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## Design Document

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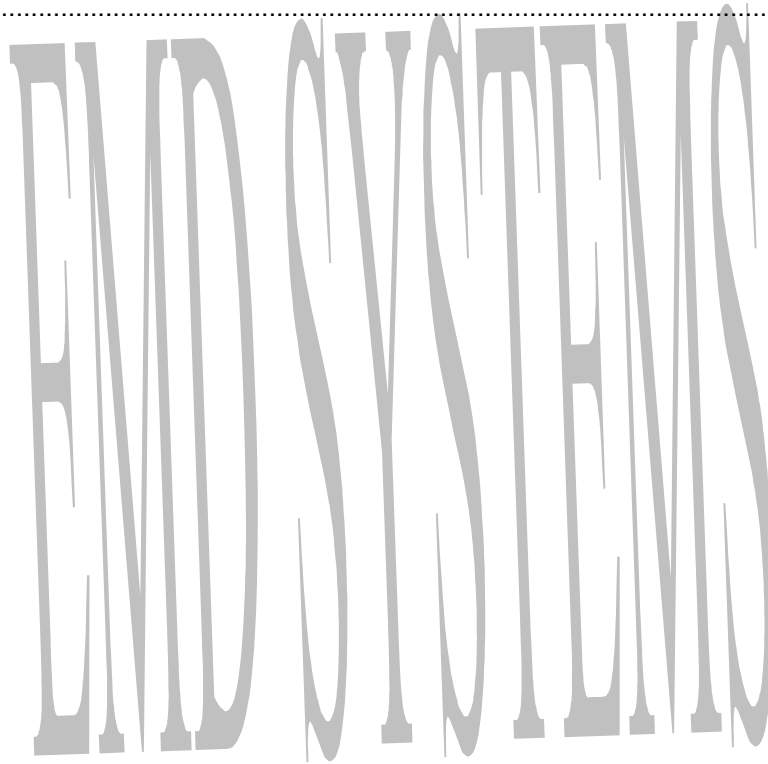
[Document Related To]

Amendment sheet

Version No.	Release Date	Modified by Date	Reviewed by Date	Authorized by Date	Remarks
1.0		Resource DD/MM/YY			Initial Version

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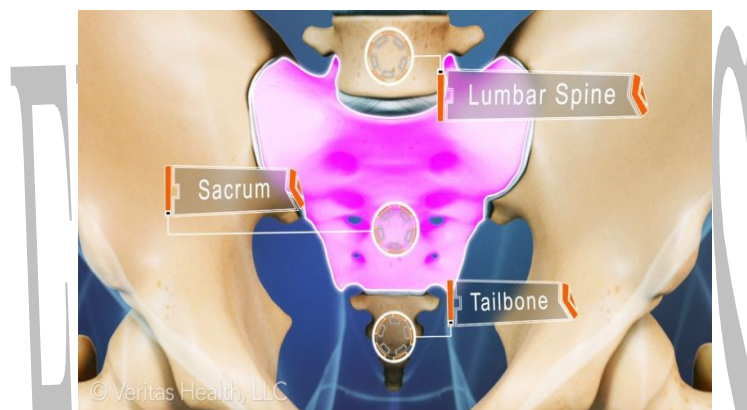


# 1. Sacral spine(Sspine)

## 1.1. Overview

The sacrum is a large wedge shaped vertebra at the inferior end of the spine. It forms the solid base of the spinal column where it intersects with the hip bones to form the pelvis. The sacrum is a very strong bone that supports the weight of the upper body as it is spread across the pelvis and into the legs.

The sacral region (sacrum) is at the bottom of the spine and lies between the fifth segment of the lumbar spine (L5) and the coccyx (tailbone). The sacrum is a triangular-shaped bone and consists of five segments (S1 - S5) that are fused together.

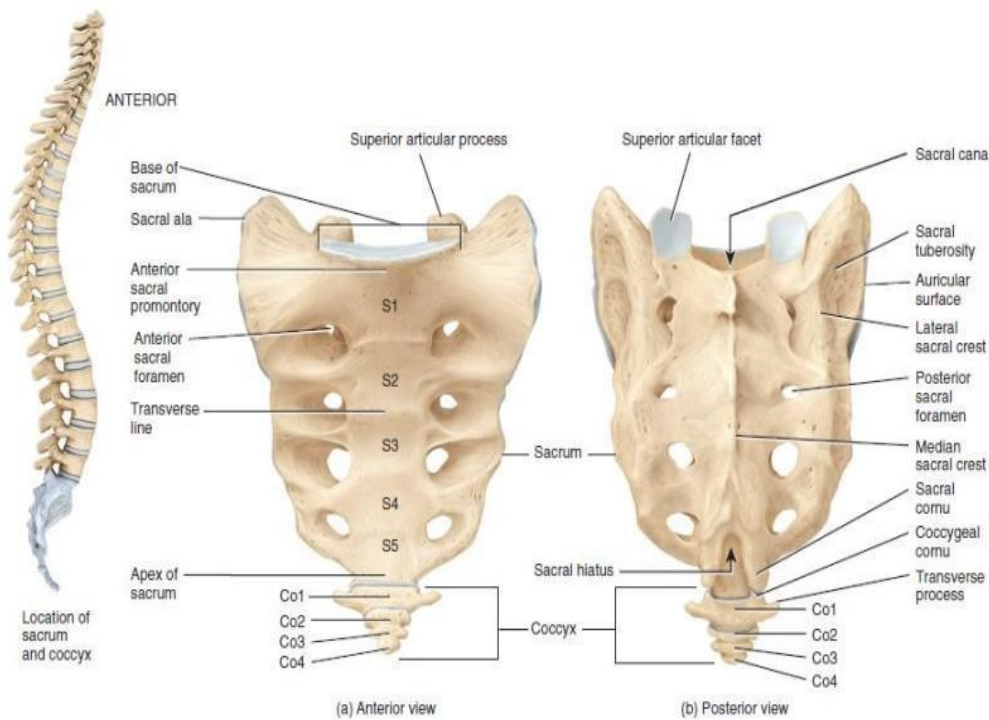


The sacrum contains a series of four openings on each side through which the sacral nerves run. Back pain can typically arise where the lumbar spine and sacrum connect because this section of the spine is subjected to a large amount of stress during certain activities, such as sports and sitting for long periods of time. Low back pain can also arise from a dysfunction in motion at the sacroiliac joint connecting the sacrum to the pelvis.

## 1.2. Functions

The main function of the sacrum is to connect the spine to the hip bones (iliac). There are five sacral vertebrae, which are fused together. Together with the iliac bones, they form a ring called the pelvic girdle.

Many nerves of the cauda equina at the inferior end of the spinal cord pass through the sacrum. These nerves enter the sacrum from the vertebral foramina of the lumbar vertebrae through the tunnel-like sacral canal. From the sacral canal these nerves branch out and exit the sacrum through four pairs of holes on the sides of the canal called the sacral foramina or through the sacral hiatus at the inferior end of the canal.



### 1.3. Major Diseases and Symptoms

S. No	Disease	Symptoms
1	<b>Neck Pain. Neurogenic Claudication.</b> - Neurogenic claudication (NC), also known as pseudoclaudication, is a common symptom of lumbar spinal stenosis, or inflammation of the nerves emanating from the spinal cord.	1.Pain. 2.Cramping. 3.Weakness. 4.Tingling.
2.	<b>Spinal Stenosis</b> -It is a condition, mostly in adults 50 and older, in which your spinal canal starts to narrow	1.pain or cramping in your legs 2.discomfort usually eases when you bend forward or sit down
3	<b>Herniated disc</b> -Sometimes called a slipped or ruptured disk, a herniated disk most often occurs in your lower back. It is one of the most common causes of low back pain, as well as leg pain	1.Leg pain 2.Nerve pain 3.Lower back pain 4.Foot drop
4	<b>Cauda equina syndrome</b> -Cauda equina syndrome (CES) is a rare but serious condition that describes extreme pressure and swelling of the nerves at the end of the spinal cord.	1.Neurological symptoms in the lower body 2.Altered sensation in the "saddle region," or saddle anesthesia. 3.Bladder or bowel incontinence 4.Localized lower back pain

## 1.4. Radiology Examinations

### 1.4.1 Applicable Radiology Examinations

Radiology Examination Name	Is Applicable (Yes/No)
CT (Computed Tomography )	yes
BD (Bone Densitometry)	yes
MG (Mammography)	No
MR (Magnetic Resonance)	yes
NM (Nuclear Medicine)	yes
RT (RadioTherapy)	No
US (Ultrasound)	yes
CR (Computed Radiography)	No
DX (Digital Radiography)	No
PT (Positron Tomography)	yes
RF (Radio Fluoroscopy)	No
SC (Secondary Capture)	No
XA (X-Ray Angiography)	No

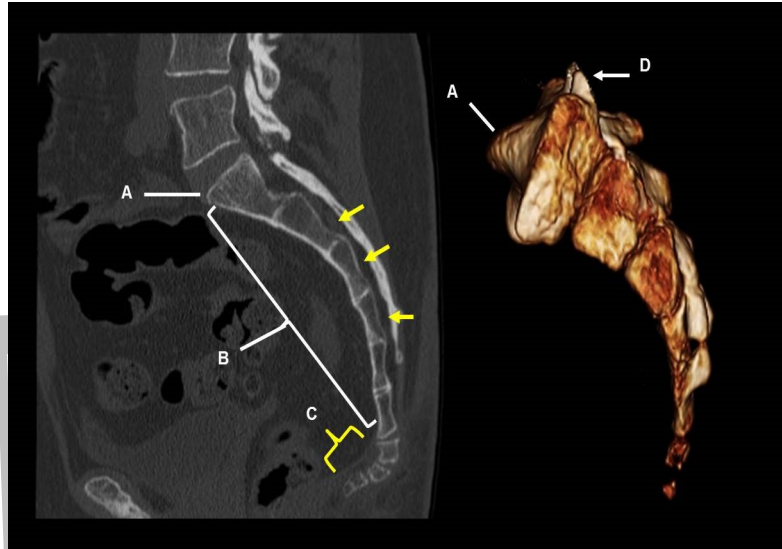
### 1.4.2 MRI ()



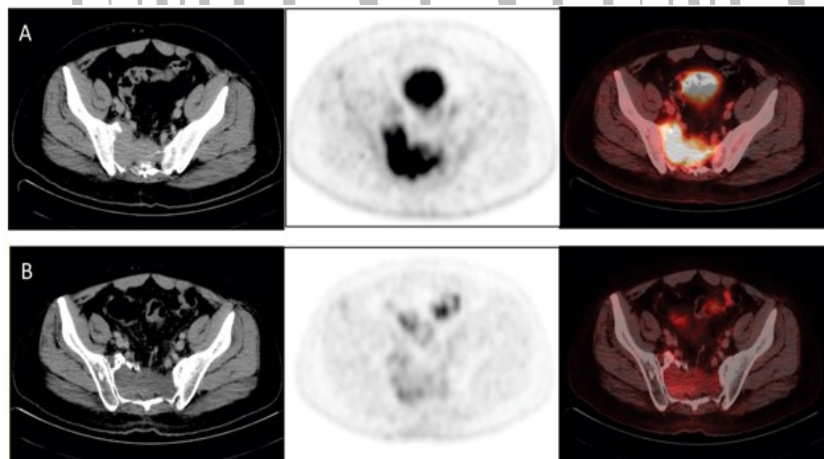
T2 weighted sagittal MRI scans of lumbar spine. Arrow indicates the sacral defect anterior to which is a larger meningocele. Incidental degeneration L5/S1 disc.

### 1.4.3 CT ( )

The CT view of the sacrum (left) shows its major structures. The sacral promontory labeled (A), and the concave curvature of the sacrum (B).



### 1.4.4 FDG PET CT ( )



FDG PET CT scan images with multiple myeloma

(A) : Baseline scan shows expansile lytic lesion in right sacral al(max SUV 7.2)

(B) Post cycle 4 LCD redomnstrates sacral lesion with inteval reduction in uptake [max SUV 2.4=Liver]

### 1.5. References

S. No	URL
1	<a href="http://www.spine-health.com/conditions/spine-anatomy/sacrum-sacral-region">http://www.spine-health.com/conditions/spine-anatomy/sacrum-sacral-region</a>
2	<a href="http://boneandspine.com/sacrum-bone-anatomy/">http://boneandspine.com/sacrum-bone-anatomy/</a>
3	<a href="http://www.spine-health.com/glossary/sacrum">http://www.spine-health.com/glossary/sacrum</a>
4	<a href="http://www.innerbody.com/image_skel05/skel14_spine.html">http://www.innerbody.com/image_skel05/skel14_spine.html</a>
5	<a href="http://www.mayfieldclinic.com/pe-anat spine.htm">http://www.mayfieldclinic.com/pe-anat spine.htm</a>
6	<a href="https://www.ceessentials.net/article47.html">https://www.ceessentials.net/article47.html</a>
7	<a href="http://journals.sfu.ca/jcas/index.php/jcas/article/viewFile/19/Imaging%20Techniques%20Used%20In%20Multiple%20Myeloma/179">http://journals.sfu.ca/jcas/index.php/jcas/article/viewFile/19/Imaging%20Techniques%20Used%20In%20Multiple%20Myeloma/179</a>

### 1.6. Glossary

S.no	Term	Description
1	pelvis	the large bony frame near the base of the spine to which the hindlimbs or legs are attached in humans and many other vertebrates.
2	cauda equina	The cauda equina is a bundle of spinal nerves and spinal nerve roots, consisting of the second through fifth lumbar nerve pairs, the first through fifth sacral nerve pairs, and the coccygeal nerve, all of which arise from the lumbar enlargement and the conus medullaris of the spinal cord.
3	sagittal	relating to or denoting the suture on top of the skull which runs between the parietal bones in a front to back direction
4	sacrum	a triangular bone in the lower back formed from fused vertebrae and situated between the two hip bones of the pelvis.