



Patient with chronic pain and anesthesia

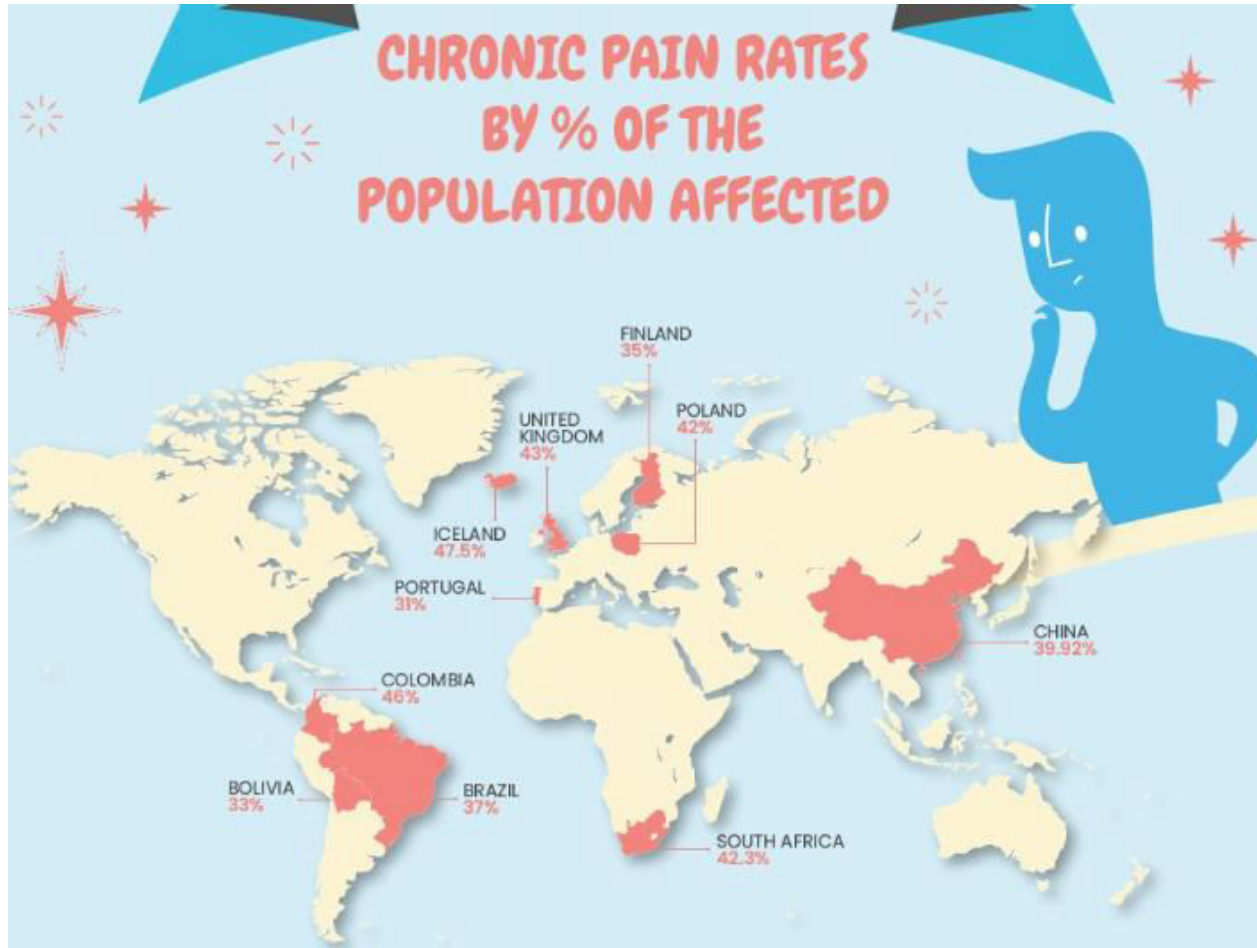
Jasmina Smajić

Chronic nonmalignant pain, Kragujevac 07.03.2020.

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Global Chronic Pain Statistics [2018 Infographic]



<https://www.pathways.health/global-chronic-pain-statistics-2018-infographic/>

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CHRONIC PAIN STATISTICS

Compiled and curated by TheGoodBody.com

▶ CHRONIC PAIN IN NUMBERS



**100
MILLION**

The number of
Americans who suffer
from chronic pain



**ONE
IN TEN**

Americans has experienced
pain every day for three
months or more



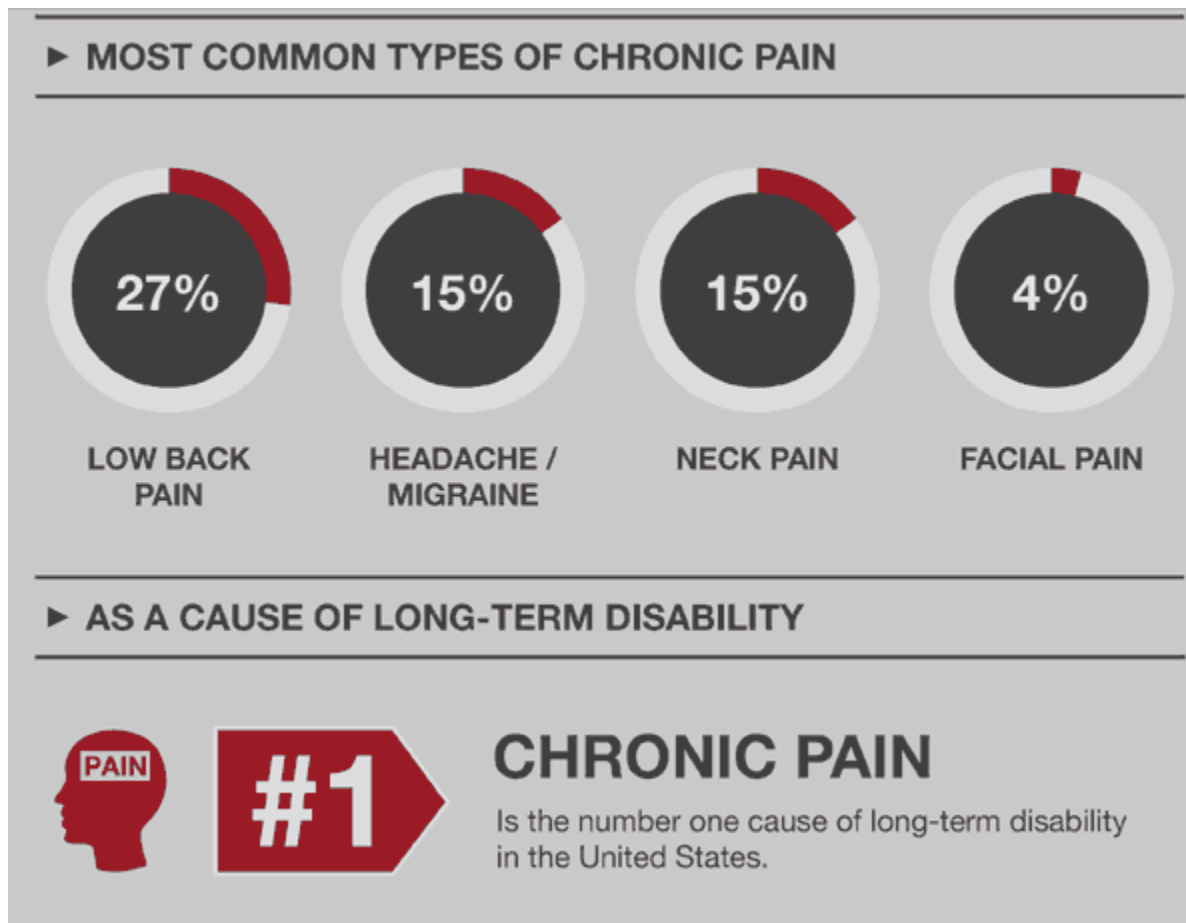
**1.5
BILLION+**

The number of people
worldwide who suffer
from chronic pain

<https://www.thegoodbody.com/chronic-pain-statistics/>

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► HEADACHES, MIGRAINES, AND FACIAL PAIN



2X

Women are twice as likely to suffer from severe headaches or migraines and facial pain than men.

► PERSISTENT PAIN THAT WON'T GO AWAY

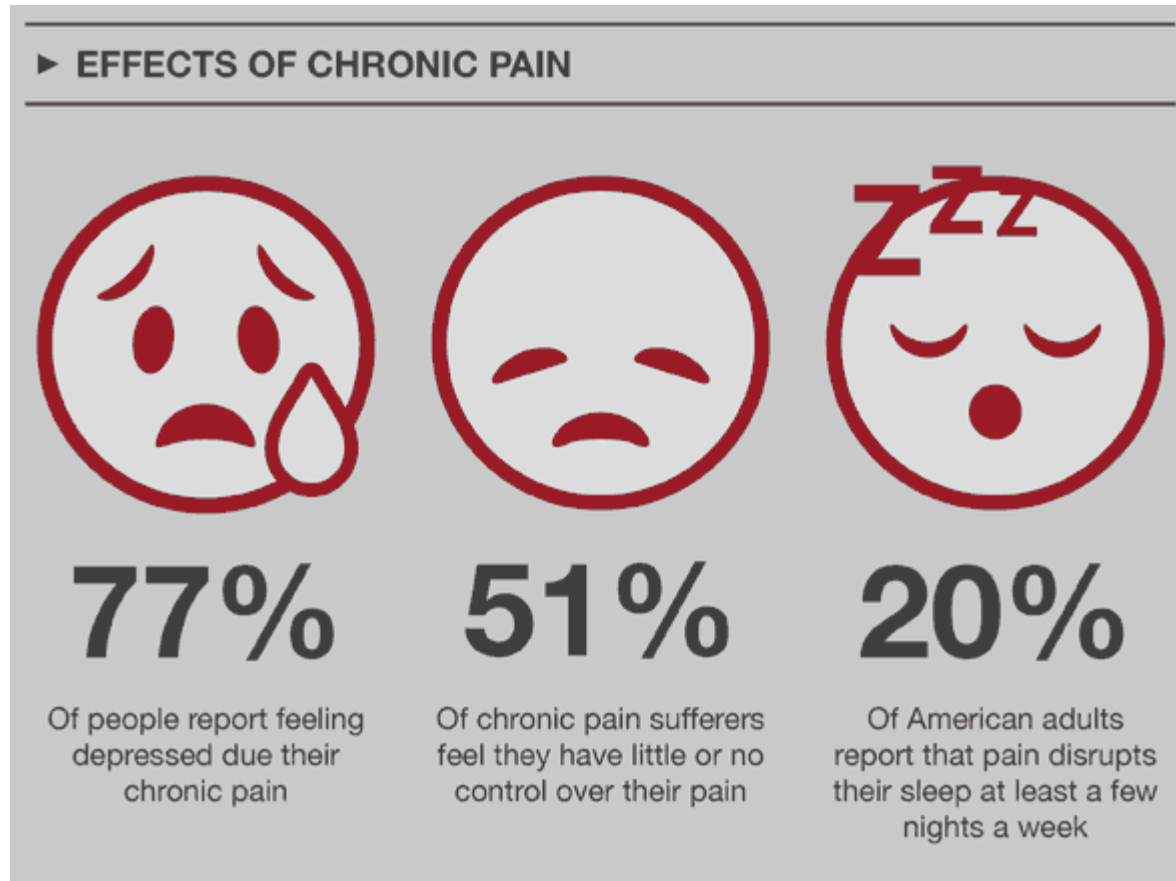
7%

Of persistent lower back pain cases develop into chronic pain.



<https://www.thegoodbody.com/chronic-pain-statistics/>

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▶ THE COST OF CHRONIC PAIN



= **\$2,000 / YEAR**

In the United States, pain is a significant public health problem that costs society at least \$560-\$635 billion annually, or equal to \$2,000 for everyone living in the US.

▶ DAYS OFF WORK

36

MILLION

The number of Americans who miss work due to pain in a single year.

<https://www.thegoodbody.com/chronic-pain-statistics/>

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Severe chronic pain

- devastating for the affected individuals
- causes substantial suffering, health impairment, and a very low quality of life
- economic consequences - health care costs and productivity loss
- ***psychiatric comorbidity is strongly associated with chronic pain***

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Prior mental disorders and subsequent onset of chronic back or neck pain: findings from 19 countries

- **19** participating countries of the WMH community-based epidemiological surveys that assessed the occurrence of occurrence of chronic back/neck pain and its age-of-onset
- sample sizes ranged from 2,357 (Romania) to 12,790 (New Zealand), with a total of **98,714** participating adult respondents
- respondents were assessed in their homes with face-to-face interviews chronic back/neck pain and its age-of-onset by trained non-clinical interviewers

Viana MC, Lim CCW, Garcia Pereira F, et al. Previous Mental Disorders and Subsequent Onset of Chronic Back or Neck Pain: Findings From 19 Countries [published correction appears in J Pain. 2018 Apr;19(4):454]. J Pain. 2018;19(1):99–110.

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Prior mental disorders and subsequent onset of chronic back or neck pain: findings from 19 countries

- chronic back/neck pain affected 20 to 30% of the general adult resident population
- psychiatric comorbidity was strongly associated with chronic pain
- Prior mental disorders assessed were positively associated with subsequent onset of chronic back/neck pain ranging from 1.7 for alcohol abuse to 2.9 for bulimia nervosa

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Pain Medicine News: 11/2008

- 1 in 8 surgery pts suffer from chronic pain (105,000 surveyed)
- Chronic pain patients (CPPs) have higher preop pain scores than non-chronic pain patients
- Psychiatric comorbidity in 25% CPPs vs. only 14% of non-CPPs
- BMI is higher in CPPs
- Regional anesthesia used less frequently in CPPs
- CPPs are more likely to have cardiovascular, pulmonary, hepatic and renal comorbidities

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Postoperative Pain Patterns in Chronic Pain Patients: A Pilot Study

- 96 normal patients and 42 chronic pain patients
- Conclusion: “Surgical patients who have chronic pain and use opioid medications for that pain have more postoperative pain than normals and resolve that pain more slowly”

Chapman et al., Pain Medicine 2009;10:481-487

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Today's challenges

Opioid and non-opioid medications are used in the treatment of chronic pain. The number of chronic pain patients receiving large regular doses of opioids is ever-expanding. The perioperative pain control of these patients is challenging.

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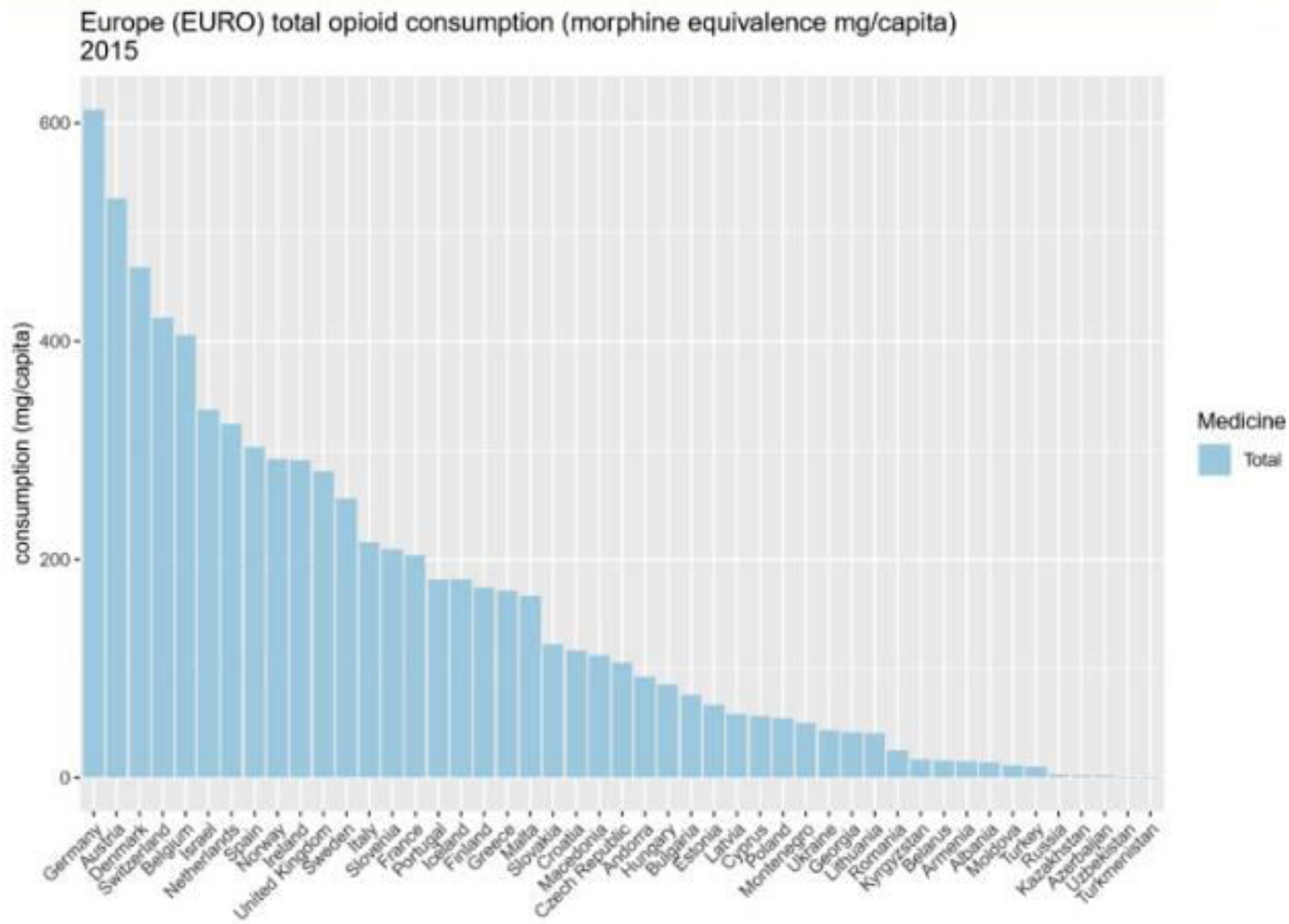
European survey on chronic pain in Europe

- computer-assisted telephone survey with 46,394 respondents from 15 European countries and Israel
- **19%** of the population suffered from chronic pain, defined as pain for more than 6 months
- **61%** of the patients with pain were unable to work outside their home
- **19%** had lost their jobs
- **60%** had visited their doctor about 2–9 times in the last six months
- only **2%** of those patients were managed by pain specialists and nearly half received inadequate pain management

Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D. Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. Eur J Pain. 2006;10:287–333.

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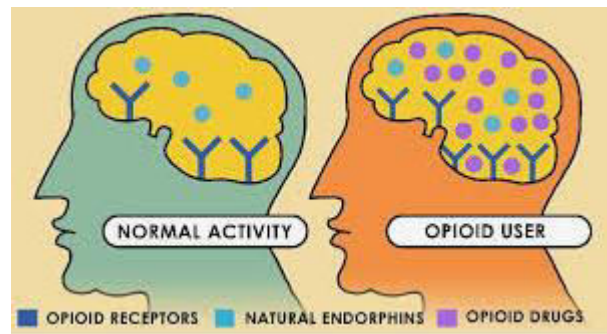


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Challenge for anesthesiologists

As the number of patients for whom opioids on a long-term basis has grown rapidly over the last decade, anaesthesiologists are likely to encounter with increasing probability in their clinical practice opioid users and abusers who require surgical treatment and adequate perioperative analgesia



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Perioperative considerations for patients with chronic opioid use

- Underlying central sensitization, increased nociception and opioid-induced hyperalgesia are some of the pathogenic mechanisms which interact with the preoperative chronic opioid use and acute postoperative pain
- Chronic pain patients are more sensitive to painful conditions, making it more challenging to treat them postoperatively
- Patients taking opioid medication are more sensitive to pain and the opioid induced vulnerability may persist long time after opioid withdrawal

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Opioiddependent patients

1. Those with chronic pain conditions who have been taking opioid analgesics for a prolonged period (months to years)
2. Opioid abusers (addicts)
 - Additional concern is for cross-addiction or polydrug abuse
3. Former addicts enrolled in long-term methadone maintenance programs
4. Long Term Tolerant Patients

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Perioperative considerations for patients with chronic opioid use

- Higher opioid prescription is associated with a dose-response increase in most postoperative complications with the strongest effect observed in thromboembolic, infectious and gastrointestinal complications (*Cozowicz C, Olson A, Poeran J, Mörwald EE, Zubizarreta N, Girardi FP, et al. Opioid prescription levels and postoperative outcomes in orthopedic surgery. Pain. 2017*)
- Chronic opioid use is a risk factor for outcome after surgery: chronic opioid users who taper their dose before surgery achieved significantly improved outcomes compared with those who did not taper (*Nguyen LL, Sing DC, Bozic KJ. Preoperative reduction of opioid use before total joint arthroplasty. J Arthroplasty. 2016;31(9 Suppl):S282–S287.*)

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Preoperative evaluation and identification of population at risk

Table I Clinical differentiation between opioid users for chronic

- pain and opioid abusers

	Opioid users for chronic pain	Opioid abusers
Use of opioids	Appropriate Declared	Out of control Often deliberately omitted
Quality of life	Improved by opioids	Impaired by opioids
Awareness of opioid-related side effects	Complete	Unconcerned
Diagnosis	Available	Unavailable
Treatment plan and medical prescription	Followed	Unavailable
Opioid medication	Available	Hidden, illicit

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Preoperative evaluation and identification of population at risk

- In opioid users/abusers obtain details of the type of opioid, the duration of use/abuse, and the timing of the last dose
- Recognize signs and symptoms of opioid abuse and opioid withdrawal as soon as possible
- Identify population at risk
- Evaluate common comorbidities in addicted patients
 - Cardiovascular disease: hypertension, dilated cardiomyopathy.
 - Gastrointestinal disease: reduced gastrointestinal motility, gastroesophageal reflux disease (GERD), which increases the risk of aspiration during orotracheal intubation, dysphagia, constipation, and bowel discomfort.
 - Infectious disease: hepatitis, human immunodeficiency virus, sexually transmitted disease.
 - Difficult vein access.
 - Concomitant drug abuse (anxiolytics, benzodiazepines, alcohol).

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Preoperative evaluation and identification of population at risk

- Consider possible coexisting psychiatric disorders (depression, anxiety, psychosis, and personality disorders)
- Avoid prejudices and assure the patient.
- Keep in mind patients' fears.
- Plan perioperative pain medication.
 - Investigate effective management strategies used in previous procedures.
 - Consider acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs) or selective COX-2 inhibitors as preoperative medication.
 - Discuss with the patient the analgesic strategy (multimodal approach, regional techniques when suitable, PCA).
 - Document treatment plan with a written opioid pain care agreement with the patient

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Preoperative assessment of opioid tolerant patients

- Consequences of long-term use of opioids:
 - *opioid-induced hyperalgesia (OIH)* - the paradoxical worsening of pain sensitivity without a new injury or exacerbation of an old injury

Opioid tolerance may be assumed to be present with a daily intake per oral opioid equivalent over 72 mg for one month or morphine intravenously 1 mg/h for one week

How to treat patients taking oral opioids for chronic pain management

- Patients should take their usual dose of oral opioid on the morning of surgery, with preoperative administration of their daily maintenance or baseline opioid dose before induction of general, spinal, or regional anesthesia
- If the patient cannot receive oral intake (preoperative fasting), the oral opioid dose can be converted to the corresponding intravenous (IV) dose of morphine:
 - Determine the total 24-hour dose of the current oral opioid.
 - Calculate the oral morphine equivalent dose (MED) of the current opioid, by using equianalgesic tables
 - Convert the calculated oral MED in IV dose of hydrochloride morphine, according to the oral:IV ratio for morphine of 3:1.

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How to treat patients taking oral opioids for chronic pain management

Table II Equianalgesic doses of opioids

Opioid	Approximate oral equianalgesic dose	Onset	Duration	Half-life
Morphine (reference drug)*	30 mg	2–3 h	8–12 h	2–4 h
Tramadol*	150 mg	1–2 h	8–12 h	2–4 h
Codeine (with APAP)	200 mg	30–60 min	4–8 h	3–4 h
Oxycodone*	20 mg	1–2 h	6–10 h	3–4 h
Tapentadol*	100 mg	1–2 h	8–12 h	2–4 h
Hydromorphone [#]	7.5 mg	12–14 h	20–24 h	8–16 h
Oxymorphone	10 mg	30–45 min	4–6 h	2–3 h
Hydrocodone (with APAP, ASA, or ibuprofen)	30 mg	15–30 min	4–8 h	2–3 h

Notes: *PKs (pharmacokinetics) refer to slow release twice daily (BID) formulations. [#]PKs refer to once daily hydromorphone formulation.

Abbreviations: APAP, acetaminophen; ASA, acetylsalicylic acid.

Coluzzi F, Bifulco F, Cuomo A, Dauri M, Leonardi C, Melotti RM, Natoli S, Romualdi P, Savoia G, Corcione A.

The challenge of perioperative pain management in opioid-tolerant patients. Therapeutics and Clinical Risk Management.

2017 Volume 2017:13 Pages 1163–1173

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UNC Health Care Guideline

Opiate Equianalgesic Dosing Chart

University of North Carolina Hospitals
Pharmacy & Therapeutics Committee

Dosing Table for Opioids						
Drug	Oral to Parenteral (IM, SQ, IV) Ratio	Approximate equianalgesic dose	ADULTS		PEDIATRICS	
			Recommended starting dose (adults more than 50 kg body weight)		Recommended starting dose (children and adults less than 50 kg body weight) NOTE: when assessing doses in larger children, note usual initial adult dose	
			oral	parenteral	oral	parenteral
Opioid Agonist						
Morphine	3 mg oral to 1 mg parenteral	10 mg PARENTERAL	10-20 mg every 4 hours	3-5 mg every 4 hours	0.3-0.5 mg/kg/dose every 6 hours	0.05-0.2 mg/kg/dose every 4 hours (MAX 2-4 mg)
Codeine^{1,2} (as Tylenol #3: 30 mg codeine/300 mg APAP)	1.7 mg oral to 1 mg parenteral	Use of parenteral codeine is not recommended.	30-60 mg Every 4 hours	N/A	0.5-1.5 mg/kg/dose every 6 hours	N/A
Fentanyl	N/A	Fentanyl 100 mcg (0.1 mg) PARENTERAL = Morphine 10 mg PARENTERAL (see next Table for conversion from fentanyl patches to parenteral morphine)	Actiq™, Fentora™ are not available at UNC.	50 mcg every 2 hours	N/A	1 – 2 mcg/kg/dose every 4 hours
Hydrocodone⁴ (as Norco: 5 mg hydrocodone/325 mg APAP)	N/A	Hydrocodone 1 mg ORAL is equal to Morphine 1 mg ORAL	5-10 mg every 4 hours	N/A	0.05-0.2 mg/kg/dose every 4 hours	N/A
Hydromorphone (Dilaudid)	5 mg oral to 1 mg parenteral	Hydromorphone 2 mg PARENTERAL is equal to Morphine 10 mg PARENTERAL	2 mg every 4 hours	1 mg every 4 hours	0.03-0.08 mg/kg/dose every 4 hours	0.015 mg/kg/dose every 4 hours
Meperidine	4 mg oral to 1 mg parenteral	Meperidine 75 mg PARENTERAL is equal to Morphine 10 mg PARENTERAL	NOT RECOMMENDED AS AN ANALGESIC (FOR TREATMENT OF RIGORS ONLY)			
Methadone⁴	Caution is advised when converting to methadone due to variability in patient response and delayed peak effects. Reliable equianalgesic conversion for repeated dosing is not available. Parenteral methadone is not available at UNC.		5 mg every 8 hours	N/A	0.1 mg/kg/dose every 8 hours	N/A
Oxycodone⁴ (as Percocet: 5 mg oxycodone/325 mg APAP)	N/A	Oxycodone 1 mg ORAL is equal to Morphine 1.5 mg ORAL	5 - 10 mg every 4 hours	N/A	0.05-0.2 mg/kg/dose every 6 hrs	N/A
Opioid Agonist-Antagonist and Partial Agonist						
Butorphanol	N/A	Butorphanol 2 mg PARENTERAL is equal to Morphine 10 mg PARENTERAL	N/A	2 mg every 4 hours	N/A	10-20 mcg/kg/dose every 4hours
Nalbuphine	N/A	Nalbuphine 10 mg PARENTERAL is equal to Morphine 10 mg PARENTERAL	N/A	10 mg every 4 hours	N/A	0.1 mg/kg/dose every 4 hours

Note: Published tables vary in the suggested doses that are equianalgesic to morphine. Clinical response is the criterion that must be applied for each patient; titration to clinical response is necessary. Due to cross-tolerance, when switching from one opioid to another, the starting dose of the new opioid should be 50% to 67% of the equianalgesic dose except when switching to methadone. When switching to methadone, the starting dose should be 10% to 25% of the equianalgesic dose. Opioid dose should then be titrated and individualized to clinical situation and patient response. When using higher total doses, decrease total dose incrementally by 30% per day.

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*University of North Carolina Hospitals
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Morphine to Transdermal Fentanyl Equivalency	
Parenteral Morphine Dose (mg/24 hours)	Fentanyl Patch dose (mcg/hr)
4-11	12
8-22	25
23-37	50
38-52	75
53-67	100
68-82	125
83-97	150
98-112	175
113-127	200

NOTE: Do NOT cut patch.

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Intraoperative management

- No preference for a specific intraoperative opioid over another in patients chronically treated with opioids or addicted
- Select the opioid and titrate the doses following the usual method
- Dosage and requirements in different surgical settings should be guided by vital signs (heart rate, pupil dilation, arterial blood pressure) and, most recently, by analgesia nociception index monitoring.
- Usually these patients need a larger dose of opioids than those commonly used for adequate pain control in opioid-naïve patients
- Opioid-sparing techniques

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Opioid sparing techniques

Intervention	Type/Dose	Effects	Side effects
Local anaesthetic techniques	<ul style="list-style-type: none"> Peripheral plexus catheter should be used in extremity surgery Epidural anaesthesia (EDA) can be used in bilateral extremity surgery or thoracotomy/laparotomy Transversous abdominal plane block can be used in laparotomy if the patient is not suitable for EDA Wound catheters can be used when EDA is not possible 	<p>Local anaesthesia is advantageous in opioid dependent patients, potentially obviating the need for additional opioids</p> <p>EDA decreases with 50% the need of continuously infusion opioids</p>	<p>Peripheral nerve blocks may induce nerve injury and/or neuropathy due to potential toxicity of local anaesthetics or due to a nerve lesion for needle trauma or infection</p> <p>The risks of epidural anaesthesia in unexperienced hands are already known</p>
Acetaminophen (Paracetamol)	<p>1 g × 4 for adults</p> <p>1 g × 3 for older patients</p>	<p>Reduces opioid [29] requirement by 20–30%</p> <p>Beneficial effect on postoperative nausea and vomiting as used preoperatively, synergistic effect with NSAIDs [30] and Coxibs [31]</p>	<p>Minimal adverse effects</p> <p>Care has to be taken in patients with severe liver insufficiency</p>

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Opioid sparing techniques

Intervention	Type/Dose	Effects	Side effects
NSAIDs Coxibs	Ketorolac 30 mg Celecoxib 400 mg	Have opioid-lowering effect and good pain relieving effect, especially in combination with paracetamol	Care has to be taken regarding renal, hepatic and gastro-intestinal side-effects
Gabapentin	<ul style="list-style-type: none"> 100–300 mg once daily p.o. or via gastrointestinal tube, then increases with 100–300 mg each day to 600 mg × 3 	Indicated in patients with neuropathic pain No benefit in enhanced recovery [34]	Both increase risk of postoperative sedation
Pregabalin	<ul style="list-style-type: none"> 50–75 mg p.o. once daily or via gastrointestinal tube, then increases with 50–75 mg each day to 150 mg × 2 	The benefits of using gabapentin and pregabalin is uncertain in opioid sparing techniques	

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Opioid sparing techniques

Intervention	Type/Dose	Effects	Side effects
Ketamine	<ul style="list-style-type: none"> • After induction, bolus dose is given $0.25\text{--}0.5\text{ mg}\cdot\text{kg}^{-1}$ • Continuous infusion $0.25\text{ mg}\cdot\text{kg}^{-1}\text{ h}^{-1}$ (at expected moderate pain) • Continuous infusion $0.5\text{ mg}\cdot\text{kg}^{-1}\text{ h}^{-1}$ (at expected moderate pain) • Stop infusion 30 minutes before extubation • Postoperative continuous infusion $0.08\text{--}0.16\text{ mg}\cdot\text{kg}^{-1}\text{ h}^{-1}$ (for the patients who can be monitored on the ward) 	<p>Ketamine reduces opioid need and inhibits the development of OIH (opioid induced hyperalgesia)</p> <p>Reduces postoperative nausea and vomiting</p>	Psychotomimetic effects (hallucinations, agitation, anxiety, dysphoria, and euphoria)
Magnesium	<p>Bolus dose at induction or during maintenance</p> <p>Infusion $40\text{--}50\text{ mg}\cdot\text{kg}^{-1}$</p>	<p>Reduces opioid dose and pain estimation up to 24 hours postoperatively</p>	<p>Bradycardia</p> <p>May prolong the duration of non-depolarizing muscle relaxants, therefore TOF measurement is recommended</p>

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Opioid sparing techniques

Intervention	Type/Dose	Effects	Side effects
Lidocaine	The dose of i.v. lidocaine [36] necessary for analgesia in the perioperative period is $1-2 \text{ mg} \cdot \text{kg}^{-1}$ as an initial bolus given slow in 2–4 min followed by a continuous infusion of $1.5 \text{ mg} \cdot \text{kg}^{-1} \text{ h}^{-1}$	Potent anti-inflammatory, anti-hyperalgesic, and gastrointestinal pro-peristaltic drug Decreased pain scores, opioid analgesic consumption, and side-effects	Symptoms and signs of toxicity Adverse effects on cardiac conductivity, myocardial contractility, and precipitate partial or grand mal seizures
Clonidine	Recommended as premedication $75 \text{ } \mu\text{g}$ p.o. or continuously i.v. postoperative $0.1-0.3 \text{ } \mu\text{g} \text{ kg}^{-1} \text{ h}^{-1}$	Reduces withdrawal Potentiates morphine effects	Hypotension Bradycardia Sedation
Dexmedetomidine	Continuously postoperative $0.3-0.8 \text{ mg} \text{ kg}^{-1} \text{ h}^{-1}$	Reduces opioid use up to 24 hours postoperatively	Hypotension Bradycardia Sedation
Dexamethazone	8 mg i.v. preoperatively	Reduces postoperative pain and opioid needs up to 24 hours postoperatively Less fatigue after operation	Elevated blood sugar

Miclescu A. Chronic pain patient and anaesthesia. *Rom J Anaesth Intensive Care*. 2019;26(1):59–66. doi:10.2478/rjaic-2019-0009

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Postoperative pain treatment

- Opioid-dependent patients have four-fold increased opioid requirements in the postoperative period compared with opioid-naïve patients
- The duration of postoperative treatment is about three times longer in these patients compared with opioid-naïve patients
- Multimodal analgesia is mandatory to reduce opioid consumption
- Regional analgesia may be useful
- Help of patient-controlled analgesia (PCA) or patient-controlled epidural analgesia (PCEA)
- Opioid antagonists, including naloxone and naltrexone, in opioid users should be avoided (could precipitate withdrawal symptoms)

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Postoperative pain treatment

- Patients with a high opioid dose postoperatively are at a greater risk of developing OIH
- OIH treatment:
 - Opioid rotation – clinically useful technique (the “new” opioid dose should be reduced by 25–50%)
 - Reduce the opioid
 - For extreme cases with severe pain and very high doses of opioid, more than 500–1,000 morphine equivalents, an anaesthesia assisted rapid detoxification can be performed using ultra low dose naloxone 0.5 µg/kg/h in infusion for 12–24 hours in combination with an alpha 2 agonist in the form of clonidine or dexmedetomidine. For this, routine sedation with propofol and intensive care monitoring of vital functions is often required

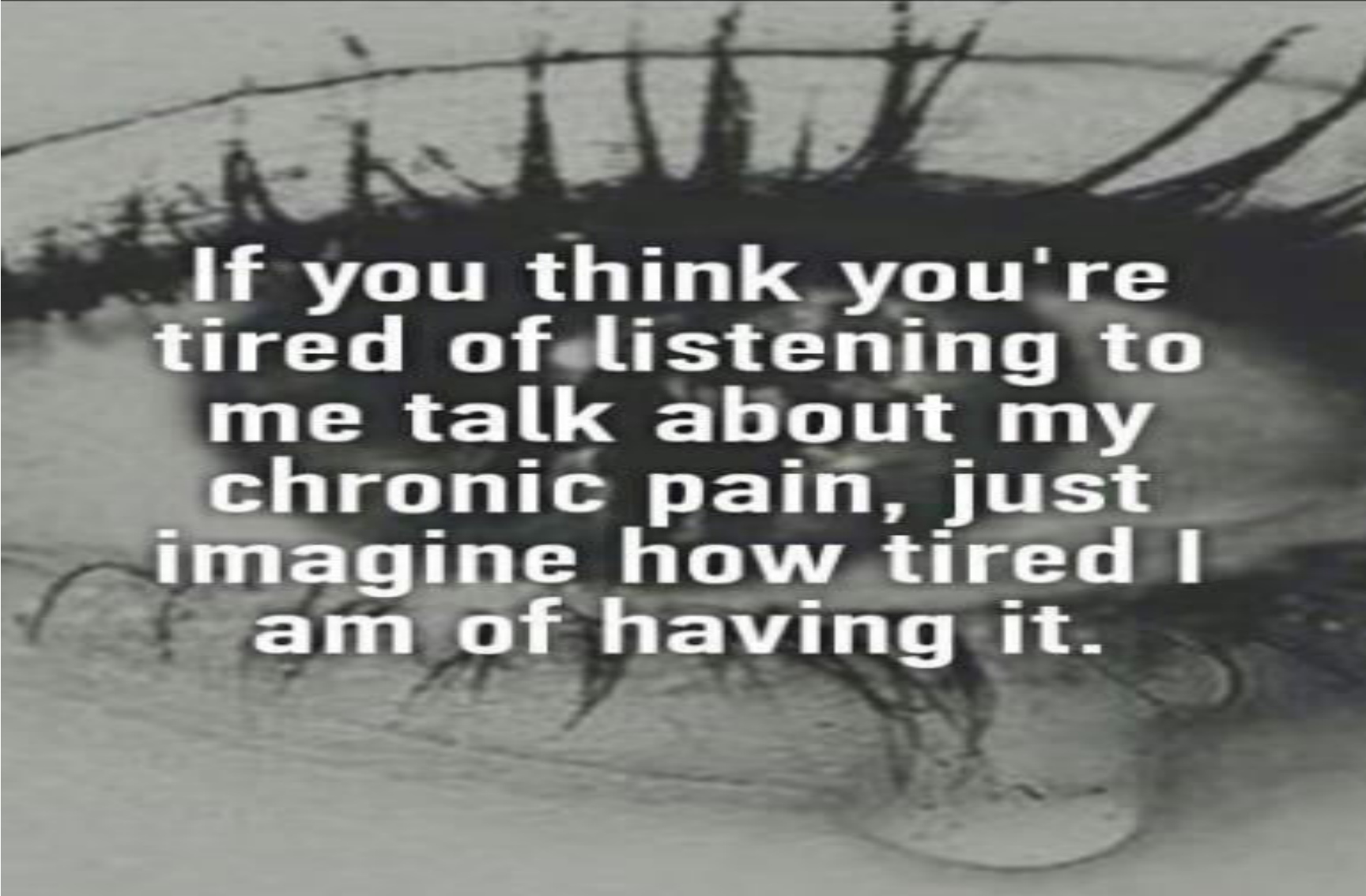
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Take home messages

- Multidisciplinary approach
- Inadequate postoperative pain management may increase pulmonary and cardiovascular complications as well as hospital length of stay
- Provide effective analgesia and treat pain aggressively
- Prefer multimodal analgesia
- Do not induce weaning or OIH in the perioperative period
- Do not give any unsuitable judgment regarding patient addiction

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**If you think you're
tired of listening to
me talk about my
chronic pain, just
imagine how tired I
am of having it.**

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