


Anaesthesia 2019 (in press) 

Enhanced postoperative recovery: Good from afar, but far from good?

Henrik Kehlet, Prof., PhD, FACS(Hon), ASA(Hon)

- **documented benefits (LOS, morbidity)**
- **implementation of evidence ?**
- **focus on pathophysiology of postoperative recovery**
- **research design ?**

Ann Surg 2018;267:998–9. 


ERAS implementation – time to move forward

Kehlet H.

process:

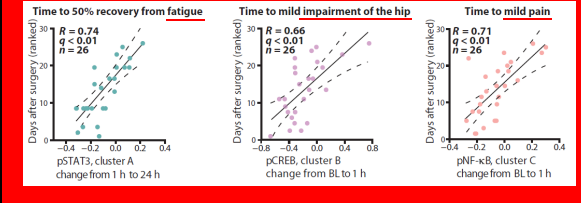
- read the procedure-specific literature
- know your data
- multidisciplinary collaboration
- monitoring
- share the economic benefits

described in detail by Kehlet & Wilmore Ann Surg 2008


Sci Transl Med 2014;6:255ra131. 

Clinical recovery from surgery correlates with single-cell immune signatures

Brice Gaudillière,^{1,2*} Gabriela K. Fragiadakis,^{2,3*} Robert V. Bruggner,^{2,4} Monica Nicolau,^{2,5,6} Rachel Finck,^{2,3} Martha Tingle,¹ Julian Silva,¹ Edward A. Ganio,¹ Christine G. Yeh,¹ William J. Maloney,⁷ James I. Huddleston,⁷ Stuart B. Goodman,⁷ Mark M. Davis,³ Sean C. Bendall,^{2,3} Wendy J. Fantl,^{2,3,8} Martin S. Angst,^{11*} Garry P. Nolan^{3,11*}




see also Fragiadakis *Anesthesiology* 2015;123:1241

Pain Reports 2019;4:e647. 

Current methods and challenges for acute pain clinical trials

Ilan Gilron^{1,2*}, Daniel B. Carr³, Paul J. Desjardins⁴, Henrik Kehlet⁵


- **pain catastrophisers**
- **opioid users**
- **"pain sensitised" patients (preop pain, endogenous pain modulation, inflammation, etc.)**

Can J Anesth 2017;64:10-15. 

Postoperative orthostatic intolerance: a common perioperative problem with few available solutions

Oivind Jans, MD, PhD · Henrik Kehlet, MD, PhD

- **40 – 50 % after major surgery**
- **0 – 5 % after minor surgery**
- **mechanisms:**
 - impaired sympathetic response
 - increased parasympathetic response
 - not a "fluid" problem
 - opioids ? inflammation ?
- **prevention:**
 - α -1 agonist (midodrine) ?

Anesthesiology 2019;130:825-32. 

Perioperative Fluid Therapy for Major Surgery

Timothy E. Miller, M.B., Ch.B., F.R.C.A., Paul S. Myles, M.B., B.S., M.P.H., D.Sc., F.A.N.Z.C.A.

- **positive balance approach (1 – 1.5 L)**
- **balanced solutions**
- **colloids controversial**
- **goal-directed therapy promising, but...**
- **need for "fast-track" studies !**

new surgical techniques ?






design issues:
incorporate the fast-track methodology when assessing new minimal invasive techniques

large, pragmatic RCT's:


why are many/most with "negative" results ?

Anaesthesia 2018;73:799-803. 

Large pragmatic randomised controlled trials in peri-operative decision making: are they really the gold standard?

Joshi G, Alexander JC, Kehlet H.


- why not ERAS discussion ?
- no "large" trials with low ERAS adherence
- more focus on organ- and procedure – specific functional recovery parameters
- first detailed pathophysiological studies – then RCT/multicenter cohort studies

Can J Anesth 2015;62:120-130. 

What outcomes are important in the assessment of Enhanced Recovery After Surgery (ERAS) pathways?

Liane S. Feldman, MD · Lawrence Lee, MD
 Julio Fiore Jr, PhD

- early: surgery → PACU → ward
- intermediate: ward → discharge
- late: return to normal function

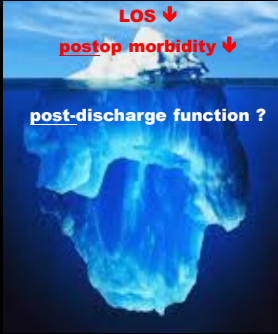
Acta Orthop 2018;89:141-4. 

Outpatient total hip and knee arthroplasty – facts and challenges

Vehmeijer SB, Husted H, Kehlet H.

- feasible in "some" patients
- first better – then faster !
- ideal LOS ?
- need for evaluation of cost reduction of same date discharge

ERAS status and challenges



**the future of fast-track surgery:
post-discharge outcomes**

functional activity after discharge
objective vs subjective (PROM)
assessment ?

Bone Joint J 2017;99-B:1167-75.
Early patient-reported outcomes versus objective function after total hip- and knee arthroplasty - a prospective cohort study
IE Luna, H Kehlet, B Petersson, HR Wede, SJ Hoevsgaard, Aasvang EK

THA (similar changes for TKA)

Δ Physical function (percentage)

Post-Op days

ΔHOOS = 17% (p=0.03)

ΔWalk = -19% (p=0.02)

ΔActigraphy = -25% (p<0.001)

J Exp Orthop 2018;5:44
Rehabilitation strategies for optimisation of functional recovery after major joint replacement
Thomas Bandholm^{1,2,3*}, Thomas W. Wainwright⁴ and Henrik Kehlet⁵

Acta Anaesthesiologica Scandinavica
The role of prehabilitation in frail surgical patients: A systematic review
David A. Milder¹ | Neil L. Pillinger^{2,3} | Peter C. A. Kam^{2,3}

- limited evidence of significant effects
- need for patient- and procedure-specific RCT design

World J Gastrointest Surg 2019;11:41-52.
Enhanced recovery after surgery in emergency colorectal surgery: Review of literature and current practices
Varut Lohsiriwat, Romyen Jitmungngan

- lower LOS, but otherwise no effects
- **interpretation: low quality evidence/ compliance for ERAS protocols and studies**

Ann Surg 2016;264:237-8.
Advancing Surgical Outcomes Research and Quality Improvement Within an Enhanced Recovery Program Framework
Henrik Kehlet, MD, PhD and Christoffer C. Jørgensen, MD

understand the pathophysiology of postoperative organ dysfunctions and recovery on a procedure specific basis

continuous outcome monitoring

formulate research topics:
• identification of areas for improvement
• assessment of new treatment strategies
• role of "conventional" risk factors in an enhanced recovery program?

implementation of procedure-specific evidence-based perioperative care principles
• multidisciplinary collaboration

monitor procedure-specific outcome data:
• use established complication score systems
• separation between direct "surgical" and "medical" complications
• time course analysis - what comes first?