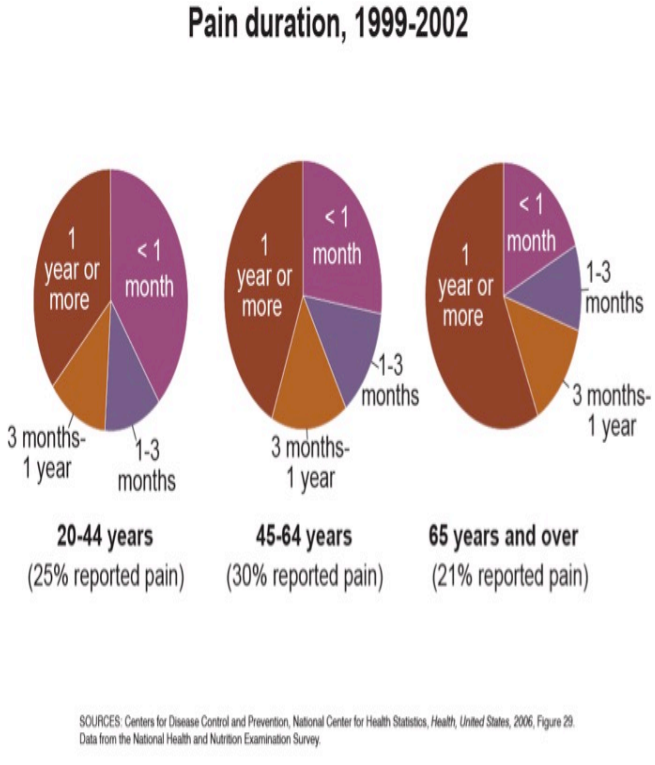
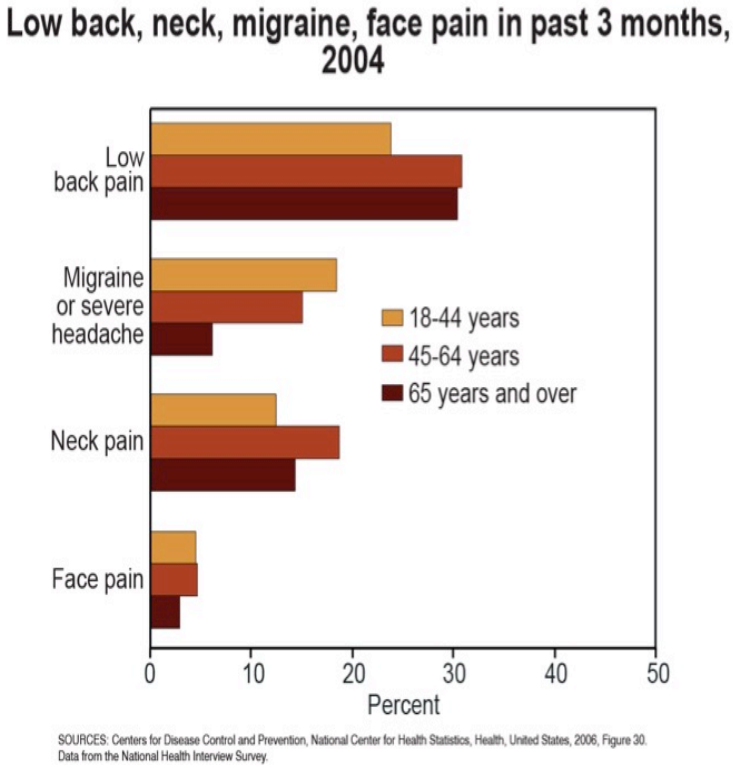
The Pain PT

The Myth of X-Ray and MRI findings and Pain

Here's where we are going to breakdown the latest X-ray and MRI research on common pain problems. To get right to it, the research has shown a poor correlation between x-ray and MRI findings and pain, especially when it comes to degeneration and age-related changes. The studies and below will hopefully open your eyes to see how many structural findings we think our due to "damage" are really just occurring due to the normal processes of aging. The interesting thing about these studies is that none of these participants have pain, yet they have all sorts of structural changes in their joints and tissues. If structural changes were the cause of all pain then we would logically see far greater amounts of pain as we got older. Yet we know this is not true. The height of pain is in mid-life and actually decreases as we move past 65 years of age (see below). So something else must be contributing to ongoing pain, and we will explore that in detail later.





Back pain is the leading cause of activity limitation and work absence throughout much of the world (Lidgren 2003). It also creates an enormous economic burden on individuals, families, communities, and governments (Steenstra 2005, Thelan 2008). The vast majority of patients seen in primary care

(>85 percent) have nonspecific low back pain, meaning they have back pain in the absence of a physical underlying condition that can be reliably identified (Deyo 2001, Chou 2007, Chou 2011). Less than 1% or people who develop acute low back pain have a serious cause like cancer or an infection (ClevelandClinic.org). Even with these statistics, much of back pain is still blamed on structural abnormalities on x-rays and MRI's. It just doesn't make sense. Have a read below.

Brinjikji (2015) reviewed 33 scientific publications with over 3000 participants, all of whom were asymptomatic and had no pain. After going through all the CT and MRI scan studies up to 2014, The authors state: "Our study suggests that imaging findings of degenerative changes such as disk degeneration, disk signal loss, disk height loss, disk protrusion, and facet arthropathy are generally part of the normal aging process rather than pathologic processes requiring intervention." Take a good look at the chart below to see what percentage of people have all sorts of spinal changes but no pain. By the age of 30, we start to accumulate a number of spinal changes that continue to increase significantly with age, yet as shown earlier, the incidence of pain actually goes down as we get older. Really doesn't add up, does it?

Percentage of Asymptomatic People at Varying Ages with Spinal Changes

Finding/Age	20	30	40	50	60	70	80
Disk degeneration	37%	52%	68%	80%	88%	93%	96%
Disk signal loss	17%	33%	54%	73%	86%	94%	97%
Disk height loss	24%	34%	45%	56%	67%	76%	84%
Disk bulge	30%	40%	50%	60%	69%	77%	84%
Disk protrusion	29%	31%	33%	36%	38%	40%	43%
Annular fissure	19%	20%	22%	23%	25%	27%	29%
Facet degeneration	4%	9%	18%	32%	50%	69%	83%
Spondylolisthesis	3%	5%	8%	14%	23%	35%	50%

A 2010 study presented by the American Orthopaedic Society for Sports Medicine showed 70% of healthy professional and collegiate hockey players had abnormal hip and pelvis MRIs even though they had no symptoms of injury. Matthew Silvis, MD, assistant professor at Penn State University College of medicine said "unexpectedly, the majority of players had some abnormality in their MRI, but it didn't limit their playing ability, the study raises many questions, but it's value to surgeons is to recognize that imaging doesn't replace good clinical judgment, it includes a detailed history and complete physical exam. This study might make you hesitate to read too much into an MRI". Another study by Birrell (2005) looked at over 1000 people and found mild/moderate radiographic changes (osteoarthritis-OA) in the hip joint are quite common and and not related to pain. Severe OA changes are not seen as frequently but they are more strongly related to pain, which would make some sense. However, in younger males, severe radiographic changes were much less likely to be associated with pain so some discrepancy exists. Unfortunately there is not a ton of data out there on hip MRI imaging of healthy people, but what do have says that only when hip radiographic changes become really severe in older people, there becomes a link between structure and pain. These are typically the cases where a hip replacement may be an appropriate treatment. Dr. Christopher DiGiovanni, a professor of orthopedics and sports medicine specialist at Brown University says "it is very rare for an MRI to come back with the words 'normal study'. I can't tell you the last time I've seen it." That's why it's so important to get a full clinical evaluation of the whole person and not just rely on a scan of a body part.

"Treat the patient, not the X-ray." -James M. Hunter

When we look to the shoulder, we find similar findings to the hip. In a New York Times article in 2011 (Kolata) titled: "Sports Medicine said to Overuse MRI's", Dr. James Andrews, one of the most prominent sports orthopedic surgeons in U.S., scanned the shoulders of 31 perfectly healthy professional baseball pictures. The pitchers were not injured and had no pain. However, the MRIs found abnormal shoulder cartilage and 90% of them and abnormal rotator cuff tendons and 87%. He states "if you want an excuse to operate on a pitchers throwing shoulder just get an MRI." Dunn (2014) performed a study with 393 patients who presented with shoulder pain and all had non-traumatic full thickness tears in their rotator cuff muscles as shown by MRI. Even with the observed rotator cuff tears and associated pain, the authors stated that there was "no correlation between the level of pain reported by patients and any anatomic measure of rotator cuff tear severity." Another even larger systematic review by Teunis (2014) looked at data from over 6000 shoulders and came to the conclusion that "the prevalence of rotator cuff abnormalities in asymptomatic people is high enough for degeneration of the rotator cuff to be considered a common aspect of normal human aging and to make it difficult to determine when an abnormality is new or is the cause of symptoms." That's a massive statement and has the weight of over 6000 people behind it. Slabaugh (2010), in his study found that "patients may become asymptomatic following rotator cuff repair despite evidence that the repair failed on magnetic resonance imaging (MRI) or ultrasound

imaging." So the surgery failed but the patient becomes pain-free? What does this mean? Just like we saw in the back, the hip, and now the shoulder, the prevalence of tissue "damage" on x-ray's and MRI's is not really damage at all, but more likely normal changes in our tissues as we get older. These changes are not the cause of pain unless there we know there is an acute traumatic injury or the x-ray/MRI scan results are severe in nature. When it comes to chronic pain, which is the focus of this booklet, we absolutely need to look past these common findings in the tissues to the scientific evidence that shows changes in the brain and nervous system are what sustain pain beyond the normal time-frame of healing.

To finish up with this section on x-ray's and MRI findings, let's look at the scientific evidence surrounding the knee. Loeser (2010) in his study, found only about half of those with x-ray evidence of knee arthritis experience significant symptoms. In snother study of 480 adults over the age of 65 who reported chronic knee pain, only about 50% had x-ray evidence of knee osteoarthritis (Miller 2001). So basically only 50% of people with knee arthritis shown on x-ray have pain while at the same time 50% of people with chronic knee pain don't show any findings of knee arthritis. What gives? You might as well flip a coin about who is going to have pain, which certainly doesn't add any weight to the idea that knee arthritis definitively causes pain. Another study in the New England Journal of Medicine (Englund 2008) looked at the prevalence of meniscal damage on a MRI's. The authors state: "The prevalence of meniscal damage increased with increasing age in both sexes. The majority of meniscal tears were found in persons who did not have knee pain, aching, or stiffness." And then a more recent study by Keng (2017) looked at knee MRI's in 73 asymptomatic people with an age range from 40-79. What they found was that 65% of pain free people have moderate cartilage damage and severe cartilage damage was found in close to 30% of asymptomatic people. They state: "our study agrees with most studies that cartilage damage is highly prevalent among middle-aged and older adults without knee pain." To pile on, other studies (Guermazi 2012, Brennan 2010, Wang 2007, Stehling 2010, Laberge 2007) mirror Keng's findings, showing cartilage damage was present in half to over 75% of all pain-free people. How can you call knee cartilage damage "damage" when such a large number of people have these findings with no pain? Sounds more like aging to me.