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## Original papers

# Audit of day case maxillofacial surgery: a pilot assessment

P R F Davies, W T Lamb, D M Adlam, T W Ogg, A D Mitchell, D B Galloway

Addenbrooke's NHS Trust, Cambridge, UK

The aim of this study was to design and evaluate an audit structure for day case maxillofacial surgery, which may be applied to other surgical specialities. Retrospective and prospective data collection over a 3-month period revealed that the clinical standards set in advance of the audit procedure were achieved in five of the 11 criteria. In only two instances were the standards not met, only 46% of patients were seen within 3 months of the referral, against the 95% desired standard, and only 50% had surgery within 3 months of being seen, against the 95% standard. Future audit should be prospective but action should be taken as necessary to address the significant failure in achieving the set standards, thus completing the audit cycle.

Key words: Day surgery, maxillofacial, quality assurance

Current government policy is directed at reducing costs in the British National Health Service (NHS). As one aspect of improved efficiency within the surgical health care system, day case surgery is expanding rapidly and is associated with patient preference[1], reduced cancellation of lists[2] and value-for-money outcomes[3].

A review of day surgery by the Audit Commission[2] has indicated that there is a lack of information to assess current performance and to link that to cost benefit and patient outcome. The 'basket' of 20 procedures listed by the commission did not include operative procedures related to maxillofacial surgery.

The Royal College of Surgeons of England publication 'Guidelines for Day Surgery'[4], lists suitable procedures for maxillofacial surgery to be performed in a day case setting. These have been adopted for the present study.

There are three major stakeholders in any surgical procedure; the patient who desires to be made well, the professionals who derive satisfaction from exercising their best skills, and management whose responsibility it is to provide the best overall health care from the available resources. This study examined the provision of professional care, but it could be expanded at a later date to encompass the other stakeholders.

*Accepted:* September 1993
*Correspondence and reprint requests to:* TW Ogg, Director Day Surgery, Addenbrooke's NHS Trust, Hills Road, Cambridge CB2 2QQ, UK


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### Methods

The first part of the audit process was to define the criteria by which clinical outcomes of day case patients undergoing maxillofacial surgery could be assessed. Eleven criteria (agreed by the surgeons and anaesthetists) were intended to be exhaustive, mutually exclusive and primarily orientated to meet patient needs. Standards were set for all of the criteria and agreement was reached on a level that clinical care should attain. Data forms were designed to correspond to the established criteria and standards. Demographic data was recorded including age, sex and referring source for each patient. The grades of surgeon and anaesthetist were also noted.

To validate the forms a retrospective study of patients who had undergone day case maxillofacial surgery was conducted over a 3-month period (January–March 1992). In addition all patients attending over a 4-week period (July/August 1992) were included in the prospective data analysis. Data referring to patient outcomes were retrieved from the notes, whereas those relating to professional outcomes were collected directly on the data forms for the prospective patients only. Criteria for professional outcome were assessed using a 100 mm visual analogue scale. A high score represented professional dissatisfaction with the outcome or conduct of the procedure by the surgeon or the anaesthetist concerned. Data was entered onto a laptop computer. The screens matched the forms exactly to facilitate entry. Double

**Table 1.** Criteria, standards and outcome for maxillofacial surgery

| *Criteria* | *Standard set* | *Outcome* |
|---|---|---|
| 1. Patients should be seen in outpatients soon after being referred | 95% within 3 months | 46% ⊕=10 |
| 2. Patients should have surgery soon after being put on the waiting list | 95% within 3 months | 50% ⊕ = 1 |
| 3. Procedures suitable for day case surgery should be included | 95% on a pre-specified coded list | 93% ⊕ = 0 |
| 4. Patients should be suitable for day case anaesthesia | 99% will be ASA* grade 1 or 2 | 100% ⊕ = 4 |
| 5. Surgery should not take long | 95% will have surgery lasting less than 30 min | 97% ⊕ = 4 |
| 6. Patients should return home as planned after surgery | 95% will be discharged on time | 94% ⊕ = 3 |
| 7. Patients should not need emergency advice | 95% will not seek emergency advice or treatment postoperatively | 98% ⊕ = 3 |
| 8. Patients should be free of untoward problems after surgery | 95% of patients should be free of troublesome postoperative sequelae | 90% ⊕ = 3 |
| 9. Patients should only need to use day case facilities during their treatment cycle | 99% of patients should not need to be admitted to hospital on the day of surgery or readmitted later | 98% ⊕ = 3 |
| 10. Surgical operators should deliver a high degree of professional outcome | 99% of procedures will be judged <50 mm VAS | 98% ⊕ = 5 |
| 11. Anaesthetists should deliver a high degree of professional outcome | 99% of procedures will be judged <50 mm VAS | 100% ⊕ = 4 |

*American Society of Anesthesiologists grading[6].
⊕ = frequency of missing data points.

**Table 2.** Criterion 3. Procedures suitable for day surgery

| *Procedure code* | *Procedure* | *No. of procedures* | *Cumulative %* |
|---|---|---|---|
| 01 | Excision of uncomplicated impacted teeth and buried roots | 116 | 62 |
| 02 | Exposure of unerupted teeth for orthodontic treatment | 2 | 63.1 |
| 04 | Enucleation of small cysts | 3 | 64.7 |
| 07 | Minor soft tissue surgery | 5 | 67.4 |
| 14 | Simple removal of teeth | 45 | 93 |
| 15 | Other | 13 | 100 |

data comparison was performed to confirm completeness and accuracy.

In this audit the patients were not treated as a sample of a larger population. The standards were intended to apply directly to the group of patients audited[5].

## Results

One hundred and seventy-two patients had data recorded: 128 retrospective, 44 prospective. Of these patients, 58% were female with a mean age of 21.4 yr (range 1–64, SD 10.9); 132 patients were referred by general dental practitioners, 26 by consultant orthodontists and eight from general medical practitioners. Six patients had no defined referral source.

Consultant surgeons performed 140 cases, 81.4% (three unspecified). Consultant anaesthetists performed 124 cases, 72.1%. Table 1 shows the outcome for each criterion. In particular it demonstrates the differences in achieving the standards set for criteria 1 and 2. Table 2

**Table 3.** Type and frequency of postoperative complications

| *Postoperative problems* | *No. of patients affected (⊕ – 3)* |
|---|---|
| Paraesthesiae | 6 |
| Pain and bleeding | 3 |
| Postoperative infection | 3 |
| Root damage | 1 |
| Headache | 1 |

⊕ = missing data.

(criterion 3) lists the procedures which account for 93% of the caseload in the audit. The remaining 7% required eight further coding categories.

All patients were found suitable for day case anaesthesia (criterion 4) and 97% had surgery which lasted less than 30 min (criterion 5). Ten patients were not discharged on time (criterion 6). Only three patients sought emergency advice (criterion 7). Bleeding accounted for two of them, the third had a large painful molar socket. Ninety per cent of patients were free of untoward problems after surgery (criterion 8) but this did not reach the 95% standard set at the beginning of the audit. Postoperative problems are listed in Table 3. Three cases were collected under criterion 9. Two cases were scheduled for further elective day case surgery to remove remaining impacted molar teeth which were not removed at the first operative session, while the third patient sought emergency advice for persistent bleeding from a tooth socket and was admitted. For criteria 10 only one patient was rated surgically above 50 mm on the visual analogue scale, representing a 'poor' professional outcome. This patient had residual upper, second molar root damage. There were no adverse events associated with anaesthetic technique (criterion 11).

Audit quality assurance was confirmed by the completeness of data recorded. The number of missing data points are represented for each criterion in Table 1 by '⊕'.

## Discussion

The standards for criteria 1 and 2 were not reached. Against that 16% of patients were seen in clinic within 1 week of referral; 9.9% of patients had surgery within 1 week of being put on the waiting list and 97% had surgery within 12 months. On detailed analysis both distributions appear to be multimodal and this might relate to degrees of urgency – 'requires immediate attention', 'cannot wait too long', and 'routine' for referral times; and 'urgent', 'non urgent', for time to operation. In future audits, patients should be categorized at the time of referral and clinic appointment with separate criteria and standards established for each category. If the overall criteria are retained for simplicity then either the standards are too challenging or the waiting times are indeed unacceptably long. For the latter, the factors to examine are the surgical and anaesthetic resource levels, outpatient clinic time, and day surgery unit (DSU) availability and efficiency.

There was an attempt to list those maxillofacial procedures suitable for day case surgery. Based on previous lists[4], fourteen procedures were coded, with number 15 coded as 'other'. Table 2 shows the procedures. These findings point to a need to develop an improved coding system for future audit work. All patients were suitable for day case anaesthesia indicating that the current selection criteria are successful. Surgical assessment of cases attained the set standard with 97% of cases lasting less than 30 min. In one patient the operation was deemed too complicated for day surgery to be performed: he was rebooked for inpatient treatment. In addition two patients had only two of four molars removed at operation, for technical reasons. Both were rescheduled for further day surgery at a later date. Two patients did not attend as appointments were mislaid. Prospective audit is essential to pick up problems of non-attenders and those found unsuitable for surgery on the day.

Anaesthesia beyond 30 min is thought to cause problems of slow recovery. Of the five patients whose anaesthesia lasted over 30 min, only two were discharged late. Similarly prolonged surgery may cause more trauma, and hence postoperative pain, which was seen in only three patients in the series.

Hospital admission and late discharge have important implications for day surgical organization. If staff have to stay late, after 18.00 hrs, this reduces efficiency and lowers morale. The major cost benefits of day surgery are gained from regular staff working patterns, and the avoidance of overnight patient care.

The re-admission rate of 2% includes the two patients rebooked for further treatment who should not be deemed a failure of the system. It appears from this study that criteria 6 and 9 overlap and are not therefore mutually exclusive. This will be reviewed at a later date.

All day surgical patients are discharged with written postoperative instructions and information on any expected problems. They are advised to contact the hospital if problems arise, though only three did. If other sources of help or advice were sought this would not be picked up by this audit method and may be a weakness of this system.

The incidence of postoperative sequelae was 10% (Table 3). The types of complication need to be reviewed clinically to establish whether or not they represent a set of adverse events necessarily accompanying maxillofacial surgery or whether relevant factors can be detected. These features may become clearer in a larger unit.

The professional outcome measure as a self-rated assessment cannot be used between surgeons and between anaesthetists because of the non-standardization between raters. For each surgeon and each anaesthetist, the value of the scoring system depends on the confidence with which each is able to use the full scale and comment on poor scores. If the clinical data so recorded are used for purposes other than professional self audit then this technique (and any other self-assessment technique) is of dubious value. The data entry technique should be reviewed carefully to establish whether there are alternative methods (e.g. laser read

forms/optical mark readers) with the same reliability and efficiency as the current computer-based technique.

## Conclusions and recommendations

This study has led to the following conclusions and recommendations:

1. The main audit should be prospective and include criteria and standards relating to patient perception of care in addition to assessment by professionals. It should remain simple and practical and the temptation to record data unrelated to specific criteria should be resisted.
2. The only significant failures to achieve standards in this audit relate to referral and waiting times. It is recommended that these be addressed formally at a later stage, taking actions as necessary and thereby completing the audit cycle.
3. Standards should explicity relate to a population, e.g. 90% achieve a certain target out of at least 150 sequential patients starting at a randomly chosen date. Otherwise, more complex estimation theory needs to be applied to select a sample size deciding a priori which is the key variable in a set of standards.
4. As part of any future follow-on audit, it is recommended that the maxillofacial coding system be reviewed, listing all procedures and determining which are essentially inpatient procedures, which outpatient procedures, and which are day surgery cases.
5. The main audit should detect patients failing to attend for day case surgery and those attending but being found unsuitable. Definitions of admissions/readmissions need to be clarified and criteria relating to postoperative sequelae and emergency treatment should be delineated.
6. The 100 mm visual analogue scale for self assessment of professional outcome is a significant step in the direction of simple self audit of professional care. Any established standardized methods should be reviewed together with alternative scoring systems and inter-rater standardization. If retained, the 100 mm lines should be revised to read from 'low' to 'high' for a more logical scoring system. If alternatives to this simple technique are not forthcoming then a clear understanding of the confidential nature of the data and purposes to which it can be put must be confirmed.

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