



Introduction to Fitness and Training and Its Importance in Dance

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Lecture 2 Outline

Recap Last Week



Cardiovascular Fitness



Flexibility

RECAP: Components of Fitness



Health-related physical fitness components

Cardiorespiratory endurance

Body Composition

Muscular Strength

Muscular Endurance

Flexibility

Skill-related
physical
fitness
components

Agility

Coordination

Balance

Power

Reaction time

Speed

Cardiovascular (CV) Fitness



What is it?



Why is it important for Dance?



How do we improve it?

Training Mode – running, cycling, swimming etc.

Training Frequency

Training Intensity

Types of training – Continuous, interval, fartlek

What is CV Fitness?



Refers to the efficiency of the heart, lungs, and blood vessels in delivering oxygen during physical activity.



Involves activities that increase heart rate, like running, swimming, cycling, or dancing.



Relies on aerobic capacity, meaning your body's ability to perform sustained work.

Why is CV Fitness important for Dance?



Cardiovascular fitness impacts endurance, performance, and recovery.



Helps dancers maintain energy during long rehearsals and performances.

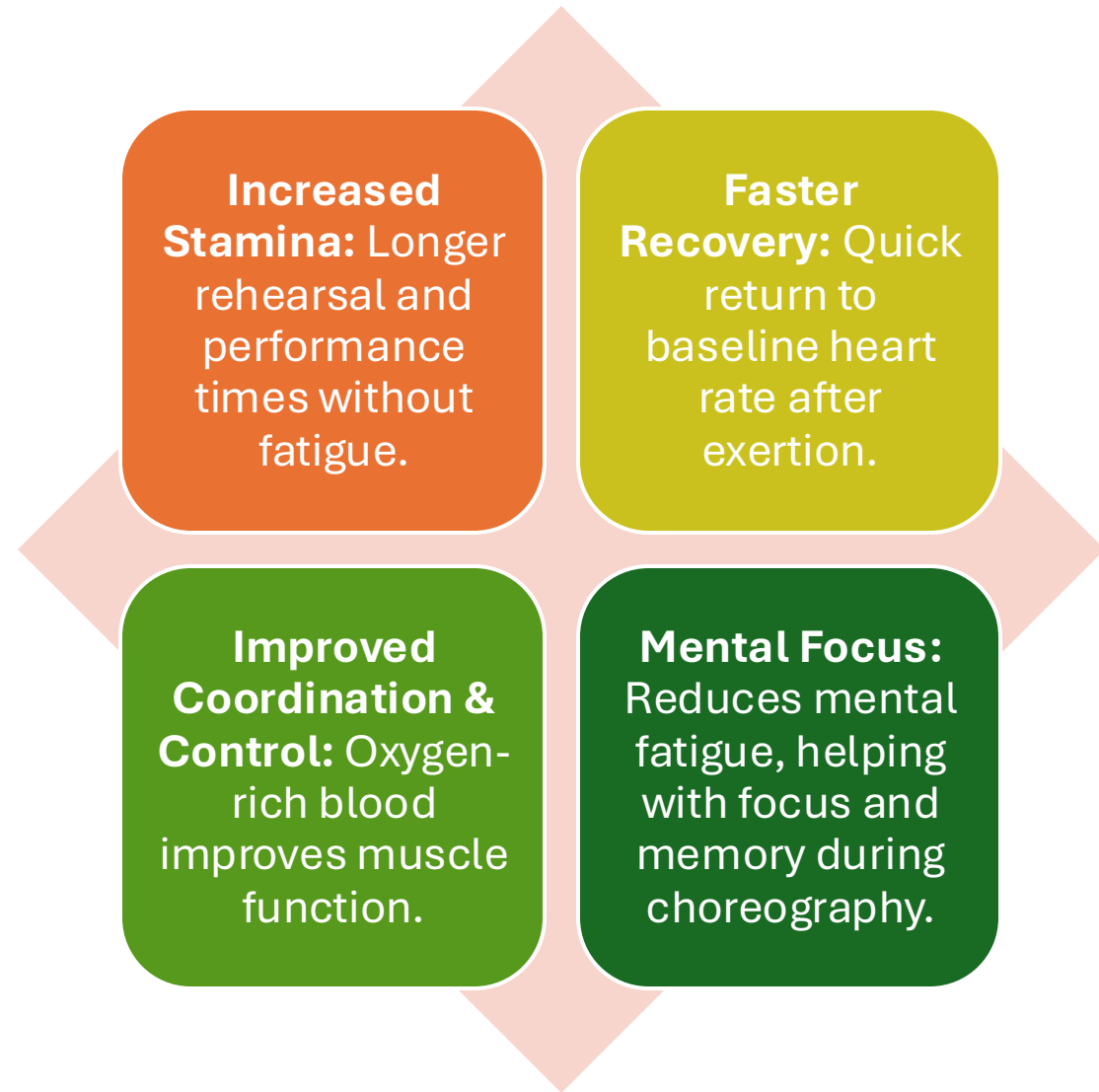


Prevents fatigue and reduces the risk of injury.



Enhances oxygen delivery to muscles for better efficiency.

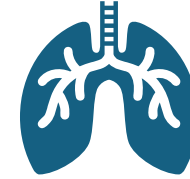
What are the benefits of higher levels of CV fitness for Dance?



A Brief look at the Physiology



Heart: Pumps oxygenated blood throughout the body.



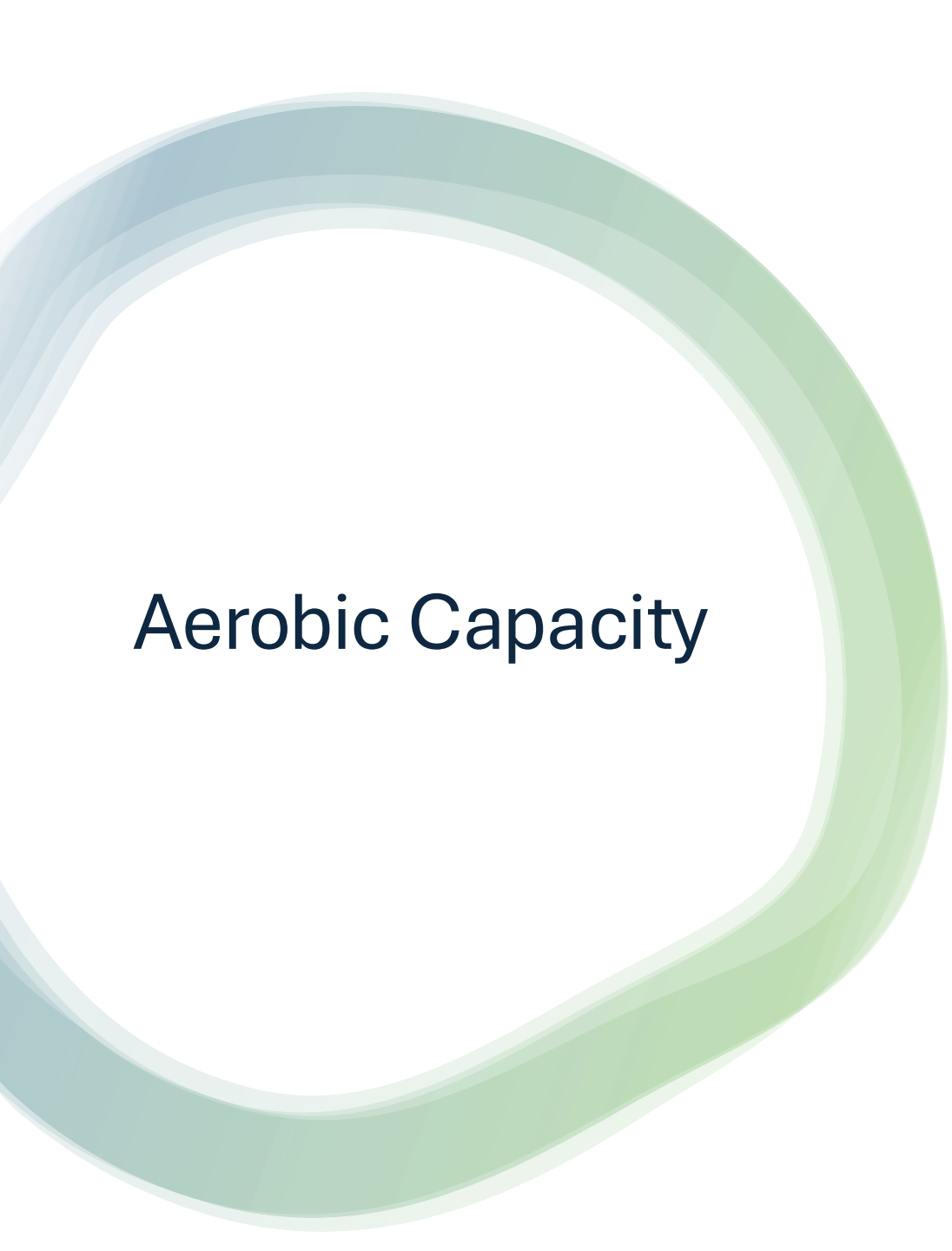
Lungs: Oxygenate the blood and expel carbon dioxide.



Blood Vessels: Carry oxygen and nutrients to muscles and remove waste.



Capillaries: Facilitate gas exchange at muscle level.



Aerobic Capacity

- Aerobic capacity
 - Maximum rate at which an athlete can produce energy through oxidation of energy resources (carbohydrates, fats, and proteins)
 - Usually expressed as a volume of oxygen consumed per kilogram of body weight per minute (i.e., $\text{ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$); also called *aerobic power*

How do we Improve CV fitness?



TRAINING MODE –
RUNNING, CYCLING,
SWIMMING ETC.



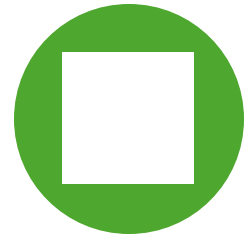
TRAINING
FREQUENCY



TRAINING INTENSITY



DURATION



TYPES OF TRAINING –
CONTINUOUS,
INTERVAL, FARTLEK



Designing an Aerobic Endurance Program

- Step 1: exercise mode
 - Exercise mode is the specific activity performed by the athlete: cycling, running, swimming, and so on.
 - The more specific the training mode is to the sport, the greater the improvement in performance.



Designing an Aerobic Endurance Program *(continued)*

- Step 2: training frequency
 - Training frequency is the number of training sessions conducted per day or per week.
 - The frequency of training sessions will depend on the interaction of exercise intensity and duration, the training status of the athlete, and the specific sport season.



Designing an Aerobic Endurance Program *(continued)*

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- Step 3: training intensity
 - Adaptations in the body are specific to the intensity of the training session.
 - High-intensity aerobic exercise increases cardiovascular and respiratory function and allows for improved oxygen delivery to the working muscles.
 - Increasing exercise intensity may also benefit skeletal muscle adaptations by affecting muscle fiber recruitment.



Designing an Aerobic Endurance Program *(continued)*

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- Step 3: training intensity
 - Heart rate
 - The most frequently used method for prescribing aerobic exercise intensity



Designing an Aerobic Endurance Program

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- Target heart rate calculations
 - Karvonen method
 - Age-predicted maximum heart rate (APMHR)
 $= 220 - \text{age}$
 - Heart rate reserve (HRR) = APMHR – resting heart rate (RHR)
 - Target heart rate (THR) = $(\text{HRR} \times \text{exercise intensity}) + \text{RHR}$
 - Do this calculation twice to determine the target heart rate range (THRR).



Designing an Aerobic Endurance Program *(continued)*



- Target heart rate calculations
 - Percentage of maximal heart rate method
 - Age-predicted maximum heart rate (APMHR) = $220 - \text{age}$
 - Target heart rate (THR) = $(\text{APMHR} \times \text{exercise intensity})$
 - Do this calculation twice to determine the target heart rate range (THRR).



Designing an Aerobic Endurance Program *(continued)*

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- Step 3: training intensity
 - Ratings of perceived exertion scales
 - Can be used to regulate intensity of aerobic endurance training across changes in fitness level
 - May be influenced by external environmental factors

TABLE 20.2 Rating of Perceived Exertion (RPE) Scale

Rating	Description
1	Nothing at all (lying down)
2	Extremely little
3	Very easy
4	Easy (could do this all day)
5	Moderate
6	Somewhat hard (starting to feel it)
7	Hard
8	Very hard (making an effort to keep up)
9	Very very hard
10	Maximum effort (can't go any further)

Reprinted, by permission, from NSCA, 2012, *Aerobic endurance training program design*, by P. Hagerman. In *NSCA's essentials of personal training*, 2nd ed., edited by J.W. Coburn and M.H. Malek (Champaign, IL: Human Kinetics), figure 16.1, 395.



Designing an Aerobic Endurance Program *(continued)*

- Step 4: exercise duration
 - Exercise duration is the length of time of the training session.
- 



Key Point

- The duration of a training session is often influenced by the exercise intensity; the longer the exercise duration, the lower the exercise intensity.
- 

Types of CV training/exercise

Continuous / Steady state
training

Interval

Faartlek

Continuous / Steady state training

Steady-state cardio involves performing a continuous, moderate-intensity exercise for an extended period of time (typically 20-60 minutes). This helps build aerobic endurance, which is crucial for maintaining energy throughout rehearsals and performances.



Examples for Dancers:

Running at a moderate pace.

Cycling on a stationary bike or outdoors.

Swimming at a consistent speed.

Brisk Walking or hiking.

Interval Training



Interval training involves alternating periods of high-intensity exercise with low-intensity recovery or rest periods.



This approach can be tailored to the dancer's fitness level and dance style, and it's an effective method for improving both aerobic and anaerobic fitness.



Interval training closely mirrors the demands of dance, where high-energy bursts are often followed by moments of recovery or lower-intensity movement.

Faartlek Training

What it is:

Fartlek is a Swedish term that translates to "speed play," and it combines continuous running with random, unstructured bursts of speed. Unlike traditional interval training, the high-intensity bursts are varied in both intensity and duration, making it a less predictable and more dynamic workout.



Examples for Dancers:

Fartlek Runs: During a 30-minute run, alternate between moderate jogging and spontaneous sprints, running at faster speeds whenever you feel energetic, then slowing down when needed.

Dance-Specific Fartlek: During a dance class, pick a section of choreography where you alternate between faster and slower movements, challenging both your stamina and ability to control tempo.



Key Point

- The various types of training induce different physiological responses. A sound program should incorporate all types of training into the athlete's weekly, monthly, and yearly training schedule.

Flexibility Training

Based on Chapter 14 –
Haff & Triplett (2016)



Flexibility



What is it?



Why is it important for Dance?



How do we improve it?

Flexibility

Flexibility is a measure of range of motion (ROM) and has static and dynamic components.

Static flexibility is the range of possible movement about a joint and its surrounding muscles during a passive movement.

Dynamic flexibility is the available ROM during active movements; it requires voluntary muscular actions.

Flexibility (continued)

- Factors affecting flexibility
 - Joint structure
 - Structure determines the joint's range of motion.
 - Age and sex
 - Older people tend to be less flexible than younger people;
females tend to be more flexible than males.
 - Muscle and connective tissue
 - Elasticity and plasticity of connective tissues affect ROM.



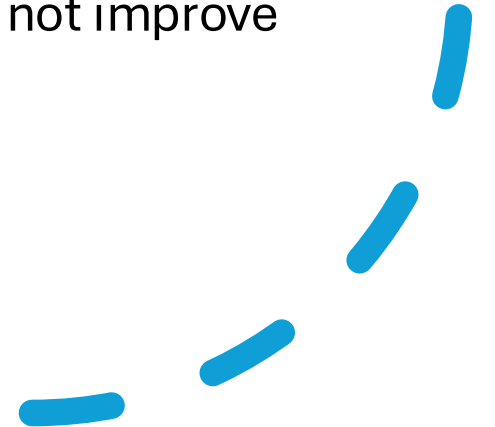
Flexibility (*continued*)

- Factors affecting flexibility
 - Stretch tolerance
 - The ability of an athlete to tolerate the discomfort of stretching.
 - Neural control
 - Range of motion is controlled by the central and peripheral nervous system, including both afferent and efferent mechanisms.



Flexibility (continued)

- Factors affecting flexibility
 - Resistance training
 - Exercise through a full ROM and develop both agonist and antagonist muscles to prevent loss of ROM.
 - Muscle bulk
 - Large muscles may impede joint movement.
 - Activity level
 - An active person tends to be more flexible than an inactive one, but activity alone will not improve flexibility.



Task - Why is
flexibility
important for
Dance?



Flexibility (continued)

- Frequency, duration, and intensity of stretching
 - Acute effects of stretching on ROM are transient.
 - For longer-lasting effects, a stretching program is required.
 - Two sessions per week for a minimum of 5 weeks.
 - Stretches should be held at a position of mild discomfort for 15 to 30 seconds.

Flexibility (continued)

- When should an athlete stretch?
 - Following practice and competition
 - Postpractice stretching facilitates ROM improvements because of increased muscle temperature.
 - Stretching should be performed within 5 to 10 minutes after practice.
 - Postpractice stretching may also decrease muscle soreness, although the evidence on this is ambiguous.



Flexibility (continued)

- When should an athlete stretch?
 - As a separate session
 - If increased levels of flexibility are required, additional stretching sessions may be needed.
 - In this case, stretching should be preceded by a thorough warm-up to allow for the increase in muscle temperature necessary for effective stretching.
 - This type of session can be especially useful as a recovery session on the day after a competition.

Types of Stretching

- Static stretch
 - Slow and constant, with the end position held for 15 to 30 seconds
- Ballistic stretch
 - Typically involves active muscular effort and uses a bouncing-type movement in which the end position is not held
- Dynamic stretch
 - A type of functionally based stretching exercise that uses sport-specific movements to prepare the body for activity



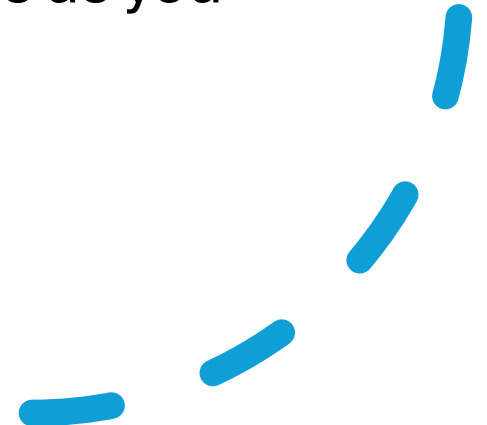
Types of Stretching (continued)

- Static stretch
 - Get into a position that facilitates relaxation.
 - Move to the point in the ROM where you experience a sensation of mild discomfort. If performing partner-assisted PNF stretching, communicate clearly with your partner.
 - Hold stretches for 15 to 30 seconds.
 - Repeat unilateral stretches on both sides.



Types of Stretching (*continued*)

- Dynamic stretch
 - Carry out 5 to 10 repetitions for each movement, either in place or over a given distance.
 - Progressively increase the ROM on each repetition.
 - Increase the speed of motion on subsequent sets where appropriate.
 - Actively control muscular actions as you move through the ROM.



Types of Stretching (*continued*)

- Proprioceptive neuromuscular facilitation (PNF) stretch
 - Hold-relax
 - Passive prestretch (10 seconds)
 - Isometric hold (6 seconds)
 - Passive stretch (30 seconds)



Positions for PNF Hamstring Stretch

- Figure 14.1 (next slide)
 - Starting position for PNF hamstring stretch



Figure 14.1



Positions for PNF Hamstring Stretch

- Figure 14.2 (next slide)
 - Partner and subject leg and hand positions for PNF hamstring stretch



Figure 14.2



Hold-Relax

- Figure 14.3 (next slide)
 - Passive prestretch of hamstrings during hold-relax PNF hamstring stretch



Figure 14.3



Hold-Relax

- Figure 14.4 (next slide)
 - Isometric action during hold-relax PNF hamstring stretch



Figure 14.4



Hold-Relax

- Figure 14.5 (next slide)
 - Increased ROM during passive stretch of hold-relax PNF hamstring stretch



Figure 14.5



Types of Stretching

- Proprioceptive neuromuscular facilitation (PNF) stretch
 - Contract-relax
 - Passive prestretch (10 seconds)
 - Concentric muscle action through full ROM
 - Passive stretch (30 seconds)



Contract- Relax

- Figure 14.6 (next slide)
 - Passive prestretch of hamstrings during contract-relax PNF stretch



Figure 14.6



Contract- Relax

- Figure 14.7 (next slide)
 - Concentric action of hip extensors during contract-relax PNF stretch



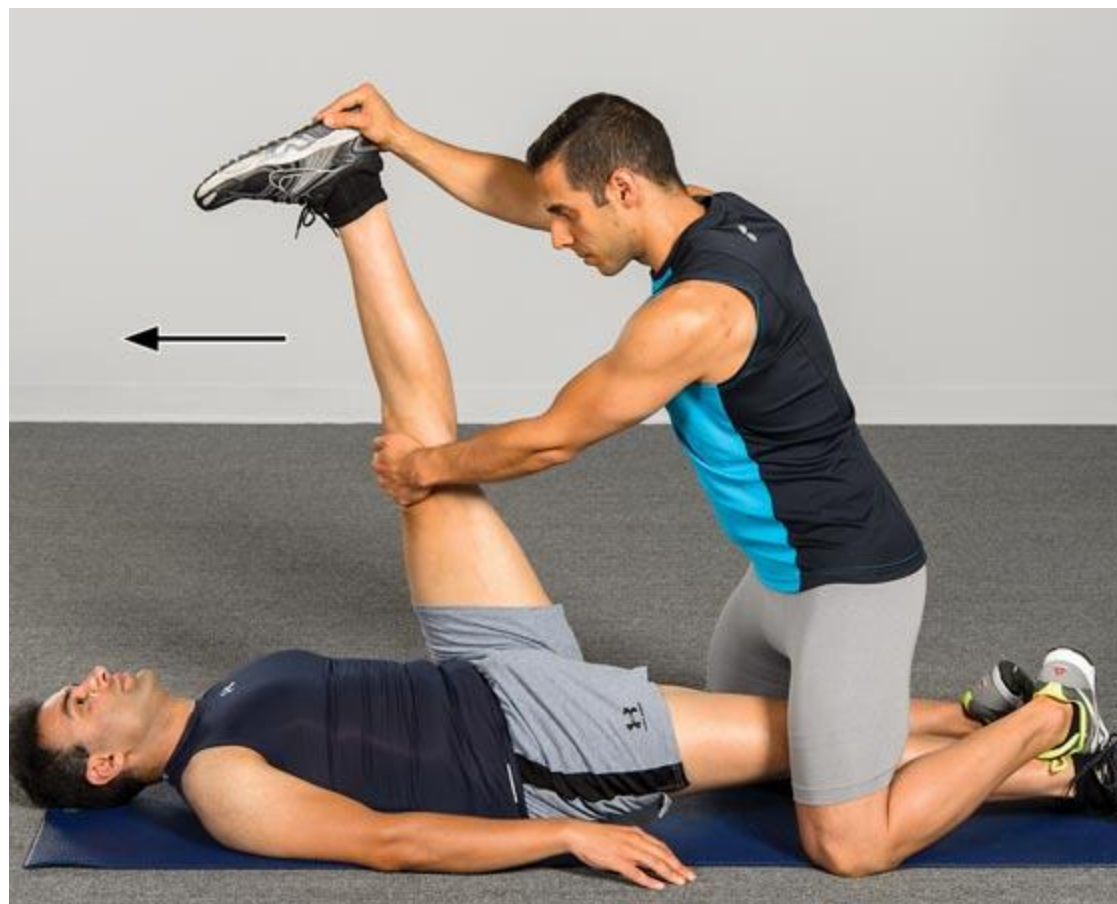
Figure 14.7



Contract- Relax

- Figure 14.8 (next slide)
 - Increased ROM during passive stretch of contract-relax PNF stretch

Figure 14.8



Types of Stretching

- Proprioceptive neuromuscular facilitation (PNF) stretch
 - Hold-relax with agonist contraction
 - During third phase (passive stretch), concentric action of the agonist is used to increase the stretch force.

Hold-Relax With Agonist Contraction

- Figure 14.9 (next slide)
 - Passive prestretch during hold-relax with agonist contraction PNF hamstring stretch

Figure 14.9



Hold-Relax With Agonist Contraction

- Figure 14.10 (next slide)
 - Isometric action of hamstrings during hold-relax with agonist contraction PNF hamstring stretch

Figure 14.10



Hold-Relax With Agonist Contraction

- Figure 14.11 (next slide)
 - Concentric contraction of quadriceps during hold-relax with agonist contraction PNF hamstring stretch, creating increased ROM during passive stretch

Figure 14.11





Key Point

- The hold-relax with agonist contraction is the most effective PNF stretching technique due to facilitation via both reciprocal and autogenic inhibition.
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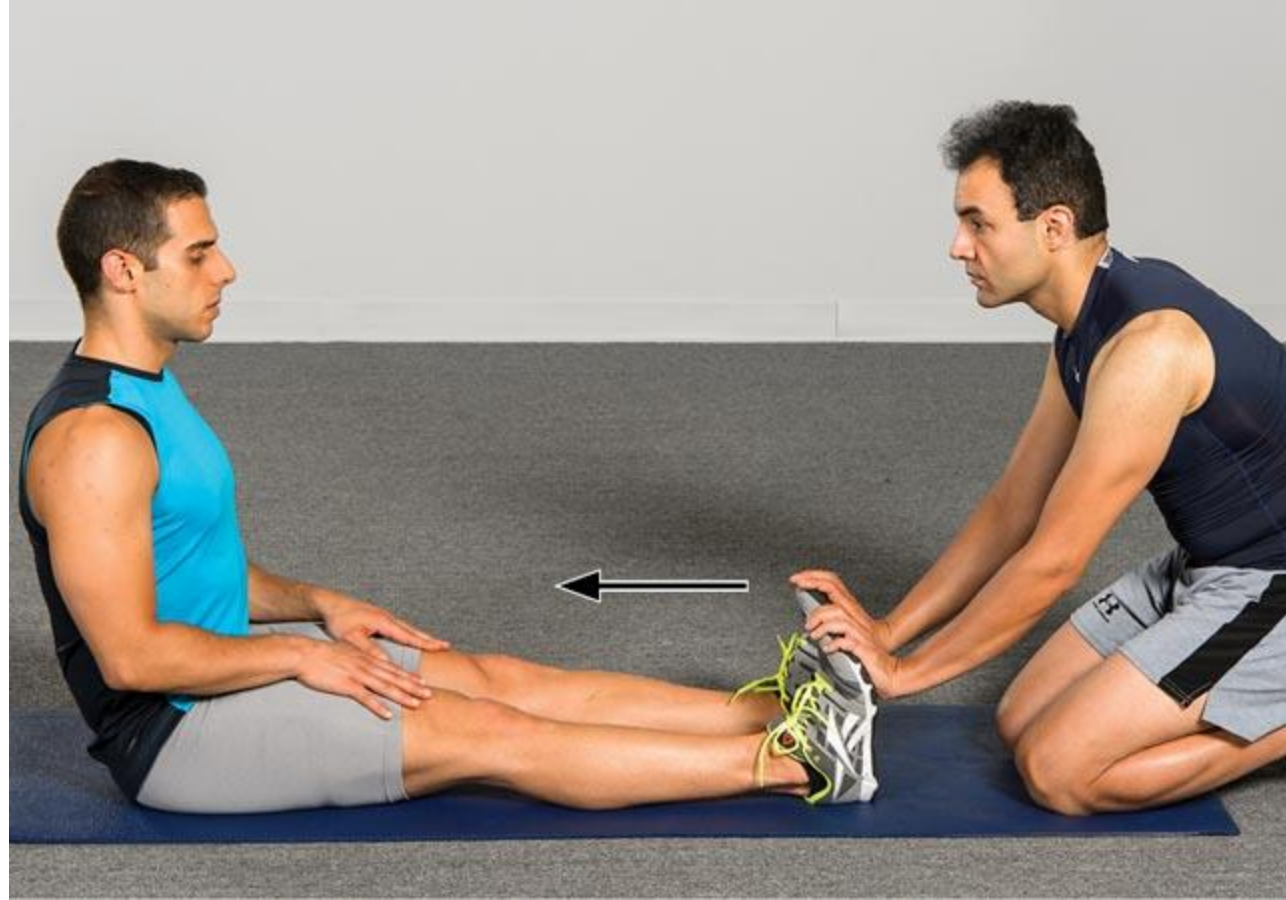
Types of Stretching

- Proprioceptive neuromuscular facilitation (PNF) stretch
 - Common PNF stretches with a partner
 - Calves and ankles
 - Chest
 - Groin
 - Hamstrings and hip extensors
 - Quadriceps and hip flexors
 - Shoulders

Partner PNF Stretching

- Figure 14.12 (next slide)
 - Partner PNF stretching for the calves

Figure 14.12



Partner PNF Stretching

- Figure 14.13 (next slide)
 - Partner PNF stretching for the chest

Figure 14.13



Partner PNF Stretching

- Figure 14.14 (next slide)
 - Partner PNF stretching for the groin

Figure 14.14



Partner PNF Stretching

- Figure 14.15 (next slide)
 - Partner PNF stretching for the quadriceps and hip flexors

Figure 14.15



Partner PNF Stretching

- Figure 14.16 (next slide)
 - Partner PNF stretching for the shoulders

Figure 14.16



Reference List

American College of Sports Medicine (ACSM). (2018). *ACSM's Guidelines for Exercise Testing and Prescription* (10th ed.). Wolters Kluwer.

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