

Outcomes of Surgeons Who Have Undergone Spine Surgery

Hamilton Hall, Greg McIntosh, Tony Melles, and *Augustus A. White III

*Canadian Back Institute, Toronto, Ontario, Canada; and *Beth Israel Hospital and Harvard Medical School, Boston, Massachusetts, U.S.A.*

Summary: The objective of this study was to examine the prevalence, characteristics, and outcomes of spine surgery among a membership of American orthopaedic surgeons with a particular interest in spine care [North American Spine Society (NASS)] and a general membership of Canadian orthopaedic surgeons [Canadian Orthopaedic Association (COA)]. A 25-item multiple choice questionnaire was developed and mailed to both memberships. The COA response rate was 45.9%; the NASS response rate was 45.8%. Of those who replied, 17.2% had undergone spinal surgery, and the results differed significantly between the COA at 12.9% and NASS at 21.9%. As a percentage of the total mailing, 7.7% had undergone spinal surgery. These results differed significantly between the COA at 5.9% and NASS at 9.7%. Although the surgery rate for NASS respondents was more than 1.5 times that of COA respondents, they had strikingly similar outcomes. They are a highly motivated, self-employed group who missed little work before and after having surgery. **Key Words:** Spine surgery—Back pain—Outcomes—Questionnaire.

The amount of spine surgery performed is a current topic of concern in North America. McIntosh et al. estimated that the incidence of spinal surgery in Canada is 8 per 1,000 (unpublished observations). A comparable estimate in the United States is 42 per 1,000 (3). Although methodological differences exist between these studies, there is a large discrepancy between the spine surgery rates of the two countries. A wide international variation in spine surgery rates has been previously documented (1). The question inevitably arises, "What is the ideal rate?" Neither clinical science nor prevailing wisdom has an authoritative answer for this important question.

We believe that knowledge of the prevalence rate of having spine surgery performed on spine surgeons would give an important and interesting perspective on this issue.

The purpose of this study was to examine the prevalence, characteristics, and outcomes of spine surgery among a membership of American orthopaedic surgeons with a particular interest in spine care [North American Spine Society (NASS)] and a general membership of Canadian orthopaedic surgeons [Canadian Orthopaedic Association (COA)].

METHODS

A 25-item multiple choice questionnaire was developed after a pilot survey in September 1993. The first section of the questionnaire pertained primarily to neck and back symptoms; the second section queried the respondents about any history of spine surgery.

In May 1995, questionnaires and self-addressed, stamped return envelopes were mailed to all Canadian members of the COA (n = 842) and to all American members of the NASS (n = 792). There were six surveys with improper addresses that were never delivered from the COA mailing and 26 questionnaires from the NASS mailing. The response rate from the COA was 45.9% (384:836). The response rate from NASS was 45.8% (351:766).

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Address correspondence and reprint requests to Mr. G. McIntosh, Canadian Back Institute, 1200-330 Front Street West, Toronto, Ontario, Canada M5V 3B7.

Results of this study were presented at the Ninth Annual Meeting of the North American Spine Society, October 19-22, 1994, Minneapolis, Minnesota.

Five respondents from the COA and 14 from NASS were nonsurgeons and were excluded from analysis, because our objective addressed the perceptions only of those who perform surgery. Thus, the total number of respondents was 379 from the COA and 337 from NASS. Table 1 displays the respondent demographics. There was no statistically significant difference between the two memberships with respect to mean age, gender distribution, and percent of orthopaedists.

RESULTS

Of those who replied, 17.2% had undergone spinal surgery and the results differed significantly between the COA at 12.9% (49:379) and NASS at 21.9% (74:337) ($\chi^2 = 10.2$, $p < 0.005$). In the COA, 46 surgeons each had one operation and 3 each had two spinal operations. In NASS, 59 surgeons each had one operation, 12 each had two, and 3 each had undergone three spinal operations. The mean age at time of first surgery was not significantly different ($t = 0.74$, $p = 0.461$) between the COA at 45.6 years (SD 12.1) and NASS at 44.1 years (SD 10.7).

To account for possible response bias, the percentages were recalculated based on the total mailing as the denominator; 7.8% (123:1,583) had undergone spinal surgery. These results differed significantly between the COA at 5.9% and NASS at 9.8% ($\chi^2 = 8.14$, $p < 0.005$). These percentages convert to spine surgery rates of 59/1,000 for Canadian respondents, 98/1,000 for U.S. respondents, and 78/1,000 for all respondents.

Active surgeons comprised 86% of the respondents (Table 2). Almost half of the Canadian respondents performed nine or more operations per week; half of the U.S. respondents performed three to five operations per week (Table 3).

In analysis of back pain prevalence, 44% of Canadian respondents and 55% of U.S. respondents indicated that they had spinal-related symptoms either before or after performing surgery. The U.S. percentage was significantly higher ($\chi^2 = 8.12$, $p < 0.001$). For respondents who indicated they had undergone surgery, the lumbar spine was

TABLE 2. Number of respondents by work status

Active surgeons	616
Residents	19
Fellows	5
Retired	53
Other	23
Total	716

the location for 85.4% of Canadians and 81.1% of Americans. These percentages were not significantly different.

For both groups combined, 28.1% of the respondents believed that "being a surgeon contributed significantly to the need to have surgery." Analysis by membership revealed no significant difference between responses (COA 30.6%, NASS 26%). A majority (62.6%) identified a specific precipitating event that led to their surgery (COA 63.3%, NASS 62.2%).

In the opinion of 79.8% of all respondents, surgery was performed at the right time (COA 88.9%, NASS 74.3%); 2.4% thought that their surgery was performed too soon, and 19.3% believed that they waited too long before going for their operations (COA 11.1%, NASS 24.3%).

In total, 76.1% of respondents missed <2 weeks of work before having surgery (COA 77.1%, NASS 75.6%). After surgery, for those who had graduated from medical school before their operations, 71.4% returned to practice within 4 weeks (COA 68.2%, NASS 73.2%), and 55.7% of the surgeons resumed performing surgery within 4 weeks of the time of their operations (COA 58.9%, NASS 53.9%). Only 19.3% of the respondents attended physical therapy (COA 18.4%, NASS 20.3%) (Table 4).

Discectomy was the most frequent procedure; 60% of Canadian respondents and 52% of U.S. respondents indicated that they had undergone this operation (Table 5). Because the prevalence of fusions in the COA (24%) and NASS (30.7%) were not statistically different and because of the small sample size, the analysis by type of surgery was performed on the combined memberships. The types of operations performed were collapsed into those who

TABLE 1. Respondent demographics

	Canadian	U.S.	Total
Orthopaedic surgeons	378	320	698
Neurosurgeons	1	17	18
Men	354	333	687
Women	14	1	15
Age ^a			
Mean	49.2	51.4	
Standard deviation	12.8	9.1	

^aMean ages not significantly different.

TABLE 3. Percentage of surgeons by approximate number of operations performed per week

Operations	Canadian ^a (n = 319)	U.S. ^a (n = 315)
<1	0.6	1.9
1-2	8.8	10.3
3-5	20.7	51.6
6-8	28.2	28.8
≥9	41.7	7.4
Total	100.0	100.0

^aSignificant difference between Canadian and U.S. responses ($z = 9.41$, $p < 0.0001$).

TABLE 4. *Approximate number of work days missed*

	Before respondents had surgery		Before returning to practice		Approximate time before performing surgery	
	Canadian (n = 48)	U.S. (n = 86)	Canadian (n = 44)	U.S. (n = 86)	Canadian (n = 31)	U.S. (n = 76)
No days	47.9	52.3	2.3	2.4	2.6	1.3
1-13 days	29.2	23.3	29.5	31.7	17.9	17.1
2-4 wk	14.6	11.6	36.4	39.0	38.5	35.5
5-8 wk	4.2	9.3	22.7	20.7	28.2	31.6
+8 wk	4.2	3.5	9.1	6.1	12.8	14.5

Responses not significantly different.

had fusions and those who had decompression. Of the 31 respondents who indicated they had a fusion, 83.9% missed <2 weeks of work before surgery. Of the 77 respondents who had spinal decompression, 74% missed <2 weeks before surgery. The results were not statistically different.

There was no statistical difference in the time to return to work postsurgery: 64.5% of the fusion group had returned to practice within 4 weeks of surgery compared with 76.6% of the decompression group. However, the fusion group took significantly longer to resume performing surgery; 41.9% were operating again within 4 weeks compared with 64.9% in the decompression group ($\chi^2 = 4.81, p < 0.05$).

Only 12.9% of the fusion group and 20.1% of the decompression group attended physical therapy. These results were not statistically different. Those who attended therapy were slower to return to practice and to the operating room. Within 4 weeks of their operations, 66.6% of those with therapy had returned to practice and 42.9% of this group had returned to performing surgery. The percentages for those who took no therapy were 73.6% and 60.4%, respectively.

DISCUSSION

The cooperation in responding to the questionnaire was almost identical for the Canadian and American responses. It is possible that the higher surgery rate for surgeons in NASS is a reflection of the higher surgery rate in the United States compared with Canada. Alternatively, the difference in surgery rates may reflect a more highly specified population in NASS. COA members with a special interest in spine, not the general orthopaedic membership, might make a better comparison. Limitations in potential sample size made this approach impractical. We considered the American Academy of Orthopaedic Surgeons (AAOS) instead of NASS as a comparison group to the COA, but the AAOS was unable to provide a mailing list.

The finding that ~17% of the respondents had undergone spine surgery was an unexpectedly high prevalence. This number represents the numerator, and the methodology of this study does not allow an accurate denominator. Using the number of respondents likely overestimates the surgery rate, because many surgeons who have not had spine surgery may not have responded. Using the total memberships, the prevalence of spine surgery was almost 8%. This calculation underestimates the surgery rate. The true denominator probably lies somewhere between the two. It is possible, but unlikely, that surgeons who have had spine surgery were less likely to respond.

The immediate proximity phenomenon may increase the acceptance of surgery. It is the same explanation for the propensity of bartenders to become alcoholics (4) or for physicians to become addicted to prescription medication (2,5). The argument runs that by being around surgery so much, one will be more likely to accept the treatment. Presumably, there is a "belief in surgery" as a method for solving problems. A majority of respondents stated that the timing of their surgery was appropriate. Working against the surgeons' choice of the surgical option was a knowledge of the operative complications and risk of failure.

These surgeons reported unusually tenacious work records with short preoperative disability, brief rehabili-

TABLE 5. *Percentage of types of spinal surgery performed on respondents*

	Canadian (n = 50)	U.S. (n = 88)
Discectomy	60	52.3
Fusion	10	14.8
Decompression	12	8.0
Discectomy & decompression	4	9.1
Discectomy & fusion	10	11.4
Decompression & fusion	2	2.3
Discectomy/decompression/fusion	2	2.3

"n" reflects number of operations not number of surgeons because some surgeons had multiple operations.

tation, and rapid return to work after surgery. This may indicate that confidence gained through a thorough knowledge of the spine, the disease, and the treatment may reduce the apprehension about surgery, facilitate rehabilitation, and decrease disability.

Surgeons having either fusion or decompression made little use of postsurgical physical therapy. Those who did not attend therapy returned to work even sooner than those who went for treatment. Perhaps the less complicated cases did not believe they needed therapy, whereas those who did go would also require more time to heal and return to work.

The rapid rates of return to work based on the presence or absence of fusion were similar, but conclusions are limited because of the small sample sizes. Motivation associated with self-employment may be an explanation, but it is also true that the "cultural norms of the surgical profession" demand that the surgeon be back to work in a very short time. Respondents who had a fusion, however, took significantly longer to return to performing surgery than those with only a spinal decompression.

This study has limitations common to questionnaire methodology. The overall response rate was <50%, introducing the problem of response bias. It is reasonable to assume that those who had spine surgery were more likely to complete and return their questionnaires than were those who had not. However, because the response bias would occur among our primary target group, those who have had surgery being more likely to respond, this bias probably had less of a negative effect on the results when calculated using percent of total mailing. Methods of

reminders common to improving response rate were not attempted because of the funding constraints. Recall bias plagues many questionnaires because of over- and under-reporting; however, given the background of this target population and the nature of the event relative to their professional interest, recall bias likely had little influence.

CONCLUSION

Although the surgery rate on American members of NASS was more than one-and-a-half times that of Canadian members in the COA, they had strikingly similar outcomes. They are a highly motivated, self-employed group who missed little work before and after having surgery. Their use of postsurgical physiotherapy was low.

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Commentary

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The article by Hall et al. presents numerous interesting discussion topics for spinal surgeons. Although the limitations of this questionnaire-type study are numerous, several compelling bits of data emerge. One suspects that spine surgery must have positive features that impact on the quality of life to explain the high prevalence of these elective procedures in a sophisticated and knowledgeable cohort group. Seventeen percent of respondents from the Canadian Orthopaedic Association and North American Spine Society underwent spinal surgery. Comparison with a control group of nonphysicians and nonsurgeons would have been worthwhile. I was most interested in the rate of return to work for this motivated, self-employed group. These individuals clearly were not interested in "time out" from

the workplace which, in many ways, reaffirms the positives of our chosen profession as well as the work ethic of the individuals. Although the use of physical therapy services in a formal sense was minimal, I suspect that many of the respondents were involved in various fitness programs at home or at club facilities and did not need to be educated in this process. When I look back on the physicians that I have operated on for various spinal disorders, I can certainly agree with the findings of this study. We must continue to direct our efforts to achieve similar outcomes for all of our patients, independent of their chosen vocations.

Dan M. Spengler, M.D.
Co-Editor