PASSIVE DRAINAGE THROUGH THE VESTIBULAR OBLIQUE INCISION IN IMPACTED INFERIOR THIRD MOLAR SURGERY: A PRELIMINARY STUDY

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ABSTRACT

The aim of the present study was to clinically evaluate the variables pain, swelling and trismus when two different suture techniques were applied in surgery of impacted lower third molars. The sample comprised 20 patients of both genders participating in the clinical trial at the Division of Oral and Maxillofacial Surgery, with an indication for the removal of bilaterally impacted lower third molars. They were divided into test and control groups. Complete suture was performed on the free and attached gums in the control group and only on the attached gum of the oblique vestibular incision in the test group.

The results showed that the fact that the drainage of fluid through the suture was not obliterated led to diminution of pain 48 hours after surgery. No statistically significant differences were observed in relation to swelling, which diminished gradually in both groups. As regards the variable trismus, the test group presented a greater mouth opening throughout the evaluation, being statistically significant at 7 days. The probing depth, three months postoperatively, was found to be greater in the control group. This difference reached statistical significance for the vestibular distal region of the adjacent second molar .

It is concluded that the strategy of not suturing the free gum of the oblique vestibular incision in the extraction of impacted lower third molars leads to the diminution of immediate painful symptomatology, but has no influence on the swelling.

Key words: *third molar, pain, edema, suture technique, trismus.*

DRENAGEM PASSIVA ATRAVÉS DA INCISÃO VESTIBULAR OBLÍQUA NA CIRURGIA DE TERCEIRO MOLAR INFERIOR IMPACTADO: ESTUDO PRELIMINAR

RESUMO

Avaliar clinicamente as variáveis dor, edema e trismo ao se utilizar duas técnicas diferentes de sutura para cirurgia de terceiro molar inferior impactado.

A amostra foi composta por 20 pacientes de ambos sexos com indicação para remover terceiros molares inferiores impactados bilaterais advindos da Clínica de Cirurgia e Traumatologia Buco-Maxilo-Facial. Esses pacientes foram divididos em grupo controle e experimental. A sutura completa da incisão oblíqua, incluindo as gengivas livre e inserida, foi considerada como grupo controle. No grupo experimental foi realizada apenas a sutura da gengiva inserida, deixando a gengiva livre sem sutura. A drenagem do fluido através da incisão que não foi totalmente suturada levou a uma diminuição da dor com 48 horas de pós-operatório. Nenhuma diferença estatística foi observada em relação ao edema, que diminuiu gradativamente em ambos os grupos. Em relação ao trismo, o grupo experimental apresentou uma maior abertura de boca durante o período de avaliação, sendo significativa com 7 dias. A sondagem periodontal, na região disto-vestibular, foi maior com significância estatística no grupo controle com 3 meses de pós-operatório.

A tática cirúrgica de não suturar a gengiva livre da incisão vestibular oblíqua na exodontia de terceiros molares inferiores impactados leva a uma diminuição da sintomatologia dolorosa imediata, mas não tem influencia no edema

Palavras chave: *terceiro molar, dor, edema, trismo, técnica sutura.*

INTRODUCTION

The surgical removal of lower third molars is a common oral surgical procedure that causes more severe pain, swelling, trismus and requires more time for the patient's recovery than the other types of oral surgery and can consequently interfere with the patient's everyday life.

Several authors state that complications, such as swelling and trismus, are related to the type of suture and duration of surgery and that the insertion of a drain may minimize the patient´s discomfort in the postoperative period[1-5].

In view of the controversy among authors found during the review of the literature in relation to the surgical technique, postoperative effects and periodontal health[1-11], the present study set out to evaluate the effect of the suture of the oblique vestibular incision in the triangular flap in impacted lower third molar surgery in relation to postoperative effects such as pain, swelling, trismus and gum insertion.

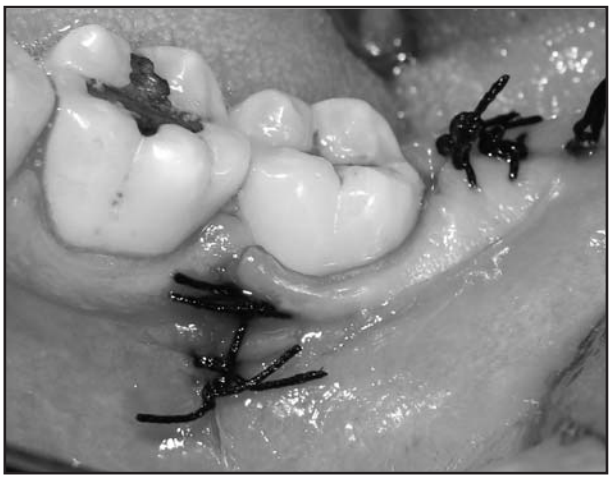

Fig. 1: Vestibular oblique incision suturing of the free and inserted gum – control group.

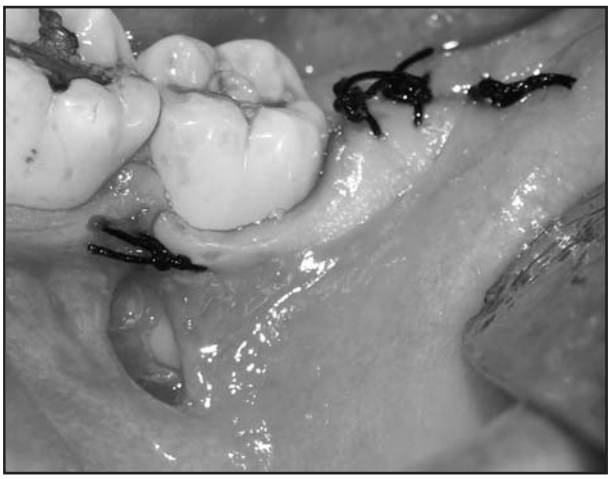

Fig. 2: Vestibular oblique incision suturing of only the inserted gum – experimental group.

MATERIAL AND METHODS

A double-blind, randomized, split-mouth study was conducted between May and September 2004 at the Division of Oral and Maxillofacial Surgery at the University of Pernambuco in Recife, Brazil. The trial protocol was approved by the university's Ethics Committee and the informed written consent was obtained from each patient. The study sample involved twenty patients (forty surgeries) of both genders, aged 18-40 years, and consecutively enrolled for the surgical extraction of bilateral impacted lower third molars under local anesthesia. Only patients classified as ASA I by the *American Society of Anesthesiology*[12-14] and with no history of significant systemic pathology or use of any medication that could interfere with the repair process were included.

To be included in this study, the patient had to have two lower third molars in a similar position according to the Pell & Gregory classification and classified as mesioangular and vertical according to the Winter classification[15].

Two groups were established (n=20) on a randomized basis (by allotment), according to whether or not suture of the free gum of the vestibular oblique incision was performed. The control group was composed of all the cases in which the vestibular oblique incision was sutured at isolated points (Fig. 1), while in the experimental group only the inserted gum was sutured (Fig. 2). The anesthetic technique comprised truncal blockage of the inferior dental nerve, with infiltrating anesthesia of the vestibular zone of the lower third molar using 3% lidocaine solution with 1/200,000 epinephrine[16].

Personal data were recorded for each patient. After the procedure was completed, each patient was given postoperative instructions, and medication for pain (50 mg Sodium Diclofenac 8/8 h for three days and 500 mg Dipyrone 6/6 h for the first 24 hours). A questionnaire on pain was filled out 48 and 72 hours, 7 and 15 days after surgery at scheduled appointments. The patients were asked to rate the pain intensity according to a visual analog scale (100 mm scale). If the patient marked a point between 1 and 25 mm the pain was considered as mild, between 26 and 50 mm moderate, from 51 to 75 mm intense and between 76 and 100 unbearable. The pain was also recorded at 72 hours, 7 days and 15 days by the observer when the patient returned for a evaluation.

The swelling was likewise recorded at 72 hours, 7 days and 15 days using the Amin-Laskin[17] method, in which the measurements in centimeters are taken in a vertical and horizontal position. The horizontal measurement corresponds to the distance between the labial cant and ear lobe and the vertical measurement is the distance between external canthal of the eye and mandibular angle. The arithmetic mean of these two distances represents the facial measurement. The percentage of facial edema was obtained by the difference between the pre- and postoperative measurements, divided by the values for the pre- and postoperative periods and multiplied by 100.

TABLE 1. Evaluation of the intensity of pain for each group and time of evaluation.

Time of evaluation	Intensity of pain	GROUPS					
		Experimental		Control		TOTAL	
		n	%	n	%	n	%
• 48 hours	No pain	9	45.0	5	25.0	14	35.0
	Mild	7	35.0	10	50.0	17	42.5
	Moderate	4	20.0	4	20.0	8	20.0
	Intense	-	-	1	5.0	1	2.5
TOTAL		20	100.0	20	100.0	40	100.0
• 72 hours	No pain	18	90.0	18	90.0	36	90.0
	Mild	2	10.0	2	10.0	4	10.0
	Moderate	-	-	-	-	-	-
	Intense	-	-	-	-	-	-
TOTAL		20	100.0	20	100.0	40	100.0
• 7 days	No pain	20	100.0	19	95.0	39	97.5
	Mild	-	-	1	5.0	1	2.5
	Moderate	-	-	-	-	-	-
	Intense	-	-	-	-	-	-
TOTAL		20	100.0	20	100.0	40	100.0
• 15 days	No pain	20	100.0	20	100.0	40	100.0
	Mild	-	-	-	-	-	-
	Moderate	-	-	-	-	-	-
	Intense	-	-	-	-	-	-
TOTAL		20	100.0	20	100.0	40	100.0

The trismus was evaluated by measuring the maximum interincisal opening with a flexible ruler at 72 hours, 7 days and 15 days.

Probing depths were evaluated in the postoperative period at three months in the vestibular-mesial, vestibular-median, vestibular-distal and distal (right above the incision) regions of the second molar.

RESULTS

Within 48 hours most patients (65%) felt some pain, the percentage being 20% higher among the controls than in the experimental group (75% versus 55%). Within 72 hours only 10% of the patients reported pain, the frequency being similar in both groups. At 7 days only one patient felt pain in the control group. No patient in either group reported pain at 15 days.

In relation to the intensity of pain, at 48 hours the highest percentage (42.5%) corresponded to the patients whose pain was classified as mild followed by patients with moderate pain (20%). At 72 hours the two cases of pain in each group were classified as mild, as in the only case of pain in the control group at 7 days (Table 1).

The mean values of swelling in the experimental group were between 10.18 cm and 10.53 cm, and in the control group 10.09 cm and 10.56 cm, the highest occurring at 72 hours. The variability expressed as the coefficient of variation was very low (6.23%). With regard to edema, there were no significant differences between the two groups at any of the times of evaluation (Table 2).

Table 3 shows that the mean values of the interincisal distance were lowest at 72 hours. The mean values were higher in the experimental group than in the control group at the other times of evaluation. The variability expressed in terms of the coefficient of variation was very low (33.66%). There were no significant differences between the two groups at 72 hours. However, significant differences were found at 7 and 15 days.

Table 4 shows the values of probing depth at three months for each group and the five regions of the second molar. The mean values of the probing depth in each region were higher for the control group than for the experimental group, the difference ranging from 0.15 to 0.65. The only significant difference corresponded to the vestibulodistal region (p=0.0374).

TABLE 2. Normal values and edema (cm) for each group.

		GROUPS		
	Time of evaluation	Experimental	Control	P value
• Mean (cm)	Preoperative	10.18	10.09	p (1) = 0.1172
	72 hours	10.53	10.56	p (1) = 0.7309
	7 days	10.36	10.30	p (1) = 0.2450
	15 days	10.22	10.16	p (1) = 0.2220
• Median (cm)	Preoperative	10.23	10.08	
	72 hours	10.50	10.45	
	7 days	10.43	10.38	
	15 days	10.38	10.25	
• Standard deviation (cm)	Preoperative	0.54	0.57	
	72 hours	0.55	0.66	
	7 days	0.61	0.56	
	15 days	0.56	0.55	
• Coefficient of variation (%)	Preoperative	5.34	5.70	
	72 hours	5.21	6.23	
	7 days	5.90	5.47	
	15 days	5.49	5.44	
• Minimum (%)	Preoperative	9.30	9.10	
	72 hours	9.35	9.45	
	7 days	9.30	9.35	
	15 days	9.30	9.30	
• Maximum (%)	Preoperative	11.35	11.25	
	72 hours	11.85	12.25	
	7 days	11.65	11.45	
	15 days	11.40	11.25	

(*) – Significant at 5.0%.
(1) – Using Student´s split mouth t-Test.

DISCUSSION

Several authors have mentioned a number of factors that may lead to postoperative discomfort: the duration of surgery, the patient's age, gender and general health, time of day of the operation, the type of suture of the flaps and the degree of retention of the tooth[18-22]. Other authors report that such discomfort may be related to the surgical technique, in particular to the procedure for suturing the flaps of the surgical wound, in relation to a suture that leads to a primary[9-24] or secondary[4,25] repair. Primary healing may lead to more postoperative problems than secondary healing[4], but other authors state that there is no difference between them[10].

The suture technique was evaluated in the present study employing four end-points: pain, swelling, trismus and probing depth, described in the literature as adequate end-points for evaluation[5,11,26-29]. Since this preliminary study has included a very low number of cases, its results cannot be generalized. Further studies with a larger sample are required.

Several studies show that fluid oozing from the wound through a tube drain may decrease edema, pain and trismus[2-5,9,30]. Some authors report that the postoperative problems with the use of a tube drain and those related to secondary healing are roughly the same[30]. In this study no tube drain was used, but not suturing the free gum allowed passive drainage.

Postoperative pain decreased with the passage of time: after 48 hours 65% of the patients reported some pain, after 72 hours only 10%, at 7 days 2.5% and at 15 days no patient reported pain (Table 2). This is in agreement with Seymour et al.[27], who state that pain is more severe in the immediate postoperative period and decreases progressively.

There was more pain in the control group (75%) than in the experimental group (55%) at 48 hours, which is in agreement with Andreasen et al.[3], who

TABLE 3. Normal values and interincisal distance (mm) for each group.

		GROUPS		
	Time of evaluation	Experimental	Control	P value
• Mean (mm)	Preoperative	52.65	52.65	p (1) = 1.000
	72 hours	33.25	29.85	p (1) = 0.1827
	7 days	46.40	38.65	p (1) < 0.001*
	15 days	51.60	48.80	p (1) = 0.0421*
• Median (mm)	Preoperative	50.00	50.00	
	72 hours	30.00	27.50	
	7 days	45.00	40.00	
	15 days	49.50	47.00	
• Standard deviation (mm)	Preoperative	9.39	9.39	
	72 hours	10.42	10.05	
	7 days	8.65	9.91	
	15 days	8.37	8.87	
• Coefficient of variation (%)	Preoperative	17.84	17.84	
	72 hours	31.34	33.66	
	7 days	18.65	25.64	
	15 days	16.22	18.17	
• Minimum (mm)	Preoperative	32.00	32.00	
	72 hours	20.00	15.00	
	7 days	35.00	24.00	
	15 days	35.00	32.00	
• Maximum (mm)	Preoperative	70.00	70.00	
	72 hours	52.00	60.00	
	7 days	65.00	61.00	
	15 days	70.00	70.00	

(*) - Significant at 5.0%.
(1) – Using Student´s split mouth t-Test.

state that the pain diminishes when a tube drain is used in the first few postoperative days, which is at variance with Rakprasitkul, Pairuchvej[2] and Cerqueira et al.[5], who claim that the use of drainage has no relation to pain.

With regard to edema, only at 72 hours were greater mean values found in the control group, but with no significant difference. At 7 and 15 days these values had decreased in both groups, but those of the experimental group remained higher, albeit with no significant difference. According to some studies, the use of a drain helps to diminish facial edema[2,5].

The mean values of the trismus were highest at 72 hours, 7 and 15 days in the experimental group. These values were higher in the control group, reaching a peak at 72 hours. In the control group, the values were significantly lower at 7 and 15 days than in the experimental group ($p<0.001$ and $p=0.0421$ respectively). This finding is at variance with Cerqueira et al.[5] who state that the use of a drain does not interfere with trismus.

The probing depth, three months postoperatively, showed a statistically significant greater value in the vestibulo-distal region of the adjacent second molar in the control group (Table 4), in agreement with Peng[31], who states that periodontal problems are found in the distal region of the adjacent second molar.

In this preliminary study, the technique of not suturing the free gum of the oblique vestibular incision in impacted inferior third molar surgery was shown to decrease early pain and trismus, but did not reduce edema, nor did it alter the periodontal depth. Thus the clinical outcomes of this technique may bring benefits in terms of decreasing pain and trismus and obviating the need for any addition of alloplastic material. However, further studies with a larger sample should be undertaken.

TABLE 4. Evaluation of the probing depth within three months for each region and group.

		GROUPS			
Region		**Experimental**	**Control**	**Mean of differences**	**P Value**
• VM	Minimum	1	1.00		
	Maximum	2	2.00		
	Mean	1.40	1.55	0.15	$p^{(1)} = 0.3299$
	Median	1	2.00		
	Standard deviation	005	0.51		
	Coefficient of variation	35.90	32.93		
•D	Minimum	1.00	1.00		
	Maximum	2.00	2.00		
	Mean	1.20	1.40	0.20	$p^{(1)} = 0.3438$
	Median	1.00	1.00		
	Standard deviation	0.41	0.50		
	Coefficient of variation	34.20	35.90		
• VMED	Minimum	1.00	1.00		
	Maximum	2.00	2.00		
	Mean	1.35	1.50	0.15	$p^{(1)} = 0.5488$
	Median	1.00	1.50		
	Standard deviation	0.49	0.51		
	Coefficient of variation	36.25	34.20		
• VD	Minimum	1.00	1.00		
	Maximum	3.00	5.00		
	Mean	1.95	2.60	0.65	$p^{(1)} = 0.0374$*
	Median	2.00	2.00		
	Standard deviation	0.69	1.23		
	Coefficient of variation	35.20	47.35		

(*) – Significant at 5.0%.
(1)– Using Wilcoxon´s matched pairs test.
VM – Vestibular-Mesial Region
D – Distal Region (right Above the Incision)
VMED – Vestibular-Median Region
VD – Vestibular-Distal Region

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REFERENCES

1. Flynn TR, Hoekstra CW, Lawrence FR. The use of drains in oral and maxillofacial surgery: a review and a new approach. J Oral Maxillofac Surg 1983; 41:508-511.
2. Rakprasitkul S, Pairuchvej V. Mandibular third molar surgery with primary closure and tube drain. J Oral Maxillofac Surg 1997; 26:187-190.
3. Andreasen JO, Ptersen JK, Laskin DM. Text book and color atlas of tooth impactions – diagnosis, treatment and prevention. Copenhagen: Hunksgaard 1997; 273-274.
4. Akota I, Alvsaker B, Bjornland T. The effect of locally applied gauze drain impregnated with chlortetracycline ointment in mandibular third-molar surgery. Acta Odontol Scand 1998; 56:25-29.
5. Cerqueira PRF, Vasconcelos BCE, Bessa-Nogueira RV. Comparative study of the effect of a tube drain in impacted lower third molar surgery. J Oral Maxillofac Surg 2004; 62: 57-61.
6. Absi EG, Shepherd JP. A comparison of morbidity following the removal of lower third molars by the lingual split and surgical bur methods. Int J Oral Maxillofac Surg 1993; 22:149-153.
7. Jakse N, Bankaoglu V, Wimmer G, Eskici A, Pertl C. Primary wound healing after lower third molar surgery:

evaluation of 2 different flap designs. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2002; 97:7-12.
8. Rosa AL, Carneiro M, Lavrador MA, Novaes AB. Influence of flap design on periodontal healing of second molars after extraction of impacted mandibular third molars. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2002; 93:404-407.
9. Holland CS, Hindle MO. The influence of closure or dressing of third molar sockets on post-operative swelling and pain. Br J Oral Maxillofac Surg 1984; 22:65-71.
10. Suddhasthira T, Chaiwat S, Satta-Pongsda P. The comparison study of primary and secondary closure technique after removal of impacted mandibular third molars. Thai J Oral Maxillofac Surg 1991; 5:67-73.
11. Mocan A, Kisnisci R, Üçok C. Stereophotogrammetric and clinical evaluation of morbidity after removal of lower third molars by two different surgical techniques. J Oral Maxillofac Surg 1996; 54:171-175.
12. Keats AS. The ASA classification of physical status – a recapitulation. Anesthesiology 1978; 49:233-236.
13. Owens WD, Felts JA, Spitznagel JR EL. ASA Physical Status Classifications: A Study of Consistency of Ratings. Anesthesiology 1978; 49:239-243.
14. Menke H, Klein A, John KD, Junginger T. Predictive value of ASA classification for the assessment of the perioperative risk. Int Surg 1993; 78:266-270.
15. Peterson LJ, Ellis E, Hupp JR, Tucker MR. Cirurgia Oral e Maxilofacial Contemporânea. Rio de Janeiro: Guanabara Koogan; 2000.
16. Mallamed SF. Manual de Anestesia Local. 4th. ed. Rio de Janeiro: Guanabara Koogan 2001; 279.
17. Amin-Laskin DM. Prophylatic use of indomethacin for prevention of post-surgical complications after removal of impacted third molars. Oral Surg Oral Med Oral Pathol 1983; 55:448-457.
18. Rud J. Reevaluation of the Lingual Split-Bone Technique for Removal of Impacted Mandibular Third Molars. J Oral Maxillofac Surg 1984; 42:114-117.
19. Berge TI, Gilhuus-Moe OT. Pre- and post-operative variables of mandibular third molar surgery by four general practitioners and one oral surgeon. Acta Odontol Scand 1993; 51:389-397.
20. Berge TI, Boe OE. Predictor evaluation of postoperative morbidity after surgical removal of mandibular third molars. Acta Odontol Scand 1994; 52:162-169.
21. Knutsson K, Brehmer B, Lysell L, Rohlin M. Mandibular third molars as mediated by three cues: dentists's treatment decisions on asymptomatic molars compared with molars associated with pathologic conditions. Acta Odontol Scand 1997; 55:372-377.
22. Bui CH, Seldin EB, Dodson TB. Types, frequencies, and risk factors for complications after third molar extraction. J Oral Maxillofac Surg 2003; 61:1379-1389.
23. Marzola C. Retenção dental. São Paulo: Panamed; 1988; 303.
24. Demitroulis G. A synopsis of oral surgery. Jordan Hill: Wright; 1997; 243.
25. Berge TI. Pattern of self-administered paracetamol and codeine analgesic consumption after mandibular third-molar surgery. Acta Odontol Scand 1997; 55:270-276.
26. Lysell L, Brehmer B, Knutsson K, Rohlin. Rating the preventive indication for mandibular third-molar surgery: the appropriateness of the visual analogue scale. Acta Odontol Scand 1995; 53:60-64.
27. Seymour RA, Meechan JG, Blair GS. An investigation into post-operative pain after third molar surgery under local analgesia. Br J Oral Maxillofac Surg 1985; 23:410-418.
28. Norholt SE, Aagaard E, Svensson P, Sindet-Pedersen S. Evaluation of trismus, bite force, and pressure algometry after third molar surgery: a placebo-controlled study of ibuprofen. J Oral Maxillofac Surg 1998; 56:420-427.
29. Seymour RA, Frame J, Negus TW, Hawkesford JE, Marsden J, Matthew I R. The comparative efficacy of aceclofenac and ibuprofen in postoperative pain after third molar surgery. Br J Oral Maxillofac Surg 1998; 36:375-379.
30. Brabander EC, Cattaneo G. The effect of surgical drain together with a secondary closure technique on postoperative trismus, swelling and pain after mandibular 3rd molar surgery. Int J Oral Maxillofac Surg 1988; 17:119-121.
31. Peng KY. Mandibular second molar periodontal status after third molar extraction. J Periodontol 2001; 72:1647-1651.