Innominate Rotation Dysfunction: Causes, Symptoms, and Complications

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Date of submission :

13 April 2023

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Abstract:

The common pelvic abnormaliy known as innominate rotation dysfunction (IRD) can affect both men and women of all ages. Low back pain, hip difficulty, and sciatica symptoms might result from the innominate bone rotating out of its proper anatomical position. The goal of this thesis is to describe the causes, symptoms, and effects of IRD as well as the various forms of treatment that are currently available.

Introduction:

Innominate rotation dysfunction (IRD) occurs when one of the two pieces of the pelvic bone moves in a certain direction to allow for limb movement or maintain overall body balance, but fails to return to its normal anatomical position due to excessive stress on the muscles and joints. This can result in significant discomfort, including low back pain, difficulty with hip movement, and symptoms of sciatica. Proper diagnosis and treatment of IRD is crucial to alleviate symptoms and prevent further complications.

Chapter 1: Anatomy and Physiology of the Innominate Bone

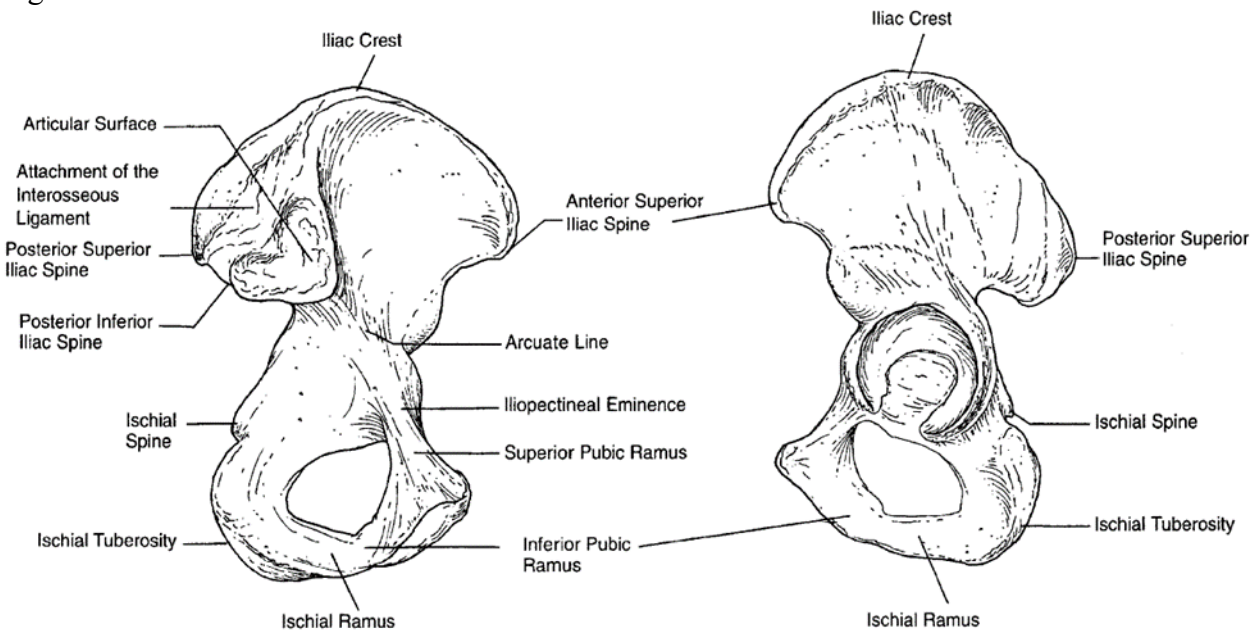
The innominate bone, also referred to as the hip bone or os coxae, is an integral component of the pelvic girdle. It was formed through the fusion of three bones during development: ilium, ischium and pubis. Not only does this provide support for spine, pelvis and lower extremities but it is essential for normal movement and function as well.

The ilium is the largest of three bones that make up the innominate bone. It features a broad superior portion known as the iliac crest, which attaches several muscles of the abdominal wall. On its posterior end, however, lies the greater sciatic notch--a passageway for important structures including sciatic nerve.

The ischium is the posterior and inferior portion of the innominate bone, providing support when sitting and serving as an attachment point for muscles in the thigh.

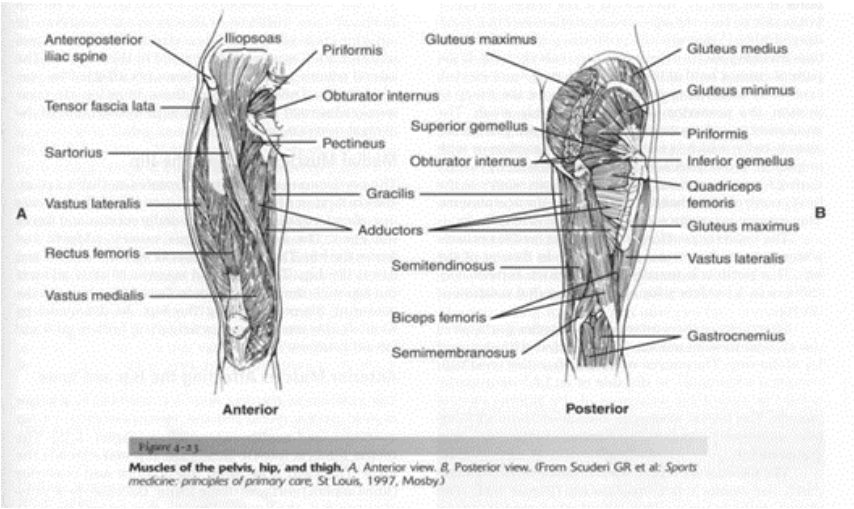
The pubis is the anterior portion of the innominate bone, divided into a superior and inferior ramus. The superior pubic ramus forms part of the anterior wall of the pelvic girdle while its inferior counterpart provides attachment for several muscles in the thigh.

- Figure 2. Pelvis Skleton



The muscles attached to the pelvis can be divided into several groups according to their location and function. The hip muscles, such as gluteus maximus, medius, and minimus; piriformis; obturator internus/externus attach to the pelvis for movement and stabilization of the hip joint; abdominal muscles like rectus abdominis, transversus abdominis and obliques attach directly onto the pelvis for support of trunk and pelvic movement; adductor muscles like magnus/brevis/longus attach to the same location on either side for hip adduction movements.

- Figure 3. Muscles in the pelvis, hip and tight around the abdomen



Dysfunction of the innominate bone can cause a variety of conditions, such as innominate rotation dysfunction which may cause low back pain, hip pain and other symptoms. Therefore, understanding its anatomy and physiology is essential for diagnosing and managing these conditions.

Chapter 2: Biomechanics of Pelvic Stability and Movement

The biomechanics of pelvic stability and movement are essential in diagnosing and managing musculoskeletal conditions, particularly those affecting the lower back and hips. By understanding how movement patterns in the pelvis interact with surrounding muscle tissue, clinicians can develop effective treatment plans that minimize potential injury.

The pelvis is the foundation of the lower body, providing support for both spine and legs as they move. To maintain balance during gait, any asymmetry or imbalance can lead to altered movement patterns and pain. The biomechanics behind pelvic stability and movement require coordination among several muscle groups including gluteals, hip flexors, and abdominals.

Gait involves three planes of motion: sagittal, frontal and transverse. In the sagittal plane, the pelvis tilts forward and backward with each step; while in frontal it tilts side to side. Transverse motion involves rotation around a vertical axis for balance and stability while walking. These movements must be coordinated with leg movement as well as spine motion to maintain these positions during gait.

In cases of innominate rotation dysfunction, the pelvis may rotate anteriorly or posteriorly, altering movement biomechanics and leading to pain and dysfunction in the low back and hips. Treatment for innominate rotation dysfunction usually entails manual techniques to restore joint mobility and alignment as well as exercises designed to address muscle imbalances and enhance pelvic stability and range of motion.

The biomechanics of pelvic stability and movement are essential in the prevention of injuries among athletes and other active individuals. By understanding which muscle groups are involved in pelvic movement and stability, one can tailor training programs to maximize results while avoiding potential future trauma.

- Figure 4. Anterior pelvic tilt in the sagittal plane. (B) Posterior pelvic tilt in the sagittal plane.(C) Lateral pelvic tilt in coronal plane.(D) Axial rotation of the pelvic girdle in transverse plane.

In conclusion, the biomechanics of pelvic stability and movement are essential in diagnosing, managing, and preventing musculoskeletal conditions. Coordination among muscle groups involved in pelvic movement helps keep you balanced during gait. Treating innominate rotation dysfunction typically involves manual techniques and exercises to address muscle imbalances and enhance pelvic stability and movement.

Chapter 3: Considerations Regarding Innominate Rotation Dysfunction

Innominate rotation dysfunction is a condition that can cause pain and dysfunction in the low back and hips when the innominate bone, also known as the hip bone, becomes rotated anteriorly or posteriorly. A variety of factors may contribute to innominate rotation dysfunction, including structural and functional issues.

Structural causes of innominate rotation dysfunction may include leg length discrepancies, pronated feet, scoliosis and pelvic asymmetry. When legs are different lengths, the pelvis will tilt and rotate to compensate for the difference. Scoliosis itself may lead to pelvic asymmetry as well as altered biomechanics of movement due to past injuries, surgery or developmental abnormalities.

Scoliosis is a condition in which the spine curves abnormally to one side, creating an unnatural three-dimensional deformity. This curvature may cause pelvic asymmetry and ultimately contribute to innominate rotation dysfunction.

Scoliosis is a condition in which the spine may curve to either left or right and the pelvis rotates to compensate. This can make one leg appear shorter than the other even if their actual lengths are equal. Furthermore, in some cases, one hip may tilt more than another, giving the illusion of higher hips on one side.

Pelvic asymmetry can impact the alignment and movement of the innominate bone, leading to innominate rotation dysfunction. As the pelvis rotates, this bone may become rotated anteriorly or posteriorly, causing pain and dysfunction in the low back and hips.

Scoliosis may also cause muscle imbalances in the hip and pelvic region. On one side of the body, muscles may become shortened or tightened while those on the other become lengthened or weakened. This could lead to altered biomechanics of movement as well as innominate rotation dysfunction.

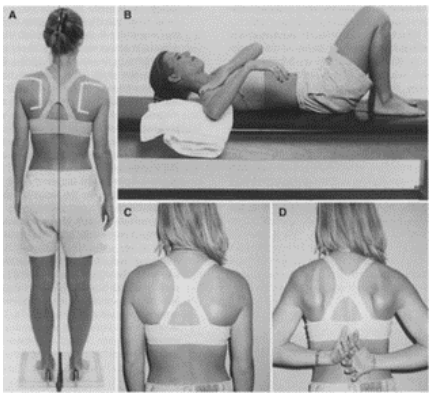
Diagnosing scoliosis and innominate rotation dysfunction typically involves a physical examination as well as imaging studies such as X-rays or MRI. Treatment may include manual techniques to restore joint mobility and alignment, along with exercises designed to address muscle imbalances and enhance pelvic stability and movement.

In severe cases of scoliosis, bracing or surgery may be required to correct the spinal curvature and avoid further complications. Even mild cases require careful management to minimize potential risks.

Addressing pelvic asymmetry and innominate rotation dysfunction can improve overall function while relieving pain and discomfort.

Scoliosis can contribute to innominate rotation dysfunction by creating pelvic asymmetry and altered movement biomechanics. Treating these underlying issues through manual techniques and exercises will improve pelvic stability, reduce pain and dysfunction in the low back and hips.

- Figure 5. Scoliosis has led to innominate rotation dysfunction.



Pronated feet refer to a condition in which the foot and ankle roll inward, causing its arch to collapse. This can contribute to innominate rotation dysfunction by altering the biomechanics of the lower extremity and altering alignment and movement in the hip and pelvic region.

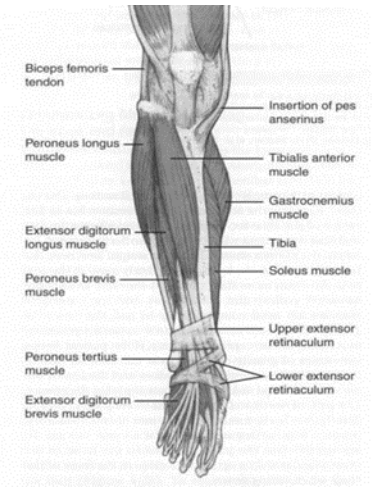
Pronating the foot can cause the tibia and fibula to rotate inward, altering the alignment of the knee joint. This also changes hip biomechanics as it must compensate for changes in lower extremity alignment. As a result, innominate bones may become rotated anteriorly or posteriorly causing pain and dysfunction throughout low back and hips.

Pronation of the foot can have an impact on muscles in both the lower extremity and pelvis. On one side of the leg, these may become shortened or tight, while on the other they may lengthened or weakened. This imbalance leads to muscular imbalances as well as altered biomechanics during movement - all contributing factors for innominate rotation dysfunction.

Orthotics or other assistive devices may be recommended to address pronated feet and restore proper alignment and biomechanics of the lower extremity. Doing so can reduce the likelihood of developing innominate rotation dysfunction and other related conditions.

In conclusion, pronation of the foot can contribute to innominate rotation dysfunction by altering its biomechanics and altering alignment and movement in the hip and pelvic region. Addressing the underlying pronation through manual techniques, exercises, and assistive devices will improve pelvic stability while relieving pain and dysfunction in low back and hips.

- Figure 6. The peroneus longus muscle everts and plantar flexes the ankle, pronating it for those with pronated feet. * Figure 7. In an individual with pronated feet, this muscle may be shorter in size.



Functional causes of innominate rotation dysfunction may include muscle imbalances and poor posture. Tightness or weakness in the hip flexors, gluteals, and abdominal muscles can contribute to altered biomechanics of movement and pelvic rotation. Poor posture such as sitting for prolonged periods or standing with a swayback posture are other potential contributing factors that lead to muscle imbalances and altered pelvic mechanics.

In some instances, innominate rotation dysfunction may be caused by trauma to the hip or pelvis. This could include falls, motor vehicle accidents, or sports-related injuries.

Finally, innominate rotation dysfunction can be caused by several causes, including structural and functional issues as well as trauma or injury. A comprehensive evaluation by a healthcare provider is necessary to identify the underlying issue and devise an appropriate treatment plan.

Chapter 4: Signs, Complications and Musculoskeletal Impacts of Innominate Rotation Dysfunction , What causes innominate rotation dysfunction and what are its symptoms and complications?

Innominate Rotation Dysfunction (IRD) is a condition that affects the pelvic girdle and is marked by an asymmetrical rotation of the innominate bones. These large hip bones form side walls for the pelvis and connect to the sacrum at the back, and when turned can lead to symptoms, complications, and musculoskeletal implications that affect overall function and mobility of the body.

Signs and Symptoms of Innominate Rotation Dysfunction:

The symptoms of IRD can vary depending on its severity and underlying cause. Some of the most common signs include:

- Low back pain: IRD may cause pain in your lower back, particularly along the side of the rotated innominate bone.
- Hip pain: Rotation of the innominate bone can cause pain in the hip joint on one side.
- Leg length discrepancy: IRD may cause one leg to appear longer than the other, leading to uneven gait and posture.
- Pelvic Pain: Rotation of the innominate bone can cause pain in the pelvic region, particularly on one side.
- Sciatica: IRD can compress the sciatic nerve, leading to leg numbness and tingling sensations.

Complications of Innominate Rotation Dysfunction.

Untreated IRD can lead to a variety of serious complications that affect an individual's overall health and wellbeing. Common effects from IRD include:

- Increased Risk of Falls: IRD can cause uneven gait and posture, increasing the potential risk for falls and injuries among older adults.
- Reduced Mobility: IRD can restrict the range of motion in one hip joint, leading to decreased mobility and difficulty performing daily activities.
- Musculoskeletal Imbalances: IRD can cause imbalances in the muscles and joints of the pelvic girdle, leading to compensatory movements and further musculoskeletal issues.
- Chronic Pain: If left untreated, IRD can cause chronic discomfort and pain that can significantly diminish quality of life for individuals.

Musculoskeletal Consequences of Innominate Rotation Dysfunction

IRD can have numerous musculoskeletal effects that extend beyond the spine. Some common examples include:

- Sacroiliac Joint Dysfunction: Rotation of the innominate bone can affect alignment and function of the sacroiliac joint, leading to pain and dysfunction.
- Lumbar Spine Dysfunction: Intervertebral disc disease (IRD) may cause imbalances in muscles and joints of the lumbar spine, leading to pain and dysfunction.
- Hip Joint Dysfunction: Rotation of the innominate bone may lead to imbalances in muscles and joints of the hip joint, leading to pain and dysfunction.
- Knee Pain: Inflammatory Rheumatism (IRD) can affect alignment and function of lower extremities, leading to compensatory movements and knee pain.
- Foot and Ankle Dysfunction: IRD can affect the alignment and function of the lower extremities, leading to compensatory movements as well as foot-and-ankle dysfunction.

Finally, Innominate rotation dysfunction (IRD) is a widespread condition that can manifest symptoms, complications and musculoskeletal effects. If left untreated, IRD can lead to chronic

pain, reduced mobility and an increased risk of falls and injuries due to its musculoskeletal imbalances. Furthermore, these imbalances may impact other parts of the body too, creating dysfunction and pain elsewhere in the body.

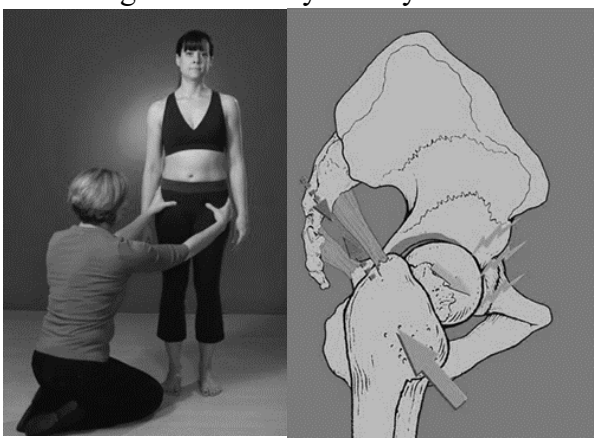
Chapter 5: outlines Diagnostic and Treatment Options for Innominate Rotatory Dysfunction.

The diagnosis of IRD is typically made through a physical examination and imaging studies such as X-rays or MRI. Treatment options for IRD include manual therapy like chiropractic adjustments or osteopathic manipulation to realign the innominate bone and restore pelvic stability; physical therapy including stretching and strengthening exercises may also be effective in managing symptoms. Surgery may be necessary in severe cases to correct structural abnormalities or manage severe cases; lifestyle modifications like maintaining a healthy weight and avoiding extended sitting can help prevent and manage IRD symptoms.

Innominate rotation dysfunction (IRD) can be diagnosed through various tests and physical examinations. Here are some commonly used tests and examinations:

1. Pelvic Landmarks: The practitioner palpates various landmarks on the pelvis, such as anterior superior iliac spine (ASIS) and posterior superior iliac spine (PSIS), to assess any discrepancies in position or alignment between these sides.

- Figure 7 depicts the pelvic landmark test for assessing iliac crest asymmetry.



2. Leg Length Assessment: The practitioner measures each leg's length to detect any discrepancy between them. A difference in leg length could be indicative of IRD.

- Figure 8 provides an example of this assessment process.

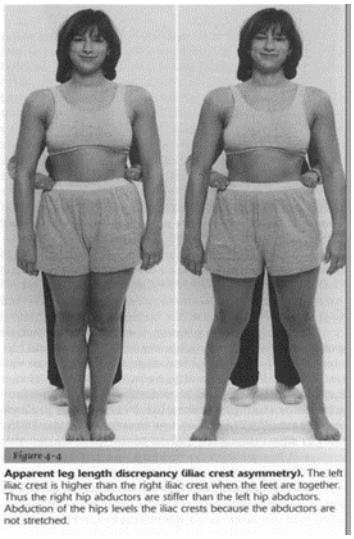
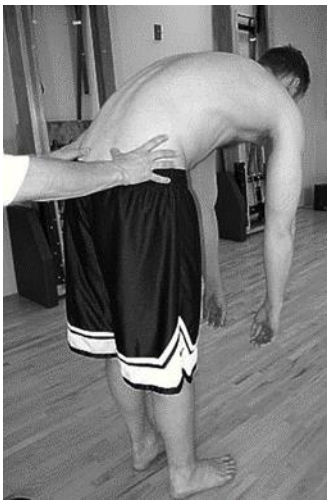


Figure 4-4

Apparent leg length discrepancy (iliac crest asymmetry). The left iliac crest is higher than the right iliac crest when the feet are together. Thus the right hip abductors are stiffer than the left hip abductors. Abduction of the hips levels the iliac crests because the abductors are not stretched.

3. Standing Flexion Test: The patient stands with feet shoulder-width apart and bends forward at the waist, reaching towards the floor. The practitioner observes any differences in height or rotation between both iliac crests to detect any discrepancies.

- Figure 9 depicts a standing flexion test.

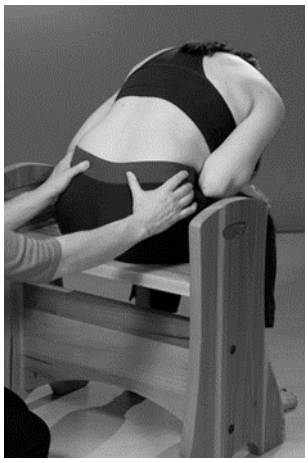


4. Seated Flexion Test: The patient sits with their legs hanging off the edge of a table and reaches forward towards the floor. The practitioner observes the position of their iliac crests to detect any differences in height or rotation between both sides.

- Figure 10 illustrates the seated flexion test.

5. illustrates the sacral spring test: While lying on one's stomach, the practitioner applies gentle pressure to the sacrum to assess for any differences in motion or tension between both sides.

- Figure 11 displays this same process.



6. Muscle Testing: The practitioner tests the strength of various muscles in the pelvis and lower extremities to detect any weakness or imbalance that could be contributing to symptoms experienced by the patient.
7. Range of Motion Assessment: The practitioner assesses the range of motion in both hip joints, as well as other joints that could be affected by IRD, such as the sacroiliac joint.

Tests and physical examinations can help diagnose IRD and create an appropriate treatment plan. It is essential that a comprehensive medical history be taken and physical exam performed by a qualified healthcare professional in order to accurately identify IRD and rule out any other potential underlying conditions.

Innominate Rotation Dysfunction (IRD) is a commonly occurring muscular-skeletal condition that affects the pelvic girdle. IRD (illegitimate rotation of the pelvis) occurs when one side of the pelvis rotates forward or backward in relation to its opposite, leading to symptoms such as low back pain, hip pain and leg length discrepancies. This condition can be caused by a number of factors, including trauma, poor posture and muscle imbalances. IRD can be diagnosed through a comprehensive physical examination and treated using manual therapy techniques such as joint mobilization, soft tissue massage, myofascial release, muscle energy techniques and balanced ligamentous tension. Osteopathy, a form of manual therapy, has been proven particularly successful at treating IRD. By targeting the underlying causes and restoring proper pelvic alignment and function, manual therapy can help alleviate symptoms and prevent further complications. In this thesis we will investigate both diagnostic and treatment options for IRD with an emphasis on using osteopathic techniques to address it.

Dr. Shawn Pourgol, founder of the National Academy of Osteopathy and an osteopathic physician, believes that osteopathy can be an effective treatment option for innominate rotation dysfunction. Osteopathy is a manual form of therapy that targets the musculoskeletal system to restore proper function and alignment within the body.

At an osteopathic treatment session, the practitioner uses gentle hands-on techniques to assess and treat any areas of dysfunction in the body, including the pelvis. These may include joint mobilization, soft tissue massage, myofascial release, muscle energy techniques and balanced ligamentous tension among others. By restoring normal range of motion and relieving muscular tension or spasm, osteopathy can help alleviate symptoms associated with innominate rotation dysfunction.

Exercise is an integral part of osteopathic treatment for innominate rotation dysfunction, in addition to manual therapy. Your practitioner may suggest specific exercises designed to strengthen core and hip muscles and promote stability and alignment within the pelvis, as well as stretching exercises to loosen any muscular tightness or imbalance that could be contributing to symptoms.

o Joint Mobilization: Joint mobilization is a manual technique used to increase the range of motion in joints. The practitioner gently moves the joint through its full range of motion to restore proper mechanics and alleviate pain or stiffness. If an individual suffers from innominate rotation dysfunction, joint mobilization may also help realign their pelvis for improved alignment.

- Soft Tissue Massage: Soft tissue massage involves applying pressure to muscles and other soft tissues of the body in an attempt to relieve tension or tightness. This can improve circulation, reduce pain and inflammation, as well as promote healing. In cases such as innominate rotation dysfunction, soft tissue massage could be utilized to release any muscular tension or spasm that could be contributing to symptoms experienced.

- Myofascial Release: Myofascial release is a technique that works to release tension in the fascia, the layer of connective tissue surrounding muscles and other body parts. The practitioner applies sustained pressure to specific areas of fascia to help alleviate tension and enhance mobility. Myofascial release can be especially helpful for cases of innominate rotation dysfunction as it addresses any fascial restrictions contributing to symptoms.

- Muscle Energy Techniques: Muscle energy techniques involve the patient in a series of movements designed to improve joint function and relieve pain or stiffness. The patient contracts and relaxes specific muscles while the practitioner applies gentle pressure on the affected area. Muscle energy techniques may even be used to realign the pelvis when dealing with innominate rotation dysfunction.

- Balanced Ligamentous Tension: Balanced ligamentous tension is a technique designed to restore proper tension and alignment of the ligaments supporting joints in the body. The practitioner applies gentle pressure to specific areas of these ligaments in order to help them relax, improving joint mechanics. If someone suffers from innominate rotation dysfunction, balanced ligamentous tension may be used to address any ligamentous restrictions contributing to their symptoms.

Dr. Shawn Pourgol's manual therapy techniques for innominate rotation dysfunction seek to address any dysfunction within the musculoskeletal system that might be contributing to symptoms of this disorder. By restoring proper function and alignment of the pelvis, these exercises can reduce pain and enhance mobility for patients.

Other therapeutic modalities, such as ultrasound, electrical stimulation and heat or cold therapy can also be combined with osteopathic treatment for innominate rotation dysfunction. These techniques help reduce pain and inflammation while encouraging healing of any soft tissue injuries or inflammation present.

Surgery should only be considered a last option when other treatments have failed to relieve the patient's symptoms.

Overall, diagnosing and treating innominate rotation dysfunction requires a comprehensive approach that includes a physical examination as well as an individualized treatment plan. Osteopathy, according to Dr. Shawn Pourgol, can be an effective option for this condition; however, it's essential that patients consult with a qualified healthcare professional in order to determine which course of action is most beneficial for them individually.

Conclusion:

Innominate Rotation Dysfunction (IRD) is a common pelvic condition that can lead to various symptoms and complications. While the exact causes and pathophysiology of IRD remain unknown, several treatments such as manual therapy, physical therapy, and surgery exist for managing it. Healthcare providers must be aware of how IRD may impact mental health and well-being of their patients and provide comprehensive care accordingly. Further research is necessary in order to gain further insights into its causes and pathophysiology; ultimately leading to more effective treatments.

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