



# Small Lifestyle Changes Can Lead to Giant Health Impacts

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# Disclosures

- NWSL: Chief Medical Officer
- USRowing: Team Physician, Medical and Sports Science Committee
- NFL: Research and Innovations Committee
- AMSSM Foundation: Board Member
- Wu Tsai Human Performance Alliance: Sports Advisory Council
- Korey Stringer Institute: Medical and Science Advisory Board
- Baseline Global: Medical Advisory Board
- Agency for Student Health Research: Medical Advisory Board
- Section Editor, UpToDate

The views presented are my own and not reflective of any of the organizations for whom I consult or provide services.

# Objectives

- Identify lifestyle modifications supported by research that can positively impact health
- Describe ways to effectively counsel patients on achieving small achievable lifestyle changes


# Develop **Optimal Communication** with your Patients

- Understand the common goal
  - Distill a *clear message* – recommend vs. suggest
  - Provide a process to engage with all stakeholders from the very beginning to increase engagement in, and ownership of, the common goal
- Understand there can be *more than one path* to the same goal
  - **Effective influence** begins when we understand that others have different belief systems
    - Builds a team of allies, not adversaries



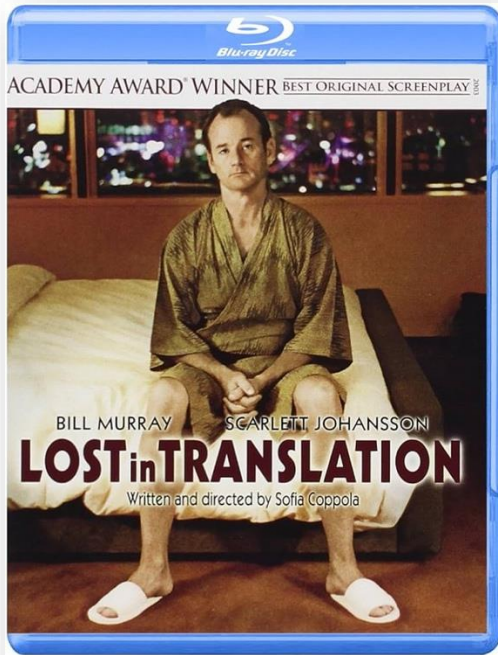
# Develop **Optimal Communication** with your Patients

- Learn the art of “hungry listening”
  - Genuinely hearing—and trying to understand--someone else’s point of view
- Learn how to respectfully agree to disagree— and agree to understand
  - Don’t lose sight of what is *most important*—the *health, safety and well-being of the athlete*

A rectangular frame containing a quote on a textured, parchment-like background. The text is in a serif font, centered, and reads: "The biggest communication problem is we do not listen to understand. We listen to reply."

The biggest  
communication problem  
is we do not listen to  
understand.  
We listen to reply.

# Knowledge Translation and Dissemination of Research



- Research findings will not change health outcomes unless health care professionals adopt them in practice.
- The gap between the best available scientific evidence and policy/clinical decision making is a common finding in health.
  - Takes 1 to 2 decades for original research to be incorporated into routine practice.



DEBATE

Open Access

# Knowledge translation of research findings

Jeremy M Grimshaw<sup>1\*</sup>, Martin P Eccles<sup>2</sup>, John N Lavis<sup>3</sup>, Sophie J Hill<sup>4</sup> and Janet E Squires<sup>5</sup>

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<https://doi.org/10.1007/s11136-022-03122-1>

SPECIAL SECTION: REDUCING RESEARCH WASTE IN (HEALTH-RELATED) QUALITY OF LIFE RESEARCH



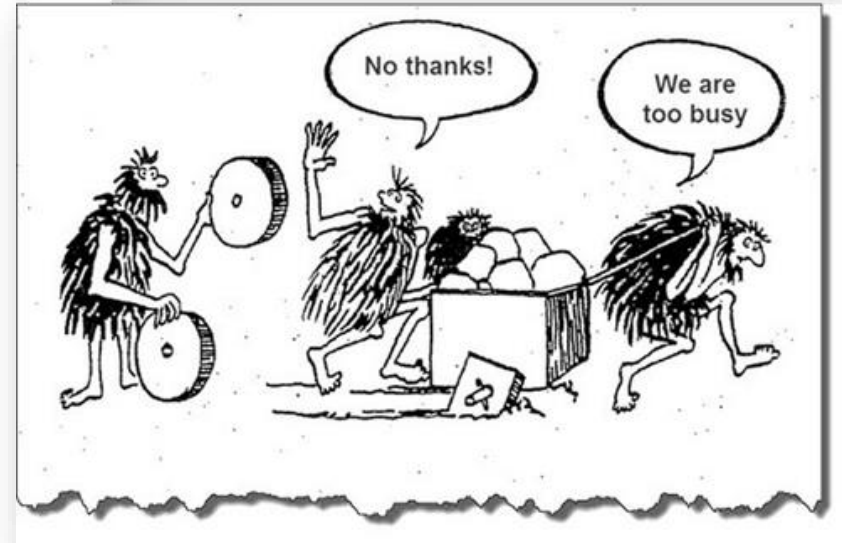
## Supporting researchers in knowledge translation and dissemination of their research to increase usability and impact

Virginia Minogue<sup>1</sup> · Mary Morrissey<sup>2</sup> · Ana Terres<sup>3</sup>



# Knowledge Translation and Dissemination of Research

- Involve all stakeholders from the beginning to increase engagement in, and ownership of, the research knowledge
- Create a plan to incorporate local and political context
- Show a means to evaluate how much the findings are applied in practice
  - Patient-reported outcomes





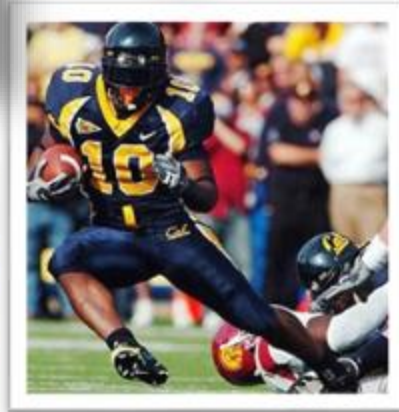
# Clinical Decision Making

- What is the trade off between benefits vs. the risks, burden, and costs?
- Considerations:
  - Clinical judgement
  - Individual patient's values and preferences
  - Strength (or grade) of recommendation
- Prevention of outcomes with high patient-importance should lead to stronger recommendations than prevention of outcomes of lesser patient importance

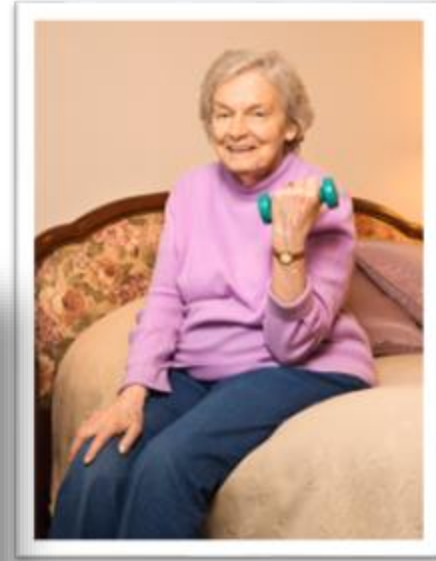
# Clinical Decision Making

- Strength of recommendation (quality of evidence re: treatment effect)
  - Confidence in a RCT *decreases* if:
    - Very large loss to follow-up
    - Unblinded study with subjective outcomes susceptible to bias
    - Very few patients therefore very few events
  - Confidence in an Observational study *increases* if:
    - Extremely large and consistent estimates of magnitude of a treatment effect
    - All plausible biases from observational studies may underestimate an apparent treatment effect

# Your Patients could identify as Athletes...



...or not -- but every Patient can be active!



# Definitions

## ▪ Physical activity

- Any body movement that results in energy expenditure (*exercise, ADLs, active transportation*)

## ▪ Exercise

- Physical activity that is planned, structured, repetitive with objective to improve or maintain physical fitness

Physical Activity  $\approx$  Exercise



# Physical Activity for Children and Adolescents

- Promotes health and fitness
- Builds healthy bones and muscles
- Reduces risk of developing obesity and risk factors for diseases (e.g., type 2 DM, heart disease)
- Reduces risk of excessive weight gain
- Reduces symptoms of anxiety and depression
- Improves quality of sleep
- Positive effect on concentration, memory, and classroom behavior





# Physical Activity for Adults

- Lower risk of all-cause mortality, incl. cardiovascular disease mortality
- Lower risk of heart dz, stroke, HTN, type 2 diabetes, adverse lipid profile
- Lower risk of cancers of bladder, breast, colon, endometrium, esophagus, kidney, lung, and stomach
- Improved cognition
- Reduced risk of dementia (including Alzheimer's disease)
- Improved quality of life
- Reduced anxiety
- Reduced risk of depression
- Improved sleep
- Slowed or reduced weight gain
- Weight loss, particularly when combined with ↓ calorie intake
- Prevention of weight regain following initial weight loss
- Improved bone health
- Improved physical function
- Lower risk of falls (older adults)
- Lower risk of fall-related injuries (older adults)



# “Let’s find a couple reasons to ↑ your physical activity”

- Before you go into exam room, review their medical record
  - What diagnoses do they have? Do their family members have?
  - Last vital signs? Weight trending upwards?
  - What will resonate with them?
    - Be around for kids to get married...have grandkids...
    - Don’t want to have a heart attack like dad...get Alzheimers...have to give myself insulin...fracture my hip...be diagnosed with colon cancer like mom...
    - Improve my sleep...decrease work stress...focus better in classroom...

# Physical Activity Guidelines for Children and Adolescents 2008



Be Active and Play, 60 minutes, every day!

# Physical Activity Guidelines for Children and Adolescents

2018

2<sup>nd</sup> Edition



# Physical Activity Guidelines for Children and Adolescents

2<sup>nd</sup> Edition



## Kids and teens ages 6 to 17 need 60 minutes of activity every day.

Most of their 60 minutes can be **moderate-intensity aerobic activity** — anything that gets their heart beating faster counts.

And at least 3 days a week, encourage them to step it up to **vigorous-intensity aerobic activity**, so they're breathing fast and their heart is pounding.



## As part of their daily 60 minutes, kids and teens also need:

**Muscle-strengthening activity**  
at least 3 days a week

Anything that makes their muscles work harder counts — like climbing or swinging on the monkey bars.

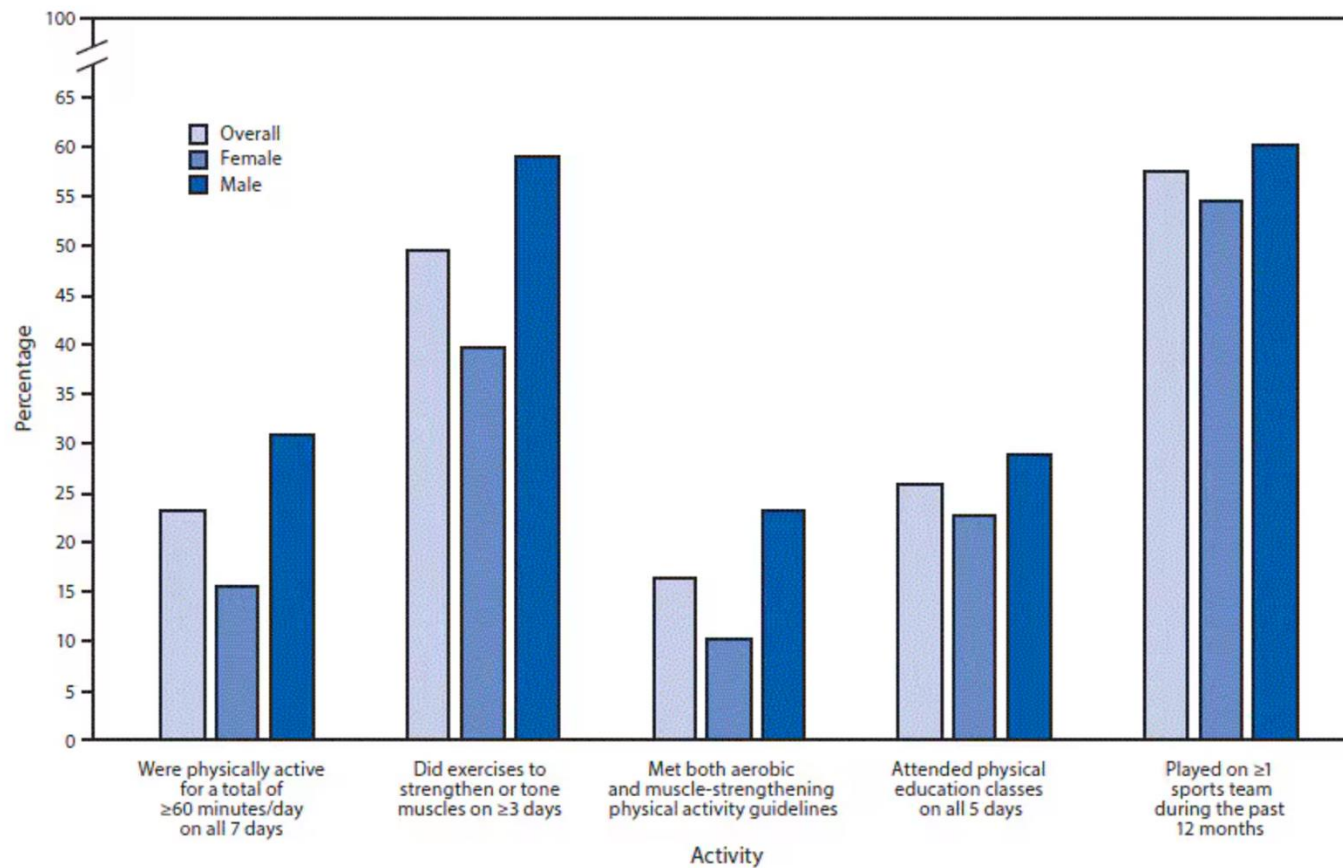


AND

**Bone-strengthening activity**  
at least 3 days a week

Bones need **pressure** to get stronger. Running, jumping, and other weight-bearing activities all count.





Merlo CL et al, Youth Risk Behav Survey, U.S. 2019. MMWR Suppl 2020

Behavior	Prevalence (%)						Linear change*	Quadratic change*	Change during 2017–2019†
	2009	2011	2013	2015	2017	2019			
Were physically active for a total of ≥60 minutes/day on all 7 days§									
Total	—¶	28.7	27.1	27.1	26.1	23.2	Decreased during 2011–2019	—**	Decreased during 2017–2019
Female	—¶	18.5	17.7	17.7	17.5	15.4	Decreased during 2011–2019	—**	None
Male	—¶	38.3	36.6	36.0	35.3	30.9	Decreased during 2011–2019	—**	Decreased during 2017–2019
White, non-Hispanic	—¶	30.4	28.2	29.0	27.1	25.6	Decreased during 2011–2019	—**	None
Black, non-Hispanic	—¶	26.0	26.3	24.2	24.5	21.1	Decreased during 2011–2019	—**	None
Hispanic	—¶	26.5	25.5	24.6	25.8	20.9	Decreased during 2011–2019	—**	Decreased during 2017–2019

Merlo CL et al, Youth Risk Behav Survey, U.S. 2019. MMWR Suppl 2020

# Physical Activity Guidelines for Adults

2<sup>nd</sup> Edition



**Adults need a mix of physical activity to stay healthy.**

## Moderate-intensity aerobic activity\*

Anything that gets your heart beating faster counts.



AND

## Muscle-strengthening activity

Do activities that make your muscles work harder than usual.



\* If you prefer vigorous-intensity aerobic activity (like running), aim for at least **75 minutes a week**.

If that's more than you can do right now, **do what you can**. Even 5 minutes of physical activity has real health benefits.

Walk. Run. Dance. Play. **What's your move?**

Figure 2. Percentage of adults aged 18 and over who met 2018 Physical Activity Guidelines for Americans for aerobic and muscle-strengthening activities, by sex and age: United States, 2020

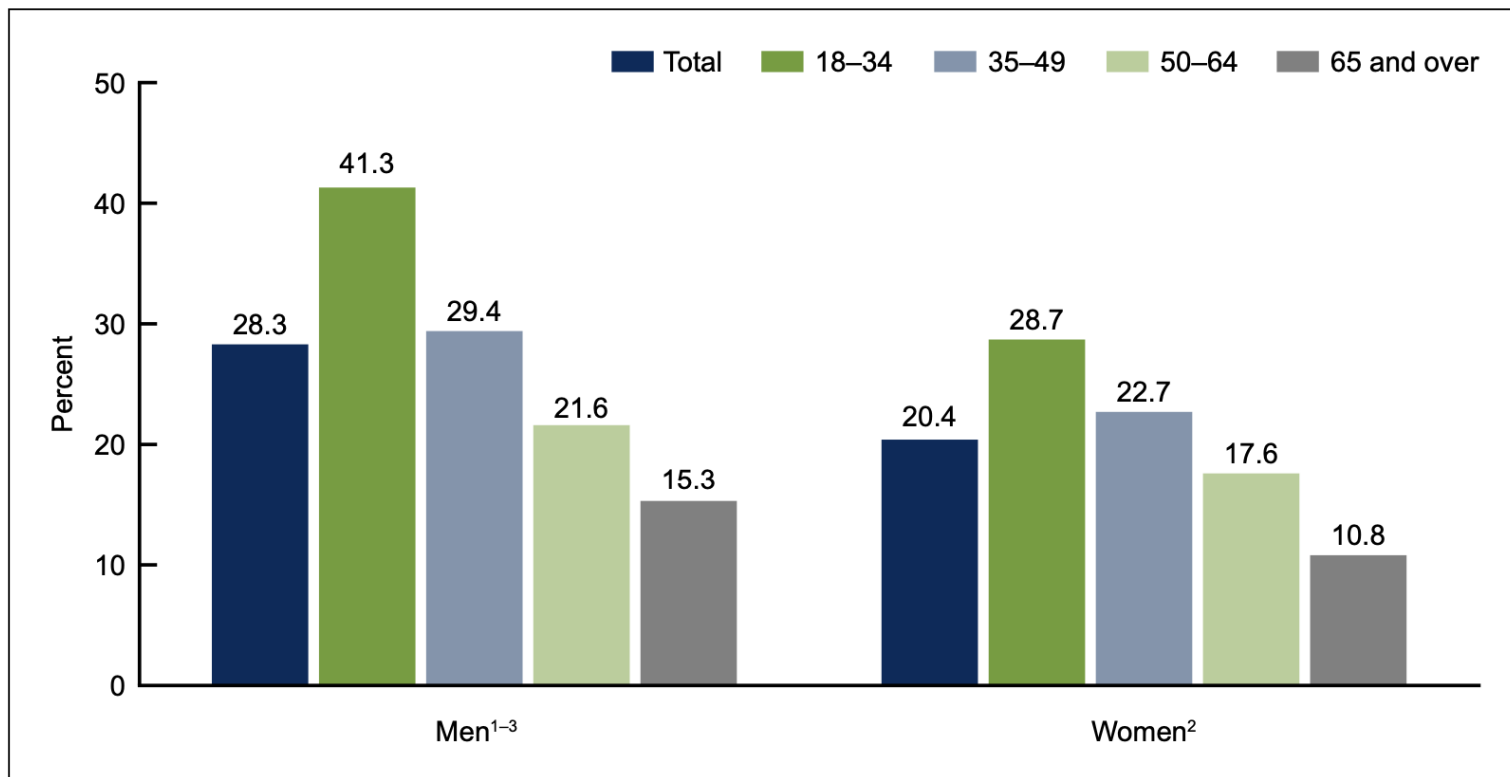




Figure 3. Age-adjusted percentage of adults aged 18 and over who met 2018 Physical Activity Guidelines for Americans for aerobic and muscle-strengthening activities, by sex and race and Hispanic origin: United States, 2020

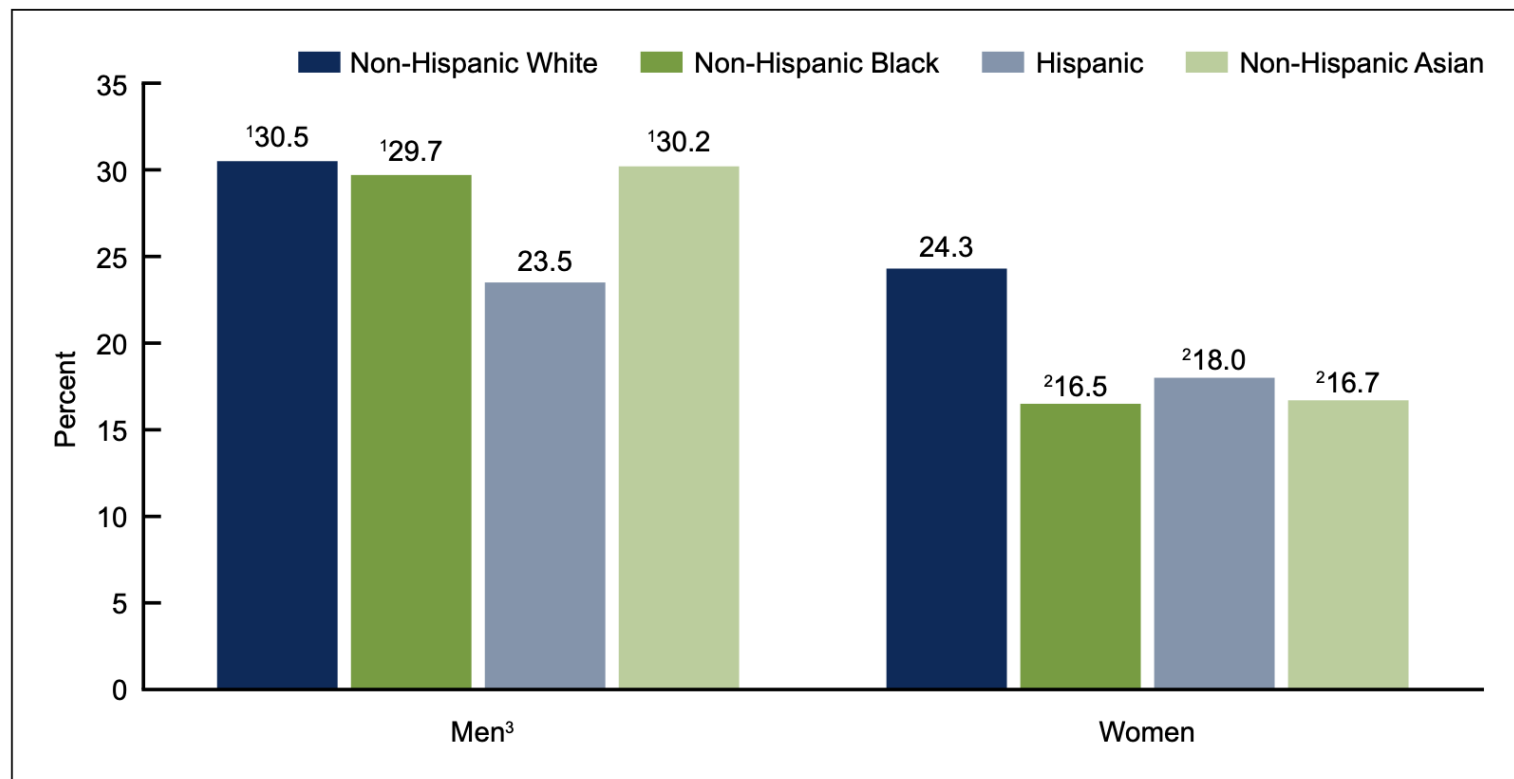
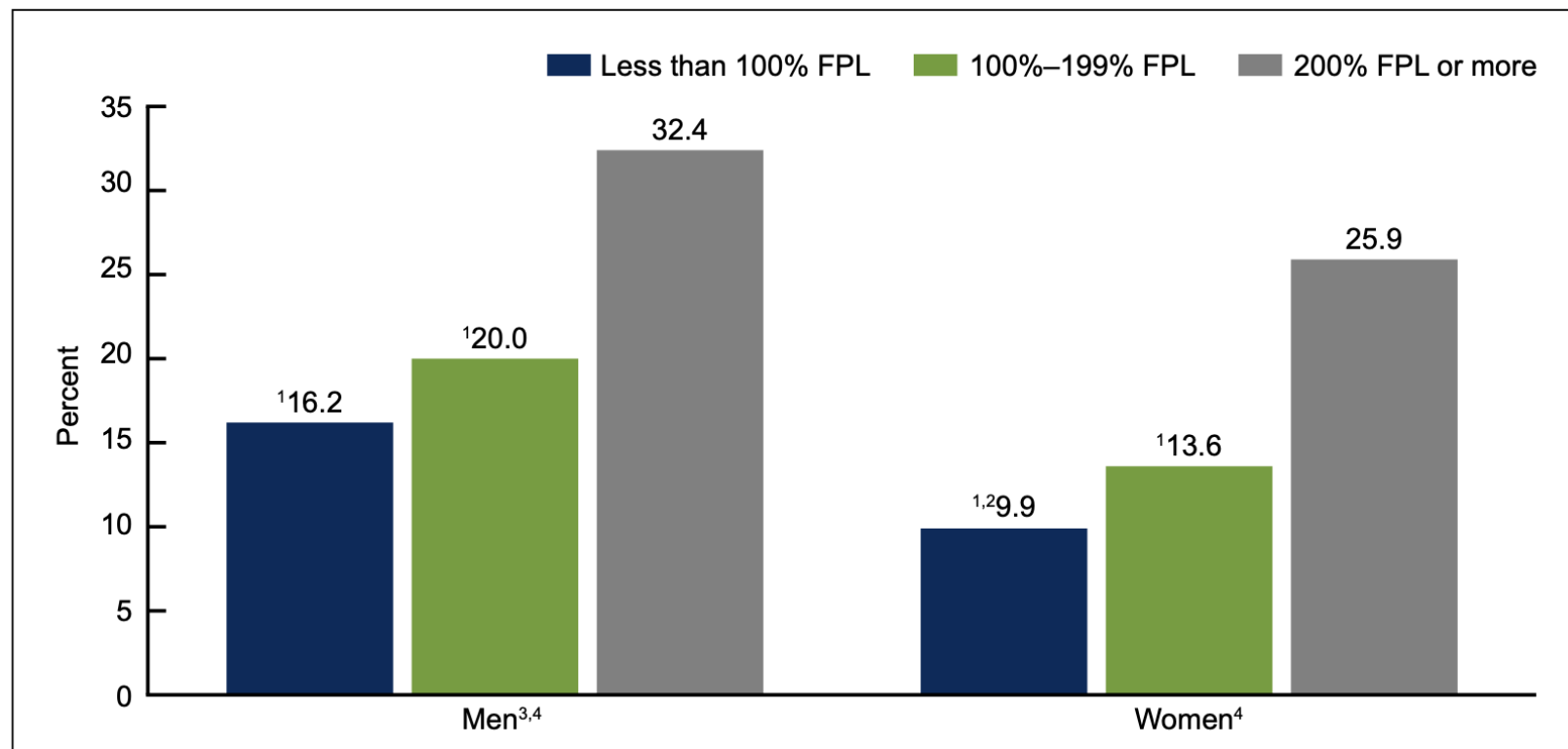
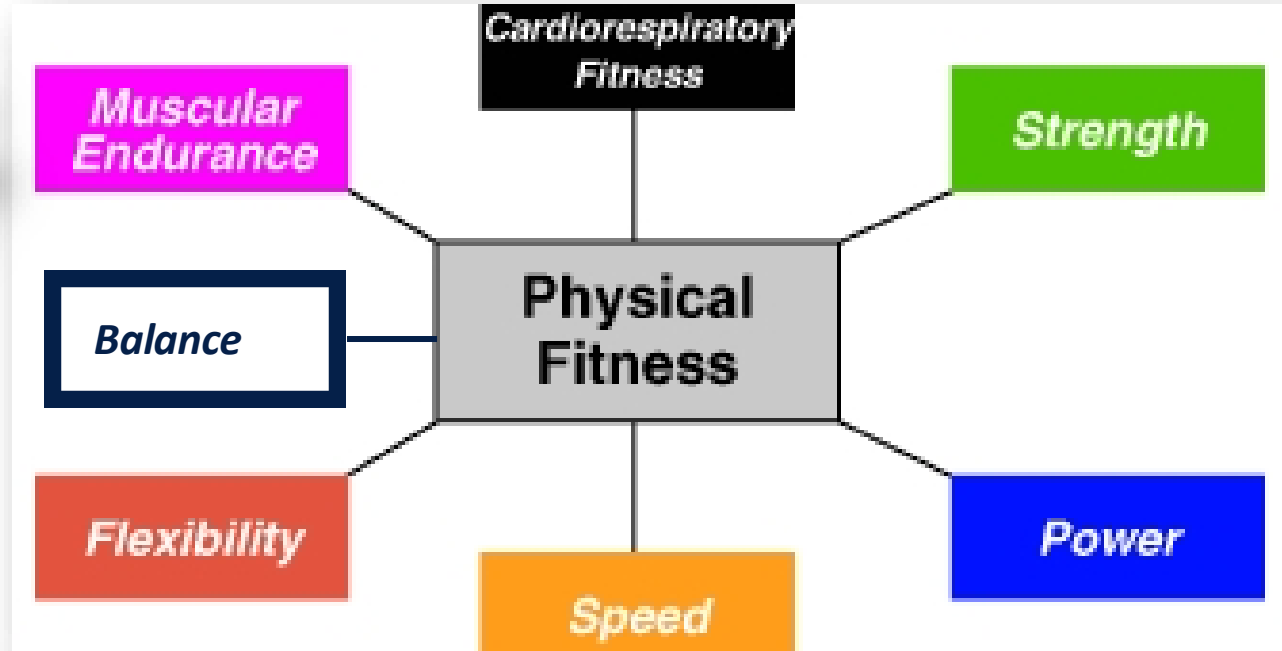
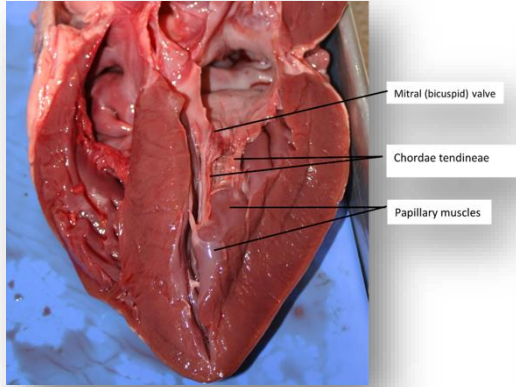


Figure 4. Age-adjusted percentage of adults aged 18 and over who met 2018 Physical Activity Guidelines for Americans for aerobic and muscle-strengthening activities, by sex and family income as percentage of federal poverty level: United States, 2020



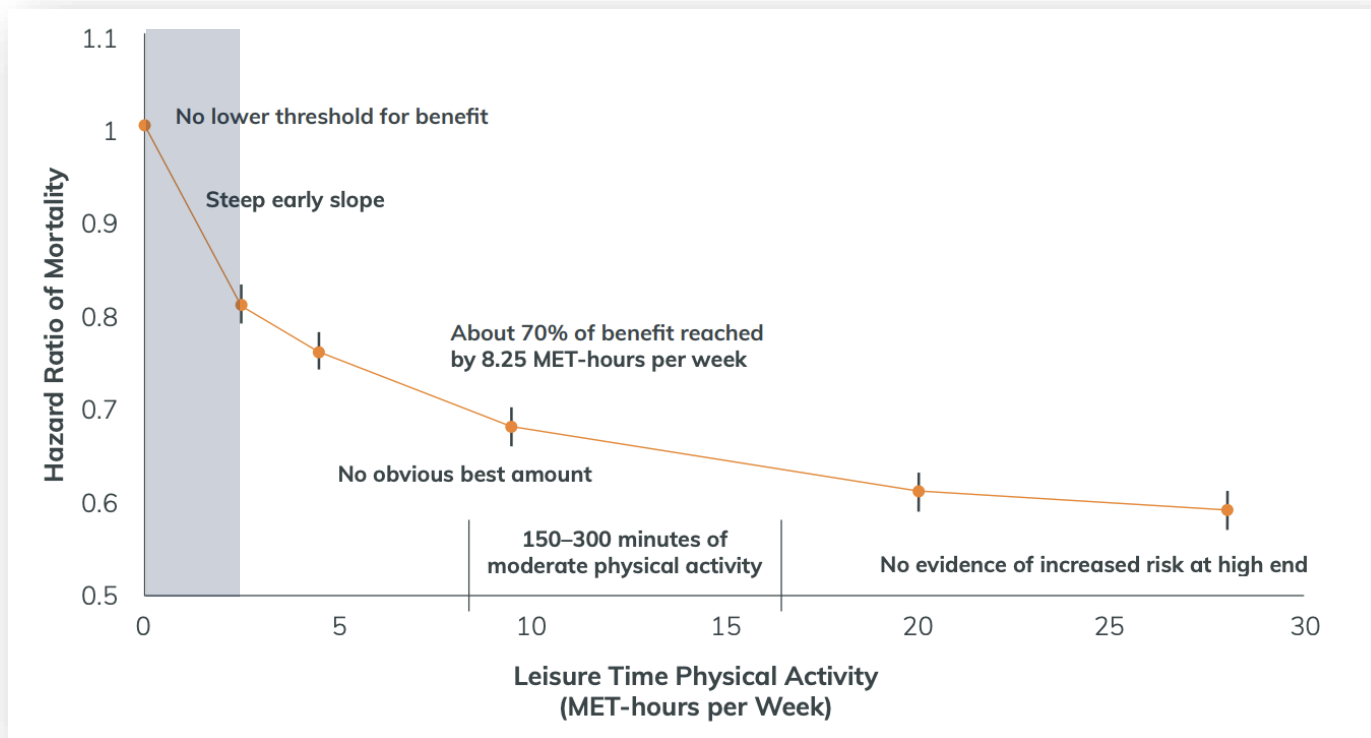
# “Our Goal”: Improve Physical Fitness to Improve Quality of Life



# Measuring Physical Activity Intensity

- Energy expenditure expressed by multiples of the *metabolic equivalent of task* (**MET**)
  - 1 MET = sitting at rest
- **Light-intensity** = non-sedentary waking behavior < 3.0 METs
  - leisurely walking, cooking, light chores
- **Moderate-intensity** = 3.0 to < 6.0 METs
  - walking briskly (2.5 to 4 mph), doubles tennis, raking the yard
- **Vigorous-intensity** = > 6.0 METs
  - Jogging/running, carrying heavy loads upstairs, shoveling snow, strenuous fitness class

# Relationship of Moderate-to-Vigorous Physical Activity to All-Cause Mortality



**PAEE = 0 kJ/kg/day**

Sedentary occupation

No leisure time physical activity

### Physical inactivity

**PAEE = 5 kJ/kg/day**

Meeting WHO minimum physical activity guidelines

(150 mins/week of moderate-intensity physical activity or equivalent)

**Brisk walk (5 km/h  $\approx$  4.5 METs)**

**Heavy cleaning or repair work ( $\approx$  3.5 METs)**

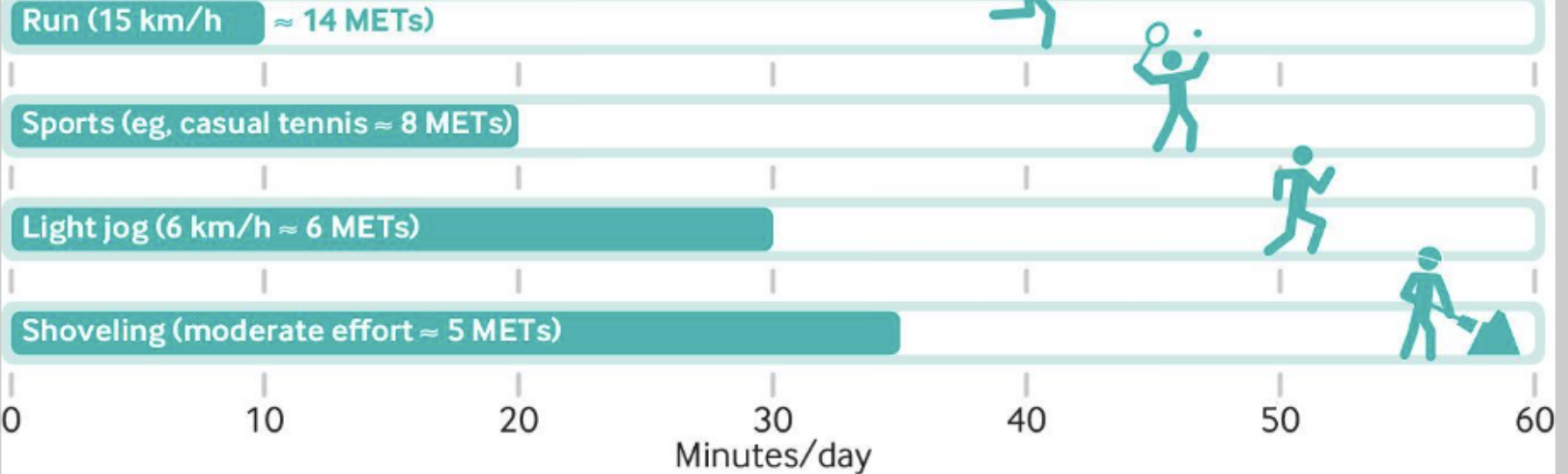
**Walking dog ( $\approx$  3 METs)**

**Light gardening ( $\approx$  2.5 METs)**



**PAEE = 10 kJ/kg/day**

Meeting WHO recommendations for additional health benefits  
(300 mins/week of moderate-intensity physical activity or equivalent)





## “What the evidence shows...”

- If **brisk walking** for **~150 minutes (2½ hrs) a week** then **33% ↓ risk of all-cause mortality** compared to those who aren't physically active.
  - All can gain benefit, no matter age, sex, race, ethnicity, or body weight
- By meeting and **maintaining 150 min/wk of moderate-intensity physical activity can prevent 46% of deaths** associated with physical inactivity.
- Middle aged and older adults, including with CVD and cancer, can gain substantial longevity benefits by becoming more physically active, **regardless of past activity levels. It is never too late.**
- **Even low amounts** of moderate to vigorous-intensity physical activity **reduce the risk of all-cause mortality. Benefits start to accumulate with any amount.**



**Adults need a mix of physical activity to stay healthy.**

**Moderate-intensity aerobic activity\***

Anything that gets your heart beating faster counts.



AND

**Muscle-strengthening activity**

Do activities that make your muscles work harder than usual.



\* If you prefer vigorous-intensity aerobic activity (like running), aim for at least 75 minutes a week.

If that's more than you can do right now, **do what you can.**  
Even 5 minutes of physical activity has real health benefits.

Walk. Run. Dance. Play. **What's your move?**

**“Even 5 minutes of physical activity has real health benefits”**

## Physical Activity Guidelines for Adults

# “Even 5 minutes of physical activity has real health benefits”

- Moderate evidence: **Bouts of any length** of moderate-to-vigorous physical activity (**MVPA**) **contribute to health benefits** associated with accumulated volume of physical activity.
  - If  $\geq 10$  min bouts
    - ↓ incidence obesity
  - For  $<10$  and  $\geq 10$  min bouts:
    - ↓ total chol, LDL, TG (? HDL); improved glucose control; ↓ odds metab syndrome; ?CRP; ↓ Framingham CVD Risk Score
- Total activity of any bout duration **even  $< 5$  min = mortality benefits**

# “What the evidence shows...”

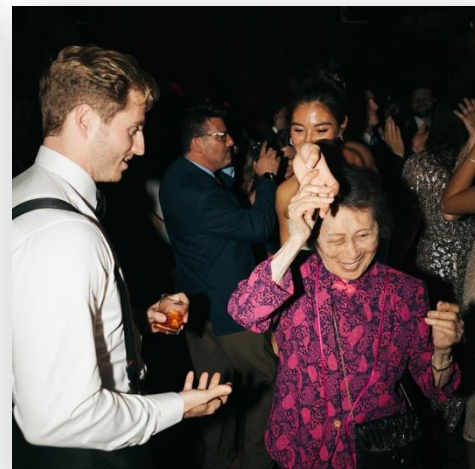
- **Even low amounts** of MVPA **reduce the risk** of all-cause mortality and benefit health
- **Benefits start to accumulate with** any amount **even bouts of < 5 min**
- **Start low, go slow**
  - Valuable for those least active and greater risk for developing chronic conditions.
  - More flexibility as progress toward 150 min/wk of MVPA

2000



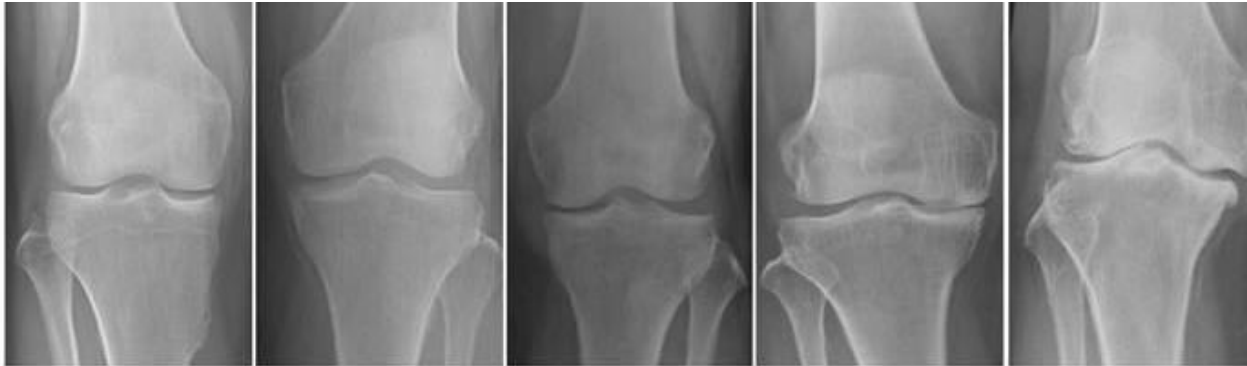
**When older people say,  
"Enjoy them while  
they are young."  
They are talking about  
your knees and hips  
not your kids.**

2023



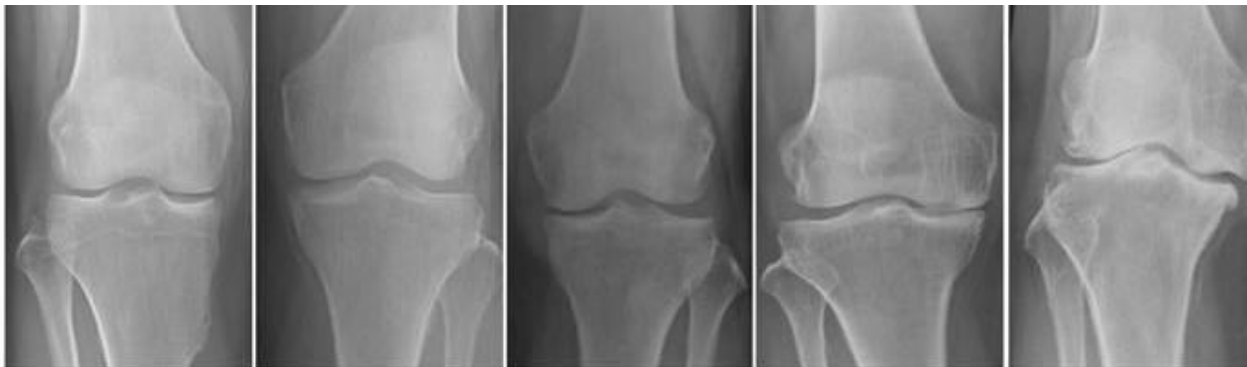
# Knee Osteoarthritis: Kellgren and Lawrence System classification

- **grade 0:** no radiographic features of OA are present
- **grade 1:** doubtful joint space narrowing (JSN) and possible osteophytic lipping
- **grade 2:** definite osteophytes and possible JSN on anteroposterior weight-bearing radiograph
- **grade 3:** multiple osteophytes, definite JSN, sclerosis, possible bony deformity
- **grade 4:** large osteophytes, marked JSN, severe sclerosis and definite bony deformity



# Knee Osteoarthritis: Kellgren and Lawrence System classification

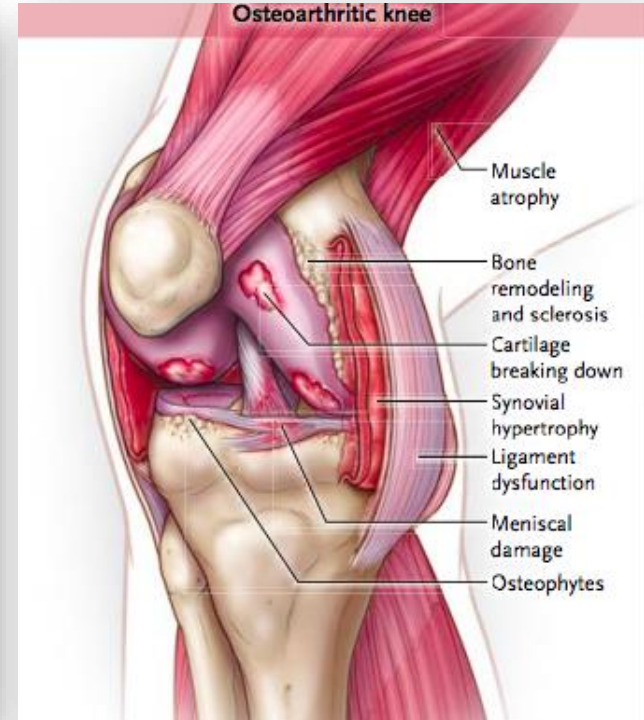
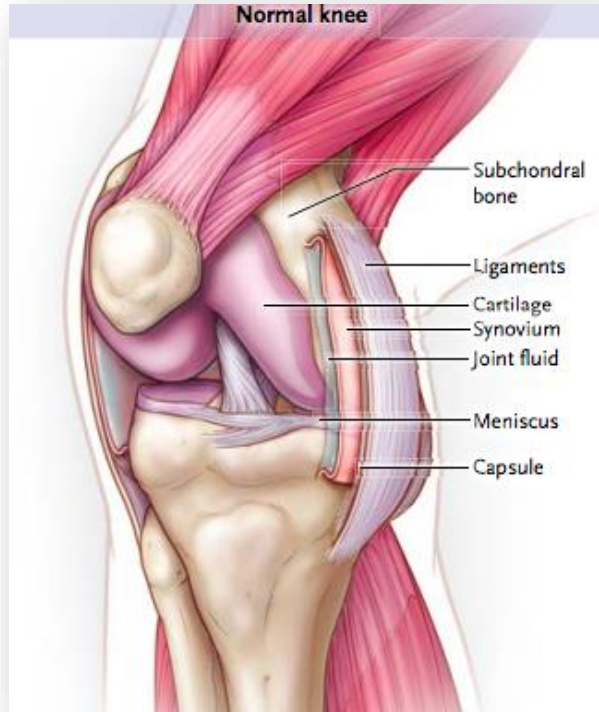
- **grade 0** -- None
- **grade 1** -- **Minor** – usually no pain or discomfort
- **grade 2** -- **Mild** – pain after long day of running/walking, some stiffness after immobile, sore when kneeling or bending
- **grade 3** -- **Moderate** – frequent pain, joint stiffness, some swelling
- **grade 4** -- **Severe** – great pain when walking or moving the knee





# Are other parts of the knee joint affected in OA?

- Disease of entire synovial joint and multifactorial
  - joint degeneration
  - intermittent inflammation
  - peripheral neuropathy



# Osteoarthritis Research Society International (OARSI) Guidelines 2019

- **Core treatments** (appropriate for most patients regardless of comorbidity)
  - **Structured land-based exercise** programs – improves function, pain
  - Dietary **weight management combined with exercise**
  - Mind-Body exercise (e.g., Tai Chi, yoga)
  - **Education** considered standard of care, despite lack of RCT data
- Level 1A: topical NSAIDs
- Level 1B: **aquatic exercise, gait aids**, CBT w/ exercise component, self-mgmt programs, oral NSAIDs, IACS, IAHA, duloxetine

“How much exercise do I *really* need to do to prevent worsening of my OA?”

- 1,564 people ages 45-79 with accelerometers
- **At least 1 hr of MVPA per wk** -- in those with pain or stiffness due to OA (hip and knee) but no disability -- significantly **increased likelihood of maintaining disability-free status over next 4 years**
  - Disability = slow walking speed, limitations in ADL

# “Rather than measuring time, can I just track my steps?”

- Health benefits present < 10,000 steps/day
- Even at low levels of activity, taking **an additional 1000 steps/day** associated with:
  - Lower risk of all-cause mortality (6–36%) over 4–10 years
  - Risk reductions in CVD morbidity and mortality (5–21%) over 2–5 years
  - Associations hold across age, gender, weight status
- In older women, **4400 steps/day 41% reduction mortality rate** vs. 2700; leveled at 7500



# Knee Joint Pain Strongly Associated with Body Weight

- **For every 1# weight loss, 5# (range 3-6 lb) Ⓢin force on knee** per step
- Pain reduction in OA with even minimal weight loss; also ↓ inflammatory biomarkers in synovial fluid
- Exercise alone without dietary changes *not* as effective for wt loss, and some functional measures

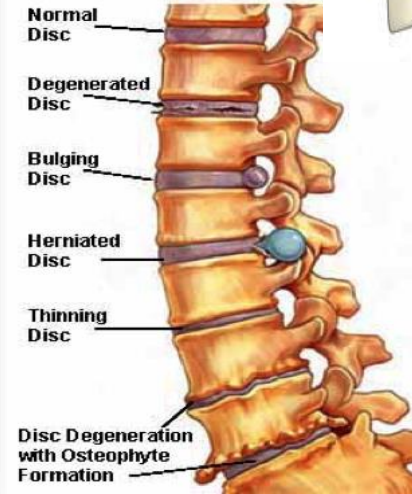
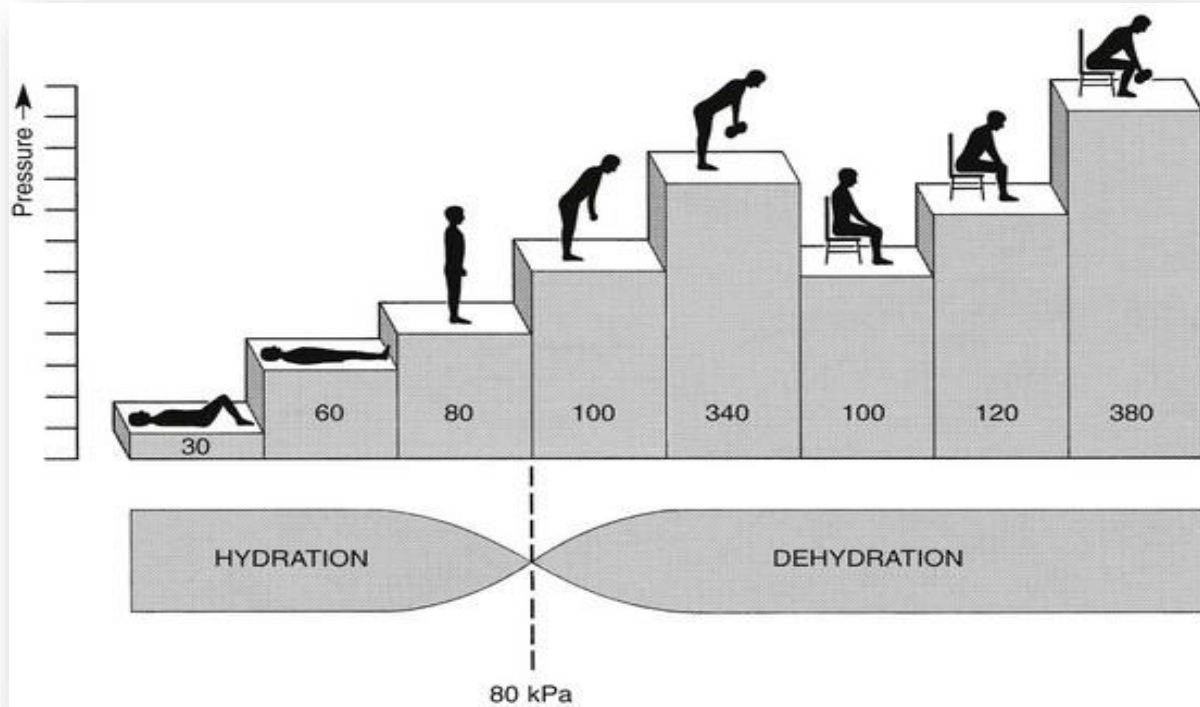


# Low Back Pain





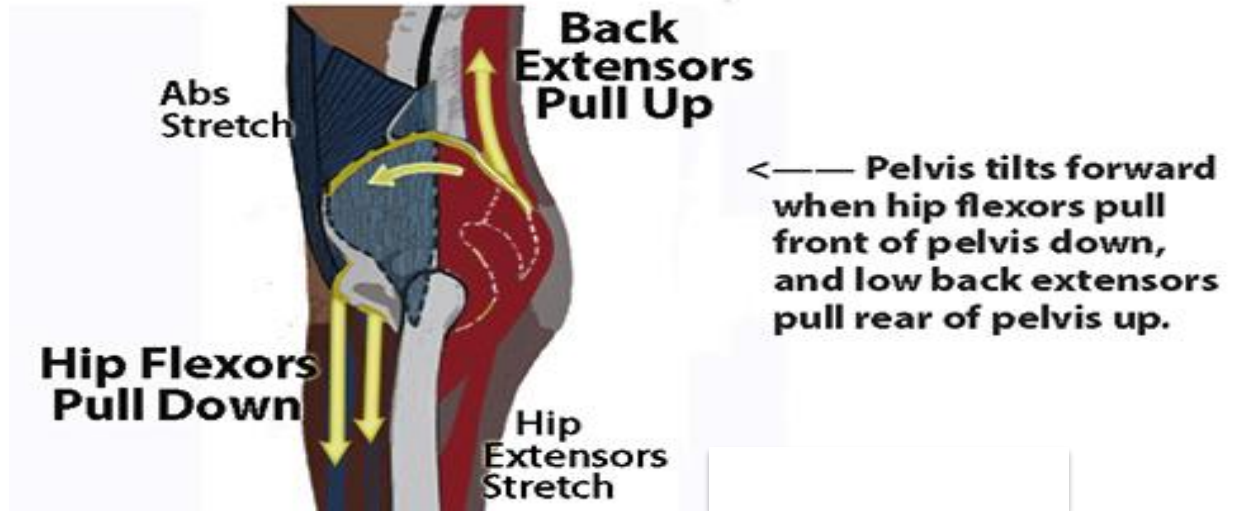
# Lumbar intradiscal pressures



# Anterior rotation of pelvis leads to LBP



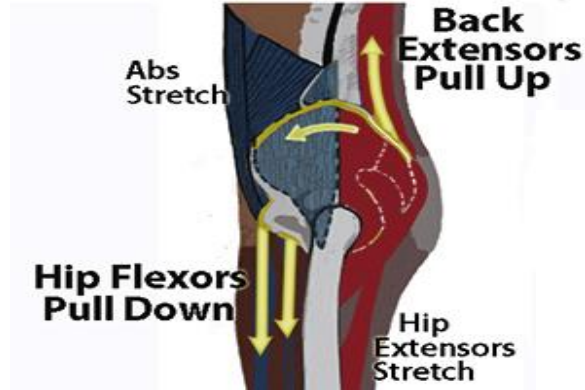
## To Tilt Pelvis Forward





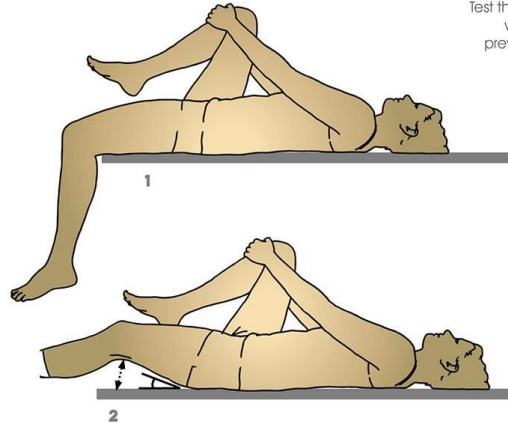
# Anterior rotation of pelvis leads to LBP

## To Tilt Pelvis Forward

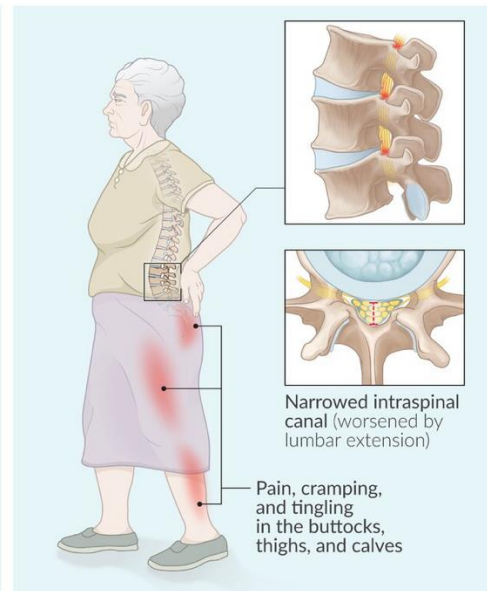
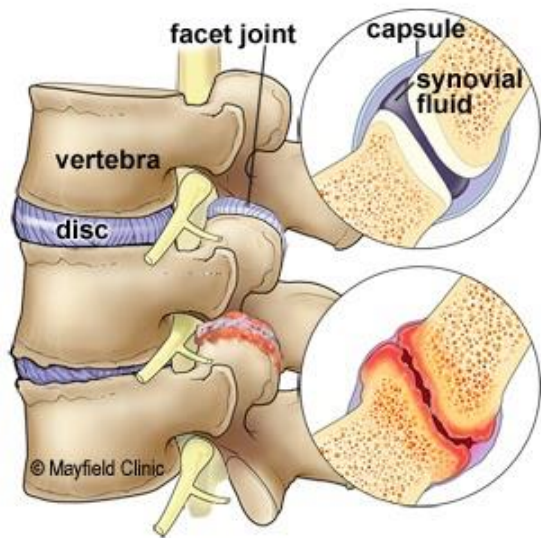


## THOMAS TEST

Test the rectus femoris muscle which may be restricted, preventing flattening of leg.  
1: normal condition  
2: restricted condition



# Anterior rotation of pelvis leads to LBP

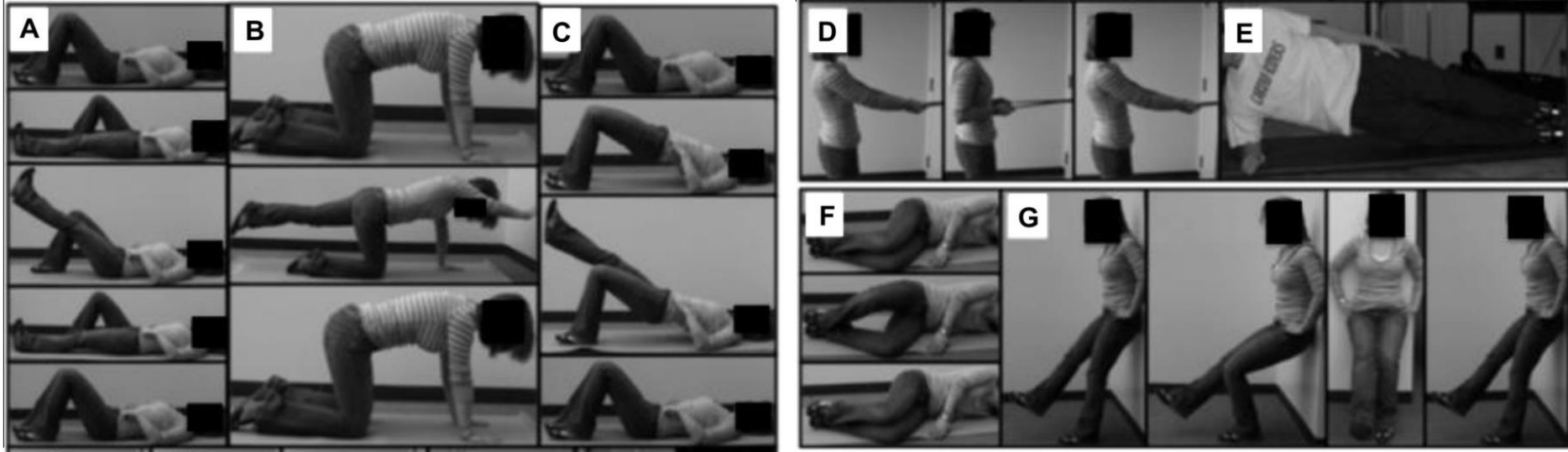


# “How can I use a standing desk if I already have LBP?”

- Successful transition can be made if:
  - A sit-stand desk is used with sit-stand protocol over 12 wks
    - Sit-stand ratio of 3:1 for wks 1–4, 2:1 for wks 5–8, 1:1 for wks 9–12
  - A dynamic standing strategy of frequent large weight shifts is encouraged
  - A home exercise program for hip and trunk control is provided
  - A walking program for endurance is initiated



# How can I transition to a standing desk if I already have LBP?



# Summary

- Optimal communication and knowledge translation are key components of implementing successful lifestyle modifications
- Engage your patient to identify a reason to be more physically active
- Even low amounts of MVPA reduce the risk of all-cause mortality and benefit health
- For every 1# weight loss, knee sees 5# ↓ in force on knee
- Education of patient critical when recommending a standing desk for LBP

# Thank you

