EU4Nutrition LIVE

# CONTINUITY OF NUTRITION CARE

optimal nutritional care for all

## THE POWER OF CONCERTED EFFORTS AGAINST MALNUTRITION

The European Nutrition for Health Alliance

NESPEN clinical nutrition and metabolism

kenniscentrum ondervoeding

Nederlandse Vereniging van Diëtisten

Nutrition & Healthcare Alliance

# Prehabilitation can enhance recovery after surgery?

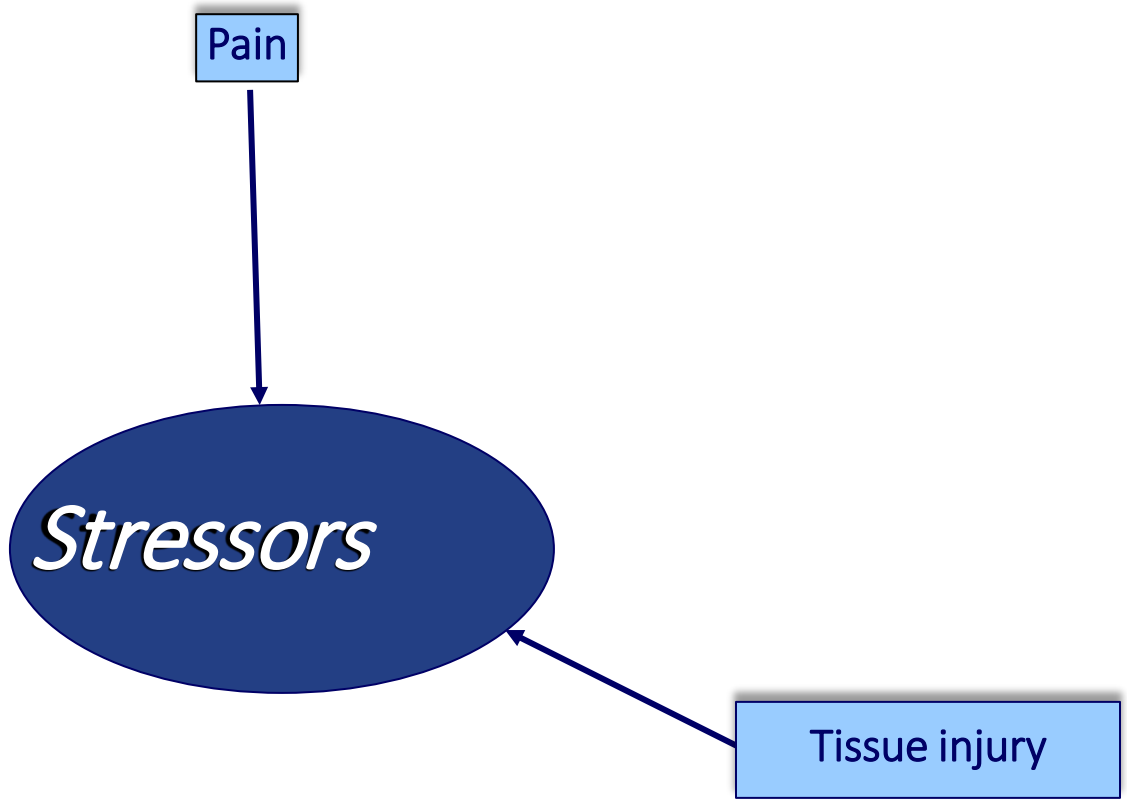
# ERAS

# Enhanced Recovery After Surgery

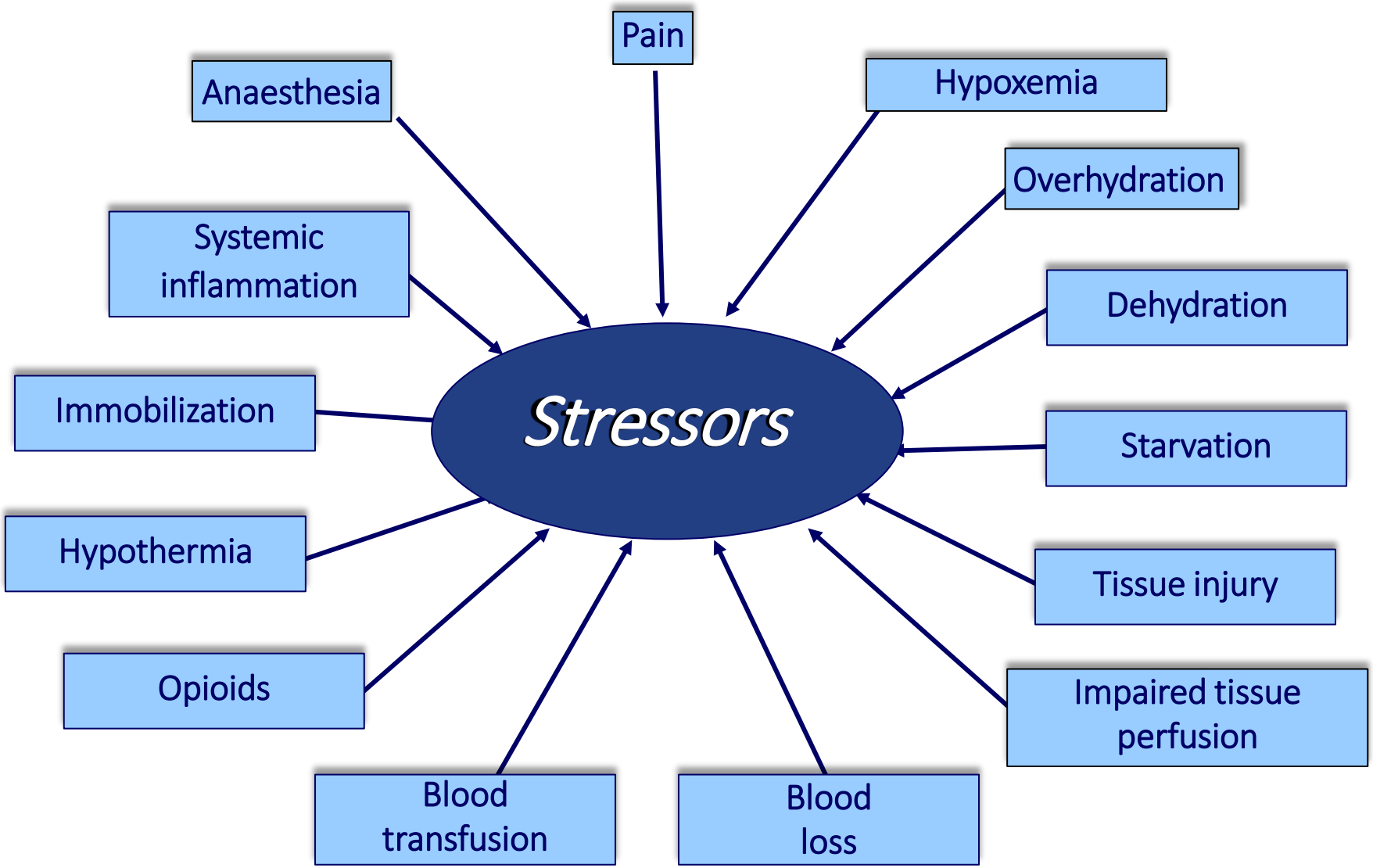
Modulator of stress reactions

Multimodal approach

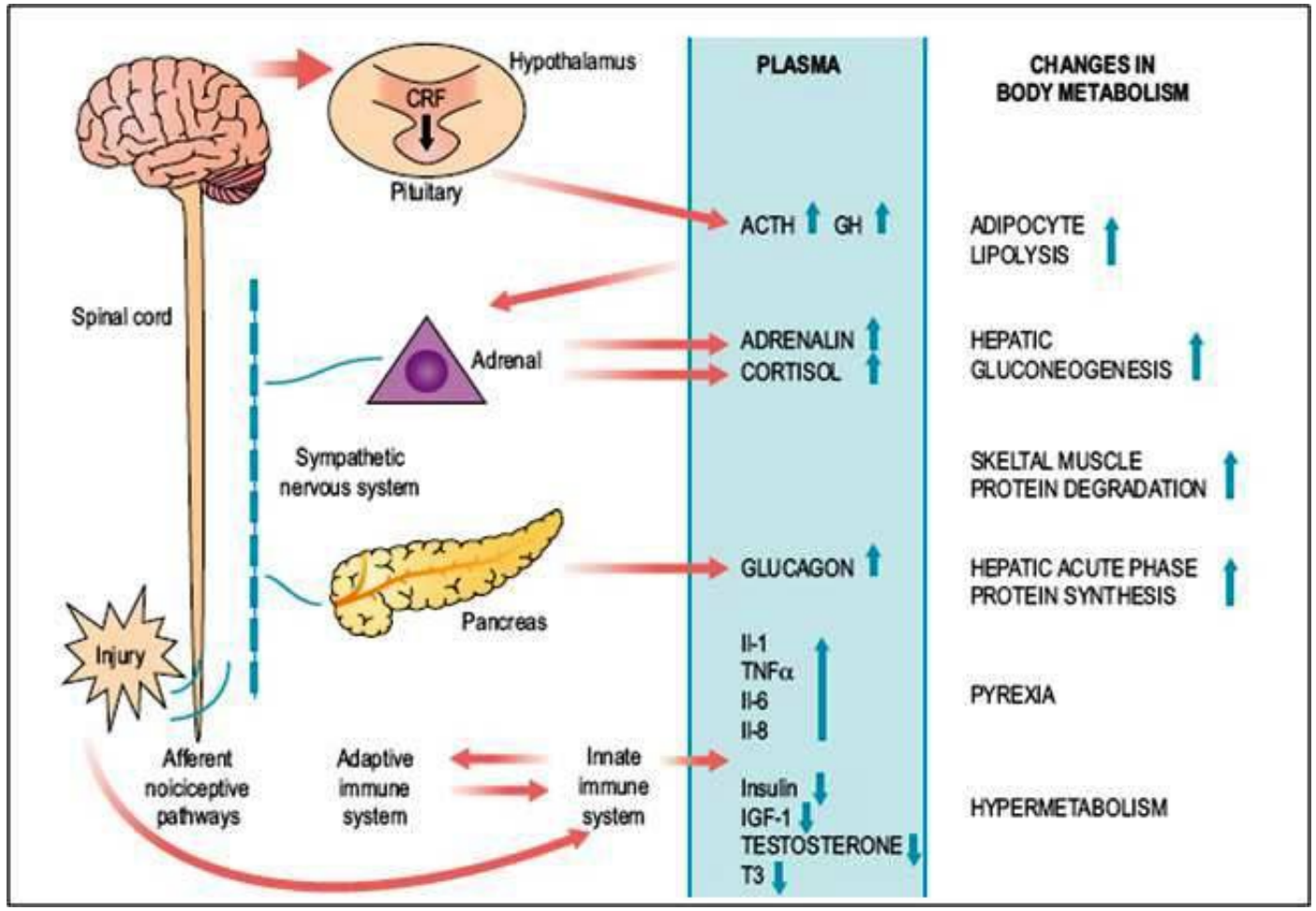
# Stressors in surgery



# Stressors in surgery



# The Metabolic Stress Response to Surgery and Trauma



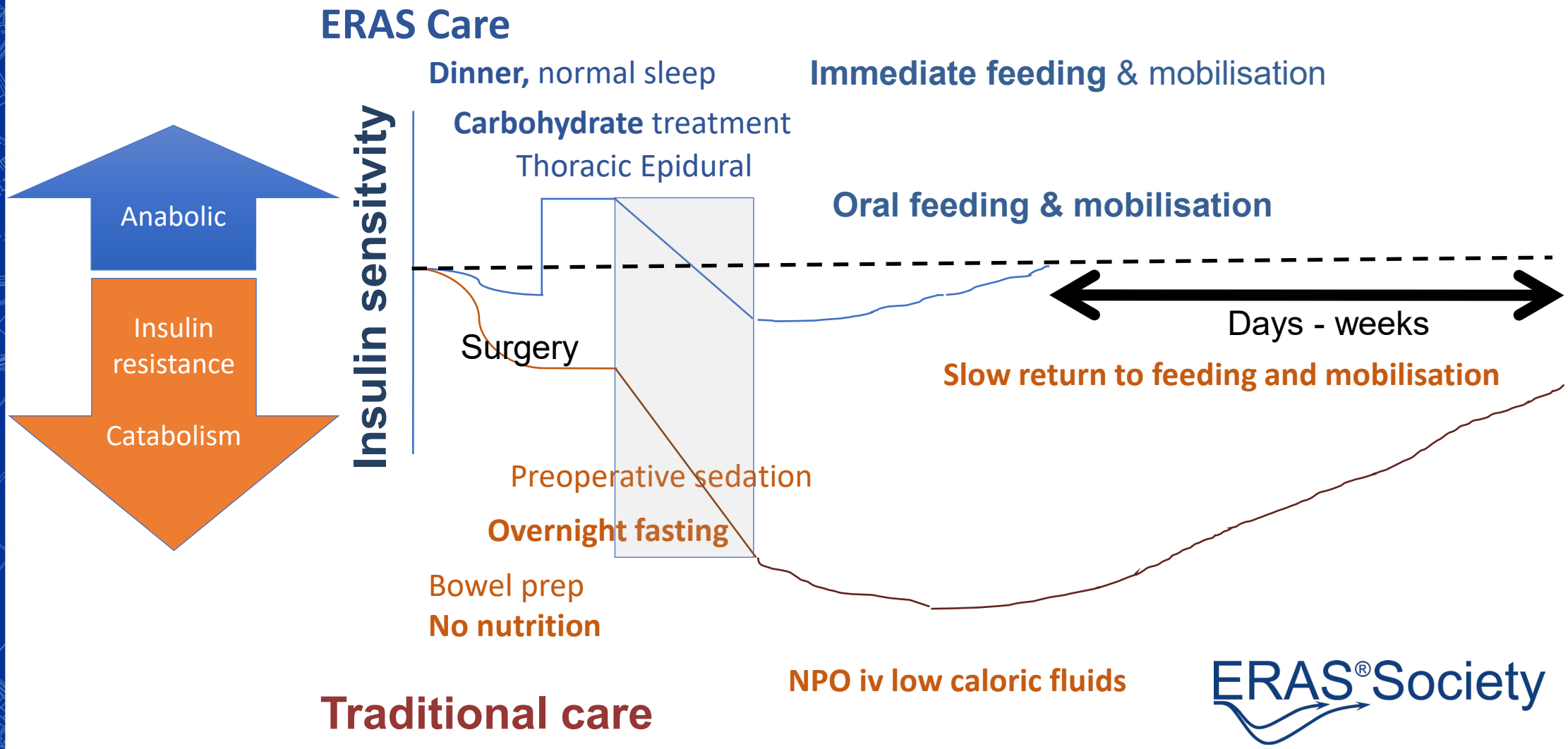
# Insulin & Recovery

## Insulin: main anabolic hormone involved in:

- All parts of metabolism
  - *Glucose control*
  - *Fat metabolism*
  - *Protein*
- Regulator of return of key functions
- Central to development of complications
- Affected by many perioperative treatments

Ljungqvist O. JPEN 2011

# Insulin sensitivity Days after surgery




ERAS® Society

Ljungqvist JPEN 2012

# Change of Nutrition practice with ERAS®

| ERAS Protocol Nutrition Care Elements | Pre-ERAS (n = 487) | ERAS (n = 3536) | *P*-Value | Not At Nutrition Risk (n = 2317) | At Nutrition Risk[a] (n = 311) | *P*-Value |
|---|---|---|---|---|---|---|
| Presurgery | | | | | | |
| Nutrition screen (n, %) | | | <.001 | – | – | – |
| Yes | 43 (9) | 2628 (74) | | – | – | – |
| No | 445 (91) | 908 (26) | | – | – | – |
| Carbohydrate treatment (n, %) | | | <.001 | | | .377 |
| Yes | 18 (4) | 2142 (61) | | 1425 (62) | 196 (63) | |
| No | 467 (96) | 1238 (35) | | 810 (35) | 100 (32) | |
| Unknown | 2 (0) | 156 (4) | | 82 (4) | 15 (5%) | |
| Oral bowel preparation (n, %) | | | <.001 | | | .310 |
| No | 270 (55) | 2561 (72) | | 1691 (73) | 236 (76) | |
| Yes | 210 (43) | 951 (27) | | 619 (27) | 73 (23) | |
| Unknown | 7 (1) | 24 (1) | | 7 (0.3) | 2 (1) | |
| Postoperative nausea and vomiting prophylaxis administered (n, %) | | | <.001 | | | .193 |
| Yes | 386 (79) | 3133 (89) | | 2069 (89) | 267 (86) | |
| No | 94 (19) | 369 (10) | | 231 (10) | 41 (13) | |
| Unknown | 7 (1) | 34 (1) | | 17 (1) | 3 (1) | |
| Postsurgery | | | | | | |
| Stimulation of gut motility (N, %) | | | <.001 | | | <.001 |
| Yes (laxatives or gum, or both) | 67 (14) | 2559 (72) | | 1715 (74) | 216 (69) | |
| No stimulation given | 420 (86) | 445 (13) | | 195 (8) | 51 (16) | |
| Unknown | 0 (0) | 532 (15) | | 407 (18) | 44 (14) | |
| POD 0: ONS intake ≥300 kcal (n, %) | | | <.001 | | | <.001 |
| Yes | 0 (0) | 709 (20) | | 507 (22) | 61 (20) | |
| No | 287 (59) | 2243 (63) | | 1477 (64) | 178 (57) | |
| Unknown | 300 (41) | 584 (17) | | 333 (14) | 72 (23) | |
| POD 0: energy intake (kcal) from ONS (mean, SD) | 1.6 (18.3) | 156.3 (148.1) | <.001 | 173.1 (147.1) | 145.8 (153.7) | .007 |
| POD 0: mobile[b] at all (n, %) | | | <.001 | | | <.001 |
| Yes | 209 (43) | 2150 (61) | | 1528 (66) | 162 (52) | |
| No | 253 (52) | 1300 (37) | | 739 (32) | 145 (47) | |
| Unknown/not applicable | 25 (5) | 86 (2) | | 50 (2) | 4 (1) | |

| Pre vs. ERAS | Pre vs. ERAS (%) |
|---|---|
| Screening | 9 –> 74 |
| Preop Carb | 4 ->61 |
| Oral Bowel prep | 55 –> 72 |
| PONV | 79 -> 89 |
| Gut stimulation | 14 –> 72 |
| ONS D 0 | 0 -> 20 |
| Mobile D0 | 43 -> 61 |

L Martin et al: JPEN 2018

# ERAS® Improving gut recovery

| ERAS Protocol Nutrition Care Elements | Pre-ERAS (n = 487) | ERAS (n = 3536) | *P*-Value | Not At Nutrition Risk (n = 2317) | At Nutrition Risk[a] (n = 311) | *P*-Value |
|---|---|---|---|---|---|---|
| Days to recover activities of daily living[d] (mean, SD) | 7.7 (24.2) | 3.4 (4.7) | <.001 | 3.1 (10.0) | 4.5 (6.1) | .046 |
| Assessed (n, %) | | | | 1738 (75) | 198 (64) | |
| Unknown/not applicable (n, %) | | | | 579 (25) | 113 (36) | |
| Days to first flatus (mean, SD) | 3.4 (16.9) | 2.1 (2.5) | .078 | 2.1 (2.9) | 2.1 (1.7) | .938 |
| Assessed (n, %) | 481 (99) | 3426 (97) | | 2259 (97) | 299 (96) | |
| Unknown/not applicable (n, %) | 6 (1) | 110 (3) | | 58 (3) | 12 (4) | |
| Days to first stool (mean, SD) | 3.7 (3.6) | 3.1 (3.3) | .004 | 3.1 (3.3) | 3.2 (3.1) | .417 |
| Assessed (n, %) | 413 (85) | 2871 (81) | | 1820 (78) | 266 (86) | |
| Unknown/not applicable (n, %) | 74 (15) | 665 (19) | | 497 (22) | 45 (15) | |
| Days to tolerating solid food[e] (mean, SD) | 5.9 (18.4) | 2.3 (4.6) | .001 | 2.8 (4.5) | 3.3 (6.4) | .079 |
| Assessed (n, %) | 461 (95) | 3377 (96) | | 2234 (96) | 288 (93) | |
| Unknown/not applicable (n, %) | 26 (5) | 159 (4) | | 83 (4) | 23 (7) | |

L Martin et al: JPEN 2018

# ERAS & Nutrition perfect interaction

- Recovery: back to normal GI function
- ERAS multi modal actions for gut function
- Nutrition care improves
- ERAS improves outcomes

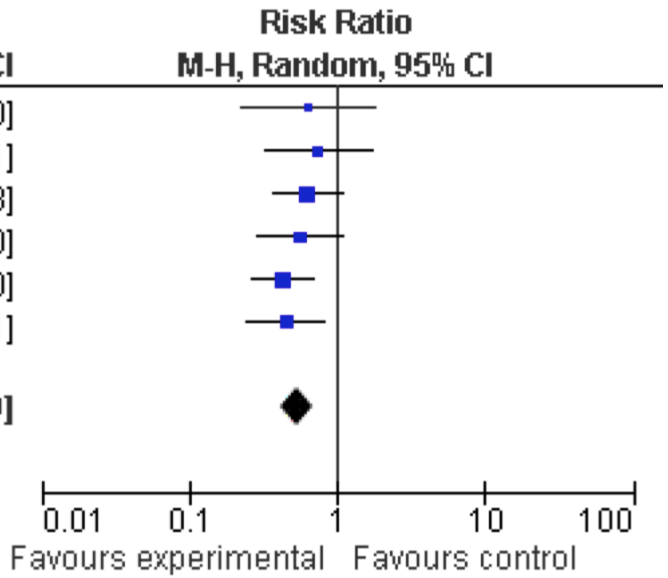
# ERAS Complications down by half

**Meta analysis 452 patients, 6 RCTs, 4 countries**

| Study or Subgroup | ERAS Events | ERAS Total | TC Events | TC Total | Weight | Risk Ratio M-H, Random, 95% CI |
|---|---|---|---|---|---|---|
| Anderson 2003 | 4 | 14 | 5 | 11 | 6.0% | 0.63 [0.22, 1.80] |
| Delaney 2003 | 7 | 31 | 10 | 33 | 9.6% | 0.75 [0.32, 1.71] |
| Gatt2005 | 9 | 19 | 15 | 20 | 23.1% | 0.63 [0.37, 1.08] |
| Khoo 2007 | 9 | 35 | 16 | 35 | 14.9% | 0.56 [0.29, 1.10] |
| Muller2009 | 16 | 76 | 37 | 75 | 27.5% | 0.43 [0.26, 0.70] |
| Serclova2009 | 11 | 51 | 25 | 52 | 18.8% | 0.45 [0.25, 0.81] |
| **Total (95% CI)** | | **226** | | **226** | **100.0%** | **0.53 [0.41, 0.69]** |
| Total events | 56 | | 108 | | | |

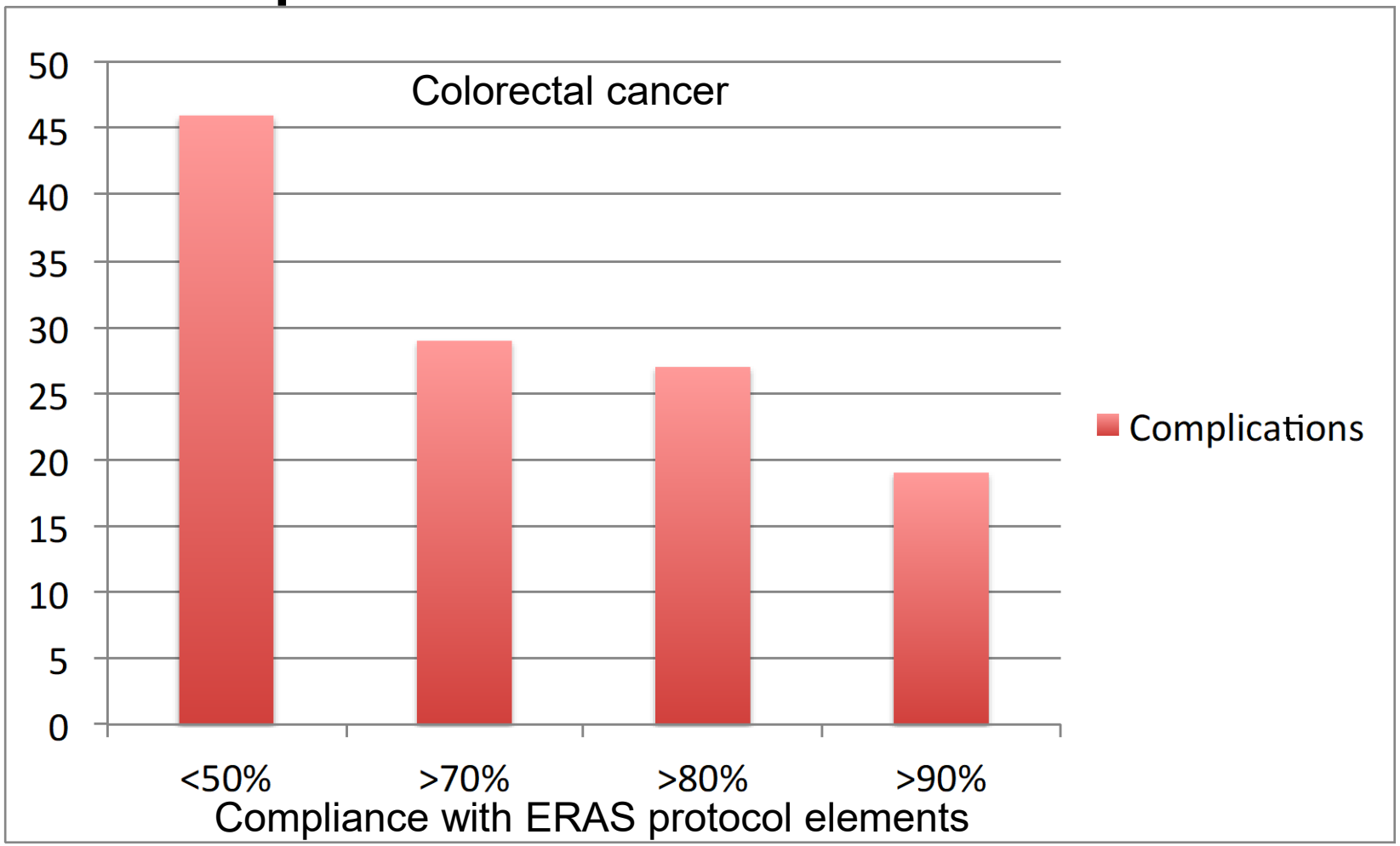
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 2.26$, df = 5 (P = 0.81); $I^2 = 0\%$

Test for overall effect: Z = 4.81 (P < 0.00001)



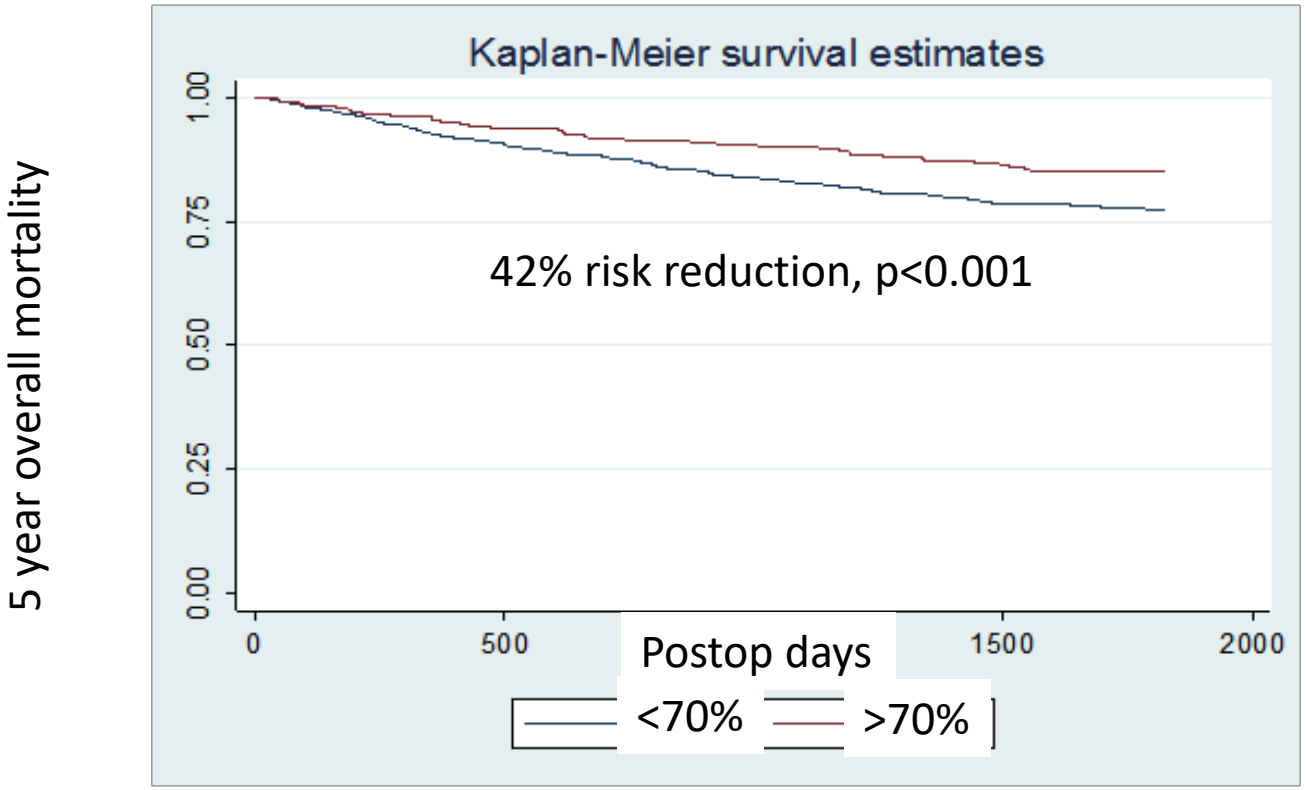

**Varadhan et al, Clin Nutr 2010**

# Improved ERAS® compliance: Fewer complications




Gustafsson et al, Arch Surg, 2011

# ERAS® open colorectal surgery: 5 year mortality improves

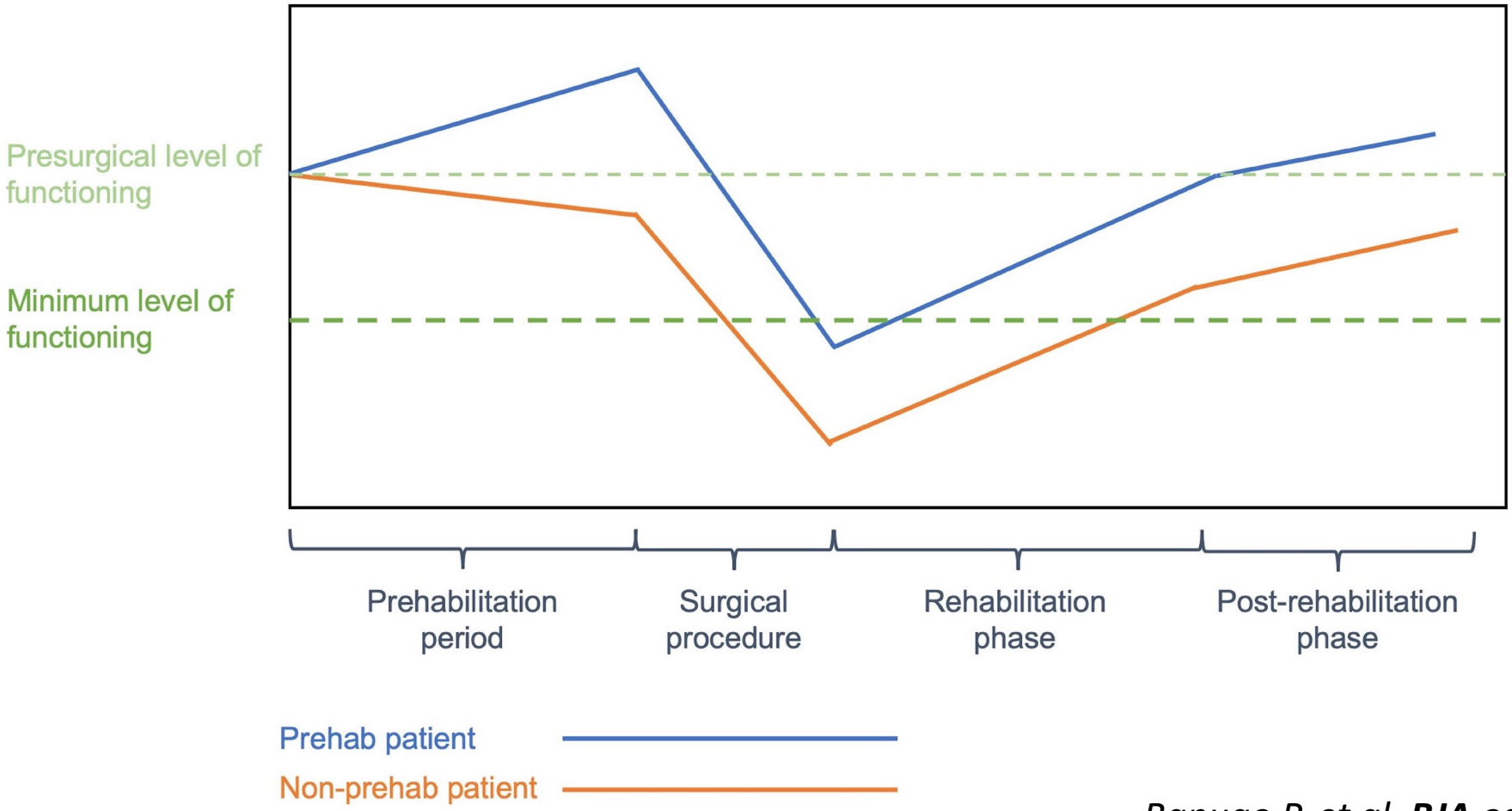



Compliance with ERAS protocol elements

**Gustafsson et al, WJS 2016**

# Prehabilitation can enhance recovery after surgery?

# Prehabilitation – conceptual model

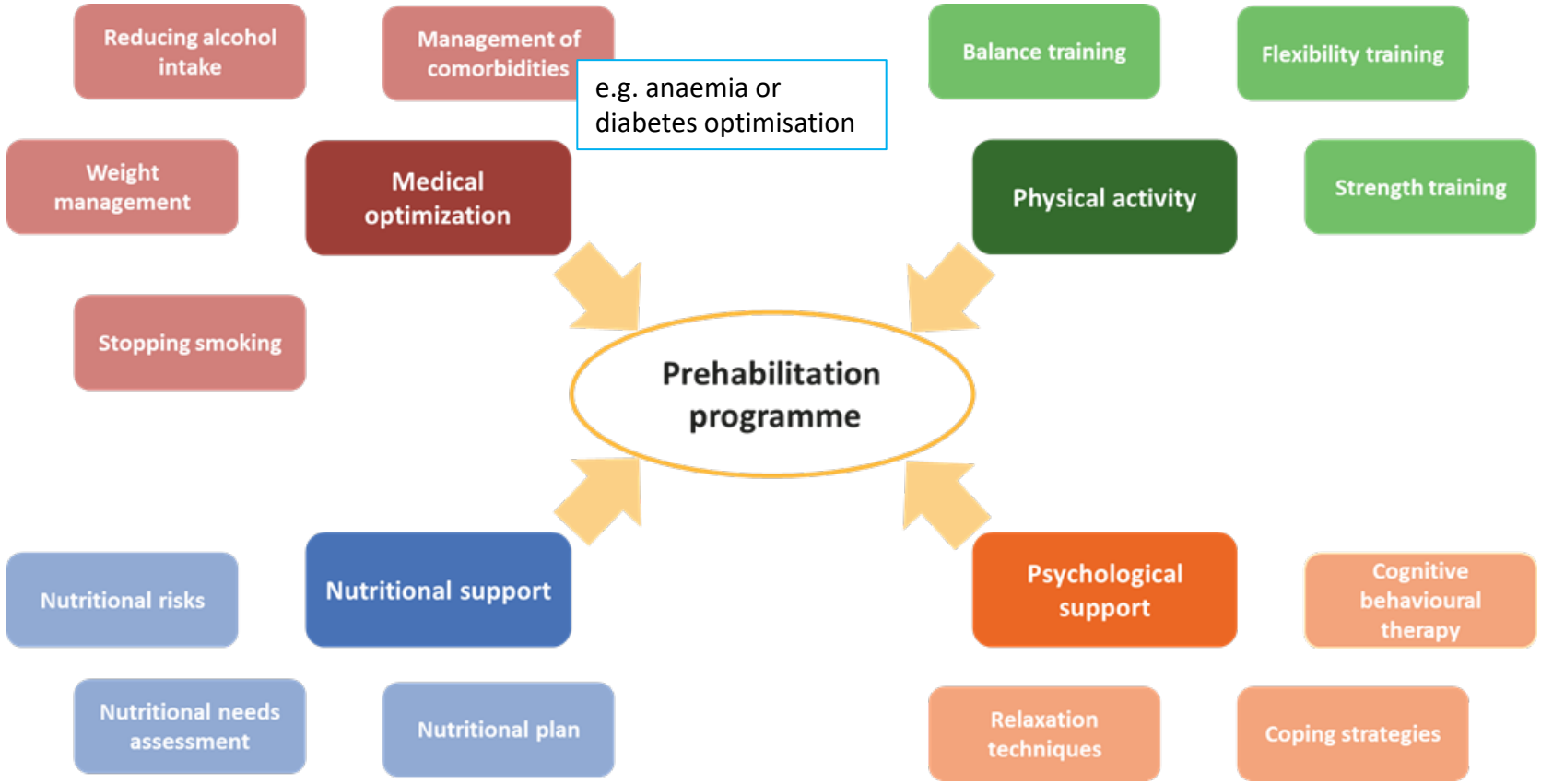



*Banugo P. et al.* ***BJA education*** *2017*

THE POWER OF CONCERTED EFFORTS AGAINST MALNUTRITION

CONTINUITY OF NUTRITION CARE

# Prehabilitation can enhance recovery after surgery?




## Patient Education & Patient Empowerment

*https://www.msbrainhealth.org/evidence/how-could-prehabilitation-help-in-ms/*

EDITORIALS

# Prehabilitation: high-quality evidence is still required

Dileep N. Lobo[1,2,*], Pavel Skořepa[1,3], Dhanwant Gomez[1] and Paul L. Greenhaff[2,4]

Prehabilitation comprises multidisciplinary healthcare interventions, including exercise, nutritional optimisation, and psychological preparation, which aim to dampen the metabolic response to surgery, shorten the period of recovery, reduce complications, and improve the quality of recovery and quality of life. This editorial evaluates the potential benefits and limitations of and barriers to prehabilitation in surgical patients. The results of several randomised clinical trials and meta-analyses on prehabilitation show differing results, and the strength of the evidence is relatively weak. Heterogeneity in patient populations, interventions, and outcome measures, with a wide range for compliance, contribute to this variation. Evidence could be strengthened by the conduct of large-scale, appropriately powered multicentre trials that have unequivocal clinically relevant and patient-centric endpoints. Studies on prehabilitation should concentrate on recruiting patients who are frail and at high risk. Interventions should be multimodal and exercise regimens should be tailored to each patient's ability with longitudinal measurements of impact.

***BJA** 2023*

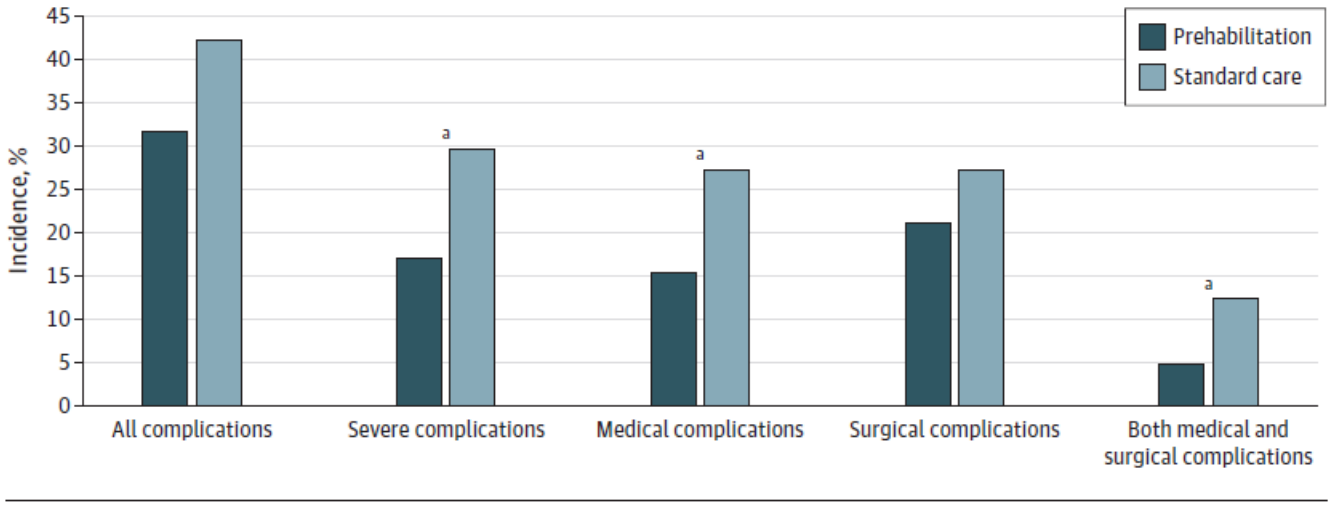
JAMA Surgery | Original Investigation

# Effect of Multimodal Prehabilitation on Reducing Postoperative Complications and Enhancing Functional Capacity Following Colorectal Cancer Surgery

## The PREHAB Randomized Clinical Trial

- 4 week program
- exercise, nutritional and psychological support
- +/- stop smoking

Figure 2. Complications Within 30 Days After Surgery




Complications in the intention-to-treat population (n = 251) are reported as percentage of patients having at least 1 complication, a severe complication (Comprehensive Complication Index score >20), at least 1 medical or surgical complication, and having at least 1 medical and 1 surgical complication.

[a] $P < .05$.

*Molenaar CJL. et al.* ***JAMA surgery*** *2023*

SUBGROUP ANALYSIS

High risk vs. low risk population based on CPET-derived variables.

High risk population (n=114; pre-operative risk assessment based on CPET variables: high risk = $VO_2AT$<11 ml·kg-1·min-1 and/or $peakVO_2$ <18 ml·kg-1·min-1)

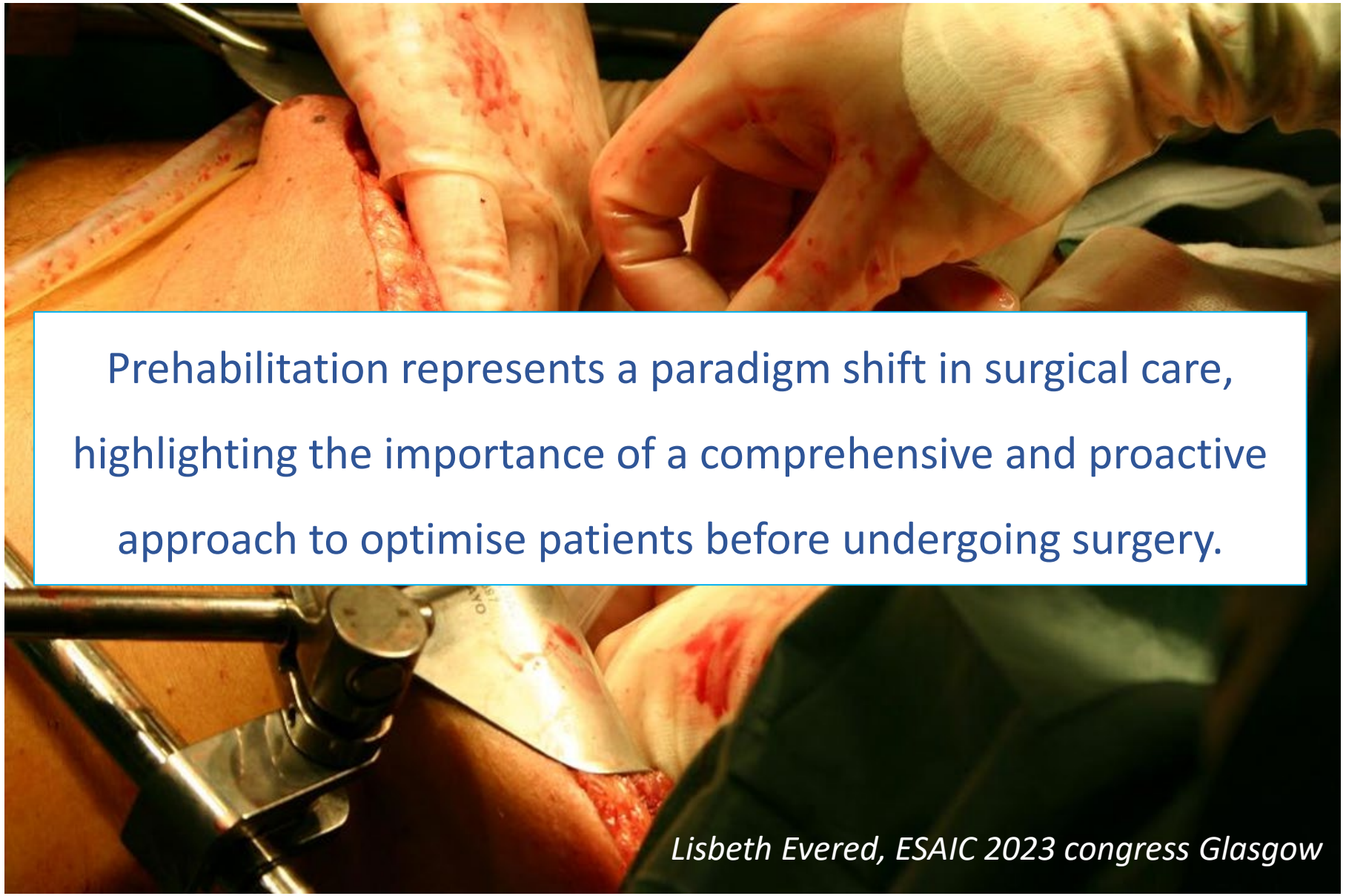
| | Prehab (n=58) | Control (n=56) | p-value |
|---|---|---|---|
| Number of complications, No. (%) | 21 (36.2%) | 29 (51.8%) | 0.09 |
| CCI>20 | 12 (20.7%) | 23 (41.1%) | 0.02 |
| Number of patients with medical complication, No. (%) | 9 (15.5%) | 22 (39.3%) | <.01 |
| Number of patients with surgical complication, No. (%) | 16 (27.59%) | 19 (33.9%) | 0.46 |
| Number of patients with both medical and surgical complication, No. (%) | 4 (6.9%) | 12 (21.4%) | 0.03 |
| 6MWD four weeks postoperatively, median [IQR] | 475.0 [412.0, 517.0] | 450 [355.0, 515.0] | 0.25 |

Low risk population (n=114; pre-operative risk assessment based on CPET variables: low risk = $VO_2AT$ ≥11 ml·kg-1·min-1 and/or $peakVO_2$ ≥18 ml·kg-1·min-1)

| | Prehab (n=55) | Control (n=59) | p-value |
|---|---|---|---|
| Number of complications, No. (%) | 14 (25.5%) | 19 (32.2%) | 0.43 |
| CCI>20 | 7 (12.7%) | 10 (17.0%) | 0.53 |
| Number of patients with medical complication, No. (%) | 7 (12.7%) | 11 (18.6%) | 0.39 |
| Number of patients with surgical complication, No. (%) | 8 (15.6%) | 12 (20.3%) | 0.42 |
| Number of patients with both medical and surgical complication, No. (%) | 1 (1.8%) | 4 (6.8%) | 0.37 |
| 6MWD four weeks postoperatively, median [IQR] | 584.5 [533.0, 663.0] | 552.0 [510.0, 616.0] | 0.05 |

Abbreviations: 6MWD, 6-minute walkingg distance; CCI, comprehensive complication index; CPET, cardiopulmonary exercise test; IQR, interquartile range; kg, kilogram; ml, milliliter; min, minute; $peakVO_2$, oxygen consumption at peak exercise; $VO_2AT$, oxygen consumption at the anaerobic threshold.

*Molenaar CJL. et al.* ***JAMA surgery*** *2023*



Prehabilitation represents a paradigm shift in surgical care, highlighting the importance of a comprehensive and proactive approach to optimise patients before undergoing surgery.

*Lisbeth Evered, ESAIC 2023 congress Glasgow*

# Discussion

## Prehabilitation can enhance recovery after surgery?

**Why?**

- Do we need ERAS / prehabilitation program's?
  - Is it for every surgical patient? Or should there be some kind of threshold to enrol?

**How?**

- What about implementation of these program's? Should we do it and how?
  - Which barriers are to be expected? Are there lessons learned?

**What?**

- Financial aspects of the program's?
  - How to justify extra health expenses?

# Budget Impact Analysis

# of the Dutch Surgeons' Position on Prehabilitation 2022

**Budget Impact Analyse: Prehabilitatie - Base case model**

Gebaseerd op concept 'Standpunt Prehabilitatie' dd. 17-06-2022