

Red Flags for Serious Disease Causing Low Back Pain

The first step in triage and differential diagnosis is to rule out the possibility of serious disease. Red flags are symptoms or signs that suggest a patient's low back pain (LBP) may be due to a serious pathology as opposed to the more common tissue injuries associated with trauma, repetitive microtrauma or sustained postural overloads.

The presence of a red flag may trigger the need to more thoroughly investigate a patient for diseases such as cancer, infections, auto-immune diseases, inflammatory arthritis, abdominal aortic aneurysms, etc.

Fortunately, the large majority of patients with LBP do not suffer from a serious pathology. The prevalence of these types of conditions in a chiropractic office is unknown. The following estimates apply to a medical ambulatory facility.

About 3% of LBP is due to serious disease. (Deyo 2001)

- 1% = cancer, spinal infection, inflammatory disease
- 2% = referred pain (usually from the GI, reproductive or urinary system)

"The main focus for the prevention of complications resulting from chiropractic treatment is the recognition of well known and established 'red flags' signs and symptoms." (Haldeman et al. 1993)

RED FLAGS FOR CANCER IN THE HISTORY

History is one of the most powerful tools a chiropractor can use to screen for serious diseases. Since at least $\frac{2}{3}$ of cancers are metastatic—usually from the breast, lung, prostate, or kidney and sometimes colon or thyroid—a thorough systems review is very useful.

RED FLAGS for CANCER	Sensitivity	Specificity
Age > 50	77	71
History of cancer	31	98
Unexplained weight loss (10 lbs. over 3 mos.)	15	94
No relief with bed rest	> 90	46
No response to treatment in 1 month	31	90
Pain duration > 1 month	50	81

Age over 50. Three similarly sized studies of cancer and back pain reported a range of 77-100% of the patients who were over 50-years old. (Deyo 1992, Fernbach 1976, Mazanec 1993) The incidence, and therefore the index of suspicion, goes up with subsequent decades.

Prior history of cancer. Due to the possibility of recurrence, this is perhaps the most significant single red flag. Specificity is 98%, but sensitivity is only 31% (Deyo 1992, Elghazawi 1991, Staiger 1999). The positive likelihood ratio is 16.0 (Mazanec 2001). One long-term study of more than 700 women who had breast cancer found 25% of deaths over the next 20 years was due to recurrence. Other "distant" cancers that return include Hodgkin's disease, lymphomas and leukemia. (Mazanec 1996)

Unexplained weight loss. Weight loss of more than 10 lbs. over three months is suspicious and could be associated with cancer, spinal infection, or autoimmune/inflammatory disease. Specificity for low back cancer is 94%, but sensitivity is very low at 15%. (Deyo 1992) The positive likelihood ratio is 14.0.

No relief with bed rest/unvarying symptoms. LBP uninfluenced by rest, recumbency or activity is worrisome and can be linked with cancer or infection. No relief with bed rest has high sensitivity for cancer (> 90%), but its specificity is poor (46%). Failure to relieve pain with bed rest has been reported in over 1/2 of patients without cancer. (Deyo 1992)

Lying down aggravates the pain. Malignant retroperitoneal lymphadenopathy may cause excruciating pain when lying supine. (Elghazawi 1991) Patients get relief only with sitting up or flexed over a table. This can be due to primary renal cancers or secondary to lymphomas and testicular cancer (both of which can respond to early treatment). (Woll 1987) Sensitivity and specificity are unknown.

No response to treatment within one month. Specificity for malignancy has been reported at 90%; sensitivity is poor at 31%. Consider also the possibility of infection or other inflammatory diseases. (Deyo 1992)

Pain duration greater than one month. Sensitivity 50%, specificity 81%. (Deyo 1992)

Special Note: In Deyo's study (1992) of 2000 consecutive patients with LBP, no patient under 50 was found to have cancer unless at least one of the following findings were present: prior cancer history, unexplained weight loss, or failure of one month of conservative therapy.

Best Questions to Screen for Cancer

- Have you ever had cancer?
YES think possible recurrence
NO no help
- Have you lost weight recently (unexplained)?
YES think possible cancer
NO no help
- Does bed rest give you any pain relief?
YES evidence against cancer
NO be very vigilant

A Word about TRAUMA

It is important to be aware that even when a patient's symptoms appear to derive from recent trauma (e.g., a slip and fall), this may obscure the fact that a serious disease may be the underlying diagnosis. For example, 50% of LBP due to cancer is associated with an initial report of trauma (Mazanec 1993). Another potential red flag is trivial trauma resulting in a fracture—this can suggest the possibility of a pathological fracture.

An appropriate strategy is to 1) find out if the symptoms actually pre-date the trauma, 2) do not dismiss red flags for disease just because the condition appears to be traumatic in origin, and 3) re-assess if the patient is not recovering at the expected rate or to the expected degree.

A Word about NIGHT PAIN

Night pain used to be listed in guidelines as a red flag for cancer. A 2004 study of 482 patients with LBP found that 42% reported some night pain and 20% presented with pain "every night." There was no correlation with serious disease. (Harding 2004) A number of guidelines no longer include night pain, although there may still be concern when the pain is severe, progressive or unabated by position.

RED FLAGS FOR OTHER SERIOUS DISEASES IN THE HISTORY

Age under 20. (Deyo 1992, Staiger 1999) Age under 20 has been considered a red flag for organic causes. However, benign LBP in adolescents may be higher than first presumed ranging from 26-30% (Fairbank 1984, Olsen 1992). A much smaller percent of these adolescents (7-8%) actually seek care (Olsen 1992). A Finnish study indicated a significant difference between the first and second decade of life (prevalence of 1% in 7-year olds and 6% in 10-year olds compared to teenagers at 18% for 14- and 16-year olds) (Tailmela 1997). A small study suggested that children younger than 11 with neoplasms were more likely to have motor weakness in addition to sensory and bilateral sciatica than children with herniated discs (Martinez-Lage 1997).

ASSOCIATED SYMPTOMS

Constitutional signs and symptoms (in addition to weight loss):

- **Fever/chills.** (Deyo 1992, Elghazawi 1991, Staiger 1999) Consider infection, especially fever over 102°F; however, low grade fevers of unknown origin may turn out be spinal infections. Sensitivity is 27% for TB, 50% for pyogenic, 83% for epidural abscess, 98% for bacterial (Deyo 1992).
- **Malaise.** (Elghazawi 1991) Malaise is a general “out of sorts” feeling, one of discomfort. It can be the first indication of a disease process. Although it can accompany fatigue, it is a separate subjective state.
- **Loss of appetite, anorexia.** (Elghazawi 1991) A newly onset indifference to food (or even repulsion to food), especially in the context of LBP, can be linked to a number of disease states.
- **Significant, unexplained fatigue.** Although this can be associated with various psychological states and can be the result of pain itself (especially if sleep is interfered with), significant fatigue can also be sign of a larger systemic disease state.

Bilateral sciatica in patients over 50.

Consider neoplasms (in addition to the more benign spinal canal stenosis). (Grieve 1981)

Sciatica with bizarre, non-dermatomal sensory symptoms, neurological deficits, but no backache. Consider neoplasms (in addition to the more benign spinal canal stenosis). (Grieve 1981)

Sciatica non-responsive to treatment or with negative low back findings. Consider neoplasm or spinal infection. (Grieve 1981)

Urinary changes (incontinence, retention, change in power or caliber of stream, trouble starting or stopping). Consider cauda equina syndrome and prostate disease. Approximately 70% of prostate cancer patients present with urinary changes.

Multiple joint involvement. (auto-immune/inflammatory disease)

Sexual dysfunction. Consider neoplasm compressing the spinal cord, cauda equina syndrome or prostate disease.

Abnormal menstrual bleeding/pain. Consider conditions such as endometriosis, ovarian cyst/cancer, pregnancy, ectopic pregnancy, spontaneous abortion, pelvic inflammatory disease (PID), etc.

Gastrointestinal symptoms such as abdominal pain, nausea, vomiting, change in bowel habits. Referral from GI tract.

Genitourinary symptoms. Consider kidney stones, pyelonephritis.

INCREASED RISKS

Recent history of primary or recurrent bacterial infections (especially urinary tract, skin, lungs, injection site for intravenous drug users). This may suggest discitis or spinal infection. Sensitivity 40% (Deyo 1992, Elghazawi 1991, Staiger 1999)

Increased susceptibility to infections. Multiple recent infections may be associated

with intravenous drug use, history of surgery or instrumentation (e.g., catheterization, spinal tap), and patients who are immunocompromised (Elghazawi 1991). These infections may be the result of an insidious disease such as multiple myeloma or may simply increase the patient's risk of a spinal infection.

Currently taking anti-coagulants (bleeding tendency). Back pain may result from retroperitoneal hemorrhage or, more rarely, from spinal epidural hematoma. (Riley 1991)

History of oral corticosteroid use. This can increase the risk for spinal infections as well as avascular necrosis (e.g., of the hip). Corticosteroids can also induce osteoporosis. They are commonly prescribed for asthma, inflammatory bowel disease, multiple sclerosis, rheumatoid arthritis, and other connective tissue diseases. An estimated 30 million Americans are on long-term use of corticosteroids. Osteoporosis occurs in more than half. In asthma patients who use them for less than 1 year, the prevalence of vertebral fractures is 11%. Of these, about 1/4 will have a spinal or extra-spinal fracture. A regime of 7.5 mg/day of oral prednisone for 6 months leads to rapid bone loss from hip, spine and forearm (inhalers deliver only a small fraction of that dosage). Most rapid bone loss occurs in first 6 months of use. (10-20% loss) (American College of Rheumatology Guidelines 1997)

History of diabetes. Consider avascular necrosis of the hip or a spinal infection.

TIMING AND PAIN PATTERNS

The spontaneous onset of LBP in late middle age in the absence of a prior history of LBP. (Riley 1991) Grieve's opinion is that in such cases the LBP is more likely due to a malignant disease or secondary to osteoporosis *rather than* due to benign joint problems. (Grieve 1981)

Severe progressive pain over weeks and months. This can signal an underlying disease process. (Riley 1991)

Refractory to mild analgesics. (Elghazawi 1991) When a patient's pain remains unaffected by mild analgesics, consider further evaluation for a disease process such as cancer or infection.

RED FLAGS FOR SERIOUS DISEASES FROM THE PHYSICAL EXAM

Neurological deficits in older patients. Though possibly due to stenosis or other causes, malignancy must be considered. Cancer is associated with older age and higher incidence of neurological deficit. In one study of 82 primary neoplasms, malignant tumors were more likely to have neurological deficits than with benign growths.

About 20% of patients with spinal malignancy present with neurological deficits (Mazanec 1996). About 8% of patients with metastatic malignancy present with cord compression as the first symptom (Mazanec 1996). Almost 1/3 of prostate cancer patients with vertebral lesions present with a neurological deficit. (Schaberg 1985)

The "alarm sign." If a patient with sciatica points to a specific location in the leg or pelvis as being aggravated during a SLR test, consider a local mass. In a series of 32 patients with extra spinal causes of sciatica, 22 demonstrated this alarm sign. Thirteen of the lesions were soft tissue tumors and were palpable. An MRI detected all of the soft tumors. 13/17 bony tumors were visualized by x-ray and the rest by CT. (Bickels 1999)

Pain with spinal percussion. If the pain is localized over one or two spinous processes, is exquisitely painful, and the pain lingers, then consider possible cancer or spinal infection. The sensitivity is 86% and specificity is 60% for infection. (Deyo 1992)

Hip pain with contracture (infection). (Elghazawi 1991)

Pronounced loss of hip flexor strength can suggest a tumor affecting the spinal cord (Grieve 1981).

Palpable mass. (Elghazawi 1991) Consider a tumor or abscess.

Significant bony tenderness. (Elghazawi 1991) Palpatory bony tenderness, especially of more superficial bones, such as the tibia and sternum, can be associated with bone disease such as multiple myeloma.

Vascular deficits (e.g., loss of pulse). (Elghazawi 1991) Indications of poor blood supply in the lower extremities may be linked to peripheral arterial disease and deep vein thrombosis contributing to a patient's leg symptoms, and have a weak link with abdominal aortic aneurysms.

Deformity. Kyphosis can reflect vertebral collapse. Scoliosis that is painful, acute or focal may suggest an underlying disease process. (Elghazawi 1991)

Abdominal mass or bruit (AAA). In one study, 57% of AAA were palpable if larger than 4 cm; 29% if smaller than 4 cm. Palpation led to the correct diagnosis 75% of the time.

SPINAL CONDITIONS: RED FLAGS FROM ANCILLARY STUDIES

Back pain with elevated ESR (especially above 50 mm/hr) or elevated CRP.

Although usually due to benign causes, significant elevations in these tests suggest the possibility of cancer, infection, various auto-immune diseases, cancer or other causes of significant inflammation (beyond the damage from tissue loading).

Back pain with increased serum calcium, protein (especially globulins) and/or alkaline phosphatase. Elevations in these tiers have been linked to various kinds of primary and metastatic bone cancer.

Back pain with anemia. While most cancers and spinal infections do not cause anemia in their early phases, 90% of anemia due to chronic disease is normocytic normochromic, and approximately 10% is associated with microcytic anemia (serum iron decreased, but serum ferritin normal or elevated).

Back pain with pathological imaging findings. Radiographic findings may suggest discitis, infectious spondylitis, primary or metastatic bone cancer, inflammatory diseases such as rheumatoid arthritis, or the presence of AAA. Compression fracture with minimal trauma can suggest an underlying pathology linked to osteoporosis.

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REFERENCES

- American College of Rheumatology guidelines [synopsis]. *JAMA* 1997 Jan 8;277(2):98-100.
- Bickels J, Kahanovitz N, Rubert CK, et al. Extraspinal bone and soft tissue tumors as a cause of sciatica: Clinical diagnosis and recommendations analysis of 32 cases. *Spine* 1999;24(15):1611-6.
- Deyo RA, Rainville J, Kent DL. What can the history and physical examination tell us about low back pain? *JAMA* 1992;268(6):760-5.
- Deyo RA, Weinstein JN. Low back pain. *N Engl J Med* 2001;344(5):363-70.
- Elghazawi AK. Clinical syndromes and differential diagnosis of spinal disorders. *Radiologic Clinics N Am* 1991;29(4):651-63.
- Fairbanks J, Pynsent PB, Poortvliet JA, et al. Influence of anthropometric factors and joint laxity in the incidence of adolescent back pain. *Spine* 1984;9:461-4.
- Fernbach JC, Langer F, Gross AE. The significance of low back pain in older adults. *CMAJ* 1976;115:898-900.
- Grieve GP. *Common Vertebral Joint Problems*. Edinburgh: Churchill Livingstone; 1981.
- Haldeman S, Chapman-Smith D, Petersen DM Jr. Frequency and duration of care. *Guidelines for Quality Assurance and Practice Parameters: Proceedings of the Mercy Center Consensus Conference*. Gaithersburg, MD: Aspen Publishers, Inc.; 1993.
- Harding IJ, et al. Is night pain a sensitive marker for serious spinal pathology in a back pain triage clinic? Presented at the annual meeting of the International Society for the Lumbar Spine, cited in *The BackLetter* 2004;19(10):109-16.
- Martinez-Lage JF, Martinez RA, Lopez F, et al. Disc protrusions in the child: Particular features and comparison with neoplasms. *Child's Nervous System* 1997;13(4):201-7.
- Mazanec D. Recognizing malignancy in patients with low back pain. *J Musculosk Med* 1996;13(1):24-32.
- Mazanec DJ, Segal AM, Sinks PB. Identification of malignancy in patients with back pain: Red flags. *Arthritis Rheum* 1993;36(suppl):S25.
- Mazanec DJ. *Low Back Pain Syndromes in Diagnostic Strategies for Common Medical Problems*. Philadelphia: American College of Physicians; 2001.
- Olsen TL, Anderson RL, Dearwater SR, et al. The epidemiology of low back pain in an adolescent population. *Am J Pub Health* 1992;82:606-8.
- Riley B. *Practical Strategies in Outpatient Medicine*, 2nd edition. Philadelphia: Saunders; 1991.
- Schaberg J, Gainor BJ. A profile of metastatic carcinoma of the spine. *Spine* 1985;10(1):19-20.
- Staiger TO, Paauw DS, Deyo RA, et al. Imaging studies for acute back pain: When and when not to order them. *Postgrad Med* 1999;105(4):161-72.
- Taimela S, Kujala UM, Salminen JJ, et al. The prevalence of low back pain among children and adolescents: A nationwide, cohort-based questionnaire survey in Finland. *Spine* 1997;22(10):1132-6.
- Woll PJ, Rankin EM. Persistent back pain due to malignant lymphadenopathy. *Ann Rheum Dis* 1987;46:681-3.