Flexibility and Low-Back Health

Chapter Five
What Is Flexibility?

- **Flexibility** is the ability of a joint to move through its normal *range of motion*.
- It is a highly adaptable fitness component and responds well when utilized as part of a fitness program.
- Flexibility is joint specific, meaning that you must work all major joints, not just a few.
Types of Flexibility

- There are two types of flexibility
  - **Static Flexibility**: ability to hold an extended position at one end in a joint’s range of motion
    - Dependent on your ability to tolerate stretched muscles, joint structure, and tightness of connective tissues
    - Most assessment tests are based on this type
  - **Dynamic Flexibility**: ability to move a joint through its range of motion with little resistance
    - Important for daily activities and sports
What Determines Flexibility?

- The flexibility of a joint is affected by the following:
  - Joint Structure (cannot be changed)
    - Hinge joint
    - Ball and socket
    - Heredity plays a part in joint structure and flexibility
  - Muscle Elasticity and Length
    - Collagen
    - Elastin
    - Elastic elongation
    - Plastic elongation
  - The Nervous System
    - Proprioceptors
    - Proprioceptive neuromuscular facilitation
Basic Joint Structure

Figure 5.1

- Fibrous joint capsule
- Joint cavity containing synovial fluid
- Ligament
- Cartilage
Benefits of Flexibility

- Joint health
- Prevention of low-back pain and injuries
- Relief of aches and pains
- Relief of muscle cramps
- Improved body position and strength for sports
- Maintenance of good posture and balance
- Relaxation
Creating a Successful Program

- Safe exercises executed with most effective techniques
- Goal should be to attain normal flexibility in the major joints
- You achieve balanced flexibility by performing stretching exercises regularly and by using a variety of stretches and stretching techniques
Applying the FITT Principle to Develop Flexibility

**Frequency:** 2-3 days per week (minimum)

**Intensity:** Stretch to the point of mild discomfort, not pain

**Time:** Hold stretches for 15-30 seconds and perform 2-4 times

**Type:** Stretching exercise that focus on major joints
Figure 5.2 The FITT Principle for a Flexibility Program

<table>
<thead>
<tr>
<th>Warm-up</th>
<th>Stretching exercises for major joints</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–10 minutes or following an endurance or strength training workout</td>
<td><strong>Sample program</strong></td>
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<tr>
<td><strong>Exercise</strong></td>
<td><strong>Areas stretched</strong></td>
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<tr>
<td>Head turns and tilts</td>
<td>Neck</td>
</tr>
<tr>
<td>Towel stretch</td>
<td>Triceps, shoulders, chest</td>
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<tr>
<td>Across-the-body and overhead stretches</td>
<td>Shoulders, upper back, back of arm</td>
</tr>
<tr>
<td>Upper-back stretch</td>
<td>Upper back</td>
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<tr>
<td>Lateral stretch</td>
<td>Trunk muscles</td>
</tr>
<tr>
<td>Step stretch</td>
<td>Hip, front of thigh</td>
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<tr>
<td>Side lunge</td>
<td>Inner thigh, hip, calf</td>
</tr>
<tr>
<td>Inner-thigh stretch</td>
<td>Inner thigh, hip</td>
</tr>
<tr>
<td>Hip and trunk stretch</td>
<td>Trunk, outer thigh, hip, buttocks, lower back</td>
</tr>
<tr>
<td>Modified hurdler stretch</td>
<td>Back of thigh, lower back</td>
</tr>
<tr>
<td>Alternate leg stretcher</td>
<td>Back of thigh, hip, knee, ankle, buttocks</td>
</tr>
<tr>
<td>Lower-leg stretch</td>
<td>Calf, soleus, Achilles tendon</td>
</tr>
</tbody>
</table>

**Frequency:** 2–3 days per week (minimum); 5–7 days per week (ideal)

**Intensity:** Stretch to the point of mild discomfort, not pain

**Time (duration):** All stretches should be held for 15–30 seconds and performed 2–4 times

**Type of activity:** Stretching exercises that focus on major joints
Types of Stretching Techniques

- Static Stretching
- Proprioceptive Neuromuscular Facilitation (PNF)
Managing Low-Back Pain

- More than 85% of Americans experience back pain at some time in their lives
- Low-back pain is the second most common ailment in the United States, headaches being number one
  - Estimated cost is $50 billion a year
- Back pain can result from sudden traumatic injuries, but more often the result of:
  - Weak and inflexible muscles
  - Poor posture
  - Poor body mechanics during activities
Muscle imbalances

- Due to overuse of some muscles (anterior when swimming or pitching)

- Can cause rotator cuff problems, back pain

- Ways to overcome this – exercise opposing muscle groups
Excessive Spinal curvatures

- Kyphosis- excessive thoracic curvature
- Lordosis- excessive lumbar curvature
- Scoliosis- excessive lateral curvature

Causes of:
- Kyphosis swimming (esp breaststroke, butterfly, freestyle)
- Lordosis: tight quads after exercise
- Scoliosis: holding a backpack on one side all the time.

Ways to prevent:
- Kyphosis backstroke
- Lordosis: crunches and stretching,
- Scoliosis check holding techniques, leg length differences.
Function/Structure of the Spine

- Provides structural support for the body
- Surrounds and protects the spinal cord
- Supports body weight
- Serves as attachment site for muscles, tendons, ligaments
- Allows movement of neck and back in all directions
The Spinal Column

**FIGURE 5.3 The spinal column.** The spine is made up of five separate regions and has four distinct curves. An intervertebral disk is located between adjoining vertebrae.
Figure 5.4 Vertebrae and an Intervertebral Disk
Core Muscle Fitness

• Core muscles include those in the abdomen, pelvic floor, sides of the trunk, back, buttocks, hip, and pelvis
  • *There are 29 muscles attaching to the ribs, hips, spinal column, and other bones in the trunk of the body*

• Core muscles stabilize the spine and help transfer force between the upper body and lower body

• Lack of core muscle fitness can create an unstable spine and stress muscles and joints

• Whole body exercises and exercises using free weights or stability balls all build core muscle fitness
Causes of Back Pain

- Back pain can occur at any point along your spine
- Any excessive stress upon the spinal column can cause injury and pain
- Risk factors:
  - Degenerative diseases (arthritis or osteoporosis)
  - Family or personal history
  - Sedentary lifestyle
- Underlying causes of back pain include:
  - Poor muscle endurance and strength
  - Excessive body weight
  - Poor posture or body position at rest
  - Poor posture body mechanics during activity
  - Previous injuries
Preventing Low-Back Pain

- Maintain a healthy weight
- Stop smoking
- Reduce stress
- Avoid sitting, standing, or working in the same position for too long
- Use a supportive seat and a medium-firm mattress
- Warm up thoroughly before exercising
- Progress gradually when improving strength and fitness
Managing Acute Back Pain

- **Symptoms:**
  - Pain
  - Muscle spasms
  - Stiffness
  - Inflammation

- **Treatment**
  - Apply heat or cold
  - Over-the-counter anti-inflammatory medication (ibuprofen or naproxen)
  - Gentle flexibility
  - Bed rest
  - See physician if pain doesn't resolve within a short time
Protecting Your Back

An exercise program designed to increase flexibility and strengthen the legs, abdomen, and lower back can help prevent low-back pain.

When sleeping:
• Lie on your side with your knees and hips bent. If you lie on your back, place a pillow under your knees.

When sitting:
• Sit with your lower back slightly rounded, knees bent and feet flat on the floor. Alternate crossing your legs or use a footrest to keep your knees higher than your hips.
When standing:
  • Keep your weight mainly on your heels, with one or both knees slightly bent. Try to keep your lower back flat (not arched) by placing one foot on a stool.

When walking:
  • Keep your toes pointed straight ahead, your back flat, head up and chin in.

When lifting:
  • Bend at the knees and hips rather than at the waist and lift gradually using your leg muscles.
Exercises for the Prevention and Management of Low-Back Pain

- Do low-back exercises at least 3 days per week
- Emphasize muscular endurance
- Do not do full range of motion spine exercises early in the morning
- Engage in regular endurance exercise
- Be patient and stick with your program