EXERCISE PRESCRIPTION FOR FLEXIBILITY

I-Hua Chu (朱奕華), PT, PhD
Department of Sports Medicine
Contact: 2646
Email: ihchu@kmu.edu.tw
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REFERENCES


LEARNING OBJECTIVES

- Understand the components and importance of flexibility exercise
- Learn the principles of flexibility training
- Identify different stretching methods
- Learn how to design a flexibility exercise program
Flexibility

- Involves moving a joint through its entire range of motion
- Good flexibility is important in athletic performance and in everyday activities
- Poor flexibility is associated with back pain and reduced ability to perform daily activities
- All exercise programs should include flexibility exercise
**Flexibility**

- Flexibility in lower-back and posterior thigh regions is important to decrease the risk of lower-back injuries and pain.
- Regular stretching may:
  - Reduce the decline in flexibility with aging.
  - Improve balance, esp. in older adults.
Flexibility Training Principles

Overload
- Stretch the muscles beyond their normal resting length
- Don’t stretch beyond the pain-free ROM

Specificity
- Flexibility is joint specific
- Stretch the appropriate muscle groups to increase the ROM of a particular joint
- No single stretch will result in total body flexibility
**Flexibility Training Principles**

- **Progression**
  - For further ROM improvements, one needs to increase the duration or number of repetitions of each stretch

- **Interindividual variability**
  - Pain-free ROM varies among individuals
  - Depend on stretch tolerance and individual’s perception of stretch and pain
**When to Stretch**

- When the core temperature of the muscle is sufficiently warmed up
  - Muscle must be actively contracted to warm up
  - Sitting in the sun or in a hot tub does not properly warm up the muscles for exercise
- Safest time to stretch is during the cool-down
- Also may include stretch at the end of the warm-up
STRETCHING METHODS

- Ballistic stretching
- Static stretching
- Proprioceptive neuromuscular facilitation (PNF)
**Ballistic Stretching**

- Involves active, bouncing movements
- If performed too aggressively, it can injure the connective tissue
- If the muscle is suddenly stretched forcefully
  - Evokes the stretch reflex
  - Produces more contraction and resistance to stretch in the target muscle group
- The viscous properties of the muscle resist elongation more when the stretch is applied rapidly
- ACSM does not recommend the use of the ballistic stretch
STATIC STRETCHING

- The preferred method for most people to maintain or improve ROM
- Has the lowest risk of injury
- How to stretch:
  - Muscle group is slowly stretched to the point of tension or mild discomfort
  - Hold for 15-30 seconds
  - Perform each stretch 2-4 times
  - Perform stretching exercise at least 2 days per week and preferably 5-7 days per week
**STATIC STRETCHING**

- For clients with low stretch tolerance, prescribe shorter stretch duration (10 sec) and more repetitions (6 times)
- Consider performing each stretching exercise for a total of 45 sec to 2 min
- As flexibility improves, progressively overload the target muscle groups by changing stretch duration or number of repetitions
PROPrioceptive neuromuscular facilitation (PNF)

- PNF stretch has been reported to produce the greatest improvements in flexibility
- Frequently used in sport and rehabilitation settings

Disadvantages:
- It can cause muscle soreness
- Have to perform with an assistant

Two common PNF techniques:
- Contract-relax
- Contract-relax-contract
**Proprioceptive Neuromuscular Facilitation (PNF)**

- **Contract-relax**
  - Stretch the target muscle group (agonist) to the end of its ROM
  - Isometrically contract the target muscle group against a resistance for 5-10 seconds
  - Relax the target muscle group and followed by slow, passive stretching (with a partner) of the target muscle group

- **Contract-relax-contract**
  - The first two steps are the same as the contract-relax techniques
  - Client submaximally contracts the opposing (antagonist) muscle group for 5-6 seconds during the stretch
  - Process of reciprocal inhibition
PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION (PNF)

- Hold at end range for 15-30 seconds
- Perform each stretch 2-4 times
- Perform stretching exercise at least 2 days per week and preferably 5-7 days per week
STRETCHING METHODS

- **Active stretching**
  - Client moves the body part without external assistance

- **Passive stretching**
  - Client relaxes the target muscle group as the body part is moved by an assistant (partner, personal trainer, physical therapist, athletic trainer)

- **Active-assisted stretching**
  - Client moves the body part to the end of its active ROM
  - Assistant then moves the body part beyond its active ROM
# Stretching Methods

<table>
<thead>
<tr>
<th>Factor</th>
<th>Ballistic</th>
<th>Slow static</th>
<th>PNF*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of injury</td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Degree of pain</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Resistance to stretch</td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Practicality (time and assistance needed)</td>
<td>Good</td>
<td>Excellent</td>
<td>Poor</td>
</tr>
<tr>
<td>Efficiency (energy consumption)</td>
<td>Poor</td>
<td>Excellent</td>
<td>Poor</td>
</tr>
<tr>
<td>Effective for increasing ROM a</td>
<td>Good</td>
<td>Good</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

*Proprioceptive neuromuscular facilitation.

Range of motion.
DESIGNING FLEXIBILITY PROGRAMS

- Assess your client’s flexibility
- Identify the joints and muscle groups needing improvement
- Select an appropriate stretching method and specific exercises for exercise prescription
- Include at least one exercise for each of the major muscle groups of the body
- Include more than one exercise for problem areas
- Common problem areas: lower back, hips, posterior thighs and legs
DESIGNING FLEXIBILITY PROGRAMS

- The program usually takes about 15-30 min
- Some stretching exercises are not recommended for flexibility programs
- Create excessive stress and increase the chance of musculoskeletal injuries (esp. knee joints and low back region)
STRETCHING EXERCISE DO’S AND DON’TS

Don’t: Neck hyperextension

Do: Neck lateral flexion
STRETCHING EXERCISE DO’S AND DON’TS

Don’t: Unsupported hip/trunk flexion

Do: Seated hip/trunk flexion
STRETCHING EXERCISE DO’S AND DON’TS

Don’t: Hamstring stretch—leg on bar or chair

Do: Hamstring stretch—knee to chest
STRETCHING EXERCISE DO’S AND DON’TS

Don’t: Hurdler’s stretch

Do: Quad stretch
GUIDELINES FOR DESIGNING FLEXIBILITY PROGRAMS

- Mode: Static or PNF stretching
- Number of exercises: 10-12
- Frequency: Minimum of 2-3 days a week, preferably daily
- Intensity: Slowly stretch the muscle to a position of mild discomfort
- Duration of stretch:
  - 10-30 sec for static stretching
  - 5-10 sec contraction, followed by 10-30 sec of assisted stretching for PNF
- Repetitions: 2-6 for each exercise
- Time: 15-30 min per session
CLIENT GUIDELINES FOR STRETCHING PROGRAMS

- Perform a warm-up before stretching to increase body temperature and to warm the muscles to be stretched
- Stretch all major muscle groups and opposing muscle groups
- When stretching, relax the target muscle and minimize the movement of other body parts
- Hold the stretch for 10-30 sec
CLIENT GUIDELINES FOR STRETCHING PROGRAMS

- Stretch to the limit of the movement, not to the point of pain
- Keep breathing slowly and rhythmically while holding the stretch
- Stretch the target muscle groups in different planes to improve overall ROM at the joint
Flexibility Exercises

Quadriceps and Hip Flexors
(Anterior Thigh Region)
EXERCISE 1
Exercise 2
EXERCISE 3
Flexibility Exercises

Hamstrings and Hip Extensors
(Posterior Thigh Region)
EXERCISE 1
EXERCISE 2
EXERCISE 3
EXERCISE 4
Exercise 5
Flexibility Exercises

Hip Adductors (Groin Region)
EXERCISE 1
EXERCISE 2
Flexibility Exercises

Hip Abductors and Trunk Lateral Flexors (Lateral Thigh-Trunk Region)
EXERCISE 1
Exercise 2
Plantar Flexors
(Posterior Leg Region)
EXERCISE 1
EXERCISE 2
Flexibility Exercises

Dorsiflexors (Anterior Leg Region)
EXERCISE 1
Flexibility Exercises

Trunk Extensors
(Upper and Lower Back Regions)
EXERCISE 1
Exercise 3
Flexibility Exercises

Shoulder Flexors and Adductors, Trunk Flexors (Anterior Chest, Shoulder, and Abdominal Regions)
Exercise 1
EXERCISE 2
EXERCISE 3
SUMMARY

- Good flexibility is important in everyday activities
- All exercise programs should include flexibility exercise
- Safest time to stretch is during the cool-down
- Three stretching methods
- Design flexibility programs