The Relationship Between Pre-Existing Conditions and Work Injuries of the Shoulder
An Overview for Attendees
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Shoulder injuries are common workplace injuries, third in claims frequency after back and finger injuries (Washington State State Labor and Industrial Relations Claims Data 2007-2016). Most shoulder injuries are benign strains and sprains which will resolve with light duty and physical therapy. However, it is common practice to order an magnetic resonance imaging study (MRI) to rule out a structural injury to the shoulder. Most laypeople, and the injured worker, regard this MRI as the definitive test to determine diagnosis and causation. Today's talk will focus on that MRI, and an important point: most adults with a normal, painless shoulder will have at least one abnormality on shoulder MRI. Therefore, MRI abnormalities after a work injury must be interpreted cautiously because most adults, at baseline, have an abnormal MRI even in the absence of prior pain or injury.

It is typical for the worker, a layperson with no medical training, to assume that an MRI abnormality must have been *caused* by the work injury. If the MRI shows a rotator cuff tear, then the worker assumes that tear must have been caused by the injury. If it shows a labral tear, the assumption is that the work injury must have caused the tear. This is a natural assumption because the shoulder never hurt before. In medical terms, the shoulder was "asymptomatic" with no pain, weakness, or disability. From the worker's perspective, the shoulder was normal prior to the injury. Then, the injury occurs and now there is pain and an MRI abnormality. Of

course it is natural to assume that the injury caused the MRI finding and that the MRI finding is causing pain. Sometimes, even often, this is true: the work injury did cause a tear or other structural abnormality on MRI. However, this is not always the case and it is often true that the MRI abnormality pre-existed the work injury.

As a shoulder surgeon, it is my job to take scientific studies from the medical literature and apply it to my patients to treat them effectively. It is also my obligation to use the best science available to address the medicolegal question of causation: what was the cause of an MRI abnormality? In Missouri, this decision must address the question of "prevailing factor". What was the primary factor, in relation to any other factor, which caused the diagnosis and pain? Using the medical literature allows for an objective, fact-based opinion as to the question of causation. Furthermore, reviewing these scientific studies shows a high percentage of MRI abnormalities even in normal shoulders. In other words, MRI studies of painless, uninjured shoulders often show abnormalities.

To illustrate this point - that even painless shoulders often have an abnormal MRI finding - we will review several studies. The first was published in 1995 in the Journal of Bone and Joint Surgery by Dr. Sher and colleagues. In this study, 96 people were chosen to undergo a shoulder MRI. These people had never had pain or injury to their shoulder. The study participants had a normal, uninjured shoulder. Researchers then performed a shoulder MRI and looked specifically at the rotator cuff. The results? A rotator cuff tear was identified in 33%. Of those between the ages of 40 and 60, 25% had a torn rotator cuff. Of those aged over 60, 54% had a torn rotator cuff. In other words, many people had tears in the rotator cuff even in

the absence of pain or prior injury. Rotator cuff tears are common in “normal” shoulders.

This finding was not an anomaly. A second study, also published in 1995 in the American Journal of Sports Medicine by Dr. Miniaci and colleagues, reproduced similar findings. In this study the researchers took 20 volunteers between 17 and 49 years old. Again, these 20 people had never had shoulder pain or injury and had an MRI of their shoulder to look for abnormalities in the rotator cuff. In this study, none of the shoulders were normal. All of the participants (100%) had at least “...focal, linear, or diffuse signal through the tendon.” This study again serves to illustrate the point that a painless shoulder is not necessarily a normal shoulder on MRI. Most adults, as a normal part of aging, have degeneration of the tendon of the rotator cuff which will show up on MRI but is not causing a problem. Most shoulders can tolerate age-related tendon degeneration and remain painless. The patient or injured worker may have never had prior symptoms yet still have an abnormal MRI.

Finally, a third study published in the American Journal of Roentgenology in 2011 by Dr. Girish and colleagues, showed a similar finding, In this study, 51 men over 40 who had never had prior shoulder pain or injury had an ultrasound of their shoulder. In this study, at least one shoulder abnormality was found in 96% of subjects.

So where does this leave us? In the injured worker with a shoulder problem and an MRI abnormality, it is possible, even likely, that the abnormality was present prior to the work injury. It is also possible that the work injury did cause a structural abnormality on MRI - it is still possible and common for a work injury to cause a tear

in the shoulder. The bottom line is that the decision as to whether a work injury caused a specific MRI finding is more complicated than the layperson might assume. When presented with an injured worker with an abnormal shoulder MRI, the key to addressing the question of causation is for the physician to determine whether the mechanism of injury could have caused the MRI finding. In my practice, I base that decision on a combination of factors: first, could the mechanism of injury have caused the MRI finding? I also consider the onset and severity of symptoms and the specifics findings on MRI. I have developed a scoring system to make the causation decision as objective and transparent as possible, although a discussion of that is outside the scope of this talk.

It often causes considerable anger when I explain to a patient that I don't think that their work injury was the primary factor causing an MRI abnormality. The reason they give, often, is that the shoulder never hurt before. This anger and disbelief is understandable. If the shoulder didn't hurt before and now the MRI shows a tear, how could the injury *not* have caused the tear? Sometimes the patient feels like he or she being accused of lying about prior pain or injury. It is simply true that 1) MRI abnormalities are common and often painless and 2) minor injuries to the shoulder do not typically cause a tear or structural injury. In the case of a more minor injury to the shoulder it is most often the case that the work injury caused a painful sprain or strain and that the MRI abnormality was a pre-existing, but painless, condition. As a treating physician, I recognize that an injury did occur, even if it is only a strain or sprain, and I will recommend treatment - usually physical therapy and sometimes an injection - to address the strain. In the case where the MRI finding is deemed to be pre-existing, however, surgery may not be appropriate or flow from the work injury.

It can be argued that, in the case where a work injury was not the cause of a tear, that the work injury was a triggering or precipitating factor causing a previously painless shoulder abnormality to become painful. When I am asked to address causation, however, I am specifically addressing the question of whether, as defined by Missouri statute, the work injury must was "...the primary factor, in relation to any other factor…" causing the "...medical condition and resulting disability." Although I am sympathetic to the patient's frustration that the shoulder was never previously painful, sometimes the mechanism of injury and MRI findings cannot justify the idea that the primary factor causing the MRI abnormality was the work injury.

In summary, shoulder MRI abnormalities are very common even in painless shoulders. Minor shoulder injuries do not typically cause tears, but often cause strains or sprains. It can be difficult to explain to an injured worker that their MRI abnormality pre-existed their work injury, but that idea is supported by the scientific literature. Although injuries must be recognized and appropriate treatment provided, it is often the case that an MRI finding is not the result of a specific work injury.