SHORT COMMUNICATION

Effect of explaining radiographic information to the patient before third molar surgery

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Objectives: The aim of this study was to compare patient satisfaction with the pre-operative information before and after explaining the radiograph and to compare patient satisfaction with the radiographic information when based on a digital or a conventional image, as well as on extraoral or intraoral images.

Methods: 263 patients (with 301 mandibular third molars) were given pre-operative information by one of two trained scholar students before removal of the third molar. The course of the surgery and possible post-operative complications and risks were explained to the patient. The patients rated their satisfaction with the information on a 100 mm visual analogue scale (VAS). The radiograph was displayed and the radiographic information was explained to the patient, with emphasis on tooth-specific risk factors. The patients again rated their satisfaction on a VAS.

Results: There was no significant difference in patient satisfaction score before (mean VAS = 92.5 mm) and after (mean VAS = 91.7 mm) the radiographic information was explained ($P = 0.15$). No difference in satisfaction was found between patients who were shown either digital or conventional images or between patients who were shown either extraoral or intraoral images ($P > 0.5$).

Conclusions: No additional patient satisfaction was obtained by showing and explaining the radiograph to the patient before lower third molar surgery. If the dentist still wishes to show the patient the radiograph, the type of image seems not to be important.

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Introduction

It has been stated that one of the major benefits of digital radiography compared with film-based radiography is that an image viewed on a monitor would ease the patient's understanding of the image information, as the displayed digital image is much larger than a conventional intraoral film.^{1,2} Also, the use of a computer allows the dentist to enlarge, brighten or darken the image, features that can help point out specific details to the patient. It can also be speculated that the use of extraoral rather than intraoral images could facilitate the patient's understanding, as an extraoral image typically provides a broader overview of the area of interest.

Before removal of a lower third molar, the patient must be informed about the course of the surgery, the risks and benefits and what to expect post-operatively. Sufficient information can reduce patient anxiety,³ give the patient realistic expectations about the surgery and increase patient satisfaction.⁴ This pre-operative information, which originates in the surgeon's clinical and radiographic examination of the patient, can be supplemented by displaying the radiograph and explaining the radiographic information to the patient. Viewing the radiograph with the patient gives the dentist the opportunity to point out tooth-specific details, such as root curvatures and relation to the mandibular canal, which can aid the patient's understanding of the risks of the surgery. To the authors' knowledge, no study has evaluated whether the extra time spent by the surgeon on explaining the radiographic information to the patient provides the patient

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with additional information, or whether it increases the patient's satisfaction with the pre-operative information.

The objective of this study was to compare patient satisfaction with pre-operative information before and after the radiograph was displayed and the radiographic information explained, and, further, to compare patient satisfaction with the radiographic information when based on a digital image as opposed to a conventional film, and satisfaction with extraoral as opposed to intraoral images.

Materials and methods

This study was part of an audit of patient satisfaction with the information given in the operating theatre before removal of a lower third molar. 263 patients had 1 or 2 (38 patients had 2) lower third molars removed (with at least 1 month between the operations for patients with 2 third molars); thus, 301 third molars were included in the study. The patients were given pre-operative information by one of two trained and pre-calibrated clinicians (scholar students) on the day of surgery. The calibration had been done beforehand by discussing which information should be given to the patient, and afterwards each clinician had training sessions with five patients while the other clinician observed, and any difference in the information procedure was detected and corrected.

The following information was given to the patient:

- An explanation of pre-surgical procedures such as medication, local anaesthetics and sterile coverage.
- Information about the course of the surgery and what to expect, for example, noise from the bur.
- An orientation about possible post-operative complications and risks, such as excessive bleeding, post-operative pain, and nerve paraesthesia.

The patients rated their satisfaction with the information on a 100 mm visual analogue scale (VAS), with the end points "not satisfied" and "very satisfied". Afterwards, the radiograph was displayed on a 19 inch monitor (digital images) or on a light box (conventional images) and the radiographic information concerning the third molar to be removed was explained to the patient. Any risk factors specific to the tooth such as root curvature and possible injury of the inferior

Table 1 Visual analogue scale (VAS) scores (mm) given before and after viewing the radiograph (first operation only)

	<i>Before viewing radiograph (n = 263)</i>	<i>After viewing radiograph (n = 263)</i>
Mean	92.5	91.7
Median	96.0	95.0
Standard deviation	10.0	8.3
Range	45–100	48–100
VAS score = 100	n = 33	n = 24

alveolar nerve were pointed out. After receiving this additional information the patients rated again on a new VAS with the same end points.

The paired *t*-test was used to compare patient satisfaction before and after the radiographic information was given. Group *t*-tests were used to compare satisfaction with the radiographic information when this was based on digital vs conventional images and intraoral vs extraoral images.

Results

First third molar operation (n = 263)

The mean VAS score for in patient satisfaction before the radiograph was explained was similar to the mean VAS score after the radiographic information was explained ($P = 0.15$). The means, medians, ranges and standard deviations are shown in Table 1.

No difference in satisfaction was found between patients shown digital or conventional images ($P = 0.75$). No difference in satisfaction was found between patients who were shown extraoral or intraoral images ($P = 0.88$). The means, medians, ranges and standard deviations are shown in Table 2.

When patients who were shown digital images were selected ($n = 209$), the difference between satisfaction before (92.6 mm) and after (91.7 mm) the radiograph was shown was similarly non-significant ($P = 0.122$). The result was the same for patients who were shown conventional images ($n = 54$; $P = 0.905$).

There were no difference in satisfaction for patients who were shown intraoral images alone ($n = 95$) (before 92.4 mm, after 91.5 mm; $P = 0.317$) or patients who were shown extraoral images alone ($n = 158$) (before 92.5 mm, after 91.7 mm; $P = 0.259$).

Second third molar operation (n = 38)

There was no significant difference in satisfaction with the radiographic information at the first and second

Table 2 Visual analogue scale (VAS) scores (mm) given after viewing the radiograph, categorized by type of radiograph

	<i>Digital images (n = 209)</i>	<i>Conventional images (n = 54)</i>	<i>Intraoral images (n = 95)</i>	<i>Extraoral images (n = 158)</i>
Mean	91.7	92.0	91.5	91.7
Median	95.0	95.0	95.0	94.0
Standard deviation	8.6	7.5	9.0	8.1
Range	48–100	69–100	52–100	48–100
VAS score = 100	n = 21	n = 3	n = 8	n = 13

Table 3 Visual analogue scale (VAS) scores given after viewing the radiograph at the first and second operation

	First operation (n = 38)	Second operation (n = 38)
Mean	91.3	92.2
Median	94.0	95.0
Standard deviation	8.7	8.9
Range	68–100	52–100
VAS score = 100	n = 3	n = 5

operation ($P = 0.691$) for patients who had both lower third molars removed (Table 3).

Discussion and conclusions

It has been claimed that one of the benefits in converting from film radiography to digital imaging is that viewing the image on the monitor helps the patient's understanding of the image.^{1,2} The present study showed no such benefit, as patients shown either conventional or digital images were equally satisfied. The same was true for extra- and intraoral images, although it might have been expected that the use of extraoral images would increase patient satisfaction. The mean VAS score for patient satisfaction was already quite high before displaying the radiograph, and there was little room for improvement after the radiograph was explained. It seems, therefore, that the two clinicians in this study had given sufficient information to the patient. The clinicians were two trained scholar students, and it may be deduced from the results that they had been trained satisfactorily.

It cannot be fully excluded that some information was given to the patient twice, both before and when viewing the radiograph. This could increase, decrease or have no effect on patient satisfaction. A future study

should randomly assign the patients to two groups: one that received all the information while viewing the radiograph with the dentist and the other that did not view the radiograph at all.

In a previous questionnaire study sent to dentists who had switched from film to digital imaging, the dentists stated "it is easier to explain treatment needs" as one of the reasons (number six out of eight reasons) to convert to digital imaging,⁵ and 85% of the dentists stated that they used the digital image for patient information much more than they had used film.⁶ No study has evaluated, however, whether the patient in fact benefits from the explanation of the radiographic information. In the present study on information to the patient about risk factors before third molar removal, this seemed not to be the case. It may be speculated that explaining the radiographic information is of more benefit to the patient in other clinical situations such as in preventive dentistry, *e.g.* showing and explaining small caries lesions that the patient should be able to arrest.

The current study was an audit evaluating patient satisfaction with pre-surgical information; those radiographs that were available were used whether on film (often included by the referring general practitioner) or digital (usually of those patients examined in the dental school). There was, therefore, an unequal number of film and digital images in the study. However, the authors believe that this does not cause a selection bias with respect to the variable evaluated, that is, the patient satisfaction with the information given.

In conclusion, this study showed that no additional patient satisfaction was obtained by displaying and explaining the radiographic information to the patient before lower third molar surgery. If the dentist still wishes to show the patient the radiograph, the type of image seems not to be important.

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