

Physiatrists' Opinions and Practice Patterns for Bone Health after SCI

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Abstract

Objective—To ascertain physiatrists' opinions and current practice patterns for bone health management after spinal cord injury (SCI).

Study Design—Self-report survey

Participants—Physiatrists who work in teaching rehabilitation centers in Canada.

Methods—A 4-page 17-question survey (available in French and English) was sent to working physiatrists in all major Canadian SCI rehabilitation centers.

Results—We had an 85% response rate (22 responses). Physiatrists reported that they should be managing bone health issues after SCI in conjunction with family physicians, and most respondents assess and treat for bone health after SCI. However, just over one-third of the physiatrists reported that the current treatment options are not effective for low bone mass; there was more support for pharmacological treatments than there was for rehabilitation modalities.

Conclusion—Bone health after SCI is an important health concern that is being managed by physiatrists; however, more discussion and research is needed to ascertain the effectiveness of assessment and treatment options for low bone mass.

Keywords

Spinal cord injury; osteoporosis; questionnaire; physician

INTRODUCTION

Bone health after a spinal cord injury (SCI) is an important issue that needs to be addressed because of an increased risk for fragility fractures. The frequency of fragility fractures after SCI ranges up to 33% (1–5) and the majority of these fractures occur during transfers or other activities that involve minimal or no trauma (1). Contributing to the increased risk for fragility fracture is the loss of bone mineral density (BMD) in the lower extremity that was initially thought to stabilize around one year post injury (6) but below that of able-bodied peers. More recent literature supports a continual loss of bone mass with time since injury suggesting that bone mineral loss continues (7) and contributes to the increased risk of fractures. In the general population, people who sustain a low impact trauma fracture (falling from a standing height or less) have an increased risk for subsequent fracture, thus practice guidelines emphasize that these fragility fractures should prompt a workup to determine possible causes and appropriate management (8). For people with SCI, previous literature suggests that the mean incidence of lower limb fracture is 2.2%/year (9). Yet despite these data there has been little published to highlight physiatrist practice patterns specifically for people with SCI.

Prevention and treatment of osteoporosis following SCI has been investigated as early as a few days after the initial injury (10). However in practice, bone health interventions are generally initiated in the inpatient rehabilitation setting where physiatrists, specialists in rehabilitation medicine, are most often involved. In Canada, as advocated from best practice guidelines, people with SCI are treated in specialized rehabilitation centers that are teaching hospitals. After being discharged from rehabilitation and living in the community, bone health evaluation may involve the ongoing care by physiatrists and/or family physicians. Family physicians' opinions of bone health in the general population has been discussed elsewhere (11–13), however, to our knowledge there are no other published surveys of physiatrists' practice patterns or clinical practice guidelines for bone health specific to SCI. Therefore understanding physiatrists' opinions and practice patterns could provide insight and a foundation for the development of standards for bone health management. Importantly, knowing the current state of practice can provide insight as to whether knowledge translation strategies are needed to change practice. Therefore, we surveyed practicing physiatrists who specialize in SCI medicine to ascertain their bone health opinions and current practice for people with SCI.

METHODS

This was a self-report survey of opinions and practice patterns of physiatrists in Canada who treat people with SCI. All research was approved by the local university ethics review board and all applicable institutional regulations were followed during the course of this research.

Questionnaire development

We developed the questionnaire in consultation with two working physiatrists. A number of clinically relevant topics were generated and questions developed to investigate clinically important themes around bone health. Once the questionnaire was developed it was piloted by asking three other physiatrists, a physician in family practice and physical therapist to

review and offer feedback on content and process items. Two other physiatrists piloted the question prior to its final version and also offered feedback. The final questionnaire comprised of predominantly closed-ended questions that focused on 3 main elements of physiatrists' medical opinions and practice patterns on bone health after SCI: 1. demographics of respondents, 2. assessment of bone health issues after SCI; and 3. timing and type of treatment for bone health issues. The full questionnaire is contained in the Appendix; most questions were either tick boxes or fill in the blank. The completed format was then translated into French and sent for review to a French speaking health professional to ensure the integrity of the translation.

Respondents

We contacted the department head of the main teaching-hospital affiliated spinal cord injury rehabilitation centers across Canada. Department heads provided a list of physiatrists who treated people with SCI at the center. Following this, a 4-page 17-question survey was mailed and emailed to physiatrists in all major Canadian SCI centers. A self-addressed returned envelope was included and respondents were given the option to email or fax the questionnaire back. Questionnaires were available in French and English. All questionnaires were numbered to track responses only; if a response was not received within 4 weeks, an email and letter were resent. Responses remained anonymous; however, respondents were asked specific questions such as gender, hours of practice/week, number of clients seen etc.

Statistical Analysis

All questionnaires were analysed for frequency of responses and reported as the number of responses.

RESULTS

We mailed 26 questionnaires to physiatrists working in Canada who treat people with SCI. We received 22 questionnaires back resulting in an 85% response rate. The respondents represented all regional areas of Canada spanning 7 Canadian provinces and including 10 treatment centers where there were major rehabilitation centers focused on the care of people with SCI. The majority of our respondents were women with a mean age of 42 years. The mean time in practice was 10 years and the mean number of hours/week spent working as a physiatrist was 51 hours; most of the work time was spent in patient care (Table 1).

Bone Health Management

Most respondents (19/22) reported that physiatrists should manage bone health issues after SCI; just under half of respondents believed that the primary care physician should also be involved in bone health management after SCI. Only 2 respondents believed that bone health evaluation should happen in the acute phase; 11 respondents believed it should happen during the rehab phase and after a fracture; while 14 respondents reported support for the period after discharge from formal rehabilitation.

Assessment of bone health after SCI

Of the physiatrists who responded, most reported that they would assess for bone health issues after SCI. On average, physiatrists report they assessed 54% (\pm 42) of clients after SCI. Dual energy X-ray absorptiometry (DXA) and tracking fracture history were the assessment tools most often used in clinical practice (Table 2).

Treatment of bone health after SCI

Most respondents (20/22) reported they would treat bone health issues after SCI; on average they treat 42% (\pm 35) of clients for bone health related issues. Just over one-third of respondents said that they did not think the current treatment options are effective for low bone mass associated with SCI. There was lower support for rehab modalities [such as weight-bearing (14 responses) and electrical stimulation training (EST; 4 responses)] compared with 20 respondents who believed bisphosphonates and 19 respondents who believed calcium/Vitamin D were effective treatment options (Table 3).

DISCUSSION

This is the first survey to report Canadian physiatrists' opinions and practice patterns for bone health after SCI. In this novel study we report two key findings: i) physiatrists believe that bone health management after SCI is an important issue; and ii) pharmacological treatments are most often prescribed for beneficial effects, while rehabilitation modalities have lower support for effectiveness amongst physiatrists.

Physiatrists report that they should be involved in the management of bone health and that the assessment should take place either in the rehab phase or after discharge. It is encouraging that most of the respondents report assessing for the prevention and treatment of bone health issues. However there remains the need to address these issues with community-based family physicians as the current general guidelines for osteoporosis management (8) do not specifically address persons with SCI.

In our survey, physiatrists report monitoring and treating clients based on established clinical practice guidelines for the general population. However, one area that requires further investigation is how bone health is monitored and managed after SCI. Although most respondents reported using DXA as an assessment tool, there are practical challenges for evaluation and diagnosis of bone health for people with SCI. Although the standard clinical protocol by DXA for assessing BMD involves the hip and spine (8), it does not routinely measure the knee/leg where fractures are more likely to occur (1–5). There have been some advances to refine the use of DXA at the distal femur and proximal tibia; Shields and co-investigators have reported the reliability of a DXA protocol for assessment of BMD around the knee (14). Importantly, establishing normative data for BMD with a DXA-knee protocol is crucial for the future assessment of bone health for this population.

There is some evidence to suggest that pharmacological therapy is beneficial for bone health after SCI (15–20), nonetheless, we recognize that more specific guidelines are necessary. Although there is some literature to support the use of bisphosphonates, we note that Bauman and coworkers found a small beneficial effect in total leg BMC by DXA in the first

month that was not maintained at 12 months (19). More recently however, Gilchrist and coworkers (20) reported maintenance of femoral neck BMD by DXA at 1-year with Alendronate that was commenced on average 10 days after injury. More research is necessary to determine the long term consequences of treatment, including the effect on fracture endpoint.

In contrast to pharmacological therapy, rehabilitation modalities had lower support by the respondents as effective treatment options. This is in agreement with our recent systematic review (21) that highlighted the lack of evidence for rehabilitation modalities for bone health after SCI and the need for more research to investigate the long-term effectiveness of such things as functional electrical stimulation.

Interestingly half of the respondents in this survey reported that they prescribe weight-bearing activities (such as a tilt-table, ambulation etc.) to improve bone health and only one respondent prescribed EST. From our systematic review (21), we note little evidence to support weight-bearing for maintenance of bone health in people with SCI. This may either be due to the limited research done in this area, or conversely, recent theories have suggest that bone loss after SCI is affected by a neurogenic response and therefore, the mechanical stimulation that may be achieved through weight-bearing may not be sufficient to counterbalance a central mechanism (22). Nonetheless, upright weight-bearing activities still play a significant role in the maintenance of other health systems such as reducing orthostatic hypotension. Another interesting result from our study was that only one respondent prescribed EST for bone health after SCI, despite having stronger support for this modality in improving bone health (21). Despite its potential benefits, the practicality of EST is that it may be costly and/or time-consuming for therapists and participants. In addition, since it only improves bone under the area of stimulation, the feasibility of improving bone in multiple locations may be difficult.

We note several limitations with our study. First, the survey was only sent to physiatrists in Canada. Although 22 responses may appear to be low, this is a small, specialized practice area and there are only a limited number of physiatrists in Canada. In addition, we note that we only approached rehabilitation centers that were considered teaching facilities; as SCI is sometimes treated in non-teaching centers, we may have missed some physiatrists. Further, we purposely did not approach family physicians about bone health issues after SCI. Although this is an important group to consider, as family physicians are essential for bone health management in the general population, we were more interested in the spectrum of care after SCI (acute to chronic) and the specialist practice in this area. Nonetheless, future research should consider family physicians and their practice patterns for bone health after SCI.

In conclusion, we note that the physiatrists who responded to our survey were very experienced in the care and management of people with SCI; they report that bone health is an important issue that they routinely address. Pharmacological treatments were almost always prescribed because of the available evidence; however, our survey respondents believed that the evidence is limited for rehabilitation options for the prevention and treatment of low bone mass after SCI. One area of knowledge translation for this important

health issue is the dissemination of the latest evidence from systematic reviews (21) to clinicians and the development of standards for bone health management based on the outcomes of well designed studies. As with surveys of practice patterns in other clinical areas (23), results are often an important starting point for discussion, and an international collaboration of health professionals would be ideal to discuss these important issues.

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APPENDIX

Bone Health Opinions and Practice Patterns After a Spinal Cord Injury

For the following items, place a mark [x] in the appropriate circle that indicates your response.

- 1 In what setting do you work with people who have had a spinal cord injury?
Check all that apply.
 - Acute care phase (in hospital)
 - Rehabilitation phase (Inpatients)
 - Rehabilitation phase (Outpatients)
 - Post-discharge community-based

Assessment of Bone Health

- 2 Do you assess bone health status in patients who have had a spinal cord injury?
 - YES
 - NO

If yes, what percentage of your SCI clients do you assess for bone health?

_____.

- 3 What do you do to assess bone health after a spinal cord injury? **Check all that apply.**
 - Dual energy X-ray absorptiometry (DXA)
 - Specific blood test for bone health
 - Specific urinalysis tests for bone health
 - Review and track fracture history

- Other _____
 I do not assess for bone health in people after a spinal cord injury.
- 4 When do you do the assessment of bone status?
- In the acute phase
 During rehabilitation phase (inpatients and outpatients)
 After discharge from formal rehabilitation
 After a fracture
 I do not assess for bone health in people after a spinal cord injury.
- 5 Who do you believe should manage bone health in a patient after a spinal cord injury? **Check best answer.**
- Surgeon/acute care physician after the initial injury
 Physiatrist
 Primary care physician
 Other _____
- 6 What do you see as factors that would prevent you from investigating bone health for a person after spinal cord injury? **Check all that apply.**
- Do not think current treatment is effective
 Unsure of what is available
 Do not have access to assessment technology (e.g. DXA)
 Not my responsibility
 Time constraints
 Do not believe that it is an important issue
 None
 Other _____

Treatment of Bone Health

- 7 Do you treat bone health in patients who have had a spinal cord injury?
- YES
 NO
- If yes, what percentage of your SCI clients do you treat bone health? _____
- 8 What treatment do you most often prescribe for bone health after a spinal cord injury? **Check all that apply.**
- Bisphosphonates

- Calcium and Vitamin D
- Weight-bearing (tilt-table, standing frame)
- Electrical stimulation applied to muscles
- Functional electrical stimulation (FES) Cycle ergometry
- Other _____

9 Do you believe that the following treatments are effective for preventing or treating bone health after a spinal cord injury? **Check all that apply.**

- Bisphosphonates
- Other medications
- Calcium and Vitamin D
- Weight-bearing (tilt-table, standing frame)
- Electrical stimulation applied to muscles
- Functional electrical stimulation (FES) Cycle ergometry
- Other _____

Thank you for completing this questionnaire. We appreciate your support.

The following section inquires about personal demographic information.

- 10** Gender (please circle): Female Male
- 11** Age _____
- 12** How many years have you been practicing as a physiatrist? _____
- 13** How many years have you been treating clients/patients with SCI?

- 14** On average, how many hours per week do you work? _____
- 15** On average, how many patients do you see daily? _____
- 16** On average, how many patients with a spinal cord injury do you see daily?

- 17** Please indicate the percentage of your total work time that you spend in each type of activity during an average month.
- Patient care _____ %
 - Research _____ %
 - Teaching _____ %

Table 1

Demographics of the questionnaire respondents.

Characteristic	Mean \pm standard deviation/percentage (N=22)
Gender	70% women; 30% men
Age (years)	42 \pm 8
Years as a physiatrist	10 \pm 7
Years working with people with a spinal cord injury (SCI)	10 \pm 6
Hours worked each week	51 \pm 15
Patients seen daily	13 \pm 7
Patients with SCI seen daily	9 \pm 7
Percentage of time in patient care	68%
Percentage of time in research	11%
Percentage of respondents who work in acute care	55%
Percentage of respondents who work in rehab (inpatients)	91%
Percentage of respondents who work in rehab (outpatients)	86%
Percentage of respondents who work in community	55%

Table 2

Responses of questions related to prevention of bone loss after a spinal cord injury.

Assessment technique used	Respondents who responded yes (%). (N=22)
Dual energy X-ray absorptiometry (DXA)	18 (82%)
Review and track fracture history	16 (73%)
Specific blood test for bone health	9 (41%)
Specific urinalysis tests for bone health	6 (27%)
I do not assess for bone health in people after SCI.	2 (9%)
Barriers to prescribing treatment options	
Do not think current treatment is effective	8 (36%)
None	6 (27%)
Do not have access to assessment tools (e.g. DXA)	4 (18%)
Time constraints	2 (9%)
Unsure of what is available	1 (5%)
Not my responsibility	0
Do not believe that it is an important issue	0

Table 3

Responses of questions related to treatment of bone loss after a spinal cord injury (>1 year after injury).

Treatment prescribed	Respondents who responded yes (%). (N=22)
Bisphosphonates	20 (91%)
Calcium and Vitamin D	20 (91%)
Weight-bearing (tilt-table, standing frame)	11 (50%)
Electrical stimulation applied to muscles	1 (5%)
Functional electrical stimulation (FES) Cycling ergometry	1 (5%)
Treatment options	Number of respondents (%) who believe these are effective treatment options. (N=22)
Bisphosphonates	20 (91%)
Calcium and Vitamin D	19 (86%)
Weight-bearing (tilt-table, standing frame)	14 (64%)
Electrical stimulation applied to muscles	4 (18%)
Functional electrical stimulation (FES) Cycle ergometry	4 (18%)
Other medications	4 (18%)