## Lumbar spine diagnosis – L1 – L5 vertebrae

### Possible diagnoses

<table>
<thead>
<tr>
<th>Type</th>
<th>Rotation findings</th>
<th>Sidebending findings</th>
<th>Findings with flexion and extension</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type I dysfunction (3 or more vertebrae, group curve)</strong></td>
<td></td>
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</tr>
<tr>
<td>NRSL</td>
<td>Right TPs are more posterior</td>
<td>Sidebent left</td>
<td>Rotation and sidebending findings are unchanged with flexion and extension</td>
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<tr>
<td>NRSR</td>
<td>Left TPs are more posterior</td>
<td>Sidebent right</td>
<td>Rotation and sidebending findings are unchanged with flexion and extension</td>
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<tr>
<td><strong>Type II dysfunction (1 or 2 vertebrae)</strong></td>
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<td>FRSR</td>
<td>Right TP is more posterior</td>
<td>Sidebent right</td>
<td>Rotation and sidebending findings are more equal with flexion (child’s pose or rolling fingers over top of TPs)</td>
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<td>ERSR</td>
<td>Right TP is more posterior</td>
<td>Sidebent right</td>
<td>Rotation and sidebending findings are more equal with extension (patient up on forearms or rolling fingers under TPs)</td>
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<td>Sidebent left</td>
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</tr>
</tbody>
</table>
Figure 3 - Child's pose to induce flexion

Figure 4 - Patient up on forearms to induce extension

Figure 5 - Flexion by rolling thumbs up over TPs and pressing up

Figure 6 - Extension by rolling thumbs down over TPs and pressing down

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**Brief description:** The lumbar spine may either have a Type I dysfunction (group curve, three or more vertebrae involved) or a Type II dysfunction (two or fewer vertebrae involved). When diagnosing, use gross motion testing as well as segmental to make a diagnosis.

**Look (observation):** Look in the lumbar region for any scars, differences in waist creases (can indicate sidebending), asymmetry or scoliotic curves.

**Feel (palpation):**

**Physician position:** Stand or sit to either side of the patient

**Patient position:** Prone or seated

**Hand positioning:** Use the pads of your thumbs to palpate the spinous processes (SPs) and transverse processes (TPs).

**Technique:**

1. With the patient either prone or seated, run your index finger over the SPs from L1 – L5. Feel for any curve in the spine that may indicate sidebending.
2. Now use your index and middle fingers and run your hand down the TPs from L1 – L5. Feel for any posterior TPs that may indicate rotation.
3. To test for individual vertebra start by finding L1. In order to find L1, palpate the 12\textsuperscript{th} rib and follow it back to T12, then drop down to L1. You may also start from L5 by finding the iliac crests, come to the middle of the back (you will be between L4 and L5 SPs) and then drop down to L5 SP.
4. After confirming you are on the L1 SP, move your fingers laterally from the SP to palpate the TPs.
5. To determine the dysfunction, feel for which TP is posterior (this is the direction of rotation). If it is a group curve the rotation will be opposite to the direction of sidebending, if it is a Type II dysfunction then the direction of rotation and sidebending will be the same.

6. Testing for flexion and extension may be done multiple ways. With the patient prone, you can check flexion by having the patient go into child’s pose and check extension by having the patient come up on to their forearms (as if watching tv). Finally, the more advanced method can be used in the prone position. Simply roll your thumbs over the top of the TPs and press upward to induce flexion; you’re your thumbs under the TPs and press down to induce extension.

7. To name Type I dysfunctions, the TPs for 3 or more vertebrae will be rotated in the same direction and upon flexion/extension there will be no improvement. (Ex. L1-L5 TPs are all posterior on the right and do not improve with flexion/extension. Sidebending is opposite of rotation with Type I dysfunctions so the diagnosis is L1-L5 Neutral R\textsubscript{SR}.)

8. To name Type II dysfunctions, the TP will be posterior on one side (direction of rotation). Rotation will be in the same direction as sidebending. The TPs will feel more even in either flexion or extension. (Ex. L4 TP feels more posterior on the left and the TPs feel more even in flexion. The diagnosis will be L4 F\textsubscript{SR}.)

**Move (motion testing):**

**Active motion testing:**

1. Ask the patient to extend backwards as far as possible. Observe how far the patient can move as well as fluidity of motion.
2. Ask the patient to bend forward (flexion) as far as possible. Observe how far the patient can move as well as fluidity of motion.
3. Ask the patient to bend towards the right and left (sidebending) as far as possible. Observe how far the patient can move as well as fluidity of motion.
4. Ask the patient to turn towards the right and left (rotation) as far as possible. Use the shoulders as a reference. Observe how far the patient can move as well as fluidity of motion.

**Passive motion testing:**

1. With the patient seated, induce all motions (flexion, extension, rotation and sidebending). Look for any asymmetry.