



Transition from Acute to Chronic Pain after Surgery

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Cliniques universitaires
SAINT-LUC
UCL BRUXELLES



- No conflict of interest to declare

Some disclosures...



- Pain is multi-faceted → highly complex

Persistent postsurgical pain: risk factors and prevention

Henrik Kehlet, Troels S Jensen, Clifford J Woolf

Lancet 2006

- Lecture will focus on clinical aspects, ongoing improvements and future challenges

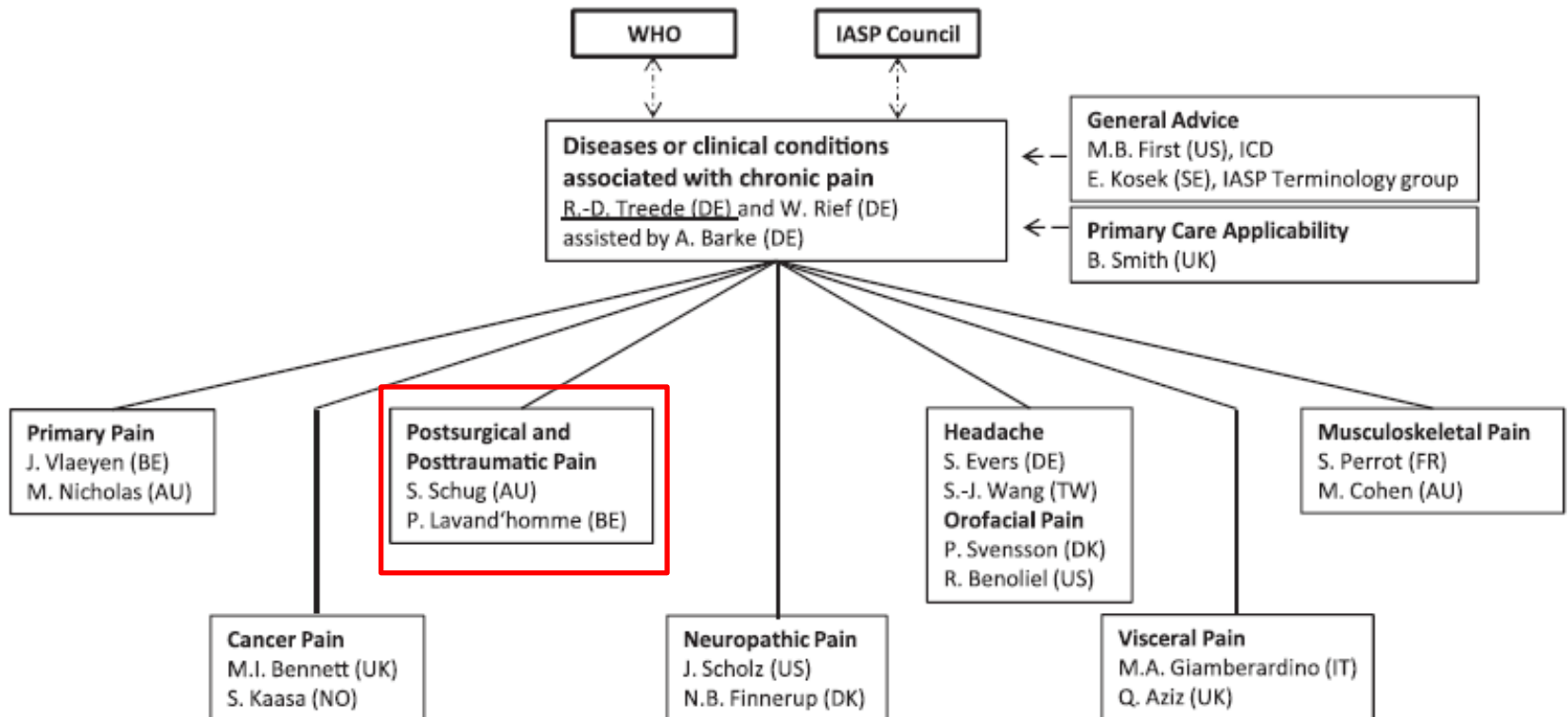
Cut and thrust: antecedent surgery and trauma among patients attending a chronic pain clinic

Iain Kinloch Crombie^{a,*}, Huw Talfryn Oakley Davies^b, William A. Macrae^c

Pain 1998

- Surgery contributed to pain in 22.5% of patients
- Longterm pain after surgery is a cause of disability (↓ quality of life, ↑ healthcare use)
- *Patients who attribute their pain **to a specific cause** report higher levels of emotional distress and pain intensity*

A classification of chronic pain for *ICD-11*



Actual picture of CPSP



- CPSP may occur after ANY surgical procedure but some procedures carry higher risk than other ones

- **Rough estimation of CPSP incidence**

- 1 patient out of 10 (10%) will develop longlasting pain after surgery
- 1 patient out of 100 (1%) will develop severe CPSP with negative impact on **QoL and rehabilitation/recovery** (Breivik & Stubhaug, **Pain 2008**)

ORIGINAL ARTICLE

Chronic postsurgical pain in Europe*An observational study*

| Preoperative Pain | Severe acute postoperative pain | CPSP Moderate / severe |
|-------------------|---------------------------------|------------------------|
| ~ 35 - 60% | ~ 30% | 11.8% / 2.2% |

- CPSP at 6 months → 56% pain free at 12 months
- 3% with *no pain at 6 months* → CPSP at 12 months
- **Signs of neuropathic pain** in 35 to 57% of CPSP patients (↓ QoL, ↑ pain severity)

Chronic postsurgical pain in children: prevalence and risk factors. A prospective observational study

H. Batoz^{1,*}, F. Semjen¹, M. Bordes-Demolis¹, A. Bénard²
and K. Nouette-Gaulain^{1,3}

- Little is known about the epidemiology of chronic post-surgical pain (CPSP) in children.
- The authors performed a prospective study of the prevalence and risk factors for CPSP in children.
- The prevalence of CPSP was found to be 10.9%.
- Risk factors for CPSP were pain before surgery and severe acute postoperative pain.

CPSP = 10.9% with a Neuropathic component = 64.3%

Defining persistent post-surgical pain: is an update required?

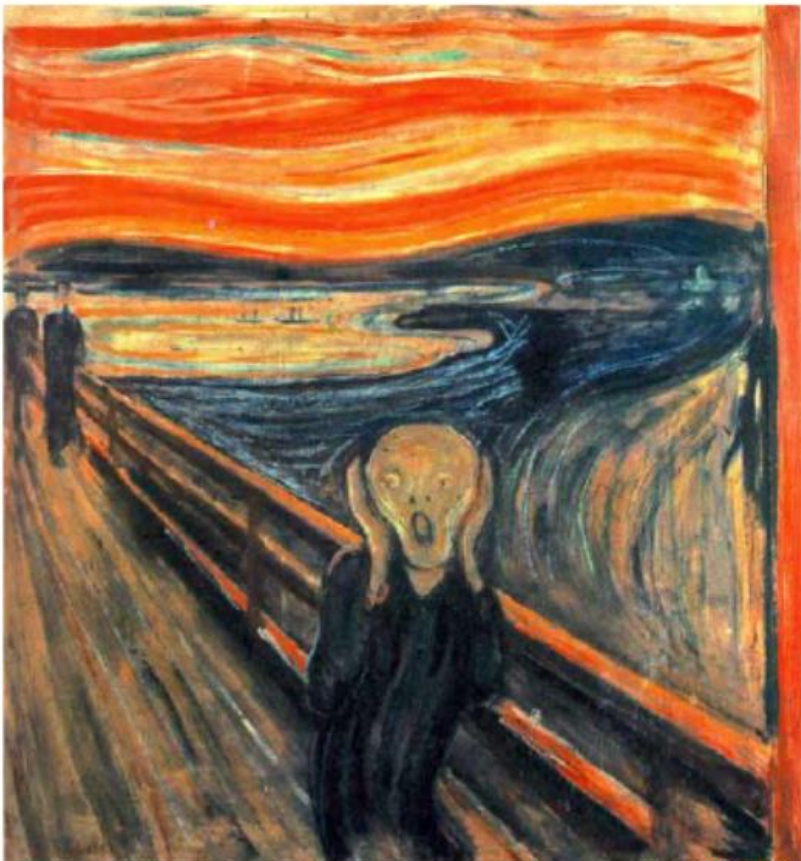
M. U. Werner^{1*} and U. E. Kongsgaard²

Br J Anaesthesia 2014

- The pain developed after a surgical procedure or increased in intensity after the surgical procedure
- Duration at least 2 months → at least 3 – 6 months with a significant negative effect on QoL
- Pain is a continuation of acute postoperative pain or develops after an asymptomatic period
- Pain is localized in the surgical field or in referred area
- Exclusion of other possible causes for the pain (infection, cancer recurrence...)

Why me ?

*Pain results from
pain amplification and psychological distress*



© Laet (p. March)



Genetic and Clinical Factors Associated with Chronic Postsurgical Pain after Hernia Repair, Hysterectomy, and Thoracotomy

A Two-year Multicenter Cohort Study GENDOLCAT study

What This Article Tells Us That Is New

- Persistent postoperative pain was diagnosed in 18% of a population-based sample of 2,929 patients who had hernia repairs, hysterectomies, or thoracotomies
- The association of persistent pain with 90 genetic markers showed no evidence for genetic predisposition in a subset of 1,000 patients
- Six clinical factors predicted 73% of the persistent pain that developed

From acute to chronic pain after surgery

PRE operative

- Pre-op pain in the part of the body operated on
- Pre-op pain elsewhere
- One or more co-morbid stress symptoms
e.g. sleep disturbance, depression...
- Capacity overload in the past 6 months

(Althaus et al, Eur J Pain 2012)

Perioperative / ACUTE Postoperative

- Severity of acute Postoperative pain
- Time spent in severe pain

(Althaus et al, Eur J Pain 2012)

(Fletcher et al, Eur J Anaesth 2015)

SUBACUTE Postoperative

???

Acute Postoperative Pain

- « Recall pain » in retrospective studies
- **Clinical reality:**
 - *Not all the patients with severe acute pain will develop CPSP >< « optimal control » of acute pain does not prevent CPSP*
- Acute pain **intensity?**
Duration : **pain resolution** (pain trajectories)?
Type of acute postoperative pain?

Chronic postsurgical pain in Europe

An observational study

Dominique Fletcher*, Ulrike M. Stamer*, Esther Pogatzki-Zahn, Ruth Zaslansky, Narcis Valentin Tanase, Christophe Perruchoud, Peter Kranke, Marcus Komann, Thomas Lehman , euCPSP group for the Clinical Trial Network group of the European Society of Anaesthesiology and Winfried Meissner

Eur J Anaesthesiol 2015

- Percentage of **time spent in severe pain**
- A 10% increase in time spent in severe pain **at day 1** was associated with a 30% increase of CPSP incidence at 12 months

Improving Individual Measurement of Postoperative Pain: The Pain Trajectory

C. Richard Chapman, Gary W. Donaldson, Jennifer J. Davis, and David H. Bradshaw

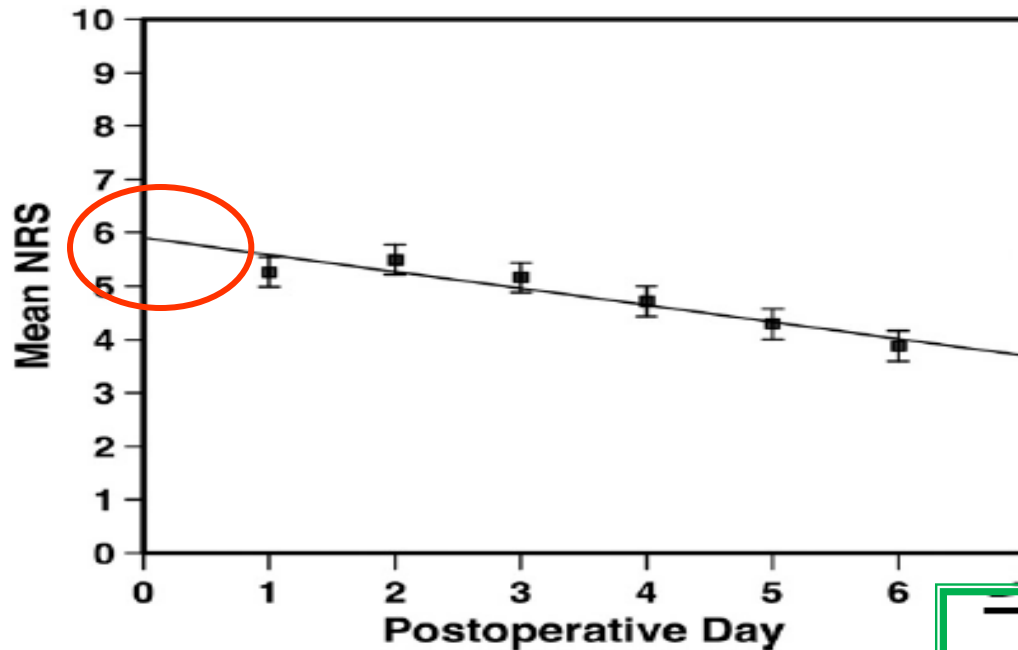


Figure 1. Mean POP trajectory for the entire sample (N = 502). Symbols are mean NRS values \pm 99% confidence interval each. Line indicating the mean POP trajectory is a linear regression fitted to the points.

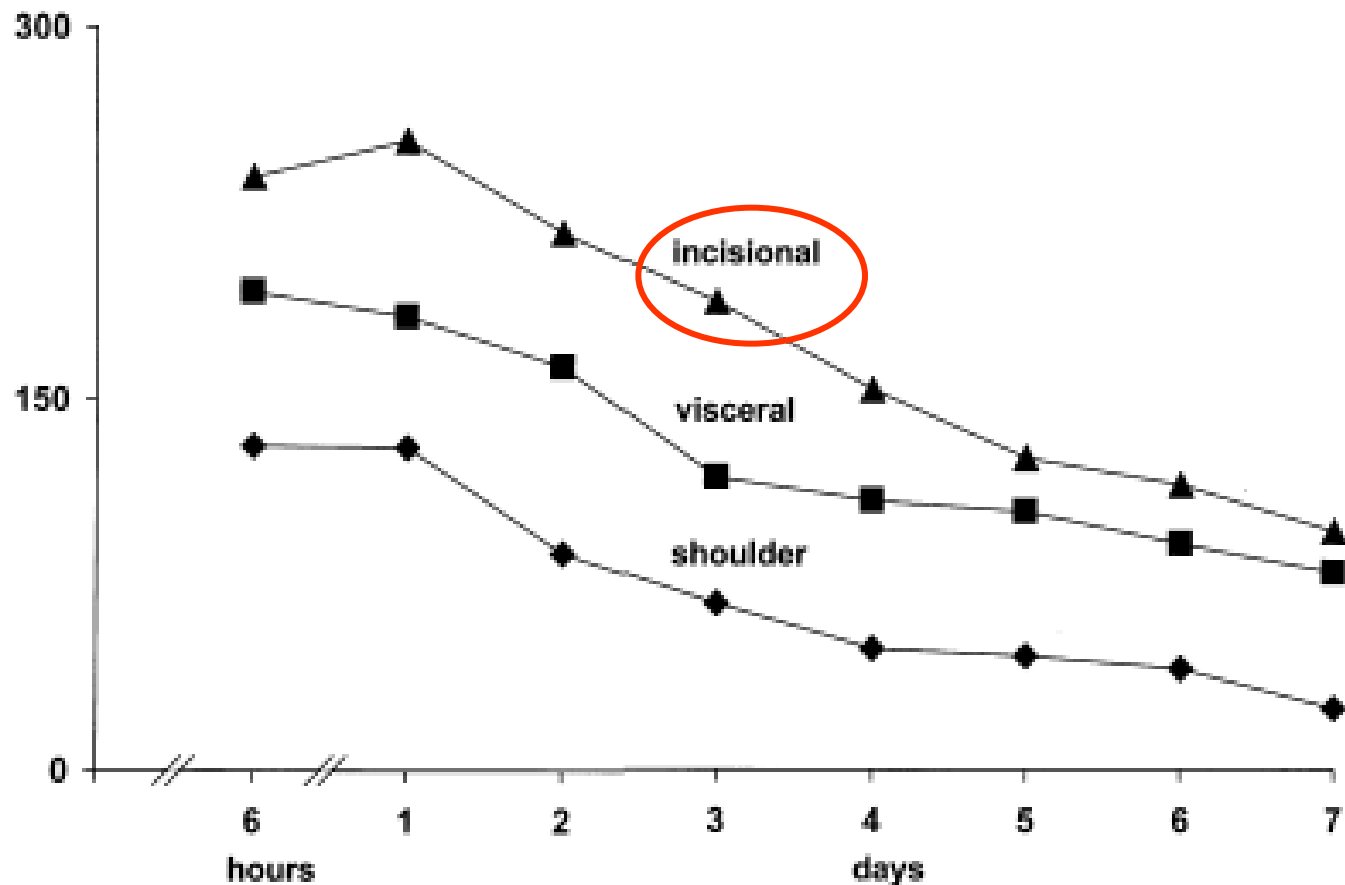
| <i>GROUP</i> | <i>N</i> | <i>SAMPLE PERCENTAGE</i> |
|----------------|----------|--------------------------|
| Whole sample | 502 | 100% |
| Negative slope | 314 | 63% |
| Flat slope | 127 | 25% |
| Positive slope | 61 | 12% |

Characteristics and prediction of early pain after laparoscopic cholecystectomy

Thue Bisgaard*, Birthe Klarskov, Jacob Rosenberg, Henrik Kehlet

Pain 2001

Daily added pain scores (VRS), n=150



Early visceral pain predicts chronic pain after laparoscopic cholecystectomy

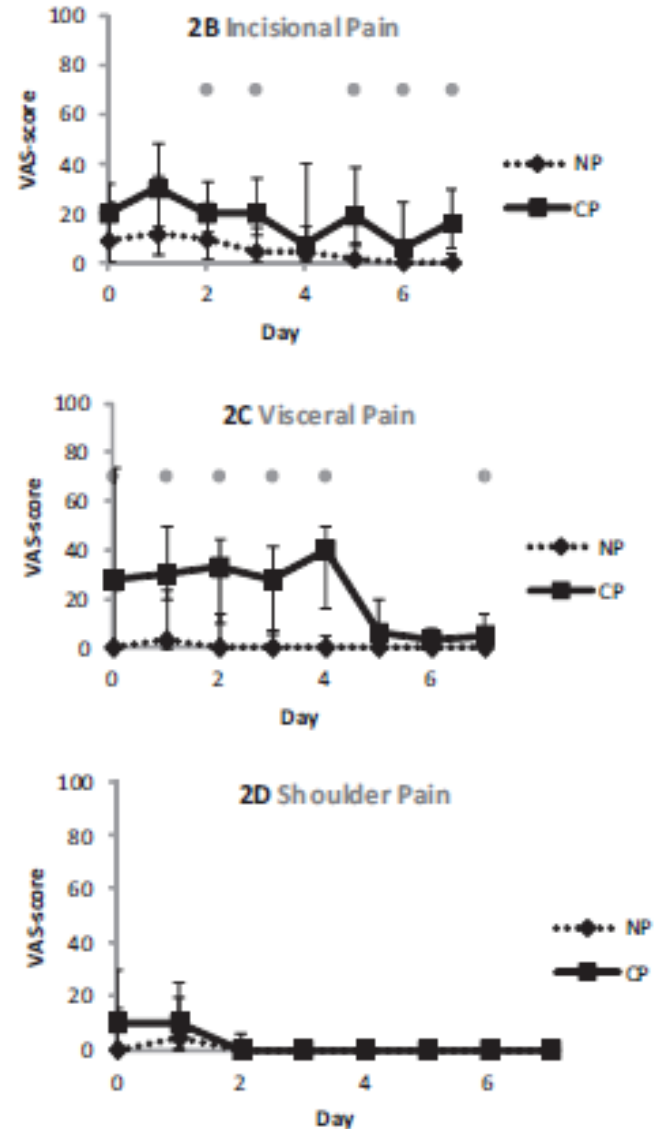
Morten Rune Blichfeldt-Eckhardt^{a,b,*}, Helle Ørding^a, Claus Andersen^b, Peter B. Licht^c, Palle

Incidence: 14% persistent pain at 3-6 months; 9% unexplained CPSP at 12 months

Predictive factors for CPSP after laparoscopic cholecystectomy:

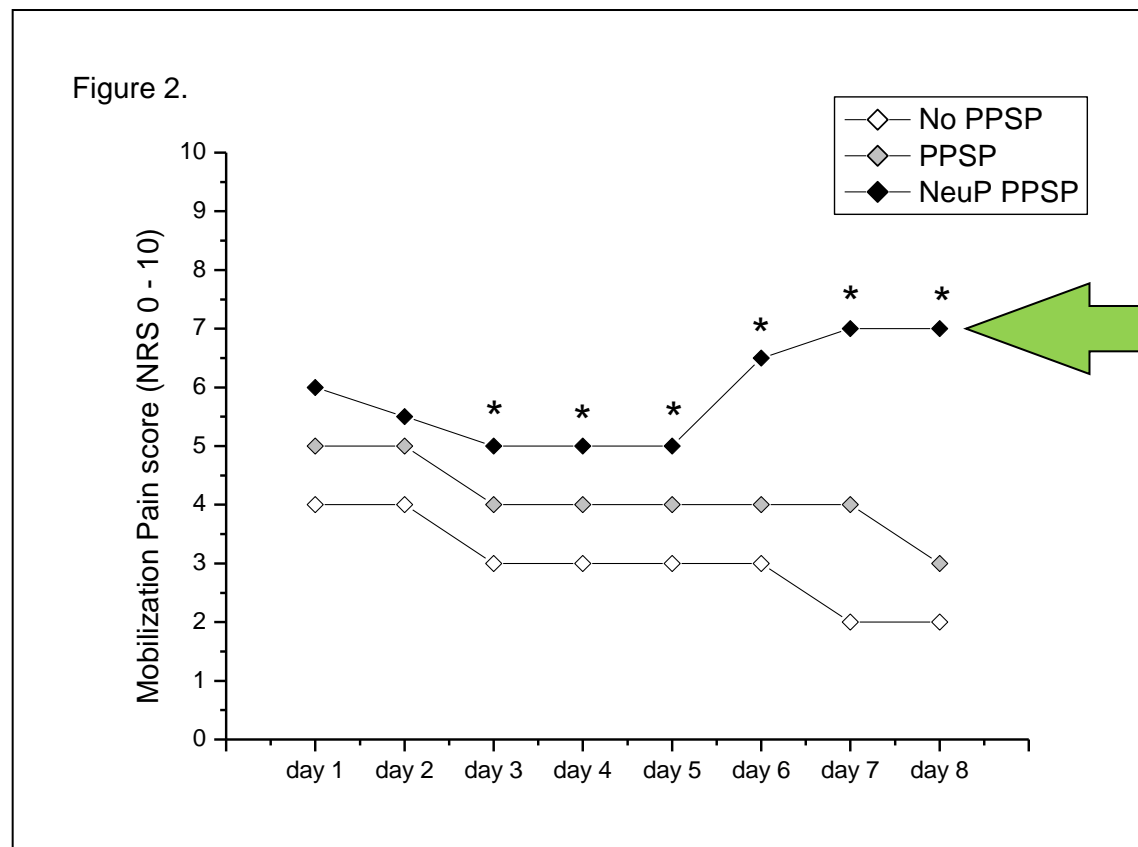
- Cumulated visceral pain scores during the first week
- Number of preoperative biliary pain attacks

(Pain 2014)



Pain Trajectories Identify Patients at Risk of Persistent Pain After Knee Arthroplasty

An Observational Study



Neuropathic component of acute POP pain?

CPSP at 3 months: 58% with 10.7% NeuP

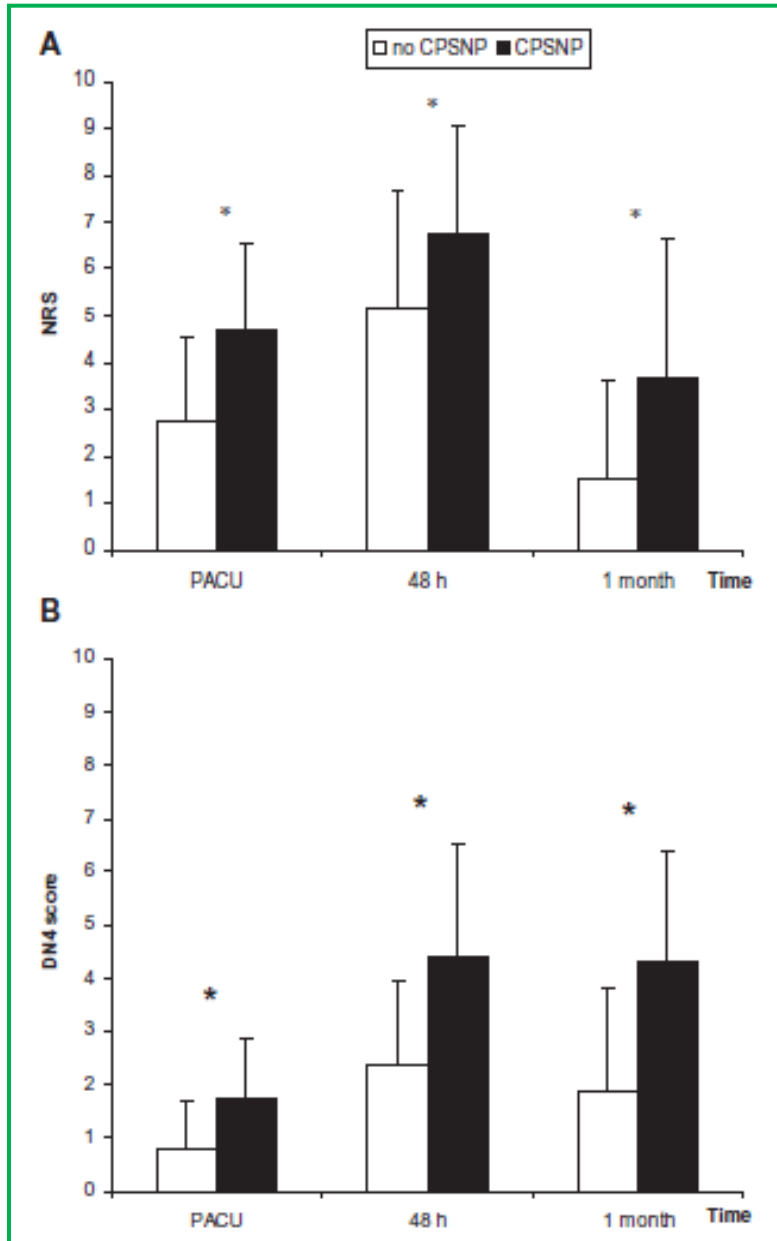
(Lavand'homme et al, Clin Orthop Relat Res 2013)

Neuropathic pain and the APS

- 3% diagnosed by APS
→ 78% ongoing pain at 6 months/ 56% ongoing pain at 1 year
(Hayes et al, Acute Pain 2002)

- 24% patients with 1-4 positive signs in **DN4 questionnaire** within 72h after surgery
(Taverner & Prince, Br J Nurs 2014)

Martinez, Pain 2012



ORIGINAL ARTICLE**Early postoperative neuropathic pain assessed by the DN4 score predicts an increased risk of persistent postsurgical neuropathic pain**

Helene Beloeil, Barthelemy Sion, Chloe Rousseau, Pierre Albaladejo, Mathieu Raux, Frederic Aubrun, Valeria Martinez, the SFAR research network*

- **NeuP component** (DN4 applied in 593 patients) in 5.6% (95%CI 3.6-8.3) patients at day 0 and 12.9% (95%CI 9.7-16.7) at day 2
- DN4 positive post-surgery is a significant risk factor for CPSP NeuP (OR 4.22)

Trajectories of NeuP

- Free interval for some patients
 - 8% NeuP component (positive S-LANSS) within 48h → 22% NeuP component at 3M after thoracotomy (Searle et al, 2009)
- DN4 questionnaire value increases with time: predictive value at 1M >>48h (RR 5.5 vs 2.8) (Martinez et al, Pain 2012)

Prevalence and Predictive Factors of Chronic Postsurgical Pain and Poor Global Recovery 1 Year After Outpatient Surgery

Daisy M. N. Hoofwijk, MD, Audrey A. A. Fiddelaers, PhD,*
Madelon L. Peters, PhD,† Björn Stessel, MD,‡ Alfons G. H. Kessels, MD,
MSc,§ Elbert A. Joosten, PhD,* Hans-Fritz Gramke, MD, PhD,*
and Marco A. E. Marcus, MD, PhD*||*

- **Preoperative pain control**
 - Preoperative analgesic use but NO pain: 8% CPSP
 - Preoperative analgesic use and unrelieved preoperative pain : 32% CPSP

(Hoofwijk et al, Clin J Pain 2015)



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Contents lists available at [ScienceDirect](#)

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Allied Health

Preoperative Reduction of Opioid Use Before Total Joint Arthroplasty

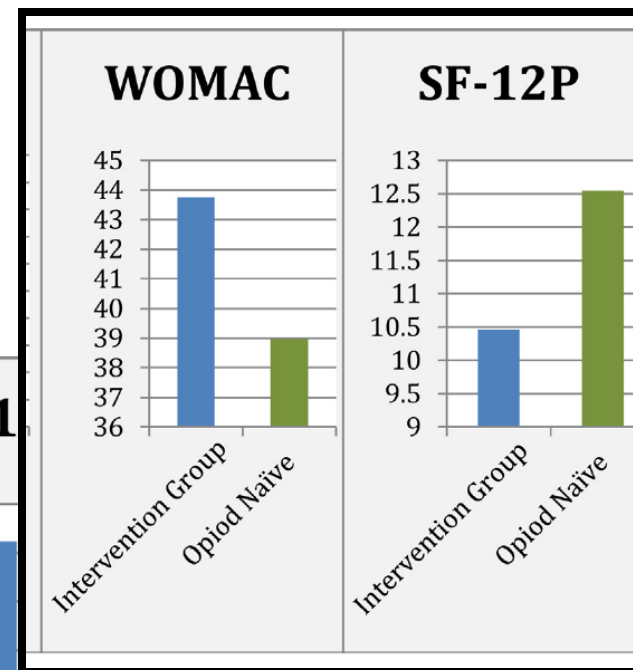
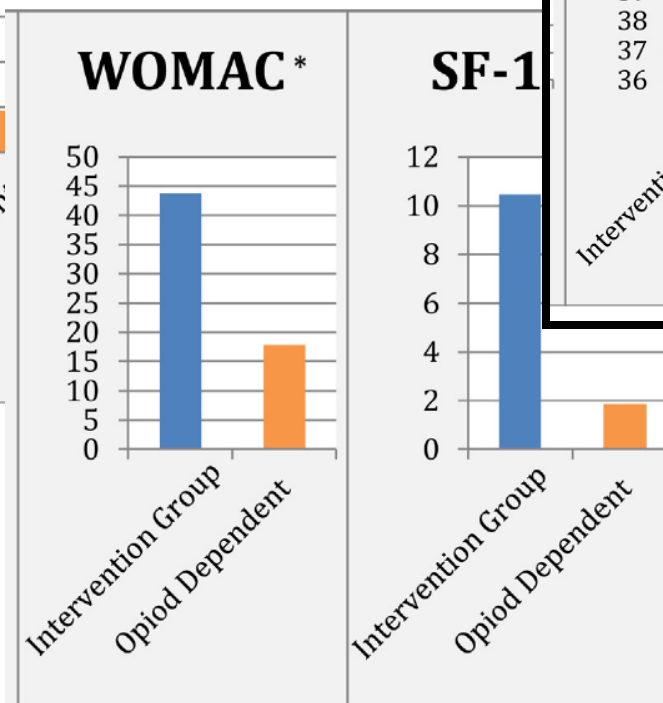
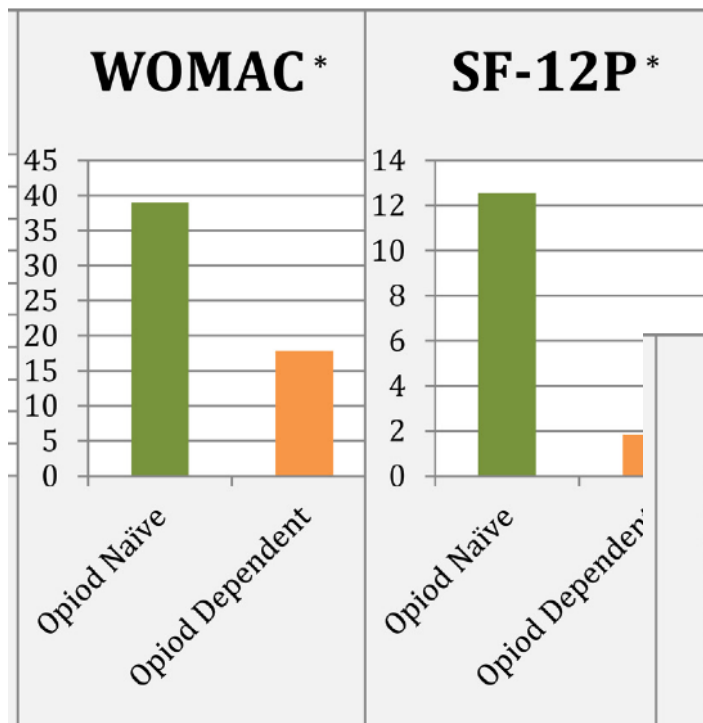
Long-Co L. Nguyen, BA, BS ^a, David C. Sing, BS ^a, Kevin J. Bozic, MD, MBA ^{b, *}

Opioid intake and TJA

Opioids sensitize CNS (OIH)

- Difficult postoperative pain management
- Poor postsurgical outcome

Changes in patient-reported outcome measures (PROMs)



Topical review

Pain modulation profile and pain therapy: Between pro- and antinociception

David Yarnitsky^{a,b,*}, Michal Granot^c, Yelena Granovsky^{a,b}

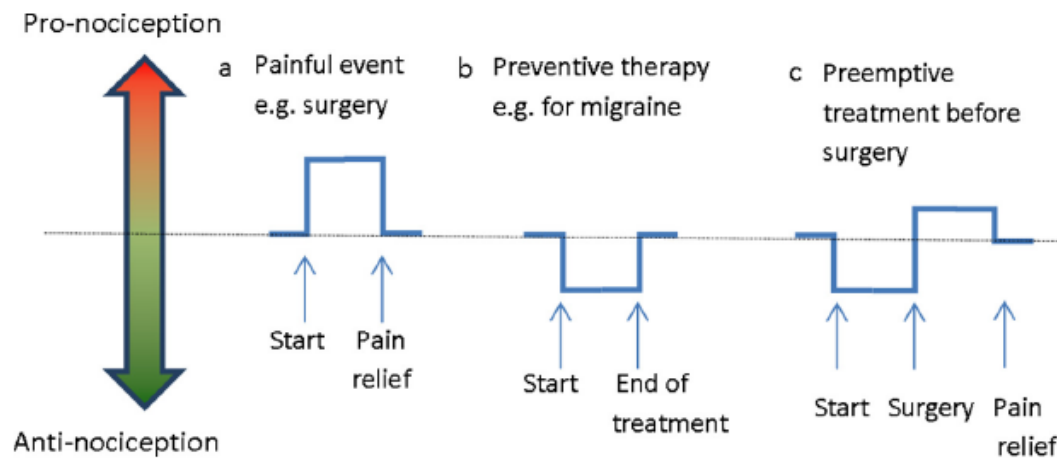


Fig. 2. Proposed patterns of change in pain modulation profile in various conditions.



Katz J.

PAIN® 153 (2012) 505–506

PAIN®

www.elsevier.com/locate/pain

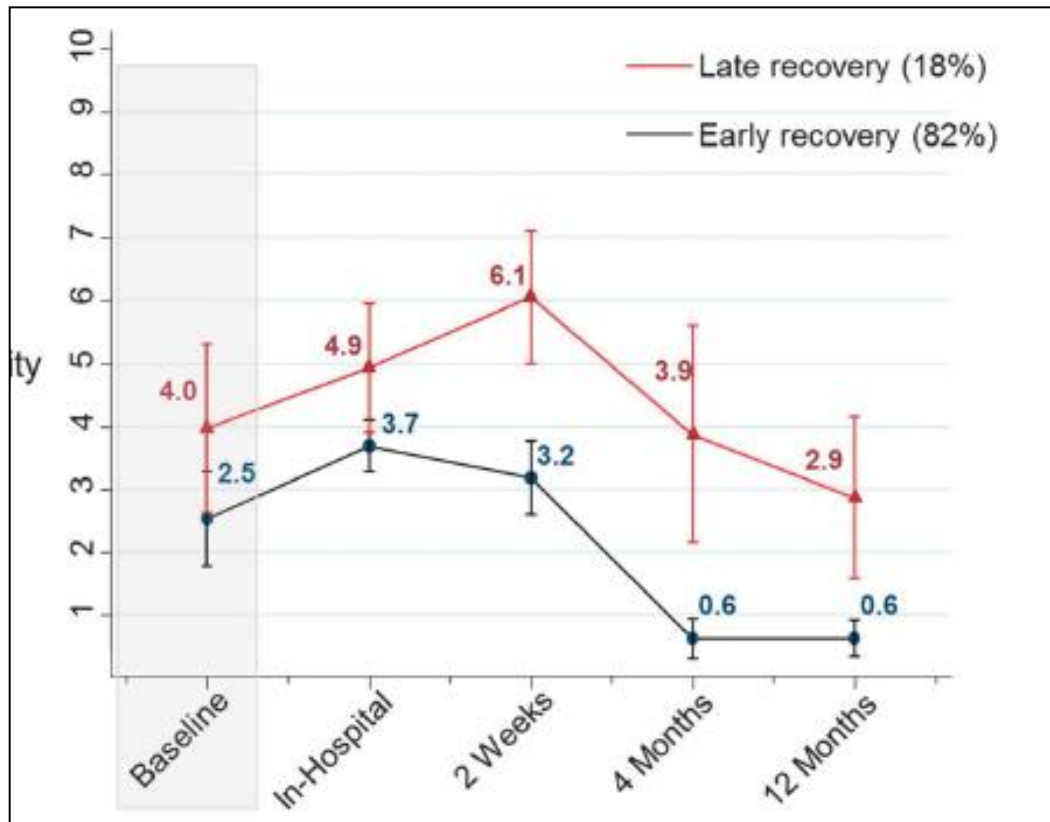
Commentary

One man's risk factor is another man's outcome: Difference in risk factor profiles for chronic postsurgical pain maintenance vs transition

- Preoperative Pain
- Acute Postoperative Pain (<10 Days? < 6 Weeks?)
- **Sub-acute Postoperative Pain (? < 3 Months)**
- CPSP (> 3 Months)
 - Chronic Pain in general population

Trajectories of postsurgical pain in children: risk factors and impact of late pain recovery on long-term health outcomes after major surgery

Jennifer A. Rabbitts^{a,b,*}, Chuan Zhou^{c,d}, Cornelius B. Groenewald^{a,d}, Lindsay Durkin^d, Tonya M. Palermo^{a,c,d}



Subacute pain
(at 2 weeks and later)

- Intensity

- **Unpleasantness**

Increases the risk of CPSP development and persistence

(Pain 2015; Pagé et al, J Pain Res 2013)

Parental risk factors for the development of pediatric acute and chronic postsurgical pain: a longitudinal study

- **Postoperative catastrophizing of the parents** (related to parent's personal experience of pain)
 - delays child's recovery
 - major risk of CPSP development in children
 - **with time, the influence of the parents increases**
- No impact of child's catastrophization, no impact of child's preoperative pain on recovery

Perioperative medicine

Anesthesiology 2009; 111:461-3

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Expanding our Horizons

Transition of Acute Postoperative Pain to Persistent Pain and Establishment of Chronic Postsurgical Pain Services

De Kock M. Anesthesiology 2009

 Open Access Full Text Article

PERSPECTIVES

The Toronto General Hospital Transitional Pain Service: development and implementation of a multidisciplinary program to prevent chronic postsurgical pain

Katz et al, J Pain Research 2013



Summary

- We have a good picture of the actual prevalence / incidence of CPSP
- Not much changes since the first reports (2000)

BUT

- **Ongoing improvements**
 - Better definition of CPSP
 - New populations of patients being screened or to be (e.g. pediatric and outpatients)
 - Inclusion of CPSP in ICD-11
 - IASP year 2017: Pain after Surgery

From acute to chronic pain after surgery

