WHILE WE'RE WAITING, PLEASE FILL OUT OUR RESEARCH SURVEY!

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MINI MED SCHOOL EXERCISE SERIES

Talk 1: Bones and Muscles

JULIA DE PIERI, BSCHK, UBC MD CLASS OF 2024

a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA
Faculty of Medicine

University of Victoria

let's talk science

TERRITORIAL ACKNOWLEDGEMENT

I would like to begin by acknowledging that I am joining you from the unceded territory of the Coast Salish Peoples, including the territories of the xwməθkwəy̓əm (Musqueam), Skwxwú7mesh (Squamish), Stó:lō and Səl̓ílwətaʔ/Selilwitulh (Tsleil- Waututh) Nations.

I would also like to acknowledge the Lekwungen peoples on whose traditional territory the University of Victoria stands and the Songhees, Esquimalt and Wsanec peoples whose historical relationships with the land continue to this day.

DISCLOSURE

I am a medical student. These talks do not constitute or substitute for medical advice. Please consult with your healthcare provider before making any modifications to your current treatment plan.

I worked as a research assistant in a lab looking at knee osteoarthritis and how walking and running can help with disease progression. I will be mentioning some of the things I learned during that time.

TOPICS

- Osteoarthritis
- Osteoporosis (+ Fall Prevention)
- Muscle Wasting
- Back Pain

POLL:

HOW MANY OF YOU HAVE EVER RECEIVED AN EXERCISE PRESCRIPTION FROM YOUR DOCTOR?

A) YES

B) NO

POLL:

CURRENT GUIDELINES SUGGEST YOU SHOULD GET ____ MINUTES/WEEK OF AEROBIC EXERCISE

A) 30 MIN/WEEK
B) 60 MIN/WEEK
C) 150 MIN/WEEK
D) 300 MIN/WEEK

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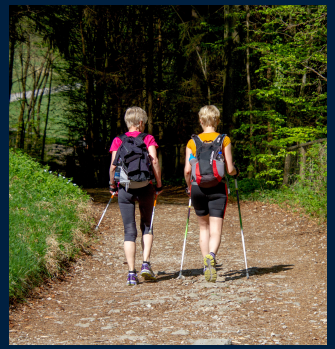
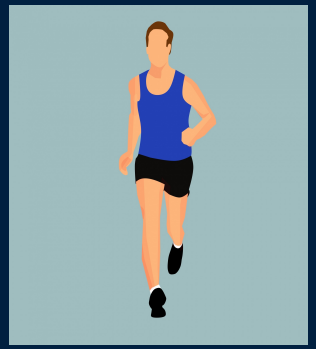
AEROBIC EXERCISE

Aka ”cardio”

Any form of exercise that will lead to cardiovascular (heart) improvement.

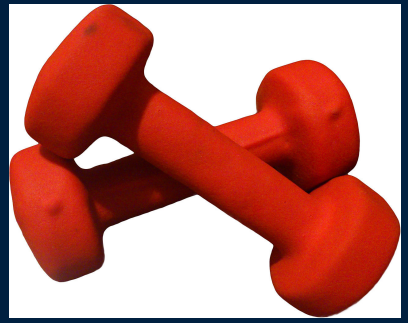
Your heart rate and respiratory rate will increase!





RESISTANCE/STRENGTH EXERCISE

Any form of exercise that will increase muscular strength and endurance.



FLEXIBILITY

Aka ”stretching”. Goal is to lengthen your muscles.

OSTEOARTHRITIS

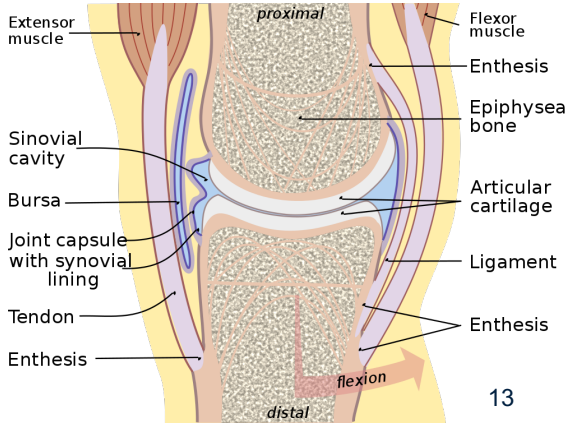
A progressive disease of the whole joint that leads to breakdown of joint cartilage and the underlying bone.

WHAT HAPPENS TO THE CARTILAGE

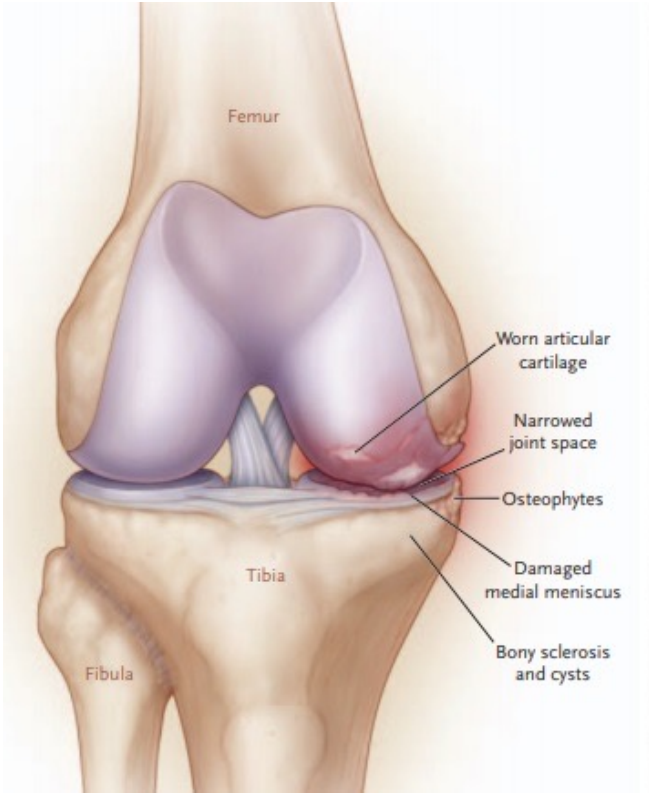
- Cartilage protects the surfaces of the bones in a joint by absorbing force

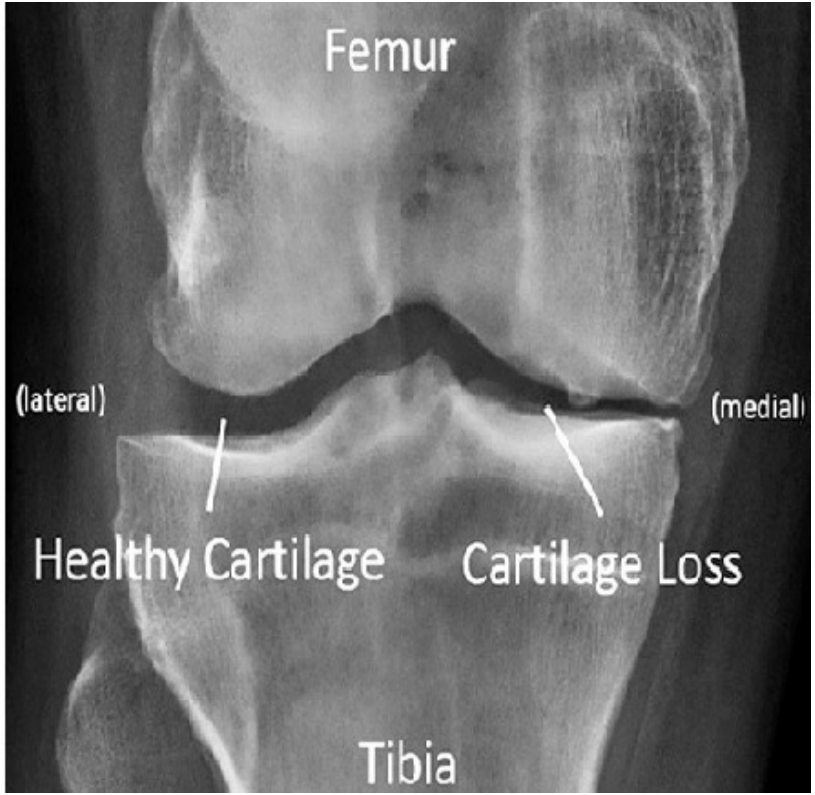
- Cartilage has a poor blood supply → doesn't heal well

- Constantly regenerating, triggered by loading on the surface
  - Too little → reduction in thickness. "Use it or lose it"
  - Too much → tissue destruction over time



WHAT HAPPENS TO THE JOINT?





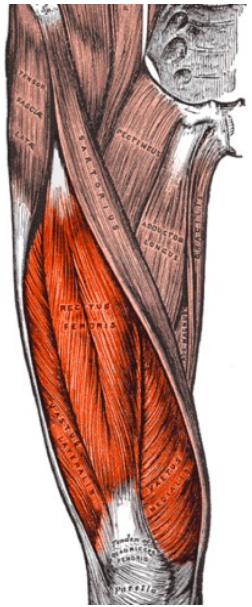
CAN EXERCISE PREVENT OA?

It depends. Are we more concerned about the disease or the pain that comes with it?

Either way, the answer is YES!

Exercise helps with:

- Weight loss
- Muscle strengthening → Joint stabilization
- Cartilage maintenance



CAN EXERCISE TREAT OA?

YES: Reduces pain and cartilage breakdown

- Weight loss reduces load on the joint
- Muscle strengthening helps to reduce pain, stabilize the joint, improve physical function and quality of life

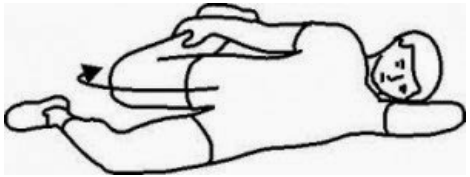
WHAT TYPE OF EXERCISE SHOULD I DO?

Aerobic: aim to build up to 150min/week

- Walking
- Biking
- Swimming
- Elliptical
- Running??

Strength training + Stretching

(especially your quadriceps)



POLL:

TRUE OR FALSE

RUNNING IS BAD FOR YOUR KNEES

POLL:

TRUE OR FALSE

RUNNING IS BAD FOR YOUR KNEES

IS RUNNING SAFE?

Yes, running is safe with or without knee osteoarthritis.

BUT, it's critical to engage in it properly to avoid injury.

<u>Common mistakes:</u>

- Increasing volume too quickly
- Poor footwear
- Improper running technique
- Hard surfaces

OSTEOPOROSIS

A disease characterized by low bone mass and deterioration of bone tissue, which can lead to increased risk of fracture.

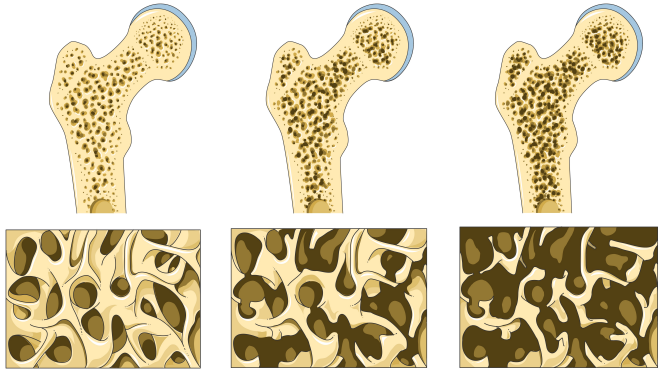
WHAT HAPPENS TO THE BONE?

A lack of bone mineral density causes the bone to be more porous. This happens due to excess bone loss or insufficient bone regeneration.

<u>This can lead to:</u>

- Increased risk of fracture
- Pain
- Decreased mobility
- Loss of height

Osteoporosis



CAN EXERCISE PREVENT OP?

YES!

Exercise causes bone remodeling and thickening via:

- Mechanical loading
- Muscle contractions
- Release of hormones that increase calcium absorption and storage

This leads to increased bone mineral density and stronger bones!

CAN EXERCISE TREAT OP?

YES!

Exercise increases bone mineral density and helps prevent negative outcomes such as falls and fractures through:

- Bone thickening
- Muscle strengthening
- Improvements in balance

WHAT TYPE OF EXERCISE SHOULD I DO?

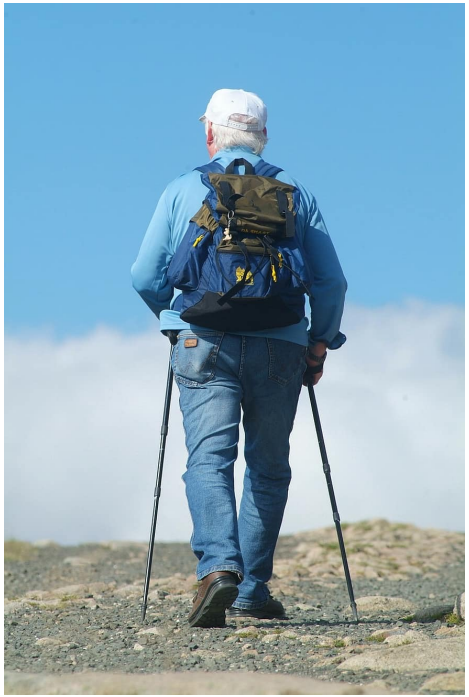
Aerobic (weight-bearing):

- Walking
- Hiking
- Running (be cautious if severe osteoporosis)

Aerobic (non weight-bearing):

- Cycling (caution with outdoor cycling)
- Swimming etc.

Strength training, stretching, yoga, tai chi



A NOTE ABOUT FALL PREVENTION

Falls are unfortunately a common occurrence, especially in frail and elderly people.

Proper stability and balance training are essential for preventing falls.

Exercises like yoga, tai chi and strength training aimed at balance improvement go a long way in preventing falls.

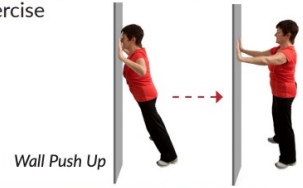
TOO FIT TO FALL OR FRACTURE (OSTEOPOROSIS CANADA)

Strength Training At least 2 days/week

- Exercises for legs, arms, chest, shoulders, back
- Use body weight against gravity, bands, or weights*
- 8 - 12 repetitions per exercise

Try these to get started:
- ☐ *Classes at YMCA/community centre*
- ☐ *Consult a physical therapist/kinesiologist*
- ☐ *Contact Osteoporosis Canada*


Squat


Wall Push Up


Seated Row

Balance Exercises Every day

- Tai Chi, dancing, walking on your toes or heels
- Have a sturdy chair, counter, or wall nearby, and try (from easier to harder): shift weight from heels to toes while standing; stand heel to toe; stand on one foot; walk on a pretend line


Heel to toe stance


Stand on one foot

Posture Awareness Every day

- Gently tuck your chin in and draw your chest up slightly
- Imagine your collarbones are wings - spread your wings slightly without pulling your shoulders back


Do

Don't

Aerobic Physical Activity At least 150 mins/week

- Bouts of 10 mins or more, moderate to vigorous intensity*
- You should feel like your heart is beating faster and you are breathing harder
- You might be able to talk while doing it, but not sing

Examples:
- ☐ *Brisk walking*
- ☐ *Dancing*
- ☐ *Jogging*
- ☐ *Aerobics class*

BREAK TIME FOR 10 MIN!

FILL OUT OUR RESEARCH SURVEY IF YOU HAVEN'T ALREADY!

HTTPS://UBC.CA1.QUALTRICS.COM/JFE/FORM/SV_3PUVZJ8M6QBGJJ4

MUSCLE WASTING (SARCOPENIA)

A gradual loss of skeletal muscle mass and strength over time, often due to aging.

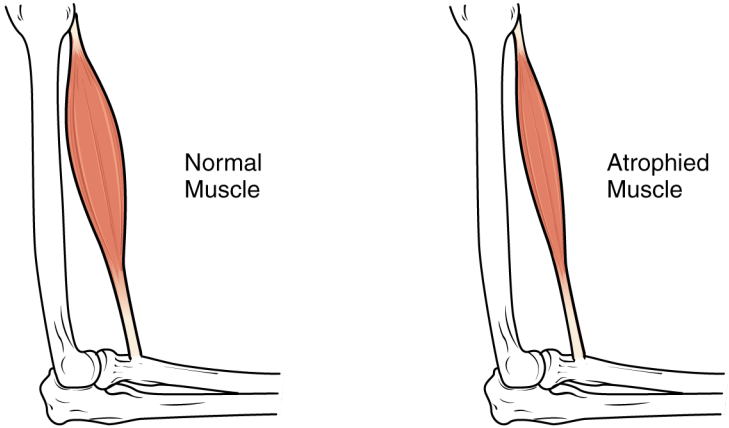
WHAT HAPPENS TO MUSCLE?

“Use it or lose it”

Muscle requires lots of energy. If it’s not being used, it will waste away.

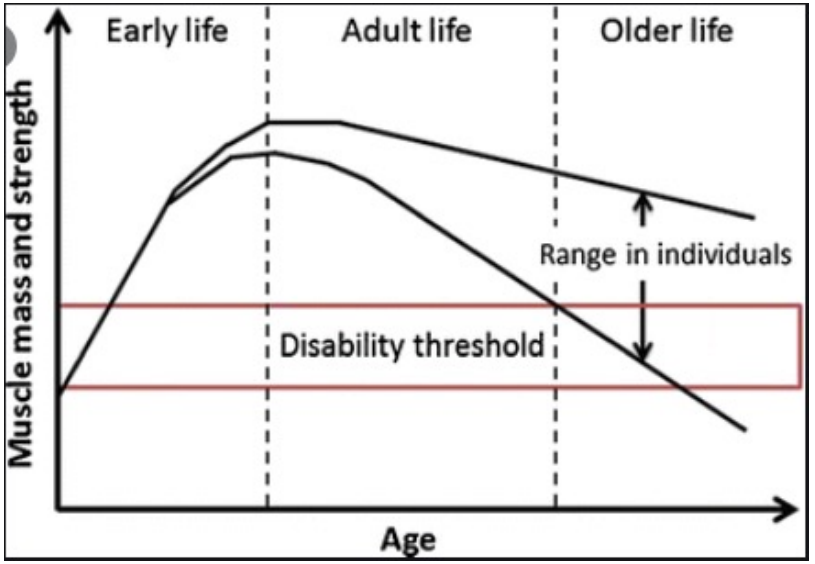
<u>This can lead to:</u>

- Loss of muscle strength
- Increase in fat tissue
- Frailty
- Difficulty performing daily activities



CAN EXERCISE PREVENT SARCOPENIA?

YES, it can prevent progression!



Exercise causes:

- Increase in muscle mass
- Prevention of muscle loss
- Weight loss/maintenance
- Maintain ability to perform activities

Of daily living (walking, groceries, stairs etc.)

CAN EXERCISE TREAT SARCOPENIA?

Yes!

Even in adults over the age of 90, muscle mass can still increase due to strength training!

Preventing declines in muscle mass at any stage is important to prevent disability and improve quality of life.

WHAT TYPE OF EXERCISE SHOULD I DO?

Strength training with or without weights

- 2-3x per week , larger muscle groups (arms, legs, back etc)
- 8-10 exercises, 6-12 repetitions

Aerobic exercise:

- Walking
- Cycling
- Running
- Fitness classes etc.

Don’t forget your protein!

LOW BACK PAIN

A real nuisance that most people will experience at some point…

WHY AM I IN PAIN?

Lots of potential causes….which are often difficult to differentiate between.

<u>Examples:</u>

- Overuse, strain or injury (more common)
- Aging
- Herniated disc
- Arthritis
- More serious pathologies (compression fractures, severe scoliosis, cancer)

RED FLAGS FOR BACK PAIN

See a physician immediately if:

Bowel or bladder dysfunction (new)

Anesthesia (saddle)

Constitutional symptoms/hx of malignancy

Chronic disease

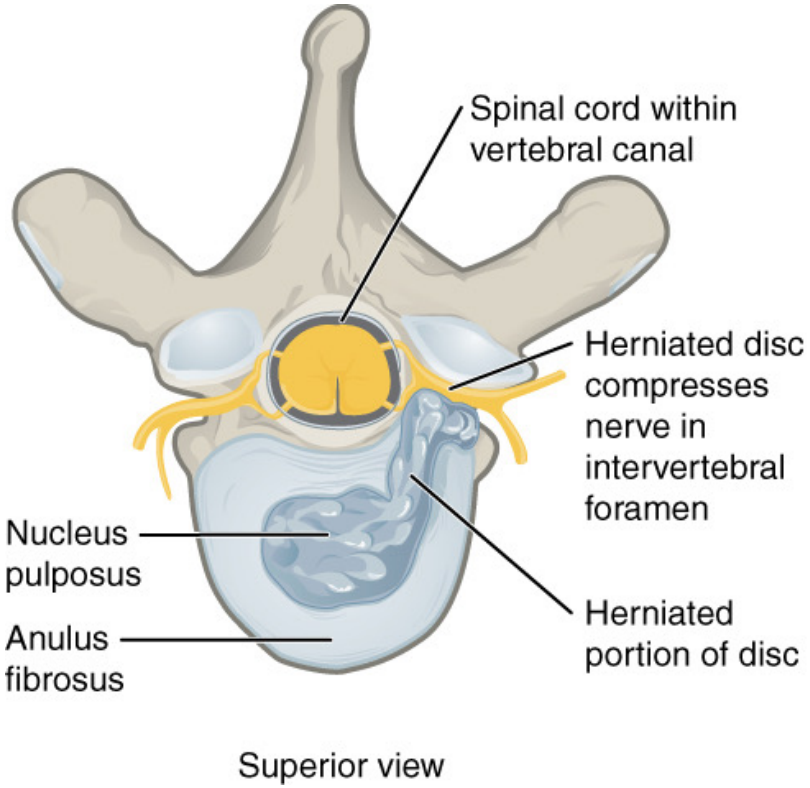
Paresthesias (tingling, prickling, chilling, burning, numbness)

Age >50 and mild trauma

IV drug use/Infection

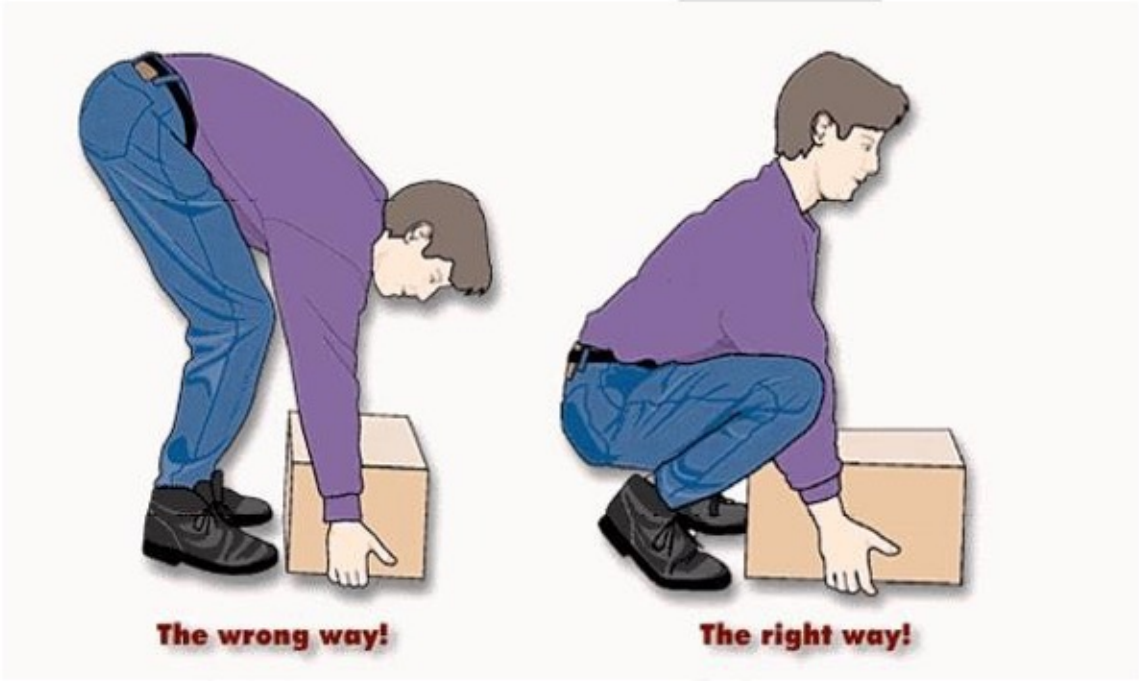
Neuromotor deficits (walking, tingling, numbness, weakness)

A NOTE ABOUT HERNIATED DISCS



CAN EXERCISE PREVENT HERNIATION?

In certain circumstances.



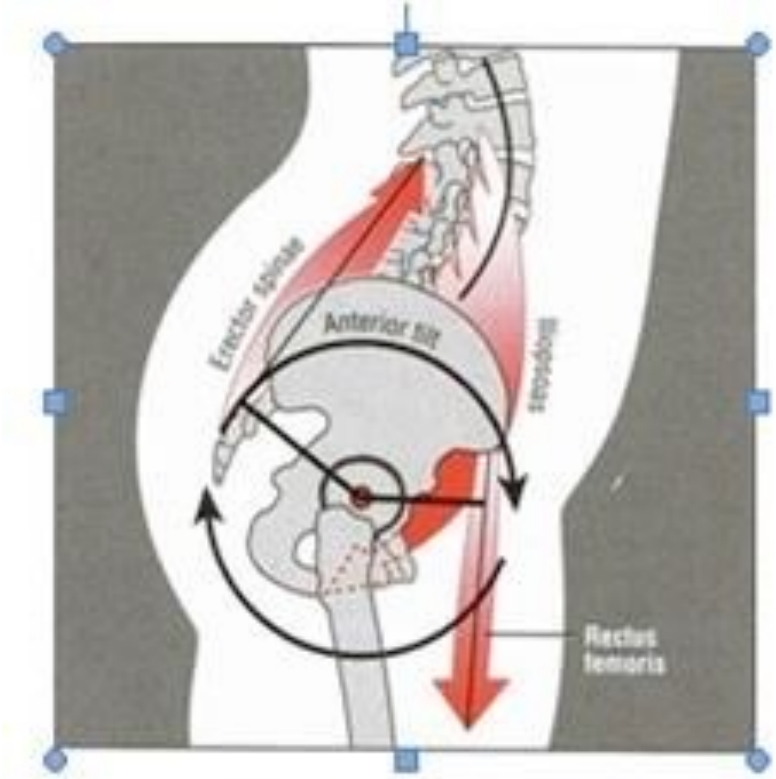
MUSCLE-RELATED BACK PAIN

Back pain can also be caused due to muscle stiffness and weakness.

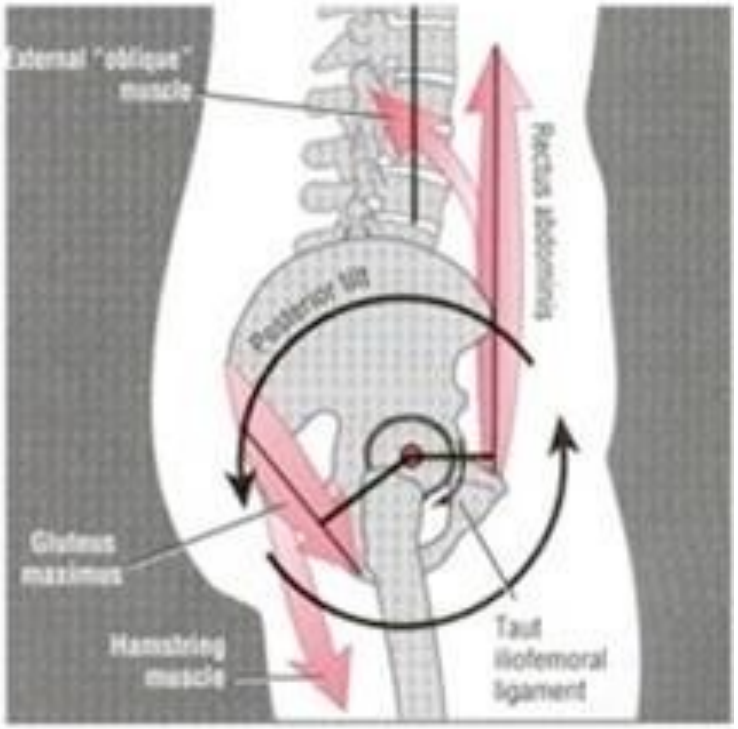
<u>The unhappy triad:</u>

- Tight hip flexors
- Weak hip extensors (ie. Hamstrings)
- Weak abdominal muscles

MUSCLE-RELATED BACK PAIN



Anterior pelvic tilt



Posterior pelvic tilt

EXERCISE + BACK PAIN

Good news! It's preventable and treatable!

Regular stretching of your quadriceps and strengthening of your hamstrings and abdominal muscles can help prevent and treat back pain!!

WHAT TYPE OF EXERCISE SHOULD I DO?

Strength training with or without weights

- 2-3x per week
- Especially core + leg muscles

Stretching hip flexors/quadriceps

Aerobic exercise:

- Walking
- Cycling
- Running
- Fitness classes etc.

5 MINUTE STRETCH ROUTINE FOR BACK

1) Child's pose

2) Knee to chest

3) Seated spinal twist

4) Piriformis stretch

5) Lying T stretch

EXERCISE TIPS

- The best type of exercise is the one that you will do
- Any movement is better than no movement
- Prevent injuries
    - Start low and go slow
    - Get the right equipment and get it properly fitted
    - Learn proper technique
- Bring a friend!
- Schedule it into your calendars
- Set goals (and reward yourself when you meet them ☺)
- Have fun!!

HELPFUL RESOURCES

- www.sportmedbc.com
- Learn to Walk or Learn to Run 10K (Vancouver Sun Run)
- https://www.healthlinkbc.ca/physical-activity
- https://osteoporosis.ca/health-care-professionals/clinical-practice-guidelines/exercise-recommendations/
- Community centers, walking/running/cycling groups (ie. Running room), personal trainers etc.
- Workout apps (ie. Nike Training Club)

FUTURE TALKS

- Thursday May 13 at 9:30AM : Sleep. (Alexandra)
- Tuesday May 18 at 9:30AM : Exercise Talk 2: CVD + Diabetes. (Julia)
- Thursday May 20 at 9:30AM : Vascular Disease. (Nicole)
- Tuesday May 25 at 9:30AM : Exercise Talk 3: Cancer + Mental Health. (Julia)
- Thursday May 27 at 9:30AM : Nature. (Alexandra)
- Tuesday June 1 at 9:30AM : Prehabilitation prior to Surgery. (Nicole)

We hope to see you there!

THE UNIVERSITY OF BRITISH COLUMBIA

Thank you!

Any questions?