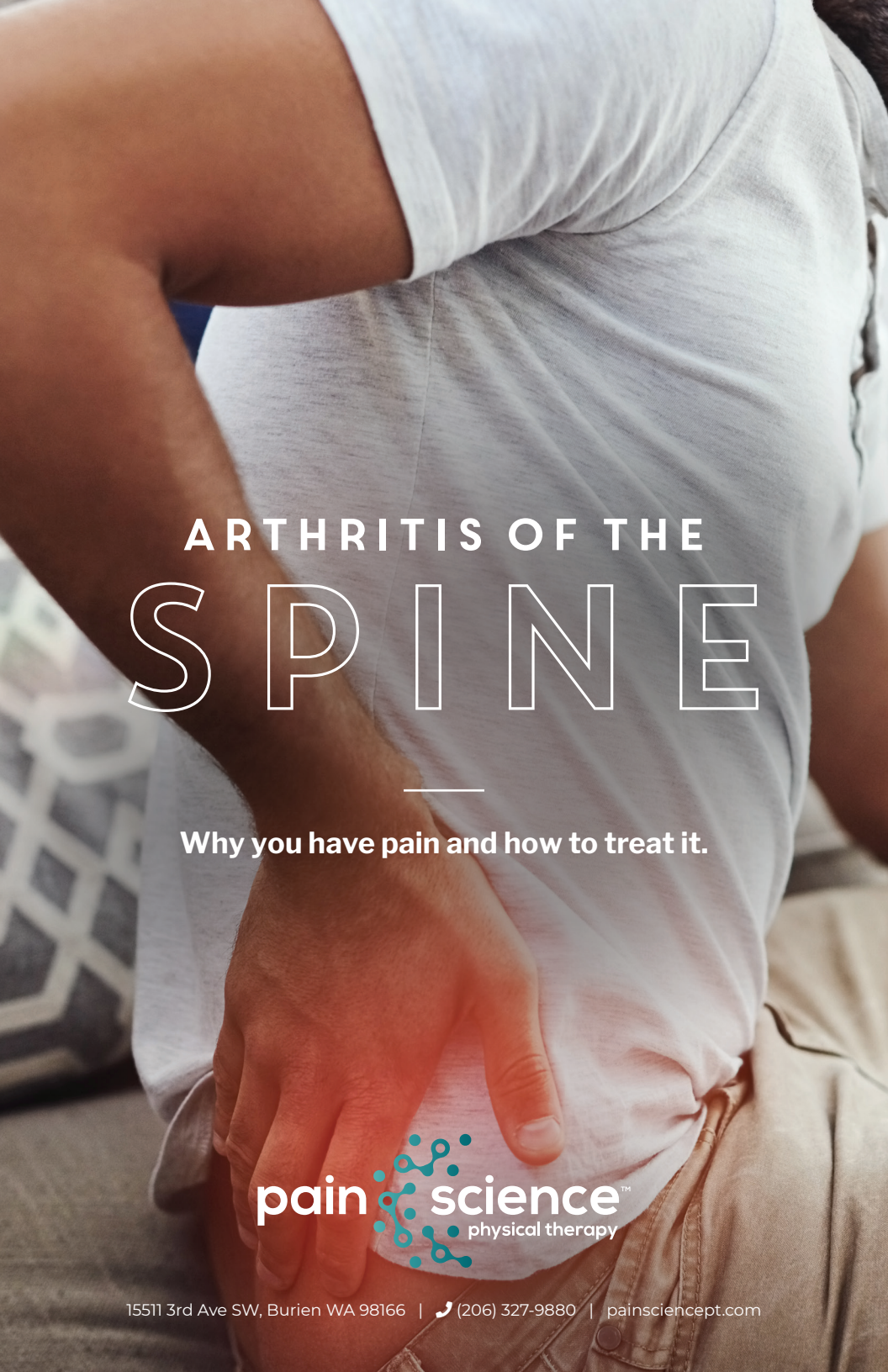
ARTHRITIS OF THE
SPINE
Why you have pain and how to treat it.
pain science™
physical therapy
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My guess is that if you downloaded this ebook, you have pain, and you have also been given a diagnosis of **spine arthritis**. I hope that this information will help you navigate your diagnosis and work to regain your function.

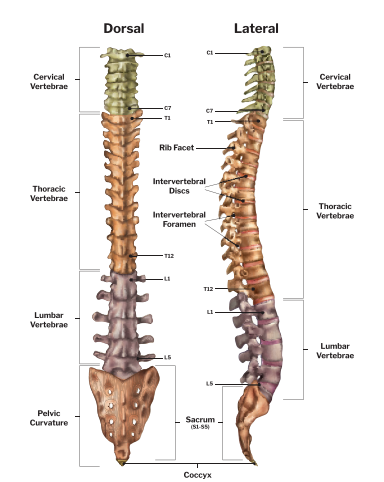
THE **DEFINITION** OF **ARTHRITIS**

Arthritis is an umbrella term that refers to joints and inflammation in and around joints. There are over 100 different conditions that fall under the term of arthritis. While there are different types of arthritis, the focus of this book is osteoarthritis, also known as degenerative joint disease (Arthritis Foundation, 2020).

Osteoarthritis refers to changes in one or multiple joints that are not due to infection, general body inflammatory processes or metabolic diagnoses (Arthritis Foundation, 2020). It is called "degenerative, but it can happen really early in our lives. For example, osteoarthritis of the spine can be seen on x-rays of people as young as 20+ years old (Brinjikji et al 2015). Also, knee arthritis has been found in the x-rays of college basketball players (Major et al 2002).

There are many different types of changes that occur to bone as we age.

Early on in the process of human development, our bones are softer, thinner and less dense. As we start walking and moving, our bones respond to the pulling of muscles attached to them and to gravity to become denser, thicker, longer and stronger. When we stop growing, our bones don't stop changing. In fact, our bones continue to "remodel" for our entire lives. Our bones are alive, and they are constantly responding to the stress and strain of muscles and gravitational forces on them. As such, our bones will change shape depending on how we use them, how our muscles pull on them, and even physical trauma or injury they've endured. This process is normal and healthy.



THE ANATOMY OF THE **SPINE**

Before we review the most common types of arthritic changes found in the spine, let's do a really quick anatomy lesson.

The spine bones, or vertebra, are oddly shaped and fit into the bones above and below them like puzzle pieces. The front part of the bone is round and is the body of the vertebra. Between each body of the vertebra in the spine sits a cartilage disc. The discs are tough pieces of fibrous cartilage. A spine joint is composed of two of the vertebra and one disc. Each bone of the spine has a letter and number designation. In the neck, the vertebra are anatomically known as cervical vertebra, so each vertebra has the letter "C" before it and are numbered one through seven, top to bottom. The vertebra in the upper back from below the neck to the end of the ribs are the thoracic vertebra. Therefore, each vertebra has the letter "T" before it and are numbered from one to twelve. In the lower back region, the vertebra are the lumbar vertebra, so each bone has the letter "L" and a number from one through five, top to bottom. Since a spine joint is made up of two vertebra and one disc, then they are referred to by their top and bottom bones. For example, some joints are the C1-C2 joint in the neck, the T11-T12 joint in the middle back, and the L4-L5 joint in the lower back.

The bones in the neck fit together differently than the bones in the middle back, both of which are also different from the bones in the lower back. Movement in each of these areas is different because of the shape of the bones. In the neck, the bones are able to twist a lot right and left, as if you are shaking your head "no." They are also able to move a lot by bending forward and backward, as if you are looking down and looking up at the sky. In the middle of the back, the ribs prevent the bones from moving very much, so they typically can side bend well and bend forward more than backward. In the lower back region, the bones are really good at bending forward and backward but not as good at side bending and rotation.

Together, all the different spine bones allow for a lot of movement in many different directions. There are also many different muscles in each of the different areas of the spine to help your bones move in each of these directions. There are about six layers of back muscles to help with bending backwards and twisting side to side!

SPINE ARTHRITIS

There are multiple changes that can be found in the spine that fall under the term "arthritis." The most common findings are changes in the shape and size of the spinal discs. The discs are flat and thick but will change shape and become sloped or thinner.

Another finding is the vertebra body changing shape or position. The vertebra can sometimes slide slightly forward or backward in relation to the bone below it.

There are lots of bumps and curves to the spine. Osteophytes, which are outcroppings that grow on the outside of the bone and are also known as bone spurs, can occur anywhere on a spine vertebra (Culvenor et al 2019).

PAIN AND ARTHRITIS

You have probably experienced pain in your knee, hip, or lower back and either been told you have arthritis, you've looked up the symptoms and the diagnosis seemed to fit, or you've even had an X-ray that shows joint changes.

Here is the bottom-line: arthritis is normal and occurs in the entire population of people walking on this earth. You cannot live beyond the age of 20 and not have joint changes in your body.

IN FACT:

- Up to 43% of MRIs show knee arthritis in *pain-free* people over the age of 40 (Culvenor et al 2019).
- MRI scans of 47.5% of a group of professional basketball players with *no* knee pain show both a high "prevalence of meniscal lesions" and "patella-femoral articular cartilage lesions" that did not stop the players' high level of competitive play (Kaplan et al 2005).
- Lumbar spine MRIs reveal many changes in people who have no pain including arthritis, disc bulges, and disc herniations (Jensen et al 1994).
- Shoulder imaging studies show normal variations in the shape of the acromion process (the top of the shoulder) from straight to sloped to hooked without a clear link to shoulder pain (Sasiponganan et al 2019).
- Hip bone spurs were found in 70% of normal, healthy participants in a 2017 study (Bensler et al 2018).

Now, if we can find pain-free arthritis in the population of people who are over the age of 20 and this is a normal finding, ask yourself why you still have pain.

THERE ARE DIFFERENT TYPES OF PAIN.

TISSUE PAIN

Tissue pain is what we experience when there has been injury to **muscles, bones, ligaments, tendons or other types of tissue** in the body. This type of pain typically occurs with an acute injury, stays painful for a period of time, then goes away as the tissue heals. This is normal, and it is the most common type of pain that we experience. We feel this type of pain when we step on something sharp, bang our arm against the door or get a paper cut. However, this type of pain can also be chronic. Arthritis pain can be tissue pain. Tissue pain typically is described as having the following characteristics (Smart et al 2012a):

1. **The pain is proportionate to the irritating activity.** For example, the pain starts when you are walking and gets gradually worse. The pain gets better when you stop walking.
2. You have a list of activities that are predictably going to make your symptoms worse or better. For example, you know that walking will make the pain worse but sitting and resting will make the pain better.
3. The pain is intermittently sharp with a dull aching or throbbing when you're at rest.
4. There is no night pain, burning pain, shooting pain or electric pain.

PERIPHERAL NEUROGENIC PAIN

Peripheral neurogenic pain is also known as "nerve pain." Nerves are tissues as well, but **when they are injured, the type of pain you experience is different from tissue pain.** Peripheral neurogenic pain is typically described as having the following characteristics (Smart et al 2012b):

1. The pain follows a pattern on the skin that is called dermatomal or cutaneous. This means that the area of skin that the affected nerve communicates with is painful.
2. Certain tests completed in physical therapy called neurodynamic tests come back with a positive result. These tests will lengthen and shorten nerves to see if they reproduce pain.
3. Palpation (poking/touching) the nerve is irritating.
4. You have had a nerve injury or illness that might have affected your nerves.

CENTRAL SENSITIZATION

Central sensitization is a **more complex and confusing type** of pain. This pain occurs because of changes that have happened in the central nervous system. The central nervous system is composed of the brain and spinal cord. The following characteristics are typical with central sensitization (Smart et al 2012c):

1. The pain has lasted longer than the typical amount of healing time for the initial injury.
2. The more doctors and practitioners you see, the more diagnoses you get.
3. The pain started without an obvious injury and then spread to multiple areas of the body.
4. Your medical providers treat one area of your body and then another area becomes painful.
5. The pain is everywhere and seems to have a mind of its own.
6. The pain can be cyclical meaning it can occur at certain times of the week, month, or year.
7. You have a history of trauma.
8. The pain doesn't improve with treatment.
9. The pain is very out of proportion when compared to your activities.
10. The pain can get worse or better with activity.
11. There are many areas of your body that feel tender or sore.
12. You have flare-ups of pain.

These different types of pain are very different when given as diagnoses. **However, they all have one thing in common, your brain.** In fact, recent research has now confirmed that **all pain, no matter the cause, is produced by the brain in response to a perceived threat.** The brain's job is to protect you. When it thinks it needs to protect, one of the best ways to do this is for the brain to produce pain. **This is a completely healthy and normal process.**

ACUTE PAIN

Your body has a very sophisticated **alarm system** whose job is to protect you and warn you of potential harm or damage. That system is made up of your brain, your spinal cord, and 400 nerves. That alarm system is sensitive and always working. It keeps your heart pumping and your lungs breathing. It also helps you heal from injury and illness (Louw and Puentedura 2013).

I want you to imagine that you are walking through your living room and you suddenly step on something sharp. Your first thought is, "That was painful!" Your second thought is, "What was that?" Then, you look at your foot. This seems simple. However, something amazing and complex happens to you to make you feel pain. When you step on something sharp, the nerve endings in your foot send a rapid message to your brain to let you know that you're in danger, and that you should probably lift your foot off the object. **In order for your brain to make you take action and lift your foot up off the object, it produces pain** (Louw and Puentedura 2013).

Pain is a response to a message from one part of your body to your brain. It is the brain's

opinion that something dangerous just happened and that you need to attend to it. If your brain doesn't think the message from the foot is dangerous, you won't feel it and you'll walk around with something sharp in your foot. However, the brain is smart, so it produces pain to warn you that something sharp is in your foot (Louw and Puentedura 2013).

Now, as soon as you lift your foot off the sharp object and find that you actually stepped on a tack, you take action. You go to the doctor and get stitches if you need to, and you protect the foot by limping or using crutches. **The tissue around the injury stays sore and sensitive for a period of time after the injury.** The brain continues to produce pain in response to the nerve sensitivity so that you continue to protect the injured area and let it heal properly. Otherwise, you would simply go running or walking on the foot as if it wasn't injured, and the tissue wouldn't heal properly. As the tissue heals, the nerves become less sensitive. As a result, the brain quiets down. Pain goes away over time as the tissue heals. It is an efficient and effective alarm system (Louw and Puentedura 2013).

We know that the brain produces pain to protect us at the time of injury and for some time after injury to promote healing. This pain is the most common type of pain that we experience. This is called **acute pain**, and it typically occurs with **tissue injury** (Louw and Puentedura 2013).

CHRONIC PAIN

Now, your pain might not be new or acute, but rather, old and familiar. If so, your pain is not the same kind of pain as acute pain. You might be assuming that you have tissue injury, but you might not. Unfortunately, there isn't a super clear path to determining if

you actually have tissue injury or not. We know that all pain is produced by the brain in response to perceived danger or threat. The question remains: Is the threat tissue injury, nerve irritation, or simply a long-standing brain program? Believe it or not, these three things are different and require different treatments (Louw and Puentedura 2013).

IT IS IMPORTANT TO ASK YOURSELF A FEW QUESTIONS:

1. Does your pain come and go?
2. Do you have flare-ups of pain that make it much harder to move for a period of time?
3. Does your pain change with the weather or when you are stressed?
4. Is it hard to pinpoint exactly where your pain is on your body?
5. Does the pain change or move?
6. Has the pain existed for years without a clear diagnosis?

If you answered "yes" to some or all of these questions, there may be something else happening in your body.

THIS IS WHEN A PHYSICAL THERAPIST CAN REALLY HELP. OUR JOB IS TO FIGURE OUT:

1. Is this really arthritis pain that you are experiencing?
2. Is it possibly nerve pain or something else?

Receiving the correct diagnosis is the first step to setting up a proper home program.

AN INCORRECT DIAGNOSIS CAN LEAD TO THE FOLLOWING ISSUES:

1. Your exercises won't help and will increase pain.
2. Your movements will not get easier.
3. Your fear will increase.
4. You will likely become discouraged.
5. You will likely see many different PTs, doctors, and other medical professionals without experiencing any improvement.

However, the correct diagnosis will calm symptoms, help you to regain function, and help you to regain control.

TREATMENT

You downloaded this ebook to discover some guidelines for treatment and what you can do to help your pain and function. The following points are the best guidelines to follow to treat arthritis pain.

1 MOVEMENT

Movement is good for arthritis pain. The more you move, the better your arthritis-related pain should get. Movement should be gentle but brisk. Getting your heart rate up to 20 beats above resting is all you need to do to help lubricate your joints and increase your blood flow to your muscles and nerves. If you can't tolerate movement on land like walking, try exercising on a stationary bike or swimming to keep weight off your joints. Aquatic therapy has been shown to be very effective for arthritis-related pain, and it helps ease movement on land as well. Even if your arthritis is in your arms, cardiovascular exercise can help the pain.

2 ICE

Ice can be helpful. It can temporarily calm your nerves down in and around your joint if you are having an acute flare-up of pain. Ice the joint for 15 minutes two to three times per day. Do not put ice directly on the skin. Make sure to have a cloth or towel in between the ice and the skin to prevent frostbite.

3 GRADED EXPOSURE

Try the technique called “graded exposure.” If you haven’t moved in a long time, don’t jump right into too much movement at once. Your nerves and nervous system have become used to protecting you. First, you want to figure out what your baseline tolerance for the activity is. For example, if you want to start a walking program, figure out how long you can walk without increasing the pain. However long that is, do that amount for 3-5 days at a time, then slowly bump up. Increase the distance and time walking incrementally every 3-5 days. Remember that pain will increase for a short period of time after every increase. Be patient, and you will get better.

4 PHYSICAL THERAPY

Meet with a physical therapist. Finding the correct diagnosis is extremely important in the process of treating your pain. If you try to exercise and your pain just increases, then you haven’t been diagnosed correctly. Our YouTube channel has many videos with exercise suggestions for pain in different parts of the body. Try them out, but remember that if the pain worsens, the diagnosis is not correct.

At the end of the day, movement is never bad for your pain. However, it may need to be incremental, and there may be other things that need to be addressed before you can move more comfortably with less fear and pain. Physical therapy is only one of many treatments for arthritis and other pain.

If you are interested in finding the right diagnosis for your pain, call Pain Science Physical Therapy clinic at (206) 327-9880. Also, feel free to check out our YouTube channel or our website at **www.painsciencept.com** for more information.

REFERENCES

Arthritis Foundation (2020, April 1) *What is Arthritis?* https://www.arthritis.org/health-wellness/about-arthritis/understanding-arthritis/what-is-arthritis

Bensler, S., Agten, C. A., Pfirrmann, C., & Sutter, R. (2018). Osseous spurs at the fovea capitis femoris-a frequent finding in asymptomatic volunteers. *Skeletal Radiology*, 47(1), 69–77. https://doi.org/10.1007/s00256-017-2763-x

Brinjikji, W., Luetmer, P. H., Comstock, B., Bresnahan, B. W., Chen, L. E., Deyo, R. A., Halabi, S., Turner, J. A., Avins, A. L., James, K., Wald, J. T., Kallmes, D. F., & Jarvik, J. G. (2015). Systematic literature review of imaging features of spinal degeneration in asymptomatic populations. *American Journal of Neuroradiology*, 36(4), 811–816. https://doi.org/10.3174/ajnr.A4173

Culvenor, A. G., Øiestad, B. E., Hart, H. F., Stefanik, J. J., Guermazi, A., & Crossley, K. M. (2019). Prevalence of knee osteoarthritis features on magnetic resonance imaging in asymptomatic uninjured adults: a systematic review and meta-analysis. *British Journal of Sports Medicine*, 53(20), 1268–1278. https://doi.org/10.1136/bjsports-2018-099257

Jensen M.C., Brant-Zawadzki M.N.,Obuchowski N.,Modic M.T.,Malkasian D., and Ross J.S. (1994). Magnetic resonance imaging of the lumbar spine in people without back pain. *New England Journal of Medicine*, 331(2), 69-73.

Kaplan, L. D., Schurhoff, M. R., Selesnick, H., Thorpe, M., & Uribe, J. W. (2005). Magnetic resonance imaging of the knee in asymptomatic professional basketball players. *Arthroscopy : The Journal of Arthroscopic & Related Surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association*, 21(5), 557–561. https://doi.org/10.1016/j.arthro.2005.01.009

Louw, A., & Puentedura, E. (2013). *Therapeutic Neuroscience Education: Teaching Patients about Pain*. International Spine and Pain Institute (USA).

Major, N., & Helms, C. (2002). MR imaging of the knee: findings in asymptomatic collegiate basketball players. *American Journal of Roentgenology*, 179(3), 641-644.

Sasiponganan, C., Dessouky, R., Ashikyan, O., Pezeshk, P., McCrum, C., Xi, Y., & Chhabra, A. (2019). Subacromial impingement anatomy and its association with rotator cuff pathology in women: radiograph and MRI correlation, a retrospective evaluation. *Skeletal Radiology*, 48(5), 781–790. https://doi.org/10.1007/s00256-018-3096-0

Smart, K., Blake, C., Staines, A., Thacker, M., & Doody, C. (2012a). Mechanisms-based classifications of musculoskeletal pain: Part 3 of 3: Symptoms and signs of nociceptive pain in patients with low back (+-leg) pain. *Manual Therapy*, 17(4), 352-357.

Smart, K., Blake, C., Staines, A., Thacker, M., & Doody, C. (2012b). Mechanisms-based classifications of musculoskeletal pain: Part 2 of 3: Symptoms and signs of peripheral neuropathic pain in patients with low back (+-leg) pain. *Manual Therapy*, 17(4), 345-351.

Smart, K., Blake, C., Staines, A., Thacker, M., & Doody, C. (2012c). Mechanisms-based classifications of musculoskeletal pain: Part 1 of 3: Symptoms and signs of central sensitization in patients with low back (+- leg) pain. *Manual Therapy*, 17(4), 336-344.