

# A Pain Medicine Perspective: Opioids and Opioid Sparing Techniques

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# Disclosure

- I have nothing to disclose.

# Objectives

- Explore interventional therapies for pain management in patients with cancer and non-malignant pain
- Define appropriate criteria for interventional pain management involvement
- Describe techniques for chronic opioid therapy from a pain management perspective

# VCU Pain Medicine

- 4 Board Certified Faculty
  - Physician Assistant
  - Psychologist
  - 3 Fellows
  - Resident Physicians
- 
- Downtown, Short Pump, Tappahanock

# Multimodal care

- Spine, neuropathic pain, certain cancer pain types
- PT, Water Therapy, Home Exercise
- Diet
- Mental Health Care
- Medications
- Procedures
- Surgical Referrals

# Epidural Steroid Injections

- Indication: Radiculopathy and Spinal stenosis with claudication
- Contra-indication
  - No current chemotherapy or radiation
  - Uncontrolled coagulopathy
  - Active infection
  - Malignancy near by

# Radiofrequency Ablation

- Treatment for “spine arthritis” AKA facet mediated pain
  - Requires diagnostic test injections prior
  - 70% relief for 1 year
  - Failure rate is 30-50%
- 
- Similar Contra-indications as epidural steroid injections

# Peripheral nerve stimulation

- Utility: severe neuropathic pain in the extremity
  - Amputees
  - Chemo-neuropathy
- Trial 60 day wire - Sprint
- Limited MRI compatibility
- Insurance coverage is challenging

# Spinal Cord Stimulation

# Intrathecal pump therapy



# Kyphoplasty and Tumor Ablation

- Treat Painful vertebral body tumors and compression fractures
- Multiple retrospective studies show mortality benefit
- Debatable new fracture risk
  - Possible selection bias
  - Adjacent levels?



# Kyphoplasty Goals

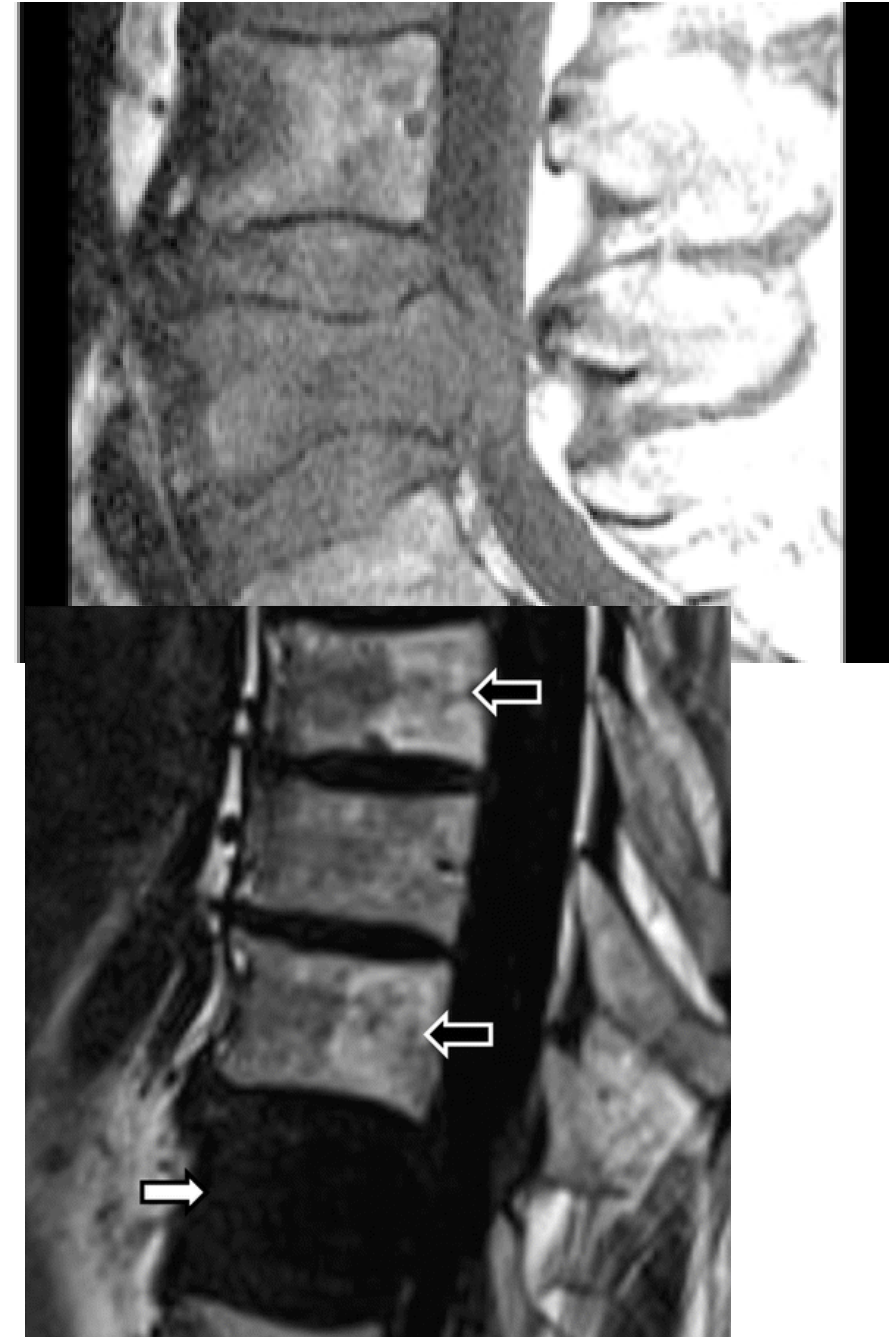
- Stabilize the fracture (important to cross midline)
- Pain reduction and improved function
  - Improved pain and function
  - EVOLVE Trial. Neurosurgery. 2019 Jan; 84(1): 169–178.
  - Selection Bias. Unblinded
- Height Restoration
- Biopsy (optional)
- Improved mortality (PE, Falls, PNA, Opioids, MI)
  - Multiple large retrospective studies

# Contra-indications

- Infection / Infection over the site
- Sedation Risks
- Instability / Myelopathy / Severe Radiculopathy
- Above T4
- ? Retropulsion > 3mm or > 1/3 canal diameter
- Uncontrolled coagulopathy
  - Platelet count?
  - ASRA Guidelines
  - Use 13 gauge canula; unipedicular approach (Stryker)

# Metastatic Disease

- Crush configuration
  - Signal change in entire body, extension to pedicles / posterior elements
  - Diffuse signal change
  - Bowing of posterior cortex
  - Cancer, Smoking History
  - If concerned get with and without contrast
- AJNR Am J Neuroradiol. 2018 Sep; 39(9): 1584–1592.



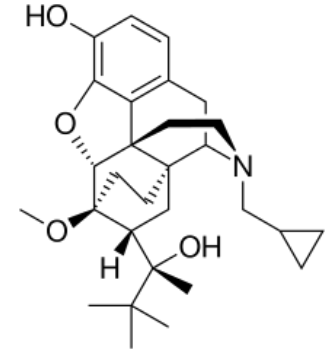
# Criteria for involvement

- Medication: specific question
- Interventional?
  - Spine
  - Focal: Extremity, Rib, thoracotomy
- Controlled:
  - Malignancy
  - Chemotherapy and immune status
  - Bleeding risks
  - Stable / low opioid dosing
  - Stable mental health

# Chronic opioid therapy – challenging patients

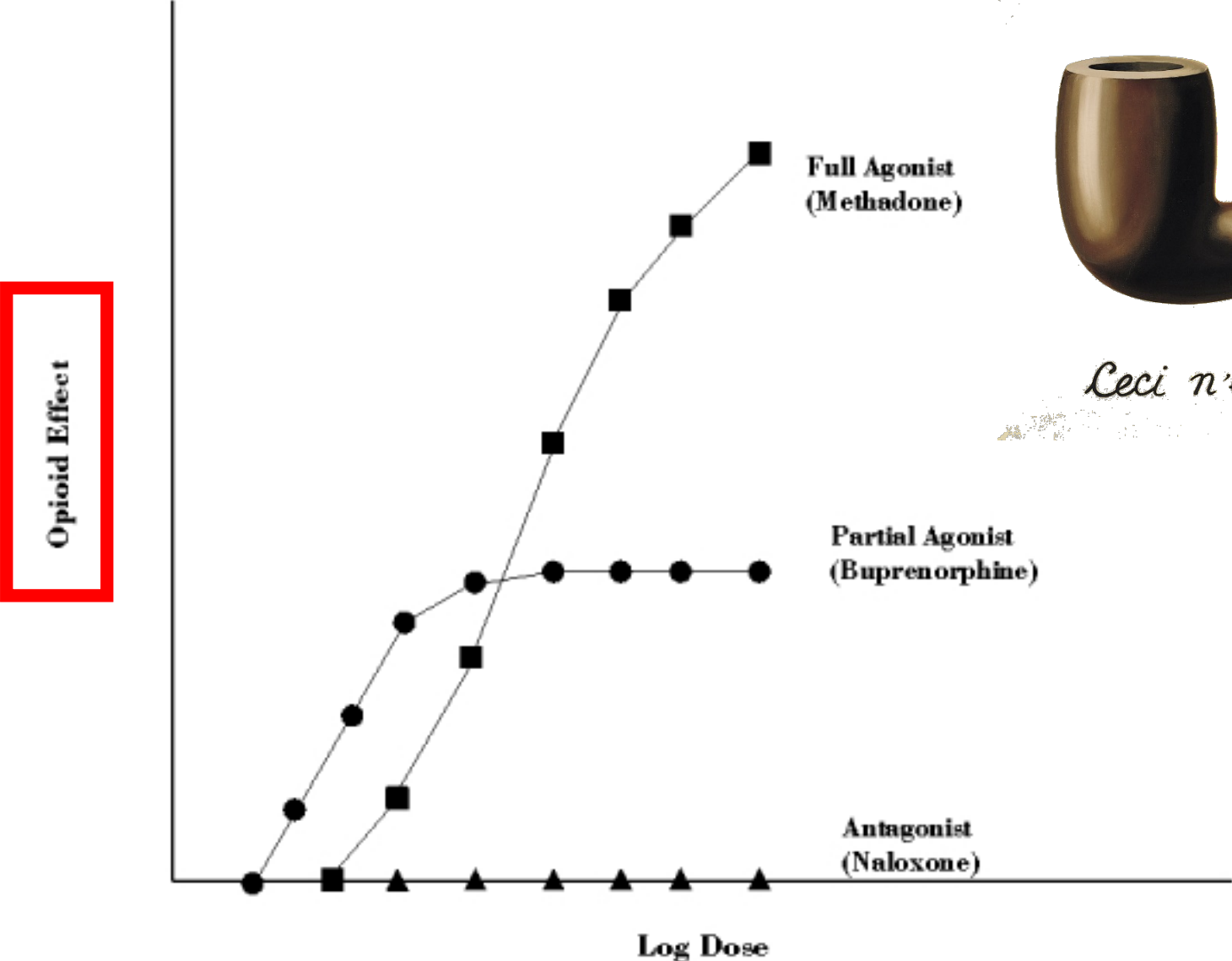
- Forced Wean???
- CONTRACT Updated
- PDMP review
- UDS with confirmation
  - Increased Frequency
- Summoned Pill Counts
  - 2-3 weeks after next dispense
  - Must present next day
  - Nurse present for count
- Increase visits
- Addiction Medicine Referral?

# Buprenorphine - Pharmacology



- “Partial” agonist at  $\mu$ -opioid receptor
  - High affinity
  - Low intrinsic activity
  - Ceiling effect for respiratory depression
- Potency 30x morphine
- Primary action site is in the spine, secondary supraspinal site
- Variable T<sub>1/2</sub>: 24 – 60 hours
- Onset is 30 – 60 minutes; peak at 100 minutes
- 10% is converted to the active metabolite norbuprenorphine
- No renal dosing adjustments needed

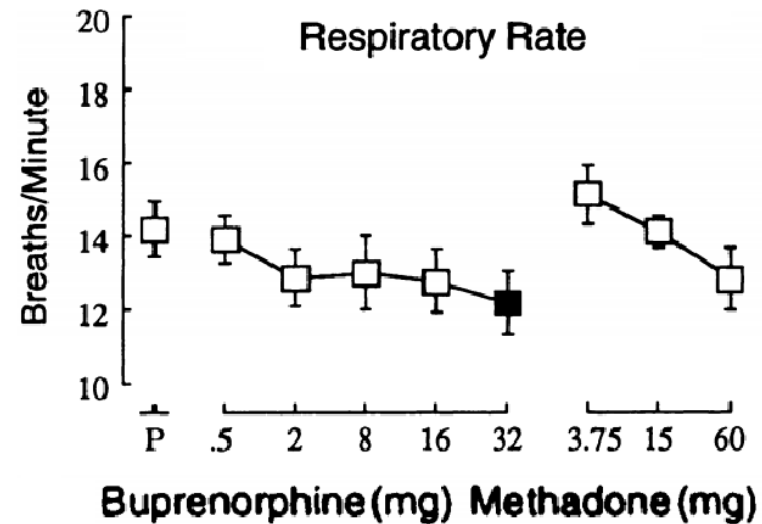
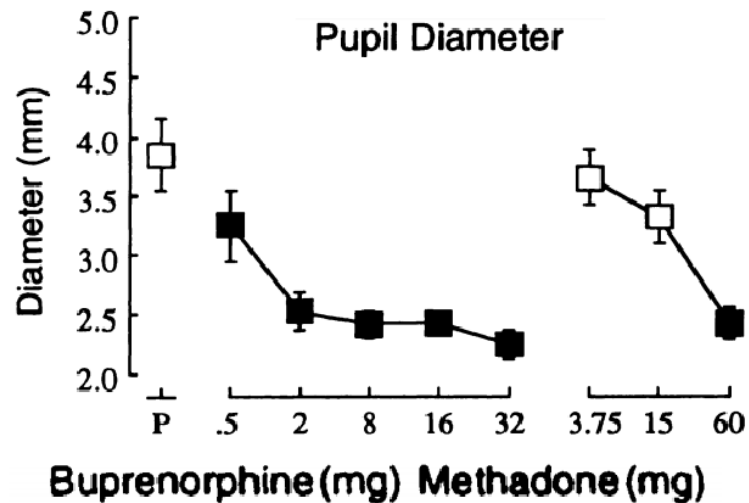
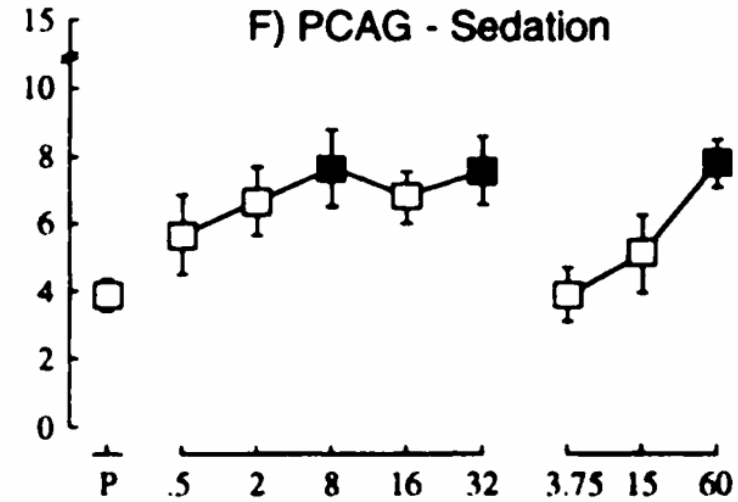
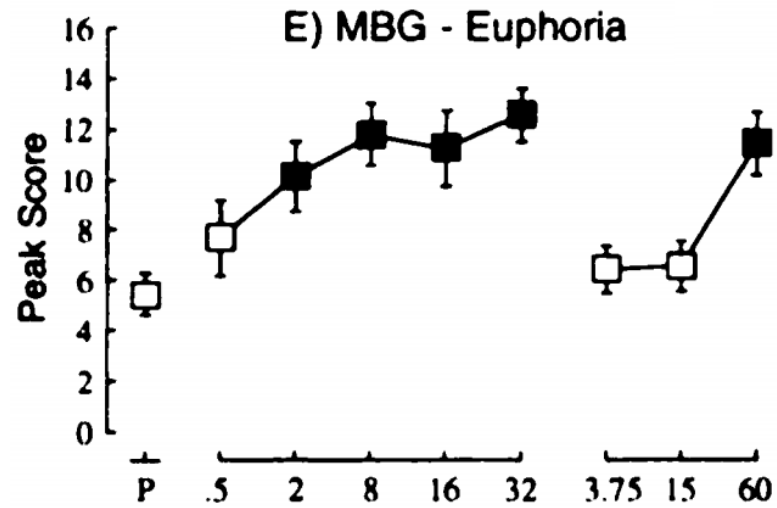
# Buprenorphine: Partial Agonist?



*Ceci n'est pas une pipe.*

(Substance Abuse and Mental Health Services Administration 2001)

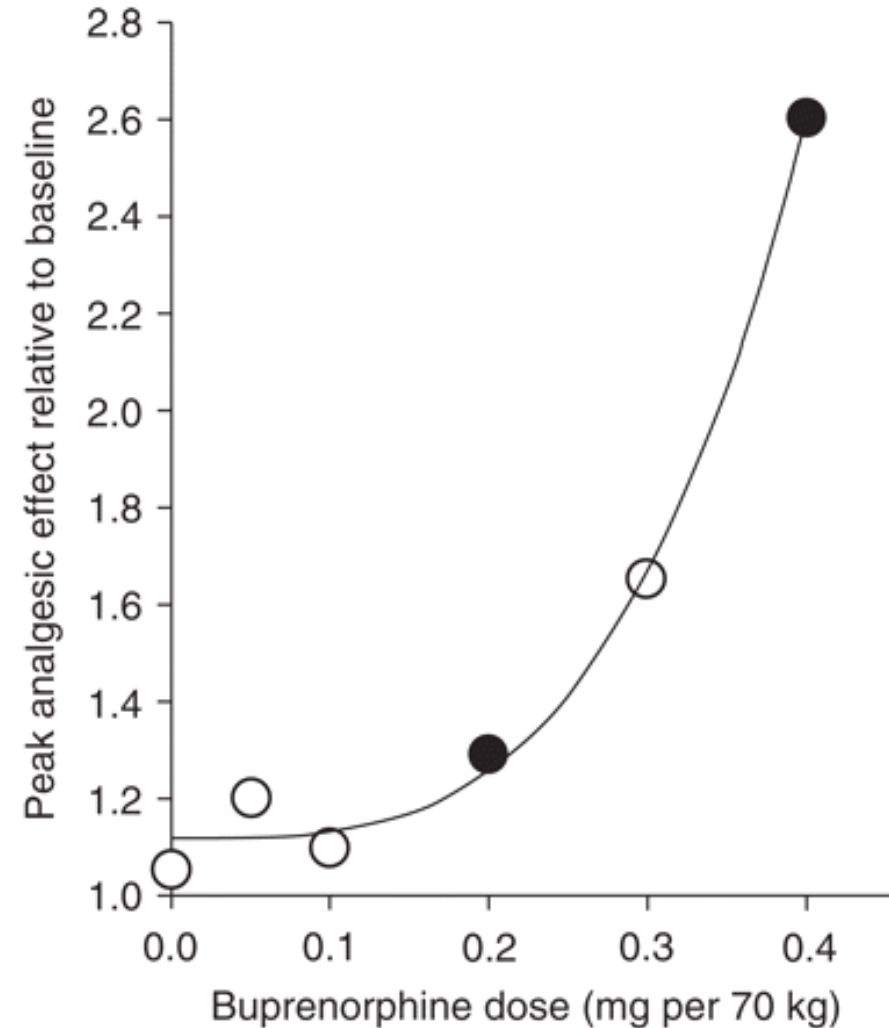
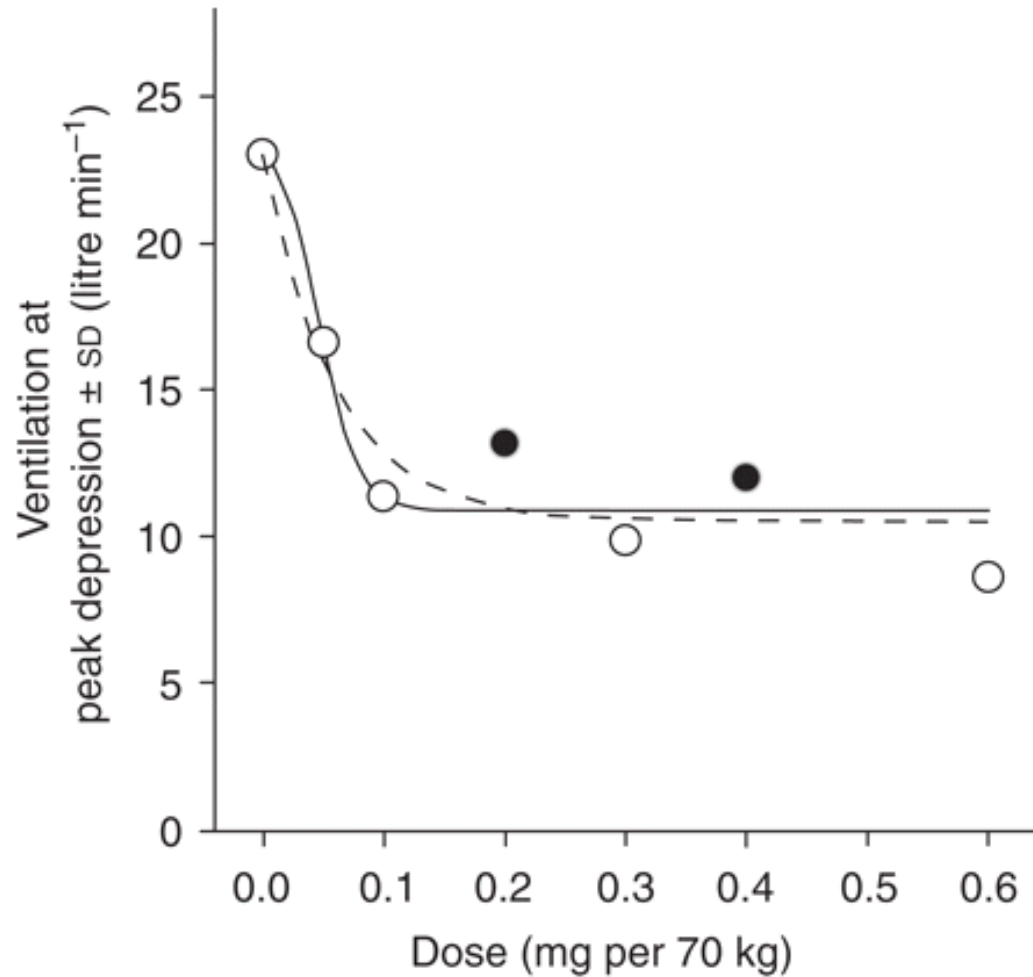
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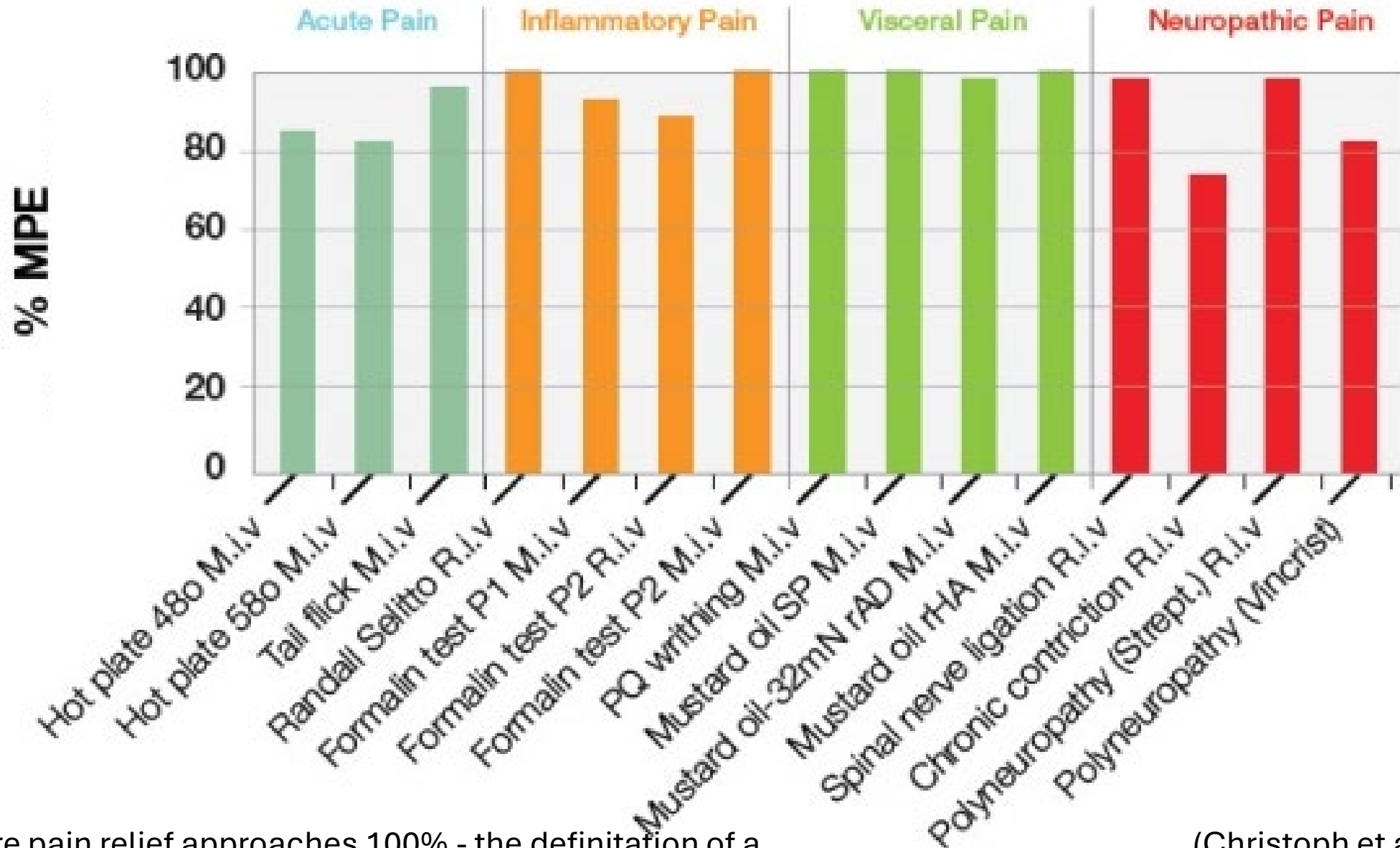
(Walsh et al 2009)

# Dahan et al. BJA: 2004.

Buprenorphine is a full agonist for pain



# Buprenorphine is a full agonist for pain



Therefore pain relief approaches 100% - the definition of a FULL agonist (for pain)

(Christoph et al 2004)

# Medical Status

- Pulmonary status
- Constipation
- Sedation
- Falls
- Cardiac risk
- Testosterone
- Mental Health

# Aberrant

- Case by case vs Policy?
- Parting Gifts?
  - Addiction Medicine Referral
  - Withdrawal medications
- VS Re-education, re-sign contract and plan retest
- Telemedicine visit
- Deferring to “Policy”

# Case 1

- 60 year Patient with chronic neuropathic pain following chemotherapy treatment
- Symptoms: burning dysesthesias, numbness, tingling in hands/feet
- Functional impact: difficulty walking, sleep disruption
- Previous treatments: oral neuropathic agents with partial relief

Interventional considerations?

# Case 1

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Interventional considerations: treatment? Life-expectancy?  
Immune status?

# Case 1

- Interventional considerations:
  - Multimodal pain management approach
  - Peripheral nerve blocks
  - Peripheral nerve stimulation
  - Spinal cord stimulation evaluation

# Case 2

- 71 year old presenting with severe axial back pain due to metastatic vertebral compression fracture
- • Symptoms: mechanical pain worsened by movement, limited mobility, radiating discomfort
- • Imaging: 60% vertebral body collapse with tumor involvement confined to the vertebral body and pedicle
- Physical exam notable for point tenderness at the level. Not myelopathic

# Case 2

- Interventional considerations:
  - Acute pain control
  - Vertebral augmentation (kyphoplasty/tumor ablation)
  - Serial Xray if conservative care
  - Integration with oncology, palliative care teams, radiation oncology
  - Bone health
  - PT and conditioning

# Case 3

- Interventional considerations

Celiac plexus block or neurolysis (alcohol / phenol)

Radiology

Intrathecal drug delivery ?

# Case 3

Diagnosis: Pancreatic cancer with painful abdominal metastatic disease

- Symptoms: deep visceral abdominal pain, episodic breakthrough pain, nausea
- Current analgesic regimen: 140 morphine milligram equivalents (MME) daily
- Functional impact: reduced appetite, impaired sleep, limited daily activities
- Interventional considerations?

# Case 4

- Thoracotomy for lung mass resection
- Severe post-thoracotomy pain.
- CRPS-like features — burning pain, hyperalgesia, allodynia, autonomic changes.
- Current Management: On 40 morphine milligram equivalents daily; limited relief.
  
- Interventional considerations?

# Case 4

- Interventional options
  - Rib blocks
    - Ablation?
    - Cryo-denervation?
  - Medication options
  - Topicals?
  - Stimulation

Questions?

# References

- Mauch JT, Carr CM, Cloft H, Diehn FE. **Review of the Imaging Features of Benign Osteoporotic and Malignant Vertebral Compression Fractures.** AJNR Am J Neuroradiol. 2018 Sep;39(9):1584-1592. doi: 10.3174/ajnr.A5528. Epub 2018 Jan 18. PMID: 29348133; PMCID: [PMC7655272](https://pubmed.ncbi.nlm.nih.gov/PMC7655272/).
- Center for Substance Abuse Treatment. **Clinical Guidelines for the Use of Buprenorphine in the Treatment of Opioid Addiction.** Rockville (MD): Substance Abuse and Mental Health Services Administration (US); 2004. (Treatment Improvement Protocol (TIP) Series, No. 40.) 2 Pharmacology. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK64236/>
- Walsh SL, Preston KL, Bigelow GE, Stitzer ML. **Acute administration of buprenorphine in humans: partial agonist and blockade effects.** J Pharmacol Exp Ther. 1995 Jul;274(1):361-72. PMID: 7542336.
- Dahan A, Yassen A, Romberg R, et al. **Buprenorphine induces ceiling in respiratory depression but not in analgesia.** Br J Anaesth. 2006 May;96(5):627-32. <https://doi.org/10.1093/bja/ael051>
- Christoph T, Kögel B, Schiene K, Méen M, De Vry J, Friderichs E. **Broad analgesic profile of buprenorphine in rodent models of acute and chronic pain.** Eur J Pharmacol. 2005 Jan 10;507(1-3):87-98. doi: [10.1016/j.ejphar.2004.11.052](https://doi.org/10.1016/j.ejphar.2004.11.052). Epub 2004 Dec 30. PMID: 15659298.
- Greenwald MK, Johanson CE, Moody DE, Woods JH, Kilbourn MR, Koeppe RA, Schuster CR, Zubieta JK. **Effects of buprenorphine maintenance dose on mu-opioid receptor availability, plasma concentrations, and antagonist blockade in heroin-dependent volunteers.** Neuropsychopharmacology. 2003 Nov;28(11):2000-9. doi: [10.1038/sj.npp.1300251](https://doi.org/10.1038/sj.npp.1300251). PMID: 12902992.
- Beall DP, Chambers MR, Thomas S, Amburgy J, Webb JR Jr, Goodman BS, Datta DK, Easton RW, Linville D 2nd, Talati S, Tillman JB. **Prospective and Multicenter Evaluation of Outcomes for Quality of Life and Activities of Daily Living for Balloon Kyphoplasty in the Treatment of Vertebral Compression Fractures: The EVOLVE Trial.** Neurosurgery. 2019 Jan 1;84(1):169-178. doi: 10.1093/neuros/nyy017. PMID: 29547939; PMCID: [PMC6354561](https://pubmed.ncbi.nlm.nih.gov/PMC6354561/).