

Spine Metrics

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Analysis: Motion Lateral Lumbar
Report: Impairment AMA Guides 5th Edition
Date: 04-21-15

Patient: [REDACTED], Taiho
Position: Standing
X-Rayed: 04-09-15

SPINAL BIOMECHANICAL ENGINEERING STUDY X-Ray Study for Alteration of Motion Segment Integrity (AOMSI)

Utilizing evidenced-based objective findings that have been deemed as "Established" by the World Health Organization and can be found in the US National Guideline Clearinghouse, the patient's x-rays were analyzed for AOMSI based on abnormal angular segmental motion and abnormal translation. The method of analysis is Computerized Radiographic Mensuration Analysis (CRMA) and the report follows the standards of the AMA Guides to the evaluation of Permanent Impairment, 5th Edition (pages 381-388).

Angular Segmental Motion

The range of motion for each motion segment is calculated by taking the difference between the flexion and extension angles for each segmental level. The range of motion for each level is then compared to the range of motion of the adjacent segments both inferior and superior. The AMA Guides 5th edition identifies AOMSI as a difference in angular motion of two adjacent motion segments greater than 15 degrees at L1-L2, L2-L3, and L3-L4 and greater than 20 degrees at L4-L5. Loss of integrity of the lumbosacral joint is defined as angular motion between L5 and S1 that is greater than 25 degrees. The difference in adjacent level ranges of motion are illustrated with horizontal bar graphs (solid bars) and compared to the threshold values of 15 and 20 degrees (hatched bar graphs). When the threshold values for ligament instability are exceeded, it is identified with a double asterisk at the motion segment level in the data table.

Translation

Translation is measured by evaluating the anterior / posterior movement of the superior vertebra on its neighboring inferior vertebra during the extension to flexion motion. Patient translation is illustrated with solid bar graphs. Normal ranges of translation are illustrated with hatched bar graphs. The AMA Guides 5th Edition identifies AOMSI when the translation is greater than 4.5 mm. When the threshold is exceeded, it is identified with a double asterisk at the motion segment level in the data table.

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REVIEW COMMENTS

Impressions

Angular Motion: Lumbar motion study (L1-L5) indicates the patient is within normal rotational limits.

Translational Motion: Lumbar motion study (L1-L5) indicates a loss of Translational Motion Segment Integrity at intersegments L2/L3, L3/L4. This was identified by an excess of 4.5 millimeters translation of one vertebra on another. Loss of translational motion segment integrity is suggestive and consistent with ligament laxity and instability.

Diagnosis

728.4 Laxity of ligament
847.2 Lumbar strain / sprain grade 2/3

Impairment Rating

Following the measurement protocols of the AMA Guides to the Evaluation of Permanent Impairment 5th Edition, the patient qualifies for a 25 per cent whole body impairment based on the DRE Category IV; Alteration of Motion Segment Integrity.

Alteration of Motion Segment Integrity is defined from flexion and extension radiographs as equal to or greater than 15 degrees difference in intersegmental angular motion L1-L3, 20 degrees difference in intersegmental angular motion L4-L5, and/or greater than 25 degrees range of motion at L5/S1. Alteration of Motion Segment Integrity is further defined when translation of one vertebra on another exceeds 4.5 millimeters L1-S1.

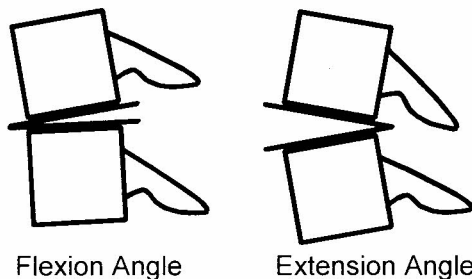
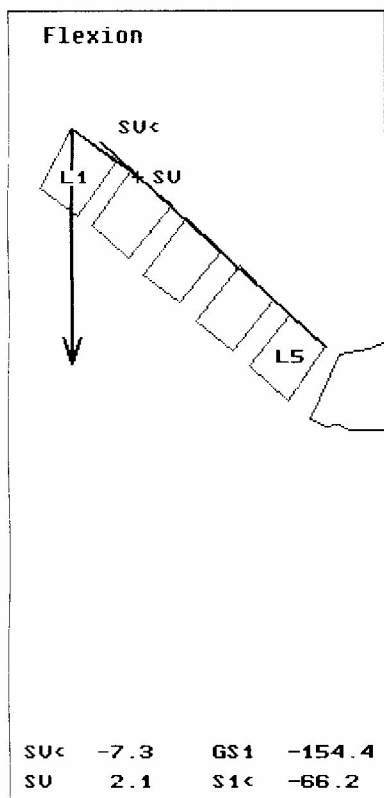
Records reviewed and report completed by _____

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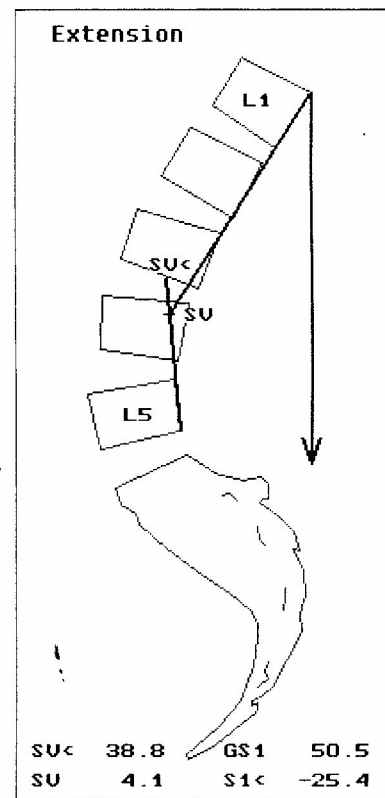
ANGULAR ANALYSIS



Flexion Angle Extension Angle

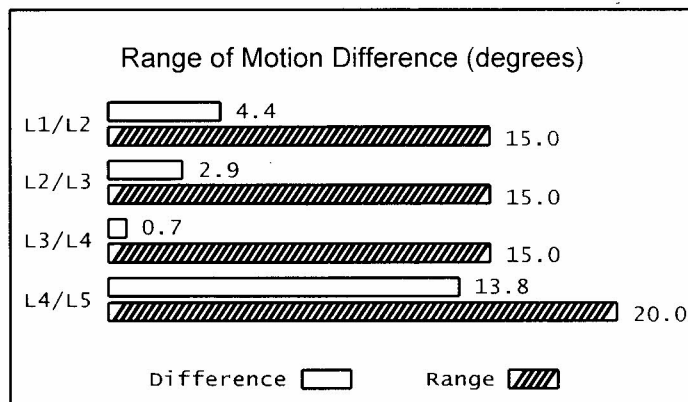
Flexion view is the referenced START position.

1. Flexion and extension angles are calculated for each motion segment level. (1)
2. The difference of flexion and extension angles is calculated to determine segmental range of motion.
3. The difference of range of motion between adjacent motion segment levels is calculated.
4. Paradoxical values (ROM < 0) are identified with a single asterisk in the data table.
5. Intersegmental levels that exceed the angular difference impairment threshold are identified with a double asterisk in the data table.
6. Range of motion (ROM) of L5 is marked with a double asterisk in the data table if its value exceeds the impairment threshold of 25 degrees.



	Flex -Ang	Extn Ang	ROM	Inter Segm	ROM Diff	Max Range
L1	0.4	8.2	7.8			
L2	0.8	13.0	12.2	L1/L2	4.4	15
L3	0.6	15.7	15.1	L2/L3	2.9	15
L4	1.9	17.7	15.8	L3/L4	0.7	15
L5	10.1	12.1	2.0	L4/L5	13.8	20

* Abnormal paradoxical motion
 ** Impairment threshold exceeded

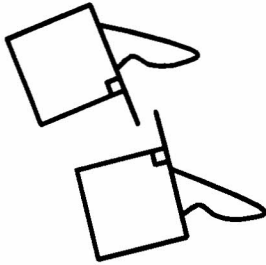


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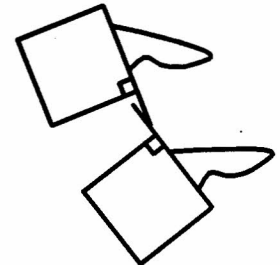
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TRANSLATION ANALYSIS



Flexion

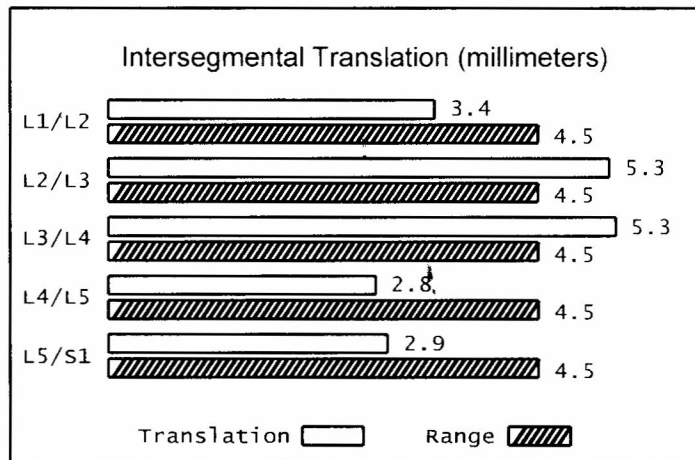
1. Lower vertebra in extension is the referenced START position.
2. Positive number indicates anterior translation.
3. Negative numbers indicate posterior translation. (2)
4. Paradoxical values (posterior translation) are identified with a single asterisk in the data table.
5. Intersegmental levels with differences equal to or greater than 4.5 mm are identified with a double asterisk.



Extension

Inter Segment	Translation	Max Range
L1/L2	3.4	4.5
L2/L3	5.3	** 4.5
L3/L4	5.3	** 4.5
L4/L5	2.8	4.5
L5/S1	2.9	4.5

* Abnormal paradoxical translation
 ** Impairment threshold exceeded



<< Negative = Posterior Positive = Anterior >>

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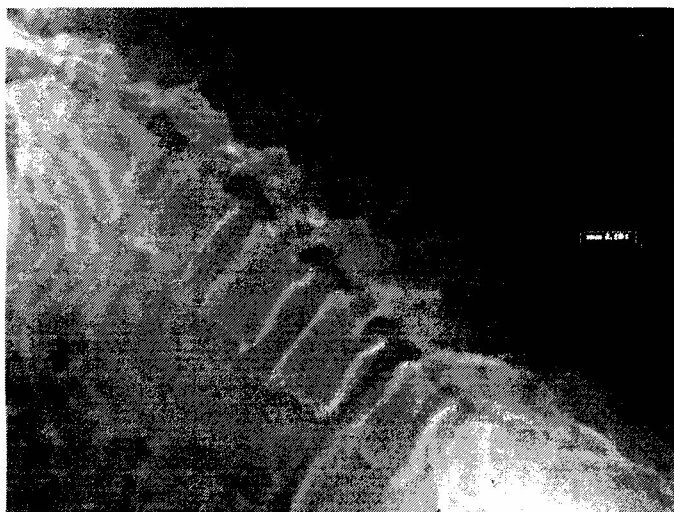
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LATERAL RADIOGRAPH DIGITIZING POINTS

The points and their relative (x,y) coordinates were identified on the radiographs shown below. From this data flexion, extension and translation values were calculated to determine Alteration of Motion Segment Integrity (AOMSI).

Flexion View



Extension View

