Preoperative preparation and perioperative care in lung cancer surgery

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Relevant Financial Relationship Disclosure Statement

Title of Presentation/Session:

Preoperative preparation and perioperative care in lung cancer surgery

Presenter/Chair Name:

Carlos Alfredo Fraile Olivero. MD, PhD.

In Compliance with UEMS/EACCME Guidelines,

potential conflicts of interest or support relevant to the above presentation that might cause a bias are declared as follows:

☒ **No potential conflicts of interest to report**

❒ **Conflicts of interest to report:** **(company name, type of relationship)**

Agenda

1. The physiologic challenge of surgery.
2. The patient at thoracic surgery clinics.
3. Modify physiologic resilience.
4. Enhanced recovery after surgery.
5. Prehabilitation, evolution of the concept.
6. What´s next?

The physiologic challenge of surgery

Injury

Afferent nerves and cytokines.

- Hypothalamic-pituitary-adrenal axis.
- Sympathetic nervous system.

The physiologic challenge of surgery

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Response

- Endocrine.
- Haemodynamic.
- Immune.

Re-establish homeostasis (body structure and function)

The physiologic challenge of surgery

Injury

Afferent nerves and cytokines.

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Response

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- Immune.

Re-establish homeostasis (body structure and function)

Modification Respiratory homeostasis

- Ischemia-reperfusion.
- Unipulmonary ventilation.
- Modification of lung volumes.
- Respiratory muscle dysfunction.

The patient at thoracic surgery clinics

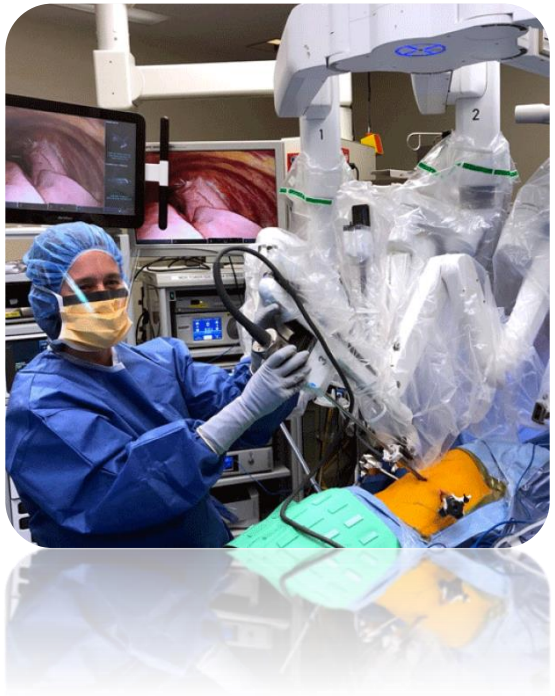
The patient at thoracic surgery clinics

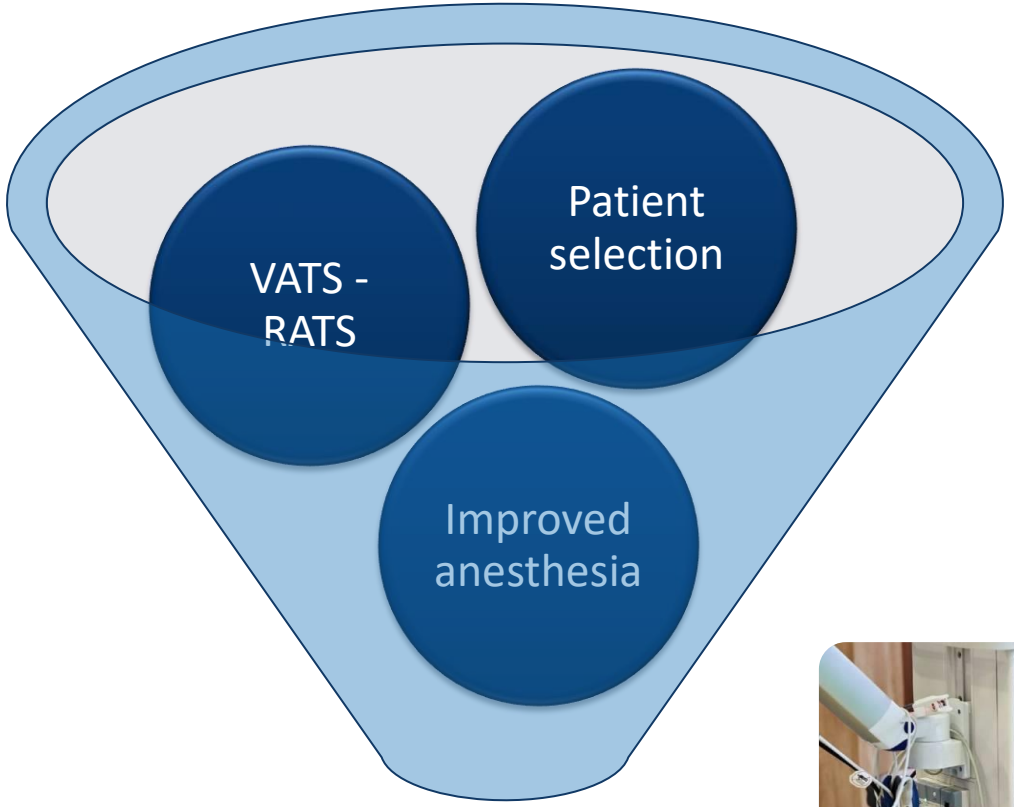
Young adults

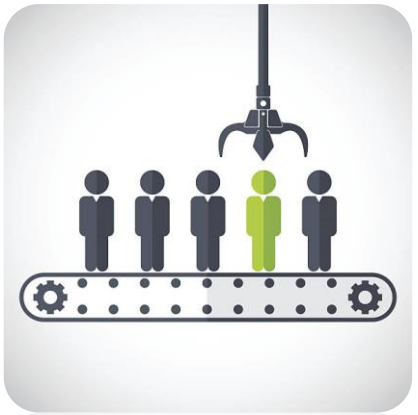
COPD, heart disease, vascular disease, stroke

Older adults

Frailty, sarcopenia





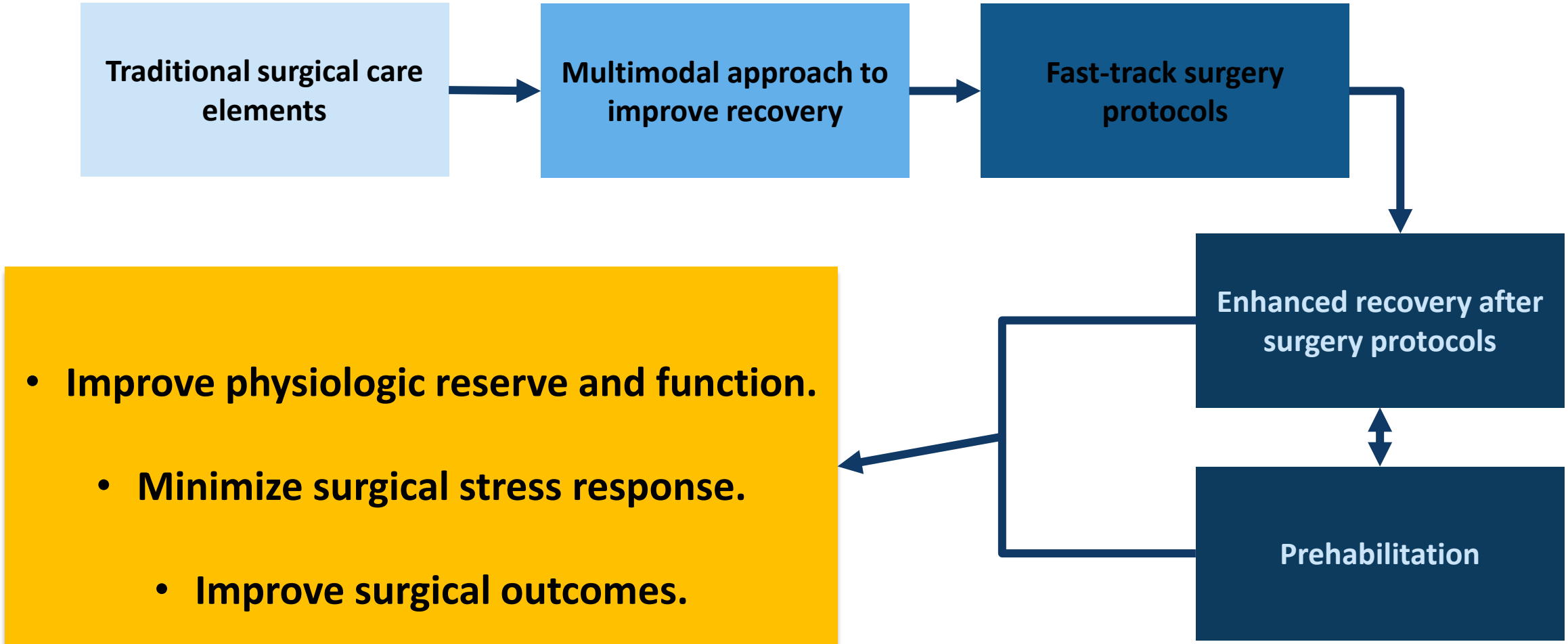


Morbidity= 20%
Mortality= 5%

"A single postoperative complication = reduces quality of life and decreases functional capacity 40%"

Modify physiologic resilience

Modify physiologic resilience



Enhanced recovery after surgery

Enhanced recovery after surgery

Multimodal, multidisciplinary perioperative elements that can improve outcomes.

1997
Multimodal approach

2001
Fast-Track in thoracic surgery

2005
First ERAS® protocol published in coloproctology surgical patients

2019
ERAS® and ESTS guidelines

2022
SECT – SEDAR guidelines

2000 | 2005 | 2010 | 2015s | 2020s | Future

Enhanced recovery after surgery

Guidelines for enhanced recovery after lung surgery: recommendations of the Enhanced Recovery After Surgery (ERAS®) Society and the European Society of Thoracic Surgeons (ESTS)

Timothy J.P. Batchelor[a,*], Neil J. Rasburn[b], Etienne Abdelnour-Berchtold[c], Alessandro Brunelli[d], Robert J. Cerfolio[e], Michel Gonzalez[c], Olle Ljungqvist[f], René H. Petersen[g], Wanda M. Popescu[h], Peter D. Slinger[i] and Babu Naidu[j]

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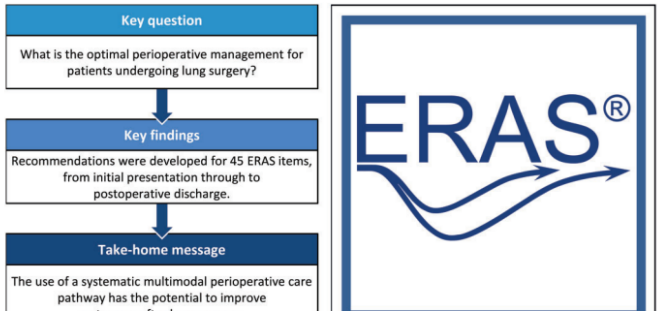
Received 14 March 2018; received in revised form 29 July 2018; accepted 31 July 2018



- **45** items.
- 21 perioperative interventions.
- **5** items preoperative phase.
- Thoracic surgery and extrapolated interventions.

Revista Española de Anestesiología y Reanimación

www.elsevier.es/redar

REVISIÓN

Recomendaciones de la Sociedad Española de Cirugía Torácica y de la Sección de Cardiotorácica y Cirugía Vascular de la Sociedad Española de Anestesiología, Reanimación y Terapéutica del Dolor, para los pacientes sometidos a cirugía pulmonar incluidos en un programa de recuperación intensificada

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- National guidelines with 2 scientific societies
- **75** items.
- **6** items preoperative phase.
- Thoracic surgery and extrapolated interventions.

Enhanced recovery after surgery

Preoperative phase

- Patient education and counseling.
- Nutritional evaluation.
- Smoking cessation.
- Anemia management.
- Pulmonary rehabilitation.

Perioperative phase

- Venous thromboembolism prophylaxis.
- Anaesthetic protocol.
- Pain relief.
- Perioperative fluid management.
- Surgical technique.

Postoperative phase

- Chest drain management.
- Early mobilization and adjuncts to physiotherapy.

Enhanced recovery after surgery

THORACIC: PERIOPERATIVE: EXPERT REVIEW

Enhanced recovery after thoracic surgery: Systematic review and meta-analysis

Check for updates

Audrey L. Khoury, MD, MPH,[a,b,c] Katharine L. McGinigle, MD, MPH,[c] Nikki L. Freeman, MA,[b] Helal El-Zaatari, BS,[b] Cynthia Feltner, MD, MPH,[d,e] and Jason M. Long, MD, MPH,[c] the University of North Carolina School of Medicine Enhanced Recovery Program Working Group*

The enhanced recovery after thoracic surgery (ERATS) protocol has been shown to reduce complications and hospital length of stay (LOS).[1-3] In thoracic surgery, the prototypical ERATS pathway involves a preoperative phase, which focuses on patient education and smoking cessation; the intraoperative phase incorporates multimodal anesthesia along with minimally invasive surgery (video-assisted thoracoscopic surgery [VATS]); and the postoperative phase emphasizes the use of incentive spirometry, early mobilization, early chest tube and urinary catheter removal. Goal-directed fluid therapy and minimization of opioids is encouraged.[2-4]

Most of the evidence for ERATS has been published in small, retrospective, single-center studies and case-series reports, all of which are prone to bias.[5-7] In 2016, Fiore and colleagues[8] published a systematic review (SR) of 6 studies on ERATS in lung resections; however, the authors determined their results were inconclusive due to high risk of bias. Li and colleagues[9] also published a SR of 7 randomized-controlled trials (RCTs), but all study participants were from China, Europe, and the Middle East. In 2019, Batchelor and colleagues[3] formulated ERATS guidelines for the Enhanced Recovery After Surgery (ERAS) Society and the European Society of Thoracic Surgeons with an SR. Recently, a few retrospective cohort studies of ERATS in lung resections have been conducted in the

Enhanced Recovery After Thoracic Surgery (ERATS)

Methods: Systematic review & meta-analysis comparing pre- and post-ERATS outcomes in 19 studies (n = 8447 patients)

Decreased hospital length of stay by 3 days

Decreased post-operative complications overall

Decreased readmission rates

Implications: ERATS improves surgical outcomes. Randomized controlled trials and studies regarding cost and patient-reported outcomes (pain and patient satisfaction) are warranted.

- Decreases hospital LOS.
- Decreases post-operative complications.
- Decreases readmission rates.

Enhanced recovery after surgery

Editorial

Implementing an enhanced recovery after thoracic surgery programme: just having a protocol is not enough

Erik M. von Meyenfeldt[1,2], Femke van Nassau[2]


Budacan et al. (94% participation): 70% compliance.


Von Meyenfeldt et al. (100% participation): 65%-86% compliance


Forster et al. (16 recommendations). 75% compliance.


SECT (30% participation): 68% compliance.

Enhanced recovery after surgery

European Journal of Cardio-Thoracic Surgery 59 (2021) 291–292
doi:10.1093/ejcts/ezaa435 Advance Access publication 17 December 2020

EDITORIAL

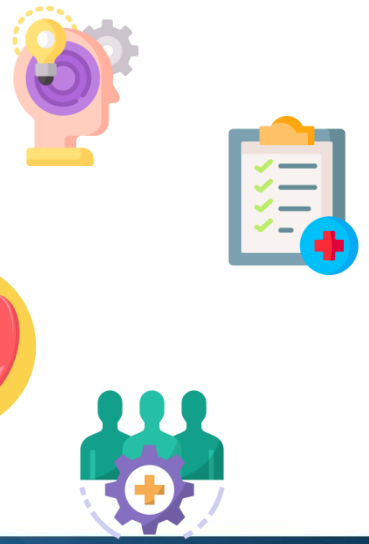
Cite this article as: Petersen RH, Huang L, Kehlet H. Guidelines for enhanced recovery after lung surgery: need for re-analysis. Eur J Cardiothorac Surg 2021;59:291–2.

Guidelines for enhanced recovery after lung surgery: need for re-analysis

René Horsleben Petersen [a], Lin Huang [a] and Henrik Kehlet [b,*]

The "aggregation of marginal gains" approach

- Large number of procedures (items).
- Variability in scientific evidence for each procedure.
- Scientific evidence transferred from other specialties.
- Need for multidisciplinary teamwork.

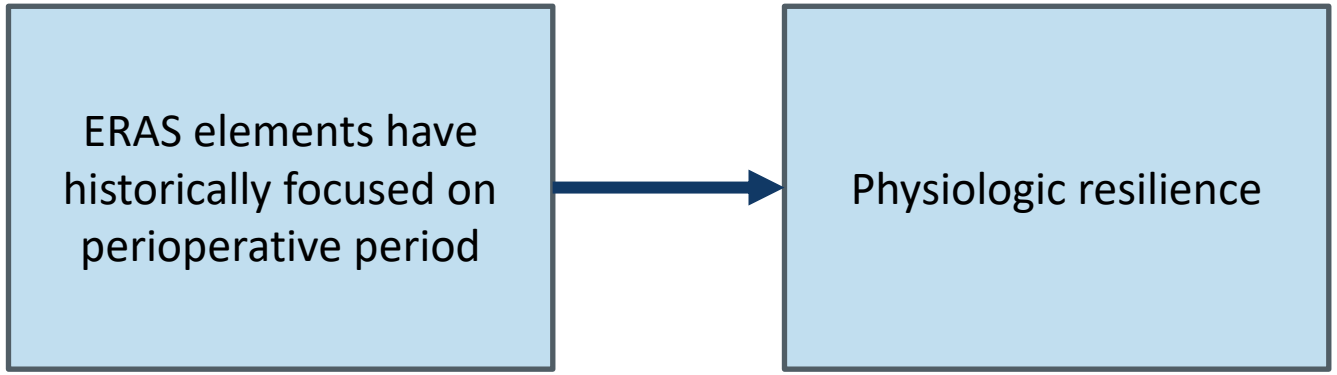


Prehabilitation

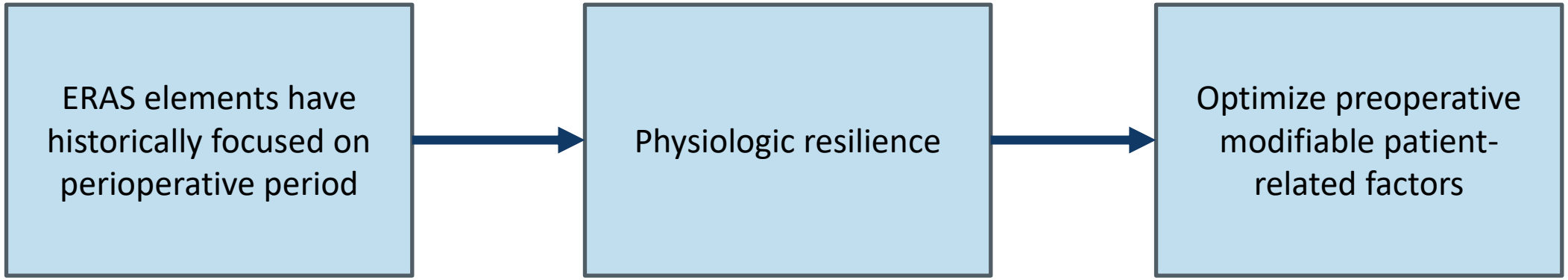
Prehabilitation, evolution of the concept

ERAS elements have historically focused on perioperative period

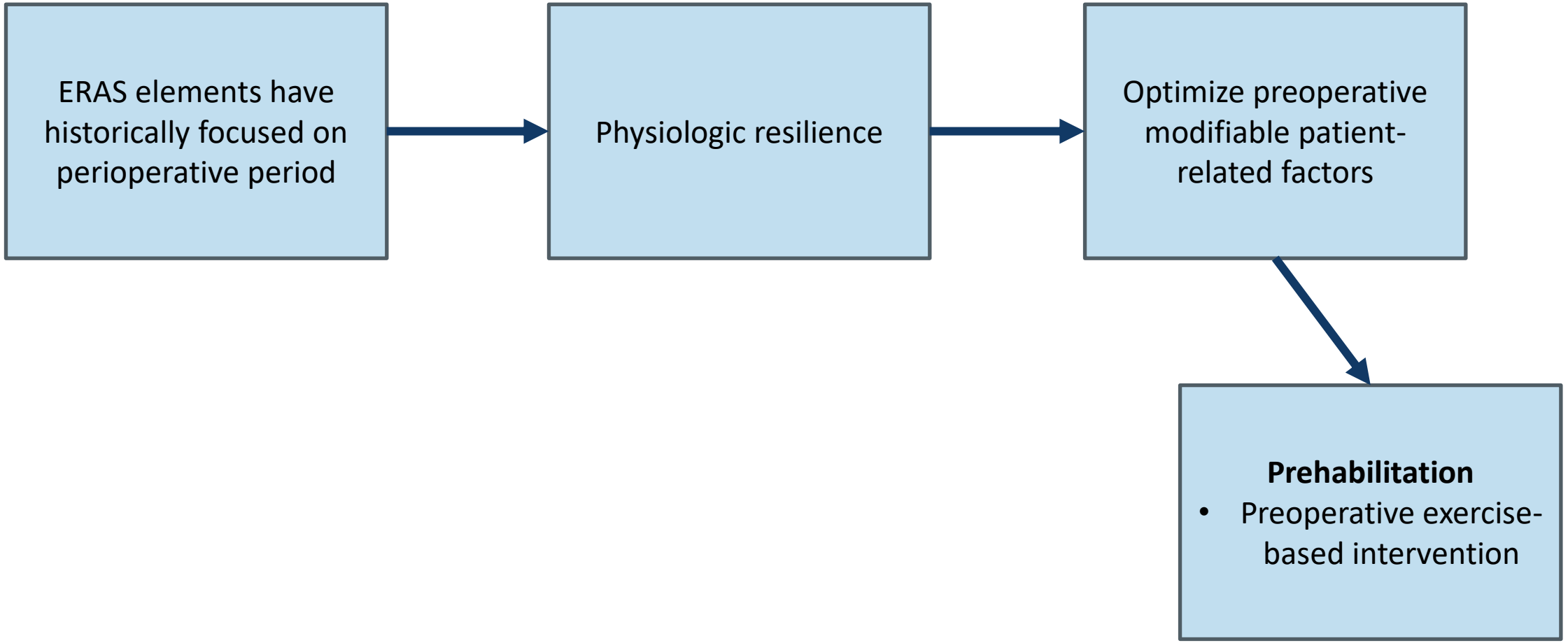
Prehabilitation, evolution of the concept



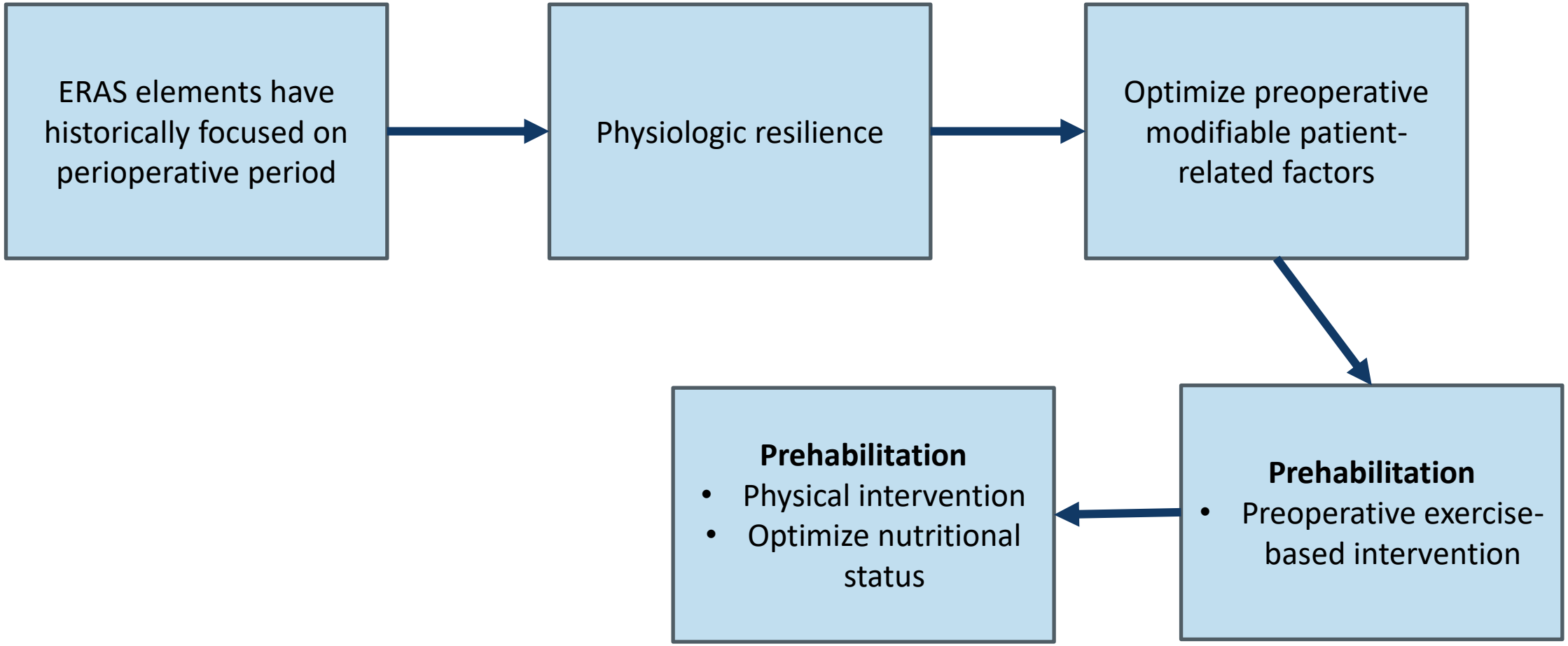
Prehabilitation, evolution of the concept



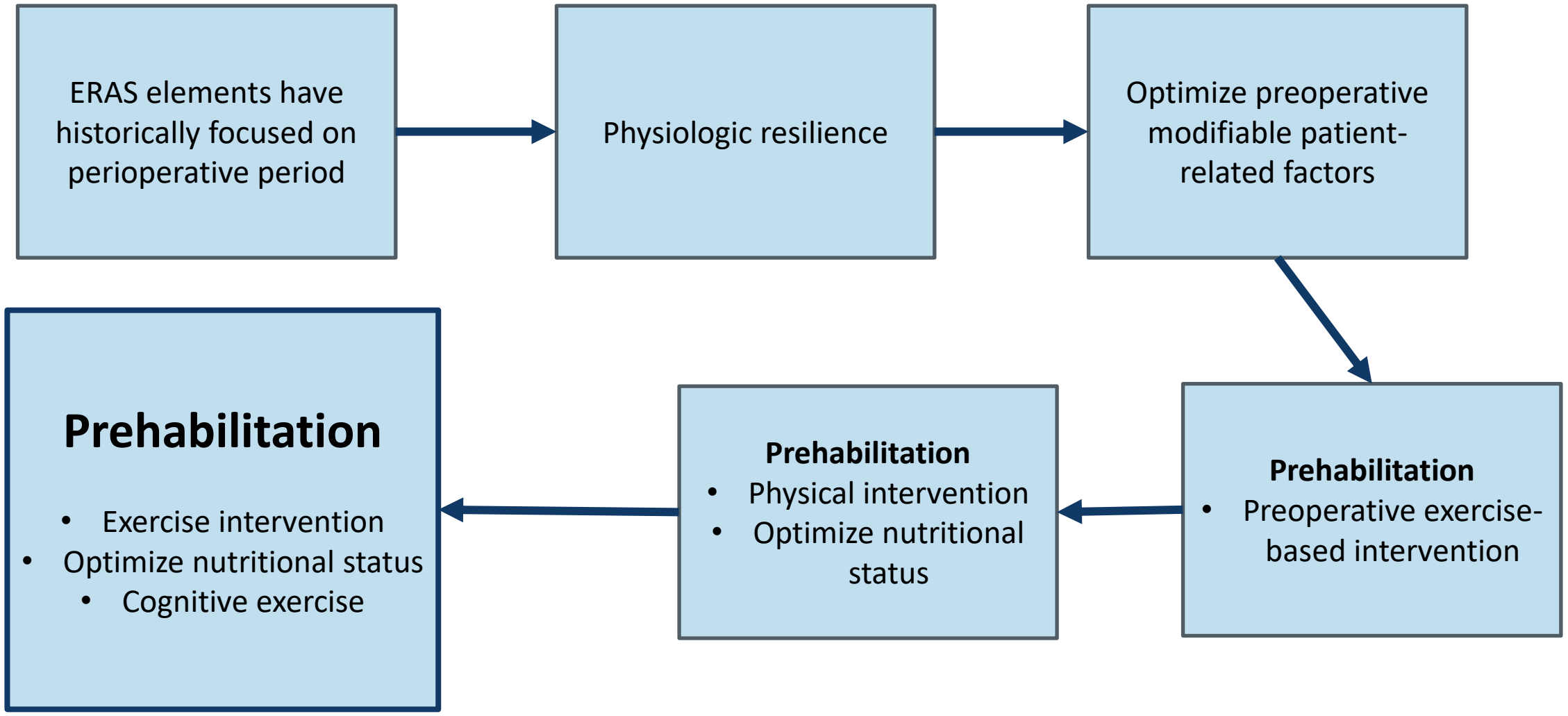
Prehabilitation, evolution of the concept



Prehabilitation, evolution of the concept



Prehabilitation, evolution of the concept



Prehabilitation, evolution of the concept

Preoperative processes to enhance a patient's functional capacity and optimize recovery from the stress of surgery and anesthesia.

NEW prehabilitation programs

- Nutrition
- Exercise (physical and cognitive)
- Worry (stress reduction)

For currents smokers = smoking cessation.

Prehabilitation, evolution of the concept

Preoperative processes to enhance a patient's functional capacity and optimize recovery from the stress of surgery and anesthesia.

NEW prehabilitation programs

- Nutrition
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- Worry (stress reduction)

For currents smokers = smoking cessation.

Duration

- Personalized.
- ≥ 4 weeks.
- More weeks for older patients and frailty.

Prehabilitation, evolution of the concept

Preoperative processes to enhance a patient's functional capacity and optimize recovery from the stress of surgery and anesthesia.

NEW prehabilitation programs

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- Exercise (physical and cognitive)
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Duration

- Personalized.
- ≥ 4 weeks.
- More weeks for older patients and frailty.

Teachable Moment

- Surgery = behavioral changes to improve health.

Prehabilitation, evolution of the concept

Cochrane Database of Systematic Reviews | Review - Intervention

New search | Conclusions changed

Preoperative exercise training for people with non-small cell lung cancer

Catherine Granger, Vinicius Cavalheri Authors' declarations of interest

Version published: 28 September 2022 Version history

https://doi.org/10.1002/14651858.CD012020.pub3

- Systematic review.
- Single modality prehabilitation.
- 10 RCT with 636 patients.
- **Results:** reduces the risk of developing a PPC and hospital LOS.

Prehabilitation, evolution of the concept

Randomized Controlled Trial > Anesth Analg. 2020 Sep;131(3):840-849.
doi: 10.1213/ANE.0000000000004342.

Two-Week Multimodal Prehabilitation Program Improves Perioperative Functional Capability in Patients Undergoing Thoracoscopic Lobectomy for Lung Cancer: A Randomized Controlled Trial

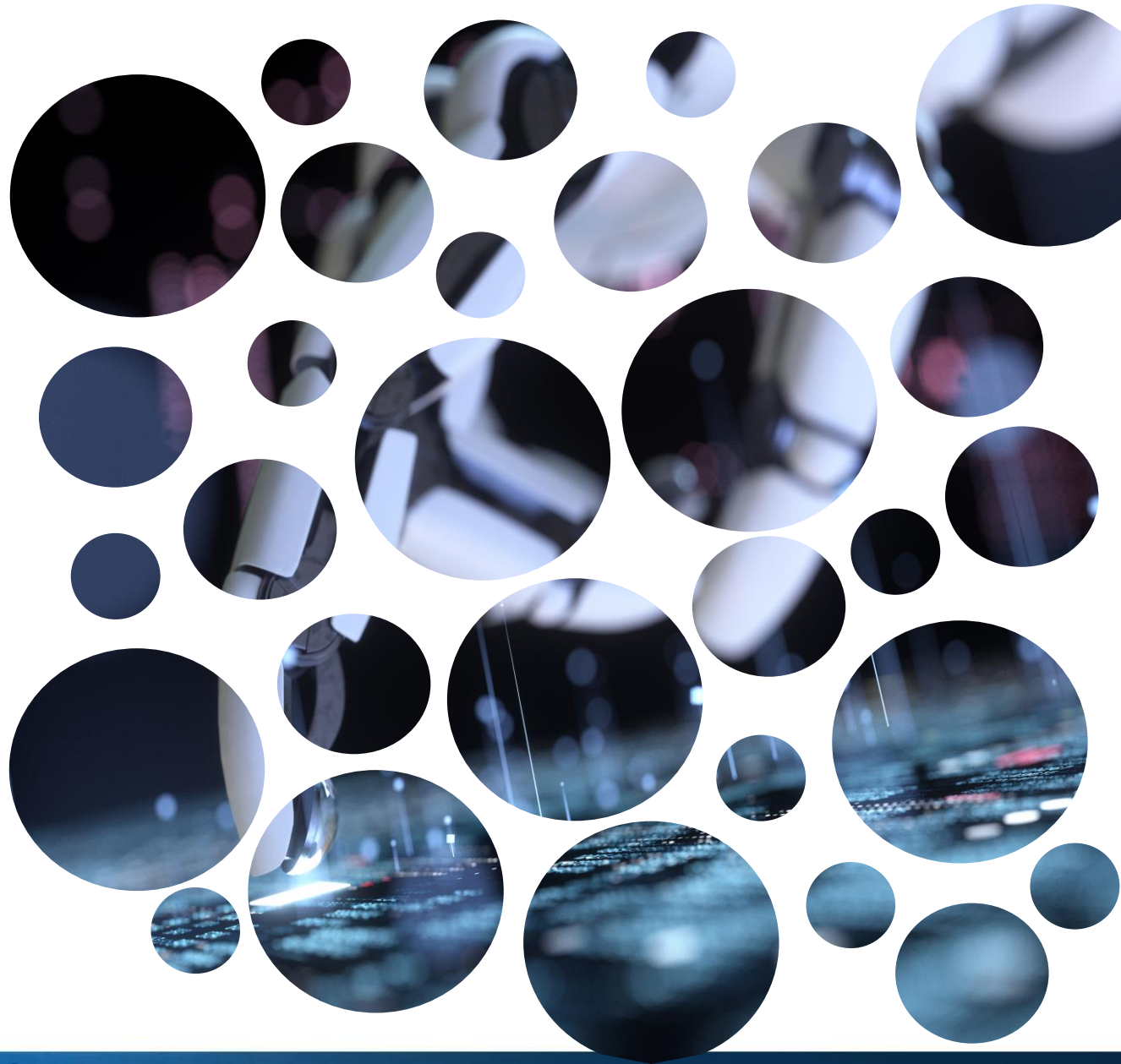
Zijia Liu [1], Tian Qiu [1], Lijian Pei [1], Yuelun Zhang [2], Li Xu [1], Yushang Cui [3], Naixin Liang [3], Shanqing Li [3], Wei Chen [4], Yuguang Huang [1]

Affiliations + expand

PMID: 31348053 DOI: 10.1213/ANE.0000000000004342

- RCT.
- Multimodal prehabilitation: exercise, nutrition counseling, psychological guidance.
- 73 patients.
- **Results:** improvements un 6MWT

What´s next?



What´s next?

Changes in enhanced recovery after surgery protocols

- “Key care elements” approach.
- Differentiate between patient and organizational factors.
- Patients' stratification by risk.
- Patients' centered protocols (QoL, satisfaction, recovery).

Review Article on Prolonged Air Leak after Lung Surgery: Prediction, Prevention and Management

Enhanced recovery after surgery and chest tube management

Tim J. P. Batchelor^

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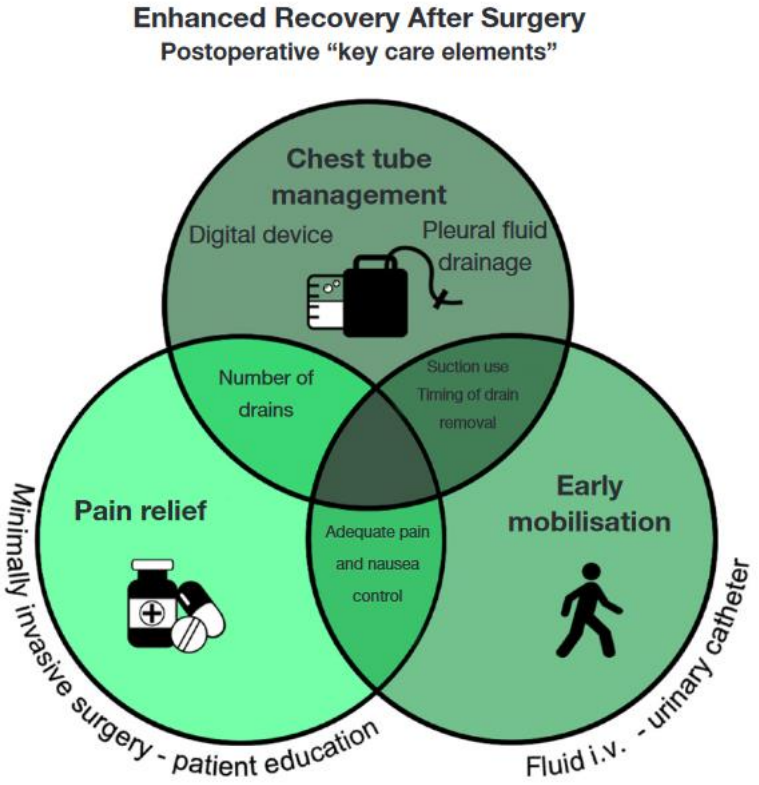
Email: tim.batchelor@nhs.net.



What´s next?

Integration of ERAS + Prehabilitation

- **Multimodal prehabilitation =** clinical and functional benefits.
- **ERAS =** improve clinical outcomes.
- Contribution of prehabilitation **vs**. Adherence to ERAS elements

Prehabilitation, enhanced recovery after surgery, or both? A narrative review

Chelsia Gillis[1,*], Olle Ljungqvist[2] and Francesco Carli[1]

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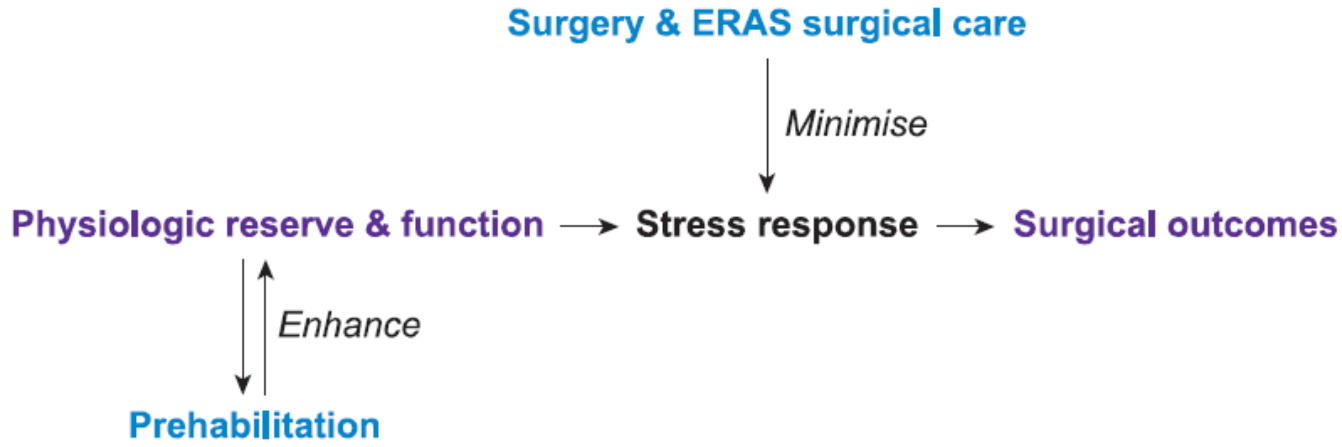
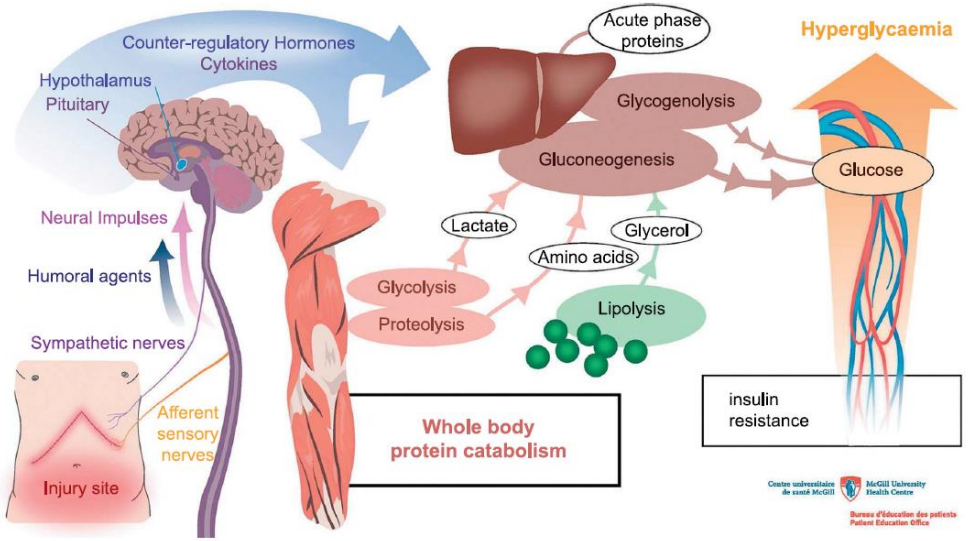


What´s next?

Back to basics

- Design **new studies** to reevaluate the stress response.
- Find the **relevant outcomes** that should be measured.
- **The interventions** should be described, and **the completeness** should be reported.
- **External variables** that influence on outcomes should be identified and measured.



Take home messages

- **Lung cancer surgery** = surgical stress + disruption of respiratory homeostasis.
- Postoperative recovery is not a passive process and begins preoperatively.
- **Prehabilitation =** improve physiologic reserves and function.
- **Enhanced recovery protocols =** Minimize stress response.
- Enhanced recovery protocols need changes to “key care elements” approach.
- Multimodal prehabilitation programs + Enhanced recovery protocols.

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