

Innsbrucker Forum für Intensivmedizin und Pflege (IFIMP)

Intensivmedizin - ist ALLES möglich? 9. - 10. April 2025

UNIVERSITÄTSKLINIKUM
TULLN

KARL
LANDSTEINER KL
PRIVATUNIVERSITÄT FÜR
GESUNDHEITSWISSENSCHAFTEN

Präoperative Leistungsoptimierung: Warum - Was -Wann- Wie?

Prim. Prof. PD. Dr. Andreas Duma, MSc, MBA, FESAIC

Klinische Abteilung für Anästhesie und Intensivmedizin,
Leiter der ARGE präoperatives und tagesklinisches Patientenmanagement (ÖGARI)

Innsbrucker Forum für Intensivmedizin und Pflege (IFIMP)

Intensivmedizin - ist ALLES möglich? 9. - 10. April 2025

UNIVERSITÄTSKLINIKUM
TULLN

KARL
LANDSTEINER KL
PRIVATUNIVERSITÄT FÜR
GESUNDHEITSWISSENSCHAFTEN

Präoperative Leistungsoptimierung: Warum - Was -Wann- Wie? Wo?

Prim. Prof. PD. Dr. Andreas Duma, MSc, MBA, FESAIC

Klinische Abteilung für Anästhesie und Intensivmedizin,
Leiter der ARGE präoperatives und tagesklinisches Patientenmanagement (ÖGARI)

Warum Prehab?

Stellen Sie sich vor....

...Sie müssen in 6 Wochen einen Halbmarathon laufen.



Central Park, NYC

3

Präoperative Leistungsoptimierung



Warum Prehab?

Stellen Sie sich vor....

...Sie müssen in 6 Wochen einen Halbmarathon laufen.

...und danach den Jakobsweg gehen.

Jakobswege

Die beliebtesten Routen in Spanien und Portugal

- Camino Frances
- Camino Portugues Central
- Camino Portugues da Costa
- Camino del Norte
- Camino Ingles
- Camino Primitivo
- Via de la Plata
- Camino Finisterre



© HelloWorld

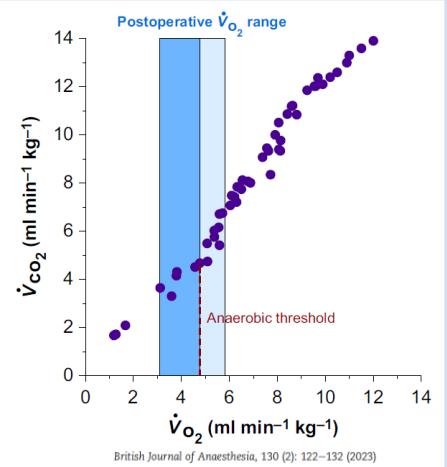
4

Präoperative Leistungsoptimierung



Unfit

Anaerobic threshold in in der blauen Zone



CARDIOVASCULAR

Physiological relationship between cardiorespiratory fitness and fitness for surgery: a narrative review

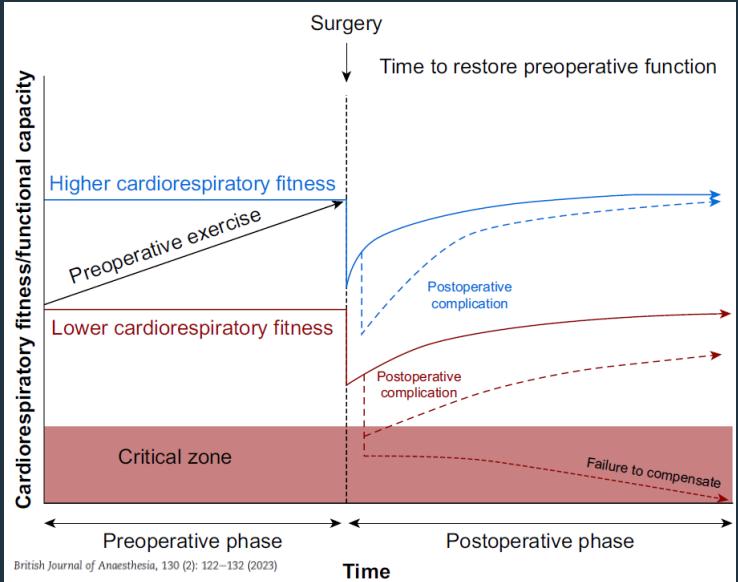
Brendon H. Roxburgh^{1,2,*}, James D. Cotter², Holly A. Campbell¹, Ulla Reymann¹, Luke C. Wilson³, David Gwynne-Jones^{1,4}, Andre M. van Rij¹ and Kate N. Thomas¹

5 Präoperative Leistungsoptimierung



Fit

Präoperative Optimierung erhöht postoperative Reserven



CARDIOVASCULAR

Physiological relationship between cardiorespiratory fitness and fitness for surgery: a narrative review

Brendon H. Roxburgh^{1,2,*}, James D. Cotter², Holly A. Campbell¹, Ulla Reymann¹, Luke C. Wilson³, David Gwynne-Jones^{1,4}, Andre M. van Rij¹ and Kate N. Thomas¹

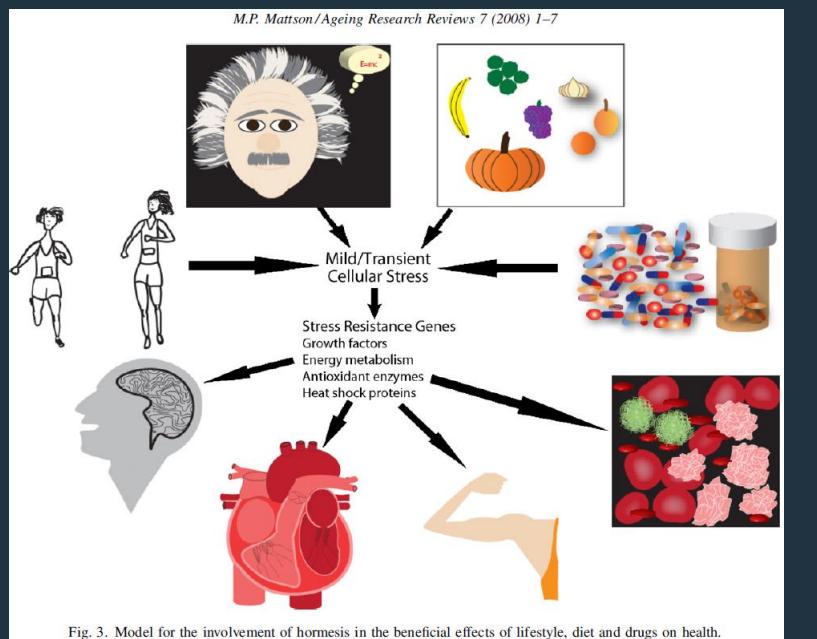
6 Präoperative Leistungsoptimierung



Hormesis

Adaptive Stressantwort

„Ein Prozess, bei dem die Exposition gegenüber einer niedrigen Dosis eines chemischen Stoffes oder Umweltfaktors, der in höheren Dosen schädlich ist, eine adaptive, vorteilhafte Wirkung auf die Zelle oder den Organismus hervorruft.“



7

Präoperative Leistungsoptimierung



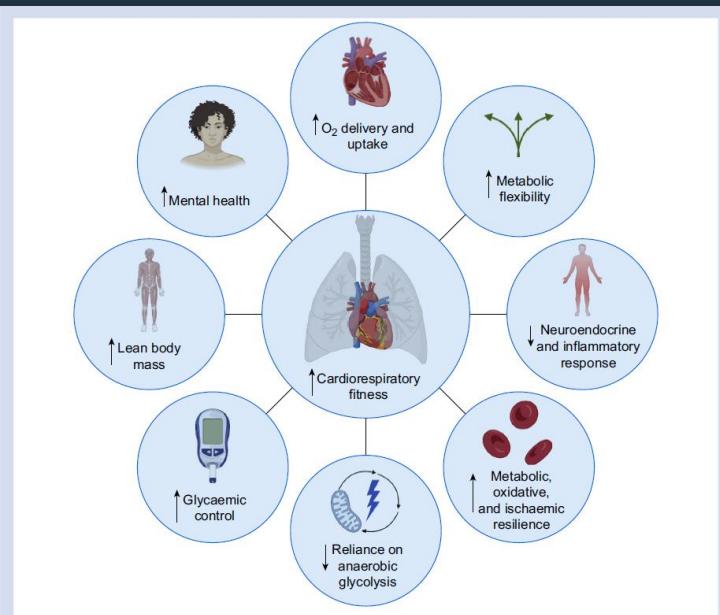
Mark P. Mattson, Hormesis defined, Ageing Research Reviews, Volume 7, Issue 1, 2008, Pages 1-7,



Cross-tressor Adaptation

Körperliches Training verbessert auch ...

- ... mentale Resilienz
- ... neuroendokrine Reaktion
- ... inflammatorische Reaktion
- ... metabolische Flexibilität

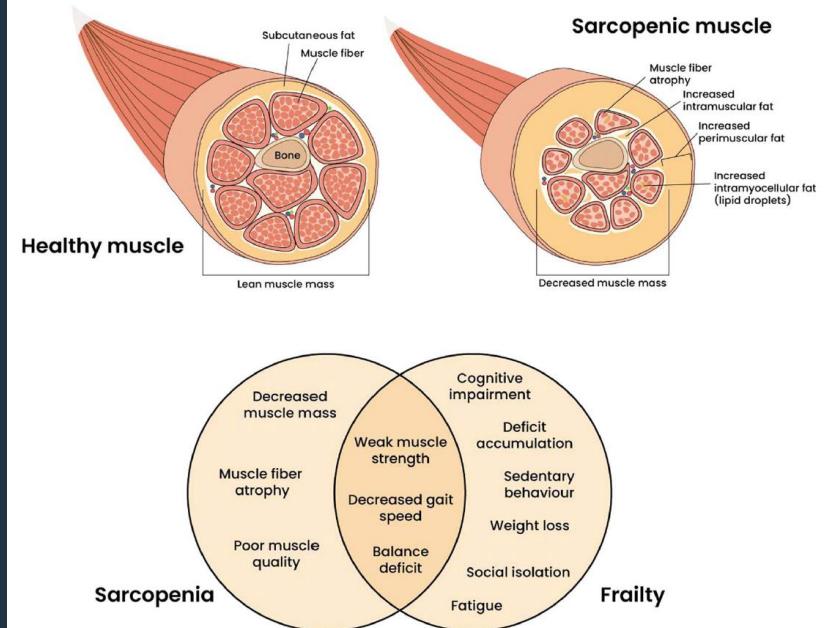


8

Präoperative Leistungsoptimierung



Lean Body Mass, Sarcopenia & Frailty



Knoedler S, Schliermann R, Knoedler L, Wu M, Hansen FJ, Matar DY, Obed D, Vervoort D, Haug V, Hundeshagen G, Paik A, Kauke-Navarro M, Kneser U, Pomahac B, Orgill DP, Panayi AC. Impact of sarcopenia on outcomes in surgical patients: a systematic review and meta-analysis. *Int J Surg.* 2023 Dec 1;109(12):4238-4262.

9

Präoperative Leistungsoptimierung



Sarcopenia und Outcome

Analysis of primary outcomes.							
Outcome	Studies	Patients (events)		OR (95% CI)	P	τ^2 (%) (P)	
		With sarcopenia	Without sarcopenia				
Mortality	154	21 122 (5599)	40 236 (8119)	2.69 (2.31–3.12)	< 0.00001	79 (< 0.00001)	
Any complications	160	16 859 (6660)	33 534 (8993)	1.68 (1.51–1.87)	< 0.00001	79 (< 0.00001)	
Home discharge	21	2720 (1833)	5338 (4257)	0.50 (0.40–0.63)	< 0.00001	67 (< 0.00001)	
1-Year	34	3560 (2785)	8814 (7935)	0.45 (0.38–0.53)	< 0.00001	39 (0.01)	
3-Year	11	1245 (721)	2618 (1839)	0.44 (0.31–0.61)	< 0.00001	69 (0.0003)	
5-Year	14	1563 (993)	1666 (1260)	0.55 (0.46–0.65)	< 0.00001	18 (0.25)	
		Patients		MD (95% CI)			
LOHS	64	7377	14 385	1.68 (1.18–2.17)	< 0.00001	90 (< 0.00001)	
Operative time	40	3350	5792	1.68 (–5.62 to 8.98)	0.65	79 (< 0.00001)	

Odds ratio estimates (OR) and mean differences (MD) with 95% confidence intervals (CI). Patients with sarcopenia were more likely to experience complications and mortality, had longer hospital stays, and were less likely to be discharged home. Operative time did not differ between the two cohorts. A direct significant correlation between the presence of sarcopenia and lower survival rates at 1, 3, and 5 years was noted.

294 Studien
97.643 Patientinnen und Patienten

Knoedler S, Schliermann R, Knoedler L, Wu M, Hansen FJ, Matar DY, Obed D, Vervoort D, Haug V, Hundeshagen G, Paik A, Kauke-Navarro M, Kneser U, Pomahac B, Orgill DP, Panayi AC. Impact of sarcopenia on outcomes in surgical patients: a systematic review and meta-analysis. *Int J Surg.* 2023 Dec 1;109(12):4238-4262.

10 Präoperative Leistungsoptimierung



Adipositas

Die richtige OP-Vorbereitung

Was bringt eine kalorienarme und proteinreiche «Spezial-Diät» vor der bariatrischen Operation? Eine solche «Spezial-Diät» kann sehr viel bringen!



<https://www.adipositaszentrum-limmattal.ch/blog/2020/05/13/die-richtige-op-vorbereitung/>

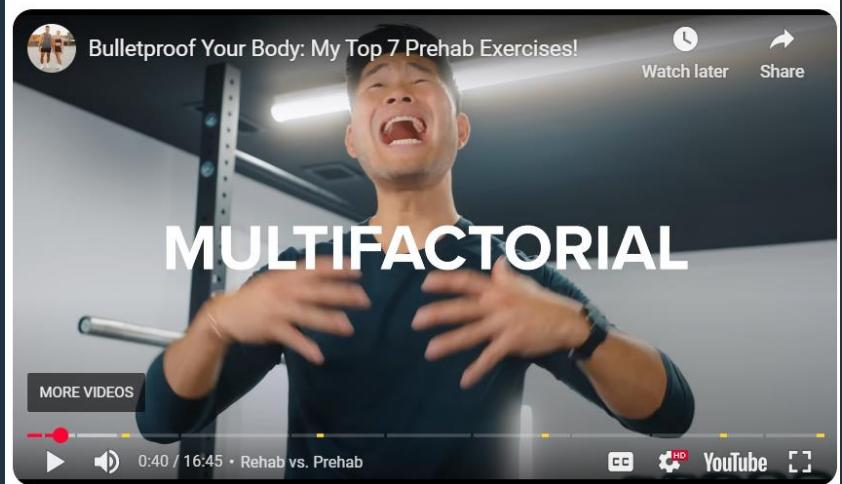
11 Präoperative Leistungsoptimierung



Jason says....

Bulletproof Your Body: My Top 7 Prehab Exercises!

YouTube · Jason and Lauren · 30.11.2024



12 Präoperative Leistungsoptimierung



Wie können wir Patientinnen und Patienten präoperativ körperlich, mental, kognitiv und diätologisch vorbereiten um den postoperativen Verlauf zu verbessern?

Identifying research priorities in anaesthesia and perioperative care.
Boney O, Bell M, Bell N, et al *BMJ Open* 2015;5:e010006.

13  Präoperative Leistungsoptimierung



Relative efficacy of prehabilitation interventions and their components: systematic review with network and component network meta-analyses of randomised controlled trials

[theBMJ](https://doi.org/10.1136/bmj-2024-081164) | *BMJ* 2025;388:e081164 | doi: 10.1136/bmj-2024-081164

Daniel I McIsaac,¹ Gurlavine Kidd,² Chelsia Gillis,³ Karina Branje,² Mariam Al-Bayati,² Adir Baxi,² Alexa L Grudzinski,⁴ Laura Boland,⁵ Areti-Angeliki Veroniki,⁶ Dianna Wolfe,² Brian Hutton²

Relative Wirksamkeit von

Körperlichem Training
Ernährung
Kognitives Training
Psychosoziales Training

Outcome

Postoperative Komplikationen
Spitalsdauer
health related quality of life
Körperliche Erholung

Einschluss

186 trials
15.684 participants
45% oncology, 23% orthopaedic, 11% major non-oncology, 11% cardiac or vascular, and 10% mixed

Vergleich

Prehab mind. 7 Tage vor OP begonnen
vs
Standard Care

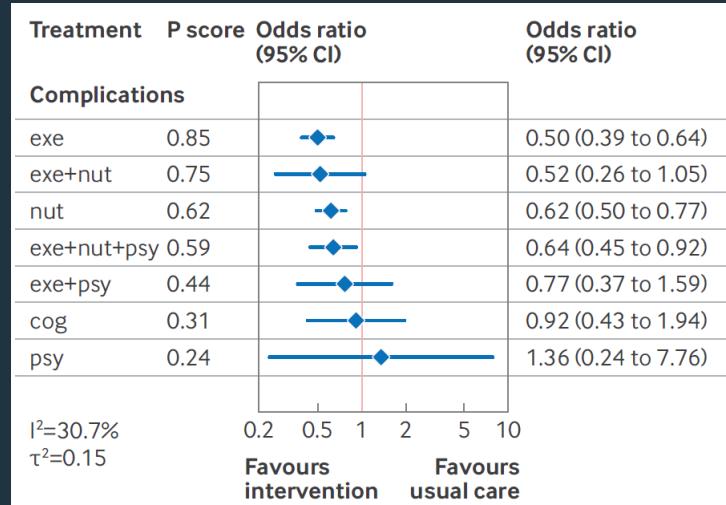
14  Präoperative Leistungsoptimierung



Komplikationen

bis 30 Tage nach OP

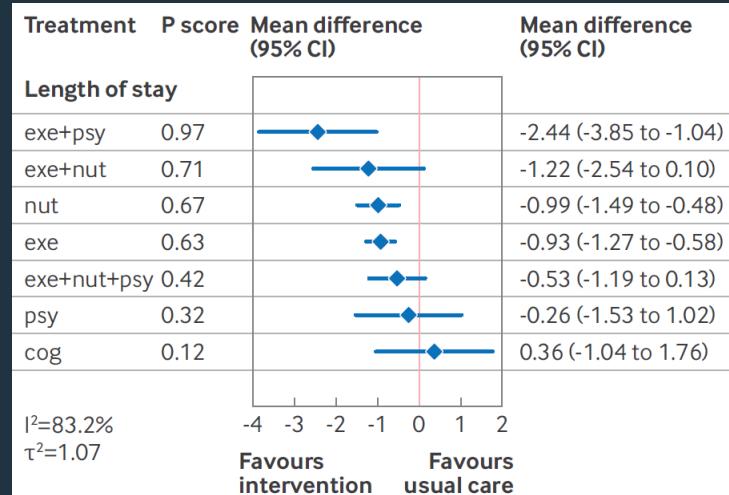
exe = körperliches Training
nut = Ernährung
psy = psychosoziales / mentales Training
cog = kognitives Training



Spitalsaufenthalt

Unterschied in Tagen

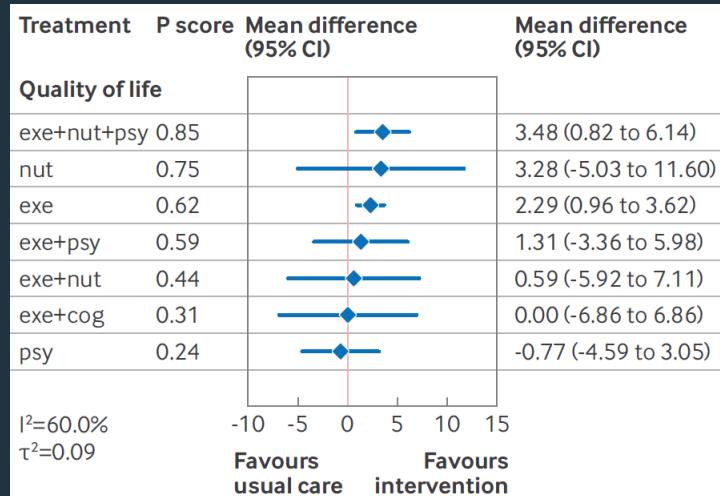
exe = körperliches Training
nut = Ernährung
psy = psychosoziales / mentales Training
cog = kognitives Training



Lebensqualität

LOQ

exe = körperliches Training
 nut = Ernährung
 psy = psychosociales / mentales Training
 cog = kognitives Training



17

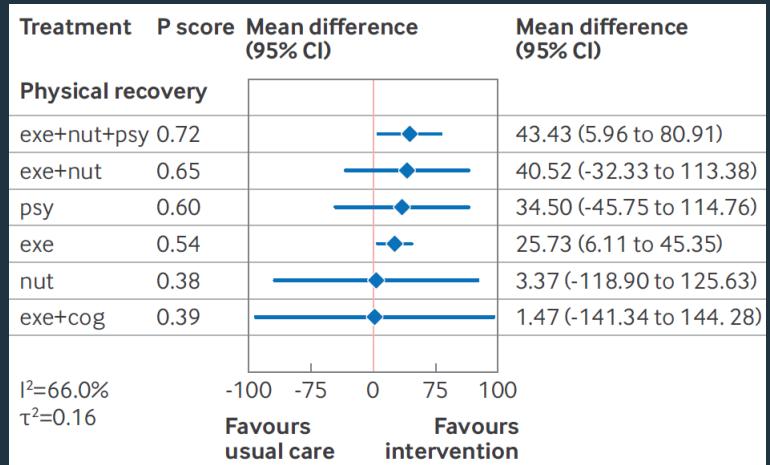
Präoperative Leistungsoptimierung



Körperliche Erholung

Körperliche Erholung
 (6 Minuten Gehdistanz)

exe = körperliches Training
 nut = Ernährung
 psy = psychosociales / mentales Training
 cog = kognitives Training



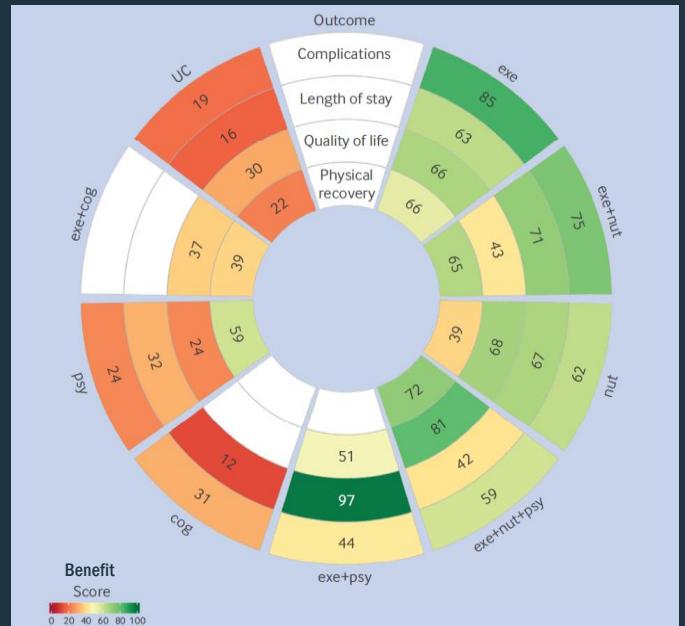
18

Präoperative Leistungsoptimierung



Key Points

Exercise prehabilitation,
Nutritional prehabilitation, and
multicomponent interventions including exercise
may benefit adults preparing for surgery and
could be considered in clinical care.



19

Präoperative Leistungsoptimierung



Key Points

Gewissheit der Ergebnisse niedrig

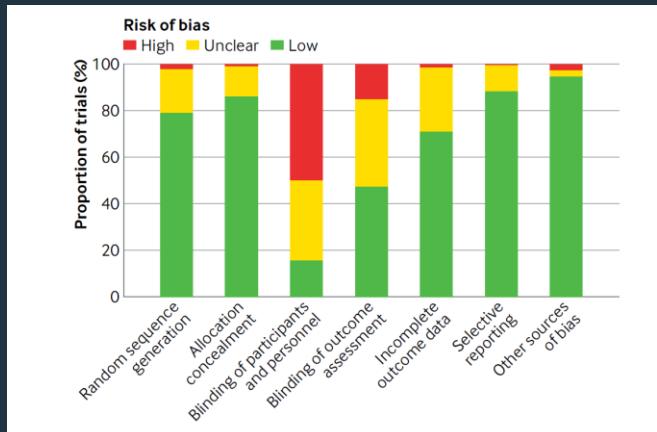


Fig 1 | Proportion of included studies with high, unclear, and low risk of bias for each bias domain of the Cochrane collaboration's risk of bias 1 tool

20

Präoperative Leistungsoptimierung



Wie und Wo?

NEJM Journal Watch

GENERAL MEDICINE SPECIALTIES TOPICS VOICES CME GUIDELINE WATCH

SUMMARY AND COMMENT | GENERAL MEDICINE, AMBULATORY MEDICINE, HOSPITAL MEDICINE

INFORMING PRACTICE

February 11, 2025

Does “Prehabilitation” Improve Surgical Outcomes?

Bruce Soloway, MD, reviewing Melsaac DJ et al. *BMJ* 2025 Jan 22

A meta-analysis suggests that it does, although evidence to support specific presurgical interventions is weak.

Primary care clinicians might have noticed that some surgeons refer their patients for “prehabilitation”—preparing patients for surgery through exercise, nutritional enhancement, psychological support, cognitive training, or a combination of these components. But in general, existing evidence is regarded as low in quality and does not clarify the relative values of different forms of prehabilitation.

Researchers performed a network meta-analysis and component network meta-analysis of 186 randomized trials in which any form of prehabilitation was compared with usual care in 15,000 patients who were preparing for major surgery. Analyses were performed to compare the effects of various single-component and multicomponent interventions on complications, length of stay, health-related quality of life, and functional recovery (e.g., 6-minute walk test at 90 days after surgery).

Certainty of evidence was low to very low for most analyses largely due to challenges in achieving blinding of participants. Isolated exercise was most likely to lower rates of surgical complications, and multicomponent interventions (including exercise) were most likely to improve other outcomes. Nutritional interventions also significantly improved all outcomes. Evidence about psychological and cognitive interventions was too sparse to draw meaningful conclusions.

COMMENT

This analysis supports “prehabilitation” interventions involving exercise and nutrition. However, available evidence offers little guidance as to just how these interventions should be designed and implemented.

21   

Home-based prehabilitation: a systematic review and meta-analysis of randomised trials

British Journal of Anaesthesia, 134 (4): 1018–1028 (2025)

Filippo D’Amico¹, Sara Dormio¹, Giulia Veronesi^{2,3}, Fabio Guerracino⁴ , Katia Donadello⁵ , Gilda Cinnella⁶, Riccardo Rosati^{3,7}, Nicolò Pecorelli^{3,8}, Gabriele Baldini^{9,10,11} , Marina Pieri^{1,3,*} , Giovanni Landoni^{1,3} , Stefano Turi¹ , and PREHAB study group

Adherence and Clinical Effectiveness von

Home-based Prehabilitation
Körperlichem Training
Ernährung
Kognitives Training
Psychosoziales Training

Einschluss

29 trials
3.508 participants
14 abdominal, 5 mixed non cardiac, 5 orthopaedic, 3 thoracic, 1 cardiac, 1 spinal

Outcome

Risk Ratio für postoperative Komplikationen
Adherenz
6 Minuten Geh-Test
Spitalsdauer
preoperative hospital anxiety and depression score (HADS).

Vergleich

Home-based Prehab mind. 7 Tage vor OP begonnen
vs
Standard Care

Ergebnisse

Weniger postoperative Komplikationen in der Prähabilitationsgruppe:

38,4 % (508 von 1.322) vs 43,3 % (578 von 1.335)

Relatives Risiko (RR): 0,84, p = 0,02

Relative Risikoreduktion: 11,2 %

Number Needed to Treat (NNT): 21

Evidenzsicherheit: Niedrige Heterogenität (I^2): 44%

Sensitivitätsanalysen bestätigen den Effekt, insbesondere bei:

Multimodaler Prähabilitation: 27,8 % vs 40,4 %, RR: 0,70, p < 0,01

Programmdauer > 2 Wochen: 28,1 % vs 35,1 %, RR: 0,80, p < 0,01

Hochrisiko-Operationen: 56,0 % vs 62,4 %, RR: 0,77, p = 0,03

Sekundäre Outcome

Leistungsfähigkeit (6-Minuten-Gehstest):

Zu Beginn: Kein Unterschied zwischen Gruppen

Nach Prähab: +28,2 m (p < 0,001, I^2 = 48 %)

Psychische Gesundheit (HADS-Skala):

Weniger präoperative Depression: MD: -0,65 (p < 0,001, I^2 = 0 %)

Weniger Angst 2 Monate postoperativ: MD: -0,50 (p < 0,001, I^2 = 0 %)

Kürzere Aufenthaltsdauer in der Prähab-Gruppe (MD: -0,3 Tage; p = 0,03, I^2 = 45 %)

Wann? und Wie? Gestalt von Home-based Prehab

Dauer:

Median 4 Wochen (IQR: 2–4 Wochen)

Häufigkeit:

3–7 Trainingstage pro Woche

Dauer der Einheiten:

30–60 Minuten pro Sitzung

Trainingsarten:

Aerobes Training (am häufigsten, in 15 Studien)

Atemmuskulatraining (in 3 Studien, als Teil des aeroben Trainings)

Krafttraining (in 7 Studien)

Therabänder verwendet (in 6 Studien)

Trainingsintensität:

Zielvorgaben nach Borg-Skala und Herzfrequenz (in 3 Studien)

Trainingsgeräte:

Atemtrainingsgeräte

Stepper

Fahrradergometer

Ernährungsintervention:

Multimodal (in 11 Studien)

Nur Ernährung (unimodal) (in 2 Studien)

Nahrungsergänzungsmittel (alle Studien, teilweise vollständige Mahlzeiten)

Psychologische & kognitive Unterstützung:

In 11 Studien enthalten

CDs oder Mobile Apps in einigen Studien

Start Your **7-Day Free Trial** **BEGIN TODAY**

[P]REHAB

DON'T MISS THIS SPECIAL OFFER!

14 day
Get a **FREE 7-day**
trial of the Prehab
app!

Email Address

BEGIN TODAY!

Are you tired of...

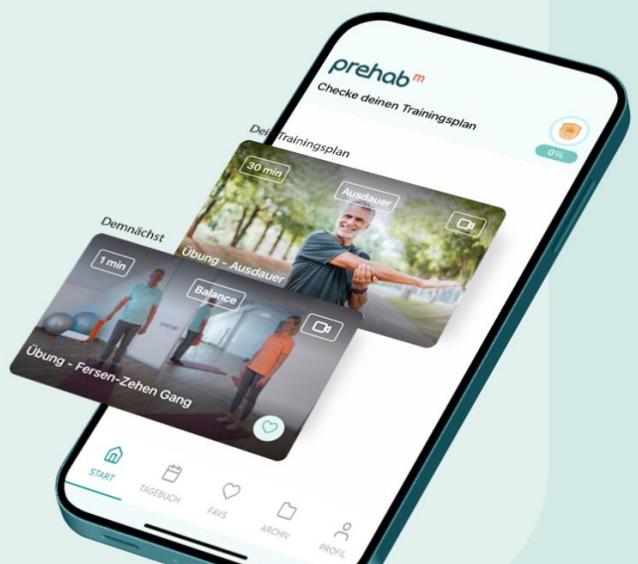
25

Digitale Vorbereitung für geplante Operationen

Für bestmögliche Effektivität sollte PrehabM über einen Zeitraum von 3-6 Wochen vor dem Eingriff genutzt werden.

[Mehr erfahren](#)

26



Your Path to a Successful Surgery Starts Here

Improve your surgery outcomes with prehabilitation program. Track your progress and share it with your doctor.

[Download for iOS](#)
[Download for Android](#)

27



How should patients at high risk of postoperative complications (respiratory, cardiac) be prehabilitated (physical therapy, nutrition)?

The role of prehabilitation should be established in noncardiac surgery patients.

Nutritional support before surgery should be considered in noncardiac surgery patients.

EJA
Eur J Anaesthesiol 2025; **42**:1–35

GUIDELINES

Preoperative assessment of adults undergoing elective noncardiac surgery

Updated guidelines from the European Society of Anaesthesiology and Intensive Care

28

 Präoperative Leistungsoptimierung

UNIVERSITÄTSKLINIKUM
TULLN


Emerging evidence suggests that prehabilitation (ie, physical conditioning, nutritional support, or both) before NCS may be associated with improved outcomes in selected patients with frailty. In selected patients, prehabilitation before NCS may be associated with improved outcomes.

2024 AHA/ACC/ACS/ASNC/HRS/SCA/SCCT/SCMR/SVM Guideline for Perioperative Cardiovascular Management for Noncardiac Surgery: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

Developed in Collaboration With and Endorsed by the American College of Surgeons, American Society of Nuclear Cardiology, Heart Rhythm Society, Society of Cardiovascular Anesthesiologists, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and the Society for Vascular Medicine

29  Präoperative Leistungsoptimierung

UNIVERSITÄTSKLINIKUM TULLN 

EJA

Eur J Anaesthesiol 2025; 42:419–429

REVIEW ARTICLE

Prehabilitation to mitigate postintensive care syndrome in surgical patients

The rationale for a peri-critical illness pathway involving anaesthesiologists and intensive care physicians

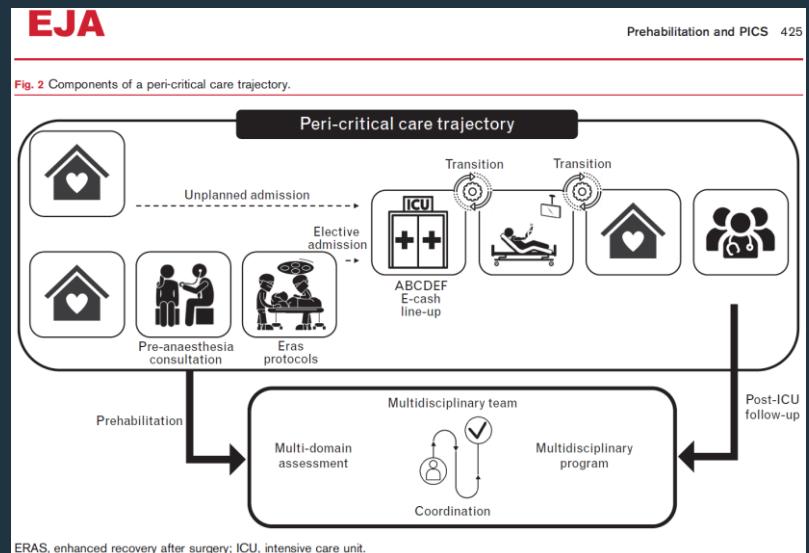
Anne-Françoise Rousseau, Gabriel Thierry, Bernard Lambermont, Vincent Bonhomme and Joana Berger-Estilita

30  Präoperative Leistungsoptimierung

UNIVERSITÄTSKLINIKUM TULLN 

Prehab & PICS

Patient Journey



Patienten/innen erfahren vielfältige positive Effekte. Dazu gehören ganz besonders die folgenden Effekte:

Eine schnellere Rückkehr in den Alltag

Vermeidung von Komplikationen

Förderung der Gesundheit

Eine Verbesserung der Leistungsfähigkeit¹³, und Bewältigung etwaiger krankheitsbedingter Schwierigkeiten im Alltag

Eine verbesserte und aktive Patienten/inneneinbindung in den Heilungsprozess und damit höhere Patientensouveränität

Geringerer Zeitbedarf zur Vorbereitung



Was nun?

3x 1h Bewegung /Woche
1g Protein / kg / Tag

medicine&science
thebmj

Prehabilitation before surgery +
Medicine and Science from The BMJ

33  Präoperative Leistungsoptimierung

UNIVERSITÄTSKLINIKUM TULLN 

Was nun?

3x 1h Bewegung /Woche
1g Protein / kg / Tag

Mach mit in der ARGE präoperatives und tagesklinisches Patientenmanagement:
praeop@oegari.at

medicine&science
thebmj

Prehabilitation before surgery +
Medicine and Science from The BMJ

34  Präoperative Leistungsoptimierung

UNIVERSITÄTSKLINIKUM TULLN 

Diskussion

- Was ist die Dosis?
- Was ist usual care?
- Adherenz und Akzeptanz?
- Sozioökonomischer Status?
- Geographische Unterschiede?
- Auswirkung auf Intensive Care Outcomes and PICS?
- Mikrobiom?
- Delir? Demenz? POCD?
- Shortcut GLP1-Agonists?

