



Referral Criteria for Non-emergent Spinal Symptoms in the Neck and Low Back: A Survey of Canadian Spine Surgeons

ABSTRACT

The majority of the patients referred for surgical consultation are not candidates for surgery. Appropriate operative candidates endure unnecessary and potentially detrimental delays in obtaining their surgery while the rest waste time waiting to be told that surgery is not the answer. The Canadian Spine Society surveyed its membership to establish a set of practical surgical referral recommendations for non-emergent spinal problems. The results support referrals of patients with leg or arm dominant pain but, in the absence of a significant structural abnormality, discourage referring patients with neck or back dominant symptoms.

KEYWORDS: Spine surgery, indications, referral, clinical presentations, non-emergent



CME

Pre-test Quiz



INTRODUCTION

It is estimated that 50–80% of the adult population will experience low back pain (LBP) in their lifetime while up to 86% will suffer from neck symptoms.^{1,2} It has been estimated that less than 10% of patients suffering from degenerative spinal disorders ultimately undergo surgery. Patients whose symptoms progress, fail to resolve in a timely manner or are associated with neurological deficits are often referred for surgical assessment. However, Canadian spinal surgeons typically have substantial waiting lists for consultation that average 6 months and in some regions are over 2 years long.^{3,4} A recent survey by Busse et al. has found that the majority of the patients



Yoga Raja Rampersaud, MD, FRCS C, Associate Professor Department of Surgery, University of Toronto, Divisions of Orthopaedic and Neurosurgery University Health Network Medical Director, Back and Neck Specialty Program, Altum Health, Past President Canadian Spine Society.



Dr. Hamilton Hall, MD, FRCS C, is a Professor in the Department of Surgery at the University of Toronto. He is the Medical Director, CBI Health Group and Executive Director of the Canadian Spine Society in Toronto, Ontario.



referred for surgical consultation assessment are not candidates for surgery, with 82% of the surgeons reporting that they have to see five or more patients to find one surgical candidate; 42% reported having to see more than 10 patients.⁵

These extended wait times for a surgical referral can produce two negative outcomes: 1) appropriate surgical candidates endure unnecessary and potentially detrimental delays in obtaining their surgery and 2) patients who are not good candidates for surgery waste time waiting to be told that surgery is not the answer. This further postpones the initiation of optimal conservative care or referral to a more appropriate specialist, which often entails yet another long-wait.⁴ In addition, there is evidence that longer delays for decompressive surgery are associated with worse outcomes, including less pain relief and a reduced likelihood of return to work.^{6,7,8,9} A practical step in the mitigation of this surgical consultation wait-times crisis would be to provide the primary care provider with a better understanding of what constitutes a reasonable non-emergent referral to a spine surgeon.

SURGICAL SPINE REFERRALS

Defining an appropriate or reasonable surgical referral is not a simple task and may vary widely depending on the perspective of the individual patient, of the pri-

mary care provider and not least of the spine surgeon. Ultimately surgical decision making and the indications for operative intervention are multifactorial.¹⁰ There is no universally acceptable ideal candidate, absolute indication or unqualified contraindication for elective spinal surgery. Considerations include, but are clearly not limited to, the dominant complaint, duration and severity of symptoms including functional limitations and impact on quality of life, appropriateness of conservative care, the patient's medical comorbidities, negative prognostic factors such as depression, smoking, poor motivation or unrealistic expectations, correlative structural abnormality on imaging, the degree of anticipated surgical morbidity and the patient's acceptance of an operative solution. This panoply of issues creates significant surgeon-to-surgeon variation in what is considered a suitable referral or a proper surgical candidate. The patient's and the referring physician's understandable frustration are further increased when conflicting criteria exist within the same region or institution.

To address this issue, the Canadian Spine Society (CSS) conducted a survey among its membership of dedicated spine surgeons across Canada to establish a set of practical surgical referral recommendations for physicians seeking a consultation.



CONSENSUS GENERATION:

The preliminary list of criteria for the survey was generated from a list prepared by a multidisciplinary team lead by Dr. Rampersaud for the Quality-Based Pathway Clinical Handbook for Non-Emergent Integrated Spine Care recommendation for the Ontario Ministry of Health and Long-Term Care.¹¹ The questions were further elaborated with suggestions from the CSS Executive Committee. The final construct was a series of common case scenarios and the same root question: “Which of the following do you believe is an appropriate basis for a referral to a spine surgeon?”

Questionnaire administration

The surgical membership of the Canadian Spine Society logged on to a link which offered a disclosure letter detailing the intent of the survey and explicit instructions for its completion. The link then provided access to the questionnaire on Survey Monkey (<http://www.surveymonkey.com/>) to facilitate online completion. At two and four weeks following the initial e-mailing, the CSS resent an email to all non-responders requesting completion of the questionnaire.

Analysis

We generated frequencies for all collected data. We accepted a simple majority vote to be sufficient agreement for a recommendation. Fifty-seven out of 145 Canadian

Spine Society members responded (39%).

RECOMMENDATIONS

The summary results of the national CSS membership survey are presented in tables 2 through 5. These recommendations are intended to serve as a guide and do not consider individual considerations or extenuating circumstances, which must be part of the referral process be addressed on a case by case basis. Importantly these scenarios describe elective situations and do not cover non-emergent or urgent situations such as patients with Red Flag conditions. (Table 1)

General Scenarios:

Scenario 1 (BACK): The patient has back or leg dominant pain with normal neurology and no structural abnormality. The variables were constant or intermittent pain, symptom duration of four or 12 weeks and whether or not the patient had received appropriate non-operative treatment (Table 2). ***For this and all other scenarios appropriate non-operative treatment included well supervised physical therapy, suitable medication, effective education and successful lifestyle modification.*** Back dominant pain was not considered an appropriate reason to recommend referral in any of the sub-categories: consistency, duration



Table 1: Red Flags requiring emergent or urgent surgical referral.

Possible Cause	Risk factors of serious pathology identified during history or physical examination
Fracture/dislocation	<ul style="list-style-type: none"> • Acute pain following recent trauma, any age • Osteoporotic fractures—History of osteoporosis, Long-term corticosteroid use, older age
Cancer	<ul style="list-style-type: none"> • History of cancer • Unexplained weight loss • Night pain
Vertebral infection	<ul style="list-style-type: none"> • Fever • Immuno-suppressed patients (Hep C, B, HIV) • Intravenous drug use • Recent infection
Cauda Equina Syndrome	<ul style="list-style-type: none"> • Saddle anesthesia with bladder dysfunction (frequency, incontinence) and bowel dysfunction
Myelopathy/Severe progressive neurological deficits	<ul style="list-style-type: none"> • Upper and / or lower extremity pain and weakness • Sensory changes in upper and/or lower extremity • Motor weakness and atrophy • Hyper-reflexia • Change in dexterity • Spastic gait • Falls
Carotid/vertebral artery dissection (Neurosurgical referral)	<ul style="list-style-type: none"> • Sudden and intense onset of headache or neck pain • Meningismus (headache, neck stiffness)
Brain haemorrhage/ mass lesion (Neurosurgical referral)	<ul style="list-style-type: none"> • Sudden and intense onset of headache • Meningismus (headache, neck stiffness)



Table 2:

Sub-categories with > 50% agreement	Percent Agreement
Untreated, constant spine related leg pain for 12 weeks	58%
Treated, intermittent spine related leg pain for 12 weeks	70%
Treated, constant spine related leg pain for 4 weeks	78%
Treated, constant spine related leg pain for 12 weeks	95%

or treatment. The mean acceptance for a referral for back dominant pain was eight percent with a range of 0% (untreated, intermittent pain of four weeks' duration) to 28% (appropriately treated, constant pain of 12 weeks' duration).

Scenario 2 (NECK): The patient presents with neck or arm dominant pain with normal neurology and no structural abnormality. The variables were constant or intermittent pain, symptom duration of four or 12 weeks and whether or not the patient had received appropriate non-operative treatment (Table 3). Neck dominant pain was not considered an appropriate reason to recommend

referral in any of the sub-categories: consistency, duration or treatment. The mean acceptance for a referral for neck dominant pain was nine percent with a range of 0% (untreated, intermittent pain of four weeks' duration) to 28% (appropriately treated, constant pain of 12 weeks' duration).

Specific Scenarios

BACK

Scenario 3 (Lumbar - Structural deformity): The patient has a major structural deformity such as severe scoliosis, kyphosis, or spondylolisthesis on clinical assessment and/or on imaging with non-disabling back dominant

Table 3:

Sub-categories with > 50% agreement	Percent Agreement
Untreated, constant spine related arm pain for 12 weeks	50%
Treated, constant spine related arm pain for 4 weeks	52%
Treated, intermittent spine related arm pain for 12 weeks	74%
Treated, constant spine related arm pain for 12 weeks	98%



Table 4:	
Sub-categories with > 50% agreement	Percent Agreement
Untreated constant leg dominant pain of four weeks duration with non-disabling dorsi-flexor weakness	51%
Untreated constant leg dominant pain of three months duration with non-disabling dorsi-flexor weakness	87%
Treated constant leg dominant pain of four weeks duration with non-disabling dorsi-flexor weakness	71%
Treated constant leg dominant pain of three months duration with non-disabling dorsi-flexor weakness	98%
Constant leg dominant pain of four weeks duration with progressive dorsi-flexor weakness	98%
Constant leg dominant pain of three months duration with progressive dorsi-flexor weakness	100%

pain and no neurological symptoms or signs. In this scenario, 90% of the surveyed surgeons believed that a surgical referral would be acceptable after 12 weeks of appropriate treatment. A recommendation for a referral for untreated patients or treated patients with only four weeks of appropriate treatment was given well below the greater than 50% threshold. However 37% responded that a surgical referral would be appropriate if non-disabling pain remained in the untreated scenario after 12 weeks.

Scenario 4a (Lumbar – Pain + Neurologic Deficit): All scenarios of leg dominant pain with a non-disabling motor deficit were felt to be appropriate surgical referrals (Table 4). Isolated nerve root based sensory deficits do not

reliably recover from surgical intervention and this scenario was not included in the national survey. Sensory deficits resulting from an upper motor lesion (Table 1–Red Flags) would require urgent imaging and referral.

Scenario 4b (Lumbar – Minimal Pain + Neurologic Deficit): In the scenario with little or no current discomfort the presence of a disabling weakness warranted surgical referral regardless of duration; at four weeks there was 82% agreement and at 12 weeks 91% agreement. Weakness that was functionally acceptable (i.e. non-disabling) to the patient did not meet the greater than 50% agreement level for referral at four weeks duration (17%) or at 12 weeks duration (33%).



Table 5:	
Sub-categories with > 50% agreement	Percent Agreement
Untreated constant arm dominant pain of three months duration with non-disabling biceps weakness	68%
Treated constant arm dominant pain of four weeks duration with non-disabling biceps weakness	72%
Treated constant arm dominant pain of three months duration with non-disabling biceps weakness	100%
Constant arm dominant pain of four weeks duration with progressive biceps weakness	98%
Constant arm dominant pain of three months duration with progressive biceps weakness	100%

Scenario 5 (Lumbar – Severe Back Dominant Pain from Isolated Single Level Degeneration): This scenario describes a patient with back dominant pain that can it is assumed be attributed to definitive single level degeneration as determined by imaging. If the patient had been appropriately treated for 12 weeks 74% of the spine surgeons in the survey would recommend a referral. No surgeon viewed a referral as appropriate in the untreated patient and only 10% would support a referral for a patient with only four weeks of treatment.

NECK

Scenario 6 (Cervical - Structural deformity): Structural deformity is much less common in the neck than in the thoracic or lumbar spine. In the case of a patient demonstrating a major

structural deformity on clinical assessment and/or on imaging of the cervical spine with non-disabling neck dominant pain and no neurological symptoms or signs, 92% of surveyed surgeons would recommend a referral after 12 weeks of appropriate treatment. In this scenario, for untreated patients and patients treated for only four weeks the recommendation to refer was well below the greater than 50% threshold. When the pain persisted for 12 weeks in the untreated patient, however, 44% of the surgeons were willing to accept a referral.

Scenario 7a (Cervical – Pain + Neurologic Deficit): Except for untreated arm dominant pain with a non-disabling motor deficit of only four weeks duration all the scenarios including constant arm pain and motor weakness were considered appropriate surgical



referrals (Table 5). Isolated nerve root based sensory deficits do not reliably recover from surgical intervention and this scenario was not included in the survey. Sensory deficits associated with cervical myelopathy (Table 1–Red Flags)) would require imaging and referral.

Scenario 7b (Cervical – Minimal Pain + Neurologic Deficit): When the patient had little or no current discomfort the presence of a disabling weakness warranted surgical referral regardless of the symptom duration; 78% of the surgeons recommended referral at four weeks, 90% agreed at 12 weeks. If the patient accepted the weakness and remained functional (i.e. non-disabling) only 12% of the survey respondents recommended a referral. This grew to 42%, still below the 50% agreement cut-off, when the deficit had lasted for 12 weeks.

Scenario 8 (Cervical – Severe Neck Dominant Pain from Isolated Single Level Degeneration): In this scenario the patient has a recognized single level degenerated disc, identified on imaging, and it is assumed that this is the cause of the neck pain. Based on this assumption 64% of surveyed surgeons stated that a surgical referral would be appropriate for patients who had received 12 weeks of non-operative care. If the patient had not been treated only 4% recommended referral at four weeks and just 18% would

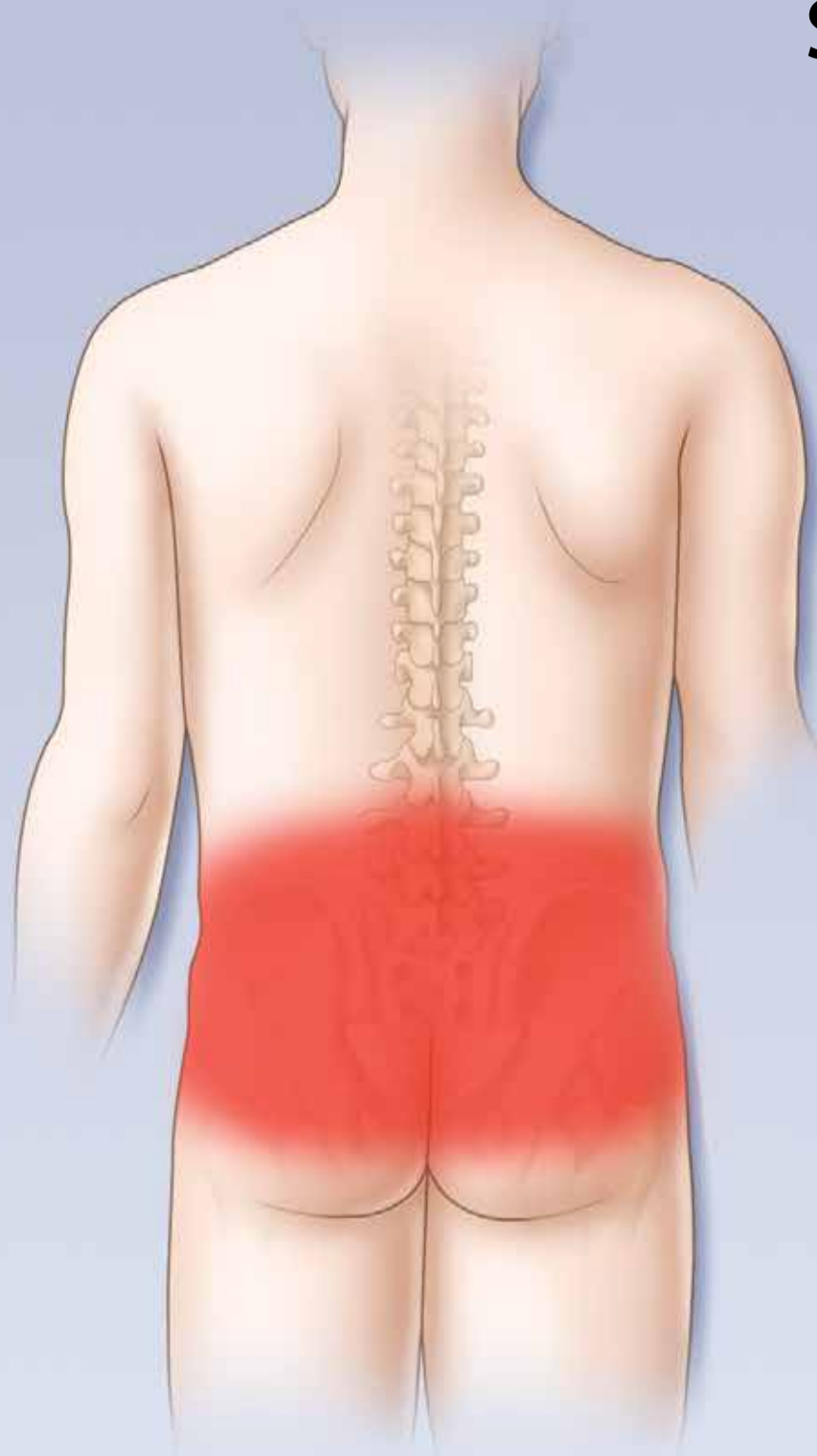
agree with a referral at 12 weeks. For those who had received four weeks of treatment 10% considered referral appropriate.

NOTE:

In Scenarios 5 and 8 the history presented to the surgeons assumed the correct identification of a single painful disc as the source of the patient's distress. This implied that a confirmatory image had already been obtained. In routine practice early imaging of the spine for back pain is not recommended.¹² Only patients who present with non-mechanical patterns, have the signs and symptoms of a sinister condition or who are already accepted for surgery require additional investigations. The reason for including these scenarios was to identify patients who might qualify for an operation to treat back pain. This is a highly controversial subject but there is general agreement that the circumstances are unusual. The candidate must exhibit an unequivocal mechanical presentation, exhibit a full and realistic understanding of the risks and limited benefits of the surgery, be motivated and accept responsibility for his/her recovery and be fully compliant with all the recommended treatments. Furthermore positive identification of the pain generator is seldom easy and is not always possible.

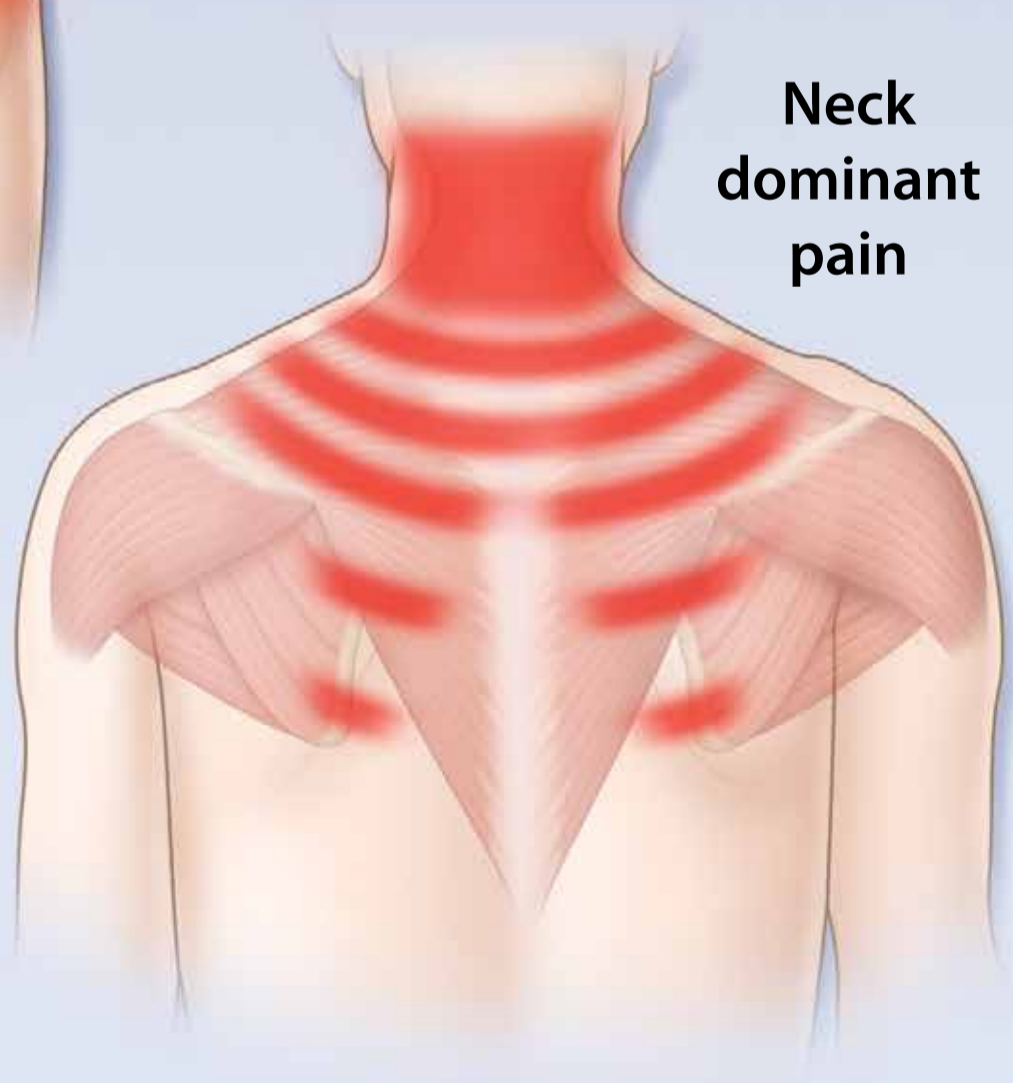
The scope of the problem is reflected in the fact that even in

Referral Criteria for Non-Emergent Spinal Symptoms in the Neck and Low Back



**Back
dominant
pain**

**Not Usually
Suitable for
Referral**



**Neck
dominant
pain**



Referral Criteria for Non-Emergent Spinal Symptoms in the Neck and Low Back

More Likely Suitable for Referral

Arm dominant pain

Leg dominant pain

Major structural deformity



SUMMARY OF KEY POINTS

1. There is no universally acceptable ideal candidate, absolute indication or unqualified contraindication for elective spinal surgery.
2. Referral is recommended most often for patients who have constant arm or leg dominant pain.
3. Patients who have untreated neck or back dominant pain are not appropriate surgical referrals.
4. Surgeons insistence on an image or refusal to see a suitable patient who rejects surgery reflect the excessive demand on their time, which can be relieved with proper referral.

the potentially ideal subject with back dominant pain only 74% of the surgeons recommended a referral while in the neck that number dropped to 64%.

Scenario 9 (Surgical referral in the absence of advanced imaging): When signs and symptoms appropriate for a referral where present, but no advanced imaging was obtained, only a minority of spine surgeons, 37% and 32% for the lumbar and cervical spine respectively, agreed that a referral was appropriate.

Scenario 10 (Surgical referral for a patient that will not accept surgery): In the scenario where the patient presented with signs and symptoms that justified a referral but stated that he/she would not consent to surgery, most surgeons surveyed would not recommend a referral (lumbar spine 88%; cervical spine 86%).

DISCUSSION

In a previous survey, over 90% of Canadian Spine Society members endorsed four critical history components: the location of dominant

pain, the consistency of the pain/symptoms, the history of presenting complaint, and symptoms of 'Red' or 'Yellow flags'.⁵ Red flags were symptoms associated with cauda equina syndrome, fracture, infection, or cancer. Yellow flags denoted a patient in receipt of disability benefits, involved with ongoing litigation, a current smoker, or demonstrating high emotional stress. Yellow flags have been associated with a poor outcome in surgical as well as non-surgical treatment outcomes.¹³

The current survey expands on those basic requirements. The survey respondents indicated that they would encourage referrals of patients who were experiencing leg or arm dominant pain but, in the absence of a significant structural abnormality, would be unwilling to accept most patients complaining primarily of axial pain in the neck or low back. Spine related arm or leg dominant pain is generally radicular pain and the result of irritation of an individual nerve root. This problem, whether due to an acute disc herniation or a long





CME

Post-test Quiz

Members of the College of Family Physicians of Canada may claim MAINPRO-M2 Credits for this unaccredited educational program.

standing bony entrapment, is predominantly mechanical and therefore usually amenable to surgical intervention. The surgeon's preference for patients with peripheral pain reflects the probability that the patient's problem will have an operative solution and therefore be of interest to the surgeon.¹⁴

In neck or back dominant pain, however, the source of pain is often multifactorial. Since surgery usually addresses a specific structural problem, which may or may not be the primary pain generator, the results of an operation are far less predictable. For example, by further interfering with muscle activity, surgery in a patient with pain amplified by paraspinal weakness may only aggravate the pain. Given the high prevalence of imaging abnormalities that do not correlate to clinical symptoms surgery for back or neck pain remains problematic.^{15,16}

Most of the responding surgeons agreed that referral was

indicated in the scenario that stipulated a single pain source for back or neck dominant pain that was confirmed on an image. It must be stressed that this is a special circumstance and that routine imaging for axial spinal pain is not recommended. Surgery for neck or back pain without radicular symptoms remains controversial.

The percentage of spine surgeons who recommended referral increased for those patients who had already received adequate non-operative care and to a lesser extent as the duration of symptoms increased. The survey arbitrarily gave only two choices for the length of time the patient had been experiencing problems, four and 12 weeks. Obviously in practice there is a gradient and other factors such as the severity of the pain or the persistence of the patient or practitioner in requesting a consultation will affect the outcome. But the responses showed a high degree of



CLINICAL PEARLS

1. The recommendation for referral is highest when the patient has had appropriate non-operative treatment: well supervised physical therapy, suitable medication, effective education and successful lifestyle modification.
2. Spine related arm and leg dominant pain are usually the result of specific nerve root pathologies and therefore are more likely amenable to surgical intervention than back or neck pain which are generally multifactorial.
3. Patients with disabling or progressive neurological deficits should be referred early; patients with little or no pain and with no functional limitation related to the neurological deficit are not recommended for referral.



agreement for pain location, previous therapy and duration.

Patients with disabling or progressive neurological deficits should be referred early; the length of time the problem existed had little impact on the recommendation to refer. On the other hand, for patients with little or no pain and with no functional limitation related to the neurological deficit, most of the surveyed surgeons did not recommend referral at all.

Two scenarios warrant further comments. The overwhelming majority of spine surgeons reported that they would not see a patient, even one with clear clinical indications for referral, without advanced imaging. This is an obvious conflict with the recommendation that patients not already accepted for surgery don't require an x-ray. In this case the surgeon's demand for a picture is not only a request for more information but a means of deflecting referrals with a low probability of needing an operation.^{4,17} Canadian spine surgeons cannot meet the demand for their expertise and so are forced to make choices that are not always agreeable to the primary care provider or the potential patient. Improving the quality of the average referral is one step toward rectifying that problem.

Much the same logic and reasoning applies to the second scenario where the responding surgeons did not recommend a refer-

ral for a patient who will not accept surgery. Once again this is a function of the overwhelming demand on the surgeon's schedule. The surgeon doesn't have the time to persuade someone that an operation is the best option. It can take a considerable period just to explain the pros and cons of the operation and discuss all the possible complications with a patient who is willing to consider surgery. Add the burden of convincing the patient that surgery is even a valid choice and the busy spine surgeon will simply refuse the referral.

Conclusion

Referral to a spine surgeon should reflect a clear set of symptoms and circumstances relating to the suitability of the patient's condition to an operative solution. Improving the primary care provider's understanding of which patients the surgeon is most likely to help should reduce the number of inappropriate requests. And better referrals can help relieve the current extreme pressure on Canadian spine surgeons to the benefit of both the patient and the physician.

Acknowledgments

We thank the members of the Canadian Spine Society who responded to the survey and Ms. Jennifer Edwards, CSS Director of Operations, for preparing Survey Monkey.



References

1. Hoy DG, Bain C, Williams G, et al. A systematic review of the global prevalence of low back pain. *Arthritis Rheum.* 2012. doi: 10.1002/art.34347.
2. Hoy DG, Protani M, De R, Buchbinder R. The epidemiology of neck pain. *Best Pract Res Clin Rheumatol.* 2010 Dec; 24(6): 783-92
3. Hurlbert J., Mobbs R. & Teo C. (2008) Access to spine care: a tale of two cities. *Canadian Journal of Neurosciences.* 35, 308–313.
4. Busse JW, Riva JJ, Rampersaud R, Goytan MJ, Feasby TE, Reed M, You JJ. Spine surgeons' requirements for imaging at the time of referral: a survey of Canadian spine surgeons. *Can J Surg.* 2014 Apr;57(2):E25-30.
5. Busse JW, Riva JJ, Nash JV, Hsu S, Fisher CG, Wai EK, Brunarski D, Drew B, Quon JA, Walter SD, Bishop PB, Rampersaud R. Surgeon attitudes toward non-physician screening of low back or low back-related leg pain patients referred for surgical assessment: a survey of Canadian spine surgeons. *Spine.* 2013 Apr 1;38(7):E402-8.
6. Braybrooke J, Ahn H, Gallant A, Ford M, Bronstein Y, Finkelstein J, Yee A. The impact of surgical wait time on patient-based outcomes in posterior lumbar spinal surgery. *Eur Spine J.* 2007; 16(11): 1832-9.
7. Folman Y, Shabat S, Catz A, Gepstein R. Late results of surgery for herniated lumbar disk as related to duration of preoperative symptoms and type of herniation. *Surg Neurol.* 2008; 70(4): 398-401.
8. Quon JA, Sobolev B, Levy AR, Fisher CG, Bishop PB, Kopec JA, Dvorak MF and Schechter MT. Effect of waitlist time on pain improvement after elective surgical lumbar discectomy. Paper presented at the International Society for the Study of the Lumbar Spine Annual Meeting. 2012; Amsterdam, Netherlands.
9. Nygaard OP, Kloster R, Solberg T. Duration of leg pain as a predictor of outcome after surgery for lumbar disc herniation: a prospective cohort study with 1-year follow up. *J Neurosurg.* 2000; 92: S131-S134.
10. Bederman SS, Mahomed NN, Kreder HJ, McIsaac WJ, Coyte PC, Wright JG. In the eye of the beholder: preferences of patients, family physicians, and surgeons for lumbar spinal surgery. *Spine* 2010 Jan 1;35(1):108-15.
11. http://www.health.gov.on.ca/en/pro/programs/ecfa/docs/hb_spine.pdf
12. <http://choosingwiselycanada.org/recommendations/spine/>
13. Kendall NA, Linton SJ, Main CJ. Guide to Assessing Psychosocial Yellow Flags in Acute Low Back Pain: Risk Factors for Long-Term Disability and Work Loss. Wellington, New Zealand: Accident Rehabilitation and Compensation Insurance Corporation of New Zealand and the National Health Committee; 1997.
14. Allen RT, Rihn JA, Glassman SD, Currier B, Albert TJ, Phillips FM. An evidence-based approach to spine surgery. *Am J Med Qual.* 2009 Nov-Dec;24(6 Suppl):15S-24S.Review.
15. Webster BS, Bauer AZ, Choi Y, Cifuentes M, Pransky GS. Iatrogenic Consequences of Early Magnetic Resonance Imaging in Acute, Work-related Disabling Low Back Pain, *Spine,* 2013; 38(22): 1939-46
16. Cheng F, You J, Rampersaud YR. Relationship between spinal magnetic resonance imaging findings and candidacy for spinal surgery. *Can Fam Physician.* 2010 Sep;56(9):e323-30
17. Kim JS, Dong JZ, Brener S, Coyte PC, Rampersaud YR. Cost-effectiveness analysis of a reduction in diagnostic imaging in degenerative spinal disorders. *Healthc Policy.* 2011 Nov;7(2):e105-21

