The Exercise Alternative: The Not So Quick Fix

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Outline

- Does exercise play a role in decreasing use of pain medication?
- How does exercise reduce pain?
- What are the different forms of exercise?
- Is there research to support exercise for people with chronic pain?
- Where can I get started?
Can Exercise Reduce Pain?
Story of the Tortoise vs Hare...

Exercise is at least as effective as the BEST pharmacologic treatments.
Source

versus

Cause

The Pain Pathway

1. Site of Injury
   - Slow, unmyelinated fibers
   - Fast, myelinated A-fibers

2. Spinal cord
   - Afferent nerve fiber

3. Brainstem
   - Spinothalamic tract
   - Synapse
   - Dorsal ganglion

4. Cerebrum
   - Somatosensory cortex
   - Limbic system
   - Thalamus

Reticular formation

Mid-pons

Source 

versus 

Cause
Pain Biology and Chronic Pain

- Pain is a conscious protective response, evaluated by the brain.
- The pain pathway can become over reactive and the reason for increased pain.
- Pain does not always equate to actual tissue damage.
- How you interpret pain is important in your recovery.
  - Confidence in performing activity regardless of pain.
  - Fear-Avoidance Beliefs.
  - Do not search for pain.
  - “Know Pain, Know Gain”

Moseley GL., Eur J pain, 2004
Karlson et al, SAGE Open Medicine, 2016
How does exercise decrease pain?

- Distraction
- Conditioned Pain Modulation
  - Exercise-Induced Pain
- Brain Changes
- Brain Messengers
  - Serotonin
  - Endocannabinoids
  - Endogenous Opioids (endorphin)

How does exercise decrease pain?

- **Brain Changes**
  - Females with fibromyalgia
  - Compared exercise (25 min of cycling) and quiet rest
  - Exercise stimulated brain regions involved in decreasing pain in fibromyalgia
  - Effects lasted for 20-30 minutes, BUT possible repeated exposure to exercise could result in PERMANENT improvements.

Ellingson, et al., 2016.
How does exercise decrease pain?

- **Endocannabinoids**
  - Exercise increases AEA, PEA, and OEA levels following resistive (isometric) and endurance exercise.

- **Cannabinoid receptors are located in the pain processing areas of the brain and spinal cord**

- **Cannabinoids suppress pain signal processing**

- **If receptors are blocked, research shows increased pain.**

  Koltyn et al., J Pain, 2015.
How does exercise decrease pain?

- Endogenous Opioids (Endorphins)?
- Muscle contractions activate A-delta and C nerves, which in tum activate the opioid system.
- Increased endorphins found post-exercise
- This likely results in inhibited pain signal in the spinal cord and brain

Thoren et al., Lipids, 2008.
Kjaer et al., Am J Physiol Department of Anesthesia, 1991
Solomon, Headache, 2002
How does exercise decrease pain?

- **Endogenous Opioids?**
  - When an opioid blocker was given to exercise participants, decreased pain was still found.
  - Opioids are not the only pain reducer!

Koltyn et al., J Pain, 2015.
Forms of Exercise

1) Resistive
   - Dynamic vs Isometric
2) Aerobic
3) Stretching
4) Balance

Which results in the biggest reduction in pain (short term)?

- For healthy adults, isometric and dynamic resistive exercise is more beneficial than aerobic
- For chronic pain, variable
- In fibromyalgia, aerobic > resistive > stretching
- Younger adults (21yo) have greater reduction than older (63yo)

Naugle et al., J pain, 2016.
**RPE Chart**
Rate of Perceived Exertion

10
**Max Effort Activity**
Feels almost impossible to keep going. Completely out of breathe, unable to talk.

9
**Very Hard Activity**
Very difficult to maintain exercise intensity. Can barely breath and speak a single word.

7-8
**Vigorous Activity**
On the verge of becoming uncomfortable. Short of breath, can speak a sentence.

4-6
**Moderate Activity**
Feels like you can exercise for hours. Breathing heavily, can hold short conversation.

2-3
**Light Activity**
Feels like you can maintain for hours. Easy to breathe and carry a conversation.

1
**Very Light Activity**
Anything other than sleeping, watching TV, riding in a car, etc.

**EXERCISE:**
**How Much Do You Really Need?**
Recommendations: Aerobic Exercise

- Parameters
  - Walking, Biking, Swimming
  - 30-60 minutes/day
  - 3-5 days/week (150-300 minutes)
  - Moderate intensity (5-6/10) or self-selected intensity
    - AVOID VIGOROUS

- Progression
  - Increase speed, intensity, duration.

Recommendations: Resistive Exercise

- **Parameters**
  - 2+ days/week
  - 2-3 sets, 8-12 repetitions
  - 8-10 exercises for major muscle groups (legs, hips, back, abdomen, chest, shoulders, arms)
  - 5-6/10 Intensity
  - 24-48 hours of rest

- **Progression**
  - Weight increase by 5-10 lbs for big muscles, 2.5-5 lbs for smaller muscles.
**Recommendations: Resistive Exercise**

- **Isometric Exercises**
  - Hold for 2-3 minutes at 25-50% of max resistance
  - Results in decreased pain on side you performed the exercise—and the opposite limb, which was never moving!
  - Longer duration holds resulted in greater pain reduction.
  - Mixed evidence for those diagnosed with fibromyalgia. But likely need to be at lower intensity, ~10%.

References:
Recommendations: Flexibility Exercise

- **Parameters**
  - 3-5+ Days/week
  - 30-60 second holds (elderly require longer time)
  - Slight discomfort but no pain

- **Progression**
  - Need to perform until a stretch is felt

Recommendations: Exercising with Recent Flare Up

- Recognize every day is NOT the same
- Apply ice/heat/creams prior
- Stretching as tolerated
- Reduce intensity of exercise
  - 3-4/10 Intensity
- Isometric exercises helpful for osteoarthritis exacerbation
  - 30% of max effort and progress to 75% for <6 sec holds, 8-10 contractions
- OKAY to take the day off but try to maintain 2 days/week

Activity Modification

- Sleep
  - Same time, Same amount
- Energy Conservation and Pacing
Key Takeaways

- Motion is Lotion
- Use it or Lose it
- Commit to be Fit
- There is never an ideal time

Tiny tweaks can lead to big and lasting changes

This woman is 84 years old. She has completed the New York Marathon 24 times in a row. Eh...what was your excuse again?
Hospital Resources

WWW.TORRANCEMEMORIAL.ORG/COURSES
- Fibromyalgia Workshop
- Tai Chi
- Mindfulness Meditation
- Sounder Sleep
- Yoga for Everyone
- Walking Qi Gong
- Chair Exercises
- Stretching for Better Balance
- Muscle Strengthening Beginning
- Mat Pilates

WWW.SILVERSNEAKERS.COM

#ChoosePT

DO IT!
DO IT NOW!