Diagnostic Corner

By Bruce Gundersen, D.C., F.A.C.O. & J. Chris Romney, D.C., F.A.C.O.

The Influence of old compression fractures T-12-L1 on the unstable posterior joint syndrome.

Introduction: The unstable low back represents perhaps the most difficult challenge to the mechanical back pain specialist. One of the most important considerations in attempting to solve the unstable low back is that of adequate compensation. The pelvic complex, SI joint function, thoracolumbar junction activity and even cervical spine mechanics may all contribute to the compensation support of the unstable lumbar joint problem. Any problems in the normal function of these areas then create a sometimes insurmountable obstacle in correction of the unstable low back. Pathophysiology of the unstable joint. This is a most complicated topic with opinions in many directions. The diversity of thought seems to be centered on the “which came first” problem rather than on the “how to treat” issue. There is no consensus on the how to treat issue and one is offered for consideration herein. The which came first issue appears to be centered on two schools of thought. 1) The episodic dysfunction leading to degeneration of all of the tissues involved in the three joint complex; the disc, the posterior joints, the ligaments and muscles, etc. and 2) the singular and severe traumatic disruption of the disc leaving less distance between the joints (end plates) and thus some laxity in the ligaments. Whatever the cause, and it certainly could be a combination of many factors, the indentification of the unstable joints as the pain generator is critical to provide satisfactory result to the already frustrated patient. There are many factors that predispose the back to eventual mechanical failure. Our goal here is to discuss one of
these as a factor. It should be obvious that each could be likewise discussed and probably should be as a series of follow-ups. These have been categorized as follows:

Low Risk:

1. 4-6 lumbar segments
2. Asymmetrical facet facing
3. Ununited epiphysis
4. Schmorles nodes
5. Increased lumbar lordosis
6. Spina Bifida one segment

Moderate Risk

1. Spina Bifida more than one segment
2. Schmorles nodes at L4-L5 segment
3. Degenerative joint disease of upper lumbar spine
4. Marked facet tropism L5-S1 with sclerosis

High Risk:

1. Spondylolisthesis and degree
2. Bilateral spondylolisthesis
3. Transition vertebrae with pseudoarthrosis
4. Degenerative joint disease of L4,L5,S1
5. Wedged vertebrae with epiphysis residuals
6. General Osteoarthritis
7. Hemangioma or tumor
8- Previous disc surgery
9- Osteoporosis
10- Hemi-Vertebra
11- Obesity over 30 lbs.

Consideration of the degenerative joint disease of the upper lumbar and thoracic spine shows how the failure of the typical compensatory support mechanisms creates an increased degree of dysfunction in the unstable areas. This is very common as the stress loads not dealt with in the unstable joints are and have been for probably quite some time transferred to the thoraco-lumbar junction. This transmits the stress of postural function onto this transitional area creating the need for increased muscle splinting and guarding. Perhaps this is the reason that the joints undergo advanced degeneration due to the increased stress. This concept also creates a definite need for mechanical attention to this area should any resolution or improvement of the unstable areas be anticipated. In fact, it is postulated that without the correction or at least improvement of the thoraco-lumbar junction biomechanics, it is doubtful if the unstable lumbar posterior joint syndrome can be improved on a long term basis.

**HISTORY**

The typical history expected when the diagnosis of unstable posterior joint syndrome is considered would include the repeated episodes of low back pain which begin at a level which seems benign but progresses to become increasingly more debilitating. Each episode will last longer than the previous and be more pronounced. There may be episodes of pain and
dysfunction that originate from other areas of the spine which are intermingled during the past history. These must be defined and ruled out as part of the unstable joint history. It is rare that a single episode would create the instability typical of this condition but it is not impossible.

EXAMINATION

The key to the examination findings is the detection of translation during movement. This may be in the lateral directions during bending movements to the sides and is very rarely detectible or significant in the forward/backward planes. Along with the expected findings of palpatory tenderness during the acute(inflammatory) phase and percussive recruitment, the astute clinician would expect to be able to detect some increased segmental motion during ROM studies and a decreased overall ROM in most directions due to compensatory splinting. Extension movements of the unstable joints will most always produce reactive muscle recruitment and pain. Orthopedic tests designed to identify other entities but with motions of extension may be misread by the novice. This is very common.

MANAGEMENT

The key is to detect and restore the normal function of the compensatory mechanism of the spine. Keeping the patient out of pain with the appropriate modalities will allow the patient to stay with you during the long and painful recovery. Immobilization should be directed to isometric exercises of the unstable areas only. This is most difficult and usually requires a monitored exercise environment. It is also important to manage the patient activities of daily living including work and recreation. Expect 2-3 months of management to produce remission and then plan on
permanent life style changes and home exercise to maintain remission.

CASE HISTORY

Here is a case history presented by Dr. Chris Romney demonstrating this breakdown.

Patient 45 years of age who works as a heavy equipment mechanic who has had multiple acute episodes of low back pain over the past nine (9) years. Most episodes of pain are a result of working in a flexed at the waist position, or lifting heavy parts away from torso.

Past History: In 1975 an auto transmission slipped off a jack while this patient attempted to secure the transmission. It took him down landing on his buttocks with the transmission on his orthopedic bracing and physiotherapeutics. He returned to work with minor difficulty.

Examination findings include: palatory tenderness of L4-L5 and posterior fixation of T12-L1, spinal percussion L1, L4, L5. Range of motion FLEX 70/90; EXT 25/30; RLB 22/30; LLB 25/30; RR 30/30; LR 25/30. Orthopedic tests positive bilateral leg-lowering, double leg raise, reverse flexion, Kemps without radiation, Schobers test less than 5 cm of lumbar.

X-Rays show healed compression fractures of T12 and L1 with degenerative changes especially T12, L1, L5 and early changes of the remaining lumbar vertebral segments. Disc height is lessened T12, L1, L2 and L5, S1. Facet imbrication noted at L5, S1 with McNabbs measurement.

Impression:

1- Old compression fracture T12, L1
2- Early degenerative change described

3- Facet imbrication

Treatment included: Spinal manipulation to the stable areas. Facet appears stable and responds with 50% reduction of pain within 3 office visits. Stretching and rehabilitation exercises have reduced episodes from what was 4-5 times per year to 2 episodes in the past two years. This unstable joint complex problem is now at a level tolerable to the patient. The key was to address the thoraco lumbar junction with the exercise routines. Although the unstable areas could not tolerate the weight lifting and rehabilitation routines that it obviously needed when we began the management, now it can. The next higher level of action, the thoracolumbar junction was the easiest area to treat and effect a change in the symptom pattern and frequency and duration of dysfunction.

**DISCUSSION**

The concept of compensation must be discussed and understood in order to recognize this case as a complicated presentation from the start. An adequate interrogation would have revealed these appearant unrelated injury sites. The astute clinican can then determine the site of compensatory failure and treat it first allowing the instability time to stabilize and then time to be rehabilitated directly. The restoration of the compensatory mechanism is paramount to the effective resolution although all aspects of treatment must be properly employed and complied.

**CONCLUSION**
Treatment of the unstable joints of the spine are perhaps the most difficult conditions of mechanical failure to treat. In order to be successful, one must accurately assess the most likely compensation site and address the dysfunction there. If this is not done, typical manipulation of the unstable areas of the spine will proliferate the dysfunction and instability creating a “doctor dependant” patient much like occurs in overmedicated patients. The treatment times for unstable joints will vary with patient compliance as a major determinant.

MCQs

1. The diagnosis of unstable posterior joint syndrome can only be made with objective evidence of which of the following:
   X A. A finding of translation in the involved joint
   B. A history of several episodes of back pain
   C. Weeks of unresponsive treatment
   D. None of the above

2. The most effective aspect of treatment of unstable posterior joint syndrome is:
   X A. Restoration of the compensatory mechanisms
   B. Immobilization of the involved joints
   C. Management of the patients work and life style
   D. Adequate pain control medication

3. In determining the long term prognosis of the unstable posterior joint problem, which of the following is most significant:
   X A. The number and severity of complicating conditions
B. The clinical skills of the treating physician

C. The age of the condition

D. The amount of translation
References:

1. Kirkaldy-Willis WH; Managing Low Back Pain; Churchill Livingstone 1983; pp 23-25

2. Eder M, Tilscher H; Chiropractic Therapy - Diagnosis and Treatment; Aspen 1990; pp 49, 64, 71

3. Zohn D, Mennell J; Musculoskeletal Pain - Diagnosis and Physical Treatment; Little, Brown 1976; 17,121

4. Evans R; Illustrated Essentials In Orthopedic Physical Assessment; Mosby 1994; 247-251


6. Ulmer JL. Mathews VP. Elster AD. King JC; Lumbar spondylolysis without spondylololithesis: recognition of isolated posterior element subluxation on sagittal MR.;Ajnr:American Journal of Neuroradiology

7. Abel MS; The radiology of low back pain associated with posterior element lesions of the lumbar spine; Critical Reviews in Diagnostic Imaging. 20

8. Sybert Dr. Steffee AD. Keppler L. Bisup RS. Enker P.; Seven-year flow up of vertebral excision and reconstruction for malignant hemagioendothelioma of bone; Spine. 20.

9. Olsewski JM. Garvey TA. Schendel MJ.;Biomechanical analysis of facet and graft
loading in a Smith-Robinson type cervical spine model.; Spine. 19

10. Lazio BE. Stambough JL.; Department of Orthopedic Surgery, University of Cincinnati College of Medicine, Ohio 45267-0212; Orthopedics 17


12. Magerl F. Aebi M. Gertzbein SD. Harms J. Nazarian S.; A comprehensive Classification of thoracic and lumbar injuries; European Spine Journal 3

13. Fehlandt AFJr. Micheli LJ.; Lumbar facets stress fracture in a ballet dancer; Spine 18.

14. Yoganandan N. Maiman DJ. Pintar FA. Bennett GJ. Larson; Biomechanical effects of laminectomy on thoracic spine stability; Neurosurgery 32.

15. Meyer S.; Thoracic spine trauma; Seminars in Roentgenology 27.


18. Willen J.; Unstable thoracolumbar injuries; Orthopedics 15.