surgeon and it was submitted t

to allow the inflammatory process to subside completely and giving the chance for spontaneous closure of the small fistulas. Preoperative dose of antibiotic (cefotaxim) 1h before surgery and continued on the same regimen postoperatively for 1 week in addition to miconazol oral jell. Two days postoperatively, the patients were allowed oral fluids only. For the rest of the week, they were allowed soft diet. Patient were followed every week for one month and every month for the next five months, during these visits patient were evaluated for surgical complication and anatomical closure of fistulas as well as functional outcome of the procedure. For assessment of functional status we used visual analog scale adapted from Kim et al. **[24]** range from 1 to 7, this scale was used to evaluate patients before surgery and repeated six months after surgery, audio samples were recorded of a fixed script to assist the previous goal.

Surgical technique:

All operations were done under magnification using 3.5 magnifying loupe. After application of a mouth gag, the under surface of the palate tissue was infiltrated with epinephrine 1/200, 000 to minimize bleeding and facilitate flap dissection. Fibrous tissue at the margin of postpalatoplasy and traumatic fistulas was excised, then our flaps were designed considering five points, first it should centered over greater palatine artery, its size is slightly larger than the defect to allow tension free closure, its medial border is continuous with the outer border of the defect, it should not have any attachment to surrounding mucosa, and lastly the dissection in the soft palate was avoided if possible to minimize scarring with subsequence dysfunction. Formal elevation of the mucoperiosteal flaps was done using a blunt dissector; this dissection was continued till the greater palatine arteries were completely skeletonized down to their bony canal to facilitate the flap rotation. The flaps were rotated to the defect and secured to with surrounding mucosa with 5/0 polygalactine (vicrl).

RESULTS

All fistulas were completely closed. No significant bleeding per nose or infection was noticed in the early postoperative period. One patient in traumatic group had minimal postoperative bleeding which responded well anti-hemorrhagic drugs. Two patient showed minor wound dehiscence which responded well to conservative managements in two weeks. Our patients were followed for a period of 9-49 months with a mean of 29±12 months, with no report of fistula recurrence in any of them. Visual analog scale for Speech intelligibility improved from 4.6 to 6.1, from 4.6 to 6.8 and from 6.6 to 7 in post-palatoplasty, post-traumatic and post-ablative respectively. Statistical analysis of the previous results revealed an overall significant improvement in all patient, however this change was highly significant in post-palatoplasty and traumatic groups ($p<0.001$) but it was non-significant in post ablative group ($p>0.5$).

Table (1): Demographic data and results.

Patient	Age	Sex	Fistula size (mm)	Cause	Reconstruction method	PRVAS-SI	POVAS-SI
1	2.5	M	10X9	Postpalatoplasty	Unilateral flap	4	6
2	3	M	20x10	Postpalatoplasty	Unilateral flap	5	7
3	2.5	F	20x15	Postpalatoplasty	Unilateral flap	5	6
4	4	M	22x19	Postpalatoplasty	Unilateral flap	4	5
5	3	M	9x8	Postpalatoplasty	Unilateral flap	5	6
6	3	F	11x8	Postpalatoplasty	Unilateral flap	5	7
7	27	M	22x11	Traumatic	Unilateral flap	4	7
8	34	M	17x15	Traumatic	Unilateral flap	5	7
9	19	M	21x16	Traumatic	Unilateral flap	5	7
10	22	M	19x17	Traumatic	Unilateral flap	4	6
11	26	F	40x39	Traumatic	Bilateral flaps	5	7
12	39	M	37x35	Post ablation	Unilateral flap	7	7
13	54	M	38x32	Post ablation	Unilateral flap	7	7
14	50	F	42x39	Post ablation	Bilateral flaps	6	7
15	43	F	40x38	Post ablation	Bilateral flaps	7	7
16	35	M	42x33	Post ablation	unilateral flaps	6	7
						5.25±1	6.65±0.6
						$p<0.001$	

M = Male. PRVAS-SI = Preoperative visual analog scale for speech intelligibility.
F = Female. POVAS-SI = Postoperative visual analog scale for speech intelligibility.

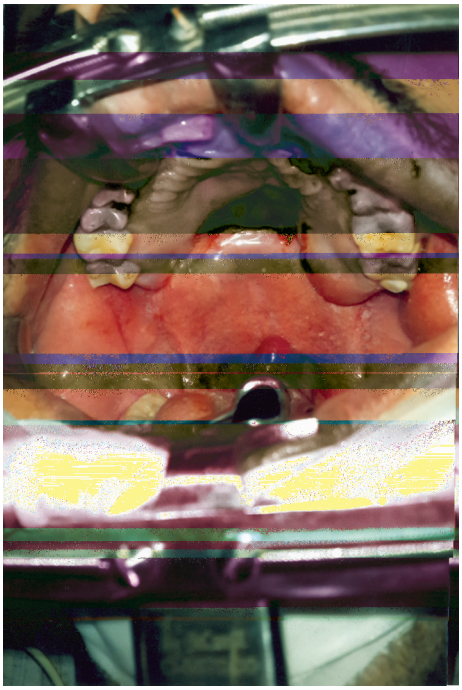

Fig. (1): Shows the palatal fistula.

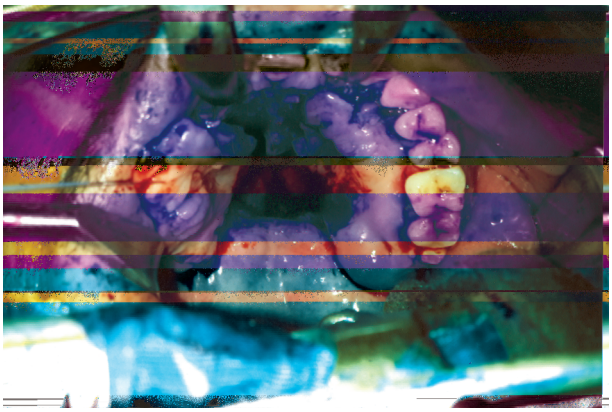

Fig. (2): Flap elevation.

Fig. (3): Flap inset.

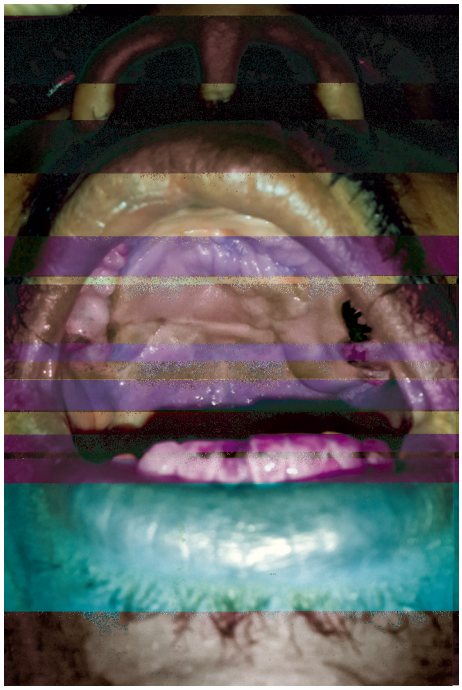

Fig. (4): Flap after healing of fistula.

DISCUSSION

Competent separation of nasal cavity from the oral one is an important element for the process of swallowing and speech, so many efforts were expended to achieve this goal in patient with oro-nasal fistulas. Methods currently employed for this task can be broadly divided into two groups: in the first one, local mucoperiosteal flaps are used in different forms **[5-8]**, the other group included the techniques that used additional tissues from the surroundings to close the defect, for example, tongue flap, **[25]** buccal mucosa flaps **[26,27]** which always need second stage surgery and anticipated tongue deformity and respiratory problems **[11]**. Nasolabial, submental and infrahyoid musculocutaneous flaps and be used but they add external skin incisions and poor tissue matching with recipient site **[28-30]** and finally a more complex techniques using free tissue transfer which needs personnel with high experience and it has high cost and morbidity **[17,18]**.

Since the palatal mucoperiosteal flap introduced in practice it was submitted to many research works to study its anatomical basis 31 and possible clinical applications. In addition to its usage in cleft palate repair and palatal defects closure, recent studies described its employment for reconstruction of nasal cavity, clival and other skull base defects after mobilization of descending palatine vessels **[32,33]**.

In our work palatal flaps was effective for closure of palatal defects with very low complication rate. We noticed that the size of defect doesn't have any effect on success rate as none of our groups showed higher complication rate than the other. In our work the flap designs was limited to epsilateral hemipalate, and in big defects more than 15cm^2 we prefer to use bilateral flaps to close it, although Magdy in his nice wok, the whole palatal lining was harvested based on only one neurovascular bundle without ischemia **[1]**. Regarding the causes of the palatal defects, we found that no group has higher complication than the other so the flap could be used safely regardless the type of palatal defects. Generally our work has a success rate comparable to the other studies, and all of them confirms the reliability of this technique **[1,24,34]**. Regarding the functional outcome our patient had significant improvement in speech intelligibility, however in post ablative group this improvement was not significant that is due to most of them did not have preoperative speech trouble apart from discomfort due to mass in the palate. Our patients had a very low complication rate (zero major and 12.5% minor complication), in his extensive review Seckel reported fistulization rate of 4-7% **[35]**. Which is a very low complication rate comparing to other methods of repair **[25]**.

Conclusion:

We conclude that this method of repair has distinct advantages of being simple, a one-stage procedure, no donor-site morbidity with good aesthetic results, and finally its sensate nature which is not available in other reconstructive options.

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