
بسم الله الرحمن الرحيم

# Exercise Prescription and Wellness

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# Regular, moderate exercise (150+ mins/week) significantly boosts mental health by

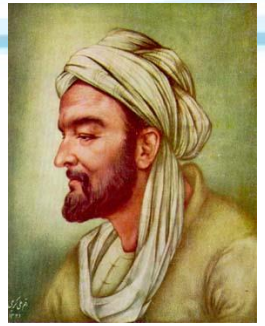
- Releasing feel-good **endorphins**,
- Reducing stress hormones like **cortisol**,
- Alleviating symptoms of **depression and anxiety**.
- While offering a productive distraction from negative thought patterns.

# Key Mental Health Benefits of ExerciseMood Elevation:

- Boosts serotonin, dopamine, and endorphins, which improve mood and create a **"runner's high".**
- Reduced Anxiety & Stress: Lowers cortisol and adrenaline, helping to manage feelings of tension and anger.
- **Improved Self-Esteem:** Enhances self-worth and confidence through a sense of achievement.
- **Better Sleep:** Regular activity helps regulate sleep patterns.
- **Cognitive Boost:** Helps slow cognitive decline and increases mental focus.

# Actionable Tips Find

- **Enjoyment:** Choose activities you enjoy, such as walking, dancing, gardening, swimming, or cycling.
- **Start Small:** Even short, 15-minute walks can reduce depression risk by 26%.
- **Aim for Consistency:** Aim for 30–60 minutes of moderate activity most days.
- **Socialize:** Join team sports or fitness classes to reduce loneliness and improve mood.
- **Mind-Body Connection:** Combine physical exertion with mindfulness (e.g., yoga) for maximum, holistic, mental health benefits.



- ابن سینا در کتاب قانون می‌گوید:

**" از آنجا که اساس تندرستی به ترتیب اهمیت بر ورزش و غذا و خواب قرار دارد، بهتر است اهم را بر مهم ترجیح دهیم و با ورزش شروع کنیم"**

- امروزه نیز سازمان جهانی بهداشت **کم بودن فعالیت بدنی** را عامل مهم ایجاد مشکلات مزمن جسمی مانند بیماریهای قلبی، چاقی، پوکی استخوان، انواع سرطانها و مرگ و میر زودرس در دنیا می‌داند.

- شعار اخیر انجمن پزشکی ورزشی آمریکا که به شکل مشترک با سازمان نظام پزشکی آمریکا اعلام شده این است که:

**"ورزش و فعالیت بدنی دارو است".**

- به بیان دیگر ورزش دیگر تفریح نیست، بلکه دارویی است که باید به همه مردم تجویز شود تا سالم بمانند و از بروز و پیشرفت بیماریها جلوگیری نمایند.

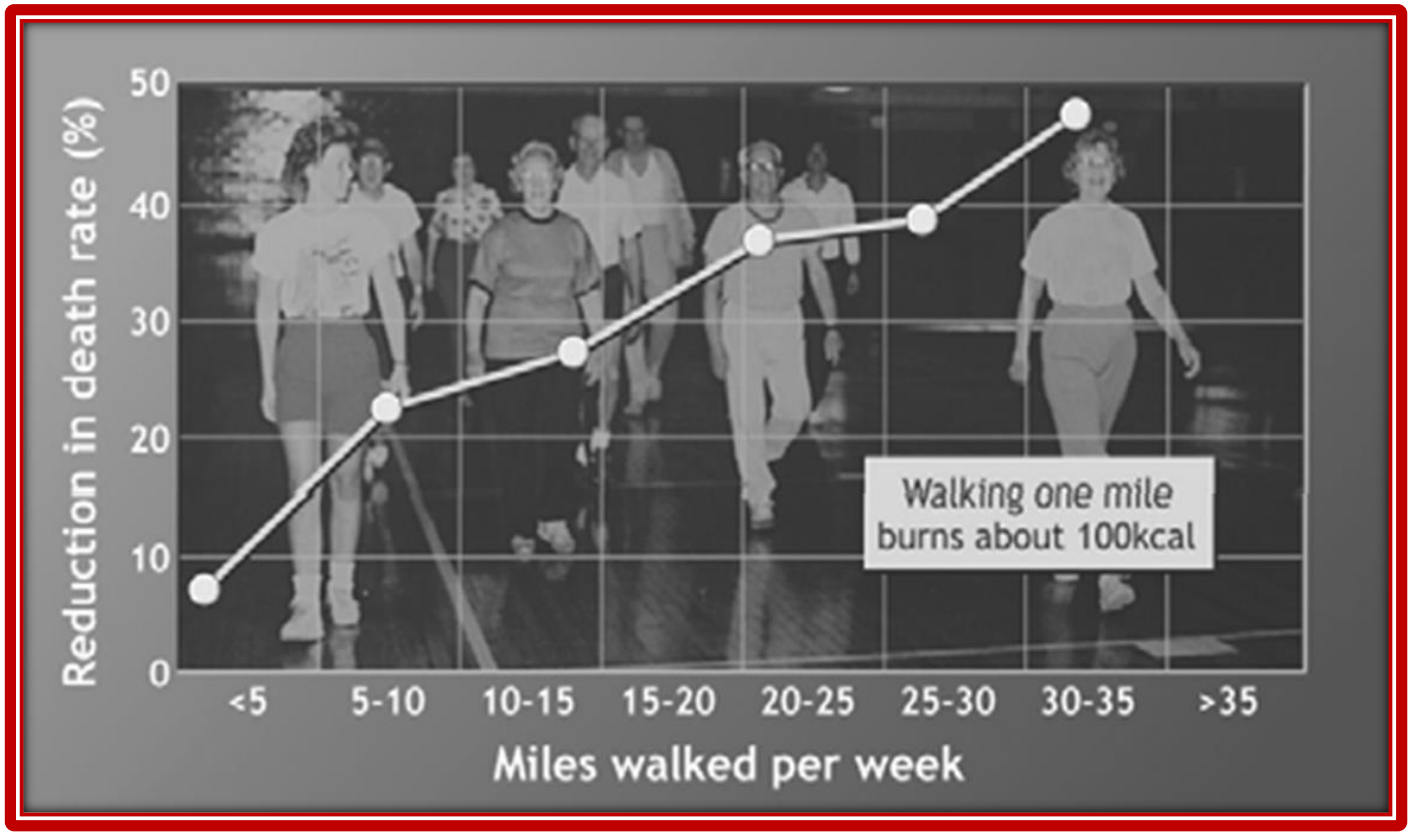
# Exercise Prescription

- A written direction for the proper
  - Volume (amount)
  - Intensity of exercise
    - to cause desired improvements in fitness
    - to maintain a certain fitness level once it has been achieved.

# Scientific Side

- The Effects of Physical Activity on Health and Disease:
  - (Overall mortality, CHD, Cancer, Diabetes, Obesity, Osteoporosis, ….)
- Exercise Physiology
- Training Principles

# Reduction of Mortality



# Good News

**The quantity of exercise needed to significantly reduce disease risk appears to be considerably**

**less than**

**that needed to develop and maintain high levels of physical fitness.**

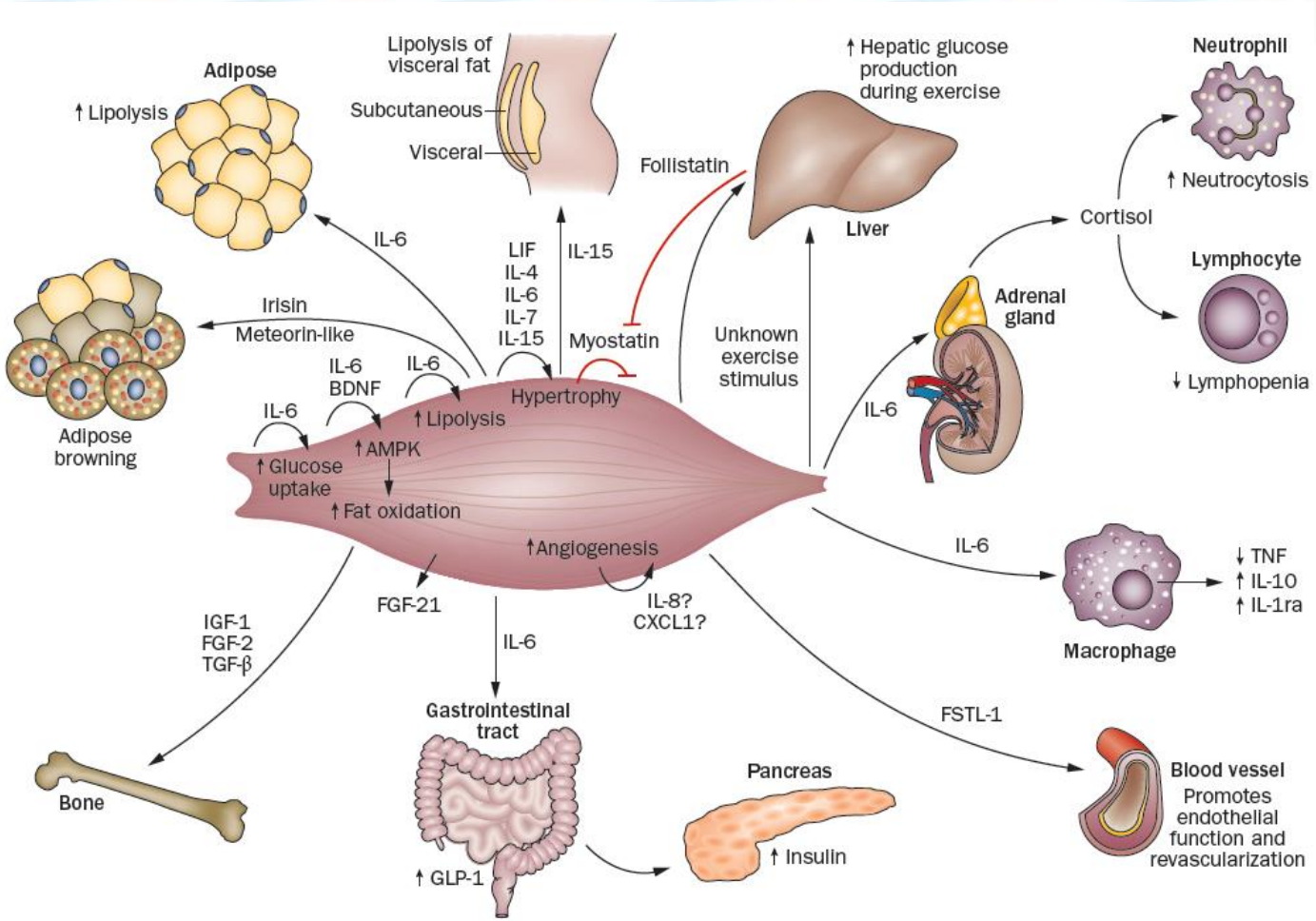
# Exercise is Medicine:
# A Global Health Initiative

# Exercise is Medicine On Campus
# Action Guide

Photo provided courtesy of Southwestern University

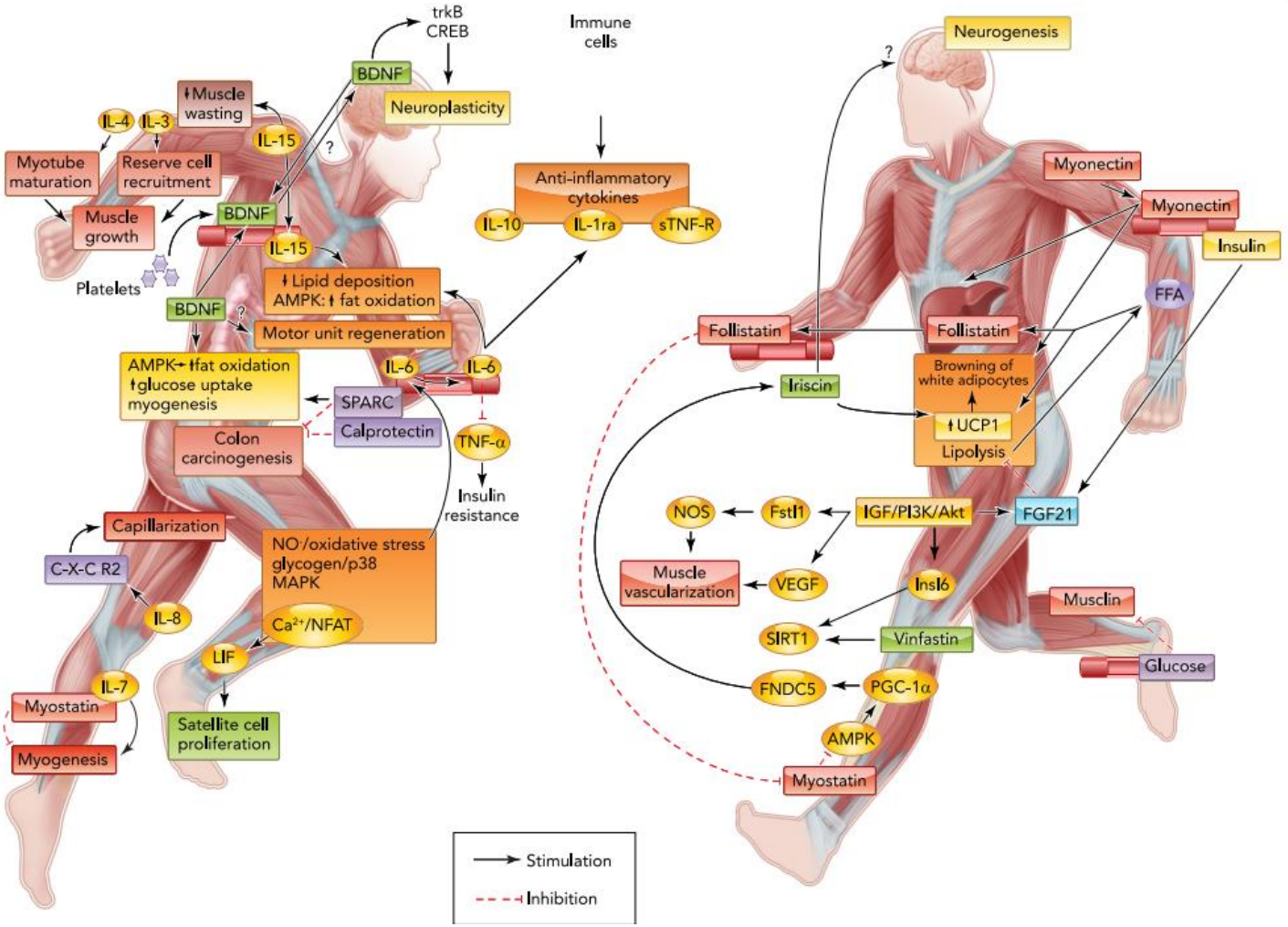
*"Exercise really is medicine and is a great tool for living a healthy life of balance of work and play."*
*– University of Toledo, 2024 Gold-level campus*

ACSM EXERCISE IS MEDICINE®
On Campus

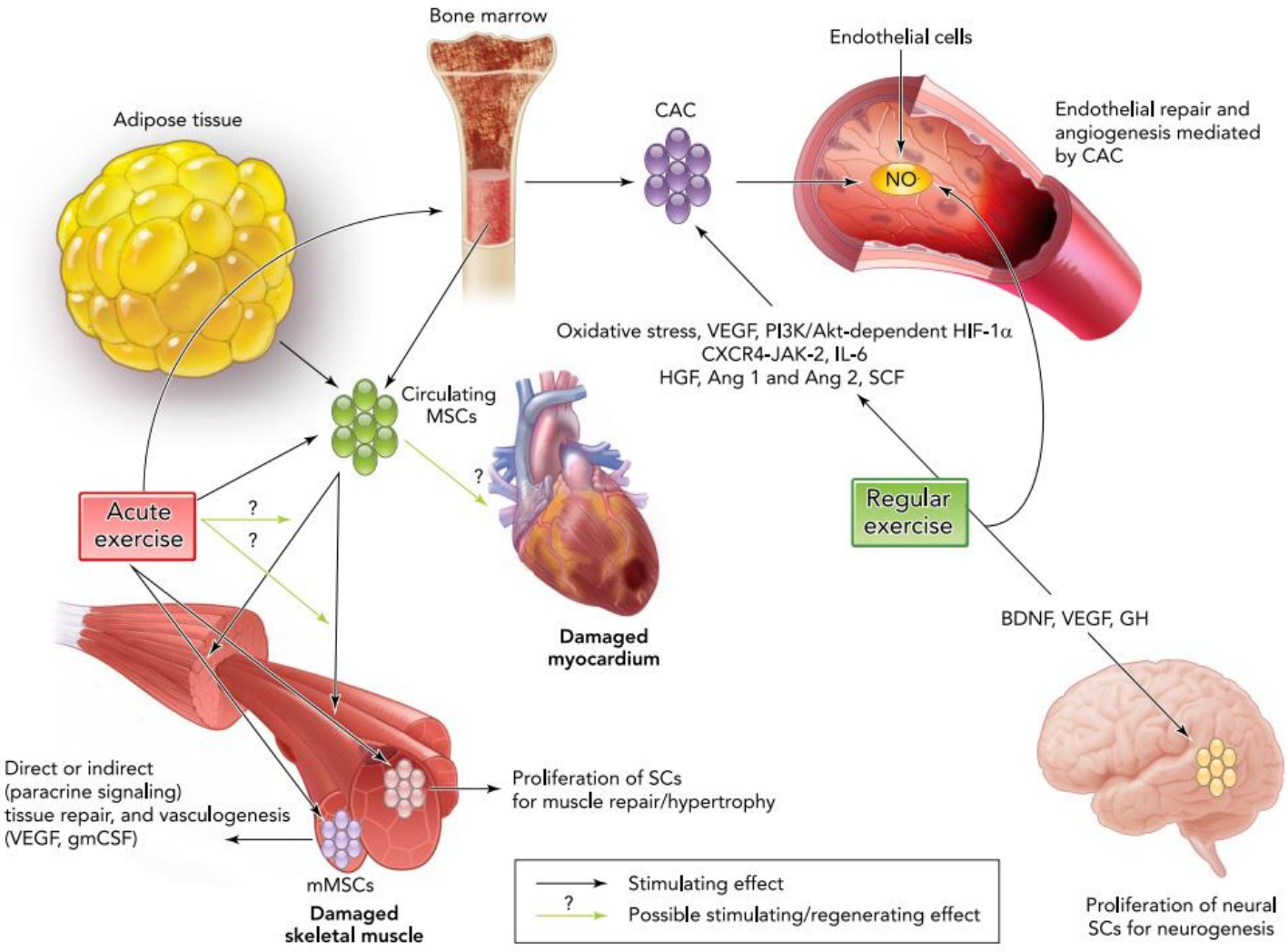



Adapted with permission obtained from Macmillan Publishers Ltd, *Nat. Rev. Endocrinol.* 8, 457–465 (2012).

# Summary of the main myokines, their putative effects, and the molecular signals/pathways involved



# Summary of the main types of stem cells associated with exercise, their main putative effects, and the molecular signals/pathways involved



REVIEWS

PHYSIO

# Exercise is the Real Polypill

The concept of a "polypill" is receiving growing attention to prevent cardiovascular disease. Yet similar if not overall higher benefits are achievable with regular exercise, a drug-free intervention for which our genome has been haped over evolution. Compared with drugs, exercise is available at low cost and relatively free of adverse effects. We summarize epidemiological evidence on the preventive/therapeutic benefits of exercise and on the main biological mediators involved.

PHYSIOLOGY 28: 330–358, 2013;doi:10.1152/physiol.00019.2013

# Do You Really Think We have a Chance Without Exercise?

- Obesity
- Coronary artery disease
- Diabetes
- Hypertension
- Cancer
- Depression and anxiety
- Arthritis
- Osteoporosis
- Etc, etc, etc…

**NO!**

# Proper Type

- ✓ Sport??
- ✓ Exercise??
- ✓ Physical Activity??

# Physical Activity

**Bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure.**

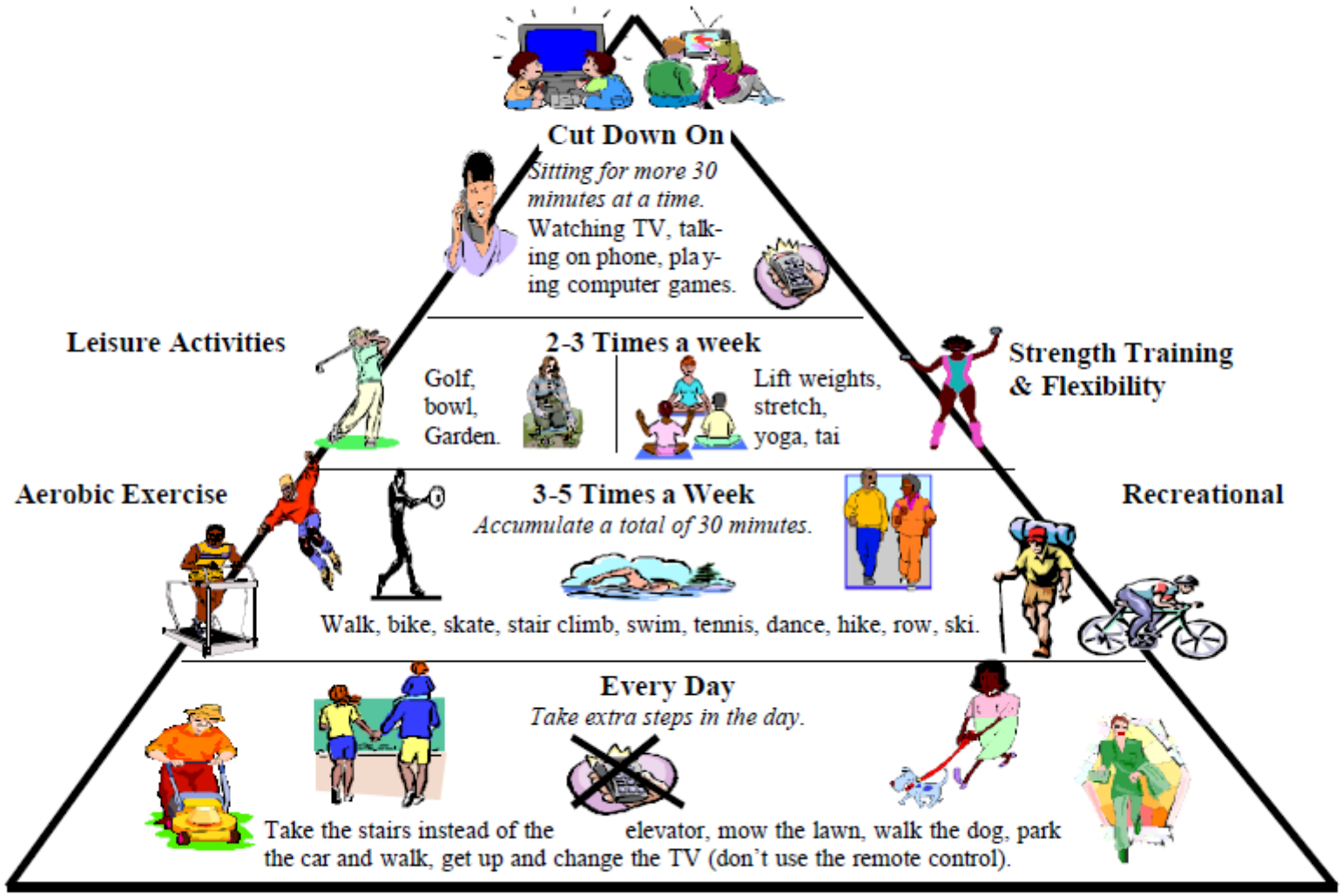
# Exercise:

**A type of physical activity, is defined as planned, structured, and repetitive bodily movement done to improve or maintain one or more components of physical fitness.**

# Sports:

**Activities require specific skilled movements performed during organized game situations.**

# PHYSICAL ACTIVITY PYRAMID



# Health Related Fitness

- Cardiorespiratory fitness (VO2max)
- Muscular strength and endurance
- Flexibility
- Body composition

# Basic Elements

- F: Frequency
- I : Intensity
- T: Time or duration
- T: Type or mode

# Recommendations of American College of Sports Medicine (ACSM) and American Heart Association (AHA)


- All adults should avoid inactivity:
  - Some physical activity is better than none,
  - Adults who participate in any amount of physical activity gain some health benefits.

- For substantial health benefits, adults should do at least
  - 150 minutes a week of moderate-intensity, or
  - 75 minutes a week of vigorous-intensity aerobic physical activity, or
  - an equivalent combination.

- Aerobic activity should be performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week.

- For additional and more extensive health benefits, adults should increase their aerobic physical activity to
  - 300 min/week of moderate-intensity, or
  - 150 min/week of vigorous-intensity aerobic physical activity or
  - an equivalent combination.

- Adults should also do muscle-strengthening activities that are moderate or high intensity and involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.

# General Exercise Recommendations for Healthy Adults

| WEEKLY FREQUENCY ($d \cdot wk^{-1}$ devoted to an exercise program) | DO THESE TYPES OF EXERCISES |
|---|---|
| At least 5 $d \cdot wk^{-1}$ | Moderate intensity (40% to <60% $\dot{V}O_2R$) aerobic (cardiovascular endurance) activities, weight-bearing exercise, flexibility exercise |
| At least 3 $d \cdot wk^{-1}$ | Vigorous intensity (≥60% $\dot{V}O_2R$) aerobic activities, weight-bearing exercise, flexibility exercise |
| 3–5 $d \cdot wk^{-1}$ | A combination of moderate- and vigorous-intensity aerobic activities, weight-bearing exercise, flexibility exercise |
| 2–3 $d \cdot wk^{-1}$ | Muscular strength and endurance, resistance exercise, calisthenics, balance and agility exercise |

# Components of the Exercise Training Session

- Warm-up: At least 5 to 10 minutes of low- (<40% $\dot{V}O_2R$) to moderate- (40%–<60% $\dot{V}O_2R$) intensity cardiovascular and muscular endurance activities
- Conditioning: 20 to 60 minutes of aerobic, resistance, neuromuscular, and/or sport activities (exercise bouts of 10 minutes are acceptable if the individual accumulates at least 20 to 60 $min \cdot d^{-1}$ of daily exercise)
- Cool-down: At least 5 to 10 minutes of low- (<40% $\dot{V}O_2R$) to moderate- (40%–<60% $\dot{V}O_2R$) intensity cardiovascular and muscular endurance activities
- Stretching: At least 10 minutes of stretching exercises performed after the warm-up or cool-down phase

Note: These recommendations are consistent with the United States Department of Health & Human Services Physical Activity Guidelines for Americans, available at http://www.health.gov/PAGuidelines/pdf/paguide.pdf (October 7, 2008).

# Volume

- Minutes per Week
- Steps per Day

# Steps per Day

- Motion sensors (pedometers) are small devices worn at the waist triggered during walking.
- **Pedometers** were first used by Japanese walking clubs and were referred to as “10 000 steps per day” (in Japanese, manpo-kei).
- Researchers have equated walking **10 000 steps per day with 300 kilocalories energy expenditure**, a daily amount identified as optimal to reduce the risks of a first heart attack.
- Based on an equivalence of approximately:
  - **1200–1500 steps per kilometer** (or 100 steps per minute),
  - brisk walking for 30 minutes per day translates to approximately 3000–4000 steps.

# Categories by Level of Physical Activity (Steps/day)

| Activity level | Steps per day |
|---|---|
| Sedentary lifestyle | <5000 |
| Low active | 5000–7499 |
| Somewhat active | 7500–9999 |
| Active | 10 000–12 499 |
| Highly active | >12 500 |

**Tudor-Locke & Bassett**

SG SLEEKGEEK

| Steps | Distance Walked | Time Spent Walking |
|---|---|---|
| 1,000 | 0.8km | 10 minutes |
| 2,000 | 1.6km | 20 minutes |
| 3,000 | 2.4km | 30 minutes |
| 4,000 | 3.2km | 40 minutes |
| 5,000 | 4km | 50 minutes |
| 6,000 | 4.8km | 1 hour |
| 7,000 | 5.6km | 1 hour 10 minutes |
| 8,000 | 6.4km | 1 hour 20 minutes |
| 9,000 | 7.2km | 1 hour 30 minutes |
| 10,000 | 8km | 1 hour 40 minutes |

www.sleekgeek.co.za

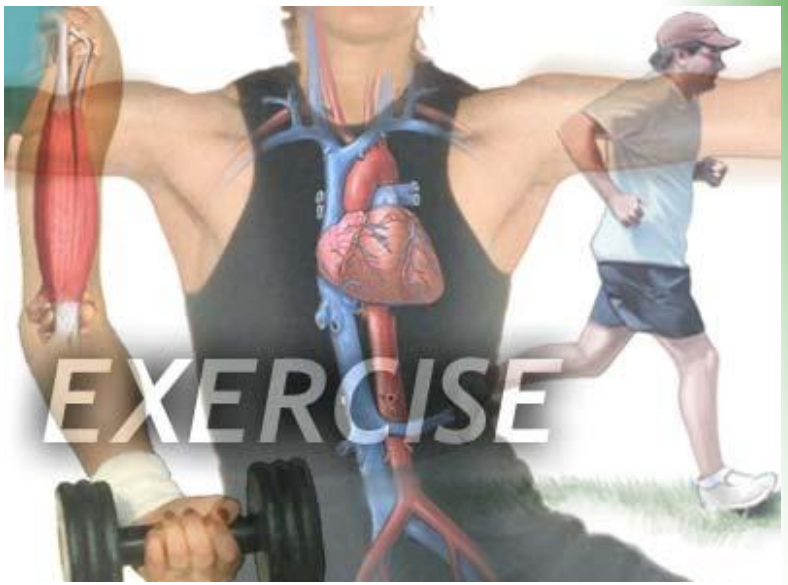
## Steps to Kilometres

Please use this chart for converting steps to kilometres.

660 steps = 0.5 km
1,320 steps = 1 km
1,980 steps = 1.5 km
2,640 steps = 2 km
3,300 steps = 2.5 km
3,960 steps = 3 km
4,620 steps = 3.5 km
5,280 steps = 4 km
5,940 steps = 4.5 km
6,600 steps = 5 km
13,200 steps = 10 km
19,800 steps = 15 km
26,400 steps = 20 km
33,000 steps = 25 km
39,600 steps = 30 km
46,200 steps = 35 km
52,800 steps = 40 km
59,400 steps = 45 km
66,000 steps = 50 km

# Proper Volume?

- Daily Aerobic Activity
  - 10,000 steps per day
  - 150 – 300 min/week (CDC)
  - ACSM guidelines
- Strength exercises 2-3 times per week
  - Body weight
  - Resistance



# Exercise Intensity

**Using More Simple and Feasible Methods, Such as:**

- **Target Heart Rate Range (THRR)**
- **Rating of Perceived Exertion (RPE)**
- **Talk test**

# Target Heart Rate Range (THRR)

- **Heart rate is linearly related to intensity of exercise and rate of O2 consumption.**
- The THRR in heartbeats per minute provides a numerical range in which heart rate should be maintained during exercise.

  - If the heart rate is below the THRR, you possibly are not working hard enough, therefore you need to pick up the pace.
  - If it is at the upper limit or above the THRR, you may be working too hard, therefore slow down the pace.

# THRR

- *Check your heart rate periodically during exercise.*
- **After the first 5 minutes of exercise, simply check your pulse during exercise for a 10-second count.**
- **Repeat as often as necessary (e.g., every 5 minutes) to ensure that you are staying within your THHR.**

# Table 1-1. Classification of Physical Activity Intensity

| Intensity | Relative Intensity | | Absolute Intensity Ranges (METs) Across Fitness Levels | | | |
|---|---|---|---|---|---|---|
| | $\dot{V}O_2R$ (%) HRR (%) | Maximal HR (%) | 12 MET $\dot{V}O_{2max}$ | 10 MET $\dot{V}O_{2max}$ | 8 MET $\dot{V}O_{2max}$ | 6 MET $\dot{V}O_{2max}$ |
| Very light | <20 | <50 | <3.2 | <2.8 | <2.4 | <2.0 |
| Light | 20–39 | 50–63 | 3.2–5.3 | 2.8–4.5 | 2.4–3.7 | 2.0–3.0 |
| Moderate | 40–59 | 64–76 | 5.4–7.5 | 4.6–6.3 | 3.8–5.1 | 3.1–4.0 |
| Hard (vigorous) | 60–84 | 77–93 | 7.6–10.2 | 6.4–8.6 | 5.2–6.9 | 4.1–5.2 |
| Very hard | ≥85 | ≥94 | ≥10.3 | ≥8.7 | ≥7.0 | ≥5.3 |
| Maximal | 100 | 100 | 12 | 10 | 8 | 6 |

Adapted from United States Department of Health and Human Services. Physical activity and health: A report of the Surgeon General, 1996; American College of Sports Medicine. Position Stand: The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness, and flexibility in healthy adults. Med Sci Sports Exerc 1998;30:975–991; Howley ET. Type of activity: resistance, aerobic and leisure versus occupational physical activity. Med Sci Sports Exerc 2001;33:S364–S369.

Abbreviations: METs, metabolic equivalent units (1 MET = 3.5 $mL \cdot kg^{-1} \cdot min^{-1}$); $\dot{V}O_2R$, oxygen uptake reserve; HRR, heart rate reserve.

# Instructions on how to calculate THRR:

1) Estimate your maximal heart rate (MHR) by subtracting your age in years from 220:
MHR = 220 – age or 208 - (0.7 × age).

2) Determine your resting heart rate (RHR).

3) Determine the heart rate reserve (HRR). This represents the heart rate above rest that you have available to use during exercise. Simply subtract the RHR from the MHR.
HRR = MHR - RHR

4) Determine the target heart rate (THR) at 40% of HRR.

THR @ 40% = (.40 × HRR) + RHR (Karvonen Equation)

Next, determine the THR at 60% of HRR.

THR @ 60% = (.60 × HRR) + RHR

You now have the two numbers that represent the low end and high end of the THRR.

THHR = THR @ 40% to THR @ 60%

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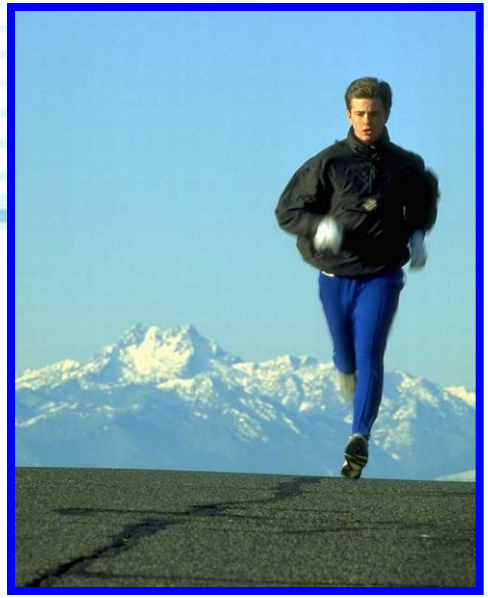
# NOTE:



- **Heart rate can be affected by temperature, altitude, infection and certain medications.**
- **In patients on beta blockers the use of heart rate to guide exercise intensity would be inappropriate and other methods to prescribe intensity need consideration.**

# RPE (Borg Scale)

**The average RPE range associated with physiologic adaptation to exercise is 12-16 (somewhat hard to hard)**

**Table 19.6**

**The Borg Ratings of Perceived Exertion Scale**

| Rating | Intensity |
|---|---|
| 6 | No exertion at all |
| 7 | Extremely light |
| 8 | |
| 9 | Very light |
| 10 | |
| 11 | Light |
| 12 | |
| 13 | Somewhat hard |
| 14 | |
| 15 | Hard (heavy) |
| 16 | |
| 17 | Very hard |
| 18 | |
| 19 | Extremely hard |
| 20 | Maximal exertion |

Borg RPE scale


From G. Borg, 1998, *Borg's perceived exertion and pain scales* (Champaign, IL: Human Kinetics), 47. By permission of G. Borg.

# The Talk Test

**While exercising at an appropriate intensity, you should be able to carry on a conversation with someone without gasping for air every other word or two.**

**If it is difficult to do this, your exercise intensity is likely too high, therefore you need to slow down the pace. Keep this in mind while exercising.**


# MUSCULAR FITNESS

# GOALS
# FOR A HEALTH-RELATED RESISTANCE TRAINING

- Make activities of daily living (ADL):
  - stair climbing, carrying bags of groceries) less stressful physiologically

- Effectively manage , attenuate, and even prevent chronic diseases and health conditions such as osteoporosis, Type 2 diabetes mellitus, and obesity.

- *Although resistance training* is *important across the age span, its importance becomes even greater with age*

# RESISTANCE TRAINING FREQU ENCY RECOMMENDATION FITT

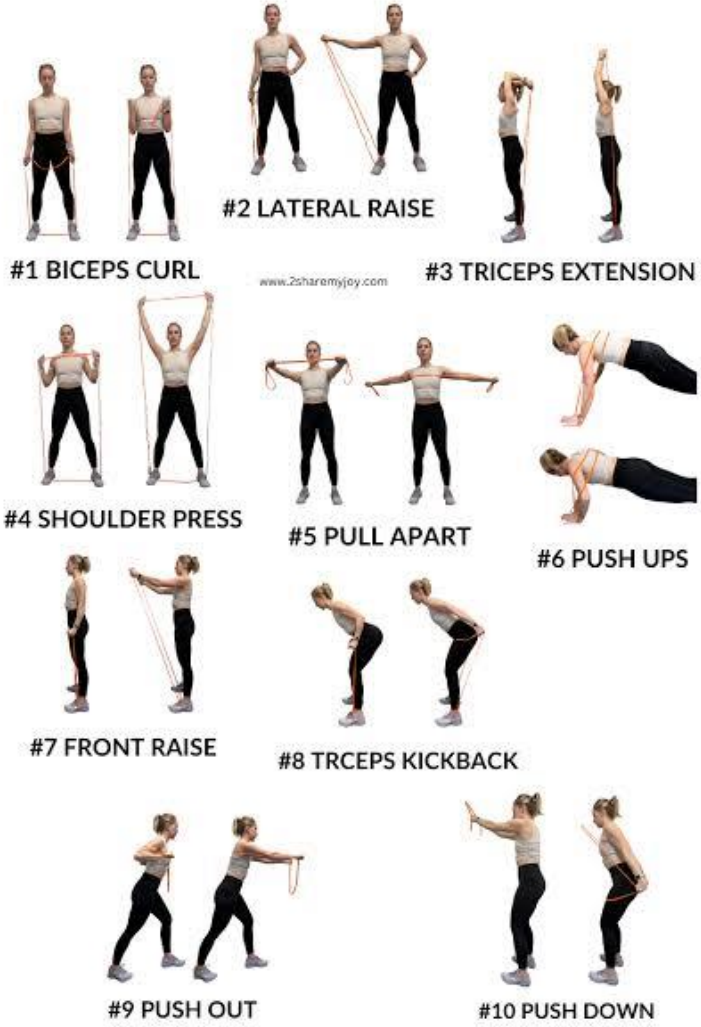
- Resistance training of each major muscle group 2-3 d/ wk

- At least 48 h separating the exercise training sessions for the same muscle group is recommended for all adults.

# TYPES OF RESISTANCE EXERCISES FITT

- Many types of resistance training equipment can effectively be used to improve muscular fitness:
  - Free weights ,
  - Machines with stacked weights or pneumatic resistance ,
  - Resistance bands.

# 10 RESISTANCE BAND
# ARM EXERCISES



# TYPES OF RESISTANCE EXERCISES FITT

- Multijoint exercises affecting more than one muscle group and targeting agonist and antagonist muscle groups are recommended for all adults.
  - Chest press , shoulder press, pull -down, dips, lower back extension, abdominal crunch/curl-up , leg press, squats).
- Single joint exercises targeting major muscle groups such as:
  - Biceps curls, triceps extensions, quadriceps extensions, leg curls, and calf raises



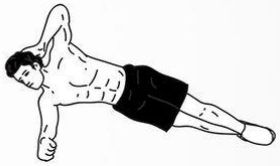


# plank
## 5 min workout

1:00 basic plank

0:30 elbow plank

1:00 leg raised plank
30 seconds - each leg



1:00 one side plank
30 seconds - each side

0:30 basic plank

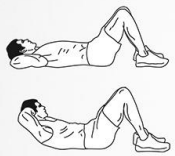
1:00 elbow plank

© Neila Rey neilarey.com

# crunch time

DAREBEE WORKOUT © darebee.com

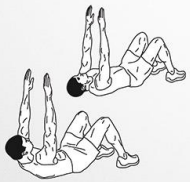
**LEVEL I** 3 sets **LEVEL II** 4 sets **LEVEL III** 5 sets **REST** up to 2 minutes



**10** crunches

**6** circle crunches

**6** folded crunches



**10** high crunches

**6** knee crunches

**6** cross crunches

# VOLUME OF RESISTANCE EXERCISE (SETS AND REPETITIONS)RECOMMENDATION FITT

- Adults should train each muscle group to improve muscular fitness:
  - 2- 4 sets
  - 8- 12 repetitions per set
  - A rest interval of 2-3 min between sets
- For older adults and very deconditioned individuals:
  - ≥1 set of 10- 15 repetitions of moderate intensity (l.e., *60*-70% 1-RM),

# *Intensity*

- 60%-70% 1-RM (moderate-to-vigorous intensity ) for novice to intermediate exercisers to improve strength
- ≥80% 1-RM (vigorous-to-very vigorous intensity) for experienced strength trainers to improve strength
- ≥ 40%- 50% RM (very light-to-light intensity) for older individuals beginning exercise to improve strength
  - ≥ 40%-50% 1-RM (very light-to-light intensity) may be beneficial for improving strength in sedentary individuals beginning a resistance training program
- < 50% 1-RM (light-ta-moderate intensity) to improve muscular endurance
- 20%-50% 1-RM in older adults to improve power
- No specific duration of training has been identified

# RESISTANCE EXERCISE TECHNIQUE RECOMMENDATIONS FITT

- All individuals should perform resistance training using correct technique.

- Proper resistance exercise techniques employ controlled movements through the full ROM and involve concentric and eccentric muscle actions.

# FLEXIBILITY EXERCISE (STRETCHING)

- Joint ROM or flexibility can be improved across all age groups by engaging in flexibility exercises.

- The ROM around a joint is improved immediately after performing flexibility exercise and shows chronic improvement after about 3- 4 wk of regular stretching at a frequency of at least 2-3 times/wk.

# FLEXIBILITY EXERCISE (STRETCHING)

- Postural stability and balance can also be improved by engaging in flexibility exercises , especially when combined with resistance exercise.

- It is possible that regular flexibility exercise may result in a reduction of musculotendinous injuries, prevention of low back pain, or delayed onset of muscle soreness

- The goal of a flexibility program is to develop ROM in the major muscle tendon groups in accordance with individualized goals.

- It is most effective to perform flexibility exercise when the muscle temperature is increased through:
  - Warm-up exercises
  - Passively through methods such as moist heat packs or hot baths,

# VOLUME OF FLEXIBILITY EXERCISE (TIME, REPETITIONS , AND FREQUENCY)

- *Frequency*:
  - 2- 3 d/wk  with daily being most effective
- *Intensity:*
  - Stretch to the point of feeling tightness or slight discomfort
- *Type:*
  - Static flexibility (i.e., active or passive),
  - dynamic flexibility,
  - ballistic flexibility,
  - PNF(proprioceptive neuromuscular facilitation)

# VOLUME OF FLEXIBILITY EXERCISE (TIME, REPETITIONS , AND FREQUENCY)

- ***Time:***
  - Holding a static stretch for 10-3 0 s is recommended for most adults .
  - In older individuals. holding a stretch for 30- 60 s may confer greater benefit.
  - For proprioceptive neuromuscular facilitation (PNF stretching. a 3-6 s light-to-moderate contraction *(e.g.,* 20%-75% of maximum voluntary contraction) followed by a 10-30 s assisted stretch is desirable.
- ***Volume:***
  - A reasonable target is to perform 60 s of total stretching time for each flexibility exercise.
- ***Pattern:***
  - Repetition of each flexibility exercise 2-4 times is recommended.

Standing hamstring stretch

Hamstring stretch on wall

Standing calf stretch

# Artistic Side

- Given the diverse nature and health needs of the population, guidelines

  cannot be applied in an overly rigid or precise fashion.

- The techniques presented should be used with
  - Flexibility
  - Careful attention paid to the goals of the individual.

# The Art of Exercise Prescription

***"….exercise prescription is the successful integration of exercise science with behavioral techniques that result in long-term program compliance and attainment of the individual's goals."***

It is important to select an activity appropriate to the preferences and abilities of the individual for whom it is prescribed.

# Thank You


- @varzeshclinic
- @Sportsmedicine_shariati_tums