

# Use of Nitrous Oxide and Oxygen for Conscious Sedation to Manage Pain and Anxiety

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## ABSTRACT

A 13-item survey of dentists' views about approaches to pain and anxiety management was distributed in Atlantic Canada. Respondents indicated that about 50% had training in conscious-sedation techniques and 20% had learned to administer intravenous (IV) sedation. Sixty-nine percent of those responding had used oral sedatives to help manage fearful patients. Forty-six percent had referred anxious adult patients to specialists or other dentists, and 78% had made similar referrals for anxious children. Seventeen percent reported using conscious sedation, but they typically treated more than 20 anxious patients per year. Most (80%) believed that nitrous oxide and oxygen (N<sub>2</sub>O/O<sub>2</sub>) conscious sedation should be included in the treatments that a licensed practitioner can provide, and they were evenly divided in their opinion about the need for a separate licence for its use. However, only half of respondents believed that IV sedation should be included among a general practitioner's treatment options, and over 70% said that this treatment should be subject to a separate licence. The implications of these findings for curriculum are discussed.

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Fear and avoidance of dental treatment are acknowledged to be major deterrents to oral health.<sup>1-5</sup> Malamed<sup>6</sup> claims that fear, anxiety and pain have long been associated with the practice of dentistry, although he goes on to explain that the image of the dentist as an instrument of pain is not justified. In fact, dentists have promoted and researched methods of pain and anxiety control. Wells, a dentist, was first to use nitrous oxide for sedation, and Morton, a dentist and physician, introduced ether.<sup>7</sup>

As in other parts of the industrialized world, many people in Canada do not seek dental care. According to Statistics Canada,<sup>8</sup> this cohort is about 40% of the total population, although it is higher in the Atlantic

provinces. The reasons for not seeking dental care are various, including cost and anxiety related to anticipated painful procedures, but no analysis of the reasons for not seeking professional dental care has been conducted. Donaldson<sup>9</sup> suggests that adolescents, in particular, suffer from acute anxiety about professional dental care. If young people avoid it because of anxiety, they are likely to carry this fear into adulthood and continue this behaviour. In their randomized controlled trial, Averley and colleagues,<sup>10</sup> who believe that children's failure to have dental treatment because of anxiety is a common problem, concluded that the use of sedation results in more successful treatments.

Awareness about using sedation to alleviate anxiety during dental procedures is growing internationally. From their national survey of the Canadian population, Chanpong and others<sup>11</sup> determined that about 50% preferred sedation or general anesthesia for endodontic, periodontal and surgical procedures. They concluded that the adult Canadian population has a significant need for sedation and general anesthesia for dental procedures. Similarly, in their survey of patients attending an emergency dental clinic in the United Kingdom, Allen and Girdler<sup>12</sup> found that 68% claimed nervousness; 43% cited fear and nervousness as the reason for not seeking dental treatment earlier; and 38% were not aware that sedation was available, although 35% claimed to have had sedation in the past. Of those surveyed, 56% said that they would like to have sedation if it were available. The authors concluded that increased availability of sedation for dental procedures would remove a barrier to care for highly anxious patients. From a survey of consultants in restorative dentistry (prosthodontists), Morgan and Skelly<sup>13</sup> concluded that despite recognizing the need, only one-third of respondents provided sedation for their patients. In Japan, too, the need for sedation for dental procedures because of anxiety has been identified. Morse and colleagues<sup>14</sup> claim that fear and anxiety continue to deter patients in that country from seeking dental services. However, information about the use of sedation in Japan is scarce, although all Japanese dental schools have departments of anesthesiology and teach a broad range of sedation techniques.

To serve the public and facilitate patients achieving an acceptable standard of oral health, methods of dealing with fear and anxiety should be made available to those who suffer from these constraints. University curricula leading to Doctor of Dental Medicine (DMD) and Doctor in Dental Surgery (DDS) degrees prepare the students to become competent beginning dental practitioners, by teaching them to recognize the common signs, symptoms, and causes of anxiety and apprehension in dental patients and to implement appropriate management of the anxious or apprehensive patient.<sup>15</sup>

University calendars reveal that in Canada 7 of the 10 DMD/DDS programs teach a course in conscious sedation with nitrous oxide and oxygen (N<sub>2</sub>O/O<sub>2</sub>); 2 Quebec programs and 1 Ontario program do not. The details of the courses taught and the amount of practical experience required for graduation in each program vary.

Not all dental licensing authorities of the provinces and territories require that dentists who intend to use conscious sedation successfully complete courses in the modality they plan to use for control of pain and anxiety. The majority of the provinces and territories have specific guidelines for the use of conscious sedation; some use the Canadian Dental Association guidelines; others have developed their own, but the documents are very similar.

For several years Dalhousie University dental students have had the opportunity to participate in a course about conscious sedation with N<sub>2</sub>O/O<sub>2</sub>. The course meets the requirements stipulated in the guidelines of the various Canadian jurisdictions and is completed at the end of the fourth year DDS program, before graduation. Successful completion of the course is not a requirement for graduation, but the majority of students register for it each year. Certificates are issued to those who complete the course successfully.

If patients suffer from fear and anxiety, and methods of successfully dealing with these conditions exist, surely it is reasonable to expect that the use of these methods should be common in dental practices. This paper describes the results of a survey seeking to determine the level of dentists' use of conscious sedation procedures in Atlantic Canada and to ascertain their views about the place of instruction in conscious sedation in DDS/DMD programs.

## Methods and Materials

In April 2003, a 13-item survey was mailed to practising dentists ( $n = 1,378$ ) in Atlantic Canada who had enrolled in continuing education courses at Dalhousie University during the previous 3 years. A second mailing to nonrespondents was conducted in October 2003. Information about the dentists' professional status, their use of and perceived need for sedation techniques in practice, and their desire for continuing education courses in these techniques was also collected. In addition, the survey did not formally define the terms "pain" or "anxiety," but left the interpretation of these terms to the dentists completing the survey.

## Results

A total of 237 (17.2%) useable surveys of the 1,378 surveys mailed were returned. In interpreting the results, it is important to remember that this convenience sample may not be representative of Canadian dentists or even of dentists in Atlantic Canada. However, the large number of responses probably helps to compensate, in part, for the low return rate.

Of those responding, 81.4% were Dalhousie graduates, 78.4% had graduated within the past 30 years and 91.3% practised in Atlantic Canada. Almost one-half (117/237) had training in conscious sedation techniques, and 20% (48/237) had learned to administer IV sedation.

Sixty-nine percent (164/237) of those responding had used oral sedatives to help manage fearful patients. Forty-six percent (110/237) had referred anxious adult patients to specialists or other dentists, and 78% (184/237) had made similar referrals for anxious children. Only 17% (39/237) reported using conscious sedation in their prac-

tice, but each of these respondents typically treated more than 20 anxious patients per year.

Over 80% (19/237) of respondents agreed that conscious sedation with N<sub>2</sub>O/O<sub>2</sub> should be included in the treatments that a licensed dental practitioner can provide, but the respondents were quite evenly divided in their opinion about whether a separate licence for the administration of conscious sedation with N<sub>2</sub>O/O<sub>2</sub> should (46% or 105/226) or should not (54% or 121/226) be required.

About half the respondents (52% or 123/237) believed that IV sedation should be included in the treatments that a licensed dentist can provide, but over 70% (167/237) believed that a separate licence for the administration of IV sedation should be required. (Frequency counts for each of the items in the survey may be found in [Appendix 1](#).)

## Discussion

The dental profession in Canada is concerned that about 40% of the Canadian population does not seek professional help for their oral health. Although this behaviour may be partly due to fear and anxiety, many members of the profession do not offer sedation to their fearful patients. The general population generally accepts that they will be sedated or be asleep for general surgical procedures, yet they seem unaware that this is also an option for dental work.

The use of oral sedatives, although not without some disadvantages, is reported to be the most common technique for managing anxious adults, whereas the treatment of choice for children seems to be referral to specialists or judicious use of “TLC.” Although the dentist and the patient probably see oral sedatives as easy to administer and the appropriate modality for many, conscious sedation is quite underused within the profession. Nevertheless, 80% of the respondents to our survey agreed that conscious sedation with N<sub>2</sub>O/O<sub>2</sub> should be included in the treatments that a dentist can provide. These results raise the question about why more dentists are not using and promoting the use of this modality. The results of a survey by Chanpong and others<sup>11</sup> suggest that the public can identify the procedures for which they want sedation; however, recognizing that they have such a choice may not be as prevalent in the Atlantic region.

One of the authors (HAR) who is involved in the course on conscious sedation provided for graduating students indicates that the students are enthusiastic about its use during and after the course. These students express their intent to use the procedure because it is effective, safe and easy to administer, and yet the results of this survey suggest that this enthusiasm wanes. Since about 15% (35/237) of dentists used conscious sedation for anxious adults and about 13% (30/237) used it for anxious children, conscious sedation should be included in the DDS/DMD curricula of Canadian faculties of dentistry. In contrast, 7.7% (18/234) of dentists used IV sedation,

but they typically completed postgraduate courses to learn its use. Teaching IV sedation in the undergraduate curriculum, however, is probably not warranted at this time. Further research is required to determine why more dentists in the Atlantic region do not use and promote conscious sedation with N<sub>2</sub>O/O<sub>2</sub>, and whether the public would welcome its availability. It would also be useful to be able to compare results of this survey with those of similar surveys administered in other regions of Canada.

Easy access to conscious sedation in dental offices and knowledge of this access might encourage the fearful among the general population to seek oral care because they could be sedated for some procedures. The Canadian dental profession is generally known for its ability to provide quality oral health care. Perhaps just as importantly it should be known for its ability to provide this care to those many Canadians who are fearful about seeking their services. It is time to post *pavor abeat* (fear be gone) above the door of every Canadian dental office. ♦

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**Appendix 1** Survey with frequency counts for each question

Survey question	Number of responses
<b>1. How do you manage anxious adult patients?</b>	
Hypnosis	5
N <sub>2</sub> O/O <sub>2</sub> conscious sedation	35
Oral sedatives	164
Intravenous (IV) sedation	17
Referral	110
Other (please specify)	---
<b>2. How do you manage anxious children or children requiring extensive treatment?</b>	
Hypnosis	6
N <sub>2</sub> O/O <sub>2</sub> conscious sedation	30
Oral sedatives	59
Intravenous (IV) sedation	11
Referral	184
Other (please specify)	---
<b>3. Was nitrous oxide/oxygen conscious sedation part of your dental undergraduate curriculum?</b>	
Yes	48
No	188
<i>If yes:</i>	
<i>Was it a required course?</i>	28
<i>Was it an elective course?</i>	18
<i>Were you competent as a beginning dental practitioner to administer N<sub>2</sub>O/O<sub>2</sub> conscious sedation?</i>	
Yes	40
No	11
<b>4. Have you completed post-graduate courses in N<sub>2</sub>O/O<sub>2</sub> conscious sedation?</b>	
Yes	69
No	167
<i>If yes, how many hours?</i>	
<i>Less than 5</i>	2
<i>5-12</i>	21
<i>13-20</i>	20
<i>More than 20</i>	25
<b>5. Do you use N<sub>2</sub>O/O<sub>2</sub> conscious sedation in your practice?</b>	
Yes	39
No	196
<i>If yes, how many cases per year would you have?</i>	
<i>10 or less</i>	3
<i>11-20</i>	9
<i>21-50</i>	16
<i>More than 50</i>	12

<i>What percentage of these cases are children (16 years of age or younger)?</i>	
5%	8
20%	11
50%	16
100%	4
<b>6. Would you participate in a practical course on N<sub>2</sub>O/O<sub>2</sub> conscious sedation if offered by Dental Continuing Education?</b>	
Yes	89
No	136
<b>7. Do you think N<sub>2</sub>O/O<sub>2</sub> conscious sedation should be included in those treatments that a licensed dental practitioner can provide?</b>	
Yes	193
No	34
<b>8. Do you think there should be separate licence for conscious sedation with N<sub>2</sub>O/O<sub>2</sub>?</b>	
Yes	105
No	121
<b>9. Was IV sedation part of your dental undergraduate curriculum?</b>	
Yes	18
No	218
<i>If yes:</i>	
<i>Was it a required course?</i>	8
<i>Was it an elective course?</i>	5
<i>How many cases to be completed?</i>	
<i>Were you competent as a beginning dental practitioner to administer IV sedation?</i>	---
Yes	7
No	8
<b>10. Have you completed post-graduate courses in IV sedation?</b>	
Yes	30
No	206
<i>If yes, how many hours?</i>	
<i>Less than 5</i>	1
<i>5-12</i>	7
<i>13-20</i>	3
<i>More than 20</i>	19
<b>11. Do you use IV sedation in your practice?</b>	
Yes	18
No	216
<i>If yes,</i>	
<i>How many cases per year would you have?</i>	
<i>10 or fewer</i>	1
<i>11-20</i>	3
<i>21-50</i>	1
<i>More than 50</i>	13

<i>What percentage of these cases are children (16 years of age or younger)?</i>	
5%	7
20%	8
50%	2
100%	17
<b>12. Do you think IV sedation should be included in those treatments that a licensed dentist can perform?</b>	
Yes	123
No	7
Don't know	39
<b>13. Do you think there should be a separate licence for IV sedation?</b>	
Yes	167
No	43
Don't know	24