



## Radiographic Evaluation of Lumbo Sacral Spine in Chronic Low Back a patients

Authors

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### Abstract

**Introduction:** Low back ache is the most common musculoskeletal complaints among the population now a day's thus making it a need for early diagnosis & detecting the underlying pathologies like intervening disc changes, lumbar spondyloarthritis, marginal osteophytes, spondylolisthesis, neural foraminal narrowing, TB spine, old wedge compression fractures etc.

**Materials & Methods:** Present study was conducted on 50 cases in the age between twenty to eighty years for a period of one year (Oct 2018 to Sep 2019) in the Department of Radio-diagnosis, Konaseema Institute Of Medical Sciences & Research Foundation (KIMS & RF), Amalapuram. Referred patients from Department of Orthopaedics & Neurosurgery and evaluated through detailed history, necessary clinical examination & Radiographs are carried out using X ray machine 650mA, SIEMENS MARS -50

**Results:** In our study, we diagnosed 80% of degenerative spine cases, 14% of disc herniation & 6% of TB spine cases.

**Conclusion:** Radiograph of the spine permits analysis of the individual vertebrae & also the overall contour of the spinal column thus we conclude radiograph as a primary diagnostic tool in diagnosing chronic low backache cases before consideration of an MRI or a CT scan.

**Keywords:** Spondyloarthritis, neural foraminal narrowing, disc degeneration.

### Introduction

Low backache is a common musculoskeletal complaint that can originate from many spinal structures including ligaments, the vertebral periosteum, facet joints, the paravertebral musculature and fascia, blood vessels, the annulus fibrosus and spinal nerve root<sup>[1]</sup>. The pain can be severe to cause debilitation. Heavy weights lifting, long time travelling on motor cycles, osteoporotic spine, old wedge compression fractures are the usual causes for loss of disc height, irregularity and sclerosis of the endplates, and herniation of nuclear disc material into the margins of the

endplates (Schmorl's node), spondyloarthritis, osteophytes<sup>[4]</sup> disc degeneration leading to degenerative spine. Other causes of low back pain are tumor of the spine, HLA-B27 associated arthritis including ankylosing spondylitis, reactive arthritis, psoriatic arthritis & inflammatory bowel disease, bone metastasis from lung, breast, prostate, thyroid etc, TB & other infections, osteomyelitis, abscess, medical conditions like renal calculi & among females conditions like endometriosis, ovarian cysts, ovarian cancer, or uterine fibroids.

Our present study was aimed to assess the feasibility of using radiographs which are relatively easily accessible and economical to evaluate chronic low backache cases.

### Materials and Methods

All patients referred to Department of Radiodiagnosis, Konaseema Institute Of Medical Sciences & Research Foundation (KIMS & RF) with chronic low backache were taken up for the study between Oct 2018 to Sep 2019 with thorough clinical history and examination before taking lumbo-sacral spine radiographs.

### Inclusion Criteria

- Patients suffering from chronic low backache between 20 to 80yrs of age.
- Clinically examined patients with only suspected musculoskeletal aetiology were included.

### Exclusion Criteria

- Patients diagnosed previously with non musculoskeletal etiology like bone metastasis, renal calculi, endometriosis, ovarian cysts, ovarian cancer, uterine fibroids, ankylosing spondylitis, reactive arthritis, psoriatic arthritis.
- Acute fractures of vertebrae.

### Technique

#### Patient position

The patient is supine or erect, depending on clinical history:

Imaging of patients with suspected spinal injury should be done in the supine position without moving the patient

In erect position, the patient in the PA position, arms to be placed by the side of patient.

### Technical factors

Antero-posterior projection

Suspended expiration (for a uniform density)

Centring point should be the level of the iliac crests at the mid sagittal plane and the central ray should be perpendicular to image receptor.

Collimation superiorly to include the T12/L1 junction inferior to include the sacral region,

lateral to include the transverse processes & sacroiliac joints

**Exposure:** 70-80 kVp, 40-60 mAs.

### Image technical evaluation:

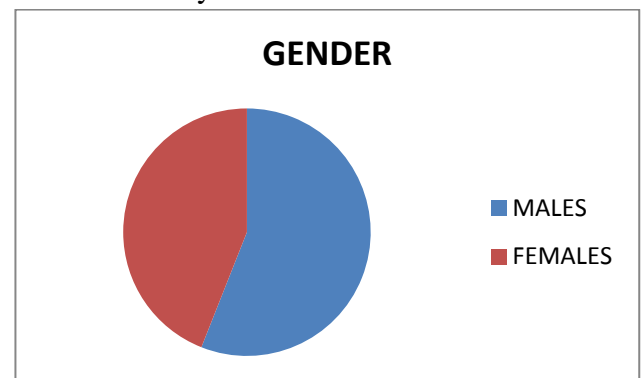
No patient rotation as evident by central spinous processes and the symmetrical appearance of the sacroiliac joints and iliac wings.

Intervertebral joints are visualized

Adequate image penetration and image contrast is evident by clear visualization of lumbar vertebral bodies, pedicles and facet joints, with both trabecular and cortical bone demonstrated

### Results

The lumbo-sacral radiographic examinations of 50 patients with LBP were reviewed 28(56%) were males and 22(44%) females giving a M:F ratio of 3:2. The frequencies of alignment patterns are shown in [Figure 1]. Decreased lumbar lordosis was the most common observed pattern. Scoliosis was noted in 6(12%) and right concavity occurred more commonly.



The frequency of patients with disc degeneration was 19(38%) while the occurrence of disc degeneration components were end plate sclerosis and irregularity, 9(18%) and reduced disc height 10(20%), schmorl's nodes 3(6%) [Table 1] shows the distribution of disc degeneration components among the lumbar vertebral spaces.

FEATURES	No. of Cases	Percentage
End plate sclerosis and irregularity	9	18%
Reduced disc height	10	20%
Schmorl's nodes	3	6%

Osteophytosis is the most common degenerative change of patients with chronic low backache<sup>[3]</sup>.

In our study it was demonstrable in about 27 (54%) cases. The anterior margin of L4 is the commonest site of osteophytosis. 16(60%) of these patients were above 50 years of age and only 1(3.7%) patient below 30 years of age. [Table 2] shows the osteophytes among the different age groups.

Age (in years)	NO. of patients with Osteophytes	Percentage
20-30	1	2%
30-40	1	2%
40-50	3	6%
50-60	6	12%
60-70	7	14%
70-80	9	18%

Spondylolisthesis was demonstrable in 4(8%) of the cases, most of which were anteriorly located and at L4/L5 and L5/S1 disc spaces [Table 3]. Grade I spondylolisthesis was observed the most constituting 3 cases (75%) while grade II was seen in 1 cases (25%). No case of grade III or IV spondylolisthesis was seen.

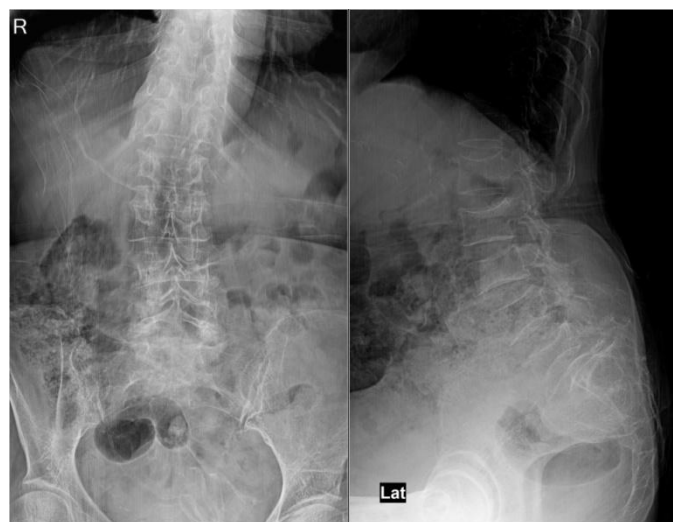
GRADE	NO. OF CASES	PERCENTAGE
I	3	75%
II	1	25%
III	-	-
IV	-	-

**Case 1**



Radiograph L.S spine (AP & Lat view) of 63 yr old female patient showing reduced disc height and end plate sclerosis & irregularities.

**Case 2**



Radiograph L.S spine (AP & Lat view) of 75 yr old male patient showing grade II anterior spondylolisthesis at L5-S1 level

**Case 3**



Radiograph L.S spine (AP & Lat view) of 62 yr old male patient showing multi level marginal osteophytes.

**Discussion**

Most of the cases of low backache are age-related degenerative processes in the spine. Reduction of the lumbar lordosis, reduced intervertebral space, facet joint hypertrophy, spondylolisthesis is the most frequently observed mal-alignment. Disc degeneration occurs due to multiple factors like apoptosis, collagen abnormality, aging, vascular supply anomaly, mechanical stress, inflammation, abnormal proteoglycan & possible hereditary factors<sup>[6]</sup>. Occurrence of disc degeneration components were end plate sclerosis

and irregularity among 9(18%) and reduced disc height<sup>[7]</sup> 10(20%), schmorl's nodes 3(6%)

Radiographic features of disc degeneration like osteophytosis and lateral osteophytes can be evaluated through radiographs that impinge on the neural foramina or cause spinal stenosis leading to radicular pain and neurologic deficit in some cases<sup>[8]</sup>. The most common site for osteophytes study is the anterior margins of L3 and L4 vertebrae. This observation was similar to other studies<sup>[1],[2]</sup> Heavy physical activity is known to result in increased incidence of osteophyte formation<sup>[1]</sup>.

O'Neill et al.<sup>[3]</sup> reported that in men with LBP, osteophytosis affecting the lumbar spine are noted and patients with more severe osteophytes were found more likely to report low back ache. Therefore we opined that osteophytosis and LBP share some relationship.

Spondylolisthesis was demonstrable in 8% of our cases, anterior shift of the superior vertebra over the inferior one occurs more commonly. The etiologies are categorized as type I - congenital (dysplastic), type II - isthmic, type III - degenerative, type IV - traumatic, type V - pathologic and iatrogenic<sup>[2]</sup>. The commonest type in below 50 years age group is isthmic while commonest above 50 years is degenerative type and has a predilection for females. In our study we observed that most (80%) of the spondylolisthesis at the L4/L5 and L5/S1 disc spaces. Degenerative disease of the facets and the posterior elements are also known causes of chronic mechanical pain and sciatica<sup>[5]</sup>

### Conclusion

Low back pain cases can be initially evaluated through radiographic features like disc herniation, end plate sclerosis & irregularities, spondylolisthesis, disc space narrowing, TB spine & osteophytosis. Thus we conclude radiograph as a primary diagnostic tool in diagnosing chronic low backache cases before consideration of an MRI or a CT scan.

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