Common Low Back Injuries in Dancers

Anatomy of the Spine

Bones

- cervical vertebrae (C1-C7)
- thoracic vertebrae (T1-T12)
- lumbar vertebrae (L1-L5)

Ligaments & Discs

- annulus
- nucleus
- facet joint
- spinal nerve

Muscles

- muscles of the back
- sternocleidomastoid muscle
- trapezius muscle
- splenius capitis muscle
- splenius cervicis muscle
- levator scapulae muscle
- supraspinatus muscle
- rhomboid minor muscle
- serratus posterior superior muscle
- rhomboid major muscle
- latissimus dorsi muscle
- erector spinae muscle
- serratus anterior muscle
- external oblique muscle
- internal oblique muscle
- gluteus maximus muscle
Quadratus Lumborum (QL) Muscle Strain or Trigger Point

- The QL originates from the posterior iliac crest and inserts on the 12th rib and transverse process of the lumbar vertebrae.
- QL strain produces local tenderness and sometimes bruising around the iliac crest.
- The QL is a muscle that lifts the hips, side flexes and extends the spine.
- This muscle is used during an arabesque.

**Signs of a QL Strain:**
- Tenderness along the 12th rib and/or iliac crest.
- Can be injured on one side of the back or both.
- Associated with muscle spasm.
- Symptoms reproduced in certain positions.
- Trigger point referral as shown in picture, below.

**What puts me at risk?**
- Overuse or single traumatic activity
- Lack of trunk stability
- Core musculature weakness
- Scoliosis
- Poor Posture
- Tight hip flexors, tight external rotators, tight hamstrings

**Injury Prevention:**
- Stretch the Quadratus Lumborum before use.
- Strengthen the Quadratus Lumborum
- Stretch the hip flexors to prevent Hyper-Lordotic posture
- Strengthen your core and work on trunk stabilization.
- Manage quadratus lumborum trigger points

**Management of quadratus lumborum muscle strain:**
- Avoid repetitions of the exercises that caused the damage.
- RICE for 2-3 days to reduce swelling and inflammation.
  - Refer back to Basic Principles of Injury & First Aid Handout: RICE, NSAIDS
- KT tape can be used to inhibit muscle activity.
- Do not use heat or massage the area for the first 2-3 days! This can increase blood flow to the area making inflammation even worse.
- After 2-3 days heat, Quadratus Lumborum Release and self-massage can be used to increase the blood flow and relieve the musculature.
Interspinous Ligament Damage
• Interspinous ligaments lie between the spinous process of the vertebrae.
• These ligaments can be sprained or crushed by uncontrolled back movements.
• Hyper-flexion can sprain or even tear the ligaments between the spinous processes in the spine.
• Hyper-extension can cause impingement of the spinous process with crushing of the interspinous ligament.
• Usually injured at L4-L5 L5-S1

Signs of Interspinous Ligament Damage:
- Sudden onset of pain
- Pain increased during flexion
- Localized tenderness
- Associated with muscle spasms

What puts me at risk?
• Weakness of the back muscles may fail to control flexion.
• Poor alignment during a back bend causing hyper-extension at one level (Failing to pull up the trunk before a back bend)
• Rapid uncontrolled, and repeated movements of the spine

Injury Prevention:
• Improving trunk muscle control
• Pulling up and spreading the extension over the whole lumbar spine instead of bending at one level of the spine

Management of interspinous ligament sprain:
• Avoid repetitions of the exercises that caused the damage.
• RICE for 2-3 days to reduce swelling and inflammation.
  - Refer back to Basic Principles of Injury & First Aid Handout: RICE, NSAIDS
• Do not use heat or massage the area for the first 2-3 days! This can increase blood flow to the area making inflammation even worse.
• After 2-3 days heat and self-massage can be used to increase the blood flow.
• PT Management:
  - Ultrasound can be used to help improve circulation to the ligaments.
Lumbar Disk Prolapse/Herniation (disk bulge)

- Between the bony vertebrae of the spine are cushion-like discs made up of cartilage.
- Discs distribute the forces on the spine.
- The outsides of the discs are ringed layers of fibrous cartilage [annulus fibrosus] while the inside is a gelatinous cartilage material [nucleus pulposus] that allows flexibility.
- When large shear and/or twisting forces are applied to the spine, the outside layers of the disc can tear.
- This can occur due to repetitive lifting especially with poor posture or can occur due to movements of combined rotation and forward flexion from the spine.
- When a disc is torn and strong forces continue to act on the spine, the center gelatinous portion of the discs can protrude through the tear in the outer rings.
  - This is called disc prolapse or disc herniation.
- A herniated disc can put pressure on nearby nerves exiting the spine causing pain in lower back, buttock and legs.

**Signs of a Disk Prolapse:**
- Pain into the leg that radiates/expands with flexion of the spine and decreases with extension of the spine
- Pain with flexion and rotation
- Associated wide spread muscle spasm

**What puts me at risk?**
- Poor posture
- Lack of core stabilization
- Movements of forward flexion and/or rotation, prolonged spine flexion (e.g. sitting)
- Improper lifting

**Injury Prevention:**
- Strengthen your core and work on trunk stabilization.
- Proper posture and body mechanics when lifting.

**Management:**
- Avoid repetitions of the exercises that caused the damage.
- RICE for 2-3 days to reduce swelling and inflammation.
  - *Refer back to Basic Principles of Injury & First Aid Handout: RICE, NSAIDS
- Do not use heat or massage the area for the first 2-3 days! This can increase blood flow to the area making inflammation even worse.
- After 2-3 days heat and self-massage can be used to relieve pain.
- Avoid forward flexion of the spine as this pushes the disk posterior.
- PT Management: Extension exercise to relieve pressure on the nerve root
  - Medical Management: Epidural Injections can be used to relieve pain
Stress Fractures of the Lumbar Vertebrae

• Stress fractures result from repeated local stress on one area of the bone.
• The healing process may be unable to keep up with the rate of injury.
• If damage outpaces healing, pain will go from only occurring during dancing to continuous pain.
  ✓ Constant load on a stress fracture increases the time it will take to heal.
• Generally occur at the pars interarticularis (spondylolysis), at L4 and L5.
• If a fracture of the pars interarticularis (spondylolysis) is not allowed to heal the fracture can widen and allow the vertebra to slip forward. This is called spondylolisthesis.
  ✓ At this point the fracture will not heal properly.

Signs of a stress fracture:
- Persistent, localized pain with activity, particularly extension of the spine.
- Local area of warmth, well localized tenderness.
- Associated with muscle spasm
- X-ray often do not show signs of stress fracture until one to two months after symptoms begin.

What puts me at risk?
• Poor nutrition/ The Athletic Triad
• Lack of trunk stabilization and abdominal activation
• Hyper lordotic posture (often used to force turn out)
• Over turning
• Hard flooring that does not cushion impact

Injury Prevention:
• Abdominal strengthening
• Controlling your turnout
• Pulling up and spreading the extension over the whole lumbar spine instead of bending or extending at one level of the spine.

Management
• Avoid activities that caused the damage (spinal extension and high impact activities)
• RICE for 2-3 days to reduce swelling and inflammation.
  o *Refer back to Basic Principles of Injury & First Aid Handout: RICE, NSAIDS
Facet Joint Sprains

- Facet joints are small synovial joints between the vertebra.
- Generally sprained due to uncontrolled movements.
- Commonly injured landing from a jump.

Signs of a Facet Joint Strain

- Deep tenderness at one or both sides of a lumbar vertebra
- Can be injured on one side of the back or both.
- Pain on hyper-extension with a tilt to one side and backwards or pain on flexion with a combined tilt to the other side.

What puts me at risk?

- Depending on the friction of your feet on the floor to hold the turn-out.
- Landing with an uncontrolled turn-out.

Injury Prevention:

- Strengthening the trunk musculature
- Correcting any asymmetries in posture
- Strengthening turn-out control especially while in the air

Management of facet joint sprain:

- Avoid repetitions of the exercises that caused the damage.
- RICE for 2-3 days to reduce swelling and inflammation.
  - *Refer back to Basic Principles of Injury & First Aid Handout: RICE, NSAIDS
- Do not use heat or massage the area for the first 2-3 days! This can increase blood flow to the area making inflammation even worse.
- After 2-3 days heat and self-massage can be used to increase the blood flow and relieve the musculature.
- Medical Treatment: Steroid injection

Resources used in this handout: