

Free Buccal Fat Pad Graft in Post Cancer Surgery Trismus with the Help of Colorado Microdissection Needle: A Case Report.

Abstract:

A numerous complication arises after surgery and /or radiotherapy/chemotherapy performed for the management of oral and maxillofacial malignant tumour which is apparently a world-wide health threat. Trismus / fibrotic scarring is among the most widespread complications after onco-surgery and/or radiotherapy & surgical management is reserved in cases of severely restricted mouth opening. excision of the fibrotic bands with Colorado micro dissection needle is advantageous in fibrotic scarring as it causes reduced tissue necrosis & intra operative blood loss; it also provides acceptable cosmesis without compromising wound healing. In cases of anatomical limitations free buccal fat graft (FBFG) can successfully act as alternative pedicled buccal fat pad graft for closure of post-excision defects.

Key-words: Free buccal fat graft (FBFG), Colorado micro dissection needle, Oral cancer.

Introduction:

Mandibular or maxillary resection is related with limitations in mastication status due to loss of stable and reproducible stomatognathic system interactions or loss of tooth-to-tooth contacts and decreased biting forces. [1]

Everyone agrees that correcting oral cavity deficiencies leads, at the very least, in fewer scars and the related functional and aesthetic limitations.

Following oral cancer surgery, trismus (limited mouth opening) is a typical problem. The major causes of the patient's inability to open their mouth include fibrosis, scar contraction, and mastication muscle contraction. For example, mandibulectomy procedures involving any of the masticatory muscles, such as the masseter muscle insertion to the mandibular angle and ramus, the temporal muscle insertion to the coronoid process, and the pterygoid insertions to the medial ramus and condylar neck, can cause trismus. These procedures are frequently used to treat oral cancer. [2,3]

The fat pad of buccal is an easily accessible, mobile, trigone-shaped, lobulated clump of adipose tissue that is located in the cheek. The fat pad of buccal has a variety of clinical applications, both therapeutic and cosmetic. In the non-conservative treatment of oral submucous fibrosis (OSMF), it is an eminent transplant of choice intended for deficiencies successively splitting of fibrotic strips.[4,5] Following

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decades of dealing fat tissue by researchers in numerous surgeries, it is assumed that fat tissue from the BFP can remain alive and mend quite well even though it is cut off from its blood supply. In aesthetic surgery, the theory of autogenic(buccal) fat transplantation as a non-pedicled graft remains widely accepted. It has been employed for beyond a century, and its scientific actions, features, and curative properties are extensively recorded here in field of medical specialty. The crucial healing pathway of non-pedicled buccal fat pad graft (BFPG) happens via formation of fibrous connective tissue or fibrotic scarring. [6,7]

The intent of this experiment were to estimate the efficiency of free buccal fat pad (BFPG) transplantation for the treatment of post cancer surgery fibrotic scarring / Trismus. This experiment comprises scientific assessment of post cancer surgery trismus patients managed with free buccal fat pad graft (BFPG).

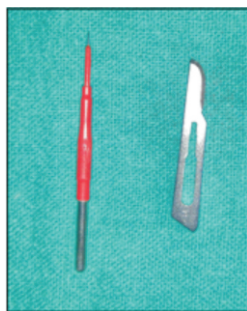


FIG. 1.Size comparison between cutting area of N 110 A Colorado micro dissection needle &No. 15 B.P. blade. smaller cutting area of Colorado micro dissection needle giving as superior aesthetic result.

Case Description:

A 42-year-old woman with trouble opening her mouth presented to a private dental facility. The chief complaints included inability to open mouth and difficulty in chewing. The patient gave a history of diagnosed with squamous cell carcinoma for which he underwent resection surgery 2^{1/2} years back. On the clinical examination, upon palpation thick fibrous bands were palpated on right side of the cheek; starting anteriorly from corner of the mouth to posteriorly retromolar region. Superiorly from depth of the maxillary vestibule to the depth of mandibular vestibule. In the mandible on right side, unilateral dento-alveolar & ramus defect present; due to surgical management of oral cancer involving right maxillary arch & right posterior mandible, on right side portion of maxilla Class 1b palatomaxillary defect was seen.

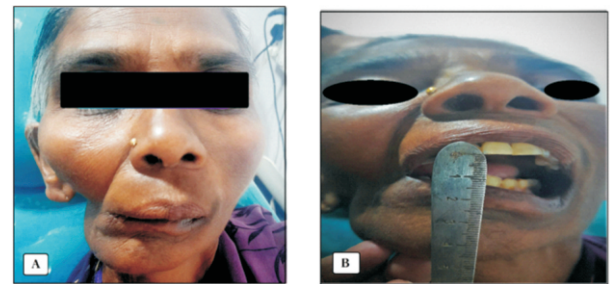


FIG. 2a. pre operative facial profile of the patient who underwent ablative surgery due to oral cancer. **2b** preoperative mouth opening of 10mm was recorded with the help of scale.

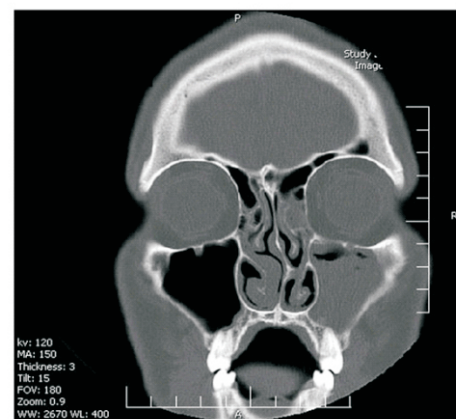


Fig. 3 CT scan coronal view showing squamous cell carcinoma of right maxilla prior to resection surgery.

The patient gives history of tobacco chewing habit prior to the diagnosis with squamous cell carcinoma. Her family history was unremarkable.

Clinical exam showed no lymphadenopathy but facial asymmetry was evident. Deviation of mandible towards unaffected side was seen & occlusion is deranged. Posterior cross bite was seen upon intra oral examination. The mouth opening is constrained to 12 mm, and the cranial nerves test is normal. An intraoral examination revealed bad oral health and several carious teeth. Fibrotic scarring has stemmed in pallid-looking mucosa. On palpation their ensued loss of resiliency of the buccal mucosa, presence of vertical bands. The condition was provisionally diagnosed as post cancer surgery trismus. The differential diagnosis was anaemia and scleroderma. The clinical findings & diagnosis was discussed and treatment options were explained to the patient. The patient's signed informed consent was acquired prior approval.

The entire procedure performed under conscious sedation & local infiltration done with local anaesthesia at the site of interest. Electrocautery with a Colorado micro dissection needle was used to do a wide excision of the fibrotic bands at the occlusal plane. The Stenson's duct has been rigorously protected from exposure. Followed by reconstruction with non-pedicled buccal pad of fat or free fat graft was done. Fibrotic bands were released on right side and the buccal fat pad was stitched by means of 3-0 black braided silk. At the conclusion of the procedure, a 35 mm immediate postoperative mouth opening was obtained.

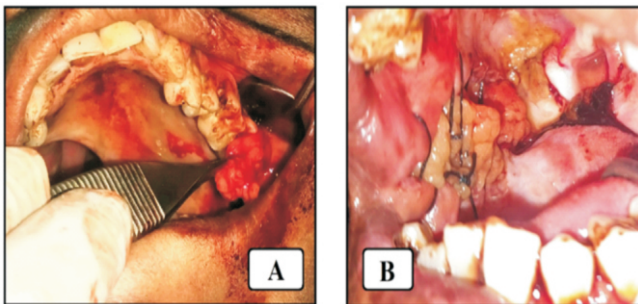


FIG. 4a. Free fat pad of buccal graft harvested from contra lateral of operated site. **4b.** Buccal fat pad free graft incorporated on the recipient site & secured using 3-0 black braided silk.

Following surgery, rigorous mouth unfolding trainings should be happened within 48 hours also uninterrupted for up to three months by means of ice-cream wooden sticks or Heister's mouth opener. During the post-operative period, the fat pad was irrigated regularly. Uneventful healing was achieved. Excellent healing was observed to extent that operated site became unrecognizable toward the end of 2nd week. Patient remained tracked up to half year period to record mouth opening status, showed satisfactory results.

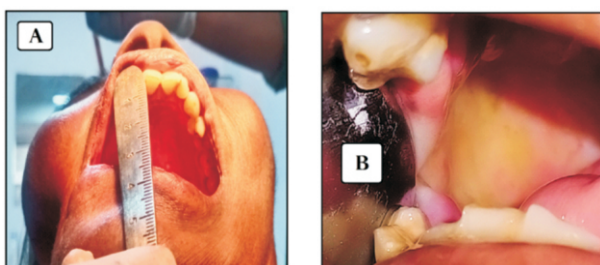


FIG. 5a. Immediate post-operative mouth opening of 35mm was recorded with the help of scale. **5b.** Buccal fat pad free graft gets completely converted into the mucosa at the 2nd week.



FIG. 6 Post operative view at 6-month interval showing adequate mouth opening & healed buccal mucosa.

Discussion:

In this case report thick vertical fibrous bands were palpated & severe restrictions in mouth opening with prior history strongly indicating diagnosis of post cancer surgery trismus.

Malignant tumour of the oral and maxillofacial region constitute for approximately 7% of the entire systemic cancers, posing a universal well-being problem. Individuals in conjunction with oral and maxillofacial cancerous growths might experience an array of impediments following surgical procedure and/or irradiation/chemo toxic drug therapy, comprising difficulty in swallowing, dysfunction, restricted mouth opening, and difficulty in mouth opening.

Early implementation of exercise regimens and mouth opening devices, whether active or passive, are crucial; if not done unfortunately, severe scarring can happen and last for a long time, with little to no improvement in trismus. (8, 9)

Trismus in oral cancer is defined as a tonic contraction of the masticatory muscles caused by any abnormal state or disease, with a maximum mouth opening (MMO) of ≤ 35 mm (alternatively the distance between the upper and lower alveolus or the interincisal distance is measured). Trismus following head and neck cancer surgery treatment has incidence rate which varies between 5% to 38%. [10-12] In our case report, clinical exam showed restricted mouth opening of 12 mm after surgery of malignancy in Oral and maxillofacial region indicating trismus; which is in accordance with review of literature.

Management is primarily concerned with the ferocity of the condition also emphasizes at correcting or relieving these signs, symptoms & preventing the disease from advancing, lowering

the risk of cancer development. In situations with considerable restricted of mouth opening <25 mm, surgical therapy is the treatment of choice. (13) In our case report pre-operatively inter-incisal mouth opening of 12mm was recorded thus; the treatment of choice was surgical management.

The Colorado Tip Micro dissection Needle (CMN) was first used in clinical practise in 1997 and features a precisely machined tip, insulated tungsten diathermy needle which is compliant with any conventional electro cautery. It enables the utilization of substantially lower quantities of energy over the cautery tip, resulting in reduced tissue necrosis and thus superior aesthetic results and speedier wound repair. The pointed tip causes a highly concentrated generation of electrical charge upon encounter with the surgical site. This effectively implies that more power density can be achieved with lower voltage current. [14-15]

Y. O. Arat et al. conducted a multi-center, prospective, interventional, comparative case series. Per formed Upper and Lower Eyelid Blepharoplasty for Aesthetic purpose; compared outcomes between Colorado Microdissection & Needle Scalpel Incision technique. The study comprised a total of 254 eyelids from 101 participants. There was no significant difference between the two procedures in postopercchymosis on 1st and 7th postoperative days, or scar cosmesis on 30th and 180th postoperative days. Only the Colorado needle sides showed necrosis histologically (p = 0.001). At any point following surgery, no unfavourable incidents take place on the Colorado needle group. [16]

P.S. Kumar et al. (2020) conducted a prospective randomised trial to compare the results of a conventional surgical blade versus Colorado micro dissection needle for conducting neck dissections. The utilization of a micro dissection needle in carrying out skin incision and neck dissection removes the necessity of a local anaesthetic with adrenaline, as well as a considerable decrease in intra operative loss of blood, drainage of pus post operative, and satisfactory cosmetic results. There was no substantial change in perioperative and postoperative complications among the two groups. [17]

The outcomes of upper blepharoplasty operations using the conventional approach (scalpel) and alternative ways were assessed by Chatchai Pruksapong et al in 2023 as part of a

systematic study. Inclusion criteria for this systematic review were satisfied by five papers. Randomised prospective controlled trial investigation involved a total of 30 patients; on electrocautery side, the average time taken for incision was substantially prolonged than on the scalpel side, as well as less blood was lost during incision on the electro cautery side than the incision taken using scalpel (2.4 versus 3.27 using average cotton bud sticks, respectively) (P0.001). The scalpel side had a higher incidence of hypopigmented scarring, despite the fact that this distinction was not of statistical significance. A change in surgical technique may be the cause of the electro cautery longer incisional times. [18]

The literature appears to have limited information on the application of Colorado micro dissection needle tips in the treatment of fibrotic scarring. In our case report, the fibrotic bands were excised utilising electrocautery fitted with a Colorado micro dissection needle tip rather than a No. 15 B.P. needle, to achieve minimum bleeding during surgery & postoperative patient discomfort.

The Fat Pad of Buccal (BFP) remains a simple agglomeration of lobules initially described as non-functional anatomic structure or surgical nuisance comprised of a core mass and consists of four extensions entitled as pterygoid, pterygopalatine, buccal and temporal. The body is divided across three lobes: anterior, intermediate, and posterior. Each of the lobe is encased in a membrane and separated by a natural gap. [19-21]

Neder described the successful application of BFP as a free graft for oral lesion repair in two patients during 1983. Fibrosis is the primary healing mechanism of free Buccal Pad of Fat (BFP). BFP is indeed not reliant on its blood supply and is capable of withstanding and repairing itself. In cosmetic surgery, the concept of autogenous fat transplantation as a free graft is widely recognised. (7-8, 22) In a retrospective analysis of total of 100 patients, Mehrotra et al. evaluated the BFP to the split skin graft, tongue flap, and nasolabial flap for the closure of incisions of post-fibrotic bands in oral submucous fibrosis (OSMF). They claimed that the BFP is the greatest option since it provides good utility while being aesthetically pleasing. It was simple to operate, had little postoperative morbidity, and had excellent patient approval. [23]

The choice of selecting buccal fat pad for closure of post-excision defects was based upon review literature but since in our case report there was palatomaxillary defect present on

posterior maxilla on right side; The free Fat Pad of Buccal (BFP) was chosen to conceal the post-fibrotic band wound in OSMF.

To obtaining a proper mouth opening, rigorous training sessions are required. They are also useful in preventing trismus recurrence after surgery. Wooden tongue spatulas can be progressively expanded and put between the molar teeth on a regular basis. Do this for at least 3 minutes, thrice a day, for at least three consecutive months for the greatest benefits. To maintain this degree of commitment, good patient engagement is necessary. [24-25]

In our case report, initially wooden tongue spatulas were used during exercise which later replaced by heister's mouth gag in the 2nd week post operatively. Regular follow up done on weekly basis till the end of six months.

Adverse effects with BFP mobilisation are uncommon, and BFP is extremely effective in the reconstruction of defects.(14,26) Partially or completely lost flap, hematoma, haemorrhage, surgical infection, herniation of buccal fat pad and flattened cheek are all potential complications. Substantial proportion of mishaps comprising the use of bifurcated flap-fascia(BFP) were due to partial necrosis. [27-28]

There were no intra & post-operative complications were observed in this case report. Patient felt minimum postoperative discomfort. Prophylactic antibiotics along with analgesics were given for a period of one week.

Conclusion:

Trismus is a common side effect of therapy for head and neck cancer nevertheless, it may be prevented by incorporating exercise routines as soon as possible and using mouth opening devices following cancer surgery. Lack on intervention in early stages inadvertently leads to trismus / fibrosis formation. This requires surgical intervention to break the fibrous scar to provide optimum mouth opening & masticatory function.

The free buccal fat graft (FBFG) was demonstrated in this patient series to be a simple technique that may be executed rapidly and with minimum morbidity. The donor wounds healed beautifully, with no cosmetic blemishes, rendering

FBFG harvesting a small and insignificant technique. The employment of a micro dissection needle reduces intra operative blood loss and gives adequate aesthetic appearance.

The findings of this case study indicate that the Colorado Tip Micro dissection Needle (CMN) can be successfully used for treating post cancer surgery trismus/ fibrosis. The findings of this case study suggest that BFPG transplantation may be deemed a clinically promising therapy for treating post cancer surgery trismus/ fibrosis. Nevertheless, the results of this case report demonstrate the need for further randomised control studies to demonstrate the long-term usefulness of this novel transplant option for the treatment of trismus/fibrosis following cancer surgery.

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