



## Lumbar Spinal Joint Dysfunction Syndrome (JDS)

Lumbar segmental joint dysfunction syndrome (JDS), also known as a subluxation syndrome, is a clinical diagnosis for a spinal joint complex disorder presenting with pain and/or altered function. JDS is an aggregate of signs and symptoms which typically includes local axial spine pain reproduced or accentuated by static and/or dynamic palpation. This disorder may be associated with referred pain into the proximal lower extremity. The JDS diagnosis usually denotes to manual therapists that the condition may be amenable to manipulation or mobilization.

Joint dysfunction syndrome (JDS) is a functional diagnosis, not a structural diagnosis, though it may be a complication of or compensation for a coexisting structural disorder. It implies that one or more of the spinal motion segments and their associated soft tissues are a source of the patient's symptoms. Unlike traditional structural diagnoses like disc derangement, sprain/strain, and spinal stenosis, the diagnosis of JDS does not attempt to identify specific tissue pain generators within the spinal motion segment.

*Note: In the UWS clinic system, joint dysfunction syndrome or subluxation syndrome designations are generally secondary to a primary pathoanatomical diagnosis such as lumbar sprain, disc derangement, etc.\**

### EXAMINATION

There is no gold standard for ruling in or ruling out JDS and there are no commonly agreed upon confirmation tests. JDS is a clinical diagnosis based on typical history and examination findings and response to manipulative therapy.

### HISTORY

Patients with JDS commonly complain of pain located in the midline to paraspinal region with or without pain referral into the lower extremity. Although spinal JDS is typically symptomatic, the diagnosis of JDS is not dependent on the patient having spinal pain. When lumbar JDS is associated with referred lower limb, it does not usually extend below the knee, although it can radiate as far as the foot. The location, quality and referral patterns of the patient's pain complaints are not unique to this diagnosis. These symptoms overlap with a number of other axial spine conditions and do not differentiate JDS from other mechanical spine disorders. The primary role of the patient history is in identifying possible red flags and differentiating nonspecific mechanical back pain from non-musculoskeletal or non-mechanical NMS disorders. The history is also helpful in implicating neurological involvement and identifying mechanisms of possible injury and pertinent load sensitivities.

\* In Medicare cases, subluxation must be the primary diagnosis. In Oregon the ICD code is 739. Note: the specific code may change depending on where one practices and the regional Medicare Carrier.

## PHYSICAL EXAM

The exam should focus on establishing the spinal motion segments as the likely source of the patient's pain or impairment. The exam findings supportive of this diagnosis can be divided into primary and secondary categories and are listed below.

It is recommended that the physical assessment of JDS focus on reproducing the patient's joint pain with palpation and joint provocation/challenge procedures. Although a number of manual exam findings have historically purported to confirm this disorder, bony and paraspinal soft tissue tenderness and/or pain reproduced with joint play (JP) or endplay (EP) are the most reliable and potentially valid diagnostic tools. (*Schneider 2008, Peterson & Bergman 2010*)

There is debate as to whether altered segmental motion alone without tenderness should be considered a manipulable disorder. There is no clear answer to this question; but for the purposes of making a *pain generating* diagnosis, it should be considered insufficient.

It is recommended that two or more of the following exam findings below be present. When diagnosing JDS in asymptomatic regions where spontaneous pain is not an issue, findings should be more pronounced.

### Primary Findings

- **Palpatory segmental bony or soft tissue tenderness/dysesthesia**
- **Painful and/or altered segmental mobility testing**  
Joint motion is traditionally assessed in its open packed position and is referred to as joint play (JP), through its segmental range of motion (SROM) and at the end range of motion called end feel or end play (EP). All three components of joint motion are evaluated for quantity, quality and pain response. When performing JP and EP the focus is commonly on pain response and quality of perceived resistance.
- **Palpable alterations in paraspinal tissue texture and or tone**  
Tissue texture changes are represented by a loss of paraspinal tissue symmetry at the segmental level or between adjacent segments. These changes are characterized by palpable alterations in muscle resting tone (hypo or hypertonicity/spasm) and textural changes characterized by a palpable sense of tissue induration/fibrosis often described as a hardening or thickening of tissue. *Note: the presence of a myofascial trigger point (MFTP) should be interpreted as a separate diagnosis.*

### Secondary Findings

- **Palpable malposition** (e.g., spinous deviation)  
Note: Because of individual variation and anatomical asymmetry (Ross 1999, Singh 1965, Tulsi 1978), many manual therapists do not consider this an indicator of joint dysfunction.
- **Repetitive loading** (e.g., mobilization) in the direction of EP restriction may improve symptoms.
- **Alterations in sectional or global range of motion**  
Decreased and painful global active range of motion and various positive pain provoking orthopedic tests are not primary features of a joint dysfunction diagnosis because of their commonality with multiple musculoskeletal disorders. Note: AROM may be normal with JDS because of the spine's ability to compensate globally for restricted motion at a segmental level.
- **Observational alteration in paraspinal tissue symmetry.**

**A note on Medicare:** To document the presence of a subluxation using Medicare's PART mnemonic, at least two examination findings must be present. One of these findings *must* be either asymmetry/misalignment or range of motion abnormality (the ROM abnormality can be regional or segmental). A second supportive examination finding would include pain/tenderness or associated tissue characteristics. See footnote for complete description.\* (Medicare 2009)

### Pertinent negatives

Signs of nerve root involvement should signal a search for additional pathoanatomical diagnoses (e.g., disc herniation, osteophytic compression, stenosis)—especially when serious nerve root compression signs are present. On the other hand, local pain and/or deep referred pain (or related symptoms) can be consistent with a joint dysfunction diagnosis.

### Therapeutic trial

A trial of joint manipulative therapy (mobilization, adjustments) is commonly applied to patients diagnosed with JDS. A positive response to treatment does not necessarily confirm the working diagnosis of JDS but does support the soundness of the therapeutic approach. Symptoms from an uncomplicated joint dysfunction syndrome may resolve rapidly with manual therapy. On the other hand, more chronic cases of joint dysfunction or cases with concomitant structural damage (e.g., sprain-strain, disc derangement) may require a longer course of treatment and time for the tissue damage to repair. It is the policy at UWS to combine these types of diagnoses whenever appropriate.

## TEST RELIABILITY and RESPONSIVENESS

### Palpation for tenderness/pain

A 2006 literature review (Stochkendahl 2006) reported that palpation for pain is reproducible at a clinically acceptable level, both within the same observer and among observers. Osseous pain had an inter-examiner reliability of 0.53 (95% CI 0.32-0.74) and intra-examiner reliability of 0.91.\*\*

### Palpation for multiple factors

When practitioners were allowed to combine various findings (i.e., segmental static and motion tenderness, palpatory altered joint motion, and/or palpable tissue changes), this combined “global assessment” appeared to be reproducible within the same observer (0.44), but there was not enough evidence to calculate pooled results for inter-examiner reliability. The level of evidence to support the above conclusions was considered to be strong.

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\* Medicare uses a PART mnemonic and stipulates the minimal physical examination findings required: “Pain/tenderness evaluated in terms of location, quality, and intensity; Asymmetry/misalignment identified on a sectional or segmental level; Range of motion abnormality (changes in active, passive, and accessory joint movements resulting in an increase or a decrease of sectional or segmental mobility); and Tissue, tone changes in the characteristics of contiguous, or associated soft tissues, including skin, fascia, muscle, and ligament. (Medicare 2009)

\*\* A threshold K value of approximate 0.40 (i.e., 40% better than agreement by chance) is generally been set for acceptable reliability in physical medicine although this number is arbitrary. (Haneline 2008, Stochkendahl 2006)

## Palpation for altered motion or tissue resistance

The quality of evidence for the following observations was also considered to be strong: inter-examiner reliability of motion palpation for detecting altered motion was poor, 0.17 (95% CI 0.10-0.24) with intra-examiner reliability better at 0.35 (0.13-0.58) but still low. However, when standing motion palpation of the SI joints (Gillette's test) was excluded, intra-examiner reliability increased to 0.44 (0.14-0.73), making this an acceptable level of agreement within one observer.

A 2008 literature review reported that motion palpation for altered resistance in general had K values below 0.4. Only 3/24 studies of end feel and 1/15 studies on spinal segmental range of motion (excursion) registered acceptable K values. Although end feel overall rated better than excursion, the difference was not statistically significant. When limiting to higher quality studies, there appeared to be no advantage for end feel vs. the degree of excursion. One confounding issue is that most studies (whether for end play or excursion) limited agreement to the same level of the spine. The inter-examiner reliability of motion palpation assessment for blocks of vertebra within 2-3 segments has not been adequately explored and may be a more practical question when considering clinical application.

A 2008 study (Schneider 2008) of a pool of 39 patients with low back pain (not contained in the review above) found palpation for prone lumbar segmental joint P-A restriction to be poor (-.20 to .17) and, in some cases, worse than chance. Segmental pain provocation ranged from fair to good (.21-.73). The authors suggest that in their study and in prior systematic reviews the poor reliability of mobility testing may be due to the lack of adjusting for high or low prevalence (e.g., very low prevalence will skew the Kappa results toward zero) although Stochkendahl, et al., thought that overall mix of the subject pool was more important. While assessment of segmental motion scored poorly in terms of reliability, in some studies it still succeeded in achieving acceptable predictor scores (likelihood ratios) for response to various types of therapies (e.g., manual therapy vs. exercise). (Flynn 2002, Fritz 2003) One question that remains is how low can a kappa value be and still be associated with a high likelihood ratio (or other measure of whether a test is a valid predictor of treatment response). (Wainner 2003)

The discussion on reliability above is based on spinal motion palpation. For an evidence table limited to motion palpation studies for the low back, see Appendix.

## Responsiveness of motion palpation

Test responsiveness of motion palpation has not been studied in the lumbar region. In one study on the thoracic spine, monitoring changes in end feel was not an effective way of assessing change after manipulation (Haas 1995). However, cervical motion palpation for end feel improvement appeared to be a responsive post-manipulation assessment tool for determining whether perceived motion restrictions found before treatment improved after manipulation. Results showed that the sensitivity was excellent (93%) and the specificity was adequate (67%). This reported degree of responsiveness was detected in symptomatic participants but not in asymptomatic participants. (Lakhani 2010)

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## APPENDIX: Reliability of Motion Palpation for Motion Restrictions

The following table is taken from Michael Haneline, DC, MPH, Robert Cooperstein, MA, DC, Morgan Young, DC, Kristopher Birkeland, BA. An annotated bibliography of spinal motion palpation reliability studies. Journal of the Canadian Chiropractic Association 2009; 53(1). It is limited to studies relative to the low back. It does not include motion palpation studies that focused only on the SI joint. The quality scores were assigned by the above authors.

Author	Region	Examiners, Experience	Subjects	Quality Score	Findings	Degree of Reliability
Bergström & Courtis	L1-L5	2 DC, Pre-trained	100 Asx	67%	% = 65 to 88	Inconclusive
Bergström & Courtis	L1-L5	2 DC, Pre-trained	100 Asx	50%	% = 91 to 100	Inconclusive
Binkley, et al.	L1-S1	6 PT, at least 6 yrs	18 Sx	50%	K = 0.09 ICC = 0.25 (CI, 0-0.39)	Slight
Degenhardt, et al.	L1-L4	3 DO, <10 yrs	15 Asx	50%	K = 0.20 % = 66	Slight
Downey, et al.	Lumbar	6 PT, 7 to 15 yrs	30 Sx	33%	K = 0.23 to 0.54	Fair to moderate
Gonella, et al.	T12-S1	5 PT, ≥3 yrs	5 Asx	17%	Visual inspection of raw data	Inconclusive
Gonella, et al.	T12-S1	5PT, ≥3 yrs	5 Asx	0%	Visual inspection of raw data	Inconclusive
Hicks, et al.	L1-L5	3 PT, 1 DC/PT, 4 to 8 yrs	63 Sx	33%	$K_w = -0.02$ to $0.26$ % = 52 to 69	None to slight
Inscoc, et al.	T12-S1	2 PT, ≥4 yrs	6 Sx	17%	Scott's Pi = 18.4% % = 33.3 to 58.3	Not acceptable
Inscoc, et al.	T12-S1	2PT, ≥4 yrs	6 Sx	0%	Scott's Pi = 41.9% to 61.3% % = 66.7 to 75.00	Not acceptable
Jull & Bullock	T12-S1	2 PT, Exp	10 Asx	0%	$r = 0.82$ to $0.94$ % = 86	Inconclusive
Jull & Bullock	T12-S1	1 PT, Exp	20 Asx	0%	$r = 0.81$ to $0.98$ % = 87.5	Inconclusive
Keating, et al.	T12-S1	3DC, >2.5 yrs	46 (21 Sx, 25 Asx)	67%	K = -0.18 to 0.31	None to fair
Leboeuf	L1-S1	4 DC St	45 Sx	17%	% > 90	Inconclusive
Lindsay, et al.	L1-S1	2 PT, ≥6 yrs	18 (Sx & Asx)	100%	$K_w = -0.03$ to $0.6$ % = 14 to 100	None to moderate
Love & Brodeur	T1-L5	8 DC St	32 Asx	17%	$r = 0.01$ to $0.49$	Inconclusive
Love & Brodeur	T1-L5	8 DC St	32 Asx	0%	$r = 0.02$ to $0.65$	Inconclusive
Maher & Adams	L1-L5	6 PT, ≥5 yrs	90 Sx	67%	ICC = -0.4 to 0.73 % = 13 to 43	Poor to fair
Maher, et al.	L3	5 PT, ≥5 yrs	40 Asx	33%	ICC = 0.50 to 0.77 SEM = 0.72 to 1.58	Fair to good
Mootz, et al.	L1-S1	2 DC, ≥7	60 Asx	33%	K = -0.17 to 0.17	None to slight
Mootz, et al.	L1-S1	2 DC, ≥7	60 Asx	25%	K = -0.09 to 0.48	None to moderate
Phillips & Twomey	L1-L5	2 PT, N1	72 (63 Sx, 9 Asx)	67%	$K_w = -0.15$ to $0.32$ % = 55 to 99	None to fair
Rhudy, et al.	C1-L5	3 DC, Exp	17 Sx	50%	K values not presented	Inconclusive
Strender, et al.	L5-S1	2 MD, 2 PT, Exp	71 Sx	67%	K = -0.08 to 0.75 % = 48 to 88	None to substantial

## REFERENCES

- Bergstrom E, Courtis G. An inter-and intra-examiner reliability study of motion palpation of the lumbar spine in lateral flexion in the seated position. *Eur J Chiropractic* 1986;34:121-41.
- Binkly J, Stratford PW, Gill C. Interrater reliability of lumbar accessory motion mobility testing. *Phys Ther* 1995;75:786-92.
- Degenhardt BF, Snider KT, Snider EJ, Johnson JC. Interobserver reliability of osteopathic palpatory diagnostic tests of the lumbar spine: Improvements from consensus training. *J Am Osteopath Assoc* 2005;105:465-73.
- Downey B, Taylor N, Niere K. Can manipulative physiotherapists agree on which lumbar level to treat based on palpation? *Physiotherapy* 2003;89:74-81.
- Fritz JM, DeLitto A, Erhard RE. Comparison of classification-based physical therapy and therapy based on clinical practice guidelines for patients with acute low back pain: a randomized clinical trial. *Spine* 2003;28:1363-72.
- Gonella C, Paris SV, Kutner M. Reliability in evaluating passive intervertebral motion. *Phys Ther* 1982;62:436-44.
- Haas M, Panzer D, Peterson D, Raphael R. Short-term responsiveness of manual thoracic end-play assessment to spinal manipulation: a randomized controlled trial of construct validity. *J Manipulative Physiol Ther* 1995;18:582-8.
- Haneline MT, Cooperstein R, Young M, Birkeland K. Spinal motion palpation: a comparison of studies that assessed intersegmental end feel vs excursion. *Journal of Manipulative & Physiological Therapeutics* 2008;31(8):616-26.
- Hestbaek L, Leboeuf-Yde C. Are chiropractic tests for the lumbo-pelvic spine reliable and valid? A systematic critical literature review. *J Manipulative Physiol Ther* 2000;23:258-75.
- Hicks GE, Fritz JM, Delitto A, Mishock J. Inter-rater reliability of clinical examination measures for identification of lumbar segmental instability. *Arch Phys Med Rehabil* 2003;84:1858-64.
- Inscoc E, Witt P, Gross M, Mitchell R. Reliability in evaluating passive intervertebral motion of the lumbar spine. *J Manual & Manipulative Ther* 1995;3:135-43.
- Jull G, Bullock M. A motion profile of the lumbar spine in an aging population assessed by manual examination. *Physiotherapy Practice* 1987;3:70-81.
- Keating JC, Jr., Bergmann TF, Jacobs GE, Finer BA, Larson K. Interexaminer reliability of eight evaluative dimensions of lumbar segmental abnormality. *J Manipulative Physiol Ther* 1990;13:463-70.
- Lakhani E, Nook B, Haas M, Docrat A. Motion palpation used as a postmanipulation assessment tool for monitoring end-feel improvement: a randomized controlled trial of test responsiveness. *J Manipulative & Physiological Therapeutics* 2009;32(7):549-55.
- Leboeuf C. Chiropractic examination procedures: A reliability and consistency study. *J Aust Chiropr Assoc* 1989;19:101-4.

- Lindsay D, Meeuwisse W, Mooney M, Summersides J. Interrater reliability of manual therapy assessment techniques. *Phys Ther Can* 1995;47:173-80.
- Love RM, Brodeur RR. Inter- and intraexaminer reliability of motion palpation for the thoracolumbar spine. *J Manipulative Physiol Ther* 1987;10:1-4.
- Maher C, Adams R. Reliability of pain and stiffness assessments in clinical manual lumbar spine examination. *Phys Ther* 1994;74:801-9; discussion 809-11.
- Maher C, Latimer J, Adams R. An investigation of the reliability and validity of posteroanterior spinal stiffness judgments made using a reference-based protocol. *Phys Ther* 1998;78:829-37.
- Medicare Benefit Policy Manual Chapter 15 - Covered Medical and Other Health Services (Rev. 109, 08-07-09).
- Mootz RD, Keating JC, Jr., Kontz HP, Milus TB, Jacobs GE. Intra- and interobserver reliability of passive motion palpation of the lumbar spine. *J Manipulative Physiol Ther* 1989;12:440-5.
- Panzer DM. The reliability of lumbar motion palpation. *J Manipulative Physiol Ther* 1992 Oct;15(8):518-24.
- Phillips DR, Twomey LT. A comparison of manual diagnosis with a diagnosis established by a unilevel lumbar spinal block procedure. *Man Ther* 1996;1:82-7.
- Rhudy T, Sandefur M, Burk J. Interexaminer/intertechnique reliability in spinal subluxation assessment: a multifactorial approach. *Am J Chiropr Med* 1988;1:111-4.
- Ross JK, Bereznick DE, McGill SM. Atlas-axis facet asymmetry. Implications in manual palpation. *Spine* 1999;24(12):1203.
- Schneider M, Erhard R, Brach J, Tellin W, Imbarlina F, Delitto A. Spinal palpation for lumbar segmental mobility and pain provocation: an interexaminer reliability study. *J Manipulative Physiol Ther* 2008 Jul-Aug;31(6):465-73.
- Seffinger MA, Najm WI, Mishra SI, et al. Reliability of spinal palpation for diagnosis of back and neck pain. *Spine* 2004;29(19):E413-E424.
- Singh S. Variations of the superior articular facets of atlas vertebrae. *J Anat* 1965;99:565-71.
- Stochkendahl MJ, Christensen HW, Hartvigsen J, et al. Manual examination of the spine: a systematic critical literature review of reproducibility. *J Manipulative Physiol Ther* 2006 Jul-Aug;29(6):475-85.
- Strender LE, Sjoblom A, Sundell K, Ludwit R, Taube A. Interexaminer reliability in physical examination of patients with low back pain. *Spine* 1997;22:814-20.
- Tulsi RS. Some specific anatomical features of the atlas and axis: Dens, epitransverse process and articular facets. *Aust NZ J Surg* 1978;48:570-4.
- Wainner RS. Reliability of the clinical examination: how close is "close enough"? *Journal of Orthopedic & Sports Physical Therapy*. 2003(9): 488-491.