

# Review Article about Magnetic Resonance Imaging of the Vertebrae

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## **Abstract:**

Magnetic resonance imaging (MRI) is a non-invasive imaging technique that uses a magnetic field to produce detailed images of the internal body structures. This imaging technique uses powerful radiation and radio waves to produce detailed images of the spinal cord and surrounding soft tissue structures. MRI of the spine is commonly used to diagnose a variety of conditions that affect the spine, including a herniated disc, spinal stenosis, and spinal cord injuries. It can also be used to evaluate the effectiveness of treatments or to monitor development. Certain situations over time. During a spinal MRI, the patient lies on a table that is inserted into the MRI scanner. The scanner uses a magnetic field to create images of the spine articulation. This procedure is painless and painless. The scan uses powerful radio waves to create surgical images, but some patients may experience anxiety or claustrophobia during the scanning process. In general, MRI is a powerful tool for diagnosing and monitoring conditions affecting the spine. Provides detailed images that can help doctors make accurate diagnoses and develop effective treatment plans.

## **1. Introduction**

The science and biology of neuroscience and microbiology the resonance of the vertebrae is the subject of its molecular and biomedical sciences. Understanding this mechanism can help

understand how the central nervous system works, movement, sensory response of the body, and other vital processes involving the vertebrae and their adjacent nerves. Resonance is an effect that occurs when something is subjected to a specific frequency of vibration. Regarding the vertebrae, resonance can occur when an external vibratory force is applied to the body, to which the bony part of the vertebrae reacts. In fact, the vertebrae can be affected by resonance due to internal vibrations as well, which are created by the body's natural movement, breathing, heart and other vital processes. Prepare MRI is a common method for diagnosing conditions related to the vertebrae. MRI is used to detect diseases, injuries, deformities, tumors, infections of the vertebrae, intervertebral discs, nerve roots, and other conditions that affect the vertebrae and the spine in general. MRI creates 3D images of the body using strong magnetic fields and radio signals. This technology is applied by placing the patient inside a powerful magnet and sending radio signals to the body, and by measuring the returned signals, accurate images of the body are created. Modern technology in magnetic resonance imaging allows the production of high-quality and accurate images of the vertebrae and surrounding tissues, which helps diagnose cases accurately and choose the appropriate treatment. Although MRI is often used in Diagnosing severe cases, but it can also be used to detect simple cases that may It is not noticeable by other tests. Magnetic resonance imaging of the vertebrae is considered one of the most detailed and accurate tools in diagnosing conditions related to the spine. MRI can provide detailed and accurate images of soft tissues, including discs, nerve tissue, blood vessels, muscles, ligaments and cartilage. Modern MRI technology provides detailed, high-resolution images of the vertebrae, allowing doctors and health practitioners to understand any potential problems with the vertebrae and diagnose and treat spinal diseases. The technology can help diagnose a variety of diseases and conditions. In addition, an MRI of the vertebrae can help determine if there are any injuries or damage to the vertebrae or the tissues supporting the vertebrae. An MRI can be used to diagnose many other conditions that affect the spine and nearby tissue. The spine consists of a series of irregular bones called vertebrae. These vertebrae differ from each other according to their areas in the spine, but they are not similar and are called according to their areas. At birth, the spine has backward convexities in the thoracic region and the sacrococcygeal region (pelvic region). These are called the primary curvature. After the child begins to raise his head, the cervical region begins to convex forward. Then, when he begins to sit and stand, the lumbar convexity begins to appear forward. They are called secondary curvatures, and these appear to balance the primary curves. These curves become more noticeable when the child begins to stand. Between the twelfth month and the eighteenth month, the convexities are integrated into each other with sufficiently strong and flexible ligaments that give it rigidity and allow it to make normal movements and to transfer and distribute the weight of the body to the lower extremities via the pelvis. It is also characterized by solidity and works as a protective shield for the spinal cord and for the roots of the nerves that emerge from the cord. The spine also gives the body its natural shape, which is the erection of the stature. The movement between each two vertebrae is small, but the sum of this movement results in a degree change in the longitudinal axis of the spine, so the spine bends forward and backward in the various sections of the spine to the same degree. Forward flexion and backward extension have a wide range in The cervical region is evident in the movement of the head, while the lowest degree of flexion and extension occurs between the thoracic vertebrae to aid respiratory movements. Therefore, the curvature of the spine forward or backward has a narrow Neighboring vertebrae are similar in their general appearance, but they differ in terms of size, as their sizes are not equal. For example, the cervical vertebrae differ greatly from the lumbar vertebrae in size and shape, and because of the increased weight that the vertebrae bear, their size and strength increase from top to bottom. This increase begins from the second cervical vertebra (axis) until The first thoracic vertebra, where the body of the second, third, fourth, and sometimes up to the sixth thoracic vertebrae, then begins to gradually increase again until it reaches its maximum at the fifth lumbar vertebra, after which it begins to decrease from the lumbosacral angle until the end of the coccyx. From this it is clear that the lower lumbar vertebrae, especially the fifth, are larger and stronger Vertebrae: The spine

consists of 33 vertebrae, distributed into five groups as follows: 7 cervical vertebrae, 5 lumbar vertebrae, 4 sacral vertebrae. It should be noted that the number of vertebrae may vary From one person to another, it ranges between 32 and 35 vertebrae. It is also worth knowing that the length of the human spine is 71 cm for males and 61 cm for females. The spine has four main functions: 1. Protection: it encircles and protects the spinal cord. 2. Support: it carries the body's weight Above the sink. the structure of the vertebrae: All vertebrae share a common basic structure. Each consists of an anterior vertebral body and a posterior vertebral arch Vertebral body: It represents the front part of the vertebra, and it is the part that supports the body's weight. This explains the gradual increase in the size and thickness of the vertebral bodies down the spine. The bodies of each two successive vertebrae are separated by the intervertebral disc. Intervertebral arch: It is the back part of each vertebra and consists of four parts; The right and left plates and the right and left plate or plate, each of which forms one side of the vertebral arch and is concentrated on the back side of the vertebral body, while each C plate forms part of the posterior roof of the vertebral arch, and there There is also a large opening between the vertebral arch and the body called the vertebral foramen and it contains the spinal cord. In a healthy spine, the vertebral foramen of all vertebrae are lined up to form the vertebral canal, which represents a passage for the spinal cord along the spine. To the lower back, when the vertebrae are aligned together, cracks form in the pedicle of one vertebra with cracks in the neck of the adjacent vertebra. It has an opening in the spine, the opening through which the spinal nerve emerges from the spine. The seven appendages: They all originate from the vertebral arch and are distributed over As follows: A pair of transverse appendages laterally, called the transverse appendix, and this pair originates from the point between the pedicle and the lamina. A single spinous appendage appears in the middle of the posterior line. The spine can be easily seen as a series of subcutaneous protrusions in the middle of the back Two superiorly articulated .

## 2. Methodology

In this study recommend MRI as one of the modern methods for diagnosing neurological diseases such as atherosclerosis, brain tumors, strokes, and encephalitis. 3- We recommend

MRI Magnetic resonance imaging because it can detect early heart disease by detecting structural and functional changes in the heart and its surrounding blood vessels, which helps in diagnosing heart disease in the early stages,

## 3. Results and discussions

MRI can diagnose many conditions that affect the spine, such as herniated disc, spinal cord stenosis, and spinal cord injuries - 2 - The success of treatment in many cases of spinal diseases depends on the accurate diagnosis obtained using MRI - 3 Magnetic resonance imaging can be used to monitor the development of pathological conditions that affect the spine over time, which allows doctors to update treatment plans and appropriate measures. 4 - Although magnetic resonance. imaging of the vertebrae is generally safe, it requires prior preparation, such as getting rid of metals found in clothing and jewelry, and may require Using a detector to help produce images. MRI procedures of the vertebrae can help determ. MRI procedures of the vertebrae can help diagnose spinal deformities. Such as arthritis that leads to vertebral atrophy. MRI can be used to ensure that there are no malignant or benign tumors in the spine. Magnetic resonance imaging (MRI) technology is characterized by the use of a strong magnetic field and waves Radio to produce three-dimensional images of the inside of the body. This type of photography is used To diagnose many medical conditions, including neurological disorders and malignant tumors Arthritis, muscular and vascular deformities. Magnetic resonance imaging features high-resolution images and fine details of tissue structure The body, which helps doctors identify cases of disease and determine appropriate treatment. And from the sides Another positive thing about MRI is that it does not cause any harm to the tissues and is not used Harmful X-rays However, MRI requires many technical conditions and requirements It is expensive and takes time to obtain high-quality images, which means it can be

a... Long time to take the test. Also, some people may not be able to undergo an MRI Magnetic damage due to internal metal objects and medical devices implanted in the body. So you must Patients should consult with their doctor about the possibility of performing the test and whether it is appropriate for their condition. In addition, magnetic resonance technology is used to treat some diseases, as magnetic waves are directed to treat cancerous tumors and some neurological diseases. The technology can be used to diagnose a wide range of diseases and medical conditions, such as neuromuscular injuries, gastrointestinal infections, liver infections, heart diseases, cancerous tumors, and congenital malformations. The technology can also be used in scientific research, as it can be used to study the functions of organs and tissues and learn about the changes that occur in them with treatment and the natural development of diseases. However, attention must be paid to some risks that may occur during examinations using MRI technology, such as sensitive reactions to some medications that may be used during the examination, and side effects that may occur due to movement within the magnet. In the end, MRI technology is considered one of the modern and advanced technologies in the field of medicine, as it helps in diagnosing diseases and improving their treatment, and this technology is constantly being improved to become more accurate and effective

#### **4. CONCLUSION**

In conclusion MRI is a non-invasive imaging technique that uses a strong magnetic field and radio waves to produce detailed images of the internal structures of the body. This imaging technique is particularly useful for studying the vertebral column, as it can provide detailed images of the spinal cord, nerve roots, and surrounding soft tissue structures. MRI for vertebral imaging is typically used to diagnose a variety of conditions affecting the vertebral column, including herniated discs, spinal stenosis, and spinal cord injuries. It may also be used to assess the effectiveness of treatments or to monitor the progress of certain conditions over time. During an MRI for vertebral imaging, the patient lies on a table that is inserted into the MRI scanner. The scanner uses a strong magnetic field and radio waves to create detailed images of the vertebral column. The procedure is painless and non- invasive, but some patients may experience anxiety or claustrophobia during the scanning process.

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