

Section 12

Analysis of Back Pain

Incidence and Prevalence

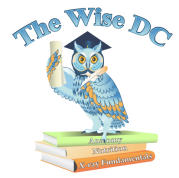
“In the United States, back pain is reported to occur at least once in 85% of adults below the age of 50. Nearly all of them will have at least one recurrence. It is the second most common illness-related reason given for a missed workday and the most common cause of disability. Work-related back injury is the number one occupational hazard.”¹

Risk Factors Include:

- **Aging** produces wear and tear on the spine that may result in conditions (e.g., disc degeneration, spinal stenosis) that produce neck and back pain.
- A **previous back injury** puts one at risk for another injury.
- Physically demanding **occupations** that require repetitive bending and lifting have a high incidence of back injury (e.g., construction worker, caregiver).
- **Sedentary lifestyle** (i.e., not exercising regularly or engaging in physical recreation).
- **Being overweight** can increase stress on the lower back.
- **Poor posture and** poor body mechanics when lifting and carrying heavy loads are risk factors.
- **Sports** that involve twisting the back, such as baseball and golf, can result in an acute back injury or worsen an existing back injury.
- **Joint and/or bone disease** (e.g., osteoporosis, arthritis) and **infectious disease** (e.g., spinal meningitis) can lead to degeneration, inflammation, and compression.

Causes of Back Pain include:

- Vertebral subluxations.
- **Overuse or underuse of the back** is by far the most common cause of back pain that manifests as tightening or spasm of the muscles that connect to the spine. Inflammation and swelling often occur in the joints and ligaments, especially in the cervical and lumbar regions, as people age.
- A **herniated disc** which results from a tearing of the annulus fibrosus of the disc and extrusion of the nucleus pulposus causing nerve root compression.
- “Ninety percent of disc herniations occur in the lower two lumbar vertebrae.” ²



- **Spinal stenosis**, narrowing of the spine, can cause spinal cord irritation and injury. Conditions that cause spinal stenosis include infection, tumors, trauma, herniated disc, arthritis, thickening of ligaments, growth of bone spurs, and disc degeneration. Spinal stenosis most commonly occurs in older individuals as a result of vertebral degeneration.
- Radiculopathy occurs when something rubs or presses against a nerve, creating irritation or inflammation. Radiculopathy can result from a herniated disc, bone spur, tumor growing into the nerves, and vertebral fracture, and many other conditions. **Sciatica** is an example of an extremely painful radiculopathy that involves inflammation of the largest nerve in the body, the sciatic nerve. Pain is experienced along the large sciatic nerve, from the lower back down through the buttocks and along the back of the leg.
- A **spinal tumor** that originates in the spine (primary tumor) or spreads to the spine from another part of the body (metastatic tumor) can compress the spine or nerve roots and cause significant pain.
- An **infection** that develops in the vertebrae (e.g., vertebral osteomyelitis), the discs, the meninges (e.g., spinal meningitis), or the cerebrospinal fluid can compress the spinal cord and result in serious neurological deterioration, if it is not diagnosed and treated immediately.
- **Facet joint degeneration can cause substantial low back pain..** As facet joints degenerate, they may not align correctly, and the cartilage and fluid that lubricates the joints may deteriorate.
- **Bone and joint diseases** (e.g., osteoporosis, ankylosing spondylitis, osteoarthritis) can cause degeneration, inflammation, and spinal nerve compression.

Multidisciplinary Approaches To Pain Management

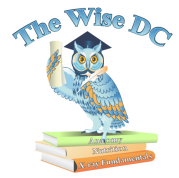
Medical Approach

Medications

- Acetaminophen and ibuprofen are most commonly recommended for pain relief.
- To relieve acute back pain, anti-inflammatory drugs (e.g., Celebrex), non-narcotic pain relievers (e.g., Tramadol), muscle relaxants (e.g., Flexeril), and narcotic pain relievers may be prescribed.
- An oral steroid (e.g., prednisone) is sometimes prescribed for acute episodes of low back pain. Patients are started on a high dose that is gradually reduced over 5 or 6 days. Serious side effects associated with steroid use include bone loss, impaired wound healing, and headache.
- Chronic back pain caused by nerve root damage is sometimes treated with tricyclic antidepressants, such as amitriptyline (e.g., Elavil) and nortriptyline (e.g., Pamelor), for numbness, burning, aching, throbbing, or stabbing pains that shoot down the limbs. Side effects include drowsiness, dry mouth, and constipation.
- Anticonvulsant drugs, such as gabapentin (Neurontin), may alleviate pain caused by nerve degeneration and persistent leg pain after surgery. Side effects include drowsiness, dizziness, fatigue, and impaired motor coordination.

Injections

- Steroid injections can significantly decrease inflammation and pain caused by spinal stenosis, disc herniation, and degenerative disc disease. A steroid is injected directly into the membrane that surrounds the nerve roots (dura). Selective nerve root block (SNRB) uses a steroid with anesthetic.



Surgery

- Surgery may be indicated for progressive or severe neurological dysfunction—such as muscle weakness, spinal cord compression, or bowel, bladder, or sexual dysfunction—and for cases of pain that is not easily relieved. Also, implanted pumps deliver a constant rate of pain-relieving medication to the spinal area. Surgically implanted spinal cord stimulators modulate the pain response, so the patient experiences less pain.

Physical Therapy Approach

- Physical Therapy

The goals of physical therapy are to decrease pain, increase function, restore normal movement, and prevent recurrences.

Physical Therapy Modalities

Cryotherapy

Is commonly used to alleviate the pain of acute musculoskeletal injuries.

Effects of Cryotherapy

- anesthesia (numbness)
- antispasmodic
- vasoconstriction reduces edema formation
- increased blood pressure, decreased pulse rate and respiration.

Heat Modalities

Effects:

Analgesic, Antispasmodic, increases connective tissue elasticity.

Vasodilator: Lowers blood pressure and increases blood and lymph flow which increases:

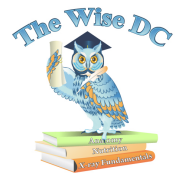
- phagocyte, leukocyte production
- edema formation (in acute phase/up to 72 hours)
- Pulse, perspiration, respiration and metabolic rate all increase

Indication: Sub-acute and chronic musculoskeletal conditions; sprains, strains, muscle spasms, back aches, myositis, tendinitis, bursitis, arthritis.

Contraindications include: Acute injuries and/or musculoskeletal conditions, cardiovascular disease, active tuberculosis, encapsulated swellings, diabetes mellitus.

Electrotherapy

Melzack and Wall's gate control theory of pain control suggests that nerve fibers carrying pain messages (C fibers) pass through the same segment of the spinal cord as those stimulated by electricity (known as A fibers).



It has been shown that the transmission of impulses along C fibers is slower than along A fibers. Therefore, overloading A fibers with electrotherapy would block the “gate” so the pain transmitted through the C fibers could not reach the brain.

Low frequency electromagnetic energy (<1000 Hz) is used to produce electrical stimulating currents which are used in electrotherapy. Two basic types of electrical current are used: alternating current/A.C. and direct current/D.C.

I. A/C. comes in many forms, the two types most commonly used are:

Sinusoidal (symmetrical)

Faradic (asymmetrical)

A/C can be used to stimulate:

1. sensory nerves for pain modulation *and/or*
2. neuromuscular elements in innervated muscles to produce electrokinetic effects: muscle contraction, muscle fatigue/relaxation, stretching fibrotic tissue, increased blood and lymph flow, decongestion and, detoxification.

II. Direct current (unidirectional) comes in two basic forms: galvanic and pulsed D.C.

Galvanic (waveless)

Pulsed (interrupted, shaped)

Direct current produces a mixture of electrokinetic and electrochemical effects. Galvanic current is used primarily for its electrochemical effects and is the only form of current suitable for iontophoresis. Pulsed square wave D.C. can be used to stimulate innervated and denervated muscle to produce electrokinetic effects (and is useful in electrodiagnosis). Hi-volt D.C. has little electrochemical effects and is primarily used to stimulate sensory nerves for pain modulation and to stimulate neuromuscular elements of innervated muscle for electrokinetic effects.

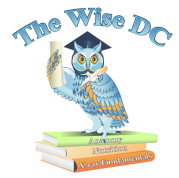
TENS (Transcutaneous Electrical Nerve Stimulation)

A procedure where an electrical current is passed across the skin. Generally, the term is reserved for small portable electrical units that patients wear to control pain. The portable unit is designed to provide sensory stimulation without motor stimulation. Afferent nerve fibers differ from efferent nerve fibers in length of refractory accommodation to stimuli, threshold of firing, and response to different wave forms. The wave forms of a TENS unit are interrupted or pulsed. Most units have a wave that alternates and is a variation of the faradic or square wave.

Electrode placement should be on the same dermatome as the patient's perception of pain, preferably over or proximal to the site of pain. In the presence of radiation, electrodes may be placed over the major nerve pathways.

Application

TENS is intended for symptomatic relief of a large number of painful syndromes. This would include the relief of chronic and intractable pain syndromes or cases where analgesic drugs would be contraindicated. Like all electrical stimulation, this procedure should be used with caution in undiagnosed pain syndromes where etiology has not been firmly established.



Massage

Massage therapy increases circulation to the affected area. There are several techniques and devices used in massage therapy.

Exercise

Exercise can correct current back problems, help prevent new ones, and relieve back pain, particularly after an injury. Proper exercise strengthens back muscles that support the spine and strengthens the abdomen, arms, and legs, reducing strain on the back. Exercise also strengthens bones and reduces the risk of falls and injuries.

Chiropractic Approach

Chiropractic management should be an integral part of care plans for most patients suffering from acute and chronic musculoskeletal pain syndromes. Chiropractic pain management strategies encompass a wide range of spinal manipulative treatment procedures as well as the use of physiotherapy modalities. Relatively speaking, chiropractic treatment methodologies carry fewer adverse effects compared to drug therapy and hospitalization.

According to Steven G. Yeoman's, "a single chiropractic adjustment produces both sensory and motor effects as well as sympathetic nervous system effects."

The sensory and motor effects of a chiropractic manipulation include:

- increased joint ROM in all 3 planes and reduction of pain.
- increased skin pain tolerance level.
- increased paraspinal muscle pressure pain tolerance.
- reduced muscle electrical activity and tension.

Sympathetic nervous system effects of a chiropractic manipulation include:

- increased blood flow and distal skin temperature.
- blood pressure reduction.

Blood chemistry changes after a chiropractic manipulation include:

- increased secretion of melatonin.
- increased plasma beta endorphin levels.
- elevation of Substance P and enhanced neutrophil respiratory burst.
- pupillary diameter changes.³



Non-Medication Treatments for Pain

The following methods have been shown to help enhance the effect of pain medication.

Acupuncture

An acupuncturist inserts hair-thin needles under the skin, which remain in place for 15 to 30 minutes. The needles cause little or no pain. Pain relief may result from the release of endorphins, the body's intrinsic painkillers.

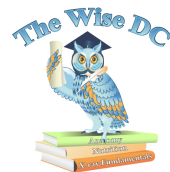
Deep Breathing - A common reaction to pain is to tense the muscles. Slow, deep breathing can be used to relax muscles and relieve pain.

Relaxation - Relaxation videos may be borrowed from the Education Department (ext. 6195) during your stay.

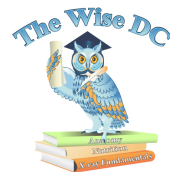
Progressive Muscle Relaxation - Alternatively tensing and relaxing muscle groups.

Imagery - Imagining peaceful places. See, touch, feel, smell and taste everything in your imagination.

Distraction - Any activity that takes your mind off of pain. Examples include reading a book, listening to music, watching television or doing crafts.



Bibliography



¹ www.neurologychannel.com

² www.neurologychannel.com

³ <http://www.spine-health.com/>