

Impact of third molar removal on demands for postoperative care and job disruption: does anaesthetic choice make a difference?

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A prospective cohort study was undertaken to investigate the influences of anaesthetic modality and surgical difficulty on social reintegration and demands on health services after third molar removal. The study was undertaken at the Oral and Maxillofacial Surgery Department, Cardiff Dental Hospital. Of 444 patients, 266 (60%) had their third molars removed. The main outcome measures included anaesthetic modality, surgical difficulty (WHARFE scores), utilisation of health services, effects on work, school and home life.

In all, 101 (40%) patients were treated under local anaesthesia (LA) ± intravenous (iv) sedation and 165 (60%) under general anaesthesia (GA); 81 (49%) as inpatients and 84 (51%) as day cases. Of these patients, 38 (14%) returned to the hospital and 74 (28%) utilised primary care services postoperatively in addition to a standard review appointment. Patients treated under GA made more demands on primary care services ($\chi^2 = 6.41$, $df = 2$, $P < 0.05$) and took more time away from work ($P < 0.05$). Patients underestimated the time they needed to recover. There was similar disruption to job, college and home life. There were no links between disruption and particular anaesthetic modalities and surgical difficulty.

Surgery under GA was linked to increased postoperative demands on primary care, but not secondary care, and to longer job disruption. This could not fully be attributed to surgical difficulty.

The surgical removal of impacted third molars has been described as the most frequently performed operation carried out by oral and maxillofacial surgeons (1). It is important that only those patients who require surgery under general anaesthesia (GA) are listed for this, and that local anaesthesia (LA) or LA plus intravenous (iv) sedation are given wherever possible (2).

The National Third Molar Project confirms previous reports that a substantial proportion of third molar extractions undertaken in the UK is performed under GA (3). Patients are sometimes referred unnecessarily for third molar surgery under GA (4). A principal reason for this is that family dentists often believe that the incidence of disease associated with unerupted and partially erupted third molars is much higher than is actually the case (5). Overall, more patients could be listed for outpatient care and fewer patients treated on an inpatient basis (4,6,7). Assessments before GA have been shown to obviate the need for a GA for 15% of patients referred by general dental practitioners for a variety of dental extractions (8).

Morbidity surveys have shown that treatment under LA, with or without iv sedation carries less risk than the same treatment under GA (9). Several factors need to be taken into account when deciding on the most appropriate

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anaesthetic for a minor surgical procedure. These include safety, physical status that may be comprised by earlier or current disease, and the preferences of both patient and surgeon. These preferences reflect factors related both to surgery to be undertaken and the patient's circumstances. Little research has been carried out on factors influencing practice in relation to choice of anaesthesia and healthcare facility for high-volume surgery. Previous work by the authors showed that difficulty of surgery, patients' anxiety levels, patients' preferences, medical history and number of teeth to be removed are important predictors of choice of anaesthetic (7). However, few studies have been carried out to compare LA with GA (inpatient and day care) in relation to postoperative recovery.

The aims of this study were therefore to look for differences between patients who had undergone third molar removal under LA and GA (day case and inpatient) in terms of the incidence of self-reported complaints, surgical difficulty, utilisation of services (in addition to a standard review appointment), inability to work and effects on work, school and home life.

Methods

The study sample consisted of 444 patients scheduled for third molar removal at the University of Wales Dental Hospital, Cardiff, UK, in 1994–1996. Patients were included in the study if one or more lower third molars had been removed.

Data were collected from the patients postoperatively by means of a questionnaire mailed with a pre-paid, pre-addressed envelope at 1 week. The variables that were included in this dataset were attendance for a problem related to postoperative morbidity (in addition to a routine review appointment), the nature of this problem, use of primary care services and time off work. The effects of surgery on job/college studies and home life were measured using standard 10 cm visual analogue scales (VAS). Age, gender, surgical difficulty, anaesthetic modality and estimation of the number of days it would take to recover were recorded at the initial outpatient assessment.

Surgical difficulty was measured using the WHARFE (10) assessment (Table I), which takes account of the angulation of the lower third molar(s) using Winter's classification, the height of the mandible and the angle of the second molar, root shape and development, the exit path of the tooth to be extracted and the size of the follicular sac. The WHARFE assessment provides a range of scores from 1 to 17 with 17 representing the greatest difficulty.

Quantitative data were subjected to summary statistical analysis, to calculate the mean, mode and median values, the standard deviation and range. Qualitative data were subjected to summary analysis to calculate the frequencies and relative frequencies. The χ^2 test was used to test for associations between variables. One-way analysis of variance and the paired *t* test were used to compare the means of different variables. The computer program SPSS for Windows[®] was used to calculate these values.

Table I. WHARFE assessment

	Category	Score
Winter's Classification	Horizontal	2
	Mesioangular	1
	Vertical	0
	Distoangular	2
Height of mandible (mm)	1–30	0
	30–34	1
	35–39	2
Angle of second molar (degrees)	1–59	0
	60–69	1
	70–79	2
	80–89	3
	90+	4
Root shape and development	Less than 1/3 complete	2
	1/3 to 2/3 complete	1
	More than 2/3 complete	3
	Complex Unfavourable curve	3
	Favourable curve	2
	Normal	1
Follicle	Normal	0
	Possibly enlarged	–1
	Enlarged	–2
	Impaction relieved	–3
Exit path	Space	0
	Distal cusp covered	1
	Mesial cusp covered	2
	All covered	3

Results

In all, 266 (60%) patients responded, 176 (66%) women and 90 (34%) men. The mean age was 27.7 years (range 15–85 years, SD = 10.19). For these patients, 751 third molars were removed (439 mandibular; 312 maxillary). There were 84 (31.5%) patients scheduled for LA; 17 (6%) for LA + iv sedation; 81 (30.5%) for inpatient GA and 84 (32%) for day case GA.

WHARFE scores ranged from 5–13 (mean = 7, median = 7, mode = 5). Those patients whose lower third molars were on this basis more difficult to remove (indicated by higher WHARFE scores), were significantly ($P < 0.05$) more likely to be scheduled for removal under GA, in particular on an inpatient basis (Table II).

Thirty-eight patients (14.3%) returned to the hospital and 74 patients (27.8%) used primary care services (general practitioner, general dental practitioner or hospital accident and emergency department) postoperatively, in addition to their standard review appointment. The frequency of self-reported complaints of those patients returning for an additional postoperative visit is

Table II. Analysis of variance model for surgical difficulty by anaesthesia modality scheduled

Anaesthetic	Mean		No of cases
	WHARFE score	SD	
Local anaesthesia (including sedation)	6.39	2.16	101
General anaesthesia: day care	6.94	2.09	84
General anaesthesia: inpatient	7.85	1.97	81

$F = 11.18$, $df = 2$, $P < 0.05$

shown in Table III. The most common self-reported complaint was pain/discomfort (6.0%), followed by infection (1.9%) and numbness (1.9%).

There were no significant associations between anaesthetic modality and additional postoperative hospital visits ($\chi^2 = 0.174$, $df = 3$, $P > 0.05$). However, there was a significant association between anaesthetic modality and additional demands on primary care services (Table IV). Those patients who received treatment under inpatient GA were more likely to utilise these services ($\chi^2 = 6.41$, $df = 2$, $P < 0.05$).

There were no significant associations between surgical difficulty and additional hospital postoperative visits ($P > 0.05$). However, there was a significant association between surgical difficulty and additional demands on

Table III. Frequency of self-reported postoperative complications

Complaint	n (%)
None specified	228 (85.7)
Pain/discomfort	16 (6.0)
Infection	5 (1.9)
Temporary numbness	5 (1.9)
Dry socket	3 (1.1)
Trismus	2 (0.8)
Problem with sutures	4 (1.5)
'Bone still in place'	2 (0.8)
Excessive bleeding	1 (0.3)
Total	266 (100)

Table IV. Utilisation of primary care services by anaesthetic modality

Anaesthetic	Use of primary care services		
	No (%)	Yes (%)	Total
Local anaesthesia (including sedation)	79 (41.1)	22 (29.7)	101
General anaesthesia: day care	63 (32.8)	21 (28.4)	84
General anaesthesia: inpatient	50 (26.0)	31 (41.9)	81
Total	192 (100)	74 (100)	266

$\chi^2 = 6.57$, $df = 2$, $P = 0.037$

Table V. Number of days taken off work

Days	n (%)
0	26 (9.7)
1	28 (10.5)
2	40 (15.4)
3	26 (9.7)
4	21 (7.9)
5	39 (14.7)
6-10	66 (24.8)
11-15	13 (4.9)
16 and over	5 (1.9)
Not specified	2 (0.8)
Total	266 (100)

primary care services ($F = 6.54$, $df = 1$, $P < 0.05$). Those patients who utilised such services ($n = 74$) had third molars that were difficult to remove (mean = 7.6, $SD = 2.5$) compared with those patients who did not utilise such services ($n = 192$, mean = 6.8, $SD = 2.0$).

There was some disruption to home life for patients postoperatively (mean VAS score = 25, $SD = 30.61$, minimum = 0, maximum = 100). Overall, third molar removal disrupted job and college to the same extent as home life (mean VAS score = 31, $SD = 31$, minimum = 0, maximum = 100). The frequencies for number of days off work are shown in Table V (mean = 4.67 days, mode = 2 days, median = 4 days, range 1-30 days). Patients who had their third molar surgery under GA ($n = 163$, mean = 5.7, $SD = 4.4$) took significantly (analysis of variance test: $F = 32.7$, $df = 1$, $P < 0.05$) more time off work than those patients who had surgery under LA ($n = 101$, mean = 2.9, $SD = 2.6$). There was no association between surgical difficulty and number of days taken off work ($r = 0.00129$). Patients significantly underestimated (t test: $t = 7.34$, $df = 261$, $CI = 1.47-2.56$, $P < 0.05$) the number of days that it would take them to recover after operation (mean estimated = 2.7, $SD = 2.3$, mean actual = 4.7, $SD = 4.1$). Those patients who returned to the hospital postoperatively in addition to their review appointment ($n = 38$, mean = 7.4, $SD = 5.0$) also took significantly (analysis of variance test: $F = 21.24$, $df = 1$, $P < 0.05$) more time off work than those patients who did not attend ($n = 226$, mean = 4.2, $SD = 3.7$).

Discussion

Over recent years there has been a move by surgeons towards a policy of selective rather than routine postoperative review (11,12). Pratt *et al.* (11), in a survey of Fellows of the British Association of Oral and Maxillo-facial Surgeons found that 62% routinely reviewed their patients as opposed to 85.7% in 1992. The same research indicated that 80% of 200 third molar patients believed that a postoperative review was unnecessary (11). However, other research has indicated that most patients prefer to be followed up after third molar removal, particularly those treated under GA (13).

Patients returning to hospital usually do so because of pain (14), nausea and vomiting (15). In the study reported here, 42% of patients returned to hospital because of pain. Other reasons cited were infection (13%) transitory numbness (13%), dry socket (8%), trismus (5%), excessive bleeding (3%), problems with sutures (11%) and 'bone still in place' (5%).

Chye *et al.* (15) described the level of usage of primary care services as 'acceptable' for a series of patients who had their third molars removed on a day case basis. In that study, rate of postoperative attendance after day case GA was 12.5%, and after LA + iv sedation, the rate was 8.5%. Overall, 11% of patients used these services within the first 3 days postoperatively (15). In the study reported here, a much higher proportion (28%) of patients used primary care services in addition to attending hospital for their standard review, and those patients treated under a GA on an inpatient basis were more likely to utilise primary care services (re-attendance rate for inpatients = 12%, day care = 7%, LA ± iv sedation = 8%). This proportion is likely to be a better estimate as this study encompasses a longer follow-up period than previous studies.

Worrall (13) found that 28% of patients used primary care services after third molar surgery. Those patients who were not followed up postoperatively did not seek help from their doctor or dentist more frequently than those patients who were followed up. In a study of those patients having their third molars removed under LA + iv sedation, 56% visited their family dental practitioner for their postoperative review and 42% attended an oral surgery clinic, and there were no differences in levels of patient satisfaction (14). Previous work in the USA has shown that just under one-half of the people who use non-hospital services after third molar surgery do so to obtain an extended prescription for analgesics or antiemetics (15). Preshaw and Fisher (12) also found that 29% visited the doctor or dentist to obtain further analgesia during the period between operation and review. In order to reduce this number, the authors suggested a need to review analgesic advice that is given to patients at discharge (12).

The number of days of sick leave from work has been used as a measure of postoperative morbidity after surgical removal of third lower molars (16,17). In this study, 89% took time off work, which is similar to findings from other centres (18). A well-established advantage of day surgery is earlier return to work (19). In the present study, those patients treated under GA took significantly more time off work than those patients treated under LA but, surprisingly, there was no difference between inpatient (mean 5.5 days) and day care (5.9 days). Those patients treated under LA took an average of 2.9 days off work. This is higher than that reported in previous studies (0.6–2.5 days) (16,20–23). In the present study, the overall number of days taken off work regardless of anaesthetic administered ranged from 1–30 days, with the follow-up period ranging from 1–4 weeks. This comparatively long follow-up period could explain why the values in the present study are higher

than those reported previously (0–6 days), in which the follow-up period ranged from 3–7 days (16,18,23). Values also differ between studies, making direct comparisons difficult owing to the different proportions of simple/surgical and single/multiple extractions. Those patients requiring surgical extractions seem to require a longer recovery period (21).

Pain, swelling and trismus (20,21), dysphagia, sleeping problems and postoperative analgesic consumption (22) have been found to be associated with inability to work postoperatively.

The study reported here showed that there was some disruption to daily functional ability. Other studies of the effects of treatment under LA only, report between 42% and 57% of patients as having no reduction in daily functional ability (22,24).

Although the response rate in this study was 60%, there was no difference between responders and non-responders in terms of demographic variables, surgical difficulty or anaesthetic modality. Nevertheless, a larger study would be helpful, possibly including more than one operative procedure, where different anaesthetic modalities are frequently utilised.

Overall, the importance of this study is that it demonstrates increased postoperative demand on primary care but not secondary services, if surgery is carried out under inpatient GA. Choices to treat under GA, particularly on an inpatient basis, also reflect surgical difficulty, but it was not possible to determine which of these factors had the greatest influence on increased utilisation of primary care postoperatively. There was greater job disruption when surgery was carried out under GA, whether or not it was performed on a day case basis. Set alongside previously published evidence, this research shows that, regardless of surgical difficulty, anaesthetic choice, in particular decisions to extract under GA, are of importance in terms of levels of morbidity, time off work and demands on primary care. It also shows that patients underestimate the time they need to recover.

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