

Assessing the use of the Index of Sedation Need in oral surgery

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VERIFIABLE CPD PAPER

IN BRIEF

- Identifies problems with the sensitivity and specificity of the Index of Sedation Need.
- Suggests there is a tension between the need for a sedation assessment tool to be simple and easy to administer, yet sophisticated enough to capture the complex psychosocial factors that predict a patient's tolerance for a specific procedure.

RESEARCH

Objective This article evaluates the use of the Index of Sedation Need in oral surgery. **Design** Service evaluation and audit. **Setting** Oral surgery department of a London dental teaching hospital. **Subjects (materials) and methods** Patients attending for oral surgery procedures with sedation which had been arranged without reference to the IOSN tool completed the IOSN and a patient questionnaire. Operators completed a similar questionnaire. The IOSN was calculated and the questionnaire responses analysed using SPSS. **Results** 56% of the patients in this study (n = 105) were receiving sedation appropriately according to the IOSN tool. When the questionnaire responses were analysed depending on sedation need, no statistical difference was found using Fisher's exact test or Pearson Chi-Square (p < 0.05). Fifty percent of patients who had no need for sedation according to the IOSN tool were considered by the operator to have been untreatable without it. **Conclusion** This study raises questions over the validity and reliability of the IOSN tool as a method of defining sedation need.

INTRODUCTION

The Index of Sedation Need¹ (IOSN) is proposed as a means to objectively assess the degree of need for sedation as a method of anxiety control for dental procedures. The IOSN combines scores for anxiety, procedure complexity and medical history and the resulting numeric score defines sedation need as minimal, moderate, high or very high. The IOSN has been developed in the North-West of England and the use of the tool has been proposed as a means of objectively assessing sedation need on an individual patient basis. The tool shares some characteristics with the established Index of Orthodontic Treatment Need² in that it can be used at the point of referral by general dental practitioners to assess the need for specialist treatment.³ NHS England are concerned that some sedation provision is led by demand rather than need and they propose the tool is used to support clinical decision making and to allow commissioners to identify the proportion of patients needing sedation in order to receive dental care.⁴

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MATERIAL AND METHODS

The study population comprised patients attending for exodontia with intravenous sedation provided by staff surgeons at a UK dental teaching hospital. The decision to provide treatment with sedation had been made at an outpatient consultation without reference to the IOSN. One hundred and

fifteen consecutive patients completed a form which contained the IOSN and post-operative questionnaires on satisfaction and attitudes to sedation. The operator completed the relevant sections of the IOSN before the procedure and answered questions seeking their views on the need for sedation once treatment was complete (Fig. 1). The patient completed

	Agree	Disagree	Unsure
Thinking about the treatment you provided today:			
I could not have performed this treatment on this patient without sedation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could have performed the treatment but it would have taken longer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could have provided the treatment without sedation but it would have been an unpleasant experience for the patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I was the patient I would have had sedation today	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thinking about the IOSN form:			
The medical history data was suitable for my use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The treatment complexity score was accurate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The anxiety section was completed correctly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thinking about the treatment offered today:			
Anxiety management offered	IV	RA	CBT Other_____
Dose of midazolam used	_____mg		
Dental treatment undertaken with brief details <i>For example, "surgical removal lower third molar, moderate bone removal"</i>	_____		
Time taken to complete treatment	_____min		
Free comments on the patient, form and treatment <i>Please add any further information on the treatment, sedation and patient that you feel will be helpful</i>	_____		

Fig. 1 Operator questionnaire

the post-operative questionnaire (Fig. 2) once they had demonstrated fitness for discharge according to our standard protocol. There was no change to any treatment and no personally identifiable information was collected. This project was locally approved as a combined audit and service evaluation exercise which did not require ethical approval. The study was run using the methodology as described by Goodwin *et al.*⁵ in their 4-centre study in the north west of England to allow direct comparison of data. The data was entered into SPSS v22.0 (IBM Corp, Armonk, NY) and the IOSN score was calculated.

RESULTS

One hundred and fifteen forms were returned, of which 105 were complete and are included in this analysis. The demographics of the respondents are shown in Table 1. The IOSN categories for the 105 participants are shown in Table 2. The individual domain score rankings are shown in Table 3. This data shows very similar demographics to the Goodwin *et al.*⁵ study although there is a slightly lower sedation need overall (56% of patients would receive sedation according to the IOSN in our unit, compared with 70% in the original study).

Tables 4 and 5 show the patient and operator questionnaire results which have been divided into two groups – the ‘no sedation need’ group who had IOSN results of low or moderate, and the ‘sedation need’ group who had IOSN results of high or very high.

Thirty seven percent of patients in the no sedation need group reported that they could not have had the procedure without sedation and 65% reported that they may have cancelled or failed to attend their appointment

Table 1 Demographics of respondents (n = 105)

Gender	Number	Mean age (SD)
Male	38	39 (13.9)
Female	67	38 (17.0)
Total	105	38 (15.9)

Table 2 The need for sedation of the respondents (n = 105)

Sedation need as indicated by IOSN score	Frequency	Percentage
Low	8	8
Moderate	38	36
High	57	54
Very high	2	2
Percentage who would have had sedation according to IOSN tool		56%

	Agree	Disagree	Unsure
Thinking about the treatment you had today:			
I could not have had this treatment without sedation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Without the offer of sedation, I may have cancelled or not attended this appointment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I asked for this treatment to be provided under sedation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My dentist suggested that I have this treatment under sedation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thinking about a year from now:			
I would ask for sedation again in the future for this type of treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would ask for sedation again for any type of treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thinking about your sedation in the past:			
I have always had sedation for dental treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't usually go to a dentist because I am not able to get sedation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't usually have sedation but my treatment was complex today	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have failed to attend appointments in the past as I have not been offered sedation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thinking about the anxiety form that you completed on the other side of this sheet:			
I found the form easy to complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was happy to complete the form	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I needed some help to complete the form	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Fig. 2 Patient questionnaire

without the offer of sedation. Patient satisfaction with sedation was high in both groups, with 93% of all patients reporting that they would ask for sedation again for a similar procedure.

When operators were asked whether they could have completed the procedure without sedation, there was very little difference between the two groups. They responded that for the 50% of the patients who would not have been offered sedation, they could not have completed the procedure successfully. This figure is similar to that reported

by Goodwin *et al.* (45%).⁵ Furthermore, 46% of operators felt that while it would have been possible to have provided the treatment without sedation in the ‘no sedation need’ group, it would have been an unpleasant experience for the patient (this rose to 69% in the ‘sedation need’ group). All of the patient and operator questionnaire responses were analysed with Fisher’s exact test or Pearson’s chi square to look for significant differences between the responses of the two groups. None were found at the p <0.05 level, although one question came close to

Table 3 Distribution of IOSN domain scores contributing to overall IOSN score

Sedation need	Rank	Treatment complexity	Medical score	Anxiety score
Minimal	1	7	8	6
	2	1	0	2
	3	0	0	0
	4	0	0	0
Moderate	1	17	28	13
	2	10	7	8
	3	10	3	14
	4	1	0	3
High	1	10	21	4
	2	15	21	4
	3	26	9	21
	4	6	6	28
Very high	1	0	0	0
	2	0	0	0
	3	1	1	0
	4	1	1	2

significance (operator question 3: I could have provided the treatment without sedation but it would have been an unpleasant experience for the patient, $p = 0.064$)

In their paper, Goodwin *et al.*⁵ suggested a modification to the IOSN that patients with Modified Dental Anxiety Scale (MDAS) scores of 24 and 25 should be considered for sedation regardless of their overall IOSN score. In our data, all the patients with MDAS scores of 24 and 25 were in the high sedation need category already and this adjustment would have had no effect.

Tables 6 and 7 show the patient and operator opinions of the IOSN form. Although 95% of patients found the form easy to complete, some 22% reported requiring help to do so. Table 8 shows a selection of the comments made by operators following the procedure grouped by sedation need.

DISCUSSION

This study provides comparative data from a different region which raises questions about the sensitivity and specificity of the IOSN tool.

Goodwin *et al.*⁵ reported that among the patients who did not need sedation according to the IOSN, in 45% of those cases the operator reported that they could not have performed the procedure without sedation. At our unit the figure was 50% which is an unacceptably high 'false negative' for the IOSN. These patients were judged by the IOSN to be treatable with local anaesthesia and behavioural management alone, but the opinion of the clinician who had just completed the procedure was that it would have been impossible without sedation.

What is remarkable from the questionnaire results at both centres is the similarity in results between the 'need' and 'no need' groups – our data showed no statistical significance and the Goodwin *et al.*⁵ data only reported statistical significance for three questions (likelihood of patient cancellation and operator questions 1 and 3). If the IOSN was an accurate, objective measure of sedation need, one would expect to see a clear divergence between the 'need' and 'no need' groups. This suggests that the IOSN is not capturing some of the factors that are being used in clinical decisions to discriminate between patients who have a need for sedation and those who do not.

The MDAS is validated as a tool for overall dental anxiety, but it is less clear if the MDAS can be used to accurately predict anxiety related to specific oral surgery procedures, especially given that among dental procedures it is oral surgery that causes the highest levels of anxiety.^{6,7} This is especially the case when considering the surgical

Table 4 Patient perspectives of sedation need

Patient questions	No need for sedation			Need for sedation		
	Agree	Disagree	Don't know	Agree	Disagree	Don't know
I could not have had this treatment without sedation	37%	46%	17%	58%	39%	3%
Without the offer of sedation I may have cancelled or not attended this appointment	65%	22%	13%	76%	17%	7%
I asked for this treatment to be provided under sedation	76%	11%	13%	86%	10%	3%
My dentist suggested that I have this treatment under sedation	87%	13%	0%	83%	15%	2%
I would ask for sedation again for this type of treatment	89%	2%	9%	98%	0%	2%

Table 5 Operator perspectives of sedation need

Operator questions	No need			Need		
	Agree	Disagree	Don't know	Agree	Disagree	Don't know
I could not have performed this treatment on this patient without sedation	50%	46%	4%	53%	44%	3%
I could have performed the treatment but it would have taken considerably longer	39%	54%	7%	36%	56%	8%
I could have provided the treatment without sedation but it would have been an unpleasant experience for the patient	46%	43%	11%	69%	31%	0%
If I was the patient I would have had sedation today	46%	46%	9%	59%	32%	8%

Table 6 Patient opinions of IOSN form

Opinion	Yes (%)	No (%)	Don't know or incomplete (%)
I found the form easy to complete	100 (95)	3 (3)	2 (2)
I was happy to complete the form	99 (94)	2 (2)	4 (4)
I needed some help to complete the form	23 (22)	77 (73)	5 (5)

Table 7 Operator opinions of IOSN form

Opinion	Yes (%)	No (%)	Don't know or incomplete (%)
The medical history detail was suitable for my use	99 (94)	6 (6)	0 (0)
The treatment complexity score was accurate	94 (90)	8 (8)	3 (3)
The anxiety section was completed correctly	93 (89)	8 (8)	4 (4)

removal of impacted third molars, which for many young adults today will be their first experience of operative dentistry. In a study⁸ on the Dental Anxiety Score (DAS) scores and factors affecting anxiety of 120 patients before and after oral surgery, the DAS scores changed much less than the anxiety scores relating to particular features of the procedure. This supports the theory that for many patients the sensations involved with a tooth

extraction are uniquely anxiety-provoking and the IOSN lacks the sensitivity to identify this sentiment (the MDAS only includes references to local anaesthesia, scaling and polishing and drilling of teeth).

It must be recognised that there is a risk in using the IOSN in such a way that it prevents access to sedation services by patients who would benefit from it. Difficult or painful procedures carry a risk of iatrogenic psychological

trauma⁹ and the views of operators regarding the numbers of minimal and moderate sedation need patients deemed untreatable without sedation are highly significant (50% in this study). In only 17 out of the 105 cases (16%) did the operator say that the procedure would not have been possible without sedation OR wouldn't have taken considerably longer OR wouldn't have been an unpleasant experience for the patient. Seven of those cases were in the 'sedation need' group and ten in the 'no need' group. The number of patients who perhaps didn't need sedation was therefore small, but even more significantly the IOSN failed to identify them reliably.

CONCLUSIONS

Based on this data there are two key conclusions. Firstly, it is questionable whether then IOSN is capturing enough of the complex human factors involved in decision making about sedation to be acceptably reliable. Secondly, it is not clear that the cut off point for sedation need is appropriately set due to the high false negative rate. The IOSN is certainly capable of distinguishing between the obviously low need non-anxious patients having straightforward procedures and the very anxious high need patients having long and complex surgical procedures. The challenge lies with those patients in the middle ground of sedation need, where a complex range of human and environmental factors interact to define their tolerance for oral surgery procedures that are often inherently

Table 8 Operator comments following procedure

Sedation need according to IOSN	Comment
Minimal	Patient very relaxed. Treatment was quick as increased cooperation from patient
	In case of complication IVS would have been necessary
Moderate	Patient anxious about intraoral injections
	Very anxious patient, bad experience in the past
	Patient was generally not anxious but it helped reduce her awareness of time
	Knackered! If it was me, GA. Would have been very unpleasant without IV
High	Very anxious patient without previous dental experience
	Patient very anxious. Well sedated and cooperative
Very high	Very anxious long procedure, difficult. Bisphosphonate patient

unpredictable. While the IOSN commendably attempts to bring some objectivity to an often subjective decision-making process, it should serve only as a means of supporting a clinical decision and auditing clinical practice, rather than determining access to sedation services.

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