



XXVI IFSO WORLD CONGRESS OF BARIATRIC & METABOLIC SURGERY



Physical Activities - The Whole Day Matters

Supervised Exercise: How and Why

PhD Emilian Rejane Marcon

Brazil



CONFLICT OF INTEREST DISCLOSURE

I have no potential conflict of interest to report



Preoperative



BMI = 93.3 kg/m²



Postoperative



BMI = 63.1 kg/m²

To prescribe exercises for these patients, we need to take into account that:



- ❖ Different realities and economic situation
- ❖ Different levels of education and obesity
- ❖ Access to information
- ❖ Access to Physical Activity Centers
- ❖ Private and Public Health System

Take care of the patients



Pre Bariatric Surgery

- ❖ Individuals with reduced cardiorespiratory function
- ❖ Osteo-muscular limitations
- ❖ Low level Physical Activities
- ❖ Low adherence to exercise programs

What do we find in the literature about preoperative exercise prescription?



❖ **Years:** 2013 to 2018

❖ **Keywords:** Exercise and Bariatric Surgery

Physical Activity and Bariatric Surgery

2301 Articles



**Excluded Articles
2280**



**Eligible
Articles
21**

- 1631 duplicates
- 416 without physical exercise program
- 67 were guidelines, abstracts, systematic reviews or meta-analyses
- 2 were outside the analyzed period
- 106 post bariatric
- 47 compared pre and post surgery
- 10 evaluation of the profile of patients in the preoperative period, classifying them as active or sedentary
- 1 without defined exercise protocol

Preoperative



Strength Training
9 Articles

Authors	Publication Year	Country	Intervention 1_Exercise 2_Counseling 3_Multidisciplinary	Intervention Time (Months)	n Total of the Study
Delgado Floody P (A)	2015	Chile	3	3	10
Delgado Floody P (C)	2015	Chile	3	3,5	14
Delgado Floody, P (B)	2015	Chile	1	3	28
Delgado Floody P (D)	2015	Chile	3	4	19
Delgado Floody P (A)	2016	Chile	3	5	13
Delgado Floody P (B)	2016	Chile	3	5	22
Delgado Floody, P	2017	Chile	1	6	22
Cofre-Lizama A	2017	Chile	1	8	16
Delgado-Floody, P	2018	Chile	3	5	20

Strength Training 9 Articles



- ✓ 3 Exercise Interventions
- ✓ 6 Multidisciplinary Interventions

Exercise Protocols:

- ❖ All studies had the same research group and exercise protocol

Exercise:

- ❖ 3 times a week, 10 min warm-up and Resistance exercises

Multidisciplinary intervention:

- ❖ Exercises, nutritional and psychological guidance.

Results

- ❖ Improved anthropometric and cardiometabolic parameters, and decreased psychiatric diseases
- ❖ Increased maximum dynamic and maximum isometric strength

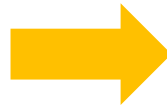
Preoperative



Aerobic Exercise
8 Articles

Authors	Publication Year	Country	Intervention 1_Exercise 2_Counseling 3_Multidisciplinary	Intervention Time (Months)	n Total of the Study
Tur JJ	2013	Espanha	3	12	143
Bond DS (A)	2015	USA	2	1,5	75
Bond DS (B)	2015	USA	2	1,5	75
Bond DS	2016	USA	2	1,5	75
Bond DS	2017	USA	2	1,5	33
Marcon ER	2017	Brazil	1 e 3	5	66
Barreto BLM	2018	Brazil	3	3	38
Lemanu D	2018	New Zealand	3	1,5	88

Aerobic Exercise 8 Articles



- ✓ 1 Exercise Intervention
- ✓ 7 Multidisciplinary or Counseling Interventions

❖ *All had control group*



- ❖ Weight
- ❖ BMI
- ❖ Waist circumference
- ❖ Pain
- ❖ Obesity levels



- ❖ Time in daily MVPA
- ❖ Daily intervals ≥ 10 minutes
- ❖ Number of steps/day
- ❖ General health scales
- ❖ Physical function
- ❖ Adherence and motivation for PA practice

Groups that received exercise prescription from a professional exercise specialist had better results

Preoperative



Concurrent Training (Aerobic + Strength)
4 Articles

Authors	Publication Year	Country	Intervention 1_Exercise 2_Counseling 3_Multidisciplinary	Intervention Time (Months)	n Total of the Study
Ortega LS	2014	Spain	3	2	10
Baillet A	2016	Canada	3	3	8
Baillet A	2017	Canada	3	3	6
Cadegiani FA	2017	Brazil	3	12	43

Concurrent Training 4 Articles

✓ 4 Multidisciplinary Interventions

Results in the Intervention groups



- ❖ Glycated hemoglobin (HbA1c)
- ❖ Alanine transaminase
- ❖ Gamma glutamine
- ❖ Uric acid
- ❖ C-reactive protein



- ❖ Cardiometabolic Parameters
- ❖ Antropometric Parameters
- ❖ Adherence

- ❖ Online and face-to-face interventions did not show differences in Quality of Life and Psychological Barrier to the Practice of PA
- ❖ The frequency in exercise sessions was higher in online activities

Importance of Preoperative Levels of PA and the Results of MBS

❖ Reduced cardiorespiratory fitness ($VO_{2max} < 15.8$ ml/kg/min) is associated with a longer operation and intubation time, estimated blood loss during surgery, and more frequent cardiovascular complications.

❖ Several factors are associated with more minutes of MVPA and 10.000 steps/day in postoperatively, such as:



Increasing exercise as a weight loss strategy
Performing 150 minutes/week
Reducing pain
Starting PA 6 months before surgery



❖ Improvements are observed in different interventions and in different exercise protocols

Pos Bariatric Surgery

Substantial Weight Loss

**Substantial Loss of Muscle Mass
(Up to 30 -35% in 6 months)**

 The lack of skeletal muscles may be related to functional, immunological, metabolic and postural problems

 33.5% drop in muscle mass may result in a decrease of more than 300 kcal / day



Energy expenditure

- ❖ The exercise promotes maintenance and/or increase of lean mass
- ❖ Improves physical fitness, metabolic health, quality of life and leads to additional weight and body fat loss
- ❖ Promotes greater weight loss at 12 and 24 months after bariatric surgery

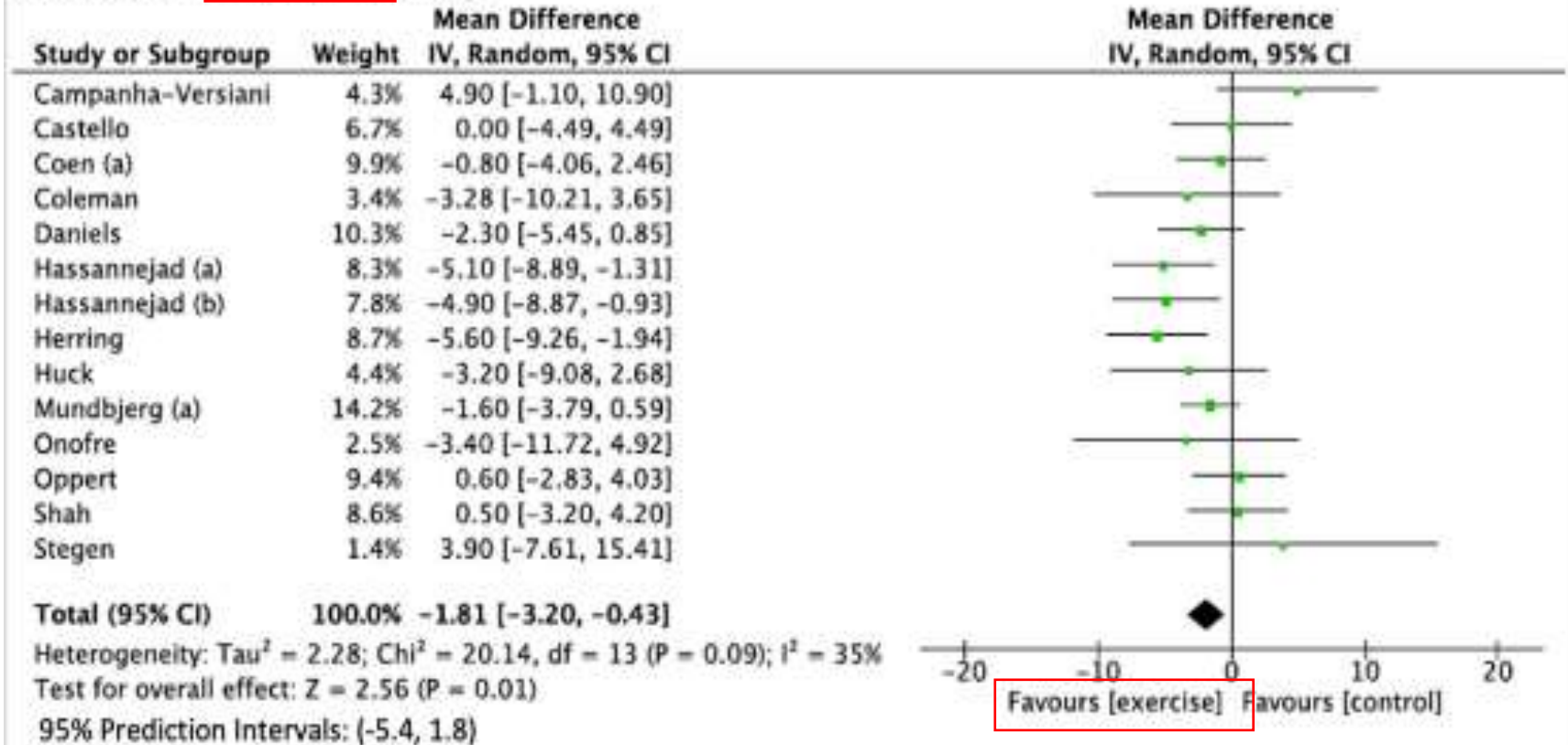
Effect of exercise training before and after bariatric surgery: A systematic review and meta-analysis

Alice Bellicha,^{1, 2} Marleen A. van Baak,³ Francesca Battista,⁴ Kristine Beaulieu,⁵ John E. Blundell,⁶ Luca Busetto,^{6, 7} Eliana V. Carraca,⁸ Dror Dicker,^{6, 9} Jorge Encantado,¹⁰ Andrea Ermolao,⁴ Nathalie Farpour-Lambert,^{6, 11} Adriyan Pramono,³ Euan Woodward,⁶ and Jean-Michel Oppert¹²

Pos Bariatric Surgery

Exercise Groups
and
Control Groups

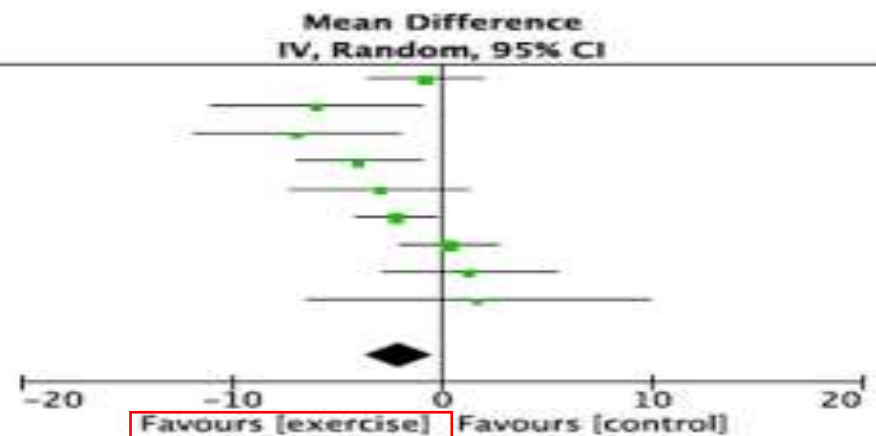
(A) Change in **body weight** (in kg)



Pos Bariatric Surgery Exercise Groups and Control Groups

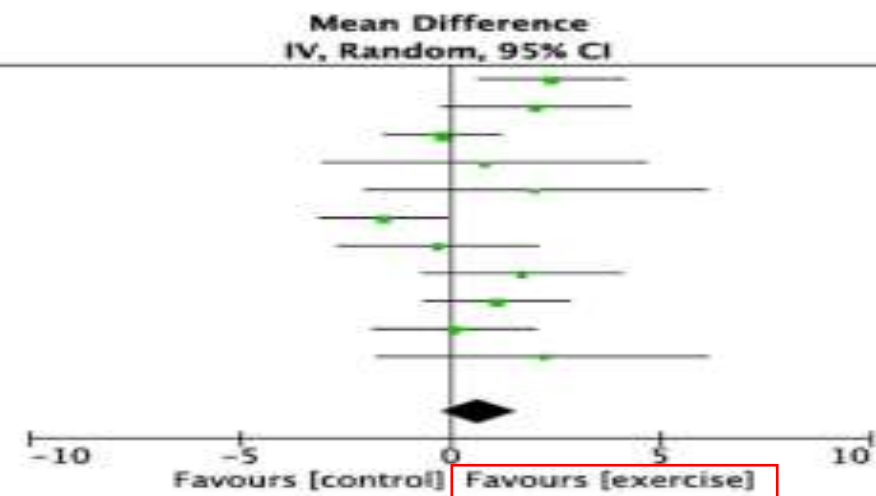
(B) Change in fat mass (in kg)

Study or Subgroup	Weight	Mean Difference IV, Random, 95% CI
Coen (a)	14.6%	-0.80 [-3.54, 1.94]
Hassannejad (a)	7.3%	-6.00 [-11.04, -0.96]
Hassannejad (b)	7.6%	-6.90 [-11.80, -2.00]
Herring	13.6%	-4.00 [-6.98, -1.02]
Huck	9.1%	-3.00 [-7.29, 1.29]
Marchesi	18.3%	-2.22 [-4.18, -0.26]
Oppert	16.5%	0.30 [-2.04, 2.64]
Shah	9.6%	1.29 [-2.84, 5.42]
Stegen	3.4%	1.70 [-6.50, 9.90]
Total (95% CI)	100.0%	-2.08 [-3.70, -0.45]
Heterogeneity: $\text{Tau}^2 = 2.76$; $\text{Chi}^2 = 15.86$, $\text{df} = 8$ ($P = 0.04$); $I^2 = 50\%$		
Test for overall effect: $Z = 2.50$ ($P = 0.01$)		



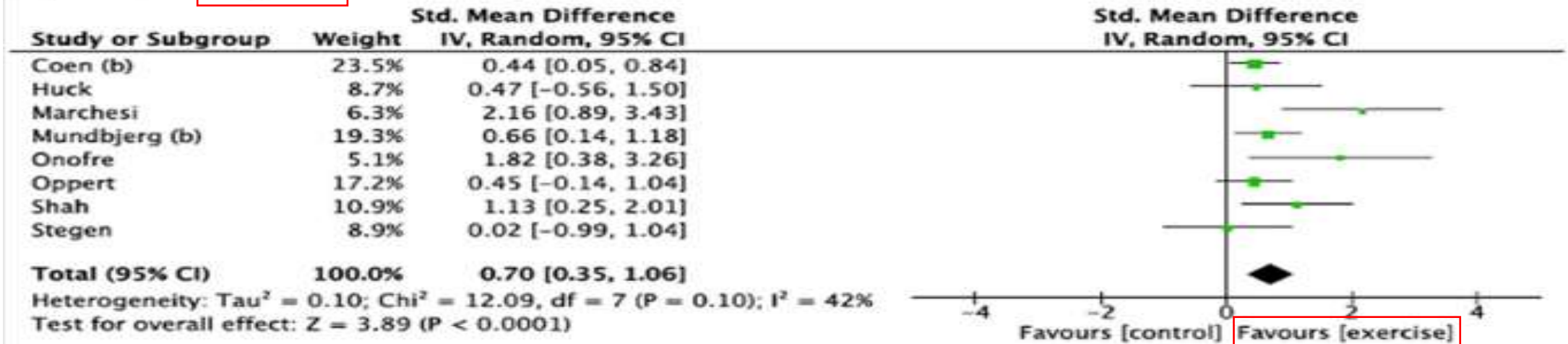
(C) Change in lean body mass (in kg)

Study or Subgroup	Weight	Mean Difference IV, Random, 95% CI
Campanha-Versiani	11.8%	2.40 [0.66, 4.14]
Castello	9.1%	2.00 [-0.23, 4.23]
Coen (a)	14.2%	-0.20 [-1.59, 1.19]
Hassannejad (a)	4.2%	0.80 [-3.07, 4.67]
Hassannejad (b)	3.9%	2.00 [-2.05, 6.05]
Herring	13.4%	-1.60 [-3.10, -0.10]
Huck	8.4%	-0.30 [-2.68, 2.08]
Marchesi	8.4%	1.70 [-0.68, 4.08]
Oppert	11.8%	1.10 [-0.64, 2.84]
Shah	10.6%	0.10 [-1.84, 2.04]
Stegen	4.1%	2.20 [-1.72, 6.12]
Total (95% CI)	100.0%	0.68 [-0.20, 1.56]
Heterogeneity: $\text{Tau}^2 = 0.92$; $\text{Chi}^2 = 18.12$, $\text{df} = 10$ ($P = 0.05$); $I^2 = 45\%$		
Test for overall effect: $Z = 1.52$ ($P = 0.13$)		
95% Prediction Intervals: (-1.7, 3.1)		

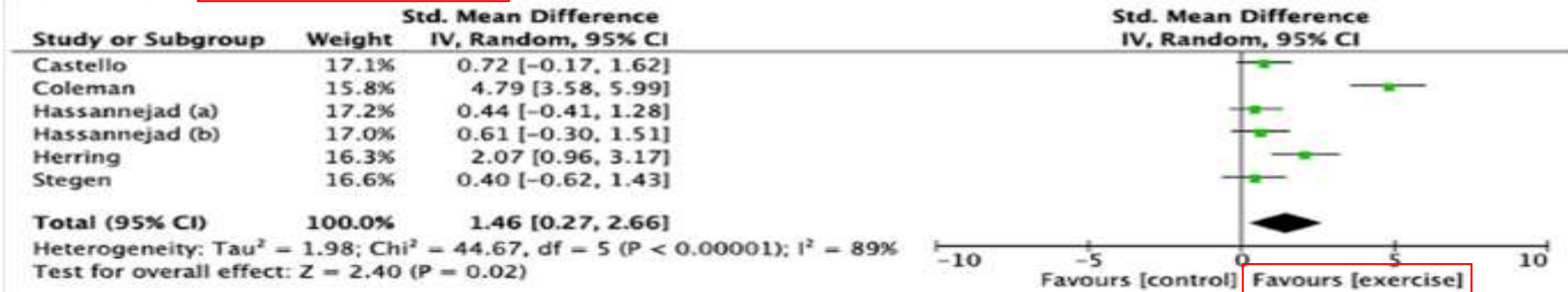


Pos Bariatric Surgery Exercise Groups and Control Groups

(A) Change in $VO_2\max$

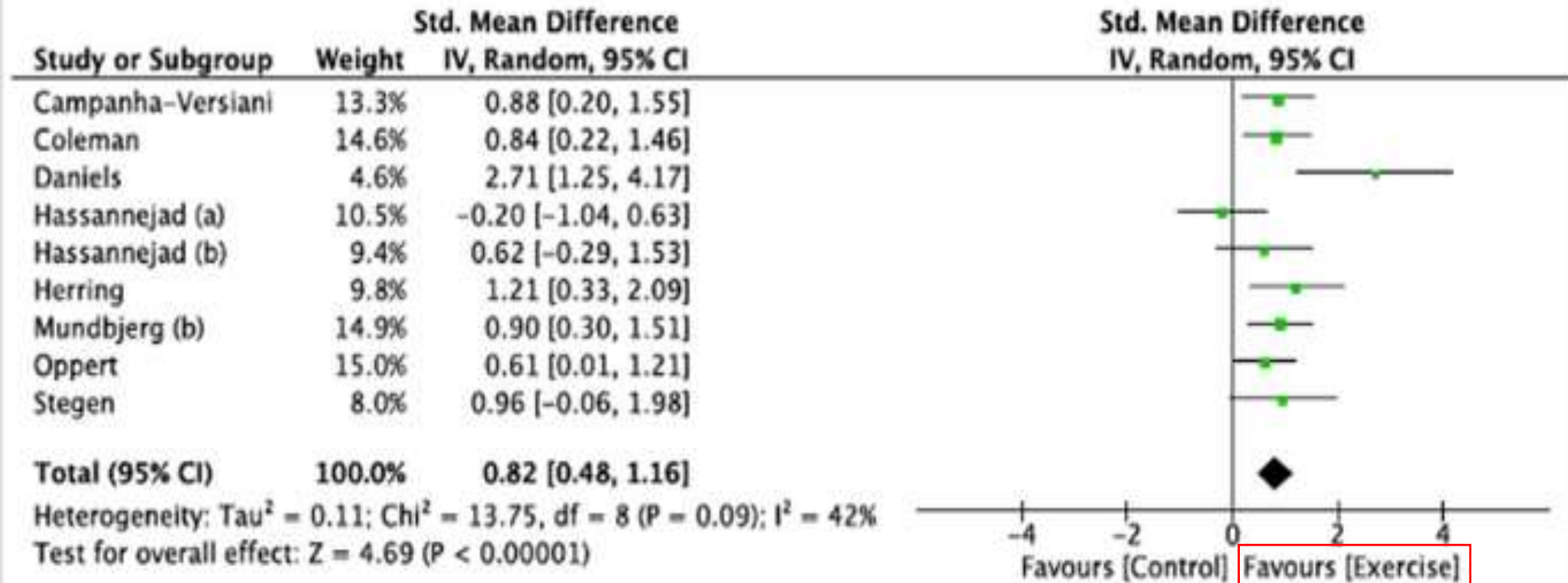


(B) Change in walking test distance



Pos Bariatric Surgery Exercise Groups and Control Groups

(C) Change in muscle strength





[Obesity Surgery](#)

March 2017, Volume 27, [Issue 3](#), pp 763–773

What Is the Best Treatment before Bariatric Surgery? Exercise, Exercise and Group Therapy, or Conventional Waiting: a Randomized Controlled Trial

Authors

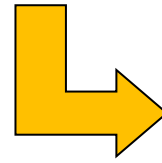
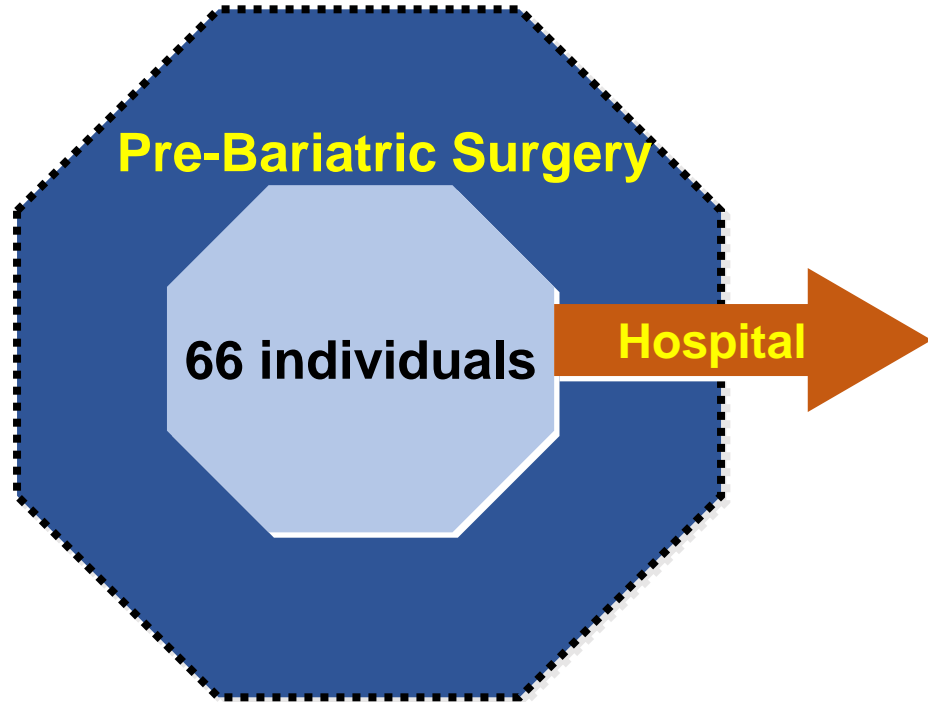
[Authors and affiliations](#)

Emilian Rejane Marcon , S. Baglioni, L. Bittencourt, C. L. N. Lopes, C. R. Neumann, M. R. M. Trindade

OBJECTIVE:

Investigate the effect of an exercise program with and without cognitive-behavioral therapy, compared by a control group, on weight, functional capacity, and cardiometabolic profile on bariatric surgery preoperative.

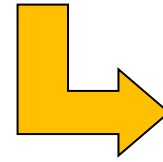
Randomized Clinical Trial



22

EXER

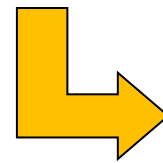
Exercises Protocol



22

EXER+CBT

Exercises Protocol
+
Cognitive Behavioral
Therapy



22

CONTROL

Routine Treatment

All underwent routine treatment

Exercises Protocol

(EXER and EXER+CBT)

Aerobic Exercises

Simulating walking
Rhythm of songs

+

Stretching

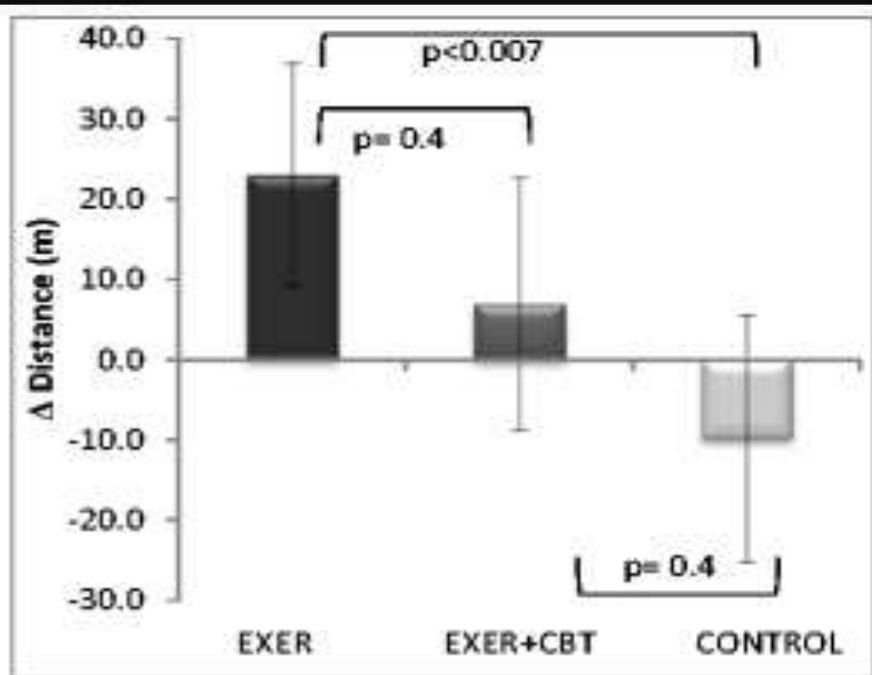
End of session

Twice a week
5 months

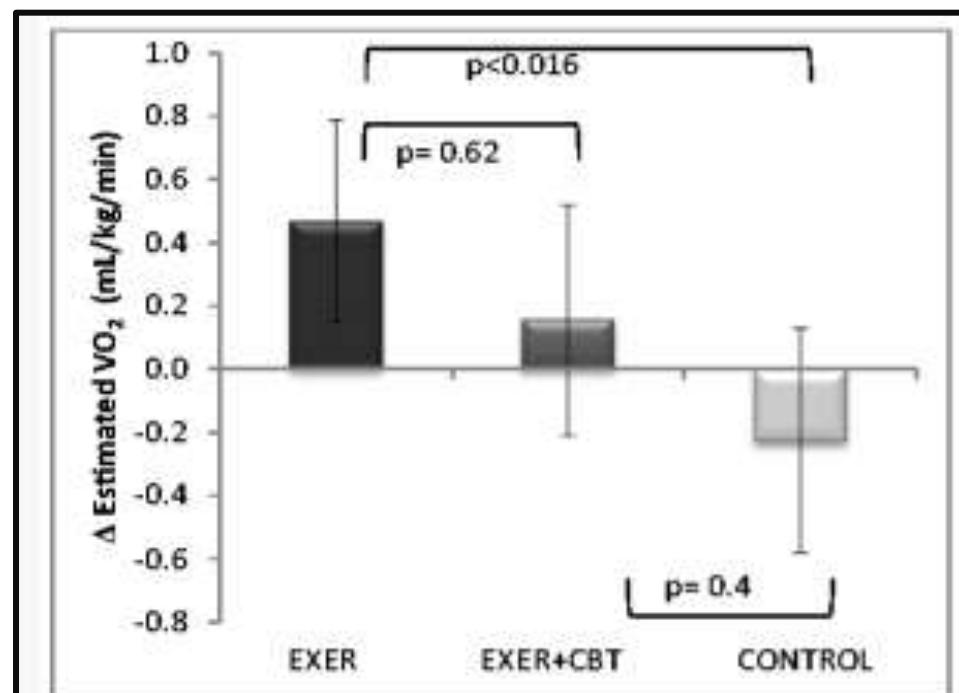
20 Minutes

5 Minutes

Were encouraged to increase exercise daily

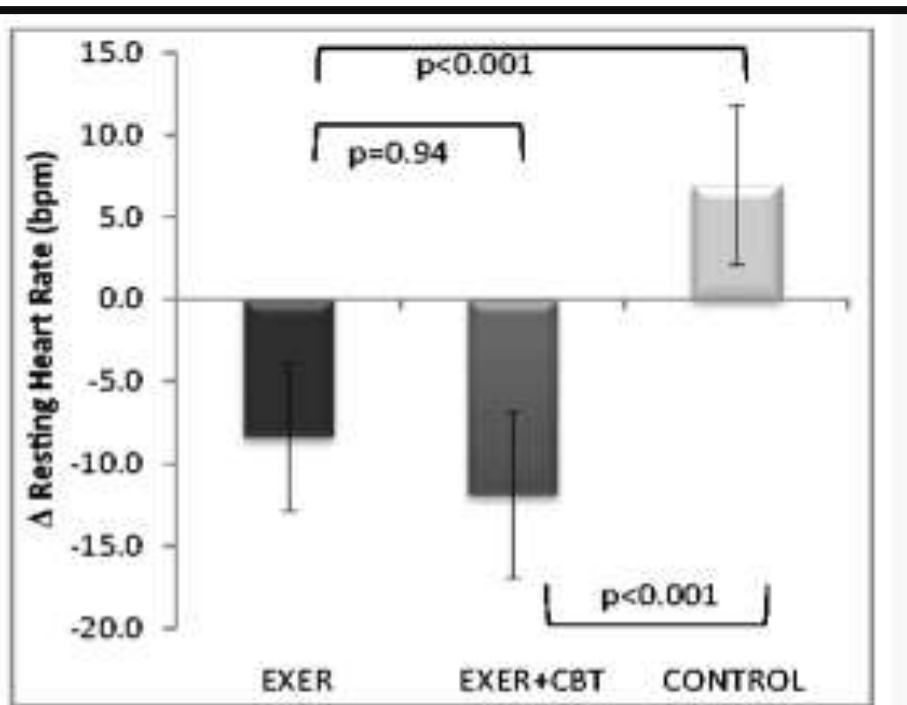


Distance (m)	Baseline Mean (SE)	Post-intervention Mean (SE)	P
EXER	435 (15)	457.5(13.6)	< 0.001
EXER+CBT	433.9(16.8)	440.6(13)	0.56
CONTROL	427.2(16)	418.2(18.3)	0.23

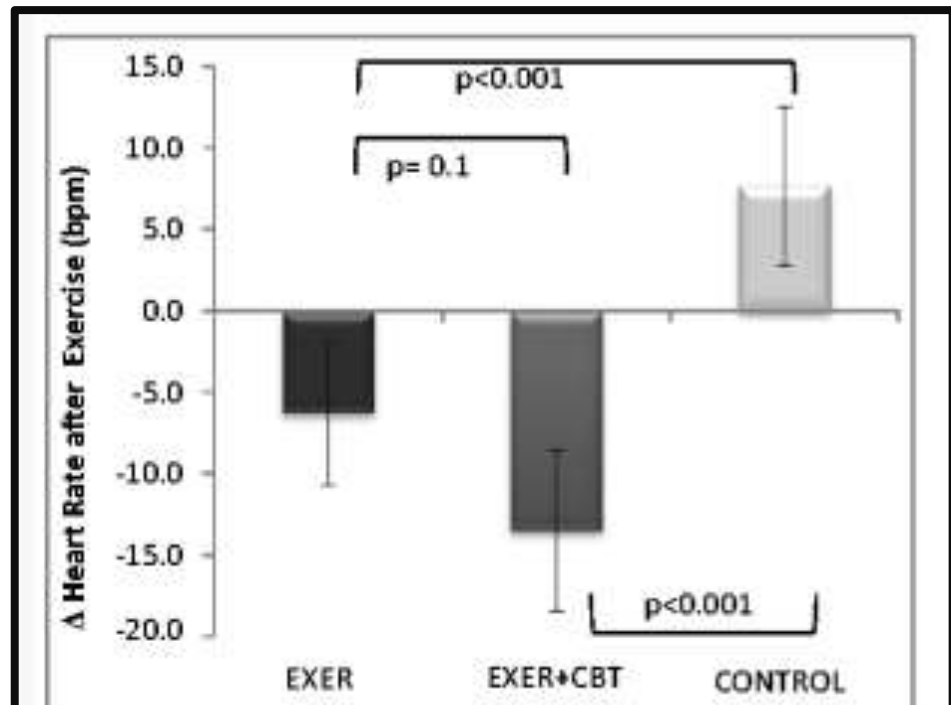


Estimated VO_2 (mL/kg/min)	Baseline Mean (SE)	Post-intervention Mean (SE)	P
EXER	14.9 (0.4)	15.4(0.3)	< 0.001
EXER+CBT	14.9(0.4)	15.1(0.3)	0.56
CONTROL	14.8(0.4)	14.6(0.4)	0.23

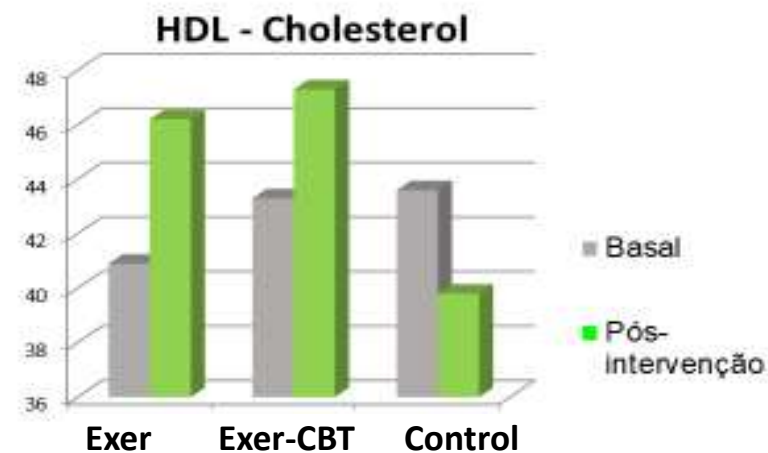
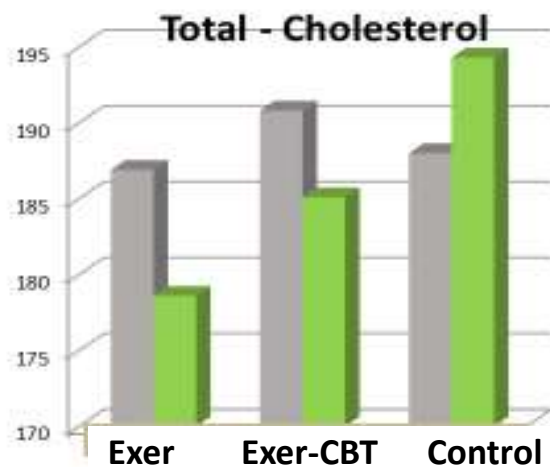
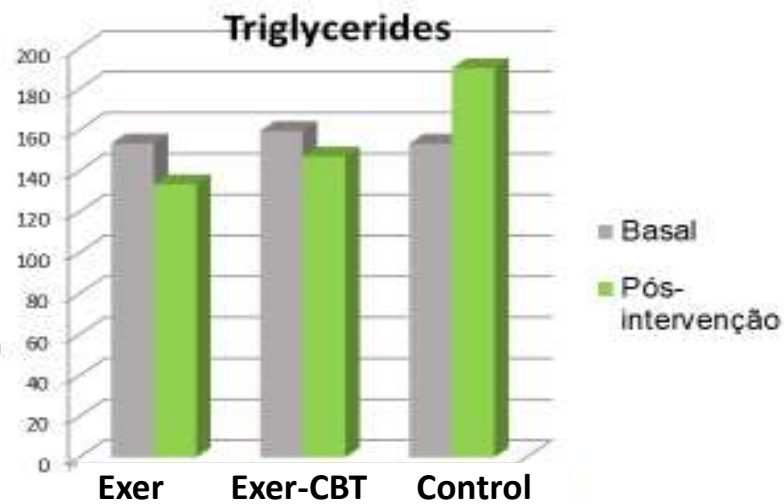
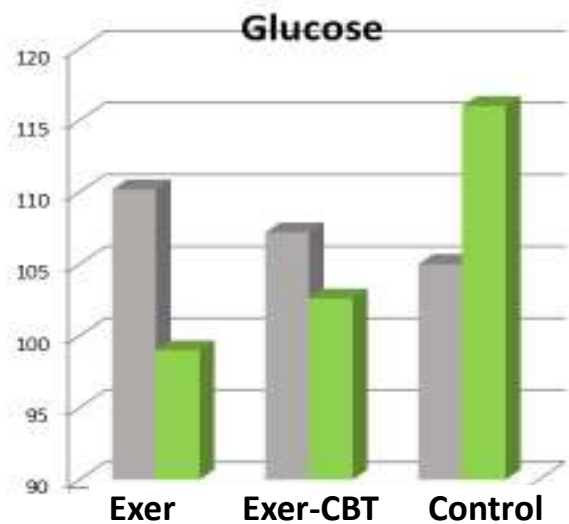


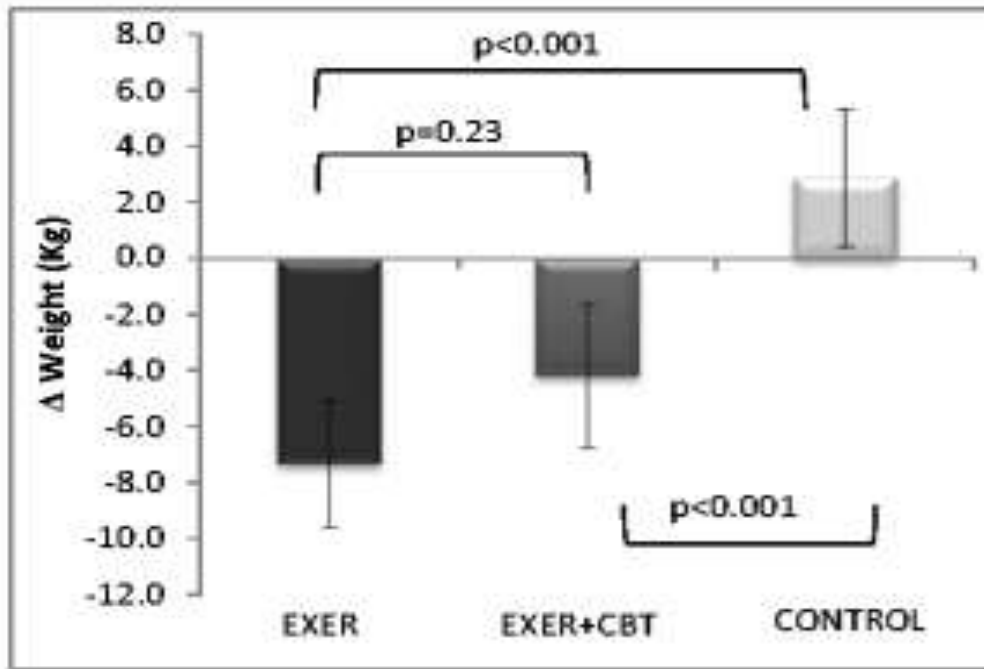


Resting Heart Rate (bpm)	Baseline Mean (SE)	Post-intervention Mean (SE)	P
EXER	92.3 (3.3)	81.9 (2.8)	< 0.001
EXER+CBT	83.4 (2.5)	73.3 (2.4)	< 0.001
CONTROL	85.7 (2.0)	93.4 (2.9)	< 0.001



Heart Rate after Exercise (bpm)	Baseline Mean (SE)	Post-intervention Mean (SE)	P
EXER	132.6 (3.2)	125 (3.2)	< 0.001
EXER+CBT	126 (5.1)	128 (4.7)	< 0.001
CONTROL	121.7 (2.6)	130.7 (2.7)	< 0.001





Weight (kg)	Baseline Mean (SE)	Post-intervention Mean (SE)	P
EXER	131(6.5)	123.5(6.5)	< 0.001
EXER+CBT	112.6(4.6)	108.5(4.7)	< 0.001
CONTROL	121(5.8)	124(6)	< 0.001

The interventions positively influenced the patients' health

Control Group in 5 months
Increased severity of
comorbidities assessed and
cardiovascular risk

Face-to-Face /// Online Program



Before and After Bariatric Surgery



PESO III
Supervised Exercise Program for
Obesity III

Public Health Care



TCHÊ MEXE ADULTO
TCHÊ MEXE GURIZADA





+ 600 Patients
+ 50 Patients per Exercises Sessions





First moment: Physical exercise | **Second moment:** Lectures on acquiring healthy habits

WhatsApp Groups : Information, Socialization and Education



**Integration
Information
Socialization**

239 Patients



**WhatsApp Business
Information**

250 Patients

#PESOIII

YouTube Channel
#TCHÊMEXE
#PESOIII



PESOIII - TCHÊ MEXE 🚴 🧑🏻 🏆

WhatsApp Group Invite

Acesse este link para entrar no meu grupo do WhatsApp:
<https://chat.whatsapp.com/BxogytmDteOJEo5gYs36G0>

[Ver grupo](#)



Emilian Rejane Marcon Emarcon

26 inscritos

PERSONALIZAR O CANAL

YOUTUBE STUDIO (BETA)

INÍCIO

VÍDEOS

PLAYLISTS

CANAIS

DISCUSSÃO

SOBRE



Envios

▶ REPRODUZIR TODOS



15:51

Vídeo 3 Alongamento +
Ginástica

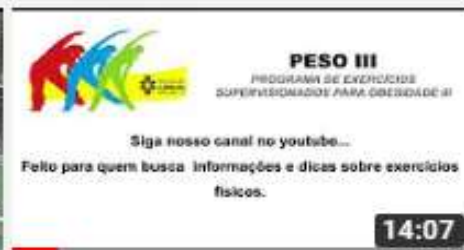
26 visualizações •
1 semana atrás



11:55

Aula 2 - PESOIII - Começando
a dançar

106 visualizações • 1 mês atrás



14:07

Aula 1 - Alongamentos -
PESOIII (Programa de...

79 visualizações • 1 mês atrás



4:00

PESOIII - Programa de
Exercícios Supervisionados...

89 visualizações • 1 mês atrás



INÍCIO

VÍDEOS

PLAYLISTS

CANAIS

DISCUSSÃO

SOBRE



Envios REPRODUZIR TODOS

ORDENAR POR



PESOSIII e TCHÊ MEXE: HORTAS e MUDAS DE...

6 visualizações • há 5 dias



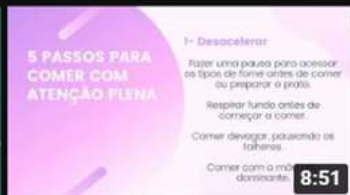
PESOSIII e TCHÊ MEXE: Meditação do Chocolate

6 visualizações • há 5 dias



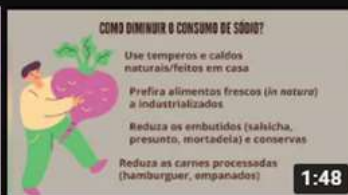
PESOSIII e TCHÊ MEXE: MOTIVAÇÃO

30 visualizações • há 5 dias



PESOSIII e TCHÊ MEXE: MINDFUL EATING -Comen...

36 visualizações • há 6 dias



PESOSIII e TCHÊ MEXE: Açúcar e Sal nos Alimentos

25 visualizações • há 6 dias



PESOSIII e TCHÊ MEXE: Aula de dança - Iniciantes

30 visualizações • há 1 semana



PESOSIII e TCHÊ MEXE: Aula de dança - baixa intensidade

27 visualizações • há 1 semana



PESOSIII e TCHÊ MEXE: MOTIVAÇÃO

21 visualizações • há 2 semanas



#PESOSIII E TCHÊ MEXE: Exercícios para reduzir a...

24 visualizações • há 2 semanas



PESOSIII e TCHÊ MEXE: Como ter uma horta em...

35 visualizações • há 3 semanas



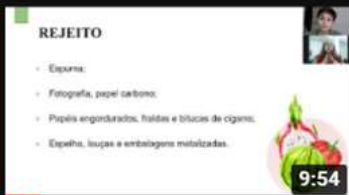
PESOSIII e TCHÊ MEXE: Aula de yoga - baixa intensidade

58 visualizações • há 4 semanas



PESOSIII e TCHÊ MEXE: Aproveitamento integral d...

61 visualizações • há 1 mês



PESOSIII e TCHÊ MEXE: Sustentabilidade e...

8 visualizações • há 1 mês



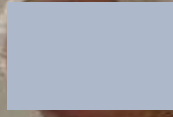
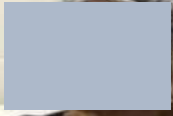
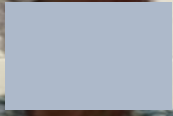
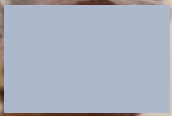
#PESOSIII e TCHÊ MEXE: Exercícios Aeróbicos

38 visualizações • há 1 mês



PESOSIII e TCHÊ MEXE: PÁSCOA SAUDÁVEL

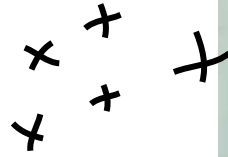
16 visualizações • há 1 mês



THE SCANDINAVIA
COPENHAGEN
Established
Danish Country



E-BOOK OF RECIPES



- ❖ Recipes submitted by patients
- ❖ Various recipes to use 100% of the food
- ❖ Working together with the pedagogy and nutrition students





1



2



3



4



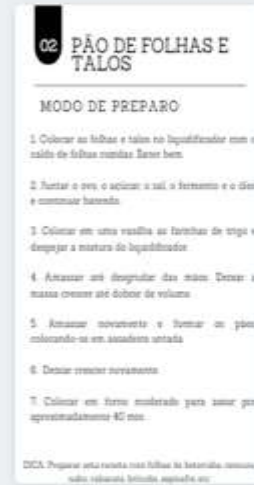
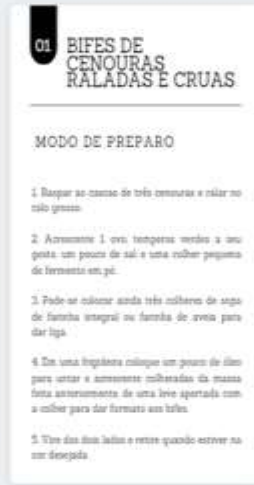
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6



7



Recommendations for exercise prescription in bariatric patients

- ❖ Taking into account individual preferences for prescribing exercise
- ❖ Create strategies that facilitate and involve the individual in the exercise program (pleasant environments, music, scenery, etc)
- ❖ Exercise supervision by an experienced exercise specialist increases adherence and reduces the risks that can be posed by PA
- ❖ Exercising in the preoperative period of bariatric surgery increases adherence and postoperative benefits.

*Maybe the world can come together
and teach each other*



Discussing adherence, motivation, strategies and exercise prescription in bariatric surgery individuals is essential.

To change lives we need to change behavior and physical exercise is part of this process.

We need to make patients aware of the importance of regular exercise and assist them in discovering their physical abilities.





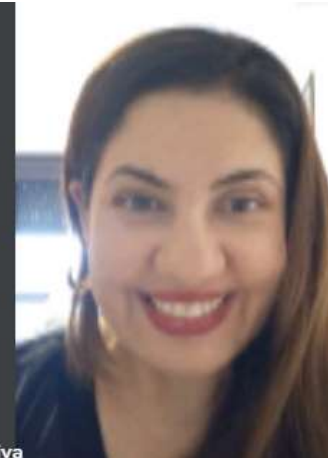
Emilian Rejane Marcon Emarcon (PESOIII)



Gabriel Marcon Porto



Laura Luna Martins



Renata Dal Piva



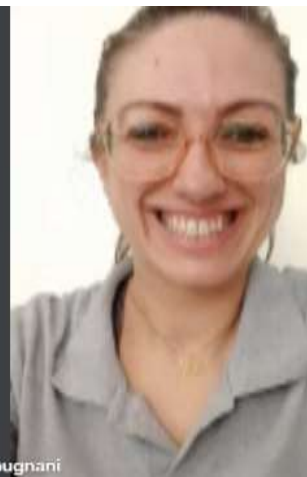
Louyso Brito



Niceli Guth



Luisa Da Silva Dias Iudsdias



Analino Lampugnani



Silmara Chaves



Carolina Wasem



Alef Alves Lemos aalemos



PhD Emilian Rejane Marcon
emarcon@hcpa.edu.br
@RejaneMarcon



NAPOLI
2023





Thank You!
Grazie!