TWIN CITIES ORTHOPEDICS

Degenerative Disc Disease

Dr. Jonathan Reid

BACKGROUND



Degenerative disc disease (DDD) represents one of the primary components of lumbar spondylosis, the broader umbrella term for age-related degenerative changes affecting the discs, facet joints, and vertebral bodies of the lower spine. Degenerative disc disease is the process by which, over time, the cartilaginous intervertebral disc gradually breaks down. Pathophysiologically, this process begins as the nucleus pulposus loses water content and proteoglycans, reducing the disc's hydrostatic pressure and its ability to evenly distribute axial load across the vertebral endplates. As hydration and structural integrity decline, the surrounding annulus fibrosus develops microtears and its collagen fibers weaken, further compromising the disc's mechanical resilience. As the process progresses, the central portion of the disc (nucleus pulposus) can breakdown and cause localized inflammation, alter the biomechanics of the back that can damage nearby structures, and can cause the outer portion to tear or allow for herniation.

As a process that occurs silently, often for decades, prior to becoming symptomatic, degenerative disc disease ultimately causes pain in three primary ways:

- **Chemical and inflammatory irritation** — Degenerating discs can release inflammatory mediators, like cytokines and inflammatory enzymes, into surrounding tissues. Nerve endings within the disc itself or in nearby tissues can become sensitized by this chemical environment, producing pain that's more inflammatory than mechanical in nature.
- **Altered biomechanics and instability** — Loss of disc height and integrity can create abnormal micromotion between vertebrae, sometimes called segmental instability. This subtle instability can strain ligaments, muscles, and joints around the affected level, generating pain through mechanical stress of nearby structures.
- **Muscular and referred pain** — The body often responds to a degenerating, unstable segment with protective muscle spasm in the surrounding paraspinal muscles. This muscular guarding can itself become a significant source of pain, sometimes referred to areas like the buttocks or thighs, mimicking nerve-related symptoms even when no nerve is actually compressed.

As the degenerative disc disease process progresses, specific injury patterns or subtypes of DDD can emerge:

- **Intervertebral disc herniation (IDH):** Intervertebral disc herniation occurs when weakened or torn annulus fibrosus fibers allow the nucleus pulposus to bulge or extrude beyond its normal boundary, and this herniated material can cause pain in isolation through chemical irritation and inflammation of pain-sensitive annular and surrounding tissue, or it can compress or irritate adjacent nerve roots, producing radicular pain, numbness, or weakness that radiates along the affected nerve's distribution into the buttock, leg, or foot.
- **Annular Tears:** Annular fissures develop when repetitive mechanical stress and disc degeneration cause tears within the layered collagen fibers of the annulus fibrosus, and these tears can trigger a localized inflammatory reaction—characterized by ingrowth of sensitized nerve fibers and release of inflammatory mediators like cytokines—that irritates the richly innervated outer annulus and produces pain, even without any nerve root compression or disc herniation.

INITIAL MANAGEMENT

Conservative management of degenerative disc disease typically begins with activity modification, short-term relief through anti-inflammatory medications or other analgesics, and a structured physical therapy program focused on core stabilization, flexibility, and posture correction to reduce mechanical stress on the affected segment.

Oral OTC Medications

- **Ibuprofen** (Advil) — For adults and children over 12, 200–400 mg every 4–6 hours (not exceeding 1200 mg per day)
- **Acetaminophen** (Tylenol) — For adults and children over 12, 325-650 mg every 4-6 hrs, (not exceeding 4000 mg per day)
- **Lidocaine patches** (Lidoderm 4%) — Recommended to wear for 12 hours, with 12 hours in between applications
- **Voltaren gel** — Apply 3-4 times per day to the area of inflammation

Oral Prescription Medications

- **Meloxicam** (Mobic) — Take one tablet as prescribed with food, do not take this with any other NSAID (e.g., Ibuprofen)
- **Oral Prednisone** — Tapered 12 day course: First four days at 60 mg, next four days at 40 mg, last four days at 20 mg
- **Cyclobenzaprine** (Flexeril) — Take one tablet as prescribed at night as this medication can cause sedation
- **Tramadol** — For adults, patients are started on 50 mg every 4-6 hours as needed (not exceeding 300 mg/day)
- **Gabapentin** — For adults, patients are started on 300 mg once at night, titrated if tolerated/necessary to 300 mg twice daily

Transcutaneous Electrical Nerve Stimulation (TENS) — An order will be placed through our partnership with Zynex for the NexWave TENS unit and you will be contacted by a representative by telephone to get set up. This product is often not covered by insurance, however Zynex offers complimentary setup and customer support, as well as a 1-month free trial

Heat/Cold therapy — Neither is universally "better" — they serve different purposes and are often most effective when used strategically depending on the situation.

- **Ice**: Acute flares, or pain within 24-72 hours, situations of active inflammation, or with post-activity soreness
- **Heat:** Chronic, ongoing stiffness or muscle tightness, before activity, or for alleviation of deep, aching pain

Home Exercise program

- **Knee-to-chest stretch:** Lying on your back, gently pull one knee (or both) toward your chest, holding for 20-30 seconds
- **Bird dog:** On hands and knees, extend one arm forward and the opposite leg straight back, keeping the spine neutral, then switch sides. This builds core and spinal stabilizer strength without placing excessive load on the discs
- **Bridges (glute bridges):** Lying on your back with knees bent, feet flat, lift the hips toward the ceiling by squeezing the glutes, then lower slowly.

Physical therapy: Appointments are scheduled by patients calling the location specific scheduling phone number, which can be found on the provided physical therapy card or by going online.

ADVANCED IMAGING (MRI)

Patients that continue to experience low back pain with or without radicular symptoms despite conservative management will often require advanced imaging in the form of an MRI of their lumbar (low back) spine. Advanced imaging confirms the clinical diagnosis of degenerative disc disease and assesses for additional soft tissue disease patterns or subtypes while also allowing for preprocedural planning for interventional modalities (epidural steroid injections, surgery, etc) as indicated. When you are contacted by our MRI scheduling team, you will also be scheduled to see Dr. Reid in office to go over the MRI.

- Please reach out to Rhodora **(952-456-7209)** to have an MRI ordered if the prescribed conservative management fails to improve your symptoms adequately. MRI's are typically performed at our TCO Edina, Eden Prairie, or Waconia sites and you will be contacted by our MRI schedulers by telephone once insurance approval has been obtained.

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EPIDURAL STEROID INJECTIONS

Epidural steroid injections performed under fluoroscopic (real-time X-ray) guidance involve delivering corticosteroid medication directly into the epidural space surrounding the spinal nerves. These injections are used both **diagnostically**, to confirm correlation between visualized pathology on MRI and patients' symptoms, as well as **therapeutically** to reduce inflammation and allow patients to better participate in physical therapy and rehabilitation. After Dr. Reid's team places an order for an injection, you are contacted once the order has been processed by your health insurer and received by the performing medical team.

INTERVENTIONAL MODALITIES | SURGERY

Patients that continue to experience pain, despite conservative management and following advanced imaging, with or without an attempted epidural steroid injection, may benefit from an interventional modality or surgery.

- Referral: _____

Notes

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For scheduling or questions, please call **952-456-7209** https://tcomn.com/physicians/jonathan-reid