Slide 1

HOW PHYSICAL THERAPISTS CAN EFFECTIVELY TREAT PATIENTS WITH MUSCULOSKELETAL DISEASE (MSD)AND SUBSTANCE USE DISORDER (SUD)

LECTURE 1

PART ONE: BRIEF OVERVIEW OF THE NEUROSCIENCE OF SUD AND OUR DRUG EPIDEMIC

PART TWO : REVIEW OF THE NEUROSCIENCE OF PAIN AND HOW CHRONIC PAIN AND SUD CAN INTERACT

HOLLY JOHNSON PT, DPT, CERT. MDT

Slide 2

INTRO: HELLO MY NAME IS……

- Holly Johnson PT, DPT, Cert MDT , Johnson PT Consulting, www.johnsonptconsulting.com
- Cell 606-524-5847 , email hollyjohnson.pt.dpt@outlook.com
- 32 yrs. in PT private practice in eastern Ky ,ground zero for the opioid epidemic since 1990s to present
- 3 yrs. in Addiction Recovery researching effects of early intervention PT on substance use disorder (SUD), Central sensitization (CS) and MSK pain with the University of Kentucky and Addiction Recovery Care (ARC)
- 13 yrs. in APTA- KY Payer specialist, and in APTA Private Practice Section's Payment Policy Committee and head of Value Based Payment Task Force
- MY PASSION: treating this underserved population and teaching PTs how to do it with great outcomes.

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OBJECTIVES PART ONE: BRIEF OVERVIEW OF THE NEUROSCIENCE OF ADDICTION AND OUR DRUG EPIDEMIC

Following this lecture participants will be able to:

Define addiction and SUD.

Discuss how does it affects the brain.

Discuss how it affects our culture globally , in the US and WI.

Discuss how it affects the chronic pain epidemic and PT practice.

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WHAT IS ADDICTION AND WHY DOES ADDICTION/SUD MATTER?

- DSM-5 Diagnostic and Statistical Manual of Mental Disorders 5th edition defines it as a chronic progressive disease with behavioral patterns that fall within a spectrum of severity. This broad spectrum is referred to as "substance use disorders (SUDS)
- From a clinical perspective it is diagnosed via clinical interview using the guidelines such as the DSM-5 by the American Psychiatric Association or the International Classification of Diseases (ICD) published by the World Health Organization (WHO) .
- It is now considered a brain disease that is pathological, pervasive and persistent.
- Mild SUD =2-3 symptoms, Moderate SUD= 4-5 , Severe = 6-11

Slide 5

MODIFICATIONS TO ADDICTION DIAGNOSIS IN DSM-5 FOR SUBSTANCE ABUSE DISORDER (SUD)

MILD SUD =2-3 SYMPTOMS, MODERATE SUD= 4-5 , SEVERE = 6-11

- Tolerance-
- Withdrawal
- Taken more /longer than required
- Desire/unsuccessful efforts to quit use
- Great deal of time taken by activities involved with use
- Use despite knowledge of problems associated with use
- Important activities given up because of use
- Recurrent use resulting in a failure to fulfill important role obligations
- Recurrent use resulting in physically hazardous behavior (e.g., driving)
- Continued use despite recurrent social problems associated with use
- Craving for the substance

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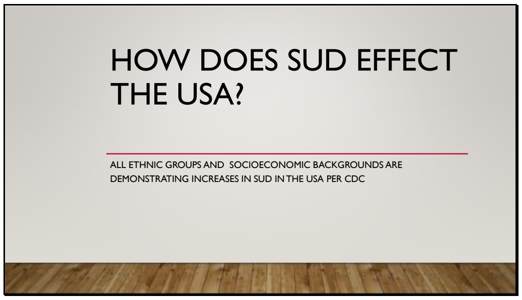
AMERICAN PSYCHIATRIC ASSOCIATION DEFINITION

- Addiction is a complex condition, a brain disease that is manifested by compulsive substance use despite harmful consequence. People with addiction (severe substance use disorder) have an intense focus on using a certain substance(s), such as alcohol or drugs, to the point that it takes over their life.
- Remember not all folks in SUD are addicted but it is a slippery slope.

Slide 7



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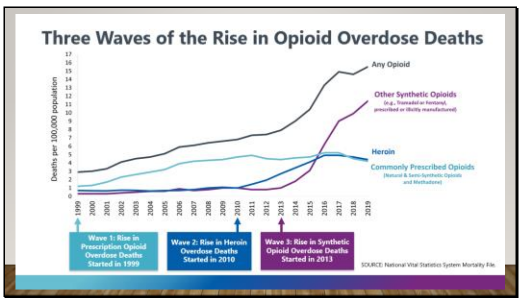

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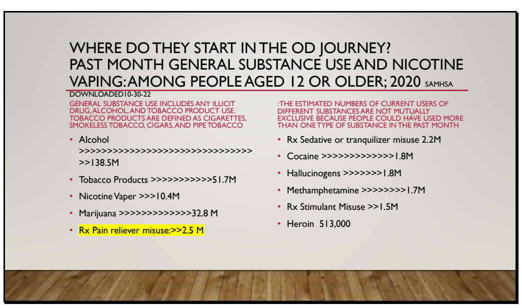

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CDC REPORTS OVER 107,000 OPIOID OD DEATHS IN THE US IN 2021 (15% INCREASE FROM 2020)

- In 2020 in Kentucky, we increased to 1964 OD deaths. 49% increase in one year !!
- 2021 Drug Overdose Report indicates that 2,250 Kentuckians died from drug overdoses in 2021, a 14.5% increase compared with the year prior. -KY.gov
- Click here to find the # of OD deaths in your counties

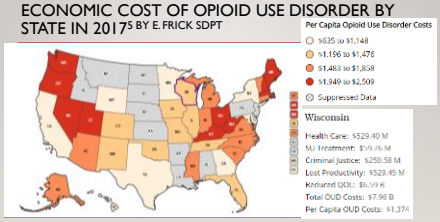
https://www.cdc.gov/nchs/nvss/vsrr/prov-county-drug-overdose.htm

DRUG TYPE	(DEATHS 2021)	(DEATHS 2020)
Synthetic Opioids (fentanyl)	71,238	57,834
Psychostimulants (meth)	32,856	24,576
Cocaine	24,538	19,927
Natural/semi-synthetic (prescription)	13,503	13,722

CDC/National Center for Health Statistics

Slide 11

ECONOMIC COST OF OPIOID USE DISORDER BY STATE IN 2017[5] BY E.FRICK SDPT



1.CDC. CDC NCIPC opioid dashboard. Centers for Disease Control and Prevention. https://wisqars.cdc.gov/opioid/. Accessed November 7, 2022.

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WISCONSIN OPIOID RATED DEATH

HTTPS://WWW.DHS.WISCONSIN.GOV/OPIOIDS/DASHBOARDS.HTM

- Increase of 46.7 % in Opioid death rates from 2018-2020 in WI
- 1427 deaths in 2021 in WI
- As off 8/31/22 there have been 898 opioid related deaths in WI
- WI is 3rd in the nation ?????

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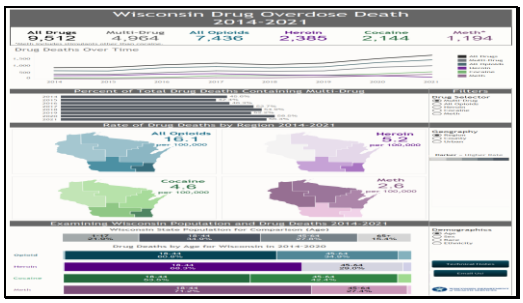

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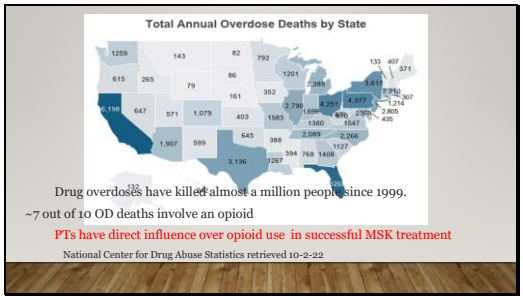

Drug overdoses have killed almost a million people since 1999.

~7 out of 10 OD deaths involve an opioid

PTs have direct influence over opioid use in successful MSK treatment

National Center for Drug Abuse Statistics retrieved 10-2-22

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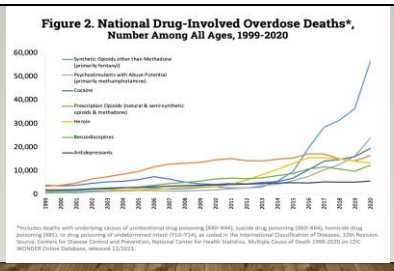

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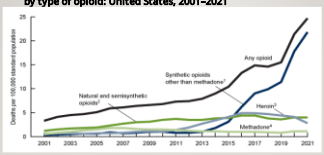
70 to 80 % of all OD deaths involve an Opioid.
~87% of those in SUD report MSK pain.

Age-adjusted rate of drug overdose deaths involving opioids, by type of opioid: United States, 2001–2021



SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality File. Downloaded 1-31-23

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PT PLAYS A PREVENTATIVE PART IN THE TOP 10 CAUSES OF DEATH IN THE US . CDC.GOV REPORTED 2021

WE MUST STEP UP OUR EFFORTS IN PREVENTING OPIOID USE AND ULTIMATELY OD DEATHS

Top 10 causes of death in US in 2020

- 1- Heart Disease:696,962
- 2-Cancer: 602,350
- 3-Covid-19: 350,831
- 4-Accidents (unintentional injuries including those with drug and alcohol use):200,955 2020 : 96000 ODs
- 5-Stroke:160,264
- 6-Chronic lower respiratory diseases:152,657
- 7-Alzheimer's disease:134,242
- 8-Diabetes mellitus:102,188
- 9-Influenza and pneumonia:53,544
- 10-Nephritis, nephrotic syndrome :52,547

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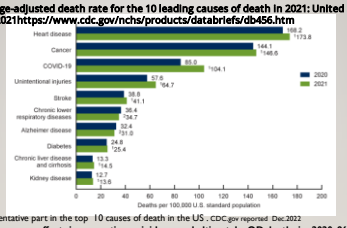
Figure 4. Age-adjusted death rate for the 10 leading causes of death in 2021: United States, 2020 and 2021https://www.cdc.gov/nchs/products/databriefs/db456.htm



PT plays a preventative part in the top 10 causes of death in the US . CDC.gov reported Dec.2022

We must step up our efforts in preventing opioid use and ultimately OD deaths in 2020: 96,000 >>2021 : 107,000 >>>>>>by March of 2022 109,000 awaiting final number from CDC

Slide 19

CONFLUENT'S PT FIRST SAVINGS : RETROSPECTIVE STUDY FINDING @GOCONFLUENT.COM RETRIEVED NOV. 2022

- PT First reduced total cost of care (TCOC) for PT appropriate MSK pain.
- The TCOC for PT First Episodes was $658. The TCOC for PT Later Episodes was $1,129. (This is not just PT costs; it includes all medical claims costs for the episode.) N of 300,000 plus employees and family members with all types of MSK
- Pain meds increased the duration of care and decreased the rate of PT First.
  - When muscle relaxers were prescribed it tripled the average cost of care.
  - When narcotics were prescribed it quadrupled the average cost of care.

Slide 20

CONFLUENT'S PT FIRST SAVINGS : RETROSPECTIVE STUDY FINDING @GOCONFLUENT.COM RETRIEVED NOV. 2022

- PT First had very large effect: 42% savings
- PT First program increased the uptake of PT first by 50% or more
- PT First reduces total cost of care and decreased duration of care episodes
- Education has significant effect on choosing PT first

Slide 21

Where is PT in this mess?

For 2020, the National Institute on Drug Abuse budgeted ~1.3 Billion to address our US drug abuse problem including a substantial increase in funding for Medically Assisted treatment (MAT) in Addiction Recovery (AR).

PT has been left out of the picture in most AR.

Yet MAT: Methadone, Suboxone, and Vivitrol use are growing and significantly subsidized by Medicaid and its MCOs in AR.

During my UK pilot we have found that 50% to 90% of SUD patients in AR begin and\or perpetuate their journey of SUD with an opioid to treat MSD pain that was not being addressed .

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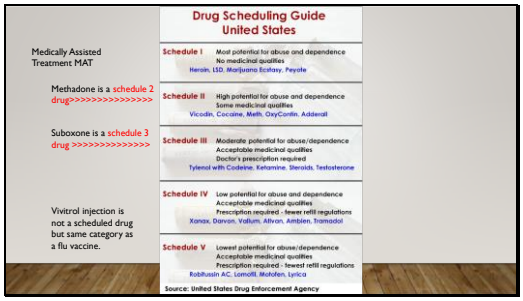

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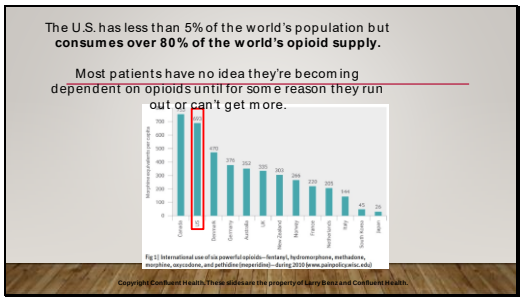

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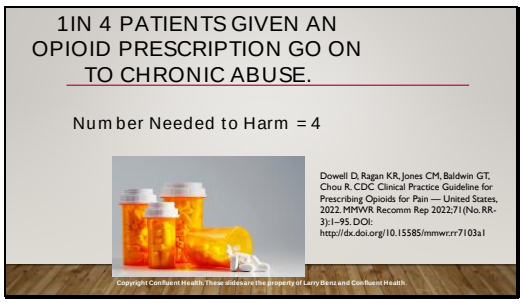

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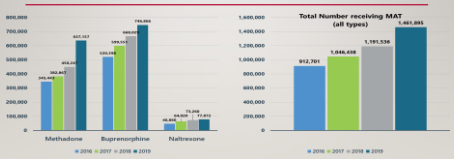
TREATMENT CONCERNS FOR MSK PAIN : NUMBER OF INDIVIDUALS RECEIVING MEDICATION ASSISTED TREATMENT (MAT) NSDUH 2019 / CREATED BY G. MANTIS LCSW,LCADC



Where is PT in this treatment picture???

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NIH \NIDA YOU TUBE VIDEOS ON THE NATURAL REWARD SYSTEM OF THE BRAIN AND HOW DRUG ABUSE EFFECTS IT

- https://youtu.be/DMcmrP-BWGk - natural reward center
- https://youtu.be/TTMNJXzL4Ok - **Meth reward center**
- https://youtu.be/H0vWVLuXTW0 - How Suboxone works
- https://www.youtube.com/watch?v=s27f7JzyZk0&t=47s-How Marijuana affects the brain and its development
- https://youtu.be/NPINCqBHPnE 2 min. neuroscience Opioids
- https://youtu.be/fVdXIB89QOA PBS News Hour:Why the Brain Loves Opioids 2017

- https://youtu.be/V0CdS128-q4 **TED Ex on opioids and MAT Watch 8min and ask Where is PT in this?**

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TEDEd
LESSONSWORTHSHARING

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FOR SOME PATIENTS IT TAKES ONLY 5 DAYS FOR ADDICTION TO OPIOIDS TO BEGIN

- Do you know the CDC guidelines for prescribing ??
- Do you know how to explain those to your patients?
- Do you know how to screen for SUD in your PT eval and treatment?
- How do you interact with referral sources who overprescribe opioids ?
- How do we help patients who want to or need to taper their opioids?
- Centers for Disease Control and Prevention. (2022, November 3). *Patients' frequently asked questions*. https://www.cdc.gov/opioids/patients/faq.html

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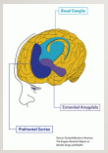
WHAT PARTS OF THE BRAIN ARE AFFECTED BY DRUG MISUSE ?



- *The basal ganglia*: plays an important role in positive forms of motivation, including the pleasurable effects of eating, socializing, exercising and sex, and are also involved in the formation of habits and routines.
- These areas form a key part of the brain's "reward circuit."
- Drugs over-activate this circuit, producing the euphoria of the drug high; but with repeated exposure, the circuit adapts to the presence of the drug, diminishing its sensitivity and making it hard to feel pleasure from anything besides the drug.

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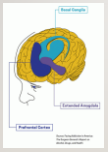
EXTENDED AMYGDALA



- *The extended amygdala* plays a role in stressful feelings like anxiety, irritability, and unease, which characterize withdrawal after the drug high fades and thus motivates the person to seek the drug again.
- This circuit becomes increasingly sensitive with increased drug use. Over time, a person with substance use disorder uses drugs to get temporary relief from this discomfort rather than to get high=DOPE SICK "I thought, I just kept getting the flu…..".

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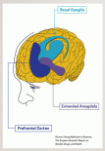
PREFRONTAL CORTEX



- *The prefrontal cortex* powers the ability to think, plan, solve problems, make decisions, and exert self-control over impulses.
- This is also the last part of the brain to mature, making teens most vulnerable.
- Shifting balance between this circuit and the reward and stress circuits of the basal ganglia and extended amygdala make a person with a substance use disorder seek the drug compulsively with reduced impulse control.

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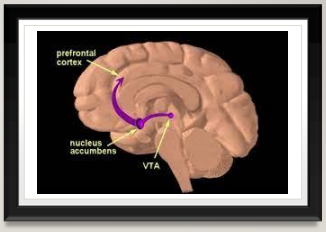
DOPAMINE REWARD PATHWAYS IN THE BRAIN



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MESOLIMBIC REWARD SYSTEM (VTA-NAc)

- The "Control Center" of all we cannot control
- Main "pleasure" neurotransmitter: Dopamine (DA)
- Opioids stimulate the Ventral Tegmental Area (VTA) to release DA to the Nucleus Accumbens (NAc)
  - Results in a sensation of pleasure
- Other areas of the brain create a lasting memory that associates these good feelings with the circumstances in which they occur

(Koob & George 2022)

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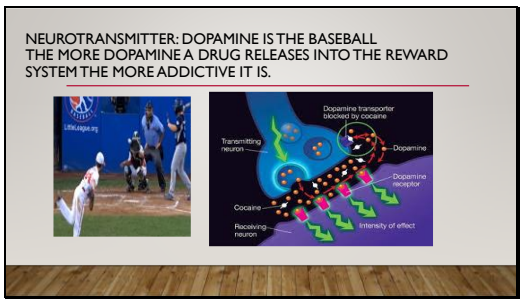

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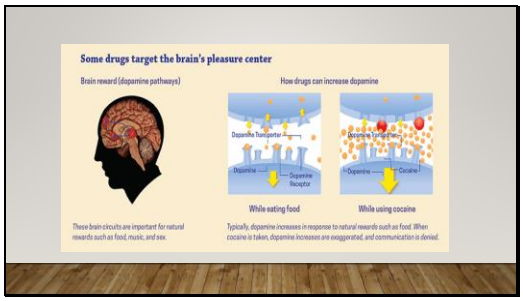

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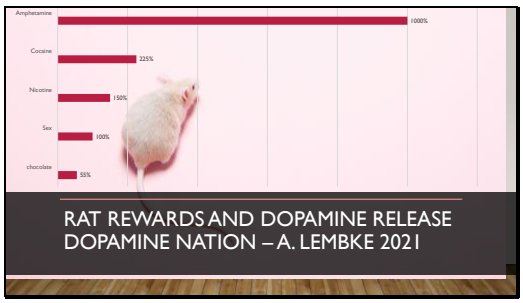

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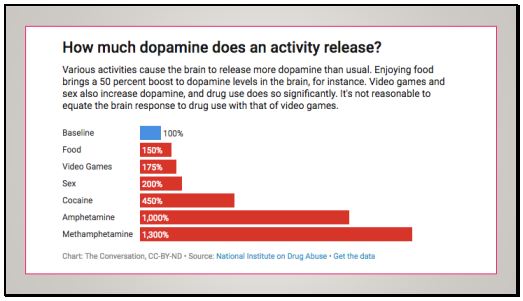

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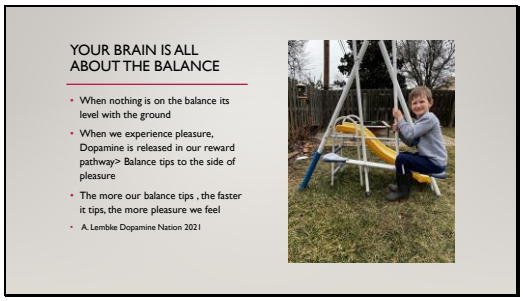

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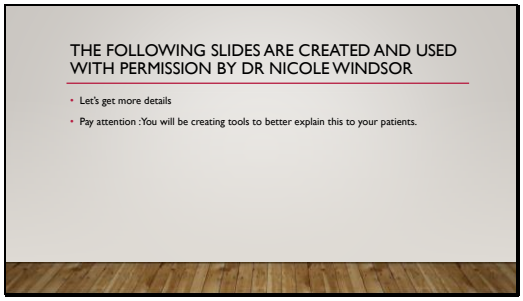

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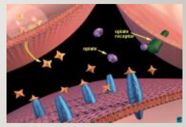
THE OPIOID RECEPTOR

- Endogenous opioids are innate
  - Helps control sensory input processing
- Exogenous opioid medications act on a variety of receptors in the brain
  - **<u>Mu</u>**, Delta, and Kappa
  - Agonists at receptor sites
- When opioids travel to the brain, the chemicals attach to the receptors



(Pathan & Williams 2012)

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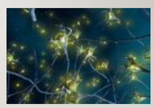
RECEPTOR CHARACTERISTICS

- **Adaptation** of opioid receptors occurs readily after chronic administration,
- Opioid receptors can **re-adapt** if given the chance to do so in the absence of additional opioid administration



(Feldman, et al 1997)

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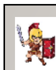
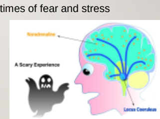


MESOLIMBIC REWARD SYSTEM

- Locus Coeruleus (LC) is involved in physiological responses to stress and panic
  - LC functions as an "on-guard soldier" that keeps the brain more reactive by increasing the responsiveness to stress
  - LC releases Noradrenaline (NA) - a signal during times of fear and stress
- The LC-NA system controls:
  - Arousal / sleep-wake cycle
  - Attention / memory
  - Behavioral flexibility, inhibition and stress
  - Cognitive control / emotions
  - Neuroplasticity



(Kosten & George 2002)

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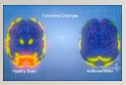
MESOLIMBIC REWARD SYSTEM



- With repeated opioid exposure, LC neurons increase their activity level and release more NA
- When opioids are **present**, their suppressive impact is offset by this heightened activity of NA release
  - Patient may feel "normal"

- When opioids are **absent**, there is no suppression activity
  - The LC neurons release excessive amounts of NA
  - Triggers jitters, anxiety, muscle cramps and diarrhea

(Koob & George 2002)

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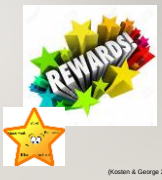
MESOLIMBIC REWARD SYSTEM

- This cycle of stimulation can lead patients to repeatedly seek and utilize drugs
  - Brain cells become *less responsive* to the opioid stimulation due to changes at the receptor site
  - Leads to opioid tolerance
  - More opioid is needed to produce pleasure
  - Ultimately, this changes the receptor



(Koob & George 2002)

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WHEN OPIOIDS AND OTHER HARMFUL SUBSTANCES ARE INCREASED THE MESOLIMBIC SYSTEM MUST BALANCE OUT THE PLEASURE WITH PAIN OF WITHDRAWALS

Frank et al. Systematic Review . Annals of Med. 2017

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WITH REPEATED EXPOSURE TO THE SAME OR SIMILAR PLEASURE STIMULUS, THE INITIAL DEVIATION TO THE SIDE OF PLEASURE GETS WEAKER = "THIS IS A BORING HIGH , I WANT MORE!"

THE AFTER-RESPONSE TO THE SIDE OF PLEASURE GETS STRONGER AND LONGER=NEUROADAPTATION. (LEMBKE MD DOPAMINE NATION 2021)

Slide 47

MOTIVATION AND DRIVE…

- As a patient develops the compulsion of addiction, the motivation and drive for drug taking behavior transitions from:
  - ***Positive reinforcement*** - euphoric effects
  - TO
  - ***Negative reinforcement*** - withdrawal symptoms oblige drug seeking / usage behaviors

Unfortunately, the very same reward system that ensures our survival also rewards drug use*

(Pignatelli & Bonci 2015; Pathan & Williams 2012)

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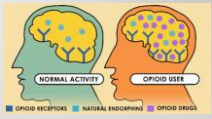
DEPENDENCE TO ADDICTION

- So…how does the brain become addicted?
- Synaptic plasticity is the key
  - Long-term potentiation -- increasing the strength of the synapses
  - Long-term depression -- weakening of the synapses



(Kosten & George 2002)

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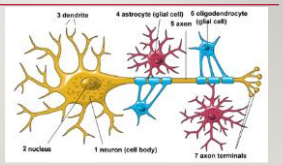
THE BRAIN ENCODES LONG-TERM MEMORIES OF REWARD BY: EXPERIENCE-DEPENDENT PLASTICITY

It does this by changing the shape and size of dopamine producing neurons:
Ex: the dendrites, the branches off the neuron, become longer and more numerous in response to high dopamine rewards= the process experience- dependent plasticity
Dopamine Nation pg 62



NIH+dendrites&tbm=isch&ved=2ahUKEwijmsSNn www.ninds.nih.gov

Slide 50

DEPENDENCE TO ADDICTION

- Neurons of the Mesolimbic Reward System are naturally "set" to release enough DA in the NAc to produce a "normal" level of pleasure
- Abuse of opioids initiates an altered neurobiology of the DA neurons in the VTA & the NA neurons in the LC
  - Release of DA is reduced & decreases pleasure/drug craving
  - NA release is increased leading to withdrawal symptoms
- This abnormal cycle demonstrates the "drug liking" & "drug withdrawal" effect of addiction

(Kosten & George 2002; Langlois & Nugent 2017)

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FOR YOUR PATIENTS ,ADD TO THIS CYCLE MSK PAIN THAT IS CHRONIC AND CAN FEED SUD.

- Physical and psychological **stressors** can also trigger drug craving
  - Chronic pain, stress, anxiety >>>> increase levels of cortisol
  - Opioids increase levels of cortisol
  - Cortisol raises the level of activity in the mesolimbic reward system
  - This increased activity may increase the desire to initiate drug use and/or compulsion to continue drug

(Kosten and George 2002)

Slide 52

FOR YOUR PATIENTS, PT PROVIDES AN INCREDIBLE BRIDGE TO RECOVERY BECAUSE WE KNOW HOW TO COMBINE PNE AND AR SCIENCE FOR POSITIVE>>>>

Neuroplasticity

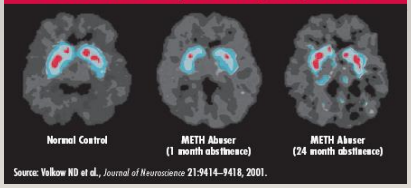
neu·ro·plas·tic·i·ty

noun

Neuro-plasticity is the brain's capacity to change and adapt. It refers to the physiological changes in the brain that happen as the result of modifying old patterns of thinking and behaving.

Slide 53

Recovery of Brain Dopamine Transporters in Chronic Methamphetamine (METH) Abusers



Normal Control | METH Abuser (1 month abstinence) | METH Abuser (24 month abstinence)

Source: Volkow ND et al., *Journal of Neuroscience* 21:9414–9418, 2001.

Slide 54

OLD NEUROPATHWAYS

- Neuropathways = "hiking trails" of the brain
- Chronic opioid use = well-worn paths in the brain
  - It's an unconscious habit to follow these paths
  - Known route
  - Known twists and turns
  - Path of least resistance
  - It hurts (physically) to come off the trail and form a new trail!

Slide 55

NEW NEUROPATHWAYS

- Recovery = **Decision** to change the brain structure
- Recovery = **Creation** of new hiking trails in the brain
  - New habits creates new neuropathways
  - The brain was changed through adaptation into dependence…
  - The brain can be changed through sustained and repeated healthy recovery habits…with intention and attention

- The Challenge of Change
  - Opioid-dependent patients are dealing with the "old forest"
  - Multidisciplinary approach to patient care
  - Obtaining buy-in

Slide 56

FACILITATE NEUROPLASTICITY…

- **Get Up and Move**
  - Essential to physical & mental health
  - Improve our mood, sleep & concentration
  - Reduce anxiety & stress
  - Release & recognize endogenous opioids
  - Create a new habit
  - Create a new neuropathway

Slide 57

RE-TRAIN THE BRAIN…

- **Intention, Attention, Motivation**
  - Recovery starts by holistically treating the patient
  - Intention - identify realistic goals
  - Motivation is a key!
    - Without it - recovery efforts cannot gain a foothold
  - Neuroplasticity is reconstruction!
- **Get honest**
  - Patient buy-in is the first step
- **Recognize triggers**
  - Help the patient be a trigger cop; staying vigilant & aware
- **Help the patient alter their responses to addictive thoughts & patterns**
  - It all begins with one step forward and getting connected to the most effective help

Slide 58

THE CHANGEABLE BRAIN…

- Physical Therapy
  - Education on acute pain vs chronic pain
  - Pain Neuroscience Education (PNE)
  - Movement / exercise programs
  - Encouragement that we can help the patient make changes
  - Education about the role of stress in the pain experience
  - Awareness of the effects of non-pain related stress in the pain experience
- Function, Function!
  - Motion is Lotion
  - Adjust activities to patient's environment
- Expectation Management
  - Recovery is a process

Slide 59

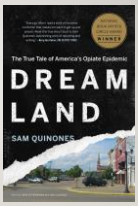
HOW DID THIS HAPPEN? YOU NEED TO KNOW A LITTLE DIRTY HISTORICAL SECRET.

- The US medical system and Big Pharma created ,promoted and sustained an epidemic of treatment of pain with narcotics in the 1990's.

Slide 60

MORE ON THE MESS…..

- Read Dreamland and Dope Sick for further historical details. (Hulu series)
- Check out the Purdue Pharma Law suites.
- Where was the first pill mill in the US??



Slide 61

IN 1996 OUR US MEDICAL SYSTEM CREATED, PROMOTED, AND NOW WE HAVE SUSTAINED AN EPIDEMIC IN PAIN TREATMENT WITH OPIOIDS

OxyContin was launched in 1996 by Purdue Pharmaceutical

All based on poor research and effective marketing

Slide 62

PROMOTED: Fake News

Canadian Family Physician published 2005 article that referred to Porter and Jick as "persuasive." The same author, Ronald Melzack, referred to Porter and Jick as "an extensive study" in 1990 article in Scientific American.

A Time Magazine story from 2001 – "Less Pain, More Gain" – referred to the letter, without naming its authors, as a "landmark study."

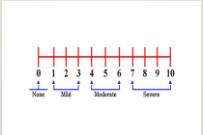
The 2007 textbook Complications in Regional Anesthesia and Pain Medicine referred to Porter and Jick as "a landmark report."

This 2012 slideshow by Physicians for Responsible Opioid Prescribing offers an overview of the epidemic, while noting that Porter and Jick had been cited 693 times by then in Google Scholar.

Slide 63

CREATED

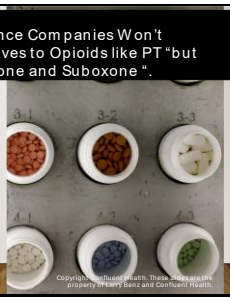
In 1996, the American Pain Society (APS) introduced the phrase "pain as the 5th vital sign."



Slide 64

Sometimes Insurance Companies Won't Cover the Alternatives to Opioids like PT "but will cover Methadone and Suboxone ".

Health insurance companies are increasingly cutting reimbursements for these alternative treatments or not covering them at all.



Business Insider, August 2016.

Slide 65

NEWS FLASH SEPTEMBER 1, 2021

- The Sackler family is paying up to 4.3 Billion dollars to those damaged by their OxyContin industry through their family-owned company Purdue Pharma.
- Over 500,000 people died as a result of using OxyContin and countless other lives were damaged due to addiction to OxyContin use.
- In exchange for this payment ,they received protection now from any future opioid court cases and admitted no wrongdoing.
- **Guess who owns the patent for Buprenorphrine?**

Slide 66

United States Patent	**9,861,628**
Oksche , et al.	**January 9, 2018**

Abstract

The present invention relates to oral pharmaceutical dosage forms comprising buprenorphine with the dosage form releasing buprenorphine instantly upon oral, preferably sublingual, application of the dosage form. The present invention also relates to the use of such dosage forms for treating pain in a human or animal or for drug substitution therapy in drug-dependent human subjects.

Inventors:

Oksche; Alexander (Limburg, **DE**), **Heath; William** (Cambridge, **GB**), **Holden; Timothy** (Cambridge, **GB**), **Prater; Derek A.** (Cambridge, **GB**), **Sackler; Richard S.** (Greenwich, CT), **Walden; Malcolm** (Cambridge, **GB**)

Family ID: **37685660**

Appl. No.: **15/135,794**

Filed: **April 22, 2016**

Slide 67

EFFECTS ON THE YOU AS A PT TODAY

- In practice daily we are digging out of the mess of MD and mid levels prescribing narcotics for the past 20 yrs for acute, subacute and chronic pain that is now shown to not even help the pain but may be causing hyperalgesia instead.
- Narcotically Naïve People are drug dependent and, in some cases, addicted or somewhere on the continuum and don't even realize it until they have withdrawal symptoms when narcotics are no longer prescribed based on new CDC guidelines.
- Primary care providers are desperate in some cases to explain pain to their MSK pts. and wean them off narcotics.
- The good news is they need PT more then ever…….so you better understand addiction and know your PNE.

Slide 68

HOW PHYSICAL THERAPISTS CAN EFFECTIVELY TREAT MSD PATIENTS IN ADDICTION

UK ELECTIVE LECTURE I

PART ONE: BRIEF OVERVIEW OF THE NEUROSCIENCE OF ADDICTION AND OUR DRUG EPIDEMIC

PART TWO : REVIEW OF THE NEUROSCIENCE OF PAIN AND HOW CHRONIC PAIN AND ADDICTION CAN INTERACT

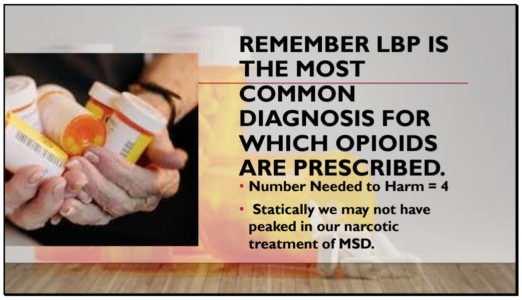
HOLLY JOHNSON PT, DPT, CERT. MDT

Slide 69

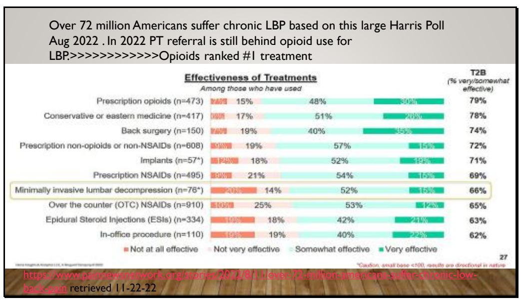
OBJECTIVES PART 2: REVIEW THE NEUROSCIENCE OF PAIN

- After completing this lecture participants will have a basic understanding of :
  1- The definition of pain, how and why it is produced in the brain.
  2- The 3 stages of pain for the MSD patient relating to addiction
  3- Why pain neuroscience education (PNE) is crucial in treatment of pts. with chronic MSD and SUD.

Slide 70



Slide 71


Over 72 million Americans suffer chronic LBP based on this large Harris Poll Aug 2022 . In 2022 PT referral is still behind opioid use for LBP.>>>>>>>>>>>>Opioids ranked #1 treatment
Effectiveness of Treatments
Among those who have used
T2B (% very/somewhat effective)
Prescription opioids (n=473) 15% 48% 79%
Conservative or eastern medicine (n=417) 17% 51% 78%
Back surgery (n=150) 19% 40% 74%
Prescription non-opioids or non-NSAIDs (n=608) 19% 57% 72%
Implants (n=57*) 18% 52% 71%
Prescription NSAIDs (n=495) 21% 54% 69%
Minimally invasive lumbar decompression (n=76*) 14% 52% 66%
Over the counter (OTC) NSAIDs (n=910) 25% 53% 65%
Epidural Steroid Injections (ESIs) (n=334) 18% 42% 63%
In-office procedure (n=110) 19% 40% 62%
Not at all effective / Not very effective / Somewhat effective / Very effective
27
https://www.painnewsnetwork.org/stories/2022/8/11/over-72-million-americans-suffer-chronic-low-back-pain retrieved 11-22-22

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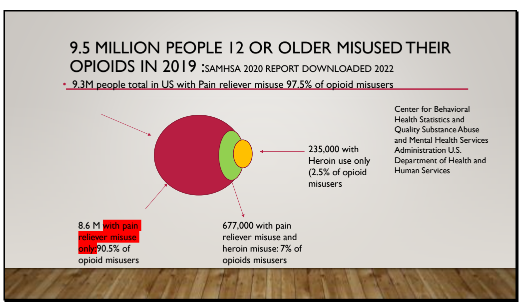
9.5 MILLION PEOPLE 12 OR OLDER MISUSED THEIR OPIOIDS IN 2019 :SAMHSA 2020 REPORT DOWNLOADED 2022
• 9.3M people total in US with Pain reliever misuse 97.5% of opioid misusers
Center for Behavioral Health Statistics and Quality Substance Abuse and Mental Health Services Administration U.S. Department of Health and Human Services
235,000 with Heroin use only (2.5% of opioid misusers
8.6 M with pain reliever misuse only 90.5% of opioid misusers
677,000 with pain reliever misuse and heroin misuse: 7% of opioids misusers

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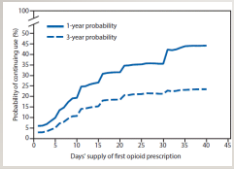
CHRONIC PAIN AND OPIOID USE
APTA WI TOOLKIT SLIDE BY E.FRICK SDPT



- In 2019[1]
  - 20.4% of US adults had chronic pain
  - 22.1% of those with chronic pain used prescription opioids over the course of the past 3 months
- Dependence can begin in as short 5 days of using opioids.[2]

1. Centers for Disease Control and Prevention. (2021, November 10). *U.S. opioid dispensing rate maps*. https://www.cdc.gov/drugoverdose/rxrate-maps/index.html

2. Centers for Disease Control and Prevention. (2022, November 3). *Patients' frequently asked questions*. https://www.cdc.gov/opioids/patients/faq.html

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SUBSTANCE ABUSE DISORDER AND CHRONIC PAIN[1,2,3]
APTA WI TOOLKIT SLIDE BY S.MAJERUS SDPT

- Up to 87% of patients with Substance Use Disorder report presence of chronic pain
- Pain during abstinence increases risk of relapse
  - Presence of pain increases OD incidence pre or post treatment
- Individuals with pain are more likely to misuse substances of any kind

Pain must be addressed in the treatment of substance abuse disorder

Slide 75

Substance Abuse Disorder and Chronic Pain[1,2,3] References APTA WI Toolkit slide by S.Majerus SDPT

1. Witkiewitz, & Vowles, K. E. (2018). Alcohol and Opioid Use, Co-Use, and Chronic Pain in the Context of the Opioid Epidemic: A Critical Review. *Alcoholism, Clinical and Experimental Research*, *42*(3), 478–488. https://doi.org/10.1111/acer.13594
2. Lorente, JD, Cuitavi, J, Campos-Jurado, Y, Hipólito, L. Pain-induced alterations in the dynorphinergic system within the mesocorticolimbic pathway: Implication for alcohol addiction. *J Neurosci Res*. 2022; 100: 165– 182. https://doi-org.cuw.ezproxy.switchinc.org/10.1002/jnr.24703
3. Fernandez AC, Bush C, Bonar EE, Blow FC, Walton MA, Bohnert ASB. Alcohol and Drug Overdose and the Influence of Pain Conditions in an Addiction Treatment Sample. *J Addict Med*. 2019;13(1):61-68. doi:10.1097/ADM.0000000000000451

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What causes this connection between SUD and Chronic pain ?

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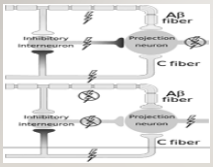
Gate Control Theory of Pain



Specialized nerve endings "nociceptors" whose response was modulated in the dorsal horn
• Information from Aβ and C fiber converge on II and PN
• Under "normal" conditions Aβ and C are neutralized and no pain is experienced *(top)*
• When nociceptor and C fiber activity is present the II is inactivated thus allowing transmission up the ST tract *(bottom)*
Melzack and Wall 1965
Slide by Dr C.Wassinger ETSU

C.Wassinger PT PHD slide

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DEFINITION OF PAIN

- Pain is an unpleasant sensory *and* emotional experience that is associated with actual ***or potential tissue*** damage or described in such terms.

International Association for the Study of Pain

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NEW DEFINITION OF PAIN BY LOMIER MOSLEY

- Pain is produced by the brain after a person's neural signature has been activated and concluded the body is in danger and action is required.
  - Mosley GL. Reconceptualising pain according to modern pain sciences. Phyical Therapy Reviews.2007;12:169-178.
  - Moseley GL.A pain neuromatrix approach to patients with chronic pain. Man Ther. Aug 2003;8(3):130-140

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PAIN IS 100% PRODUCED BY THE BRAIN

:Based on the perception of threat.

Mosley, GL, A pain neuromatrix approach to patients with chronic pain.

Man Ther, 2003.8(3):p.130-40.

Melzack, R., Pain and the neuromatrix in the brain Journal of Dental Education, 2001. 65:p 1378-1382

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PAIN DEFINTIONS :

Nociceptive
- Pain that arises from actual or threatened damage to nonneural tissue and is due to the activation of nociceptors
- *Classically mechanical/chemical associated pain experience*

Neuropathic
- Pain caused by a lesion or disease of the somatosensory nervous system
- *Classically nerve tissue injury identifiable with diagnostic testing*

Nociplastic – *IASP Official as of February 5th, 2018!*
- Pain that arises from altered nociception despite no clear evidence of actual or threatened tissue damage causing the activation of peripheral nociceptors or evidence for disease or lesion of the somatosensory system causing the pain

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PAIN TIMEFRAMES DEFINED

Acute Pain:

- Pain that occurs as direct results of tissue damage or potential tissue damage and is a symptom in the 1–4-week period

Subacute Pain: 4–12-week period

Chronic Pain:

- Pain that outlasts normal tissue healing time 3, 6, or 12 months
- Impairments are greater that would be expected from the physical findings or injury
- Pain that occurs in the absence of identifiable tissue damage
- A (pain) problem for which previous treatment has been unsuccessful

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FOR CHRONIC LOW BACK PAIN PNE: NUMBER NEEDED TO TREAT (NNT) WITH PNE AND TO IMPROVE PAIN AND FUNCTION

- Best combo is PNE Plus PT
- For Function NNT 2:1
- For Pain NNT 3:1

- Mosley L. Combined physiotherapy and education efficacious for chronic low back pain. Aust J Physiother. 2002; 48(4):297-302
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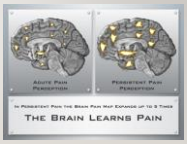
THE BRAIN…AN ACTIVE CONTRIBUTOR

- In acute LBP patients:
  - Spontaneous episodes of pain were initially processed in brain regions responsive to nociception
- In **chronic** LBP patients:
  - Spontaneous episodes of chronic pain elicited increased brain activity in the ***medial prefrontal cortex***
- Processing geography changes with transition to chronic pain



Hannibal, et al 2014; Vachon-Presseau 2016

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THE BRAIN…CHANGES WITH CHRONIC PAIN

- Studies have found a significant correlation between brain gray matter changes and duration of pain
  - Chronic pain = decreases in gray matter
- Location of gray matter changes vary depending upon the origin of pain, type of pain, duration of pain
  - Possibly the result of experience-dependent neuroplasticity
- Brain changes recede when the pain is resolved

May, A 2007; Rodriguez-Raecke, et al 2009; Kang, et al 2017

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CORTISOL DYSFUNCTION & CHRONIC PAIN

- CNS and PNS are inappropriately adapted
- Cortisol secretion in response to chronic pain:
  - **Magnifies** the pain experience
  - Creates a **fear-based memory** of pain
  - Conditions a **sensitized** physiologic stress response
  - Can **impede** recovery
- Chronic *stress response*, *cortisol dysfunction* and *widespread inflammation* may initiate, exacerbate or prolong the **pain experience**, **impair healing** and perpetuate **chronic disability**

Hannibal, et al 2014; Vachon-Presseau 2018

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CHRONIC PAIN & STRESS HORMONES

- This combination creates a maladaptive pain/stress response
- The neurotoxic effect of stress hormones induces
  - Neuroplasticity
  - Decreased neurogenesis
    - …in limbic regions that contribute to depressive symptoms
- The physical hamster in the wheel…

Vachon-Presseau, 2018

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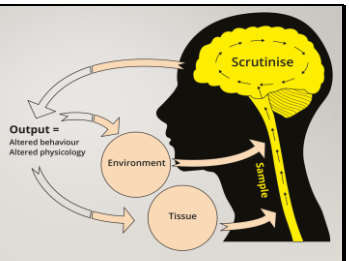
FEAR- AVOIDANCE MODEL BY VLAEYEN, AND LINTON 2000-2016

Slide 89

Explain pain to your patients with the conceptual model of the Mature Organism Model (MOM)

L .Gifford. Pain, the tissues and the nervous system: a conceptual Model Physiotherapy 1998 ,vol 84 , no 1



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WHY DOES THE TIME FRAME OF PAIN MAKE A DIFFERENCE IN TREATING MSD PTS IN ADDICTION

- 1- In the acute episode of MSD with early PT it is much easier to explain pain and give great EB PT and educate the pt. on why opioids will not help their pain and puts them at risk for SUD .
- 2- In sub- acute episodes of MSD pts are generally even more ready to know what is wrong with them and how to fix the problem but with higher levels of frustration exhibited. PNE plus PT will benefit them as an alternative to opioids and you can help them taper off these drugs, but it may take a longer time frame and use of various modalities with more varied methods of PNE.
- 3-In the chronic pain episode of care of MSD, a late start in PT is still the best option for the pt. but now it will require longer PNE , more in depth PNE and a slower tapering process in most cases with greater deconditioning issues ,possible central sensitization , possible hyperalgesia and may even require counseling or a substance abuse recovery program.

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THE TAKE-HOME MESSAGE

- Collaboration is the Key: MD, DO, APRN,PAs, Dentists, Physical Therapy, Behavioral Health and now early intervention in PT in AR centers!!
- Re-training the brain is doable, and it works!
- Change takes time – recovery can be slow
- Back to the basics
- Functional Outcome Measures will be different from the norm
- We need new PT functional measures in Recovery. (Recovery Exercise Program Rep Index)

(Kolsten & Goodine 2020)

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GO TO JOHNSONPTCONSULTING.COM FOR PT SELF CARE.

- Take these tests: Finding Your ACE score, CSI, REP index, Stages of Change Questionnaire (in regard to your bad habit) , and the Beck or PTSD screen if needed. Make yourself a spread sheet and place your scores in it. Also, if you have pain fill out a body chart.
- Do the Revised Neurophysiology of Pain Questionnaire to see if you are up on your PNE.
- Be open to the fact that you may have a habit that needs to change in the areas of stress management ,work- life balance, eating, sleep hygiene, exercise etc.
- Retest yourself after a month of changes and see how you do. Get help for you. You are worth it.

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Slide 1

Lecture 2:How Physical Therapists can Effectively treat patients with trauma informed care for musculoskeletal disease (MSD)and Substance use Disorder (SUD)

Part one: Importance of a comprehensive Trauma informed PT evaluation and POC

Part two: What Effects do Depression, PTSD, ACES and other forms of Abuse have on patients with MSK pain in SUD and how do we screen for them?

Slide 2

Part one Objectives

Following this lecture patients will be able to discuss :

- Components of trauma informed PT evaluation as it relates to MSD, SUD and CS
- APTA SUD related questions
- Confirm or deny CS and SUD

Slide 3

CDC REPORTS OVER 107,000 OPIOID OD DEATHS IN THE US IN 2021 (15% INCREASE FROM 2020)

Content source: CDC/National Center for Health Statistics

Increase of 46.7 % in Opioid death rates from 2018-2020 in WI

1427 deaths in 2021 in WI

As off 8/31/22 there have been 898 opioid related deaths in WI https://www.dhs.wisconsin.gov/opioids/dashboards.htm

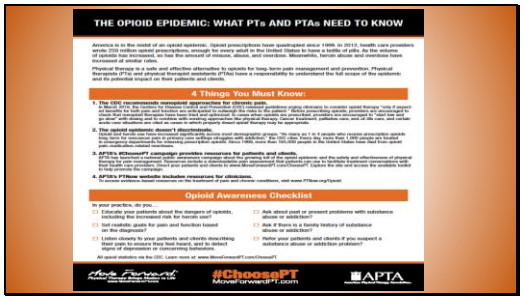
DRUG TYPE	(DEATHS 2021)	(DEATHS 2020)
Synthetic Opioids (fentanyl)	71,238	57,834
Psychostimulants (meth)	32,856	24,576
Cocaine	24,538	19,927
Natural/semi-synthetic (prescription)	13,503	13,722

Slide 4

PT Evaluation\ systems review

- History \PMH: listen for ACEs and signs of PTSD (screen as needed)
- Mental illness Hx
- Family Hx including SUD issues (APTA guidelines)
- Meds use now and historically
- Functional Outcomes per area affected
- Fear Avoidance Questionnaire ?
- Rule out SUD and CS on every PT evaluation and over next few visits. How?

Slide 5



Slide 6

Systems Review

Cardiopulmonary :BP , HR, RR, O2 level if COPD present

Integumentary: Visual scan for integrity, abnormalities, rashes, erythema, palpate for : pitting edema

Neurologic: Orientation x 4, myotomes, dermatomes, DTRs, UMN screen: Hoffmann's screen, myoclonus, Plantar response, ULT, SLR, Slump test, balance screen , 2- point discrimination and other CS tests as needed.

If Head trauma suspected use Cranial nerve screen as needed

May see parathesias from the multiple IV needles sticks and "misses"

Musculoskeletal: ROM(AROM and PROM) , Goniometric measurements in functional positions, MMT from end rom, End feel assessments (overpressure and pain provocation) , palpation , and postural assessment.

Slide 7

Intake forms I use for AR\ MSD patients

- **Med list**
- **Signed consent to treat, participate in research, and TH**
- **ACE**
- **Body Chart**

After PT eval same day

- **Rep Index**
- **CSI**
- **Functional outcome if time allows**

Slide 8

Body chart Drawing

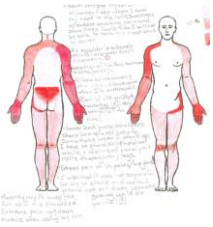
Watch for non dermatomal pain patterns

Excessive writing outside the lines

Full body part shading,

Extra arrows and exclamation points.

BE SURE YOU KNOW YOUR DERMATOMES A AND REFERRAL PATTERNS AND VARIATIONS. BE CLINICALLY EXCELLENT!



Slide 9

Central Sensitization Inventory CSI levels of CS Validated in 2011 Research

- **Subclinical: 0 to 29**
- **Mild: 30 to 39**
- **Moderate: 40 to 49**
- **Severe: 50 to 59**
- **Extreme: 60 to 100**
- Majority of L- house PT patients scored 40 or > at initial PT eval (~82%) and scored ~75% scored at mild or subclinical at 30- day PT reeval.

Slide 10

Why Should I and how do I rule out Central Sensitization

- It is common for chronic pain patients to exhibit some level of CS.
- A large percentage of patients abuse opioids with long term use aided by their prescribing provider for CSP that is unnoticed, undiagnosed and therefore untreated.
- CS can reinforce substance abuse disorder and lead to addiction if not treated appropriately in PT.

Slide 11

Pain Mechanisms: summary from A.Louw Pain neuroscience education teaching people about pain 2nd edition

Nociceptive Pain

- Nociceptive symptom and exam clusters indicate pts. that have these features are 100 times more likely to accurately predict a clinical classification of, nociceptive pain in patients classified with this type of pain :
- Proportionate pain
- Aggravating and easing factors
- Pain that is intermittent sharp, dull ache or throb at rest
- No night pain, dysesthesia, burning, shooting or electric pain

Smart KM-2012 Part 3of 3

Slide 12

Peripheral Neurogenic:

Peripheral neurogenic symptoms and sign clusters identified indicating pts. are 150 times more likely to have peripheral neurogenic pain states:

- If pain in the dermatomal or cutaneous distribution
- Positive neurodynamic tests and palpation (mechanical tests)
- History or nerve pathology or compromise

Smart KM 2012 Part 2 of 3

Slide 13

Central Sensitization

Central sensitization symptoms and sign clusters identified indicating pts. are 486 times more likely to have a central sensitization pain state:

- Disproportionate pain
- Disproportionate aggravating and easing factors
- Diffuse palpation tenderness
- Psychosocial issues, i.e., fear-avoidance and pain catastrophization

Smart KM 2012 Part 1 of 3

Slide 14

Central Sensitization: Objective Clinical Findings: the big 3

1-Positive findings of hyperalgesia, and / or allodynia within pain distributions.

2-Disproportionate, inconsistent, non-mechanical / non anatomical pattern of pain provocation in response to movement and mechanical testing.

3-Central Sensitization Inventory Score ≥ 40.

(Nijs, 2016), (Smart, 2012)

Slide 15

Definitions to consider with palpation

- Central Sensitization : Increased responsiveness of nociceptive neurons in the central nervous system to their normal or subthreshold afferent input= overly sensitive alarm system that needs to be reset with PT.
- Allodynia : pain due to a stimulus that does not normally provoke pain.

  Example : extreme pain to light touch palp. of the shoulder in a low back pt.
- Hyperalgesia: Increased pain from a stimulus that normally provokes pain.

  Example extreme pain reaction to a light L5-S1 palpation

Slide 16

Central Sensitization: Objective Clinical Findings

Study by Smart et. al. indicated that if the following four are present CSP can be ruled in (97.7% specificity), and not present CS can be ruled out (91.8% sensitivity)

(+) Findings of Pain disproportionate to injury

(+) Disproportionate aggravating / easing factors

(+) Presence of Psychological symptoms

(+) Pain with diffuse palpation

(Nijs, 2010)

Slide 17

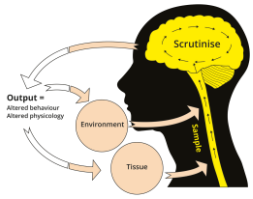
Central Sensitization: Treatment Why does it need to be different from traditional PT?

Treatment strategies that aim at targeting local structures within the painful anatomical region are typically of little value in patients with predominate CSP.

Treatment should have a top-down approach targeting brain and CNS with PNE and AR science.

(Nijs, 2016)

Slide 18



The Mature Organism Model –by Gifford

Louis Gifford the conceptual Model 1998

Slide 19

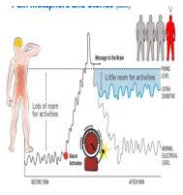
What is Central Sensitization?

- Central sensitization is a condition of the nervous system that is associated with the development and maintenance of chronic pain. When central sensitization occurs, the nervous system goes through a process called *wind-up* and gets regulated in a persistent state of high reactivity. This persistent, or regulated, state of reactivity lowers the threshold for what causes pain and subsequently comes to maintain pain even after the initial injury might have healed.

(Institute for Chronic Pain)

- **1-4 people will develop chronic pain, and many will develop CS.**
- **They may seek opioids to treat MSP, and this only exacerbate the pain because CS is undetected.**

A.Louw Explain Pain



Slide 20

Some ways to Screen for CS

- PMH
- PT reports about when and how pain occurs: with temperature change, with stress etc.
- Palpation: Hyperalgesia, Allodynia , 2 pt. discrimination , temperature , pressure
- Central Sensitization Inventory
- Body Chart (my first tip-off)

Slide 21

Central Sensitization: Typical Medical Associations (Several covered on CSI part A)

- **Chronic Low back pain.**
- **Chronic Whiplash Associated Disorders (WAD).**
- **Acute or Subacute WAD.**
- **TMJ dysfunction.**
- **Myofascial Pain Syndromes.**
- **OA**
- **RA**
- **Fibromyalgia**
- **Chronic Fatigue syndrome**
- **Chronic HA's**
- **Irritable Bowel Syndrome**

(Nijs, 2010)

Slide 22

Central Sensitization: Patient signs / symptoms: Most found on CSI

- Hypersensitivity to Bright light.
- Hypersensitivity to touch.
- Hypersensitivity to noise.
- Hypersensitivity to mechanical pressure.
- Hypersensitivity to temperature (high and low).
- Disproportionate, non mechanical, unpredictable patterns of pain provocation in response to multiple, non-specific aggravating and easing factors.
- Pain that has persisted beyond normal tissue healing and recovery time.

(Nijs, 2010), (Smart, 2012)

Slide 23

Central Sensitization: Patient signs / symptoms

- Pain that is disproportionate to the nature and extent of injury or pathology.
- Widespread, non-anatomical distribution of pain.
- Hx of failed interventions (medical, surgical, and therapeutic).
- Reports of spontaneous pain and / or intense pain.
- Pain associated with high levels of functional disability.
- Pain that is constant and unremitting.
- Night pain, disturbed sleep, non restful sleep.

(Nijs, 2010), (Smart, 2012)

Slide 24

Central Sensitization: Patient signs / symptoms

- Pain associated with other dysesthesias: altered sensations such as crawling, tingling burning, coldness, etc..
- Pain that is easily provoked and takes a long time to settle down.

(Smart, 2012)

Slide 25

Central Sensitization: Objective Clinical Findings

Positive Neurodynamic / Neural tension Provocation Tests

(Nijs, 2010)

Slide 26

Central Sensitization: Patient signs / symptoms

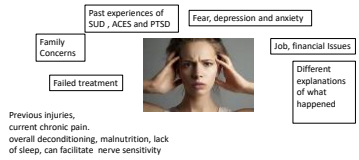
CSP has a strong association with maladaptive psychosocial factors.

- **Catastrophization**
- **High fear-avoidance levels**
- **Altered family / work / social life**
- **PTSD**
- **Abuse (high ACEs scores)**
- **Poor self efficacy**
- **Negative emotions**

(Smart, 2012)

Slide 27

Why did my nerves stay sensitive? This didn't happen to my neighbor.



Slide 28

Make the unknowns known: Your pts. want to know 4 + 1=5 things From your PT evaluation

Louis Gifford

- 1. What's wrong with me?
- 2. How long will it take for me to get better?
- 3. Is there anything I can do to help myself?
- 4. Is there anything you can do to help me?
- *5. How much will it cost ?(Adriaan Louw)*

Slide 29

When should I suspect Substance abuse disorder ? Red Flags

- **No decrease or tapering in narcotic pain meds in 2 months or longer or continual increases.**
- **Pt requests you or family get more pain meds for them.**
- **Pt is impaired or demonstrates withdrawal symptoms in PT or in public especially when their opioid prescription runs out.**
- **Pt is blaming anyone else for his\her pain and bad\risky behavior to obtain the substance to drug it.**
- **Pt takes no responsibility for his\ her care or recovery.**
- **A family member or close friend reports to you a problem of risky behavior to get drugs or other medicating substances.**

Slide 30

Modifications to addiction diagnosis in DSM-5 for Substance abuse disorder (SUD)

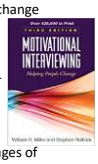
Mild SUD =2-3 symptoms, Moderate SUD= 4-5 , Severe = 6-11

- Tolerance
- Withdrawal
- Taken more /longer than required
- Desire/unsuccessful efforts to quit use
- Great deal of time taken by activities involved with use
- Use despite knowledge of problems associated with use
- Important activities given up because of use
- Recurrent use resulting in a failure to fulfill important role obligations
- Recurrent use resulting in physically hazardous behavior (e.g.driving)
- Continued use despite recurrent social problems associated with use
- Craving for the substance

Slide 31

Do you know how to apply the levels of change in Addiction\SUD treatment to your patients ?

- 1-Precompletive:No recognition of need for or interest in a change
- 2-Contemplative:Thinking about changing
- 3-Preparation: Preparing for change
- 4-Action:Adopting new habits
- 5-Maintenance: Ongoing practice of new, healthier behavior
- 6-Relapse: added later: Resumption of old behaviors



By Prochaska and DiClemente earliest work in 1978

- Motivational interviewing helps pts. move through these stages of changes and combos well with good PNE

Integrating Motivational Interviewing in Pain Neuroscience Education for People With Chronic Pain: A Practical Guide for Clinicians 2020 Physical Therapy

Slide 32

Sample Cases to ID red Flags

Construction worker

- Treated pt. for DDD of low back and he admitted getting off OxyContin 10 yrs. ago in PT
- This episode he said he just could not and knew he was addicted but not ready to do anything about it.
- In denial and felt he could continue and was willing to discuss with his wife.....

Church organist

- ORIF elbow fracture taking Lortab for 3 months due to pain.
- After 1 month of PT had the conversation about tapering.
- Pt asked if she could be addicted?
- PT helped her set up tapering schedule and reviewed withdrawals symptoms to prepare her.

Slide 33

Let's Briefly review some Opioid Induced Hyperalgesia findings

- Always consider this in the evaluation of a patient who has taken opioids daily for 1 month or longer at risk for OIH (Chou 2005) or who has a history of taking opioids intermittently for many years legally or illegally.
- They report the pain keeps getting worse and spreading to other parts of their bodies as they take higher levels of opioids with no additional injury noted.
- Seen in AR with long term Suboxone or Methadone use in some pts. in SUD\Chronic pain.
- Those taking Suboxone with SUD\MSK pain had higher \less healthy CSI and REP scored day one of PT compared to those patients taking a Vivitrol injection.(preliminary UK\ARC \SUD\PT research findings 2022)

Slide 34

Opioid – Induced Hyperalgesia: APTA –KY Toolkit

C Thorner SDPT

- OIH is nociceptive sensitization following acute or chronic exposure to opioids.
- Worsening pain despite current use of opioids and lack of new Dx.
- Symptoms potentially relieved with decreased opioid dosage.

Wilson et al 2021

Slide 35

OIH: When Opioids are increased the pain increases and even spreads

When opioids are tapered the withdrawals kick in and then taper off and the pain goes down as/ or after the system rebalances.(Lembke MD Dopamine Nation 2021)

Frank et al, Systematic Review , Annals of Med. 2017

Slide 36

Differential Diagnosis from APTA WI tool kit G.Hoerchner SDPT[3]

- Withdrawal
  - Onset of symptoms due to abrupt discontinuation or decrease in opioid use
  - Requiring a specific dosage of an opioid to avoid symptoms
- Tolerance
  - Onset of symptoms due to decreased effectiveness of an opioid
  - Requiring an increased dosage of an opioid to relieve symptoms
- Opioid-Induced Hyperalgesia
  - Progression of symptoms due to increased sensitivity from opioid usage
  - Continued use and increased dosages of an opioid do not relieve symptoms

Slide 37

A Systemic Mistake[2,4]

- Opioids have created a vicious cycle
  - Advertised by pharmaceutical companies as the best solution to pain relief
  - Prescribed by physicians despite side-effects and risk of substance use disorder
  - Consumed by patients as it is the easiest intervention to relieve pain
- Common Misdiagnoses of OIH
  - Tolerance
    - Relief vs Worsening
  - Progression of MSD
    - Original source vs New mechanism
- Solutions
  - Understanding differential diagnoses and patient response to opioids
  - Understanding the pathophysiology and importance of therapy

Slide 38

Pathophysiology[2,3,4,5]

- Complex mechanisms that induce prolonged adaptations
  - Within the Central Nervous System and Peripheral Nervous System
    - (CNS) and (PNS)
  - Exact mechanism not fully understood
  - Multiple systems/pathways are implicated
- Adaptations
  - Increase in nociceptive receptors
    - More receptors available to receive opioid based signals
  - Increase in nociceptive receptor sensitivity
    - Smaller amount of opioid based signals required to reach threshold

Slide 39

1. Lee M, Silverman SM, Hansen H, Patel VB, Manchikanti L. A comprehensive review of opioid-induced hyperalgesia. *Pain Physician*. 2011;14(2):145-161.
2. Wilson SH, Hellman KM, James D, Adler AC, Chandrakantan A. Mechanisms, diagnosis, prevention and management of perioperative opioid-induced hyperalgesia. *Pain Manag*. 2021;11(4):405-417. doi:10.2217/pmt-2020-0105
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4. Colvin LA, Bull F, Hales TG. Perioperative opioid analgesia-when is enough too much? A review of opioid-induced tolerance and hyperalgesia. *Lancet*. 2019;393(10180):1558-1568. doi:10.1016/S0140-6736(19)30430-1
5. Lima LV, Abner TSS, Sluka KA. Does exercise increase or decrease pain? Central mechanisms underlying these two phenomena. *J Physiol*. 2017;595(13):4141-4150. doi:10.1113/JP273355

Slide 40

A Comprehensive Review of Opioid-Induced Hyperalgesia (OIH) by Martin Et al 2011

Defines Opioid-induced hyperalgesia (OIH) : as a state of nociceptive sensitization caused by exposure to opioids. The condition is characterized by a paradoxical response whereby a patient receiving opioids for the treatment of pain could become more sensitive to certain painful stimuli.

..."found in the context of unexplained pain reports or diffuse allodynia unassociated with the original pain, and increased levels of pain with increasing dosages....."

Treatment : PT with PNE with opioid taper and expect withdrawal symptoms

Slide 41

A Comprehensive Review of Opioid-Induced Hyperalgesia (OIH) by Martin Et al 2011

- OIH typically produces diffuse pain, less defined in quality, which extends to other areas of distribution from preexisting pain. Further, OIH mimics opioid withdrawal including pain, since the neurobiology of both is similar. (Mao 1995)

Slide 42

Comprehensive Review of Opioid-Induced Hyperalgesia (OIH) by Martin Et al 2011

- Further, OIH has been demonstrated clinically by inducing changes in pain threshold, tolerability, and distribution pattern in opioid-maintained former addicts . (Compton 2001)
- A substantial number of my patients with SUD, CS and MSK pain don't have full resolution of MSK pain until they have fully tapered Suboxone.

Slide 43

A Comprehensive Review of Opioid-Induced Hyperalgesia (OIH) by Martin Et al 2011

- Many laboratories have reported mechanical allodynia and/or thermal hyperalgesia after the acute administration of opioids like heroin and fentanyl ,the chronic administration of intrathecal morphine, the local peripheral administration of morphine, or the chronic administration of systematic opioids of several types (39-41).
- Be aware these are common drug use patterns in AR.
- These pts must be very careful with opioid use in surgical and dental procedures
- This is imperative for relapse prevention (see toolkit lessons)

Slide 44

PT need to be aware of the symptom changes in OIH And communicate with their patient's Prescribers.

The prescriber may not ever admit OIH is the problem so you may be getting ready to "step in it"

Here are 3 of the 9 studies cited in the Comprehensive review on OIH

- 39. Li X, Angst MS, Clark JD. A murine model of opioid-induced hyperalgesia.*Brain Res Mol Brain Res* 2001; 86:56-62.
- 40. Li X, Angst MS, Clark JD. Opioid-induce040. hyperalgesia and incisional pain. *AnesthAnealg* 2001; 93:204-209
- 41. Vanderah TW, Suenaga NM, Ossipov MH, Malan TP, Jr, Lai J, Porreca F. Tonic descending facilitation from the rostral ventromedial medulla mediates opioid-induced abnormal pain and antinociceptivetolerance. *J Neurosci* 2001;21:279-286.

Slide 45

How Physical Therapists Can Effectively Treat Patients With Trauma Informed Care for Musculoskeletal Disease (MSD)and Substance use Disorder (SUD)

Lecture 2 Part one: importance of a comprehensive PT evaluation and POC

Part two: What Effects do Anxiety, Depression, PTSD, ACES and other forms of Abuse have on pts in Addiction

Slide 46

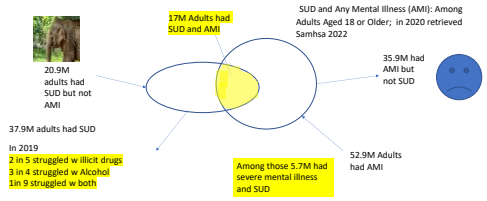
Part two objectives:

Following this lecture participants will be able to discuss the following:

- How does depression and anxiety effect SUD ?
- How does PTSD effect SUD?
- How do ACEs and other forms of abuse effect SUD?
- How do PTs screen for these cormorbidities?
- How do we use the PT decision tree

Slide 47

In trauma informed care : understanding connection between mental illness and substance use disorder is key for successful PT in MSK.



Slide 48

Substance Abuse Disorder and Chronic Pain[1,2,3]

APTA WI Toolkit slide by S.Majerus SDPT

- Up to 87% of patients with Substance Use Disorder report presence of chronic pain
- Pain during abstinence increases risk of relapse
  - Presence of pain increases OD incidence pre or post treatment
- Individuals with pain are more likely to misuse substances of any kind

Pain must be addressed in the treatment of substance abuse disorder

1. Witkiewitz et al 2018
2. Lorente et al 2022
3. Fernandez et al 2019

Slide 49

Depression and Anxiety Disorder

- Chronic pain is common in up to 70% of patients with depressive and anxiety disorders"
- Presence of Depression and Anxiety Disorders
  - Depression and anxiety disorders also share the same pathophysiological pathways as pain.(MOM)
  - Depression and anxiety induce stress and increases the production of pro-inflammatory cytokines, which may increase pain
  - Remember how Cortisol levels are increased with chronic pain and depression.

Asmundson, de Heer, Eric W., et al. "The association of depression and anxiety with pain: a study from NESDA." *PloS one* 9.10 (2014): e106907.

Slide 50

OPIOIDS AND DECREASED HIPPOCAMPALVOLUME[12]

Loss of Neurogenesis

Reduced dendritic branching and dendritic spines

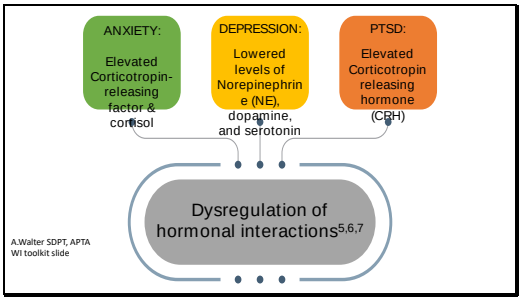
OPIOIDS ARE ASSOCIATED WITH AN INCREASED RISK OF DEPRESSION

Poor control of Hypothalamus Pituitary Axis (HPA)

Controls cortisol release, leading to elevation in stress levels

A.Walter SDPT APTA WI toolkit
Sherin JE et al. 2011

Slide 51



A.Walter SDPT, APTA
WI toolkit slide

Slide 52

OPIOIDS INCITE DEPRESSION[8-11]

OPIOIDS ARE ASSOCIATED WITH AN INCREASED RISK OF DEPRESSION

- Dysregulated reward circuitry
- Morphine injections cause decreased levels of serotonin

A.Walters SDPT, APTA WI tool kit

Slide 53

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Slide 54

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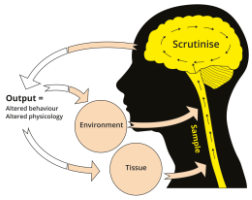
Slide 55

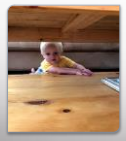


The Mature Organism Model –by Gifford

Louis Gifford the conceptual Model 1998

Slide 56

Adverse Childhood events (ACEs) and Post Traumatic Stress Disorder (PTSD)



- Be keenly aware that when a pt. has over 3 ACEs, they are more likely to have chronic pain and could become addicted to pain meds or other forms of self medication> Use ACE screen
- Pts with PTSD are more likely to have chronic pain as well and may likely need counseling to have optimal recovery. > Use PTSD screen
- When we suffer ACEs or PTSD our CNS system is greatly effected and sensitized and can remain in a high state of alert affecting many aspects of our lives. This can set us up for chronic pain and SUD to attempt to treat the pain.

•https://pubmed.ncbi.nlm.nih.gov/31989435/#:~:text=Prim%20Prev%2019%2D00578%2D0.

doi: 10.1007/s10935-020-00578-0.
Adverse Childhood Experiences Increase Risk for Prescription Opioid Misuse
Merrick et al 2020 NIH

Slide 57

PTSD

- Research has shown that at least 83% of persons in the general population with PTSD have at least one other mental health diagnosis: general anxiety, chronic pain, general sense of not being able to control their life, and inability to find positivity.

Javier et al 2005

Slide 58

Chronic pain, posttraumatic stress disorder, and opioid intake: A systematic review AE López-Martínez, et al Dec 2019

- There is a high degree of co-occurrence between chronic pain and posttraumatic stress disorder (PTSD).
- An association has been found between PTSD and substance abuse.
- PTSD is a severe disorder that should be strongly considered when opioids are prescribed.

How do I change my PT eval and treatment?

- It has been found that the prevalence of opioid use disorder (OUD) in chronic pain patients is higher among those with PTSD than those without this disorder.
- The study participants with comorbid PTSD and chronic non-cancer pain received higher doses of opioids, received more than 1 type of opioid concurrently, and were more likely to receive chronic opioids.

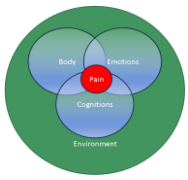
Slide 59

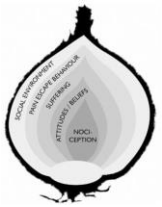
Unaddressed triggers can lead to addiction

- Many people "drug or drink" their emotional pain.
- When trauma, tragedy and turmoil in our lives are not properly dealt with we find unhealthy ways to sooth our hurts.
- A large percentage of people in addiction have underlying untreated depression, anxiety or other mental illness and are self medicating.
- Successful addiction treatment involves the hard work of addressing the reasons (triggers) for using and finding new healthy ways to treat our emotional and MSK pain. We use trauma counselors and drug and alcohol counselors.

Slide 60

BIOPSYCHOSOCIAL MODEL





L Mosley 2003

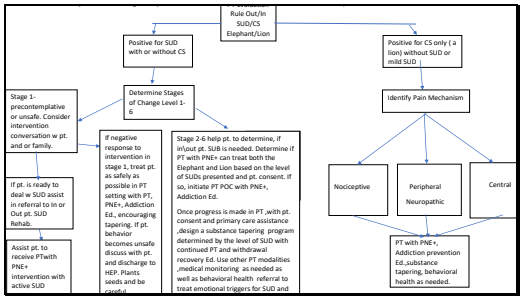
Slide 61

The levels of change applied in Addiction\SUD treatment

- 1-Precompletive:No recognition of need for or interest in a change
- 2-Contemplative:Thinking about changing
- 3-Preparation: Preparing for change
- 4-Action:Adopting new habits
- 5-Maintenance: Ongoing practice of new, healthier behavior
- 6-Relapse: added later: Resumption of old behaviors

- By Prochaska and DiClemente earliest work in 1978

Slide 62



Slide 63

PT Addiction Prevention education includes:

- How opioids alter mechanism of reward system and create cravings effected by supply and demand
- PNE of Brain producing pain as protective mechanism with MOM model
- How to turn down your personal alarm system with PT \PNE
- Discuss neuroplasticity of the brain and it works to heal our brains.
- How to replace SUD with healthy habits and coping skills one day at a time and then for life.
- If the pt. is considering MAT ,review the positive and negative effects of MAT so pt. can give informed consent based on sound info.

Slide 64

PT SUD withdrawal Recovery Education

- How the brain and body perceive the withdrawal process.
- Signs and symptoms: what to expect based on your level of SUDs and drug of choice.
- You will get through it !
- Get the assistance you need to succeed.
- Why its worth it.
- How to take care of yourself going through it.
- Vitals signs, dehydration prevention.
- Is medical assistance needed In or Out- patient? MAT may be offered
- PT for MSK pain relief

Slide 65

Case Study John L : video last

- **After last deployment to Iraq pt. can home with high doses of Roxy and OxyContin up to 4 times per day.**
- **Chronic pain from lumbar DDD, hip OA possible fracture, R shoulder cuff tear \tendonitis**
- **Deconditioning , walking on a cane, total body pain , PTSD, sleep disturbance , Wt . Gain of ~50 Lbs to obese level**
- **VAS of 9-10 with pain meds**
- **Body chart drawing: B extremities UE, LE and T/L spine marked for severe pain**

Slide 66

PT evaluation

- **Central Sensitization and Opioid Induced Hyperalgesia : strongly suspected**
- **Behavior and mood changes : reported by pt. and family members**
- **Pt had a family history of alcoholism, was over 600 men and brought them all home ,but experienced several suicides and suicide attempts among his men after returning home.**
- **DX of PTSD per VA**
- **Limited rom and strength of B extremities to overall 25- 30% of normal, strength 3+ to 4-\5**
- **Positive SLR test, made worse by standing and bending positive B rotator cuff impingement tests made worse by overhead reaching,**
- **Limited cervical and lumbar rom to 25% of normal overall**
- **6 min walking test: pt. could walk 50 to 100ft with cane and sitting rest breaks required following attempted test**
- **Sit to stand : with cane 2 attempts**
- **Cardio system : WNL**
- **Skin: foot diagnosis of "Army foot root"**

Slide 67

PT Treatment

- 2-3 wks of PT , 2 days per wk. of out pt rehab for manual PT of back, hips , cervical spine and B shoulders
- Rom HEP , beginning aerobic graded exposure on bike and walking with cane
- E-stim and ice\MH for pain control
- Pt was physically impaired due to prescribed med intake and could not be on treadmill or go up clinic stairs safely in the clinic.
- PT had interventional talk with pt. about his personality changes and drug use and impairment and how it was affecting his life and not helping his pain levels with PNE.

Slide 68

Slide 1

Get me up to speed as A PT on Addiction Recovery (AR) treatment.

Lecture 3

part one: Review on How to Recognize signs and symptoms of CS with SUD in MSD PT treatment review

part two: Tutorial on Recovery Programs , Medically Assisted treatment and the use of PT in Lydia's house PT early Intervention Pilot

Slide 2

Lecture 3
part one: Recognizing signs, symptoms of SUD, addiction and dependency in PT treatment

Objectives

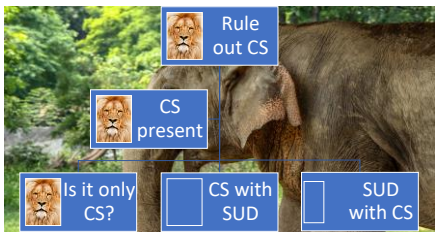
Following this lectures PTs will be able to identify:

1-Signs and symptoms of SUD with and without CS

2-Ways to successfully treat their patients, using the Stages of Recovery and PT decision tree.

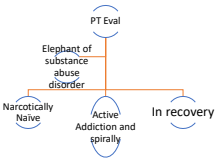
3- Signs and symptoms of detox and ways to prepare patients with MSD/SUD for successful detox or taper.

Slide 3



Slide 4

Where is your patient on the spectrum of SUD ????



Mild 2-3 , Mod. 4-5. Severe 6-11
SUD Symptoms. ,

Slide 5

Modifications to addiction diagnosis in DSM-5 for Substance abuse disorder (SuD)

Mild SUD =2-3 symptoms, Moderate SUD= 4-5 , Severe = 6-11

- Tolerance
- Withdrawal
- Taken more /longer than required
- Desire/unsuccessful efforts to quit use
- Great deal of time taken by activities involved with use
- Use despite knowledge of problems associated with use
- Important activities given up because of use
- Recurrent use resulting in a failure to fulfill important role obligations
- Recurrent use resulting in physically hazardous behavior (e.g. driving)
- Continued use despite recurrent social problems associated with use
- Craving for the substance

Slide 6

Remember SUD is a spectrum based somewhat on behavior that is hard to assess in 1or 2 PT visits.

- DSM-5 Diagnostic and Statistical Manual of Mental Disorders 5th edition defines it as a chronic progressive disease with behavioral patterns that fall within a spectrum of severity. This broad spectrum is referred to as "substance use disorders (SUDS)
- The DSM-5 classifies the diagnosis of SUDs based on the evidence of impaired control , social impairment, risky use, and pharmacological criteria.
- Part of the patient's risky behavior may involve deceiving you , the prescriber or their family so it is hard to expose risky behavior.
- The person in SUD thinks they can always control their behavior until they can't.

Slide 7

If your patient demonstrates both CS and SUD, you must ask yourself these questions.

1-After PT PNE and SUD education in the evaluation is my patient self aware or in denial of CS or SUD?

2- Is my patient open to making a change determined through motivational interviewing and non-judgmental questions?

3-What other patient education would help them understand their Dx and comorbidities best? Use the APTA WI tools.

3- If both CS and SUD are suspected which is bigger the Lion or the Elephant ?

4- Can I treat them together or should we treat them separately?

5- What does the patient want to address and are they ready to make a change?

Slide 8

Stages of recovery

- Determine where your patient is with motivational interviewing.
- Carefully determine if they are ready for a change.
- Is it still someone else's problem?
- Do they think someone or something else is going to fix this?

Slide 9

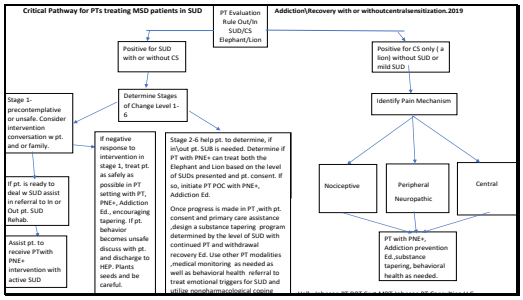
Which is primary (the bigger Threat) today in PT?
What is the patient ready to address today?

Slide 10

John L case study review with PTSD, Depressive, MSD , CS…….

- We treated for a ~month to determine he needed to go to Rehab
- VA Rehab failed him by placing him back on opioids and he then choose to detox at home. He was ready to address SUD and take his life back.

Slide 11



Slide 12

Warning !! Be cautious and get Medical assistance on Detox

- Withdrawal symptoms review
- Cardiac issues
- Dehydration
- Alcoholics and betablockers and Benzos= medical detox facility
- Meth withdrawals
- Opioid withdrawals
- Suboxone withdrawals (longer half life)

General physical symptoms of withdrawals are usually over in a week or 2 and meds can be used to assist for nausea and diarrhea.

Emotional cravings can last a long time (several years).

Some pts. require inpatient psychiatric monitoring if mentally instable.

More details from Addiction Recovery

Slide 13

Get me up to speed as A PT on Addition Recovery (AR) treatment.

Lecture 3

part one: review on how to Recognize the signs and symptoms of CS with SUD in MSD PT treatment

part two: Tutorial on Recovery Programs , Medically assisted treatment (MAT) and the use of pt

Slide 14

Part two: Tutorial on Recovery Programs and Medically assisted treatment

Objectives

Following this lecture PTs will be able to identify:

1-A basic understanding of the levels of Addiction Recovery Care services.

2-The basic mechanisms of MAT and how Suboxone and Vivitrol work

3-PT guidelines for taper within MAT case study.

Slide 15

Levels of Care in Substance Abuse Treatment

Carter Hendrickson, LPCA
Utilization Review Clinician
Addiction Recovery Care

gg103627707 www.gograph.com

Slide 16

Determining Levels of Care

- Licensed Clinical Counselor
- Comprehensive Assessments
- ASAM
- 6 Different Dimensions
- Withdrawal/Withdrawal Potential
- Medical Health
- Mental Health
- Motivation
- Relapse Potential
- Recovery/Living Environment

Slide 17

Withdrawal Management (detox)

- 24 Hour Monitoring
- Medical Care
- Daily Check-in With Counselor
- Groups
- Duration 3-10 days

Slide 18

Residential Treatment

- Medical Care
- 24 Hour Monitoring
- Weekly Sessions With Licensed Counselor
- 15 Hours Group Sessions Weekly
- Both Peer Support And Clinical Groups
- Duration 21-30 Days
- Duration Based On Medical Necessity
- MAT Provided (Center-specific)

Slide 19

Intensive Outpatient Treatment (IOP)

- No Requirements For 24 Hour Monitoring
- No Requirements For Medical Care
- 3 Hour Group Sessions 3 Days Per Week
- MAT Offered
- Must See Staff Doctor In Order To Receive MAT
- Ky State Law Requires Monthly Clinical Counseling When On MAT
- Duration 6-12 Weeks

Slide 20

Outpatient Treatment

- Very Similar to IOP
- Can Be Combo Of Individual/Group Sessions
- No Min/Max On Number Of Sessions
- Same Regulations Apply For MAT

Slide 21

CONCORDIA UNIVERSITY WISCONSIN
SCHOOL OF HEALTH PROFESSIONS

WI Addiction Recovery Resources

Seth Majerus
Doctoral Physical Therapy Student

APTA Wisconsin
A Chapter of the American Physical Therapy Association

Slide 22

WI Levels of Care (Chapter DHS 75) [1]

- Level 0.5-SUD risk factors present but no immediate disorder
- Level 1- Outpatient
  - <9 hrs/week, recovery or motivational therapies
- Level 2.1 Intensive Outpatient/Partial Hospitalization
  - >9 hrs/week, multidimensional instability
- Level 2.5 Partial Hospitalization/Day treatment
  - >20 hours/week, not 24 hour care, multidimensional instability

Slide 23

WI Levels of Care[1]

- Level 3.1 Clinically Managed Low-intensity Residential
  - 24 hour, trained personnel available, >5 hrs/week clinical service
  - "Halfway Houses"
- Level 3.3 Clinically Managed Population-specific High-intensity residential
  - Same as 3.1, significant cognitive impairment
- Level 3.5 Clinically Managed High intensity Residential
  - Same as 3.1, nursing staff available, imminent danger
  - Must be able to utilize facility treatments

Slide 24

WI Levels of Care[1]

- Level 3.7 Medically Monitored Intensive Inpatient
  - 24 hour nursing care with physician availability/monitoring for significant problem, counselor availability
- Level 4
  - 24 hour nursing care, daily physician care for severe, unstable problem
  - Counselor availability

Slide 25

Level of Care Placement[1,2]

- Most payers require medical assessment
  - Dimension 1: Acute intoxication/withdrawl symptoms
  - Dimension 2: Biomedical-medications & health history
  - Dimension 3: cognitive & psychosocial factors
  - Dimension 4: Readiness to change
  - Dimension 5: Relapse or continued use potential
  - Dimension 6: Environmental factors/living situation

Slide 26

Medication *Assisted* Therapy[3-5]

- Use of medications to ease withdrawl symptoms & cravings to decrease relapse risk

- Methadone
  - Mu agonist
  - Full opioid effects

- Buprenorphine (suboxone)
  - Partial mu agonist
  - Partial opioid effects

- Naltrexone (vivitrol)
  - Mu antagonist
  - Blocks opioid effects

https://youtu.be/H0vWVLuXTW0

https://youtu.be/DqARFIVoqTE

Slide 27

Medication *Assisted* Therapy[3-5]

All medication options have pros and cons-discuss with physician

Methadone	Buprenorphine	Naltrexone
• **Decreases risk of relapse, increase participation in rehab** • Still get high, **still have side effects** • May limit ability to drive and work • High risk of relapse upon cessation • **1/3 prescription overdose deaths from methadone**	• Less retention in rehab vs methadone • Less risk of side effects, overdose • Risk of relapse upon cessation still high • Increased **OD risk with alcohol, depression medication** • **Less side effects, less retention in rehab with buprenorphine vs methadone**	• Similar success rate to buprenorphine • **Better for those who continue to use alcohol or have severe mental health disorders** • **Less side effects** than others • Must completely taper off opioids or other medications • **Increased risk of overdose upon cessation-decreased tolerance**

Slide 28

Links/Resources

- UW Addiction Consultation Provider Hotline (Weekdays 8am-5pm)
  - 1-800-472-0111
  - https://www.fammed.wisc.edu/addiction-hotline/
  - Advice/support for *clinicians* treating patients with SUD
- 211 Wisconsin (24/7)
  - Call 211
  - https://wisconsinvoicesforrecovery.org/211-helpline/
  - Patron Facing Chat (incontact.com)
  - Text your zip code to 898211
  - Connects you with appropriate treatment options, peer coaches

Slide 29

Links/Resources

- https://www.freerehabcenters.org/state/wisconsin
  - Options most likely to be affordable
- Substance Abuse and Mental Health Services Administration (SAMHSA)
  - 24/7 National Helpline 1-800-662-4357
    - Referral and informational service
  - 24/7 Distress Hotline 1-800-985-5990
    - Trained crisis counselors
  - https://findtreatment.gov/
    - National treatment center locator with services offered an payments accepted

Slide 30

Links/Resources

- https://www.dhs.wisconsin.gov/regulations/aoda/sa-only-directory.pdf
- https://www.dhs.wisconsin.gov/guide/recovresdir.pdf
  - Phonebook style directories of all residential & outpatient WI SUD programs
- https://www.dhs.wisconsin.gov/forwardhealth/imagency/index.htm
  - Contacts for financial resources in each county

Slide 31

Insurance coverage

- Almost All Private Commercial Insurances Have Substance Abuse Treatment Coverage
- Some Are In-Network While Others Are Not.
- Most ALL Medicaid (MCOs) Providers Have Substance Abuse Treatment Coverage

Slide 32

Help your patients find counseling

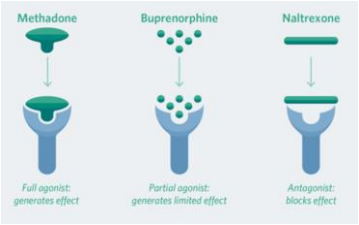
- Research effective referral sites in your area that utilize TH.
- Train them in what PTs can do for their clients.
- They are looking for good trauma informed PTs like you.
- Find trauma therapists.
- Drug and Alcohol abuse counselors
- Family therapists
- It takes time and effort to find the right fit.

Slide 33

What is Medically Assisted treatment (MAT) in AR ?

METHADONE, SUBOXONE, VIVITROL

Slide 34



Slide 35

NIH Videos

- https://youtu.be/H0vWVLuXTW0 - How Suboxone works as a semiagonist
- It contents 2 blockers: an opioid semi- agonist, with Naloxone (a small amount of Naran) 8 mg contains 2 mg of Naloxone

Slide 36

Suboxone vs Buprenorphine

Suboxone contains 2 blockers:1- Buprenorphine and 2nd Naloxone
Buprenorphine is an opioid semi- antagonist that contains no Naloxone and does have a ceiling effect which creates a limited "high" making misuse less tempting.
Subutec is only Buprenorphine with no Naloxone
Subutec is given to pregnant women in SUD

Slide 37

Can we safely use Vivitrol during pregnancy???
Typically,~50% of babies of moms with OUD who use Subutec are treated for NAS –Samhsa Pathways to Healthier KY 2022

Dr. Towers et al at UT Knoxville compared the outcomes of 121 pregnant women who chose naltrexone pharmacotherapy MAT (after full detoxification) with those of 109 similar women who opted for continued opioid agonist (traditional) pharmacotherapy MAT.

The rates of positive toxicology screens for an opioid drug once opioid-drug free did not differ significantly between the naltrexone group (14/121, 11.6%) and the traditional MAT group (16/109, 14.7%).

Obstetrical outcomes did not differ between the groups, and there were no problems with pain-control management at delivery in the naltrexone group.

None of the neonates of mothers who were on naltrexone at delivery were treated for signs of neonatal abstinence syndrome (NAS), but 10 newborns of 34 women who discontinued naltrexone prior to delivery were treated for symptoms of NAS.

Reuters Health American Journal of Obstetrics and Gynecology July 2019

Slide 38

How does Vivitrol work ?

https://youtu.be/DqARFlVoqTE

- https://www.vivitrol.com/alcohol-dependence/questions-and-answers

Slide 39

Slide 40

The underbelly of Rehab: How to deal with bad actors

Problems:

- Suboxone Pill Mills and their entrepreneurial MD directors
- Black market for Suboxone
- Scam half -way houses
- Non- reputable or non- evidence-based pain management
- Suboxone is used to treat chronic pain without PT and PNE and CS is not addressed

PT solutions

- Market PT services to taper off Suboxone or at least treat MSD pts. to give them an exit ramp and prevent the relapse trigger of unmanaged pain and CS.
- Be knowledgeable on good rehab referral sources\effective counseling and encourage their use.
- Volunteer or pursue PT employment at a reputable rehab facilities. Volunteer at a half -way house to help with MSD.
- Do free educational PT in-services with case studies to help pain management providers taper pts. off opioids and Suboxone safely.

Slide 41

Case for Suboxone Taping with PT treating SUD,CS, MSK pain and opioid use

With trained Suboxone medical provider ,following thorough medical exam and blood work\drug screen

24 hrs after the last opioid is taken:

- 12 -day Suboxone Taper begins: 8 mg for 3 days>>6 mg for 3 days>>4 mg for 3 days>> 2 mg for 3 days
- Option to receive Lucemyra as needed with other comfort meds. in the last 1-2 weeks of the taper.
- Stopping Lucemyra 1-9 days max. after the Suboxone taper if it is needed.
- PT+ PNE and counseling as needed before , during and after the taper
- Pts. may decide to begin Vivitrol per protocol to decrease cravings with counseling and PT
- Wait 2-4 wks after a negative drug screen for Suboxone with long –term Suboxone users (5+ or more years) before Vivitrol injection is given to prevent precipitated withdrawal symptoms

Slide 42

Victoria Case study on MSD\ SUD and Suboxone Taper in AR

- PT Eval:12-18-19 26 yr. old female evaluated at 28 days sober from opioids for pain, Meth, Marj. Using MAT Suboxone starting at 8 mg given at entrance into H. Hills.
- Dx of Anxiety, Depressive Disorder, SUD, occasional low back pain with nociplastic pain with beginning Suboxone detox
- PMH: Recent traumas of group sexual assault and ex boy-friend physical abuse while "using "with multiple blows to the head but no medical care reported.
- Hx of drug use beginning with using with her dad as a teenager
- ACE score of 5 or higher (her dad taught her how to use as a teen)
- Meds: Ibuprofen 400 mg, Lexapro 10 mg, Buprenorphine-naloxone 8 mg to 6 mg, Melatonin 5mg, Amoxicillin 500 mg for oral care
- Hep C positive and being treated in AR.

Slide 43

Slide 1

Lecture 4
Treat the whole Patient at the right time in the episode of care with the best PT tools

Part one: How to Match PT treatment with changing levels of patient progression while considering the needs of total person.

Part 2 Why and How should PTs address patient wholeness in PT SUD treatment?

Slide 2

Part one:
How to Match PT treatment with changing levels of patient progression while considering the needs of total person.

Following this lecture PTs should be able to :

1-Effectively treat the Lion of CS and Elephant of SUD considering the: PT eval, ACE , CSI, Body chart , REP index and level of SUD

2- Consistently use evidence for effective PNE in PT treatment

.

Slide 3

PAIN DEFINTIONS : Pain is produced in the brain. <u>Which are present in your patient today? Can have all 3 !</u>

<u>Nociceptive</u>

- Pain that arises from actual or threatened damage to nonneural tissue and is due to the activation of nociceptors
- *Classically mechanical/chemical associated pain experience*

<u>Neuropathic</u>

- Pain caused by a lesion or disease of the somatosensory nervous system
- *Classically nerve tissue injury identifiable with diagnostic testing, Slump test , ULT*

<u>Nociplastic</u> – *IASP*

- Pain that arises from altered nociception despite no clear evidence of actual or threatened tissue damage causing the activation of peripheral nociceptors or evidence for disease or lesion of the somatosensory system causing the pain

Slide 4

What about the Lion of Central Sensitization ?

Example from A.Louw ISPI PNE course. **HOW BIG IS THE LION ?**

Subclinical: 0 to 29

Mild: 30 to 39

Moderate: 40 to 49

Severe: 50 to 59

Extreme: 60 to 100

Slide 5

PT decision tree Elephants and Lions

3 sizes of Elephants in SUD

- Opioid Misuse Pt
- Opioid Dependent Pt.
- Opioid Addicted Pt.

Slide 6

Who are you treating in your clinic?

- Opioid Misuse Pt .:
  - The use of opioids contrary to medical instructions
- Opioid Dependent Pt.:
  - Individual can function normally with the drug
  - Over time, there is a need for increased doses to obtain optimum relief
- Opioid Addicted Pt.:
  - A *chronic disease* of brain reward, motivation, and memory
  - Impairment in behavioral control; uncontrollable cravings; diminished recognition of problematic behaviors and interpersonal relationships; and dysfunctional emotional response

American Association of Addiction Medicine

Slide 7

Slide 8

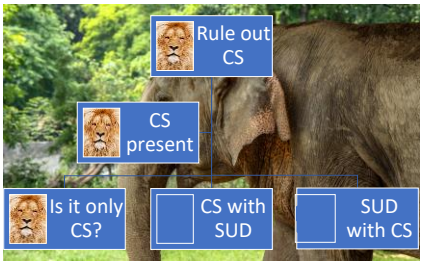
Rep Index : measures the effectiveness of PT+ in Addiction Recovery was found to be a Reliable test in UK DPT Research from 2020-2022.
Norm is in the range of 11-12.5

In addition to recovery (MAT) data, the REP Index helps the PT determine progress in the following areas:

- 1-Cravings
- 2- Self rated health
- 3-Physical activity level
- 4-Understanding pain science
- 5-Pain self-efficacy
- 6-Pain coping mechanisms
- 7- Sleep coping and quality
- 8- Screening for depression
- 9- Screening for anxiety
- 10- Functional level

Developed by Drs. Holly Johnson PT, DPT, MDT and April Gamble PT,DPT 2019

Slide 9



Slide 10

PNE Evidence is strong
13 RCTS provide strong evidence for PNE improving the following:

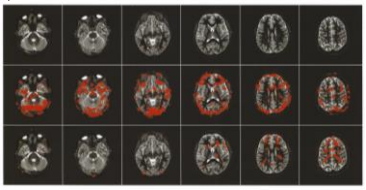
- Pain ratings
- Pain knowledge
- Disability
- Pain catastrophization
- Fear-avoidance
- Attitudes and behaviors regarding pain
- Physical movement
- Health care utilization

A Louw , Zimney K et al Systematic Review Physiother Theory Pract. 2016

Remember PNE Number needed to help CLB patient with PNE is 2:1 for function and 3:1 for pain.

Slide 11

Central Sensitization: Treatment
Therapeutic Pain Neuroscience Education



(Louw, 2012), (Louw 2014)

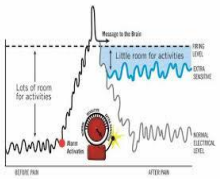
Slide 12

PT scores indicating need for PNE

- FABQ-PA>15
- FABQ-W>34
- Higher Tampa Scale for Kinesiophobia (TSK-11) score (Kinesiophobia measured)
- PCS >30 Pain Catastrophizing Scale
- CSI>40 Central Sensitization Inventory used with REP index
- Keele SBST: Total>4 and scores 5-9>4
- In reality all pts. with MSD pain need good PNE.
- Early PNE is best to prevent CS, especially those with potential for SUD

Slide 13

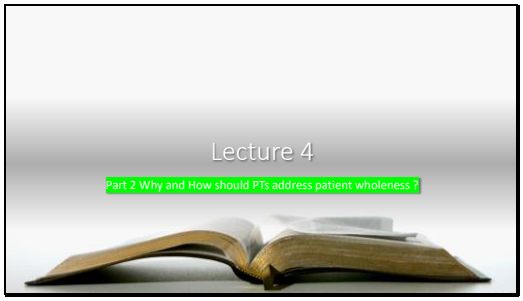
PNE 101: by A. Louw Pain stories combined. See Why I hurt Patient book



- The body has a living , breathing alarm system that's always humming along , monitoring treats.
- When the alarm system is activated, it ramps up, hitting a threshold and firing a danger signal to the brain.
- Once the action is taken, the alarm is designed to steadily calm and reset as life returns to normal.
- Unfortunately, for 1 in 4 people the alarm is activated, calls for help and never calms down, leaving the extra sensitive alarm system.
- Before pain your alarm system allowed you to do lots of things, but since developing pain, the extra sensitive alarm system severely limits your ability to do things

Slide 14

Slide 15



Slide 16

Objectives Part 2
Why and How should PTs address patient wholeness ?

Following this Lecture PTs should recognize their role to assist the patient with SUD in the areas of :

Motivational interviewing with

- Medication management
- Nutrition
- Sleep Hygiene
- Mindfulness
- Lifelong exercise habits
- Counseling needs
- SEE APTA – WI Toolkit for more info on these topics with pt. handouts

Slide 17

Planting seeds, watering and nurturing through the Stages of Change

- Remember you can only teach PT and PNE in a meaningful way, meeting the patient at their point of need and interest.
- Be ready when they are to move forward.
- They may not "get it" until the physical and emotional pain of what they are doing becomes greater than their free of change.
- Patients heal in layers.

Slide 18

Stages of change

Stage of change	As a PT you might see..
• Precontemplation:	• Ignorant bliss, not my problem but someone else's, that D-river in Egypt
• Contemplation:	• Sitting on the fence, some talk but no " do" this month
• Preparation:	• Planning to act this month, some experience with change and trying to change, just testing the waters

Slide 19

Stages of change

Stage of change	As a PT you might see..
• Action:	• Practicing new behavior for 2-6 months.
• Maintenance	• Practicing new behavior for post 6 months to 5 yrs.
• Relapse	• Resuming old behaviors="fell off the wagon" It is a brave thing to ask for help again.

Slide 20

What is Motivational Interviewing? Why consider using it?

- You can't force your approach on your patients.
- We must treat all pts. with compassion, empathy and respect even when they refuse not to listen to your medical advice.
- If this happens, consider the back door approach of MI.
- Diffuse the situation by figuring out what the pt. wants to address within your scope of practice.
- Don't take pt. defensiveness, disrespect, disregard personally. Give them space to process and get comfortable as you earn their trust by respecting their prospective by listening to them.
- MI is helping the pt. discover a solution via their internal drive not by you telling them what they ought to do to fix themselves which is external drive.

Slide 21

If your patient is resistant to move through the stages of change, consider asking…..

- What do you want my assistance with today?
- What do you really want to work on?
- How is the way you are handling _____ working out for you to this point?
- All your questions focus on moving the pt. from ambivalence to motional processes that facilitate a positive change in their lives.
- As a clinician you support changes based on the patient's own concerns and values.

Slide 22

MI is patient-centered not expert-recipient

- It brings out the patient's own motivation and commitment in a conversation about change in their lives.

USE OARS: Open ended questions, Affirmations, Reflections, and Summaries to establish a therapeutic alliance leading to lasting positive change

Adapted from PNE Teaching people about pain 2nd addition A Louw

For more application: See APTA- WI Tool kit resources

Slide 23

MI Toolkit role play:15 min

Slide 24

MI is patient-centered not expert-recipient

1. Express Empathy: see the world through the patient's eyes and be sure they feel heard and understood.
2. Support Self Efficacy: bring out previous strengths and skills the pt. has displayed to demonstrate the capacity to successfully change
3. Embrace resistance: as the patient's right, knowing it may represent a necessary conflict within themselves when they see the problem differently then the clinician sees it.
4. Develop Discrepancy: Motivation for change occurs when pts. perceive the mismatch between" where they are and where they want to be". The clinician helps the pt. examine these based on their own behavior , values and goals.

Adapted from PNE Teaching people about pain 2nd addition A Louw

Slide 25

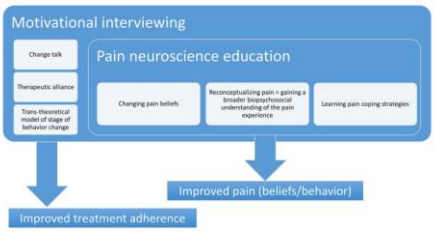


Figure 1.
Pain neuroscience education and motivational interviewing are conceptually complementary interventions.

Nijs J, Wijma AJ, Willaert W, et al. Integrating Motivational Interviewing in Pain Neuroscience Education for People With Chronic Pain: A Practical Guide for Clinicians. *Phys Ther*. 2020;100(5):846-859. doi:10.1093/ptj/pzaa021 from APTA WI tool kit M Knurr

Slide 26

Medications
Always Consult the prescriber

- Is your pt. tapering off opioids or escalating?
- What is the plan made by the patient and his\her prescriber? What if there is no plan? Can you and the pt. safely discuss a plan and consult with prescriber?
- Is pain management involved in positive or a negative way?
- What drugs especially need MD supervision: Gabapentin, Neurontin, SSRIs and SNRIs? Some patients should not taper these drugs for good reasons. Know your patients.
- If your patient wants to taper off Methadone or Suboxone, you can now help them, but you will need to **collaborate with their prescriber** with your **APTA – WI tool kit**.

Slide 27

Membrane stabilizers and Low Dose anti-depressants

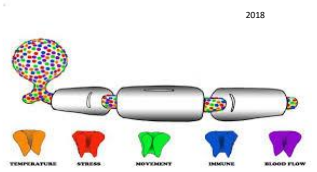
- cts

- Many pts are left on some medications too long without consideration that they may be ready to begin tapering off some meds. with the help of PT and their prescribers.
- However, membrane stabilizing meds. may deactivate ion channels , therefore making the axon less reactive, resulting in a nerve that is less prone to fire so pts who may be too sensitive to move or exercise may benefit from these meds and be able to engage in PT more easily and then tapered if needed.

- Derry S, Gill D, Phillips T, Moore RA. Milnacipran for neuropathic pain and fibromyalgia in adults. The Cochrane database of systematic reviews. 2012;3:CD008244.
- Hauser W, Urrutia G, Tort S, Uceyler N, Walitt B. Serotonin and noradrenaline reuptake inhibitors (SNRIs) for fibromyalgia syndrome. The Cochrane database of systematic reviews. 2013;1:CD010292.
- Lunn MP, Hughes RA, Wiffen PJ. Duloxetine for treating painful neuropathy, chronic pain or fibromyalgia. The Cochrane database of systemic reviews. 2014;1:CDOO7115

Slide 28

Remember we teach in PNE that we can become extra sensitive to the following areas. PT\PNE+ can help reset our alarm systems.



Slide 29

Suboxone /Methadone model: Why is PT so important here?

- How it works: Suboxone makes opioid detox much easier to go through.
- Tapering vs Maintenance : See Betty Ford Model – give the pt. a choose with informed consent. Tapering these opioids prevents OIH with chronic MSK pain.
- Pill mills and street value up to 900$ per week per pt. if you sell your Suboxone
- Negatives and Positives
- Is your patient using Suboxone correctly? Watch for signs of relapse and misuse.

Slide 30

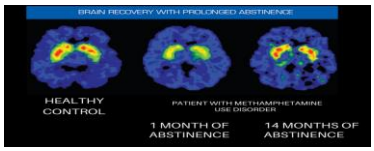
Vivitrol Model

How it works : pt. must be willing to stop all opioids first

- 1 injections every 30 days until the patient is ready to stop
- No street value
- No MD or pt. revenue stream
- Positives: not an opioid therefore no withdrawals and no OIH
- Temporary shield from using until pts. get their life in order
- Negatives : Can a patient learn to handle their cravings without it?
- Is it time to help them taper ?

Slide 31

When tapering opioids or illicit drugs , It takes 30 plus days for dopamine receptors to heal and begin reset……Recovery required patience



The kidney bean shaped region of the brain indicates little or no red at 2 weeks detox indicating little or no dopamine transmission.(Volkow 2002.) Thankfully, the red returns with recovery and positive neuroplasticity.

Slide 32

THE ROLE OF THE PHYSICAL THERAPIST AND THE AMERICAN PT ASSOCIATION IN DIET AND NUTRITION
HOD P06-19-08-44 [Previously Titled: The Role of the Physical Therapist in Diet and Nutrition] [initial HOD P06-15-22-17] [Position]

The American Physical Therapy Association (APTA) supports collaboration at the association and membership levels to promote education, research, and practice between physical therapists and registered dietitians to pr o-mote the health and well-being of society consistent with APTA's Vision and Guiding Principles to Achieve the Vision. Diet and nutrition are key components of primary, secondary, and tertiary prevention of many con-ditions managed by physical therapists. It is within the professional scope of physical therapist practice to scree n for and provide information on diet and nutritional issues to patients, clients, and the community. This includ es
appropriate consultation or co-management with or referral to a registered dietitian when seeking the expert opinion of another provider with specialized knowledge or skills, or to obtain services for a patient or client tha t are beyond the professional or personal scope of practice of the physical therapist.
Explanation of Reference Numbers:

HOD P00-00-00-00 stands for House of Delegates/month/year/page/vote in the House of Delegates minutes; t he "P" indicates that it is a position (see below). For example, HOD P06-17-05-04 means that this position can be found in the June 2017 House of Delegates minutes on Page 5 and that it was Vote 4. P: Position | S: Standa rd | G: Guideline | Y: Policy | R: Procedure
Last updated 9-20-19

Slide 33

Malnutrition and SUD Slide by Dr. Gentry Lewis DPt APTA-KY tool Kit

Signal confusion:

- While using→ patients can confuse hunger vs. drug cravings
- During recovery providers can confuse→ malnourishment vs. withdrawal

Substance abuse disrupts the body's nutrient absorption:

- Alcohol→ thiamine (B1) and magnesium deficiency
- Opioids→ slowed digestion and metabolism causing inefficient nutrient absorption
- Stimulants→ highs and lows correlate to starvation and binge eating episodes

Elkins, 2020.

Slide 34

Alcohol Affects http://www.bones.nih.gov

- Alcohol negative affects on bone health:
  - interferes with the balance of calcium
  - interferes with production of vitamin D, a vitamin essential for calcium absorption
- Chronic heavy drinking can cause hormone deficiencies in men and women.
  - Men with alcoholism may produce less testosterone, a hormone linked to the production of osteoblasts
  - Women with chronic alcohol exposure can trigger irregular menstrual cycles, reducing estrogen
- Because of the effects of alcohol on balance and gait, people with alcoholism tend to fall more frequently and increase in the risk of fracture
- Cortisol levels are higher with alcoholism and known to decrease bone formation and increase bone breakdown.

Slide 35

Osteoporosis management strategies

http://www.bones.nih.gov/

- Abstinence: The most effective strategy for alcohol-induced bone loss is abstinence. People with alcoholism who abstain from drinking tend to have a rapid recovery of osteoblastic (bone-building) activity.
- **Nutrition for** bone health eat diet rich in calcium: low-fat dairy products; dark green, leafy vegetables; and calcium-fortified foods and beverages. The Institute of Medicine recommends a daily calcium intake of 1,000 mg (milligrams) for men and women up to age 50. Women over age 50 and men over age 70 should increase their intake to 1,200 mg daily.
- Vitamin D plays an important role in calcium absorption and bone health. Food sources of vitamin D include egg yolks, saltwater fish, and liver. Many people, especially those who are older or housebound, may need vitamin D supplements to achieve the recommended intake of 600 to 800 IU (International Units) each day.
- **Exercise:** weight-bearing aerobic and resistance exercises

Slide 36

Symptoms of Malnutrition Slide by Dr. Gentry Lewis DPt APTA KY tool kit

- Reduced appetite
- Generalized fatigue
- Feelings of weakness
- Poor concentration
- Low mood or depression
- Decreased immune function

Reasons for malnutrition: damaged reward system, choosing drug over food, financial issues, or lack of motivation and means to prepare healthy meals.

NHS, 2020.

Slide 37

Nutrients for a Healthy Brain

Slide by Dr. G. Lewis DPt

People with SUD often suffer from anxiety & depression, which can inhibit the road to recovery.

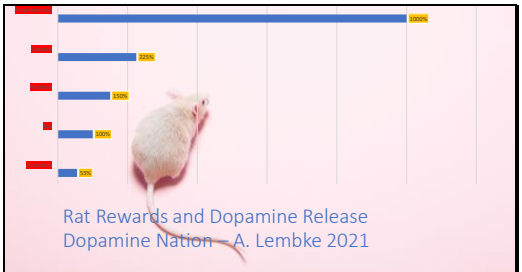
A few of the nutrients needed to maintain healthy neurotransmitter levels…

- Tryptophan
- Phenylalanine
- Tyrosine
- Vitamins B6 and B12
- Omega-3 fatty acids

Maintaining normal levels of these nutrients promotes a healthy brain and sets the body up for a successful recovery process.

Salz, 2014.

Slide 38



Rat Rewards and Dopamine Release
Dopamine Nation – A. Lembke 2021

Slide 39

Better Nutrition References for successful Rx of SUD

Elkins, C. (2020, March 2). The Nutrition Guide: Boosting Recovery with a Healthy Diet. Retrieved from https://www.drugrehab.com/guides/nutrition/

National Health Service. (Reviewed 2020, February 7). Symptoms of Malnutrition. Retrieved from https://www.nhs.uk/conditions/malnutrition/symptoms/

Salz A. Substance Abuse and Nutrition. *Today's Dietitian.* 2014; 16(12): 44. Retrieved from https://www.todaysdietitian.com/newarchives/120914p44.shtml

Jeynes KD., Gibson EL. The importance of nutrition in aiding recovery from substance use disorders: A review. *Drug and Alcohol Dependence.* 2017; 179: 229-239.

Slide 40

Nutrition and Diet: for some our drug of choice is food

Eat clean ,real food, farm to table, mostly plants and not too much,

- Protein is important for rebuilding those that are malnourished
- Hypoglycemic eating
- Keto progressing to Mediterranean diet (Dr. D Colbe
- Anti-inflammatory diet : VA
- Multivitamins, fish oil, other supplements
- What to eat before or after exercise.
- Water intake :64 oz per day, dehydration prevention
- May need dietician or eating disorder counseling in the spectrum of food addiction issues

Choosemyplate.gov

Effectiveness and Safety of dietary interventions for rheumatoid arthritis a systematic review of randomized controlled trials. J Am Diet Assoc. May 2010;110(5):727-735

Slide 41

What foods are best ?

- **Nourish yourself: Your body is healing!**
- Cut out the junk food because it is empty calories that don't support your healing body.
- Eat "Farm to table" and limit fried and fast food with a lot of preservatives.
- Eat Good carbs- limit bad carbs, sugar, white bread, rice, pasta and use good carbs like multi or whole grain because it is more fuel efficient and your burn it up slowly so it good for your blood sugar levels.(Low Glycemic)
- Eat low fat protein: lean meats ,limiting pork and red meat and processed meat. Eat protein up to 5 times per day in small portions.
- Eat fresh veggies and fruit: low glycemic fruits like berries are best, limiting high sugar and high carb fruit and veggies.
- Eat healthy portions and don't emotionally overeat. Do you eat your feeling ?
- Balance fuel out and fuel going in your body.

Slide 42

Many Patients in Recovery from SUD need to rebuild their immune system and healthy Gut

They need a health diet rich in;

- Antioxidants
- Probiotics, healthy fiber
- Healthy Protein
- Affordable options
- Meal planning assistance
- Help with IBS and rebuilding gut health with new healthy eating habits

Slide 43

Slide 44

Aerobic exercise: Replace a Bad Habit with a Great one : it is the best coping mechanism ever invented!

Use aerobic neuroplasiticity to heal the damaged reward system.

Aerobic exercise is one of the most effective pain medications available to mankind.

*There are thresholds for both the intensity(>50% Vo(2) max) and duration (>10 min) of exercise required to elicit exercise analgesia

Hoffman MD, Shepanski MA, Mackenzie SP, Clifford PS. Experimentally induced pain perception is acutely reduced by aerobic exercise in people with chronic low back pain. J Rehabil Res Dev.Mar-Apr 2005; 42(2): 183-190

*. A 6 mile run stimulates endorphin release that is equivalent to 10 mg of morphine

Janal MN, Colt EW, Clark WC, Glusman M. Pain sensitivity, mood and plasma endocrine levels in man following long-distance running:effects of naloxe.Pain. May1984: 19(1):13-25

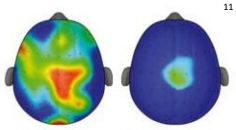
Slide 45

Why Exercise to promote healing of the damaged reward system? (H Little DPT APTA -KY Toolkit)

- Physical activity can reduce the risk of various neurologic diseases and protect the brain from the detrimental effects of aging.
- The most commonly reported area in the brain that benefits from exercise is the prefrontal cortex.
  - The prefrontal cortex is responsible for attention, working memory, decision making and other executive functions Basso 2017
- Exercise improves overall physical health, mental health and physical functioning.

Geneen 2017

11



Exercise No Exercise

Slide 46

Aerobic exercise for chronic pain

- Most pts. in chronic pain should aim to raise their exercises HR to ~ 100-110 beats per minute. Its not that much higher than their resting heart rate
- Example: To work through the fear of pain start walking 5 – 15 min per day 5 days per wk. Add a minute or 2 a day to get 30 min.=graded exposure

Slide 47

Aerobic exercise for SUD treatment Replaces a BAD Habit with a Great Habit because it is the best coping mechanism ever!

Gowans SE, deHueck A, Voss S, Silaj A, Abbey SE, Reynolds WJ. Effect of randomized, controlled trial of exercise on mood and physical function in individuals with fibromyalgia. Arthritis Rheum.Dec 2001; 45(6): 519-529

Sim J, Adams N. Systemic review of randomized controlled trials of nonpharmacological interventions for fibromyalgia. The Clinical Journal of Pain. Sep-Oct 2002;18(5):324-336

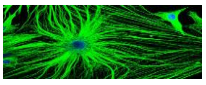
Goldenberg DL, Burckhardt C, Crofford L. Management of fibromyalgia syndrome. JAMA: the journal of the American Medical Association. Nov 17 2004;292(19):2388-2395

Slide 48

Exercise increases the levels of many Neurotransmitters and helps heal a damaged dopamine reward system:

All these neurotransmitters are involved in positive mood regulation:

- Dopamine
- Serotonin
- Norepinephrine
- Epinephrine
- Endocannabinoids
- Endogenous opioid peptides (endorphins)
- Exercise promotes the birth of new neurons and supporting glial cells (Lembke 2019)



Slide 49

Exercise's Effect [11]

Physical, Physiological, and Psychological

Study by Brellenthin et al 2021. APTA WI Toolkit G.Hoerchner

- Purpose
  - Study the effects of aerobic exercise on psychological variables and endocannabinoids in individuals with SUDs
  - Endocannabinoids
    - Lipid metabolites that have a role in synaptic modulation and plasticity
- Methods
  - Treatment as Usual (TAU) vs TAU plus aerobic exercise
  - 30 minutes of moderate intensity exercise, 3 times/week for 6 weeks
- Results
  - Reductions in perceived stress and craving for both groups
  - Exercise Group
    - Increase in anandamide
      - Neurotransmitter stimulating a sense of happiness and mental wellness

Slide 50

Exercise for SUD: What Does the Research Say?[2020]

APTA WI Toolkit byA.Van Den Elzer SDPT

The Benefits of Physical Exercise on Mental Disorders and Quality of Life in Substance Use Disorders Patients. Systematic Review and Meta-Analysis

Jorge Giménez-Meseguer, Juan Tortosa-Martínez * and Juan M. Cortell-Tormo

- ↑ physical fitness and quality of life, ↓ stress
- Moderate or vigorous exercise:
  - Greater acute benefits for craving after 1 session vs mild intensity exercise
- Conclusion:
  - Physical Exercise programs should be included in rehabilitation to maximize patient's recovery progress

Slide 51

Aerobic Exercise improves:

Appetite
Blood Flow and circulation
Brain function: cognition, concentration, motivation
Changes in Adrenaline
Decrease activation of ion channels , decreased sensitivity
Decreased firing of the nervous system
Decreased up-regulation of the CNS
Energy Level
Healthy Wt. control

Slide 52

Aerobic Exercise improves:

Heart Health
Digestive Gut Health
Depression \ Anxiety level decrease and moods swings and stress management
Immune system
Ischemic tissues
Memory (Alzheimer's and dementia)
Respiration
Sleep
Promotes healing of the damaged reward system and frontal lobe function !!!

Slide 53

Exercise and Pain

Favorite Adriaan Louw ISPI quotes "Motion is Lotion" and "Sore but safe"

- Don't say if it hurts don't do it. Pts don't need to be afraid of pain.
- In effective PNE its OK to: Tease it, Touch it, Nudge it but don't blow past it.
- PT needs to help the pt. set realistic goals
- With those pts. in SUD exercise can become the new obsession so be sure they don't over do it.

Slide 54

It is useful to add other types of exercise to your patient's work out: As a PT you are the exercise expert

+Warm up and cool down stretching before and after aerobic exercise is important to prevent pain and injury.

+Strength training: More important as you age because we tend to lose physical stamina , conditioning , bone density and muscle mass if you don't use weight bearing and strength training exercises as you age.

+Pain and fear of OA can inhibit exercise, but it is the best treatment. It is important to use lighter wts. and resistance with moderate to high repetition as you age and with chronic pain.

Slide 55

Other important types of exercise to your patient's work out

+Core Stability training and strengthening with improved bladder and fecal incontinence and spine pain.

+Balance and body awareness exercise like Yoga and Tai Chi help prevent falls and pain from stiffness and inflexibility as we age.

Slide 56

Mindfulness and meditation positive effects:

- Decreases reported pain levels
- Decreases stressful thoughts
- Improves relaxation and peacefulness
- Improves muscle guarding
- Improves sleep quality

- SEE More Info. @ APTA- WI TOOL KIT

Examples:

- Relaxation Diaphragmatic Breathing
- Calm/Abide apps
- Yoga
- Mediation hikes
- 12 step programs devotionals
- Scripture or proverb memory work
- Music meditation

Slide 57

Evidence for Mindfulness as an Intervention

- Reduced Rumination and Anxiety
- Reduced Stress
- Better Working Memory
- Increased Focus
- Less Emotional Reactivity
- Improved Satisfaction with Relationships

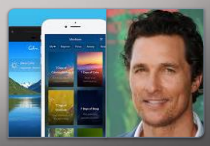
Alsubaie, Clinical Psych Review, 2017

Fjorback, Acta Psychiatr Scan, 2011

Slide 58

Some more references on mindfulness\relaxation\meditation\

- Hassett AL, Gevirtz RN. Nonpharmacologic treatment of fibromyalgia: patient education, cognitive-behavioral therapy, relaxation techniques, and complementary and alternative medicine. Rheum Dis Clin North Am. May 2009;35(2):393-407.
- Charalambous A,Giannakopoulou M, Bozas E, Paikousis L. A Randomized Controlled Trial of the Effectiveness of Progressive Muscle Relaxation and Guided Imagery as Anxiety Reducing Interventions in Breast and Prostate Cancer Patients Undergoing Chemotherapy. Evid Based Complement Alternative Med. 2015;2015:270876
- Williams AM, Cano A Spousal mindfulness and social support in couples with chronic pain. The Clinical journal of pain. Jun 2014;30(6):528-535
- Theadom A, Cropley M, Smith HE, Feigin VL, McPherson K. Mind and body therapy for fibromyalgia. The Cochrane database of systematic reviews. 2015;4:CD001980.



Slide 59

The role of the PT and the APTA in sleep health according to our HOD

- The American Physical Therapy Association supports collaboration to promote education, research, and practice between physical therapists and sleep medicine professionals to enhance the health and well-being of society. Physical therapists are part of an interdisciplinary team of licensed health services providers in prevention and management of sleep impairments and promotion of healthy sleep behaviors. The physical therapist's role includes using the best available evidence and standards of practice to: • Screen for sleep dysfunction; • Identify impairments related to sleep dysfunction; • Implement and progress therapeutic interventions to address impairments that interfere with sleep; • Educate society, patients and clients, caregivers and providers on healthy sleep behaviors and the relationship between sleep, pain, physical activity, function, health, and wellbeing; • Monitor and, if indicated, manage sleep quality and quantity in patients and clients to enhance physical therapy outcomes; and • Refer to sleep medicine professionals as indicated.
- Explanation of Reference Numbers: HOD P00-00-00-00 stands for House of Delegates/month/year/page/vote in the House of Delegates minutes; the "P" indicates that it is a position (see below). For example, HOD P06-17-05-04 means that this position can be found in the June 2017 House of Delegates minutes on Page 5 and that it was Vote 4. P: Position | S: Standard | G: Guideline | Y: Policy | R: Procedure Last Updated: 8/13/2020 Contact: nationalgovernance@apt

Slide 60

Sleep and Pain

- Insomnia is an independent risk factor for developing chronic pain. Generaal, Sleep, 2016
- Disrupted sleep is associated with musculoskeletal pain in adults. Liu,. Arthritis Care Res. 2016
- Poor sleep quality has been shown to induce generalized hyperalgesia, increase anxiety and affect one's ability to regulate cortisol in response to stress. Onen, J Sleep Res, 2001 Schuh-Hofer, Pain, 2013 Bassett, Stress, 2015

Slide 61

Sleep and Chronic MSK pain: taken from C Thorner DPT APTA –KY tool kit

- People who have difficulty sleeping report increased sensations of pain potentially due to decreased slow- wave sleep (3rd and 4 th stage).
- Sleep quality helps determines pain modulation.
- Pain has been associated with poorer sleep quality: difficulty falling asleep, staying asleep and sleep efficiency

Siengsukon 2017

Slide 62

SUD and Sleep : C thorner APTA – KY tool Kit

- Drug use alters our body's normal dopamine pathways.
- Dopamine is essential for our body's normal sleep wake cycles.
- Without enough sleep, our body craves dopamine even more , leading to drug use and impulsively.
  Volkow 2020
- Those with SUD tend to have more difficulty sleeping then those who do not have SUD.
- Lack of sleep in pts. with SUD causes distress that leads to even poorer sleep outcomes.
- Pts. with SUD experience less time in stages of deep sleep and more time in light sleep, leading to decreased sleep quality.
  Frers et al 2021

Slide 63

Opioids and Sleep

- Opioids are a major contributor to nocturnal hypoxemia and sleep-disordered breathing(apnea). Zulter, Curr Pharm, Des 2011
- Sleep architecture can be altered after one single dose of oral opioids in healthy adults . Dimsdate, J Clin Sleep Med, 2007
- Acute use of opioids can increase REM latency, decrease REM sleep time, decrease overall sleep time and decrease sleep efficiency. Angarita, Addict Sci Clin Pract, 2016

Slide 64

Stages of Sleep: quality and Quantity :

C Thorner : NIH.gov

N1 (non- REM)Rapid eye movement	Brain slows, easy to waken • 1-5 min.
N2 (non- REM)	Heart rate and breathing slow down, body temperature drops, increased brain activity • More difficult to waken • 10-25 min.
N3 (non- REM)	Muscles relax, HR and breathing slow down even more. • **Most bodily repair occurs in this stage** • 20-40 min.
REM	Rapid eye movement, vivid brain activity • Essential for learning, memory, cognition and creativity • Occurs first ~ 90 min mark

Slide 65

What happens when you don't get enough sleep?

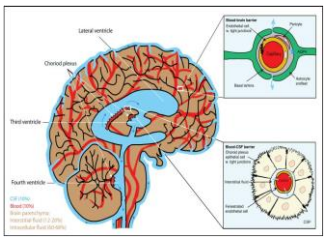
- During sleep we "take out the trash"
- Without enough effective sleep we shorten the time of the night shift work to get this done.
- Good sleep helps us emotionally process stressful things well.
- Good sleep strengthens our immune system

Slide 66

Sleep allows your brain to take out the trash at night so be sure you get 7-9 hrs

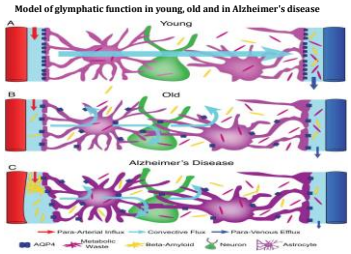
- An Australia study from Edith Cowan U found the gene that codes for protein Aquaporin4(AQP4) plays a role in the glymphatic system – the brain's clean up device that pumps out waste at night and helps you process information.
- It sweeps up debris and toxins that build up during the day, the key components that lead to plaques and tangles that lead to cognitive breakdown of dementia and Alzheimer's
- The better the brain gets rid of the excess amyloids that form brain plaques, the less risk of Alzheimer's. The less sleep you get, the less time the night shift has, to do its important work.

Slide 67



Jessen NA, Munk AS, Lundgaard I, Nedergaard M. The Glymphatic System: A Beginner's Guide. *Neurochem Res*. 2015;40(12):2583-2599. doi:10.1007/s11064-015-1581-6

Slide 68



Jessen NA, Munk AS, Lundgaard I, Nedergaard M. The Glymphatic System: A Beginner's Guide. *Neurochem Res*. 2015;40(12):2583-2599. doi:10.1007/s11064-015-1581-6

Slide 69

Sleep Hygiene: tips designed to let your brain go to sleep>>>Create your routine

- Set a reasonable time to go to bed that fits their life.
- Decrease all light stimulants: computer phone, TV 1 hr. before bedtime. No checking phone or email in bed!
- No large fluid intakes (including alcohol) 1-2 hrs. before bedtime to avoid stimulation to use the bathroom (getting up once to urinate is normal)
- Limit caffeine or GI irritating foods.
- Keep the bedroom sleep friendly: cool, dark (stimulates Melatonin) and uncluttered.

Slide 70

Sleep Hygiene: tips designed to let your brain go to sleep

- Limit animals or children in the bed or spouse hanging on you.
- Check mattress and pillow for good Orthopedic fit and wear and tear
- Have a notebook on bed stand to write down ideas you need to get out of your head that might keep you up.
- One hour before bed get a routine of light stretches, meditations, scriptures, calming music , Calm app sounds, breathing relaxation exercises etc.

Slide 71

Sleep Hygiene: tips designed to let your brain go to sleep

- Turn the lights off and keep the room as dark as possible (May need night light for fall prevention with seniors)
- If you can't sleep lying in bed don't fret because lying and resting can translate as another hour of sleep and is part for your body's recovery time.
- Brain has a glymph system and pumps out waste products and processes information from the day as you sleep.
- Most adults need 8-9 hrs. per day but get much less.

Slide 72

Sleep Hygiene: tips designed to let your brain go to sleep

- Have a set wake up time and if you wake up early lie and rest as this time counts as sleep recovery time as well.
- Aerobic exercise each day will assist with sleep quality but not right before bed for most people.
- Do PT HEP before bed or if you wake up in pain.
- Consult MD on sleeping aids if these tips don't fully work in the first 2-4 wks. Be patient.
- Recurrent nightmares may need with counseling.

Slide 73

Sleep Hygiene

- See APTA- WI TOOL KIT
- Wolfe F. Sleep problems and risk of fibromyalgia-untenable conslusions: comment on the article by Mork et al. Arthritis Rheum. May 2012;64(5):1692-1693 author reply 1693-1694
- Schaefar C, Chandran A, Hufstader M, et al. The comparative burden of mild, moderate and severe fibromyalgia: results from a cross-sectional survey in the United States. Health Qual Life Outcomes 2011;9:71
- Mork PJ, HilsenTI.Sleep problems and risk of fibromyalgia:longitudinal data on an adult female population in Norway. Arthritis Rheum.Jan 2012;64(1):281-284

- **SLEEP HEALTH SHEET**
- Sleep is needed for good health. Sleep can be disrupted when people experience stress, pain or other medical conditions. People can have trouble falling asleep, staying asleep or be unable to return to sleep if they wake too early. They may also have a sleep disorder, such as sleep apnea, which should be evaluated by a physician specializing in sleep medicine. The body needs sleep to naturally restore the immune, nervous, skeletal, and muscular systems. Good sleep also promotes positive mood, memory and clear thinking. You can support your body's natural ability to get healthy sleep by following the guidelines below:
- • **Stick to a consistent sleep schedule.** Go to bed and wake at the same time each day.
- • **Make your bedroom supportive to sleep.** Your bedroom should be cool and dark and as free as possible from sounds that might disturb or wake you.
- • **Your mattress and pillows should be comfortable.** A mattress will typically last 9 or 10 years before needing to be replaced.
- • **Practice a calming bedtime routine.** A calming routine helps your nervous system relax and prepare for sleep. Examples include listening to relaxing music or practicing a guided relaxation exercise, doing simple stretching exercises or taking a warm bath. Find what works for you and be consistent.
- • **Avoid bright lights and electronic devices before bed.** Bright light and electronic screen light suppresses melatonin production. This can lead to increased alertness and prevent the brain from winding down in preparation for sleep.
- • **Exercise.** Regular exercise promotes health and contributes to longer and more restful sleep. For some people, exercising too close to bedtime can make it difficult to fall asleep. If this is the case for you, exercise in the morning or early afternoon.
- • **Avoid caffeine during the 6 hours prior to bed**. Caffeine blocks the body's natural ability to relax, rest and sleep.
- • **Avoid alcohol, cigarettes and heavy meals in the evening.** Alcohol and cigarettes disrupt sleep while eating a big meal can cause indigestion that also makes it hard to sleep.
- • **A bedtime snack can promote sleep.** The best bedtime snack to support sleepiness contains both protein and carbohydrate, such as cereal with milk.
- • **If you have problems sleeping, avoid naps.**
- • **Calm your mind with calming thoughts.** At bedtime or should you wake, repeat calming phrases while breathing deeply as an alternative to thinking about your worries. An example is: "May I be peaceful. May I be safe. May I be at ease."
- • **Put your stress to rest.** Imagine hanging your stressors in a hall closet or placing them in a helium balloon and letting them float away for the night.

Slide 74

Counseling and accountability groups

- Individual counseling to work through the triggers that lead to " drugging or drinking it "
- 12 step AA
- Celebrate Recovery\ step studies
- Individual drug and alcohol counseling'
- Group therapy
- Cognitive Behavioral Therapy>>> Create your own referral resource network

Slide 75

Lifelong exercise prescriptions with PT tweaks

- Use pictures with starred exercise for flareup or videos
- Exercise logbook
- Educate and exercise: Sell it
- Lydia's house example of group exercise with meditation, music, breathing, aerobic, stretching , strengthening , core activation, goal setting and cool down
- Walking program couch to 3K

Slide 1

LECTURE 5 USE ALL THE NEEDED PT TOOLS IN YOUR TOOL BELT.

- How do Pain neuroscience education (PNE), manual PT, Therapeutic Exercise, Graded exposure , modalities , wellness and PT Relapse prevention education Fit into treatment of the patient with MSD and SUD

Slide 2

OBJECTIVES:

Following this lecture PTs will be able to identify why the listed treatment modalities are effective in the plan of care of patient's with MSD and SUD:

- PNE: pain stories
- Various types of Manual PT
- Various types of therapeutic exercise including aerobic, strength training, stability and stretches
- Graded exposure
- EGS
- PT relapse prevention education
- Wellness and 12 step programs and counseling as needed
- PT booster sessions

Slide 3

PNE+ PROGRAM HAS 4 PILLARS:

- The PNE + program facilitates naturally occurring endogenous mechanisms, is far more powerful than the current pharmaceutical approach, and has little to no side effects. As the various aspects of the PNE+ program are applied, tapering of pharmaceuticals should occur per physician discretion. "Pain Neuroscience Education; Teaching People About Pain 2 nd Edition. A Louw

Slide 4

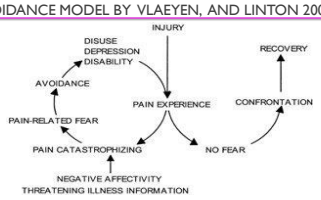
FOR CHRONIC LOW BACK PAIN PNE: NUMBER NEEDED TO TREAT (NNT) WITH PNE AND TO IMPROVE PAIN AND FUNCTION

- Best combo is PNE Plus PT
- For Function NNT 2:1
- For Pain NNT 3:1

- Mosley L. Combined physiotherapy and education efficacious for chronic low back pain.Aust J Physiother. 2002; 48(4):297-302
- Louw A, Diener I, Landers MR, Puentedura EJ. Preoperative Pain Neuroscience Education for Lumbar Radiculopathy:A Multicenter Randomized Controlled Trial With 1-year Follow-up.Spine.Aug 15 2014;39(18):1449-1457
- Louw A, Zimney K,Puentedura EJ, Diener I.The efficacy of pain neuroscience education on musculoskeletal pain:A systematic review of the literature. Physiotherapy Theory and Practice. Jul 2016;32(5):332-355

Slide 5

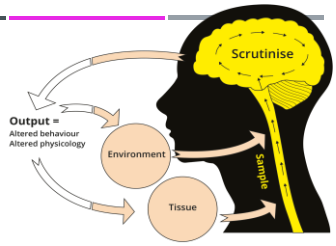
FEAR- AVOIDANCE MODEL BY VLAEYEN, AND LINTON 2000-2016



Slide 6

We now explain pain to patients with the conceptual model of the Mature Organism Model (MOM)

L .Gifford. Pain, the tissues and the nervous system: a conceptual Model Physiotherapy 1998 ,vol 84 , no 1



Slide 7

WHY DID MY NERVES STAY SENSITIVE? THIS DIDN'T HAPPEN TO MY NEIGHBOR.

- Past experiences of SUD ,ACES and PTSD
- Fear and anxiety
- Family Concerns
- Job, financial Issues
- Failed treatment
- Different explanations of what happened

Slide 8

PNE :WHY DO I HURT BY ADRIANN LOUW PT , PHD PAIN STORIES

- Your tissues and your nerves: Review your body contains 45 miles of nerves over 400 individual nerves – all connected like a network of roads
- Your sensitive home alarm system
- Ions Channels
- Your Brain the CEO and pain meetings
- Nosy Neighbors
- Your body under attack : Lion in the room
- The above pain stories were adapted from material from this resource
  - Why Do I Hurt ? A patient book about the neuroscience of pain
  - It is recommended to be used along side for additional patient information

Slide 9

YOUR SENSITIVE ALARM SYSTEM

- by A.Louw

Slide 10

SECTION 1 YOUR TISSUES AND YOUR NERVES

Sections 1-7 taken from Why Do I hurt?

A patient book about the neuroscience of pain. by A. Louw 2013 and should be used with this patient booklet for PNE.

- Each of your body areas where you are experiencing pain has nerves in and all around them.
- Your body contains 45 miles of nerves and > 400 individual nerves all connected in a network connecting all body parts to the spinal cord so messages can be sent to the brain for analysis.
- If you step on a nail the nerves in your foot send messages by electrical impulse to the spinal cord and then to the brain to alert it so it can decide what action is needed to protect you.
- The brain's action may include a pain , a limp, stress chemicals, telling you to take action and get the nail out or get help to get you out of danger.
- It sounds the alarm and creates a memory of this experience for future reference.
- The alarm system should quiet down when the nail is removed, and you are out of danger. The wound heals and your nervous system to get ready for the potentially dangerous situation.
- Your body produces chemical responses to heal the wound along with a tetanus shot.

Slide 11

NEW NEUROPATHWAYS

- Recovery = **Decision** to change the brain structure
- Recovery = **Creation** of new hiking trails in the brain
  - New habits creates new neuropathways
  - The brain was changed through adaptation into dependence…
  - The brain can be changed through sustained and repeated healthy recovery habits…with intention and attention
- The Challenge of Change
  - Opioid-dependent patients are dealing with the "old forest"
  - Multidisciplinary approach to patient care
  - Obtaining buy-in

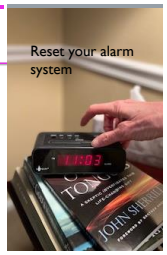
Slide 12

AEROBIC ACTIVITY TREATS CENTRAL SENSITIZATION

- (Courtney, 2017), (Louw, 2013), (Louw, 2014)

Pt's need to be reeducated because they must learn to confront their fears of movement with regular aerobic exercise :

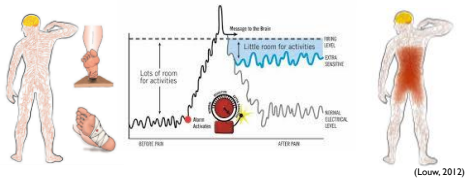
- Forge new trails and pathways to healing
- Build new pathways in your brain
- Sore by safe
- Motion is lotion
- Hurt does not equal harm



Slide 13

CENTRAL SENSITIZATION: TREATMENT
THERAPEUTIC PAIN NEUROSCIENCE EDUCATION

The Body's Living Alarm System



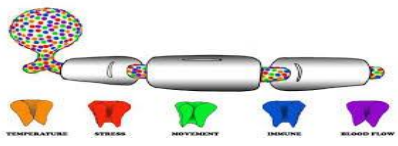
(Louw, 2012)

Slide 14

ION CHANNELS

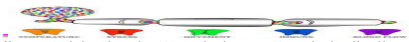
Slide 15

ION CHANNELS
REMEMBER WE TEACH IN PNE THAT WE CAN BECOME EXTRA SENSITIVE TO THE FOLLOWING AREAS. PT\PNE+ CAN HELP RESET OUR ALARM SYSTEMS.



Slide 16

MORE DETAILS ON THE ALARM SYSTEM… ION CHANNELS FOR TEMPERATURE, STRESS, MOVEMENT, IMMUNITY AND BLOOD FLOW



- You may notice the beyond normal sensitivity , you have become sensitive to other things like cold **temperature,** stress, pressure , movement and blood flow and immunity:
- 1-There are sensors in your nerves that tell you if there is a change in temperature. So you might feel more aches and pains when its cold out.
- 2-There are sensors in nerves that are sensitive to stress chemicals flowing in your blood. The more stressed and anxious you are the more stress chemicals , like cortisol run through your body and therefore more stress sensors are activated.
- 3-There are sensors in your nerves that are sensitive to movement and pressure around them. Movement after surgery or injury may activate a few more sensors and make movement extra sensitive for a little while.
- 4-When you are sick (ie flu) there are many molecules floating around the body, helping you fight off illness. This also happens following surgery or injury. Research now shows that when you are really worried about an inflamed part of your body, you'll have an immune response. Nerves have sensors telling them of the increased immune molecules, and the immune chemicals produced can make you ache.

Slide 17

MORE DETAILS ON THE ALARM SYSTEM INCLUDE ION CHANNELS FOR TEMPERATURE, STRESS, MOVEMENT, IMMUNITY AND BLOOD FLOW : CONTINUED

- 5- Blood flow: There are sensors in your nerves that are sensitive to the amount of blood around your tissues. When blood flow slows down slightly, after sitting too long for example, these sensors " wake up " and make the nerves sensitive. – So listen to your body and get up and stretch.
- Key Points:
- 1-When you develop pain , your nerves increase their sensitivity to protect you.
- 2-This is a normal response that happens in every human being.
- 3-These sensors are constantly updated based on your environment.

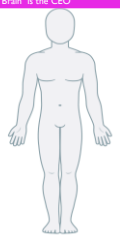
Slide 18

YOUR NOSY NEIGHBORS: IT FEELS LIKE MY PAIN IS SPREADING

1- When you develop pain in an area of your body and the nerves in that area "wake up", there are usually some nosy neighbors that want to know what is going on and why your alarm system went off in the first place.
2- As the neighboring tissues are awaken it is not uncommon for the nosy neighbors to experience some sensitivity such as aches and pain or to sense a spreading pain.
3- The police (various immune molecules) are called into inspect the neighborhood because of the alarms going off. They go door to door waking up more neighbors to investigate and make the situation a little testier.
4- Its important to know that previous crimes in your neighborhood like old surgeries, scars and old injuries will definitely be checked out by the police and agitated nerves may be felt as aches but they may not indicate injury.
5- Remember there are nerve sensors that will sense the immune molecules. Old aches and pains may show up again, but it is due to sensitivity not injury.

Slide 19

Your Body INC.
Your Brain is the CEO



YOUR BRAIN IS THE CEO OF YOUR BODY'S COMPANY .

WHEN YOU ARE IN CHRONIC PAIN, IT IS KEPT BUSY IN A LOT OF PAIN MEETINGS

(Louw, 2012), (Louw 2014)Explain Pain Materials A. Louw

Reporting Departments in the pain meeting:

- Arm Department
- Leg Department
- Neck Department
- Thoracic Department
- Lumbar Department

Slide 20

SECTION 3
YOUR BODY'S CHIEF EXECUTIVE OFFICER

- All the areas in which you experience pain have extra-sensitive nerves.
- They need to send info somewhere so something can be done. Info goes from nerves> spinal cord>to the brain. The Brain analyses and takes action such as stopping movement in a painful body part and sending you to see an MD.
- When pain persists your brain (the CEO of your body) keeps analyzing and can even over analyze trying to figure out the solution to protect you.
- Think of your brain as the top floor of a company called your body. The divisions like the feet ,leg back arms , neck and head are the divisions of the company.
- The CEO on the top floor asks for more detailed reported to try to figure out the problem because he is worried and instead of monthly reports he now asks for weekly reports and makes all the divisions over analyze and send the reports directly to him and not follow the normal change of command.

Slide 21

CEO TAKES ACTION: LOW BACK EXAMPLE: SORE FOR THE PAST 5-10 YRS.

- The old back injury is healed.
- The tissues are still tired, sore , tight , deconditioned and sensitive.
- The lower- back division is underperforming.
- The CEO investigates and find 5 people were off on vacation and then 5 more went on leave ,leaving the department short staffed.
- The brain decides after PT/PNE+ the problem of deconditioning can be fixed, and the division restored to better than full capacity .
- He can now get normal weekly reports, then goes to normal monthly reports and then back to normal as the threat is taken care of as PT/PNE+ continue to solve the problem.
- Once the patient in pain is educated about this reason for extra sensitive nerves sending danger messages processed as pain by the brain the nerve sensitivity begins to turn down.

Slide 22

ALL CLEAR!>>>>>>>>>>>

I understand what is going on in my body.

I am in PT and doing my exercises and getting better!

I don't have to use opioids including Suboxone or Methadone because I can now manage my pain with PT plus\PNE

My recovery is more important.

Slide 23

LION IN THE ROOM

Slide 24

SECTION 6
YOUR BODY UNDER ATTACK: LION IN THE ROOM

- You are sitting in a chair and all your systems are relaxed. Suddenly, a huge lion bursts into the room and jumps in the chair beside you.
- To deal with immediate threat ,your body systems will react to protect you, shifting the balance to prioritized tasks.
- These systems are:

  Adrenaline, Muscles, Stomach, Language, Breathing, Pain, Healing, Intimacy, and others

Slide 25

SYSTEMS UNDER ATTACK WHEN THE LION ENTERS THE ROOM

1- Adrenaline: This is a stress hormone that controls breathing, heart rate, blood flow, levels of alertness and more. Responding to the lion your HR increases rapidly to pump blood through the body areas needing blood and O2 such as your big muscles. Adrenaline causes you to be alert and ready to run if needed.
2-Muscles: In an immediate threat the large muscle groups are ready to respond to help escape or fight as needed. Smaller postural muscles or abdominal muscles are not needed in this crisis moment. They will be turned back on after the crisis is over. PT can help with this.
3-Stomach: Digestion of food is slowed down or even put on hold, allowing for possible energy and blood to flow to be directed to the immediate, much-needed systems
4-Language: When startled with a threat such as the lion, you might say a few choice words.
5-Breathing: With the threat, breathing becomes faster and shallower.

Slide 26

SECTION 6:SYSTEMS UNDER ATTACK WHEN THE LION ENTERS THE ROOM CONTINUED

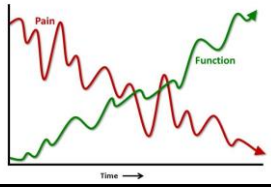
6-Pain is a perception of the threat. In this case it would be a perception of greater threat.
If you stepped on a nail while running from the room with the lion , you wouldn't feel pain because the lion is a bigger threat per your brain's decision.
7-Healing: Your immune system helps you stay healthy and fight infections. During this lion threat this system is not needed so healing is slowed down. Your immune system can be resumed tomorrow if you are able to get away from lion.
8-Intimacy: When the lion enters the room sexual intimacy and attraction are put on hold and low priority. There is no time for intimacy: there are bigger threat issues because a lion is in the room.
9-Other responses such as lack of motivation and poor memory also can occur.

Slide 27

Slide 28

CENTRAL SENSITIZATION: TREATMENT PROGRESS

THE PREDICTED PATH OF RECOVERY IN CHRONIC PAIN: A.LOUW 2016 : DRAW THIS FOR YOUR PATIENTS AS PART OF YOUR PNE



(Louw, 2018)

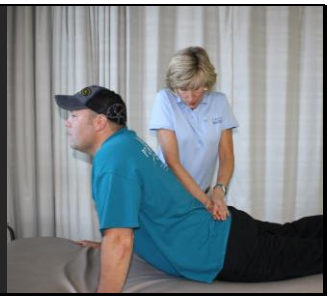
Slide 29

MANUAL PT

USE YOUR GRADES EFFECTIVELY 1-5

TEACH PATIENTS HOW TO SELF MOBILIZE AND DON'T CREATE DEPENDENCE

PUENTEDURA EJ, ET AL 2016, LOUW A, ET AL 2017,



Slide 30

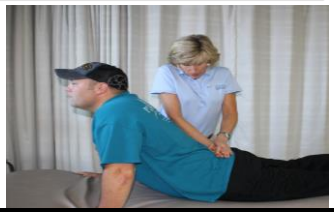
MANUAL PT

USE YOUR GRADES EFFECTIVELY 1-5

- Teach patients how to self mobilize and don't create dependence.

Puentedura EJ et 2016

Louw A et al 2017



Slide 31

NEURAL MOBILIZATION

- Test with SLR , Slump test, ULT in addition to other neural gliding tests
- Treat with graded exposure approach. Be care to prevent flares up but move into the pain with each stretch
- Nerves love space and gliding and hate edema and compression. Respect the healing process or you will have a mad pt.
- MDT : approach adhered nerve root treat in the subacute phase could take 3 months to resolve
- HEP of daily stretches

Santos FM et al 2012, 2014, Beneciuk JM et al 2009

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GRADED EXPOSURE

- Sample Language :nudge the pain, Avoid the boom to bust cycles, Divide the tasks in parts with rest breaks,
- Manual PT is a form of graded exposure : using grade I small movement to larger movements
- Walking 3 min progressing to 30 min
- Cooking dinner or cleaning house: use rest breaks, Divide the job into parts with the patient.
- Yard Work: divide the job into parts
- In a work comp injury work Conditioning , work Hardening , FCE , retraining See case study

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FOCUSING ON FUNCTION VERSUS PAIN RESULTS IN SUPERIOR OUTCOMES KNOW PAIN, KNOW GAIN : A. LOUW 2016

- Don't ask about pain every visit focus on function.
- Ask about their most important goal and the progression being made toward it.
- Discuss and celebrate victories.
- When setbacks occur , problem solve to figure out why they might have occurred.
- Ask the questions and let the patient figure out and apply the solutions to empower them. Use MI when needed.
- Teach them to take responsibility for their healing process and build Self efficacy measured in the REP Index.
- Teach them to make the necessary changes for success and link them to their personal achievements to achieve one small victory after another.

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DRY NEEDLING , A GOOD NON- PHARMACOLOGIC TREATMENT BUT BE CAUTIOUS WITH>>>

- IV users
- Cutters
- Dependency
- Hep C and HIV positive patients

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REVIEW POSITIVE EFFECTS OF AEROBIC EX

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AEROBIC EXERCISE PER A. LOUW ISPI
MOTION IS LOTION AND IMPROVES:

Appetite
Blood Flow and circulation
Brain function: cognition, concentration
Changes in Adrenaline
Decrease activation of ion channels , decreased sensitivity
Decreased firing of the nervous system
Decreased up-regulation of the CNS
Energy Level

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AEROBIC EXERCISE IMPROVES:

Heart Health
Digestive Gut Health
Depression \ Anxiety level decrease and improved mood
Immune system
Ischemic tissues
Memory (Alzheimer's)
Respiration
Sleep
Rewiring the damaged reward system

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STRENGTH TRAINING

- Consider age , chronic pain levels, osteoporosis risk. Remember you are the expert and most qualified to design a safe program for your Pt.
- As your pt. ages they tend to lose physical stamina , conditioning , bone density and muscle mass. You must teach them to use weight bearing and strength training exercises to help them age well.
- Chronic Pain and fear of OA can inhibit exercise, but exercise with stretches is an effective treatment. It is important to use lighter wts. and resistance with moderate to high repetition as you age and with chronic pain. Challenge them safely.

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CALL IT CONDITIONING TRAINING NOT STRENGTH TRAINING

- Chronic pain patients in recovery are not typically weak but are usually deconditioned.

- A person must lose 70% muscle mass to become structurally weak
- These patients have low endurance so use graded exposure and pacing
- Use terms like:
- its ok to be "sore but safe "not no pain no gain
- Use light weights, High Reps for chronic pain and building endurance
- Seniors will benefit even more with preventing bone loss

Slide 40

STABILIZATION EXERCISE

IF THE LION IS IN THE ROOM CONSTANTLY THE SYMPATHETIC NERVOUS SYSTEM IS ON HIGH ALTER SHUTTING BLOOD TO BIG FIGHT OR FLIGHT MUSCLES. SPINAL STABILIZERS DEACTIVATE AND NEED TO REBUT. MAKE SURE THE FEED FORWARD MECHANISM AND RECRUITMENT OF THE TRUNK MUSCLES IN PEOPLE WITH LBP ARE REPROGRAMING.

HODGES PW ET AL 1997, 1998,1999,

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PAIN CONTROL HELPED WITH STABILIZATION EXERCISE

- When the Lion is in the room the motor cortex is in a "pain meeting" the pain neuromatrix is activated .
- Its very hard to concentrate on precise , specific muscle contraction like " only contract your Transversus Abdominus
- The higher the fear and frustration of the patient the more difficulty they have with co-contractions or specific muscles group contracts
- Higher fear level of the pt. will facilitate more difficulty with motor control.
- Keep your instructions simple and less frustrating
- Help the pt. activate groups of muscles not isolated contractions (especially true with chronic pelvic pain pts and urinary incontinence)
- Can go to PT specialists in biofeedback.
- Women's health consideration: may need counseling for traumatic sexual assault and pelvic floor pain and dysfunction

Puentedura EJ, Louw A 2012

Moseley GL, Hodges PW 2006

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CHRONIC PAIN PATIENTS IN SUD CONSIDERATIONS

- The longer the pain and addiction has been going on means it may take longer to unlearn the behaviors and thought patterns associated with pain and unhealthy coping mechanisms
- Neuroplasticity takes time : Be Patient they will disappoint you and themselves at times

https://www.khanacademy.org/science/health-and-medicine/nervous-system-and-sensory-infor/neural-cells-and-neurotransmitters/v/neuroplasticity

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Stretching and flexibility and balance training

- Yoga
- Tai Chai
- Body awareness positioning exercises helps remap the brain and decrease pain
- Red Dot stretches \ exercises you do in a flare up on bad day
- Maintenance stretches to prevent pain with aggravating activities such as long drives

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MODALITIES

- Gate theory of Pain: modalities close the gait but don't' create dependency
- Can be used for comfort measures in detox: soft tissue release, tens,
- Too many modalities is a red Flag to insurance companies to deny payment
- Use a trial of Tens at home.
- Better than opioids with no side effects
- Ice is the best anti-inflammatory with no GI bleeding risks, slows C fiber activity
- Apply Tens for function but don't' let the patient create Boom Bust cycle
- EGS including TENS has been shown via the Gate control theory to alter the pain experience by altering the input to the CNS and therefore its treat appraisal

Fordyce W et al 1973,Kroeling P, et al 2009, Iverson MD et al 2011

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CHRONIC PAIN CONSIDERATIONS

- Have you taught your patients to use Ice \ Heat\ Tens at home if needed
- Do they know their **flare up** exercises\ stretches?
- Do they know how to avoid Trigger situations?
- Do they know how to Prioritize to decrease stressful situations?
- Do they know what caused the flare up and how to treat it and when to see you again?
- Wean out of PT not an abrupt stop.
- Do they have a good support group ?
- Are they following their exercise prescription, or do they need a PT tweak?
- Encourage patient problem solving and coping skills

Keefe FJ 1990, Nielson M, 2014, Holt-Lunstad 2015 ,Yang YC, 2016

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WELLNESS AND LIFELONG EXERCISE

YOU ARE TEACHING A LIFE-GIVING SKILLS TO REPLACE DRUGS AND OTHER SUD WITH HEALTHY COPING SKILLS LIKE EXERCISE>>>> WHAT ELSE?

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RELAPSE PREVENTION : DOES YOUR PATIENT HAVE OR NEED:

- An accountability group: AA, Al-anon, NA, Celebrate Recovery, 12 step programs , inventory and sponsors
- Support system versus enablers
- Positive versus negative environment (work or play)
- Triggers and stress management
- Sleep
- Nutrition
- Meaningful work or volunteer opportunities for a positive life purpose
- Counseling individual and group
- Spirituality and mindfulness

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- Relapse Prevention Check list: Ask am I…..
- **Physical Issues**
- 1-Getting enough sleep? 7-9 hrs.
- 2-Eating in a healthy way and at a healthy weight ?
- 3-Getting enough exercise? At least 150 min per wk.
- 4- Drinking 64 oz clean water per day?
- 5- Treating mental health issues?
- **Spiritual Issues**
- 6- Reserving a daily time for inspirational reading , meditation and spiritual development
- 7- Attending my support group, and sponsor meetings ?
- 8- Working my 12 step program?

Emotional Issues

- 9- Giving back to others in my recovery?
- 10- Holding onto toxic unforgiveness, bitterness and resentment and becoming isolated?
- 11-Entertaining a toxic relationship?
- 12-Developing unhealthy coping skills with another habit?
- More info at APTA-KY and soon WI Tool Kit

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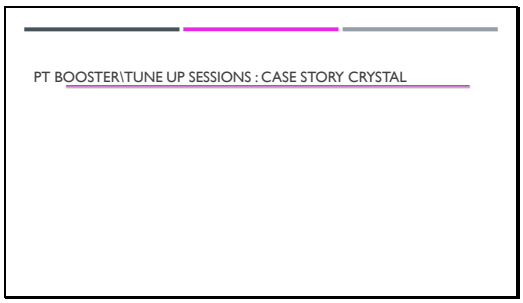

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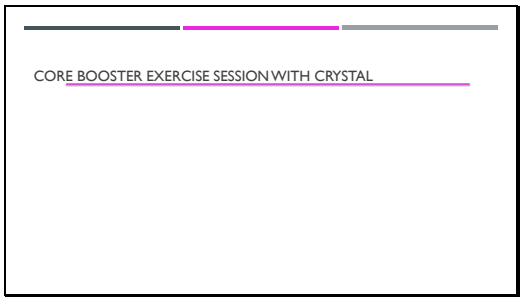

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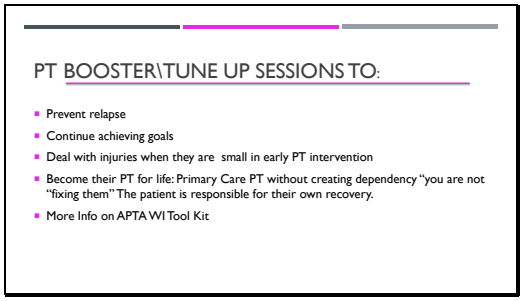

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GOAL SETTING:
AVOID THE EXTREMES OF HAVING NO GOALS OR TOO MANY OR UNREALISTIC GOALS

- Tap into your patient's deep concerns:
- functional goals
- Job goals
- Social goals
- Family goals
- Use Pacing and graded exposure : Divide it into parts

Schmidt SG 2016 , Louw A, Puentadura EL , Mintken P, 2012

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TREATING PATIENTS IN RECOVERY

35 yr old RN lost his license due to narcotic addiction and in the last month injured his back 2xs as an underground coal miner and was in recovery from addiction but vulnerable to relapse.

PT and pt. and neurosurgeon, formed a plan to taper off Lortab ASAP in few weeks. Used steroids and Tramadol for a few weeks for LE pain.

Treated with CS precautions , MDT, Osteopathic approach for new HNP and LE radicular pain. Treated for adherence Nerve root and sciatic with sensitization slowly improving.

After PT 6 weeks, Pt had WC WH 6 wks for , strength and lifting training for industrial rehab to prepare for retraining and return to nursing with FCE. Pt avoided back surgery and relapse.