

Comparative study of the effects of Suture-less and Multiple Sutures Techniques on Complications following Third Molar Surgery in a secondary health facility in Benin City, Nigeria

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ABSTRACT

Objective: To compare the effects of suture-less and multiple sutures techniques on complications following third molar surgery.

Methods: The study was a prospective randomized clinical study involving 112 patients (44 males and 68 females). The patients were randomly divided into two equal groups (suture-less $n = 56$; multiple suture $n = 56$). In the experimental group (suture-less, group 1), the flaps were replaced without suturing. The control group (multiple sutures, group 2) was selected using the same criteria and treated under the same surgical protocol, except that the flaps were opposed using multiple sutures. Trismus, swelling and pain were evaluated at days 1, 2, 3, 5 and 7 postoperatively in both groups. Independent t-test was used to compare post-operative outcomes (trismus, swelling and pain) of both techniques. All statistical analyses were set at 5% level of significance.

Results: The mean age of the participants was 34.2 ± 12.3 years in group 1 and 30.5 ± 7.6 years in group 2. The ratio of males to females was 2:3. Over 90% of the participants live in Benin City. Reduction in mouth opening (trismus) was consistently less among the patients that received suture-less technique (group 1) than among those that received multiple suture technique (group 2) across all postoperative evaluation days (1, 2, 3, 5 & 7). This difference was however only statistically significant ($p < 0.05$) in postoperative day 1. At evaluation on the first, second and third postoperative days, facial swelling, when measured from tragus to pogonium (TP) and when measured from tragus to commissure (TC), were found to be significantly less ($p < 0.05$) in the group in which no suturing was done (group 1) compared to the other group that received multiple sutures. Pain reduction was found to be significantly more ($p < 0.05$) in the group that received suture-less technique (group 1) compared to the group that received multiple sutures technique (group 2) on postoperative day 1. There was no significant difference between both groups at postoperative days 2, 3, 5 and 7.

Conclusion: This study has shown that suture-less technique can be used in third molar surgery, including those performed via standard incisions. The suture-less technique is a simple and viable option for minimizing the postoperative morbidity associated with inflammatory sequelae after third molar surgery.

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INTRODUCTION

Impacted tooth has been defined as a tooth that is prevented from eruption by a physical barrier within the path of eruption, unlike embedded tooth which is prevented from eruption due to lack of eruptive forces (Peterson et al., 1998; Agarwal et al., 2004). Impaction of third molar occurs in about

9.2% of young adults in Nigeria (Odusanya, 1986). Generally, third molar has been found to erupt between the ages of 17 and 25 (Odusanya, 1986; Pahkala et al., 1991). Third molar eruption time has been reported to vary with races. For example, mandibular third molars may erupt as early as 14 years in Nigerians and up to the age of 20 years in

Europeans (Pahkala et al., 1991; Odusanya & Abayomi, 1991). The average age for the eruption of mandibular third molars in males is approximately 3 – 6 months ahead of females and the incidence of mandibular third molar impaction is higher in females (Yuasa & Sugiura, 2004). The nature of diet and genetic background also affect third molar impaction (Alling et al., 1993).

The definitive treatment for an impacted third molar is surgical extraction. One of two types of closure techniques may be used. These are primary (total) and secondary (partial) closure techniques. Primary closure heals by primary intention. Here, the suture material facilitates healing by joining the wound edges, thus minimizing new tissue formation within the wound. Meanwhile, secondary closure, with or without intra-alveolar dressing, heals by secondary intention in which case the wound is left to heal on its own by granulation.

This study was aimed at comparing the effect of suture-less and multiple sutures techniques on complications following third molar surgery.

MATERIALS AND METHODS

Study Design/ Setting: The study was a prospective randomized clinical study involving 112 patients attending the Oral and Maxillo-facial Surgery Clinic of the Dental Centre in Central Hospital, Benin City.

Sampling/ Sample Size: A sample size of 110 was calculated using the formula for analytic study for qualitative outcome in the comparison of two proportions. However, this was adjusted to 122 to compensate for non-response rate of 10% (Lemeshow et al., 1990). Patients were consecutively selected, and randomly divided into two equal groups, until the required sample size was obtained. All patients that met the criteria for inclusion were recruited into the study.

Data collection tool/ procedure: The patients were randomly divided into two equal groups (suture-less n = 56; multiple suture n = 56). In the experimental group (suture-less, group 1), the flaps were replaced without suturing. The control group (multiple sutures, group 2) was selected using the same criteria and treated under the same surgical protocol, except that the flaps were opposed using multiple sutures. Trismus, swelling and pain were evaluated preoperatively and at days 1, 2, 3, 5 and 7 postoperatively in both groups.

Data Management and Analysis: The data were entered, cleaned and analyzed using IBM SPSS 22.0 (Armonk, NY: IBM Corp). Simple summary statistics (percentage for categorical and mean for quantitative variables) were done for all variables. Chi-square test, at 5% level of significance, was

used to assess the differences between these variables in both groups. Independent t-test was used to compare post-operative outcomes of multiple suture technique and suture-less technique. Based on 95% confidence interval, all statistical analyses were set at 5% level of significance. Tables were used in the presentation of results.

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Ethical Consideration: Ethical approval was obtained from the ethical review committee of Central Hospital, Benin. Informed consent was obtained from all participants. The participants' responses were held in strict confidence. There were no identifiers on the questionnaire. The study did not pose any risk or harm to the research participants. Recruitment was based on participants' readiness to take part in the study.

RESULTS

Out of 122 questionnaires administered, 114 (93.4%) patients completed the study and 112 (91.8%) duly completed questionnaires were analyzed. Fifty-six (56) questionnaires in group 1 (suture-less technique) and 56 questionnaires in group 2 (multiple suture technique).

Table-1 shows that there were no statistically significant differences ($p > 0.05$) between both groups in socio-demographic characteristics, except in educational background and occupation $p = 0.001$ ($p < 0.05$). Most of the participants were in age-group 26-35. 41% of those in group 1 and 46% of those in group 2 were between 26 and 35 years old. The mean age of the participants was 34.2 ± 12.3 years in group 1 and 30.5 ± 7.6 years in group 2. The combined age-range was 18 – 66 years. Although the difference was not statistically significant, the females (51.8% and 69.6% in groups 1 and 2 respectively) were more than the males in both groups. The ratio of males to females was 2:3. Majority of the participants in both groups (over 90% in each) live in Benin City. Most of the participants (66% of those in group 1 and 92.8% of those in group 2) had post-secondary education. Most (41.1%) of those in group 1 and 12.7% of those in group 2 are unskilled in occupation, while 19.6% of those in group 1 and 29.1% of those in group 2 are non-manual skilled in occupation.

Table-2 shows comparative statistics for the parameters of trismus, swelling and pain between the two treatment modalities. Reduction in mouth opening (trismus) was consistently less among the

patients that received suture-less technique (group 1) than among those that received multiple suture technique (group 2) across all postoperative evaluation days (1,2,3,5 & 7). This difference was however only statistically significant in postoperative day-1 ($p = 0.045$). In both groups, the reduction in mouth opening generally decreased from $1.420 \pm 0.900\text{cm}$ in group-1 and 1.770 ± 0.900 in group 2 in day 1 to 0.000 ± 0.000 in group 1 and $0.002 \pm 0.009\text{cm}$ in group 2 in day 7.

At evaluation on the first, second and third postoperative days, facial swelling when measured from the tragus to the pogonium was found to be significantly less in the group in which no suturing was done (group 1) compared to the other group that received multiple sutures ($p < 0.001$). There was no statistically significant difference in facial

swelling between the treatment groups at day 5 ($p = 0.288$) and day 7 ($p = 0.647$) postoperative review. These findings were similar to those observed when the facial swelling was measured from tragus to commissure, in which the facial swelling was also found to be significantly less in group-1 compared to group 2 on postoperative days 1, 2 and 3 ($p < 0.001$) and no significant difference in facial swelling in both groups on postoperative days 5 ($p = 0.184$) and 7 ($p = 0.928$).

Pain reduction was found to be significantly more in the group that received suture-less technique (group 1) compared to the group that received multiple sutures technique (Group 2) on postoperative day 1 ($p = 0.009$). There was no significant difference between both groups at postoperative days 2, 3, 5 and 7 ($p > 0.05$).

Table 1: Distribution of Social demographic characteristics of participants in both groups

Variable	Frequency Group 1 (n=56)	Group 2 (n=56)	X ²	P-value
Age categories (years)			1.599	0.450
<26	14(25.0)	17(30.4)		
26-35	23(41.1)	26(46.4)		
>35	19(33.9)	13(23.2)		
Sex			3.743	0.053
Male	27(48.2)	17(30.2)		
Female	29(51.8)	39(69.6)		
Address			5.084	0.079
Benin	55(98.2)	52(92.9)		
Outside Benin City	0(0.0)	4(7.1)		
Outside Edo State	1(1.8)	0(0.0)		
Educational background			15.423	0.001
None	0(0.0)	1(1.8)		
Primary	3(5.4)	0(0.0)		
Secondary	16(28.6)	3(5.4)		
Post secondary	37(66.0)	52(92.8)		
Occupation			19.409	0.002
Professional & managerial	5(8.9)	10(18.2)		
Non manual skilled	11(19.6)	16(29.1)		
Manual skilled	0(0.0)	6(10.9)		
Unskilled	23(41.1)	7(12.7)		
Student	17(30.4)	14(25.5)		
Unemployed/housewife	0(0.0)	2(3.6)		
Retired/pensioner	0(0.0)	0(0.0)		

DISCUSSION

The definitive treatment for an impacted third molar is surgical removal. Surgery of the impacted third molar is one of the most frequently performed procedures in oral and Maxillofacial surgery (Fayad et al., 2004). This procedure can lead to immediate post-operative pain and discomfort (Ibikunle & Adeyomo, 2016).

Assessment of pain may be difficult (Adeyemo et al., 2008) because it is a subjective experience that is influenced by factors such as patient's age, cultural background, pain threshold and tolerance.

Facial swelling was determined by the use of flexible tape and vernier caliper was used for measurement of trismus

The result of this study showed that the age-range of the participants was similar to those found in previous studies in which the mean ages were reported to be within the range 20-30 years (Saheeb & Obuekwe, 2001). This is probably due to the eruption time of the third molar and the timing of the surgery following period of observation to allow for spontaneous eruption.

Table 2: Comparison of postoperative trismus, swelling and pain between group 1 (suture-less) and group 2 (multiple suture) on patients undergoing third molar surgery

Variable	Day	Group-1 (n=56) M±SD	Group-2 (n=56) M±SD	T	P-value
Reduction in MID (cm) [TRISMUS]					
	1	1.420±0.900	1.770±0.900	-2.025	0.045
	2	1.380±0.930	1.500±0.700	-0.811	0.419
	3	0.002±0.009	0.003±0.011	-0.454	0.651
	5	0.001±0.007	0.002±0.009	-0.851	0.563
	7	0.002±0.009	0.000±0.000	1.427	0.159
Increase in Facial width, TP (cm) [SWELLING]					
	1	1.238±0.334	2.017±0.486	-9.897	<0.001
	2	0.704±0.271	1.456±0.504	-9.843	<0.001
	3	0.345±0.194	0.792±0.547	-5.773	<0.001
	5	0.005±0.018	0.009±0.025	-1.068	0.288
	7	0.002±0.007	0.003±0.009	-0.459	0.647
Increase in Facial width, TC (cm) [SWELLING]					
	1	1.143±0.387	2.053±0.451	-11.338	<0.001
	2	0.637±0.311	1.270±0.427	-8.964	<0.001
	3	0.313±0.232	0.713±0.375	-6.772	<0.001
	5	0.006±0.021	0.013±0.034	-1.338	0.184
	7	0.017±0.049	0.018±0.054	-0.091	0.928
Reduction in VAS, (cm) [Reduction in PAIN]					
	1	2.090±3.730	0.200±3.780	2.662	0.009
	2	0.730±3.610	1.050±3.910	-0.452	0.652
	3	1.770±2.150	2.050±3.990	-0.472	0.638
	5	1.680±2.740	1.910±3.740	-0.374	0.709
	7	3.540±1.900	3.960±2.830	-0.942	0.349

There were more females than males in this study, as reported by several similar studies (Chukwuneke & Saheeb, 2008). The higher female to male ratio observed in these studies could possibly be attributed to the propensity of females to attend dental checkup (Bramah & Ibikunle, 2018). These findings were contrary to that reported by (Nwaniki & Guthua, 1996) in which a male to female ratio was 7:5.

This study revealed that the reduction in mouth opening(trismus) was consistently less among the patients that received suture-less technique (group-1) than those that received multiple suture technique (group-2) across all postoperative evaluation days (1,2,3,5, and 7). This difference was however only statistically significant in postoperative day 1. This result was comparable with similar studies by Osunde et al. (2011), who both reported less postoperative trismus with patients that received suture-less technique. The reduction in mouth opening was attributed to reduction in postoperative oedema.

At evaluation on the first, second and third postoperative days, facial swelling were found to be statistically significantly less in the group in which no suturing was done (group 1) compared to

the group that received multiple sutures. There were no statistically significant differences in facial swelling between both groups in days 5 and 7 postoperatively. These findings corroborate other studies (Anighoro & Gbotolorun, 2013) that reported greater swelling when surgical wound healed by first intention. This has been attributed to the fact that primary closure of wound prevents drainage of the wound leading to worsening postoperative pain and swelling (Makama and Ameh, 2008). These findings however did not agree with a study that reported no differences between the two groups of patients subjected to both closures' techniques (deBrabander & Cattaneo, 1998).

In this study it was revealed that pain reduction was found to be significantly more in the group that received suture-less technique (group-1) compared to those that received multiple suture technique (group 2) on postoperative day 1. There was no significant difference between both groups at postoperative days 2,3,5 and 7. This agrees with the findings by (Pasqualini et al., 2005). The fact that suture-less technique was associated with remarkable pain reduction has been attributed to more drainage of inflammatory exudates from the

surgical site as opposed primary closure of wound (multiple suture) which prevents drainage of the wound leading to worsening postoperative pain (Makama & Ameh, 2008).

CONCLUSION

Postoperative trismus, swelling and pain were generally worse in the group that received multiple sutures technique as compared to those that received suture-less technique. Sutureless technique can therefore be used in third molar surgery including those performed via standard incisions. Suture-less technique is a simple and viable option for minimizing the postoperative morbidity associated with inflammatory sequelae after third molar surgery.

RECOMMENDATIONS

Suture-less technique be used in third molar surgery especially when performed via minimal incisions is hereby recommended

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