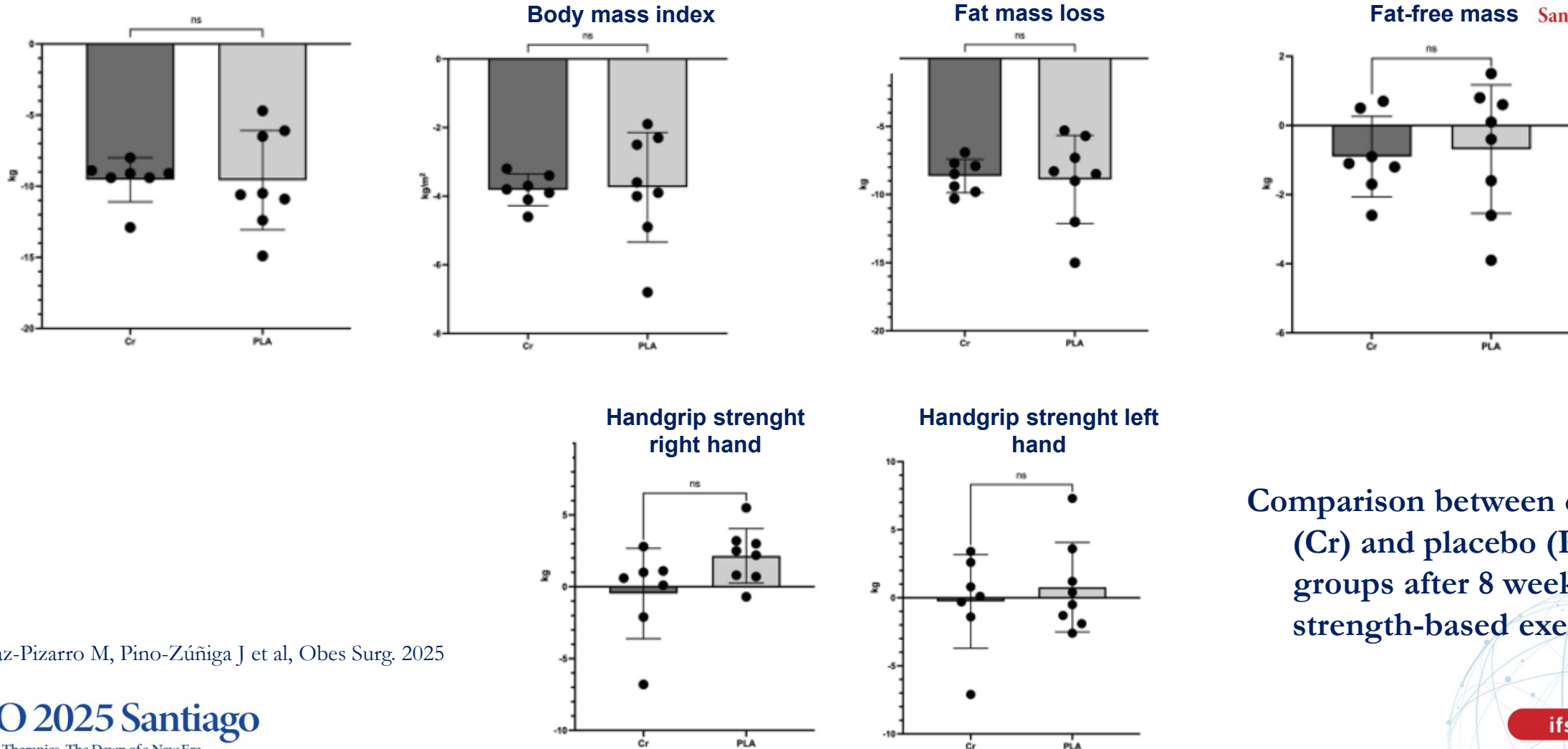
Creatine supplementation plus strength exercises after bariatric surgery



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Comparison between creatine (Cr) and placebo (PLA) groups after 8 weeks of strength-based exercise

Diaz-Pizarro M, Pino-Zúñiga J et al, Obes Surg. 2025

Dietary habits: weight maintainers versus weight regainers



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	Weight maintainers (<i>n</i> = 29)	Weight regainers (<i>n</i> = 21)	<i>P</i>
Healthy dietary habits	44%	10%	<0.001
<i>Meal pattern behaviors</i>			
Breakfast consumption	23 (80%)	4 (19%)	0.001
Having three structured meals daily (breakfast, lunch, and dinner)	23 (80%)	5 (24%)	<0.001
Consuming more than five meals daily, including snacks	14 (48%)	0	<0.001
<i>Daily consumption of foods and food groups</i>			
Carbohydrates (1–5 Ex.)	18 (62%)	8 (38%)	0.094
Fat (3–5 Ex.)	17 (59%)	4 (19%)	0.005
Vegetables (3–5 Ex.)	18 (62%)	3 (14%)	0.001
Fruits (3–5 Ex.)	17 (59%)	1 (0.5%)	<0.001
Water (6–11 Cups)	23 (79%)	8 (38%)	<0.001
<i>Weekly consumption of foods and food groups</i>			
Ready-to-eat foods (0-1 time)	23 (79%)	13 (62%)	0.304
Fast foods (0-1 time)	24 (83%)	14 (67%)	0.189
Healthy lifestyle practices	30%	4%	0.002
<i>Grocery shopping behaviors</i>			
Consideration of healthy foods while shopping	27 (93%)	3 (14%)	<0.001
Selection of whole-grain over refined-grain products	17 (59%)	6 (29%)	0.035
Selection of low-fat products over full-fat products	20 (69%)	7 (33%)	0.013
Selection of foods based on nutritional facts	17 (59%)	2 (10%)	0.002
Reading the nutritional label of food products	22 (76%)	3 (14%)	<0.001





Behavioral Lifestyle Practices

Weight maintainers versus Weight regainers

Pace of eating

Stoppage of eating when feeling full	25 (86%)	12 (57%)	0.021
Taking pauses between bites	21 (72%)	5 (24%)	0.001
Taking >20–30 minutes for a meal	21 (72%)	4 (19%)	<0.001
Practicing sufficient chewing while eating	26 (90%)	10 (48%)	0.001

Self-assessment behaviors

Regular body weight measuring	25 (86%)	6 (29%)	<0.001
Monitoring the daily consumed and burned calories	25 (86%)	4 (19%)	<0.001
Regular nutritional follow-up visits	15 (52%)	0	<0.001

Negative eating behaviors

Emotional binge eating	7 (24%)	7 (33%)	0.475
Distracted eating	6 (21%)	11 (52%)	0.020
Late-night snacking	5 (17%)	12 (57%)	0.003

Physical activity

Physically active	17 (59%)	4 (19%)	0.005
Daily exercise for ≥30 minutes	9 (31%)	1 (5%)	0.022



Summary



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- Restricted calorie diets, high in proteins and fiber, with complex carbohydrates of low glycemic index, healthy fat with minimal consumption of UPF have shown beneficial effect to prevent weight regain after BS; and **add global health**
- Use of hydrolyzed protein could have some benefit to reduce weight regain after BS.
- Early last meal could be a contribute factor to reduce weight regain after BS.
- Healthy behavioral lifestyle practices (nutritional follow-up, mindful shopping behavior, self-assessment behavior), are important predictors of weight regain after BS
- The success of weight management strategies after BS relies on a multidisciplinary approach that includes tailored nutritional interventions, focused to prevent weight regain, **but also to improve the global health (not just scale focused).**

BS: bariatric surgery
UPF: ultraprocessed food



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