Somanath A Mungarwadi, Venkatesh Anehosur, Mahantesh S Shirganvi, K Gopalkrishnan, Niranjan Kumar, Bhushan Jayade. *Ethiop Med J, 2018, Vol.56, No.3*

ORIGINAL ARTICLE

COMPARISON OF SCHOBINGER INCISION AND MACFEE INCISION IN NECK DISSECTION-A PROSPECTIVE STUDY

Somanath A Mungarwadi (MDS)[1,2*], Venkatesh Anehosur (MDS)[1], Mahantesh S Shirganvi (MDS)[1], K Gopalkrishnan (MDS, FDSRCS)[1], Niranjan Kumar (MBBS, MS.MCH)[1], Bhushan Jayade (MDS,FDSRCS, FFDRCS)[1]

ABSTRACT

Objectives: *There are many incisions that are most commonly recommended for performing neck dissection for oral cancer. The need towards more conservative surgical treatment of oral cancer has led to performing various incisions.*

Methods*: In this study the Schobinger and MacFee Incisions were used in radical neck dissection (RND) and compared intraoperatively, postoperative and during follow up at regular intervals. The study was conducted from November 2011 to June 2014 on 30 patients who were biopsy proven case of squamous cell carcinoma (SCC). Fifteen patients aged 20-60 including males and females were randomly sorted into Schobinger incision group and MacFee incision group. The study was conducted in the Department of Oral and Maxillofacial Surgery SDM College of Dental Sciences and Hospital, Dharwad, Karnataka, India.*

Result: *The Schobinger incision (Group I) and MacFee incision (Group II) both had 12 males and 3 females. Time taken to raise and close the flap was greater among Schobinger incision patients. Dehiscence was observed less in the MacFee incision group. Marginal necrosis of the flap was also less in MacFee incision. Wound contraction, infection, and scar assessment was better in the MacFee incision compared to the Schobinger incision.*

Conclusion: *MacFee incision was observed to have better cosmetic effect, the time taken for the raise and closure of the flap was less, and post-operative healing was better achieved. The Schobinger incision on the other hand provided a better exposure of neck during dissection, but a higher incidence of marginal necrosis and contracture of the flap with scaring was observed. In MacFee incision there was difficulty observed during neck dissection under the flap and in the posterior triangle.*

Keys words: *Schobinger Incision, MacFee Incision, Neck Dissection, Healing, Scar assessment.*

INTRODUCTION

The first radical neck dissection (RND) was described by Jawdynsky in 1888, in Poland, and later described by Crile in 1906 (1). A number of skin incisions have been used to obtain exposure for the required neck dissection. One of the first to mention an incision of the neck, in connection with tumour of the mouth, was Regnoli of Pisa in 1838. He described a T shaped incision made under the chin for the removal of tumour of the tongue (2).

There are many incisions that are used for neck dissection in oral cancer. The incisions that were designed to perform neck dissection have remained unchanged over the past 3 decades. The use of different incisions to perform current standard neck dissection must be re-evaluated. Preoperative planning is required for the success and the outcome of the patient.

Depending on the intra-operative findings, neck dissection which allows a good exposure of the operative site and a safe, lymphadenectomy is important. Some incisions which are used for neck dissection provide excellent exposure during dissection at the expense of aesthetic outcomes. Some incisions, which provide a good exposure to all areas of the neck, are also prone to wound dehiscence which requires additional care and prolonged hospitalization, and scar contractures are also seen causing difficulty in neck movements. The ideal skin incision for radical or modified radical neck dissection should maintain adequate skin viability, provide adequate exposure and coverage of the carotid artery, allow transfer of appropriate flaps to head and neck region for reconstruction, and good cosmetic results (3).

[1]Department of Oral and Maxillofacial Surgery, SDM College of Dental Sciences and Hospital, Dharwad, Karnataka, India.
[2]Current address: College of Medicine and Health Science, Hawassa University , Hawassa, Ethiopia
* corresponding author email: somanath_bgm@yahoo.co.in

MATERIAL AND METHODS

A prospective study was conducted on 30 patients who reported with oral squamous cell carcinoma (SCC). The patients were divided randomly in to 2 groups with 15 patients operated using Schobinger incision and 15 patients operated using MacFee incision.

All patients undergoing radical neck dissection only, age 20 to 60 yrs were included, irrespective of gender. Patients were excluded if they had undergone radiotherapy and chemotherapy pre-operatively, if the tumour mass was tightly adherent to the tissues, if bilateral neck dissection was required, if there were N3 nodes present involving important anatomical structures, or if they were medically compromised.

The study was conducted in the Department of Oral and Maxillofacial Surgery SDM College of Dental Sciences and Hospital, Dharwad, Karnataka, India.

Ethical approval was obtained from the Institutional review board from SDM college of Dental science and Hospital, Dharwad, and Informed consent for participation in the study was obtained from the patients.

Schobinger Incision: The horizontal limb of the incision follows the conventionally used slightly downward curved line leading from the tip of the mastoid process to the midline of the submental region. If there is need, the incision may be carried further along the under surface of the chin to the opposite submandibular region.

This extension will allow adequate retraction of the medial flap and permit satisfactory access to the opposite side of the neck which may be required during more extensive procedures. The vertical limb of the incision starts approximately one finger breadth and behind the angle of the mandible and at right angles with the horizontal portion of the skin incision. It is very important to avoid acute angles, since narrow skin flaps have an increased tendency to slough. The incision is then carried along the edge of the trapezius muscle in a curved fashion down to the midline of the clavicle(1).

Macfee Incision: It is a double horizontal incision where two incisions are made, one in the upper cervical area beginning approximately 2.5cms below and 2.5cms behind the tip of the mastoid process and continuing below the angle of the mandible, then parallel to the lower margin of the mandible diverging slightly from it. The lower incision is made 3.5 cms above the clavicle and parallel to it. This approach gives access to the cervical lymph nodes and vascular structures, muscles of the neck, and the submandibular region. This incision exposure may be difficult at times but appealing cosmetic results can be achieved (2).

Patient Evaluation: Intra-operative time taken to raise the flap, accessibility to the neck, damage to the internal jugular vein (IJV) and the time to close the flap were analysed. The time to raise the flap was determined from the start of the incision up to the point before starting the neck dissection from the lower end. The time taken for closure was determined from the time of approximation of flap to the completion of the last skin suture.

Post operatively the patient was assessed at the time of discharge and at first, third and sixth month of follow-up as well as post radiotherapy. The incision was assessed for marginal necrosis of flap, dehiscence and contraction of wound, edema, infection or any exposure of vessels. Cosmesis of scar was assessed by the Stony Brook Scar Evaluation Score.

Statistical evaluation was done using non-parametric tests (Mann Whitney Test). Statistical significance was set at the $p = 0.05$ level.

The objective of the study was to compare Schobinger and Macfee incision used in radical neck dissection for improved aesthetic outcomes and need towards more conservative surgical treatment of oral cancer.

RESULT

Patient Descriptions: Schobinger incision patients (Group I) consisted of 12 males and 3 females; the mean age being 46.0 years with a standard deviation of 12.6. MacFee incision (Group II) had 12 males and 3 females with the mean age of 51.6 years and a standard deviation of 11.9. Among the Schobinger incision group, 6 patients underwent elective tracheostomy, whereas 5 underwent this procedure among the Macfee incision group.

Within the Schobinger incision group, the lesion site was in the buccal mucosa in 60% of patients, retromolar trigone (RMT) in 6.7% patients, gingivobuccal

(GB) sulcus in 20% of patients and tongue in 13.3% of patients. Among MacFee incision patients the lesion involved buccal mucosa in 53.3%, GB sulcus in 6.7%, tongue in 20%, and combined buccal mucosa and RMT in 20%.

Among Schobinger incision patients, 86.6% had well differentiated squamous cell carcinoma by histology, 6.7% had moderately differentiated squamous cell carcinoma and 6.7% poorly differentiated SCC. Within the MacFee incision group, all patients (100%) had well differentiated squamous cell carcinoma. Comorbities among Schobinger incision patients included epilepsy (one patient) and diabetes (one patient), where as one patient in the MacFee incision group was hypertensive.

Time to raise the flap and closure of flap: The mean time taken to raise the flap was 63.0 ± 11.9 min among Schobinger incision patients, while it was 47.3 ± 5.3 min in the MacFee incision group (Fig 1).

The mean time for flap closure was 85.3 ± 6.9 for the Schobinger incision group, while it was 62.0 ± 6.7 for those with the MacFee incision (Fig 1). The differences between the two incision groups were highly significant both for flap raise and closure ($p < 0.05$ Mann-Whitney).

None of the patients in either of the groups had any damage to anatomical structures. The internal jugular vein (IJV) was preserved in all the cases, except for one case using the MacFee incision. Preservation or removal of the IJV did not impact healing in either group. Edema was noted in the patient from whom the internal jugular vein was removed, and this resolved over the observation period.

Healing outcomes and complications: The healing of the incision was assessed post operatively at the time of discharge and at regular intervals during follow-up.

Marginal necrosis and dehiscence were seen in five patients at the trifurcation point among Group I patients and in one patient in the MacFee incision group in the upper limb at the junction where the flap joins the bridge. These differences between the groups did not reach statistical significance ($p>0.05$).

Wound contracture was not seen in 3 Group I patients due to infection at the trifurcation point and in 1 Group II patient. These differences between the two incision groups were not significant ($p>0.05$). In the Schobinger incision group, infection was seen in three patients, one with diabetes mellitus and the remaining two without any underlying comorbid illnesses. In MacFee incision group, the one patient with infection similarly had no comorbid conditions. These group differences were not statistically significant ($p>0.05$).

Scar assessment : In the post-operative assessment at the time of discharge, the mean score for healing of the incision with scar assessment using the Stony Brook Scar Evaluation scale from 0-5, (the higher the score the better the outcome) was 2.7± 0.8 and 3.2 ± 0.6 for the Schobinger incision and MacFee incision groups, respectively.

At one month, the Schobinger incision group score was 3.2 ± 0.5 and for the MacFee incision group it was 3.9 ± 0.2. At month three the values were 3.4 ± 0.5 (Schobinger) and 4.1 ± 0.5 (MacFee). At the final sixth month follow-up the scar values were 3.6 ± 0.4 and 4.6 ± 0.4 for the Schobinger and MacFee groups, respectively.

Whereas the baseline Stony Brook scores did not differ significantly between the groups, at each of the follow-up visits, the scores were statistically significant between the groups ($p<0.05$). These results are summarized graphically in Fig 2. Eleven Schobinger incision and 13 MacFee incision patients underwent radiotherapy. Two patients from the MacFee incision group had undergone chemotherapy as well. In neither group did the presence of radiotherapy and chemotherapy impact flap healing ($p > 0.05$).

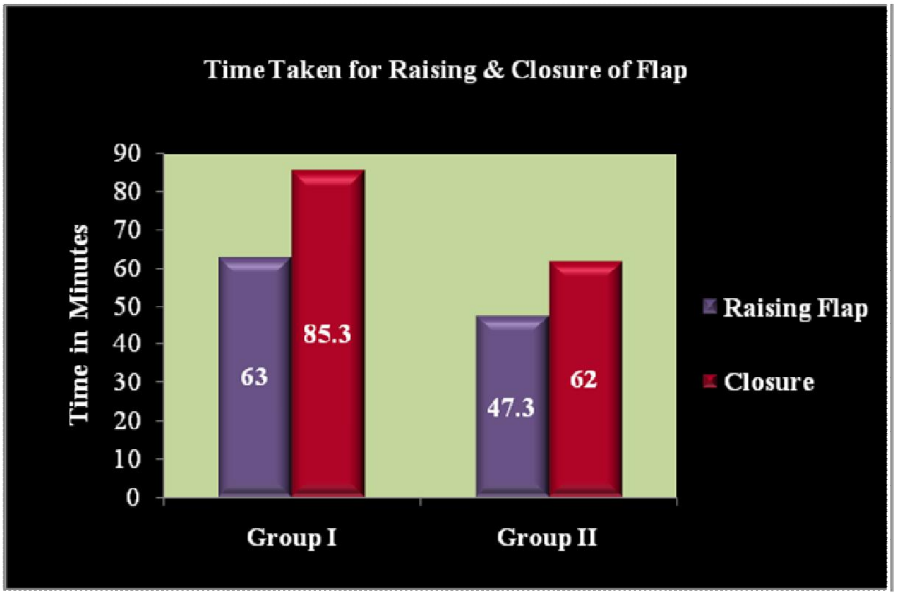


Figure 1. Time taken for raising and closure of the flap. Data represent the means of 15 individuals in each group.

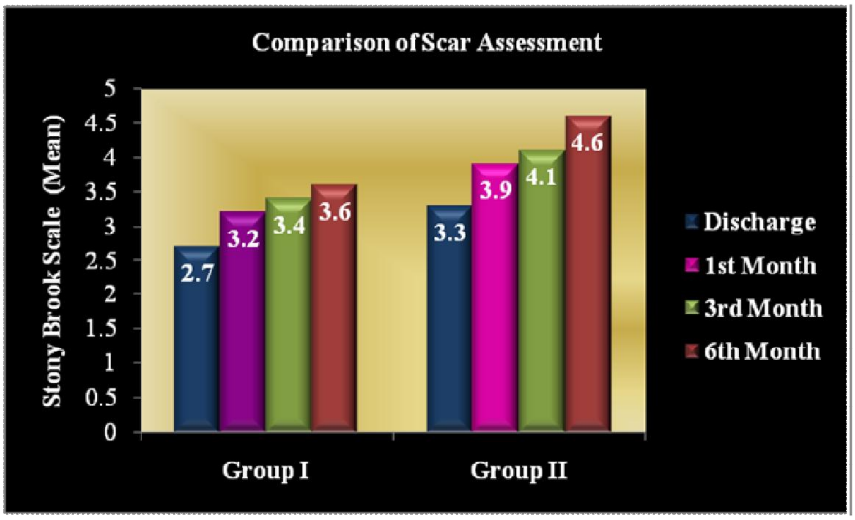
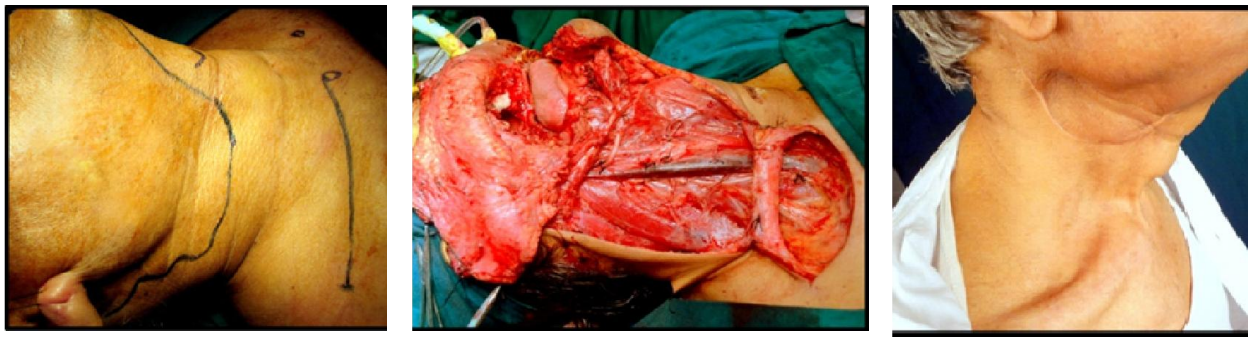


Figure 2. Scar assessment by the Stony Brook Scale. Data represent means of each group at each of the indicated time points.

Schobinger Incision

Macfee Incision



Marking of Incision | After Neck Dissection | 6 Month follow up

Figure3. Operative and post-operative depictions of the Schrobinger and MacFee procedure and outcomes. The upper panel depicts a representative patient undergoing the Shrobinger incision, and the lower panel a patient with the MacFee incision.

DISCUSSION

A total of 24 male and 6 female patients were operated in our unit from November 2011 to June 2014. The mean age was 48.8 yrs. The raising of the flap was done by a single surgeon. The time to raise the flap was determined from the start of the incision up to the point before starting the neck dissection from the lower end. In both groups, the incision was extended up to the lower border of the mandible above and the insertion of the sternocleidomastoid muscle below. The time taken was significantly more for the Schobinger incision than the MacFee incision.

Considering the accessibility of the structures of the neck, the Schobinger incision resulted in good exposure of the neck, and all 4 levels of lymph nodes were clearly seen with direct vision (4). With either method, there was no anatomical damage noted to the vessels or nerves directly while raising the flap.

All patients in the Schobinger incision group underwent modified radical neck dissection (MRND) preserving the internal jugular vein, and in the MacFee group all but one had the MRND, the exception had a radical neck dissection with IJV excision, but this did not apparently impact the healing process. There was edema noted in the patient in which IJV was removed which eventually resolved.

After the clearance of the neck nodes and the resection of the primary tumour were accomplished, primary reconstruction of the defect was done using free flap, regional flap or skin graft. Before the closure began, suction drains were placed, one in the submandibular region and one in the posterior triangle not crossing the IJV and the carotid vessels and secured using silk suture. The closure of the incision was done using 3-0 vicry 1 for the platysmal layer and 3-0 silk for the skin. The time taken for closure was significantly longer for the Schobinger incision than the MacFee incision.

The marginal necrosis of the flap was seen in 5 patients within the Schobinger incision group at the time of discharge, between 8 to 12 days post OP at the trifurcation point (5), and this healed over the follow up period. It was seen in one MacFee incision case; however, the differences in marginal necrosis between the two incision groups were not significant statistically. Regular dressing was done for these patients and healing occurred over the follow-up period (3).

Wound contraction was seen in 12 patients within the Schobinger incision group with minimal dehiscence in 3 patients. This healed in 20 ± 3 days post-op. Among the MacFee incision group, wound contraction was present in 14 patients and in only one patient there was minimal dehiscence of the wound which eventually healed (5).

Wound infection was seen in 3 patients in the Schobinger incision group, in whom marginal necrosis, dehiscence and contraction of the wound were not present. Healing occurred at 20 ± 3 days post-op. One MacFee incision patient, experience wound infection involving both the upper and lower incisions.

The cosmesis of the scar was better among MacFee incision then Schobinger incision patients. A vertical contracture band was noted with the Schobinger incision in some cases, whereas no patients with the MacFee incision had a contracture. The cosmesis of the scar in MacFee incision group at the end of 6 months showed a mean score of 4.6 ± 0.4 out of a maximal score of 5 (Stony Brook Scar Evaluation Score), where as the Schobinger incision group was statistically significantly lower at 3.6 ± 0.4.

In our study total of 6 patients did not undergo radiotherapy; of these, 4 were in the Schobinger incision and 2 in the MacFee incision group. The patients who underwent radiotherapy did not have any complication with the healing of the incision lines, nor did patients not receiving radiotherapy. We did not find any exposure of the vessels in either incision.

Conclusion of the Study: In the present study, Schobinger incision provided better exposure of the neck during dissection, and higher incidence of marginal necrosis and contracture of the flap with scaring was noted. In contrast, with the MacFee incision there was difficulty noted under the bridge flap and in the posterior triangle during neck dissection, but it provided a better cosmetic outcome with minimal scaring.

Conflict of Interest*:* There is no conflict of interest.

REFERENCES

1. Schobinger R. The Use of a Long Anterior Skin Flap in Radical Neck Resections**.** Annals of Surgery.1957;146: 221-23.
2. MacFee WF**.** Transverse Incisions for Neck incision. Annals of Surgery.1960; 151: 279-284.
3. White K, Mosdell DA, and Morris D. MacFee Incision: A Safe Approach to the Neck. Southern Medical Journal.1993 Aug; 86: 871-74.
4. Gulati A, Shekar K, Downie IP. Aesthetic incision for neck dissection. British Journal of Oral and Maxillofacial Surgery.2012; 50: 183–84.
5. Acar A, Dursun G, Aydin O, Akba Y.J Incision in Neck Dissections. The Journal of Laryngology and Otology.1998 Jan; 112: 55-60.