



A subjective assessment of pain and swelling following the surgical removal of impacted third molar teeth using different surgical techniques

Keywords: wisdoms, pain, swelling

SUMMARY

Pain and swelling are two of the most common problems experienced by patients who have undergone surgical removal of impacted third molars. The purpose of this research project was to ascertain which of two surgical techniques was judged by patients to cause the least pain and swelling. The survey comprised 20 patients with bilaterally symmetrical impacted third molar teeth. In each patient, the third molars on one side were removed using a standard mucoperiosteal flap, while on the opposite side, a smaller access incision was used. The results of this survey show conclusively that when a small incision

was used, with minimal reflection of the mucoperiosteum, the subjective evaluation of patients is that there is significantly less postoperative pain and swelling than when the larger standard incision is used.

OPSOMMING

Pyn en swelsel is die twee algemeenste probleme wat pasiënte ondervind wat geïmpakteerde derde molaartande chirurgies laat verwyder het. Die doel van hierdie navorsingsprojek was om vas te stel watter een van twee chirurgiese tegnieke deur pasiënte ervaar is as dié een wat die minste pyn en swelsel veroorsaak. Twintig pasiënte met bilat-

eraal simmetriese geïmpakteerde derde molare het aan die projek deelgeneem. In elke pasiënt is 'n derde molaar aan een kant verwyder deur 'n standaard mukoperiosteale flap, terwyl die ander molaar verwyder is deur 'n kleiner toegangsinsnyding te maak. Die resultate van die opname het onomwonde getoon dat, wanneer 'n klein insnyding met minimale terugswaai van die mukoperiosteum gebruik is, die subjektiewe oordeel van pasiënte was dat betekenisvol minder na-operatiewe pyn en swelsel ervaar is as met die standaard prosedure.

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Introduction

Two of the most common problems encountered by patients after third

molar surgery are pain and swelling.¹⁻⁴

These problems result from inflammation following on surgical trauma.⁵ A number of intra-operative causative factors of this pain and swelling have been studied, such as the experience of the surgeon,^{5,6} the duration of the procedure,^{3,4,7-9} reflection of the mucoperiosteal flap,⁴ bone removal,⁴ tooth sectioning,⁴ and the method of wound closure.

Clauser and Barone¹⁰ found that when partially erupted mesio-angular third molars were removed without raising a mucoperiosteal flap, there was less postoperative pain and swelling than when a flap was raised.

DuBois *et al.*¹¹ showed that primary suture of the incision following removal of impacted third molars resulted in more postoperative pain and swelling than when a surgical window was left and the wound allowed to heal by secondary intention.

It has been suggested that by reducing the size of the mucoperiosteal flap,¹⁰ avoiding tight wound closure,¹¹ and reducing the duration of the procedure,^{3,4,7,8,12,13} it may be possible to reduce postoperative pain and swelling.

The purpose of the present study was to ascertain whether a standard mucoperiosteal flap or a smaller

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access incision is judged by patients to cause the least pain and swelling.

Materials and methods

This study was a prospective randomised double-blind study in which the patients served as their own controls. Intra-individual pain and swelling resulting from the two different surgical techniques (performed by two different surgeons to eliminate bias) were determined.

The research protocol was approved by the University of Pretoria Ethics Committee.

Entry criteria

The following entry criteria were established: age between 18 and 30 years, absence of significant medical problems, absence of local inflammation, and symmetrically impacted third molars.

Symmetry was defined on the basis of the difference in the angle between the occlusal plane and the axis of the third molar, measured on the orthopantomograph, which had to be less than 10 degrees (Fig. 1).¹⁰

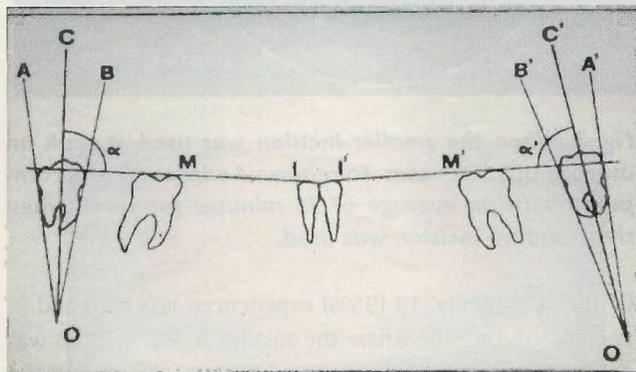


Fig. 1. Determination of symmetry of impactions according to Clauser and Barone.¹⁰

Twenty patients fulfilling these entry criteria were selected at the Dento-Alveolar Surgery Clinic of the Department of Maxillo-facial and Oral Surgery, University of Pretoria. All patients were fully informed of the nature of the project, and their prior written consent was obtained.

Participants were examined 1 week pre-operatively and again just before surgery, to exclude the presence of infection. At this stage, patients were instructed in the use of visual analogue and graphic valuation scales.¹⁴

Surgical procedure

The bilateral surgery was carried out under the same general anaesthetic, following standard sterile procedures. The first operator, on a random basis, removed the impaction on one side, and the other operator the impaction on the contralateral side.

Infiltration with local anaesthetic with vasoconstrictor was used for haemostasis before incision.

Access to the impacted lower third molar teeth was gained by operator A via a standard envelope flap as described by Szmyd.⁹ A distobuccal incision extending mesially from the external oblique ridge to the distobuccal sulcus of the second molar was made. The incision then continued anteriorly along the buccal sulcus of the second molar, to include the papilla between first and second molar, and ended at the mesio-buccal aspect of the first molar (Fig. 2). A buccal mucoperiosteal flap was raised to allow for the subperiosteal placement of an Austin retractor, to enable adequate flap retraction (Fig. 3).



Fig. 2. Standard envelope flap according to Szmyd.⁹

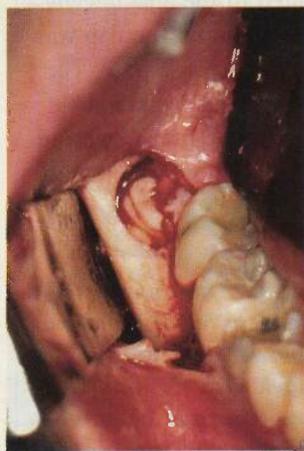


Fig. 3. Buccal mucoperiosteal flap raised to allow for subperiosteal placement of Austin retractor.

The wound was closed with three interrupted resorbable (Vicryl 3/0) sutures placed as follows; a vertical interdental suture to position the papilla between the first and second molars, a vertical suture just distal to the second molar, and a horizontal mattress suture in the distobuccal part of the incision (Fig. 4).

Access to the impacted teeth gained by operator B via an incision extending distobuccally from the distal aspect of the second molar tooth. The length of the incision approximately the width of the crown of the third molar, as per the orthopantomogram, and extended anteriorly to include the distal third of the buccal sulcus of the second



Fig. 4. Wound closed with three interrupted resorbable (Vicryl 310) sutures.



Fig. 5. Reflection of mucoperiosteum limited to the area directly over the crown of the impacted tooth. No vertical relieving incision.

molar. No vertical relieving incision was made. Reflection of the mucoperiosteum was limited to the area directly over the crown of the impacted tooth, and the flap was retracted with a Symes periosteal retractor (Fig. 5). The mucoperiosteum on the buccal aspect of the mandible was left undisturbed. The absence of a vertical relieving incision allowed the flap to fall back into position without the use of sutures (Fig. 6).



Fig. 6. The absence of a vertical relieving incision allows the flap to fall back into position without the use of sutures. The tension on the flap due to mouth opening causes the flap to gape a little. As the mouth is closed, the flap closes further.

Data collection

The time taken for each side was recorded. The duration of surgery was the time taken from the start of the incision until, in the case of operator A, the last suture was

placed, and in the case of operator B, all tooth fragments had been completely removed.

Patients were issued with visual analogue and graphic valuation scales¹⁴ and were instructed to record pain and swelling scores for ten consecutive days after surgery.

Results

When the smaller incision was used, it took an average of 4 minutes to remove a single wisdom tooth, compared with an average of 9 minutes for each tooth when the standard incision was used. (Fig. 7).

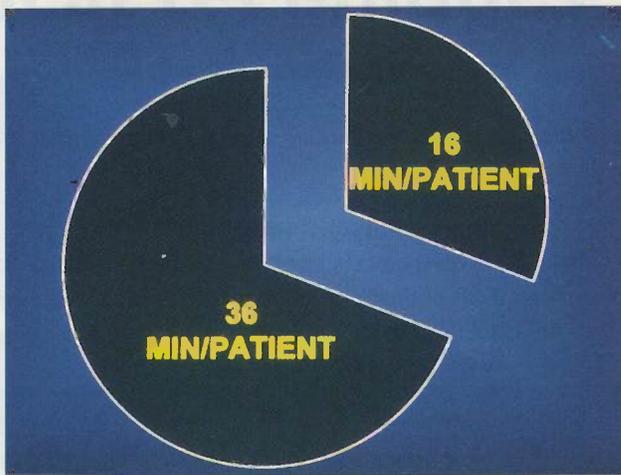


Fig. 7. When the smaller incision was used, it took an average of 16 minutes to remove 4 wisdom teeth, compared with an average of 36 minutes for teeth when the standard incision was used.

Of the 20 patients, 19 (95%) experienced less pain and swelling on the side where the smaller access incision was used. One patient (5%) developed bilateral dry sockets, and had no difference in pain or swelling between the two sides.

Statistical analysis (paired *t*-test) showed that significantly more patients reported less swelling on the side where the smaller incision was used ($t = 6.576$ with 39 degrees of freedom; $P = 0.000$) (Figs 8,10).

There were also significantly more patients who reported less pain on the side where the smaller incision was used ($t = 7.897$ with 39 degrees of freedom; $P = 0.000$) (Fig. 9).

Discussion

This study tested the hypothesis that flap design influences pain and swelling after surgical removal of impacted wisdom teeth.

Pain and swelling after surgical removal of impacted third molars is related to inflammation consequent upon surgical trauma.⁵ Previous studies show that pain and swelling

SWELLING			
Group	N	Mean	Std Dev
1	40	37	31
2	40	6	15
Difference		31.00	
t = 6.576 with 39 degrees of freedom; p = 0.000			

Fig. 8. Statistical analysis (paired t-test) showed that significantly more patients felt that there was less swelling on the side where the smaller incision was used ($t = 6.576$ with 39 degrees of freedom; $P = 0.000$).

PAIN			
Group	N	Mean	Std Dev
1	40	44	32
2	40	4	9
Difference		40.58	
t = 7.897 with 39 degrees of freedom; p = 0.000			

Fig. 9. Statistical analysis (paired t-test) showed that significantly more patients felt that there was less pain on the side where the smaller incision was used ($t = 7.897$ with 39 degrees of freedom; $P = 0.000$).

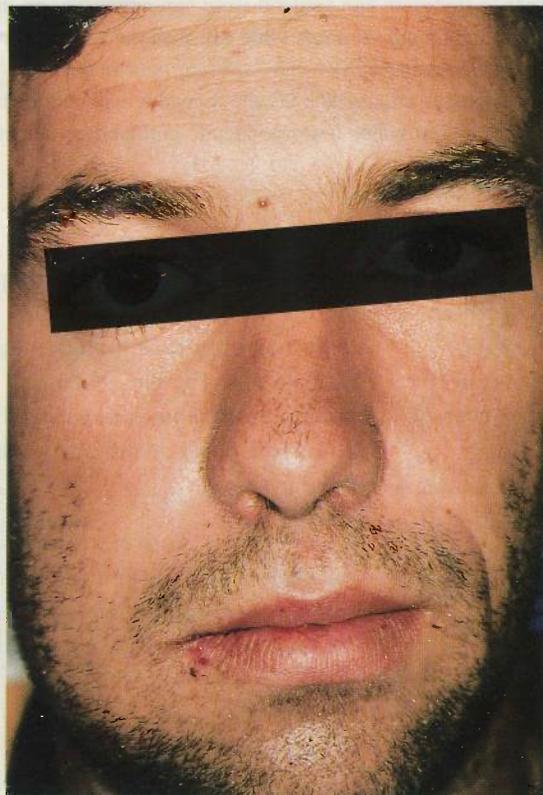


Fig. 10. Typical differences in swelling between the two sides.

are influenced by the reflection of a mucoperiosteal flap,⁴ the method of wound closure,¹¹ and the duration of the procedure.^{3,4,7,8,12,13}

The smaller incision was designed to reduce tissue damage as much as possible. This was accomplished as follows:

- the incision was as short as possible without compromising access
- the smallest mucoperiosteal flap was reflected which would allow sufficient access to the submerged tooth crown
- care was taken to use the minimum of force in retracting the flap, to reduce damage due to stretching of the soft tissues
- the small flap fell back into place spontaneously, eliminating the need to suture the incision
- eliminating the need for sutures reduced the duration of surgery.

The assessment of pain and swelling was deliberately designed to take into account the patients' perceptions and not to include independent assessment.

Conclusion

The results of this study show conclusively that after third molar surgery, most patients report less postoperative pain and swelling when a small incision is made, with minimal reflection of the mucoperiosteum.

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