

IL RUOLO DELLA PREABILITAZIONE IN CHIRURGIA ONCOLOGICA: FOCUS ED EVIDENZE SUL CARCINOMA COLO-RETTALE

Dott. Fabbri Nicolò,
UOC Chirurgia Generale Provinciale, Azienda USL di Ferrara



Disclosure of conflict of interest:

I have nothing to declare



Tumore del colon retto:

Terzo tumore per incidenza e quarta causa di decesso per malattia oncologica.

Nel mondo:

circa 945 000 nuovi casi e 492 000 decessi/anno (dati World Health Organization)

Incidenza e mortalità in calo globalmente, ma con grandi differenze geografiche: età, sesso, etnia, sede anatomica.

In Italia: ~40 nuovi casi ogni 100.000 abitanti

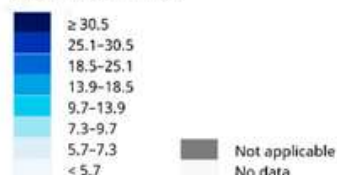
In Italia, fra gli uomini:
0-49 anni → 7% (5° più frequente),
50-69 anni → 12% (3°),
≥70 anni → 14% (3°)

Nelle donne:

0-49 anni → 4% (4°),
da 50+ anni → 3° posto

Estimated age-standardized incidence rates (World) in 2020, Colorectum, both sexes, all ages

ASR (World) per 100 000

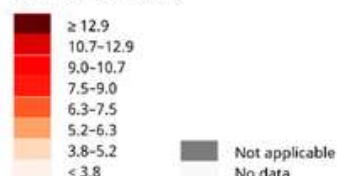


All rights reserved. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization / International Agency for Research on Cancer concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate borderlines for which there may not yet be full agreement.

Data source: GLOBOCAN 2020
Graph production: IARC
(<http://gco.iarc.fr/today>)
World Health Organization

Estimated age-standardized mortality rates (World) in 2020, Colorectum, both sexes, all ages

ASR (World) per 100 000



All rights reserved. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization / International Agency for Research on Cancer concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate borderlines for which there may not yet be full agreement.

Data source: GLOBOCAN 2020
Graph production: IARC
(<http://gco.iarc.fr/today>)
World Health Organization

Fattori di Rischio

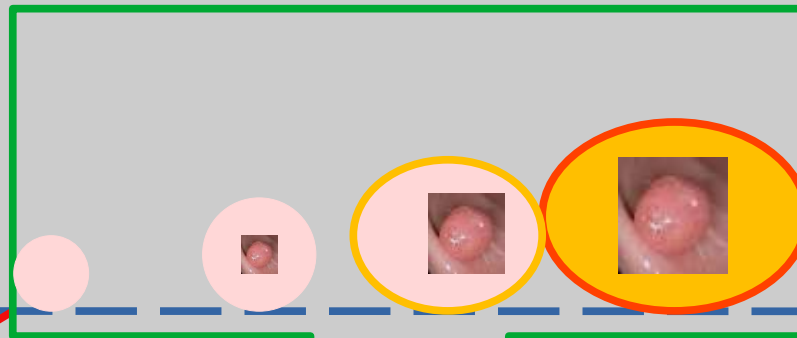
Categoria	Fattori chiave	Note essenziali
Sporadico	• Sovrappeso/obesità (BMI > 29), grasso centrale • Fumo di sigaretta • Abuso di alcol • Alto consumo di carne rossa/lavorata • Inattività fisica	Fattori modificabili . Il fumo e l'uso di NSAID influenzano le fasi iniziali (adenoma); obesità e inattività più nella fase tardiva.
Ereditario	• Poliposi adenomatosa familiare (FAP) – mutazione gene APC • Sindrome di Lynch (HNPCC) – mutazione geni MMR • Altre sindromi da poliposi hamartomatosa	Rappresentano circa 5-10% dei casi totali. I tumori si sviluppano in un contesto genetico definito.
Malattia infiammatoria intestinale (IBD)	• Colite ulcerosa (principalmente) con lunga durata della malattia • Gravità dell'infiammazione • Presenza di colangite sclerosante primitiva • "Backwash" ileite	Il rischio aumenta con durata/severità della IBD.
Lesione pre-neoplastica	• Adenomi (tubulari, villosi, sessili, peduncolati) • Numero maggiore di polipi • Dimensioni maggiori • Tipo istologico "villosa" più rischioso	Si stima che fino al ~95% dei carcinomi coloretali originino da adenomi.

Come intercettiamo la malattia

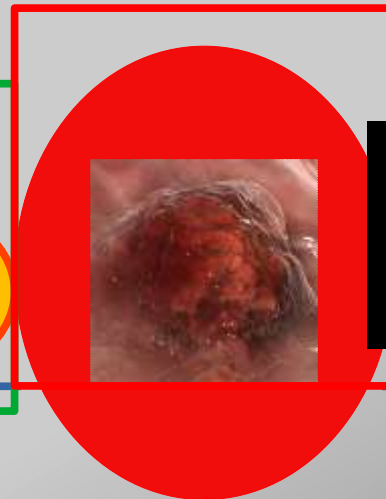
Correzione dei FDR



Sorveglianza precoce



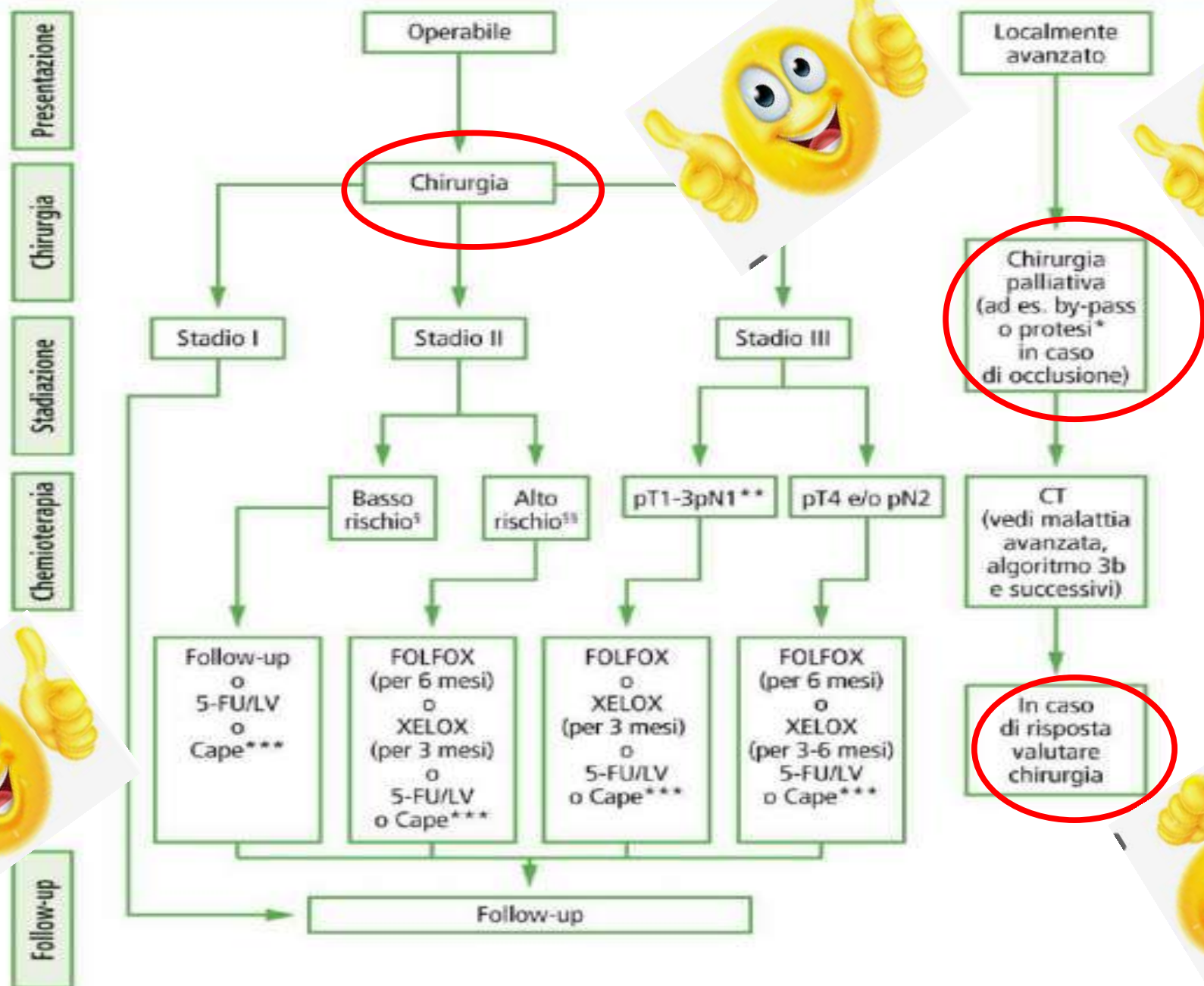
SCREENING



Stadiazione

TERAPIA

TO BE
CONTINUED

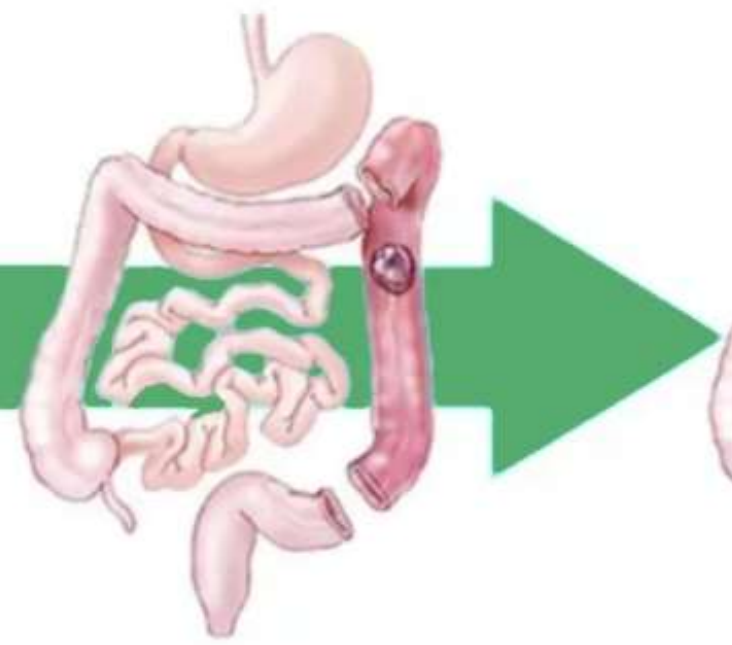


The End



**YOUR COMPANY
PICTURE**

EMICOLECTOMIA SINISTRA
nel tumore del colon discendente



Philippe Mouret

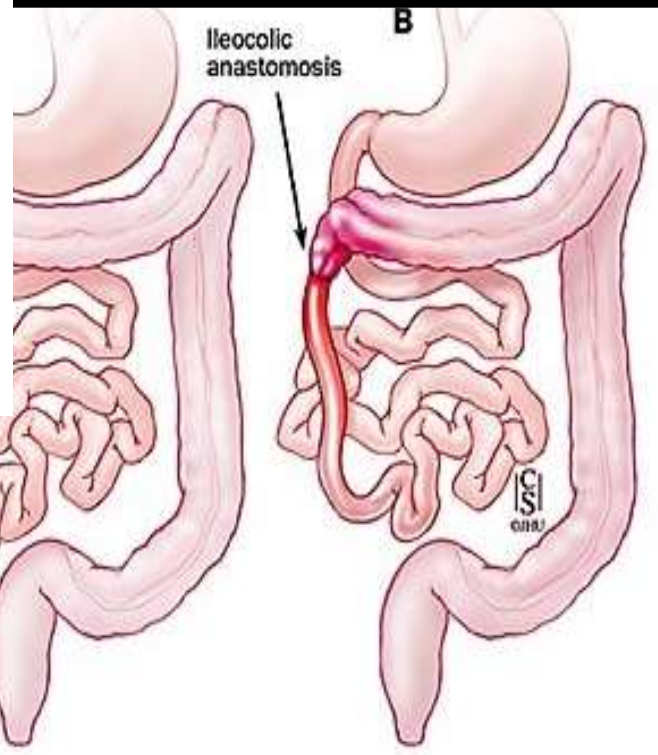
Une (R)évolution
par la cœlio-chirurgie

Le Français qui a bouleversé
la pratique chirurgicale du monde entier

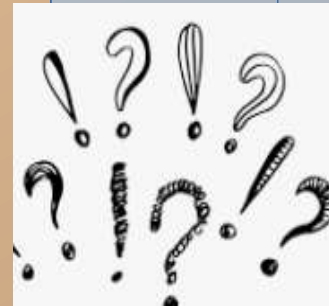


1987

Préface du Professeur Dominique Franco
Président de l'Académie Nationale de Chirurgie



PERIODO PERIOPERATORIO



“541 consecutive operations involving anastomoses of the colon and rectum that were carried out between 1999 and 2004 at a single colorectal unit were reviewed. Data concerning 35 variables, relating to patient, tumour and surgical factors, were recorded.”

Lipska MA, Bissett IP, Parry BR, Merrie AE. Anastomotic leakage after lower gastrointestinal anastomosis: men are at a higher risk. ANZ J Surg. 2006 Jul;76(7):579-85. doi: 10.1111/j.1445-2197.2006.03780.x. PMID: 16813622.

“La deiscenza anastomotica resta la più temuta tra le complicanze precoci dopo chirurgia colo-rettale in quanto peggiora la prognosi a breve e lungo termine, oltre ad aumentare i tempi e i costi di degenza.

L'incidenza varia tra il 3 e il 21%”

(G Chir Vol. 29 - n. 11/12 - pp. 483-487 Novembre-Dicembre 2008)

1562 patients included

- low preoperative hemoglobin (< 0.001),
- contamination of the operative field (< 0.001),
- hyperglycemia(0.003),
- duration of surgery of more than 3 hours (0.010),
- administration of vasopressors (0.010),
- inadequate timing of preoperative antibiotic prophylaxis (0.047),
- epidural analgesia (0. 014)

were all associated with colorectal anastomotic leakage

LekCheck: A Prospective Study to Identify Perioperative Modifiable Risk Factors for Anastomotic Leakage in Colorectal Surgery.

Ann Surg. 2022 Jan 1;275(1):e189-e197. doi:

10.1097/SLA.0000000000003853. PMID: 32511133; PMCID: PMC8683256.

7 Department of Surgery, Maastricht Universitair Medisch Centrum, Maastricht, The Netherlands.

8 Ospedale del Delta, Lagosanto, Ferrara, Italy.

PERIODO PERIOPERATORIO



Enhanced Recovery after surgery (ERAS) optimises patient procedures before, during and after surgery. The initiative seeks to improve results and patients' general experiences while reducing the length of stay and facilitating early mobility and recovery. It is used for colorectal surgery, vascular surgery and in thoracic surgery. The concept was introduced in 1997 by Henrik Kehlet. ERAS reduces length of stay by an average of 2.35 days.

2025

> Updates Surg. 2025 Jul 12. doi: 10.1007/s13304-025-02325-8. Online ahead of print.

Adherence to enhanced recovery protocol in emergency general surgery: a prospective observational study

Home > [Langenbeck's Archives of Surgery](#) > Article

Patients' perceptions of barriers to enhanced recovery after emergency abdominal surgery

Original Article | Published: 19 November 2020
Volume 406, pages 405–412, (2021) [Cite this article](#)

an Biloslavo⁵, Antonio La Greca⁶,
o Occhionorelli⁹, Pietro Bisagni¹⁰, Carlo Feo¹¹,
nfolà¹⁴, Riccardo Somigli¹⁵, Diego Visconti¹⁶,
ianotti^{3 4 19}, Andrea Mingoli²⁰, Enrico Lena²¹,
senti⁸, Domenico Lacavalla⁹, Nicolò Fabbri¹¹,
rgia Boschetto^{22 23}, Gianandrea Baldazzi¹⁷,
16, Diletta Cassini²⁵, Marco Braga^{3 4};

Implementation of a multidisciplinary perioperative protocol in major emergency abdominal surgery

Original Article | Published: 18 October 2019
Volume 167–477, (2021) [Cite this article](#)



The American Journal of Surgery

Volume 207, Issue 6, June 2014, Pages 807-814



Clinical Science

Enhanced postoperative recovery pathways in emergency surgery: a randomised controlled clinical trial

Murat Gonenc M.D.^a , Ahmet Cem Dural M.D.^a, Ferhat Celik M.D.^a, Cevher Akarsu M.D.^a,
Ali Kocatas M.D.^a, Mustafa Uygur Kalayci M.D.^a, Yasar Dogan M.D.^b, Halil Alis M.D.^c

2014

2010

Counselling pre-ricovero

Informazione multidisciplinare (chirurgo, anestesista, infermiere) sul percorso post-operatorio.

Presentazione del concetto di riabilitazione e coinvolgimento attivo del paziente.

Gestione delle aspettative, del dolore, delle misure da seguire in ogni giorno post-op.

Ottimizzazione preoperatoria

Valutazione e correzione dei fattori di rischio (cardiovascolari, diabete, anemia, fumo/alcol).

Cessazione del fumo/alcol in fase pre-riabilitativa per ridurre complicanze post-operatorie.

Strategie intra-operatorie

Scelta di anestesia rapida (es. propofol, sevoflurane), evitazione di midazolam e blocchi neuromuscolari prolungati.

Ventilazione protettiva, mantenimento della normotermia, chirurgia mininvasiva quando possibile.

Monitoraggio fluidi, profilassi tromboembolica, antibiotica.

Strategie post-operatorie

Gestione del dolore con analgesici non oppioidi; evitare se possibile analgesia epidurale.

Alimentazione enterale precoce, mobilitazione immediata, rimozione precoce di tubi/cateteri.

Riduzione della degenza, valutazione CRP per complicanze, dimissione precoce se criteri soddisfatti.

Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS[®]) Society Recommendations: 2018

U. O. Gustafsson¹ · M. J. Scott^{2,3} · M. Hubner⁴ · J. Nygren⁵ · N. Demartines⁴ · N. Francis^{6,7} ·
T. A. Rockall⁸ · T. M. Young-Fadok⁹ · A. G. Hill¹⁰ · M. Soop¹¹ · H. D. de Boer¹² · R. D. Urman¹³ ·
G. J. Chang¹⁴ · A. Fichera¹⁵ · H. Kessler¹⁶ · F. Grass⁴ · E. E. Whang¹⁷ · W. J. Fawcett¹⁸ ·
F. Carli¹⁹ · D. N. Lobo²⁰ · K. E. Rollins²⁰ · A. Balfour²¹ · G. Baldini¹⁹ · B. Riedel²² · O. Ljungqvist²³

Meta-Analysis > Medicine (Baltimore). 2020 Jul 17;99(29):e20983.
doi: 10.1097/MD.00000000000020983.
Enhanced recovery after surgery on multiple clinical
outcomes: Umbrella review of systematic reviews
and meta-analyses



Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS®) Society Recommendations: 2018

U. O. Gustafsson¹ · M. J. Scott^{2,3} · M. Hubner⁴ · J. Nygren⁵ · N. Demartines⁴ · N. Francis^{6,7} · T. A. Rockall⁸ · T. M. Young-Fadok⁹ · A. G. Hill¹⁰ · M. Soop¹¹ · H. D. de Boer¹² · R. D. Urman¹³ · G. J. Chang¹⁴ · A. Fichera¹⁵ · H. Kessler¹⁶ · F. Grass⁴ · E. E. Whang¹⁷ · W. J. Fawcett¹⁸ · F. Carli¹⁹ · D. N. Lobo²⁰ · K. E. Rollins²⁰ · A. Balfour²¹ · G. Baldini¹⁹ · B. Riedel²² · O. Ljungqvist²³

Fig. 1 Preadmission items

2018

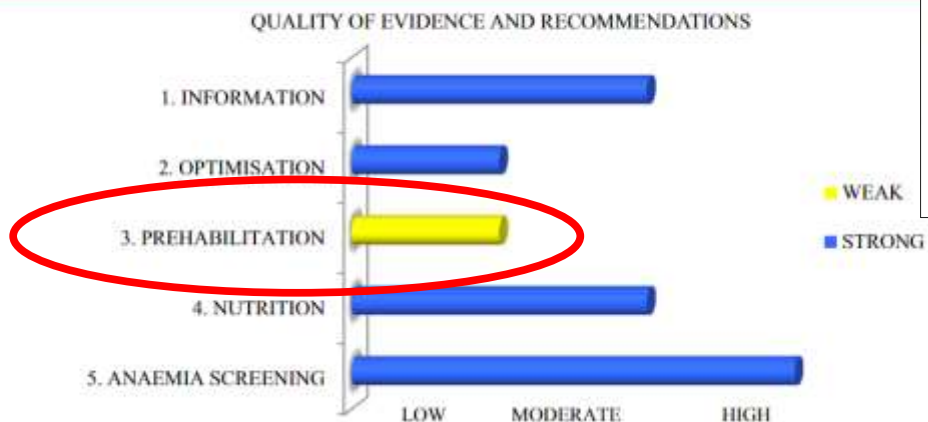


Fig. 3 Intraoperative items

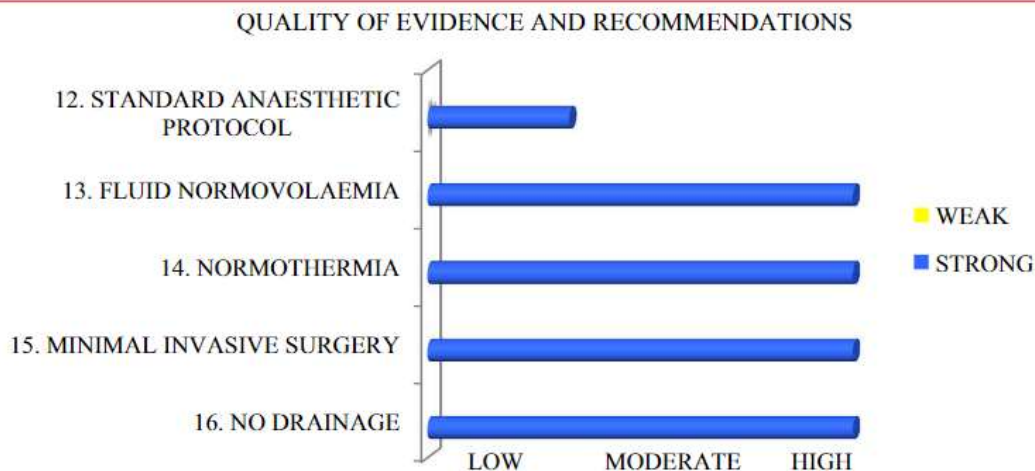
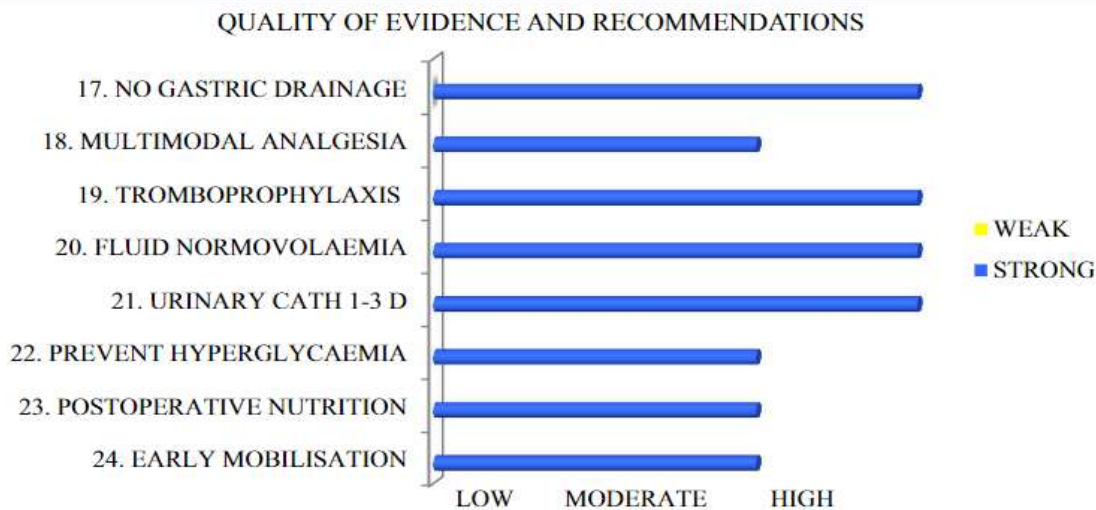


Fig. 4 Postoperative items



PERIODO PERIOPERATORIO



Fattori di Rischio

Categoria	Fattori chiave	Note essenziali
Sporadico	• Sovrappeso/obesità (BMI > 29), grasso centrale • Fumo di sigaretta • Abuso di alcol • Alto consumo di carne rossa/lavorata • Inattività fisica	Fattori modificabili . Il fumo e l'uso di NSAID influenzano le fasi iniziali (adenoma); obesità e inattività più nella fase tardiva.
Ereditario	• Poliposi adenomatosa familiare (FAP) – mutazione gene APC • Sindrome di Lynch (HNPCC) – mutazione geni MMR • Altre sindromi da poliposi hamartomatosa	Rappresentano circa 5-10% dei casi totali. I tumori si sviluppano in un contesto genetico definito.
Malattia infiammatoria intestinale (IBD)	• Colite ulcerosa (principalmente) con lunga durata della malattia • Gravità dell'infiammazione • Presenza di colangite sclerosante primitiva • "Backwash" ileite	Il rischio aumenta con durata/severità della IBD.
Lesione pre-neoplastica	• Adenomi (tubulari, villosi, sessili, peduncolati) • Numero maggiore di polipi • Dimensioni maggiori • Tipo istologico "villosa" più rischioso	Si stima che fino al ~95% dei carcinomi coloretali originino da adenomi.



Ricercatore

Direzione Sanitaria

Paziente



PREABILITAZIONE

Ha le sue origini nel campo della medicina dello sport, dove gli atleti partecipano a programmi strutturati di esercizio fisico e nutrizione per migliorare le prestazioni e prevenire infortuni.

Il concetto è stato esportato all'ambito chirurgico, per accrescere la resistenza fisica e mentale dei pazienti prima dell'intervento chirurgico, al fine di migliorare gli esiti e ridurre le complicanze. L'utilizzo della pre-habilitation è stato esteso ad altre aree, tra cui oncologia, cardiologia e pneumologia, man mano che gli studi hanno riconosciuto i suoi potenziali benefici.

Una delle principali sfide consiste nell'**identificare i pazienti** che trarrebbero beneficio da un programma di pre-habilitation e nell'assicurare che ricevano interventi appropriati. Questo richiede **infrastrutture** e una stretta **collaborazione** tra chirurghi, anestesisti e altri membri del team sanitario.



Critical zone

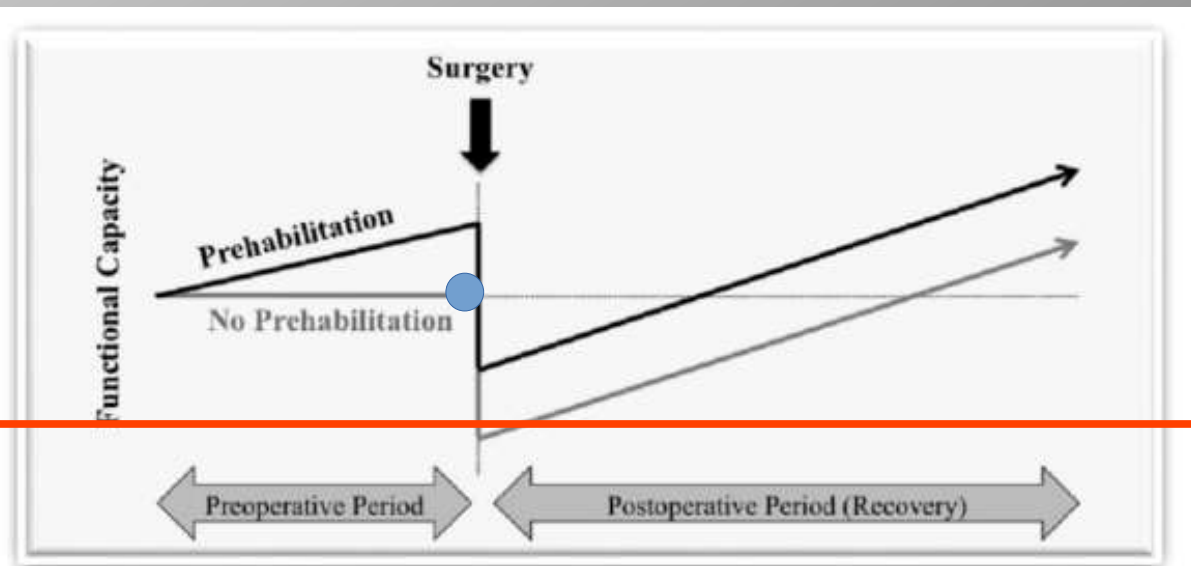
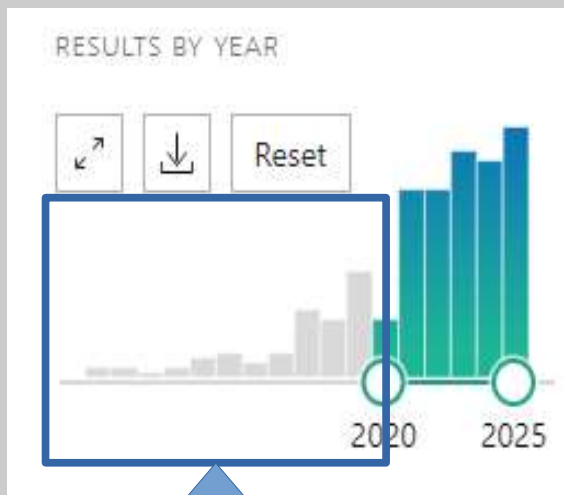


Figure 24. Theoretical model of surgical prehabilitation based on strengthening functional ability prior to surgery. [71]



**(Prehabilitation) AND (colorectal) from 2020 – 2025:
388 results**

**((exercise) AND (prehabilitation)) AND (colorectal) from
2020 – 2025: 267 results**

**((multimodal) AND (prehabilitation)) AND (colorectal)
from 2020 – 2025:
101 results**



Cochrane Database of Systematic Reviews

2023

Prehabilitation versus no prehabilitation to improve functional capacity, reduce postoperative complications and improve quality of life in colorectal cancer surgery (Review)

Molenaar CJL, van Rooijen SJ, Fokkenrood HJP, Roumen RMH, Janssen L, Slooter GD

Prehabilitation may result in an improved functional capacity, (...) A solid effect on the number of implications, postoperative emergency department visits and re-admissions could not be established (...) only three heterogeneous studies were included in this review.

Numerous relevant RCTs are ongoing and will be included in a future update of this review.

Uno studio del 2014 RCT su preabilitazione di sole capacità fisiche, condotto in Canada, pur rilevando un'aumento delle performance fisiche nel postoperatorio, non ha riscontrato differenze significative nelle complicanze postoperatorie rispetto alla tradizionale riabilitazione.

Prehabilitation versus Rehabilitation
A Randomized Control Trial in Patients Undergoing Colorectal Resection for Cancer

Chelsia Gillis, R.D., M.Sc., Chao Li, M.D., M.Sc., Lawrence Lee, M.D., M.Sc., Rashami Awasthi, B.Sc.,
Berson Augustin, B.Sc., Ann Gamsa, Ph.D., A. Sender Liberman, M.D., Barry Stein, M.D.,
Patrick Charlebois, M.D., Liane S. Feldman, M.D., Francesco Carli, M.D., M.Phil.

Effect of Multimodal Prehabilitation vs Postoperative Rehabilitation on 30-Day Postoperative Complications for Frail Patients Undergoing Resection of Colorectal Cancer

A Randomized Clinical Trial

2020

Francesco Carli, MD, MPhil¹; Guillaume Bousquet-Dion, MD¹; Rashami Awasthi, MSc¹; [et al](#)

Studio RCT di pre-abilitazione multimodale (esercizio, nutrizione, supporto psicologico) sulle complicanze a 30 giorni in pazienti fragili sottoposti a resezione coloretale, rispetto alla riabilitazione postoperatoria. Pazienti inclusi 110.

Nessuna differenza significativa tra i gruppi sull'outcome primario (CCI) a 30 giorni

Preoperative multimodal prehabilitation before elective colorectal cancer surgery in patients with WHO performance status I or II: randomized clinical trial

2023

Rasmus Dahlin Bojesen ^{1 2}, Susanne Oksbjerg Dalton ^{3 4}, Søren Thorgaard Skou ^{5 6},
Lars Bo Jørgensen ^{5 6 7}, Line Rosell Walker ¹, Jens Ravn Eriksen ^{2 8}, Camilla Grube ^{1 2},
Tobias Freyberg Justesen ², [Christoffer Johansen](#) ^{4 9}, Gerrit Slooter ¹⁰, Franco Carli ¹¹,
Ismail Gögenur ²

L'endpoint primario era il recupero postoperatorio nei primi 3 giorni dopo l'intervento, valutato mediante il questionario validato Quality of Recovery-15

Pazienti inclusi 36.

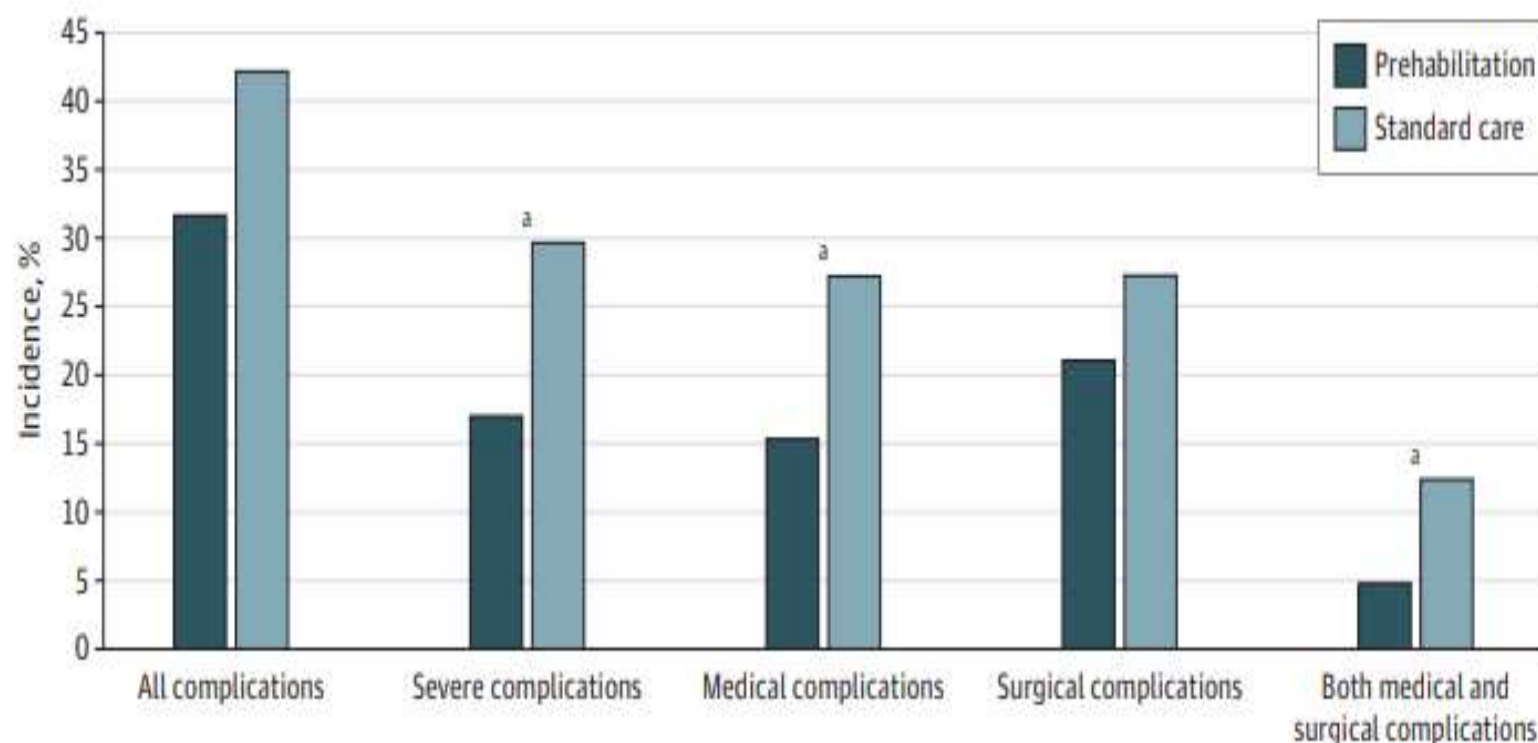
Quattro settimane di pre-abilitazione multimodale sono state associate a un miglioramento clinicamente significativo del recupero postoperatorio

- ¹Department of Surgery, Maxisima Medical Center, Veldhoven, the Netherlands
- ²Department of Anesthesia, Montreal General Hospital, McGill University Health Center, Montreal, Quebec, Canada
- ³Department of Anesthesia, Hospital Clínic de Barcelona, Barcelona, Spain
- ⁴Department of Mathematics and Computer Science, Eindhoven University of Technology, Eindhoven, the Netherlands
- ⁵IDIBAPS, University of Barcelona, Barcelona, Spain
- ⁶Physical Medicine and Rehabilitation Department, Hospital Clínic de Barcelona, Barcelona, Spain
- ⁷Department of Medical Sciences, University of Ferrara, Ferrara, Italy
- ⁸Unit of Provincial General Surgery, Azienda Unità Sanitaria Locale Ferrara, Ferrara, Italy
- ⁹Department of Surgery, Amphia, Breda, the Netherlands
- ¹⁰Center for Surgical Science, Zealand University Hospital, Roskilde, Denmark
- ¹¹Department of Surgery, Slagelse Hospital, Slagelse, Denmark
- ¹²Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark
- ¹³Department of Surgery, Zealand University Hospital, Køge, Denmark

Effect of Multimodal Prehabilitation on Reducing Postoperative Complications and Enhancing Functional Capacity Following Colorectal Cancer Surgery The PREHAB Randomized Clinical Trial

Charlotte Johanna Laura Molenaar, MD; Enrico Maria Minnella, MD, PhD; Miquel Coca-Martinez, MD, MSc; David Wouter Gerard ten Cate, MD; Marta Regis, PhD; Rashmi Awasthi, MSc; Graciela Martinez-Palli, MD, PhD; Manuel López-Baamonde, MD; Raquel Sebío-García, MSc, PhD; Carlo Vittorio Feo, MD; Stefanus Johannes van Rooijen, MD, PhD; Jennifer Marijke Janneke Schreinemakers, MD, PhD; Rasmus Dahlin Bojesen, MD, PhD; Ismail Gögenur, MD, PhD; Edwin R. van den Heuvel, MSc, PhD; Francesco Carli, MD, MPhil; Gerrit Dirk Slooter, MD, PhD; for the PREHAB Study Group

Figure 2. Complications Within 30 Days After Surgery



**Jama surg.
2023**

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.

Multimodal prehabilitation in elective oncological colorectal surgery enhances postoperative functional recovery: A secondary analysis of the PREHAB randomized clinical trial

2024

David W G Ten Cate ¹, Charlotte J L Molenaar ², Raquel Sebio Garcia ³, Rasmus D Bojesen ⁴, Bhagya Lakshmi Ramappa Tahasildar ⁵, Loes Jansen ², Manuel López-Baamonde ⁶, Carlo Vittorio Feo ⁷, Graciela Martínez-Palli ⁶, Ismail Gögenur ⁸, Francesco Carli ⁵, Gerrit D Slooter ²; PREHAB study group

Analisi secondaria del trial PREHAB.

Sono stati eseguiti test da sforzo cardiopolmonare (CPET), steep ramp test (SRT), test del cammino di 6 minuti (6MWT), test di salita delle scale (SCT), test sit-to-stand di 30 secondi (STS), test timed-up-and-go (TUG) e valutazioni della forza muscolare al basale (T0) e a 4 settimane dopo l'intervento (T3).

L'endpoint primario era la variazione relativa della capacità funzionale tra T0 e T3 per gruppo (pre-abilitazione vs controllo).

Pazienti inclusi 251.

La pre-abilitazione multimodale nella chirurgia del carcinoma coloretale è associata a un miglioramento della capacità funzionale postoperatoria, anche nei pazienti che non sviluppano complicanze postoperatorie.

The Effects of Multimodal Prehabilitation on Postoperative Outcomes in Colorectal Surgery: A Systematic Review and Meta-Analysis

Nirmani Widanage¹, Ahmed Almonib², Kasun Gunathilaka³

Confronto tra pre-abilitazione multimodale e standard of care in colorectal surgery

- Outcome primario: complicanze postoperatorie complessive;
- Outcome secondari: capacità funzionale (6MWT) e complicanze gravi (Clavien-Dindo $\geq$ III).

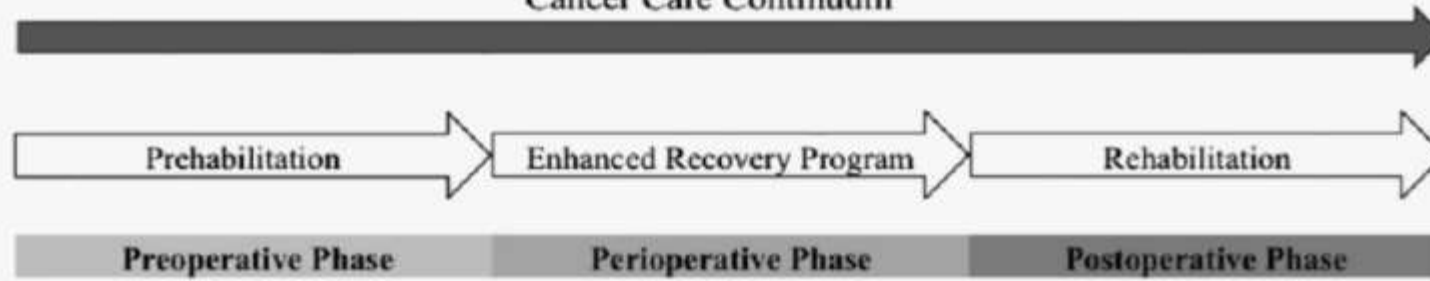
Sono stati inclusi cinque RCT con un totale di 422 pazienti.

La pre-abilitazione ha ridotto significativamente le complicanze postoperatorie complessive rispetto alla cura standard;

Il recupero funzionale è risultato migliorato, con una differenza media aggregata nel 6MWT di +50,8 m a 8 settimane (IC 95% 25,9–75,7; $p < 0,0001$; $I^2 = 59\%$).

Non è stata invece osservata una riduzione significativa delle complicanze gravi

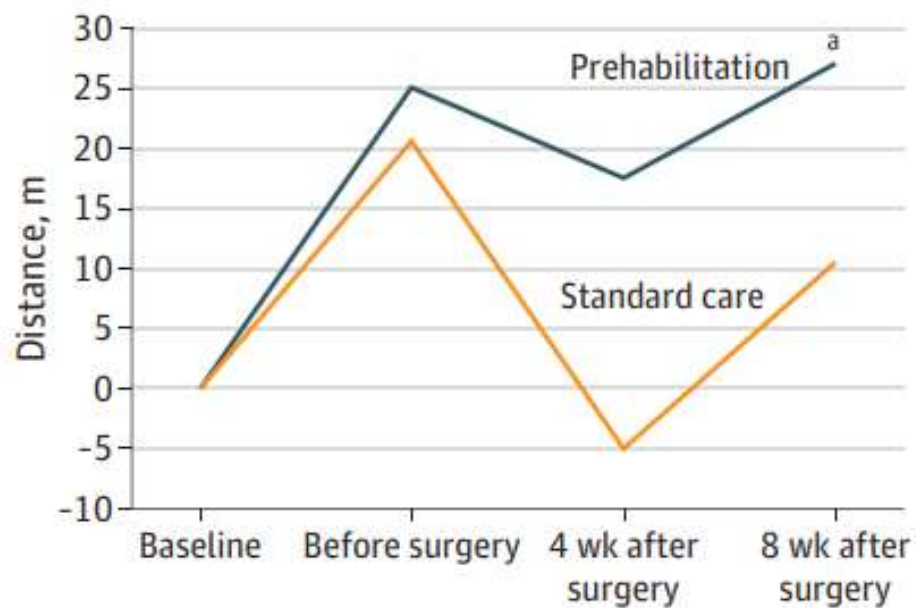
Cancer Care Continuum



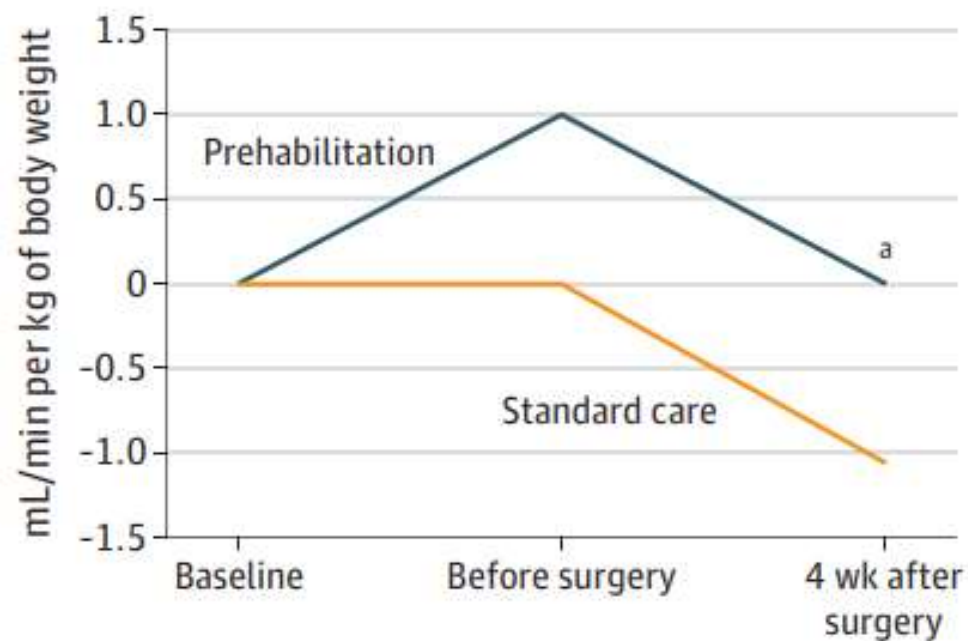
Need for Surgery
Identified



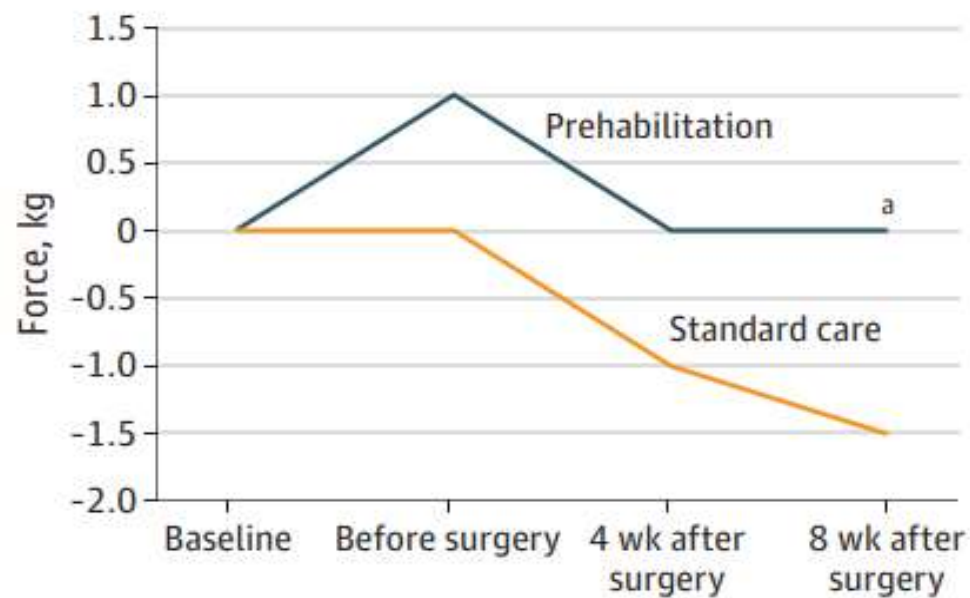
A 6-min Walking distance



B Oxygen consumption at anaerobic threshold



E Handgrip strength



La nostra esperienza:

Studio (RF-2018-1236727) RCT monocentrico di preabilitazione trimodale (totale pazienti 112) dal 2020 al 2025 in pazienti sottoposti a chirurgia coloretale con protocollo ERAS:

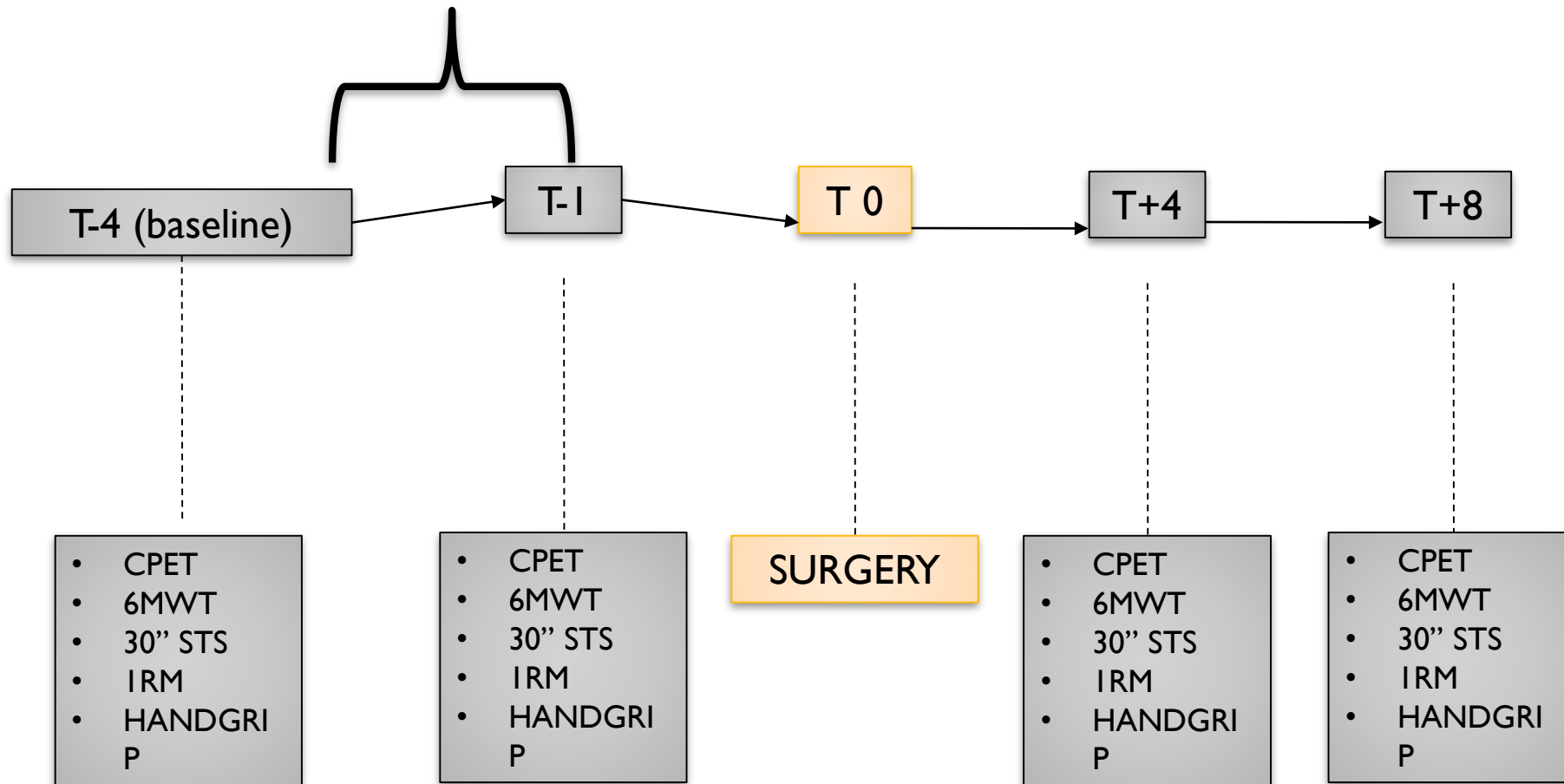
1) **Esercizio fisico:** valutazione, programma personalizzato (3 sessioni supervisionate/settimana + aerobica domiciliare), monitoraggio via accelerometro.

2) **Nutrizione:** valutazione dello stato nutrizionale, incremento proteico (1,5 g/kg/die) in caso di cachessia, multivitaminici + omega-3.

3) **Supporto psicologico:** screening ansia/depressione, interventi mirati (relax, respirazione, coping attivo) durante le 4 settimane pre-operatorie.



Prehabilitation
(4 weeks) 3 training sessions per week



Resultati preliminari: 51 casi

Physical performances after 4 weeks of prehabilitation before surgery.

<u>Variables</u>	<u>Prehabilitation group</u> (N=35)	<u>Control Group</u> (N=36)	<u>P value</u>
<u>6-MWD (m)</u>	523 $\pm$ 24.6	427 $\pm$ 25.3	0.01
<u>VO² peak (ml/kg/min)</u>	20.4 (14-32.3)	16.9 (10-33)	0.03
<u>Hand grip test (kg)</u>	37 $\pm$ 16	35 $\pm$ 11	0.6
<u>Sit-to-stand test</u>	12.5 (8-31)	12 (8-31)	0.8

Physical performances at 8 weeks after surgery.

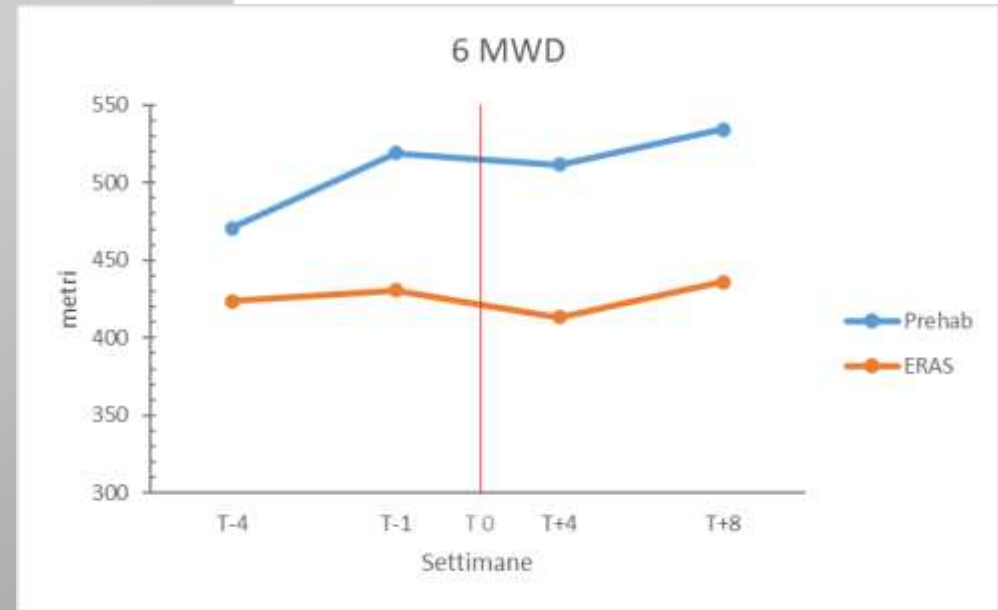
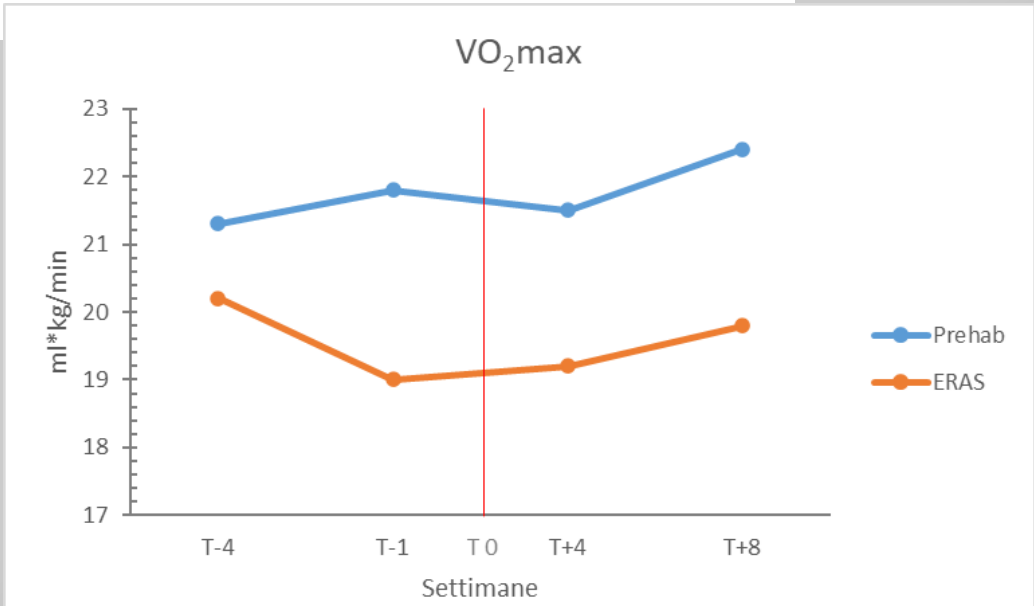
<u>Variables</u>	<u>Prehabilitation group</u> (N=35)	<u>Control Group</u> (N=36)	<u>P value</u>
<u>6-MWD (m)</u>	531 $\pm$ 82	441 $\pm$ 107	0.008
<u>VO² peak (ml/kg/min)</u>	21 $\pm$ 4	20 $\pm$ 5	0.4
<u>Hand grip test (kg)</u>	34 $\pm$ 12	33 $\pm$ 9	0.8
<u>Sit-to-stand test</u>	18 (12-33)	13 (9-30)	0.01



ABSTRACTS

Risultati preliminari: 51 casi

2024 Scientific Session of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), Cleveland, USA, 17–20 April 2024: Podium



Physical performance at different times between the two groups

A Randomized Clinical Trial on Multimodal Prehabilitation in Colorectal Cancer Patients to Improve Functional Capacity and Lower Postoperative Complications: Preliminary Results

Antonio Pesce, MD, PhD, FACS¹; Nicolò Fabbri, MD²; Simona Colombari, Dietitian³; Francesco Bagolini, MD¹; Lisa Uccellatori, Ms²; Giovanni Grazi, MD⁴; Rosario Lordi, Dr⁴; Gabriele Anania, MD¹; Carlo V Feo, MD, FACS¹; ¹Department of Surgery-University of Ferrara; ²AUSL of Ferrara; ³AOU S. Anna Hospital of Ferrara; ⁴Department of Neuroscience and Rehabilitation, University of Ferrara

Introduction: The main objective of this study was to determine whether a trimodal prehabilitation program, consisting of customized and physician-supervised physical exercise, nutritional optimization and dietitian-supplemented care, and, when necessary, psychological support from a psycho-oncologist, had a positive effect on the functional capacity and reduced postoperative complications in patients undergoing laparoscopic ERAS colorectal cancer resection.

Methods and Procedures: A randomized single-blind study was conducted at Delta Hospital (AUSL of Ferrara) and S. Anna Hospital (AOU of Ferrara) involving 112 patients with colonic cancer who underwent elective colorectal resection following an ERAS program. Patients were randomly assigned to either the experimental group (Prehabilitation Group - GP), which received 4 weeks of trimodal prehabilitation followed by standard ERAS rehabilitation, or the control group (Standard ERAS Group - GSE), which received standard ERAS rehabilitation. Exclusion criteria included ASA >3, chronic kidney disease >2 according to KDIGO classification, physical limitations preventing exercise, distant metastases, and rectal cancer. The primary outcome measure was functional capacity assessed using the 6-minute walk test (6MWT), while secondary outcomes included postoperative complications according to the Clavien-Dindo classification (CCD) and length of postoperative hospital stay.

Results: Preliminary results from an interim analysis of 51 patients revealed that the GP (Prehabilitation Group) demonstrated a significant increase in mean 6MWT distance compared to the GSE (Standard ERAS Group), with an increase of 96 meters (523 ± 24.6 vs. 427 ± 25.3, p=0.01). At 4 and 8 weeks, the GP maintained significant improvements, with an increase of 103 meters (514 ± 89 vs. 411 ± 115, p=0.003) and 90 meters (531 ± 82 vs. 441 ± 107, p=0.008), respectively. There were no significant differences in mild post-operative complications (CCD I-II) between the groups (9 [34%] vs. 8 [32%], p=0.7). In terms of severe complications (CCD III-V), the GP showed potentially fewer complications than the controls [1 (4%) vs. 6 (24%), p=0.2]. The length of postoperative hospital stay tended to be shorter in the GP compared to the controls [4 (4-6) vs. 5 (4-5), p=0.1].

Conclusions: These findings suggest that the trimodal prehabilitation program positively impacted functional capacity and may reduce the risk of severe postoperative complications while potentially shortening the length of postoperative hospitalization. However, it is important to note that these results are preliminary, and further analysis with a larger sample size is necessary to confirm these trends and reach more definitive conclusions.

Durata della degenza ospedaliera simile tra i gruppi (5 giorni per il gruppo di controllo e 4 giorni per il gruppo intervento);

Effetto moderato nella riduzione delle complicanze postoperatorie.

Analizzando le complicanze di grado maggiore, si osserva una differenza tra i due gruppi, suggerendo una potenziale riduzione delle complicanze di grado moderato nel gruppo intervento.

Prima dell'intervento (T-4):

distanza media del test di cammino di 6 minuti (6MWD) del gruppo intervento 60 m superiore rispetto al gruppo controllo.

Dopo 4 settimane di pre-abilitazione (T0): incremento medio di 100 m rispetto al gruppo controllo e 50 m superiore al basale. Lo stesso trend positivo si osservava anche per VO₂ peak, forza della presa mano e test sit-to-stand.

Quattro settimane dopo l'intervento (T+4) e otto settimane dopo l'intervento (T+8): il trend migliorativo permaneva, e il test sit-to-stand mostrava un aumento significativo. Nel gruppo controllo si è registrato miglioramento, ma inferiore rispetto al gruppo intervento.

Inoltre, nonostante un calo temporaneo delle prestazioni dopo l'intervento in entrambi i gruppi (dovuto allo stress chirurgico e alla fase di guarigione), il gruppo intervento ha mostrato un declino meno marcato e un recupero più rapido rispetto al controllo.



“Without data
you’re just
another person
with an opinion.”

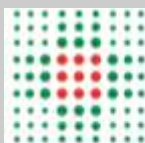
- W. Edwards Deming,
Data Scientist

Study	Country / Setting	Study Design	Population	Intervention	Comparator	Outcomes Measured	Key Results
Pesce et al. (2024)	Italy (single centre – Ferrara)	Randomized controlled trial (interim n=71)	Adults scheduled for elective colorectal cancer surgery (n=35/36)	4-week trimodal prehabilitation: CPET-guided exercise, protein supplements, psychological support	No formal prehabilitation; ERAS-based care	6MWT, VO ₂ peak, handgrip, sit-to-stand, complications, LOS	Prehab group walked ~90–100 m farther at 4 and 8 weeks; complications and hospital stay similar between groups
PREHAB Trial (2023)	International multicenter trial	Randomized clinical trial (n=251)	Adults with non-metastatic colorectal cancer, elective surgery (n=123/128)	4-week supervised in-hospital multimodal prehabilitation: exercise, nutrition, psychological support, smoking cessation	Standard ERAS perioperative care	CCI score, severe complications (CCI >20), medical complications, 6MWT at 4 weeks postop	Fewer severe complications (17.1% vs 29.7%, p=.02); fewer medical complications (15.4% vs 27.3%, p=.02); 6MWT improvement not statistically significant
López-Rodríguez-Arias et al. (2021)	Spain	Randomized controlled trial (n=20)	Patients undergoing elective colorectal cancer surgery (n=10/10)	Home-based multimodal prehabilitation: aerobic + resistance exercise, nutritional support, relaxation techniques	Standard ERAS care, no structured prehabilitation	6MWT, postoperative complications, hospital length of stay	Improved functional outcomes and lean body mass preservation; no significant difference in complications or LOS
Triguero-Cánovas et al. (2023)	Spain	Randomized controlled trial (n=44)	Patients treated surgically for colorectal cancer (n=23/21)	Physical activity, nutritional supplementation, and relaxation exercises (home-based multimodal)	Usual care	6MWT, LOS, complications	Improved physical condition and 6MWT; effects on LOS and complications not statistically significant
Bojesen et al. (2023)	Denmark	Randomized controlled trial (n=36)	Patients with colorectal cancer surgery (n=16/20)	Physical activity, nutritional supplementation, and medical optimisation (hospital-based multimodal)	Usual care	6MWT, LOS, complications	Improved 6MWT; no significant difference in LOS or overall complications

PERIODO PERIOPERATORIO



I dati a disposizione sembrano suggerire che la pre-abilitazione trimodale (esercizio + nutrizione + supporto psicologico) conferisca una base solida che favorisce un recupero funzionale migliore e una minore perdita di performance fisica nel lungo termine.



SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA
Azienda Unità Sanitaria Locale di Ferrara



GRAZIE PER L'ATTENZIONE

Bibliografia

Lipska MA, Bissett IP, Parry BR, Merrie AE. Anastomotic leakage after lower gastrointestinal anastomosis: men are at a higher risk. ANZ J Surg. 2006 Jul;76(7):579-85. doi: 10.1111/j.1445-2197.2006.03780.x. PMID: 16813622.

G Chir Vol. 29 - n. 11/12 - pp. 483-487 Novembre-Dicembre 2008

LekCheck: A Prospective Study to Identify Perioperative Modifiable Risk Factors for Anastomotic Leakage in Colorectal Surgery. Ann Surg. 2022 Jan 1;275(1):e189-e197. doi: 10.1097/SLA.0000000000003853. PMID: 32511133; PMCID: PMC8683256.

Gustafsson UO, Scott MJ, Hubner M, Nygren J, Demartines N, Francis N, Rockall TA, Young-Fadok TM, Hill AG, Soop M, de Boer HD, Urman RD, Chang GJ, Fichera A, Kessler H, Grass F, Whang EE, Fawcett WJ, Carli F, Lobo DN, Rollins KE, Balfour A, Baldini G, Riedel B, Ljungqvist O. Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS®) Society Recommendations: 2018. World J Surg. 2019 Mar;43(3):659-695. doi: 10.1007/s00268-018-4844-y. PMID: 30426190.