



## EFFECTIVE PAIN RELIEF IS THE KEY FOR SUCCESSFUL SURGICAL OUTCOME

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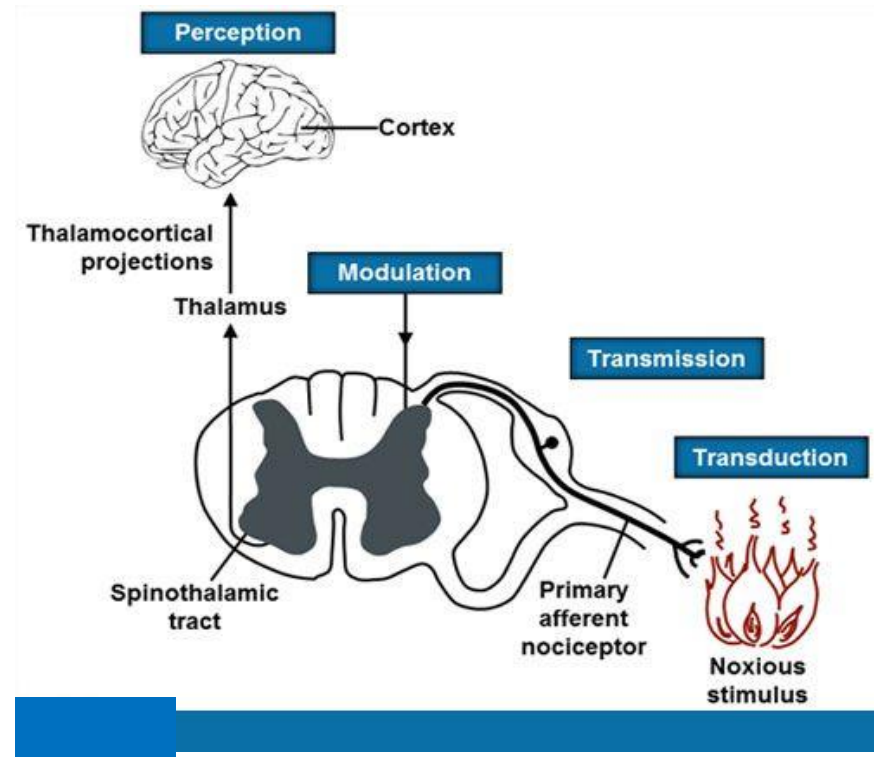
## ACUTE PAIN DEFINITION

- Acute pain, such as that following trauma or surgery, constitutes a signal to a conscious brain about the presence of noxious stimuli and/or ongoing tissue damage.
- This acute pain signal is useful and adaptive, warning the individual of danger and the need to escape or seek help.
- Acute pain is a direct outcome of the noxious event, and is reasonably classified as a symptom of underlying tissue damage or disease.

## ACUTE PAIN

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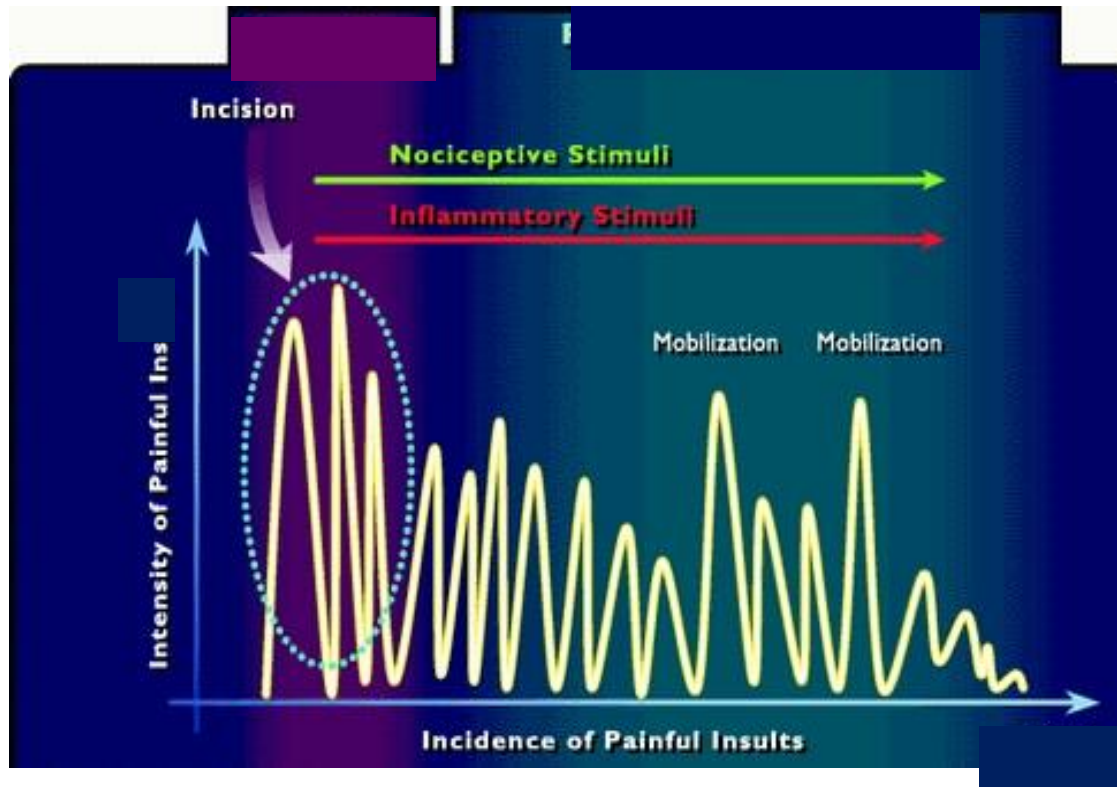
Pain perception is influenced by emotional modulation.



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## POSTOPERATIVE PAIN : ACUTE PAIN MODEL



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## POSTOPERATIVE PAIN: A WORLDWIDE SOLVED PROBLEM?

- More than 230 million people undergo surgery / year worldwide
- Pain management is a medical obligation
- Pain became the fifth vital sign
- **Undertreated postoperative pain remains a considerable problem**

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Rawal N. Current issues in postoperative pain management.

EJA 2016;33:160-71.

## **POSTOPERATIVE PAIN IS NOT SUCCESSFULLY TREATED**

- No optimal postoperative pain control in Europe and USA
- Written protocols only in 60% teaching hospitals
- Nurses are not allowed to adjust the treatment
- Postoperative analgesia is most often prescribed by surgeons

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## SCIENTIFIC APPROACH TO POSTOPERATIVE PAIN MANAGEMENT

- First **clinical** study about postoperative pain: in 1932
- 30 publications/ year until 1960
- 300 publications in 1978
- 2700 publications in 2017
- Till now: more than 100.000 published papers altogether
- **Animal** pain models since 20 years

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## EFFECTS OF UNEFFECTIVE POSTOPERATIVE PAIN RELIEF

- increased morbidity
- development of chronic postoperative pain
- prolonged opioid use
- impaired mobility and recovery from surgery
- reduced quality of life
- increased medical costs

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## MORBIDITY

Poorly controlled postoperative pain causes **impaired physiological functions**:

- cardiovascular (coronary ischemia, myocardial infarction)
- pulmonary (hypoventilation, decreased vital capacity, pulmonary infection)
- gastrointestinal (reduced motility, ileus, nausea, vomiting)
- renal (increases in urinary retention and sphincter tone, oliguria)
- immune function and wound healing
- coagulation (hypercoagulation: thrombotic complications)

Poorly controlled pain after surgery may **impair sleep**  
and have negative **psychological effects**, such as demoralization and anxiety



## PERSISTENT POSTOPERATIVE PAIN

enduring pain that has no other evident causes  
and lasts at least 2 months after surgery, past the expected healing period.

Poorly managed acute pain experienced after surgery:  
the presence and intensity of acute postoperative pain are significant  
predictive risk factors for the development of chronic pain.

Based on reviews of the literature, persistent pain appears to affect between  
10% and 60% of patients after common operations.



## GUIDELINES

- **generalized pain management recommendations** for the use of analgesic drugs and techniques:

„one size fits all“

- **PROSPECT guidelines** : an example of recommendations based on systematic reviews of the literature for a particular surgical procedure [www.postoppain.org](http://www.postoppain.org)

- **any guidelines are applied according to the intensity of pain:**

**pain assessment is crucial !**

- **ACUTE PAIN SERVICE:** **pain management team – organization & education**



## STANDARDIZED ANALGESIC PROTOCOLS ACCORDING TO **LOCAL CLINICAL PRACTICE** IN ANESTHESIA AND SURGERY

- STANDARDIZED OPERATING PROCEDURES (SOP) FOR POSTOPERATIVE ANALGESIA
- WRITTEN BY TEAM ANESTHESIOLOGISTS
- SPECIFICALLY FOR EACH SURGICAL SPECIALITY

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## HOW TO START WITH ACUTE PAIN SERVICE?

1. **Written protocols** for postoperative analgesia
2. New nurse profile: **pain nurse**
3. **Education** : ward nurses and patients
4. Regular pain assessment: **make pain visible**
5. **Recording** VAS and analgesic consumption
6. **Recording** side effects and complications
7. **Analysing**
8. **Audits** : regular meetings and improvement plans





## PAIN NURSE

### new nurse profile

- **DAILY VISITS OF PATIENTS WITH PCA PUMPS** (recording VAS scores, calculating analgesic consumption, adjusting PCA pumps programme to patient's needs, recording side effects)
- **DAILY VISITS OF PATIENTS WITH CATHETERS** (catheter nursing, recording complications, safe epidural catheter removal)
- **EDUCATION OF WARD NURSES: REGULAR EDUCATION PROGRAMS**
- **STATISTICAL ANALYSIS, ANNUAL REPORTS**

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## ANESTHESIOLOGIST FOR ACUTE PAIN SERVICE

### ON CALL FOR

- ANALGESIC PROTOCOL ADJUSTMENTS
- SOLVING PROBLEMS AND COMPLICATIONS
- *PALIATIVE CARE AND CHRONIC PAIN TREATMENT FOR PATIENTS AT ALL DEPARTMENTS IN THE HOSPITAL*
- RECORDING DAILY VISITS
- COMMUNICATION WITH TEAM ANESTHESIOLOGISTS

### RESPONSIBLE FOR

- STANDARDS AND PROTOCOLS
- COMMUNICATION WITH HOSPITAL PHARMACY
- ANNUAL MEETINGS WITH SURGEONS

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## PROTOCOL FOR TREATMENT OF SIDE EFFECTS AND COMPLICATIONS OF POSTOPERATIVE ANALGESIA TECHNIQUES

### SLABOST IN BRUHANJE

1. antiemetik i.v.
2. če čez 30 min ni izboljšanja, pretok analgetikov zmanjšaj ali ustavi za 2 uri

### HIPOTENZIJA

- Padec KT za več kot 25% od izhodiščnega
1. i.v. infuzija kristaloidov 200 ml/5 min
  2. simpatikomimetik efedrinijev klorid 10 mg i.v.
  3. ob padcu KT za več kot 50% od izhodiščnega kliči reanimacijo

### SRBEŽ

1. antihistaminik i.v.
2. epiduralne analgezije ne ustavimo, nadaljujemo z analgetsko mešanico brez morfina

### SEDACIJA

1. stopnja 2 - izražena: pacient zaspan, zenice zožene na 2-3 mm - zmanjšaj analgezijo za 50%; ponovna ocena čez 15 min
2. stopnja 3 - pacient spi, ga težko predramimo, zenice so maksimalno zožene - ukrepi kot pri depresiji dihanja

### DEPRESIJA DIHANJA

Frekvenca dihanja < kot 8/min, plitvo dihanje/apnoične pavze, SpO<sub>2</sub> < kot 90%

1. analgezijo ustavi - stalen nadzor
2. aplikacija O<sub>2</sub> 6L/min prek obrazne maske
3. sprostitvev dihalne poti oz. predihavanje z masko in ročnim dihalnim balonom
4. nalokson 1 amp (0,4 mg) razredči do 10 ml, nato daj po 1 ml do učinka
5. kliči reanimacijo

## UKREPI PRI ZDRAVLJENJU NEŽELENIH UČINKOV IN ZAPLETOV POOPERATIVNE ANALGEZIJE

### NEVROLOŠKI ZAPLETI

SENZORIČNE MOTNJE /  
MOTORIČNA BLOKADA /  
NEOBČUTLJIVOST OD TH4 NAVZGOR

1. ustavi epiduralno analgezijo
2. ponovna ocena motorike čez 2 uri
3. kliči SLAPB oz. nadzornega anesteziologa
4. zmanjšaj odmerik/pretok po PCEA

Oslabelost v spodnjih okončinah narašča  
Močna bolečina v hrbtu narašča

Kliči anesteziologa na dect 7200,  
v času dežurstva 8842 ali MT 511

SLUŽBA ZA LAJŠANJE AKUTNE  
POOPERATIVNE BOLEČINE (SLAPB)  
anesteziolog **dect 7200**  
medicinske sestre **dect 8623, 7243, MT 775**  
popoldne/dežurstvo:  
nadzorni anesteziolog **dect 8842**  
nadzorna anestezijska medicinska sestra **8202**

### SISTEMSKA TOKSIČNOST LOKALNIH ANESTETIKOV

#### Nevrotoksičnost:

metalni okus, otrpel jezik,  
zvenenje v ušesih,  
motnje vida, tonično klonični krči,  
izguba zavesti

#### Kardiotoksičnost:

hipertenzija, hipotenzija, tahikadija,  
bradikadija, motnje ritma, srčni zastoj

1. prekini dovajanje lokalnega anestetika
2. kliči reanimacijo
3. dodaj 100% O<sub>2</sub>, sprostitvev dihalne poti oz. predihavanje z obrazno masko in ročnim dihalnim balonom
4. zdravi krče: midazolam, propofol
5. zdravi motnje srčnega ritma, srčnega zastoja
6. intralipid 20% 1,5 ml / kg v bolusu, ponovi bolus čez 5 min, nato infuzija 0,25 – 0,5 ml / kg / min ob hipotenziji





## MAKING PAIN VISIBLE

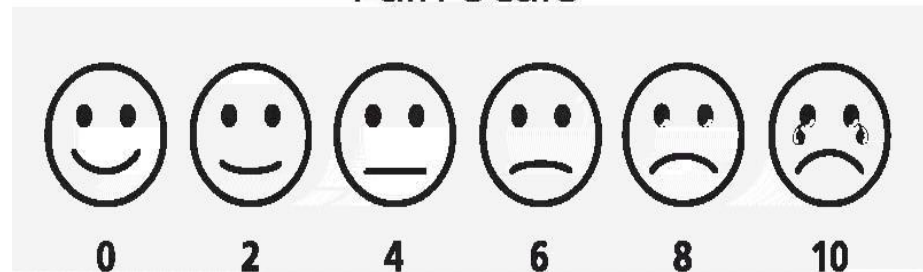
Ward nurses record VAS pain scores :

in intensive care units 1x / hr

on surgical wards: 1x / 3 hrs

**SEEPAIN**  
CAMPAIGN

Pain Scale



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## PATIENT CONTROLLED ANALGESIA (PCA) PUMPS

- Patient is actively involved
- Independent from staff members
- Continuous analgesic infusion / no continuous infusion plus boli within programmed safe limits
- Record given boli and attempted boli
- Daily analgesic consumption is calculated



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## ELASTOMERIC PUMPS



- DISPOSABLE
- CONTINUOUS FLOW 2ml/h OR 5 ml/h
- FOR PALIATIVE CARE
- FOR WOUND CATHETER ANALGESIA

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## MONITORING OF PATIENTS WITH PCA / ELASTOMERIC PUMPS

### WARD NURSES:

- SEDATION MONITORING EVERY 3 HRS
- PAIN ASSESSMENT AND RECORDING EVERY 3 HRS
- RECOGNIZING SIDE EFFECTS AND POSSIBLE COMPLICATIONS
- CHANGING BATERIES OF PCA PUMPS WHEN NEEDED

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## PAIN NURSES TAKE CARE OF ALL PCA PUMPS

- DAILY VISITS OF ALL PATIENTS WITH PCA PUMPS AND CATHETERS
- DAILY CALCULATIONS OF ANALGESIC CONSUMPTIONS, RECORDING ON THE „YELLOW PAPER“
- DAILY ADJUSTMENTS OF PCA PUMPS PROGRAMME- ACCORDING TO EACH PATIENT NEEDS
- AFTER DISCONNECTION OF PCA PUMP, PAIN NURSE COLLECTS ALL PUMPS AND CLEANS THEM
- TAKES CARE OF REPAIR WHEN NECESSARY

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## MONTHLY STATISTICAL ANALYSIS QUALITY ASSESSMENT REPORTS 1 X PER YEAR

- Numbers of different techniques
- Numbers of daily VAS assessments
- Average daily VAS scores
- Numbers of side effects and complications  
altogether and separately for each surgical department

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## ANNUAL REPORTS

- Reports presented annually at quality assessment meetings of Clinical department for anaesthesiology and intensive care
- Analysis of effectiveness and safety
- Improvement suggestions

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## ANNUAL MEETINGS ON SURGICAL DEPARTMENTS WITH SURGEONS AND WARD NURSES

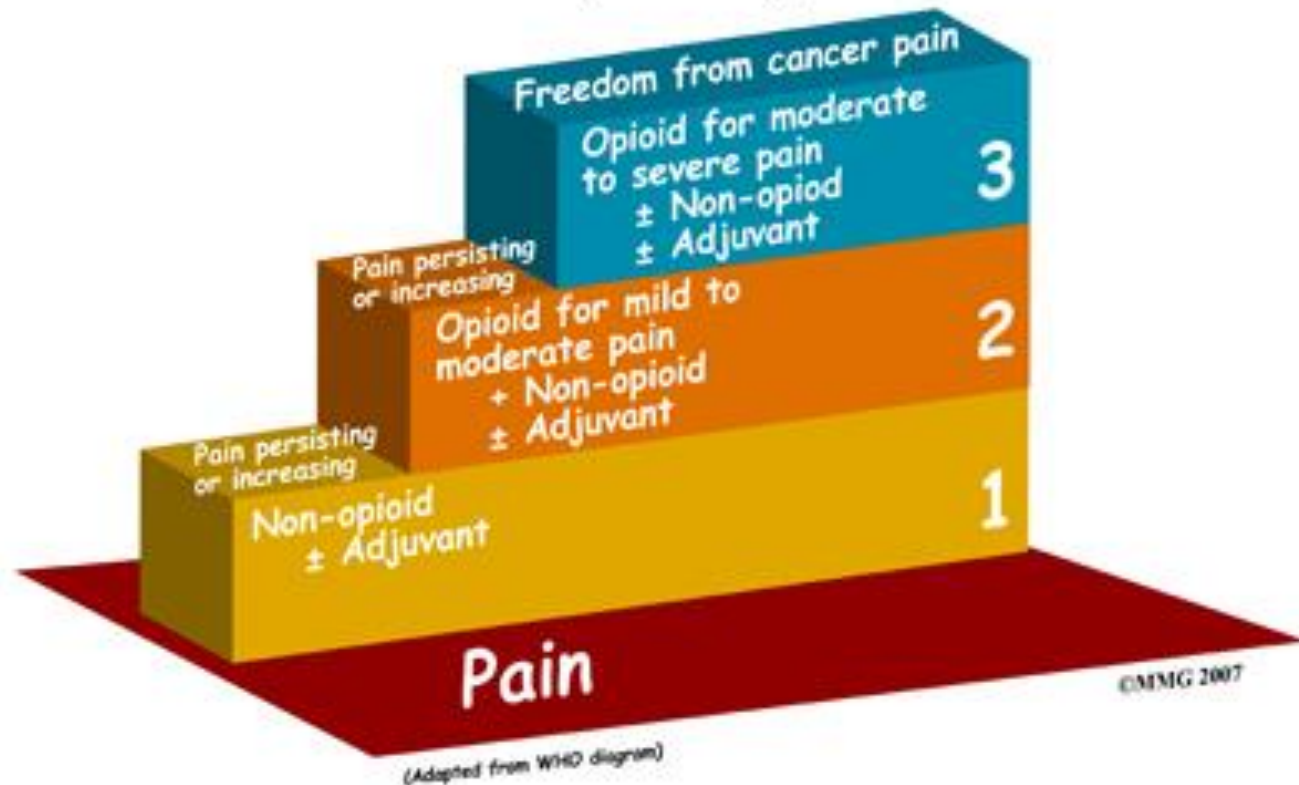
- PRESENTING THE ACHIEVEMENTS: effectiveness and side effects
- SUGGESTING SOME IMPROVEMENTS ACCORDING TO QUALITY ASSESSMENT STANDARDS

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## WHO Three-Step Analgesic Ladder



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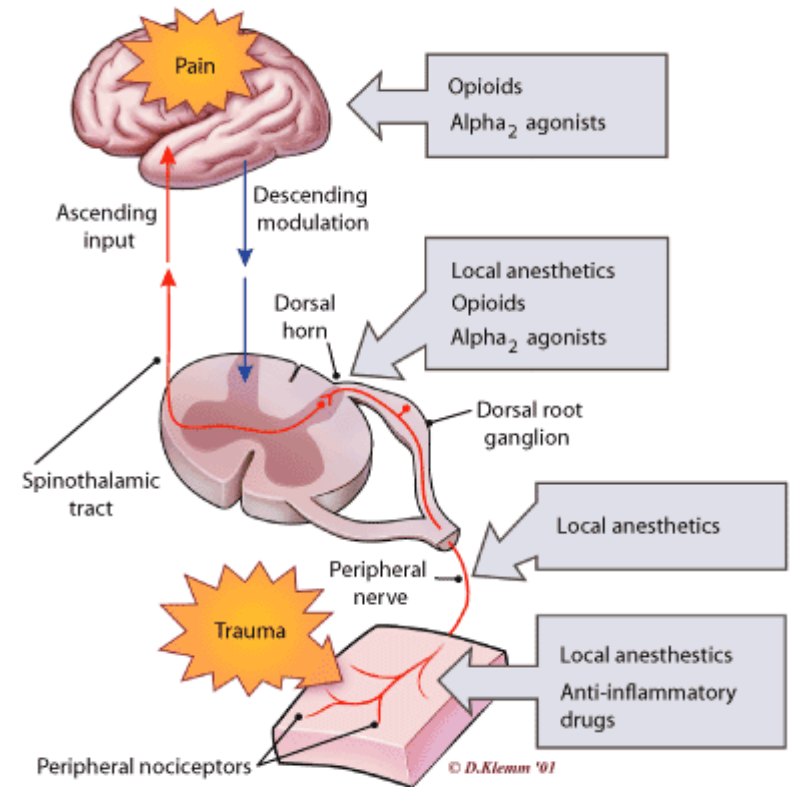
# POSTOPERATIVE PAIN MANAGEMENT

## SYSTEMIC TECHNIQUES

- IV analgesia
- Oral analgesia

## REGIONAL TECHNIQUES

- Continuous epidural blockade
- Peripheral nerve blocks
- Wound catheter analgesia





## **MULTIMODAL ANALGESIA**

### **combination of different techniques and different drugs**

**REGIONAL TECHNIQUE**  
(WOUND INFILTRATION, large volume infiltration)  
**PLUS**  
**SYSTEMIC ANALGESIA**  
paracetamol / metamizol / NSAID / opioid

**AIM:**  
**IMPROVE EFFECTIVENESS, MINIMIZE OPIOID REQUIREMENTS**

## INCREASING NUMBER OF CONTINUOUS PERIPHERAL NERVE BLOCKS

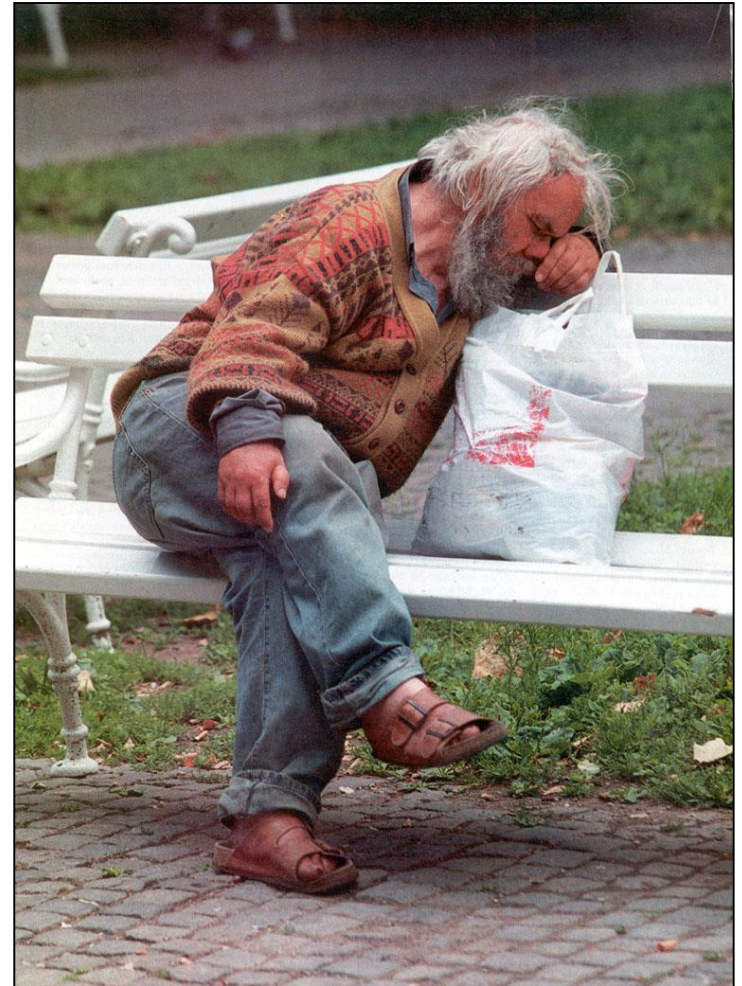


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## ADVANTAGES OF REGIONAL ANALGESIC TECHNIQUES

- regional analgesia with local anesthetics **avoids opioid side effects:** sedation, dizziness, nausea / vomiting
- **enables early mobilization:** effective analgesia for physiotherapy



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## NUMBER OF PATIENTS WITH DIFFERENT TYPES OF ANALGESIA:

changed with development of new techniques of analgesia and new surgical techniques

| YEAR | i.v. opioid<br>PCA<br>analgesia | epidural<br>PCEA<br>analgesia | Peripheral<br>catheter<br>analgesia | Single shot<br>peripheral<br>blocks | Wound<br>catheter<br>analgesia | Paliative<br>care<br>analgesia<br><br>–<br>elastomeri<br>c pumps |
|------|---------------------------------|-------------------------------|-------------------------------------|-------------------------------------|--------------------------------|--|
| 2009 | 3061                            | 774                           | 9                                   | ?                                   | 75                             | -  |
| 2012 | 2803                            | 622                           | 12                                  | ?                                   | 62                             | -  |
| 2014 | 3764                            | 559                           | 32                                  | ?                                   | 83                             | -  |
| 2016 | 4023                            | 426                           | 202                                 | 343                                 | 175                            | 50   |
| 2017 | 3586                            | 409                           | 503                                 | 458                                 | 144                            | 73   |



## ACUTE PAIN SERVICE LJUBLJANA 1998 - 2018

### AFTER 20 YEARS:

DAILY 1 anesthesiologist on call (phone 7200)

DAILY 2 -4 pain nurses (phone 8623, 7243)

100 PCA pumps in use daily

Per 1 year:  $\geq 5000$  patients with

IV PCA, PCEA, peripheral catheters

Each patient PCA for 3 days:  $\geq 15000$  visits per year

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**EFFECTIVE POSTOPERATIVE PAIN RELIEF IN UMC LJUBLJANA in 2017**

| <b>Type of analgesia</b>             | <b>VAS/NRS 0 – 3<br/>MILD PAIN</b> | <b>VAS /NRS 4 – 7<br/>MODERATE PAIN</b> | <b>VAS/NRS 8 -10<br/>SEVERE PAIN</b> |
|--------------------------------------|------------------------------------|---|--------------------------------------|
| <b>IV PCA</b>                        | <b>93,7%</b>                       | <b>6,2%</b>                             | <b>0,3%</b>                          |
| <b>Epidural PCEA</b>                 | <b>92,5%</b>                       | <b>7,2%</b>                             | <b>0,3%</b>                          |
| <b>Wound catheter analgesia</b>      | <b>95,5%</b>                       | <b>4,5%</b>                             | <b>0,0%</b>                          |
| <b>Continuous peripheral blocks</b>  | <b>87,7%</b>                       | <b>11,7%,</b>                           | <b>0,4%</b>                          |
| <b>Single shot peripheral blocks</b> | <b>84,8%</b>                       | <b>14,6%</b>                            | <b>0,6%</b>                          |

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## AIMS OF POSTOPERATIVE PAIN MANAGEMENT: ACHIEVED?



- Patient's satisfaction:  
patient's wellbeing  
good sleep and appetite
- Prevention of chronic postoperative pain
- Good surgical outcome:  
early mobilization  
good wound healing  
short hospital stay

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THANK YOU



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