RESULTS

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- The study group consisted of 100 patients subjected to submucous inferior turbinate bone resection.
- The hundred patients included 59 males and 41 females. Their ages ranged from 21 to 43 years, distributed as follow.

Age	Males	Females
20-30	36	31
30-40	19	9
over 40	4	1

This distribution was statistically insignificant. Table (1) ·

- 16 patients failed to attend follow-up at 12 months Fig. (7) ·
- Pre-and postoperative assessment was done subjectively and objectively by the peak nasal inspiratory flowmetry and Anterior rhinomanometry.
- The pre-operative mean nasal inspiratory flow rate was 83.37 (Table 8).
- The pre-operative mean nasal resistance was 0.729 (Table 11).

Table (1): Distribution of studied cases according to age and sex.

Sex	Males		Females		Total	
Age group	No	%	No	%	No	%
20-	36	53.7	31	46.3	67	100
30-	19	67.9	9	32.1	28	100
40-	4	80.0	1	20.0	5	100
Total	59	59.0	41	41.0	100	100

Adjusted $X^2 = 2.59$

$P > 0.05$ insignificant.

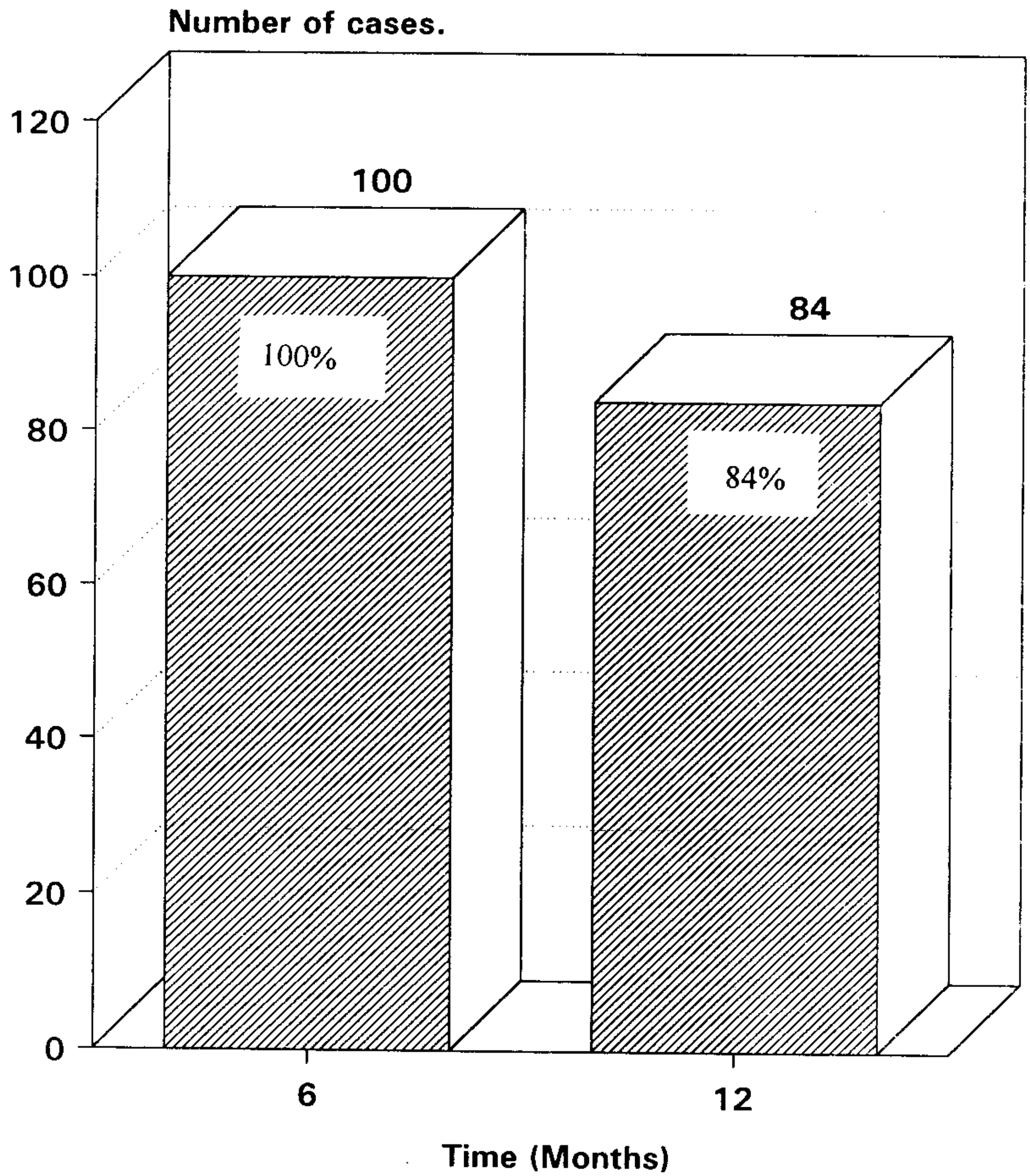

Fig. (7) : **Post-operative follow-up.**

Subjective Evaluation

- After 6 months: Table 2.
  - 100 patients were presented.
  - 83 patients (83%) showed subjective improvement. Fig. (8).
  - 17 patients (17%) showed no improvement. Fig. (9).

- After 12 months Table 3.
  - 84 cases were presented while 16 cases failed to attend follow up.
  - 68 cases showed improvement, 16 cases did not show improvement.
  - The seventeen patients showing no subjective improvement at 6 months.
    - One cases improved.
    - 3 cases did not present.
    - 13 cases were still not improved.
  - 3 cases, showing initial improvement at 6 months, showed no improvement after one year.
  - 5 cases with subjective improvement after one year showed no decrease in the mean nasal resistance.
  - The sixteen patients with no subjective improvement after one year.

  3 patients showed increased nasal air flow.

  13 patients showed no increase.

Table (2): Subjective Evaluation after 6 months.

Number of patients	Patients with subjective Improvement	%	Patients with No subjective Improvement	%
100	83	83%	17	17%

Table (3): Subjective Evaluation after 12 months.

Number of patients	Patients with subjective Improvement	%	Patients with No subjective Improvement	%
84	68	81%	16	19%

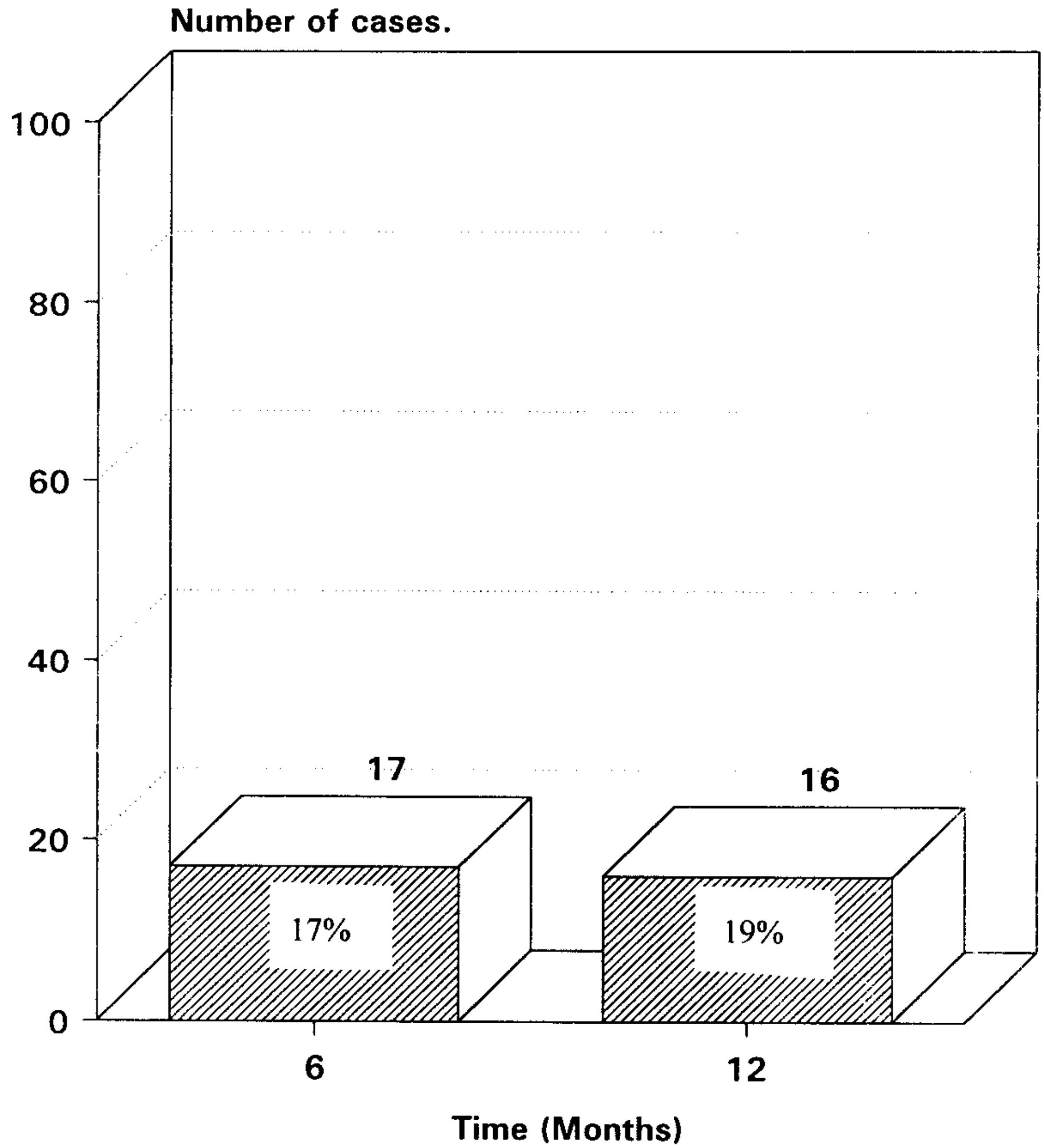

Fig. (9) **:Post-operative No. subjective relief.**

Table (4): Distribution of cases according to subjective improvement 6 months and 12 months post operatively.

Subjective improvement	Improvement		No improvement		Total	
Time	No	%	No	%	No	%
6 months post operative	83	83.0	17	17.0	100	100
12 months post operative	68	81.0	16	19.0	84	100
- Test of Significance	Z1 = 0.32 P > 0.05		Z2 = 0.15 P > 0.05		-	-

Insignificant.

Flow metric evaluation:

After 6 months: (Table 5).

- 100 patients were presented after 6 months.
- 86 patients showed increased nasal air flow (86%). Fig. (10).
- 14 patients (14%) showed no increase nasal air flow. Fig. (11).

The mean nasal inspiratory flow rate was 118.7. (Table 8)

After 12 months: (Table 6).

- 84 patients were presented.
- 71 patients (84.5%) showed increased nasal airflow.
- 13 patients (15.5%) showed no increase nasal air flow.

    (Also No subjective improvement. No decrease mean resistance).
- The mean nasal inspiratory flow rate was 126.31 Table 8. Fig. (12).

One case with no increase nasal air flow after 6 months, showed:

- Increased nasal air flow.
- Subjective improvements and
- Decreased mean resistance.

after one year.

- 3 cases with increased nasal air flow after 6 months showed.
    - No increased nasal air flow with No subjective improvement also

after one year.

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Table (5): Flowmetric evaluation after 6 months:

Number of patients	Patients with increased nasal air flow	%	Patients with No increased nasal airflow	%
100	86	86%	14	14%

Table (6): Flowmetric evaluation after 12 months.

Number of patients	Patients with increased nasal airflow	%	Patients with No increased nasal airflow	%
84	71	84.5%	13	15.5%

Table (8): Means and standard deviations of peak nasal inspiratory flow rate, preoperative, 6 months and 12 months postoperatively among the studied cases.

Peak inspiratory flow rate	No.	($\overline{X}$)	± SD	T of significance	
Time				Paried t	p
Pre operative	100	85.37	23.95	-	-
Post operative					
6 months	100	118.7	36.09	7. 69	< 0.01
12 months	84	126.31	43.04	7.77	< 0.01

Significant.

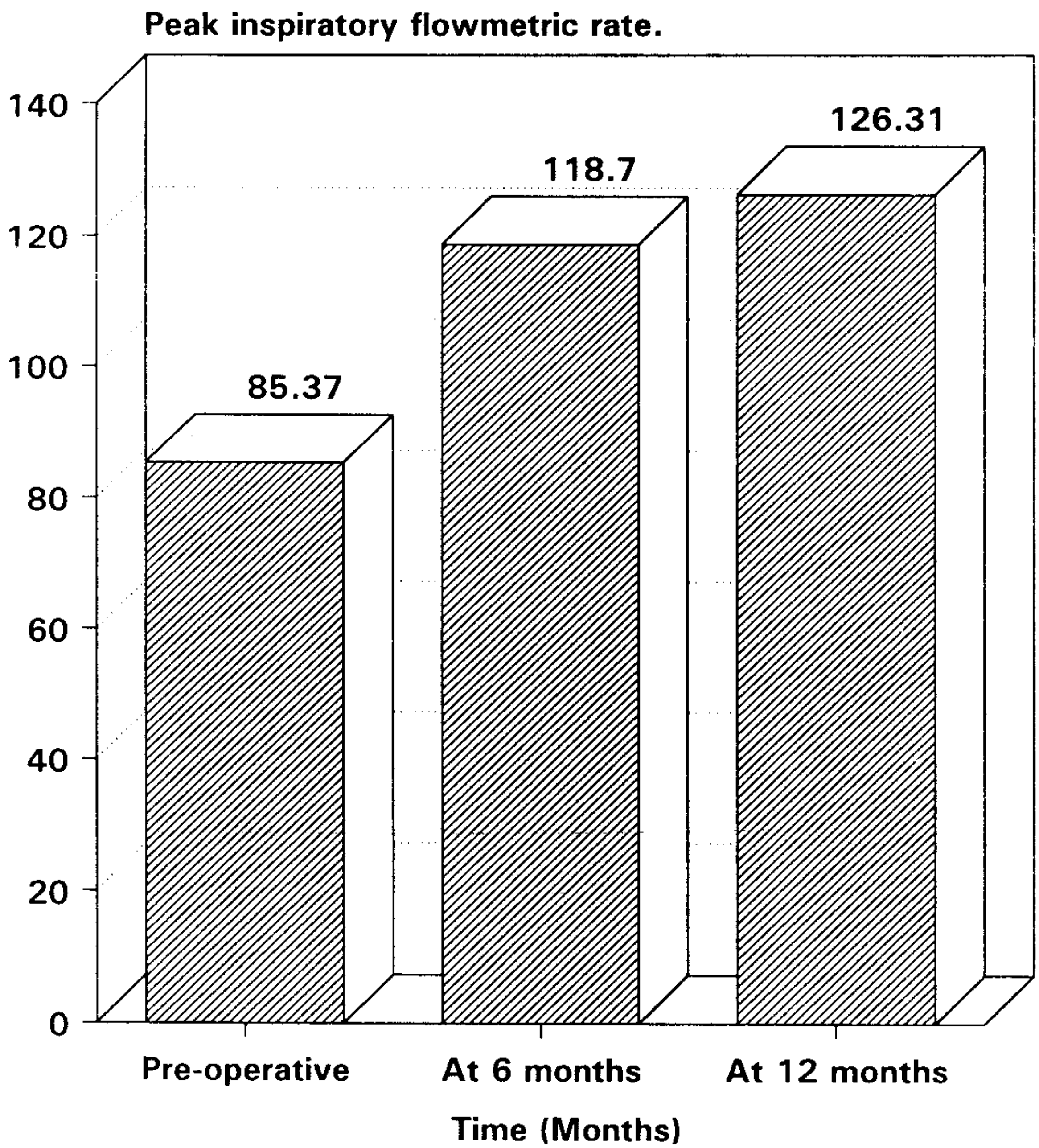

Fig. (12) :**Pre-operative and postoperative flow rate.**

Rhinomanometric evaluation:

After 6 months: (Table 9).

- 100 patients were presented.
- 81 patients (81%) showed decreased nasal resistance. Fig. (13).
- 19 patients (19%) showed no decreased nasal resistance. Fig. (14).

4 cases out of these patients showed subjective improvement.

The mean nasal resistance was 0.334 (Table 11).

After 12 months: (Table 10).

- 16 patients failed to attend follow-up.
- 84 patients were presented.
- 63 patients (75%) showed decreased nasal resistance.
- 21 patients (25%) showed no decreased nasal resistance.

The mean nasal resistance was 0.344 (Table 11). Fig. (15).

- The 19th patients with no decreased nasal resistance at 6 months postoperatively.
    - 3 cases failed to attend follow-up after one year.
    - 15 cases showed no decreased nasal resistance after one year.
    - One cases showed decreased nasal resistance after one year.
    - 6 cases with decreased nasal resistance at 6 months postoperatively showed same pre-operative value i.e. no decreased nasal resistance after one year.

Out of these 6 cases, 3 cases showed subjective improvement while the remaining 3 patients were not subjectively improved.

Table (9): Rhinomanometic Evaluation after 6 months.

Number of patients	Patients with decreased mean resistance	%	Patient with no decreased mean resistance	%
100	81	81%	19	19%

Table (10): Rhinomanometric Evaluation after 12 months.

Number of patients	Patients with decreased mean resistance	%	Patient with no decreased mean resistance	%
84	63	75%	21	25%

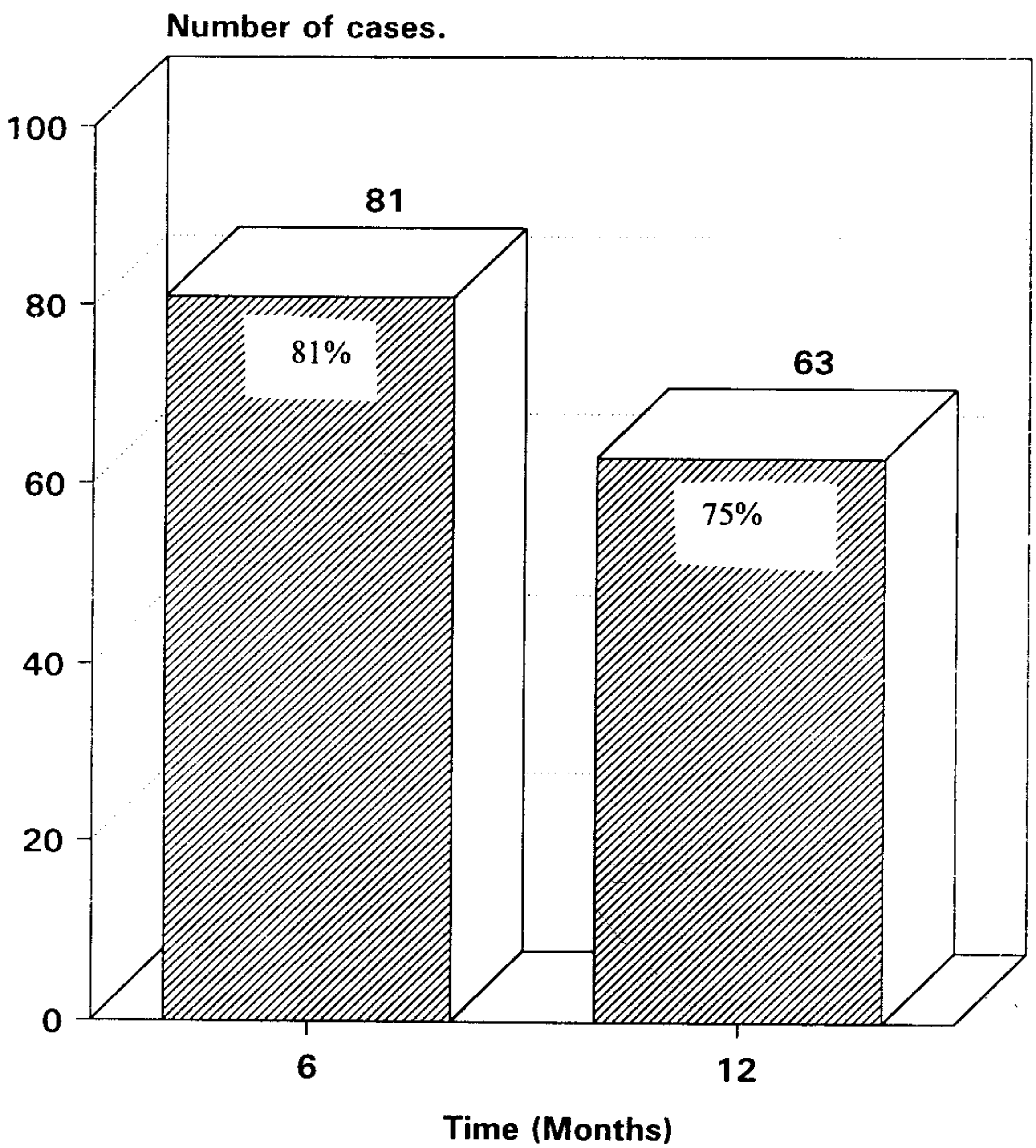

Fig. (13) : **Post-operative decreased mean resistance.**

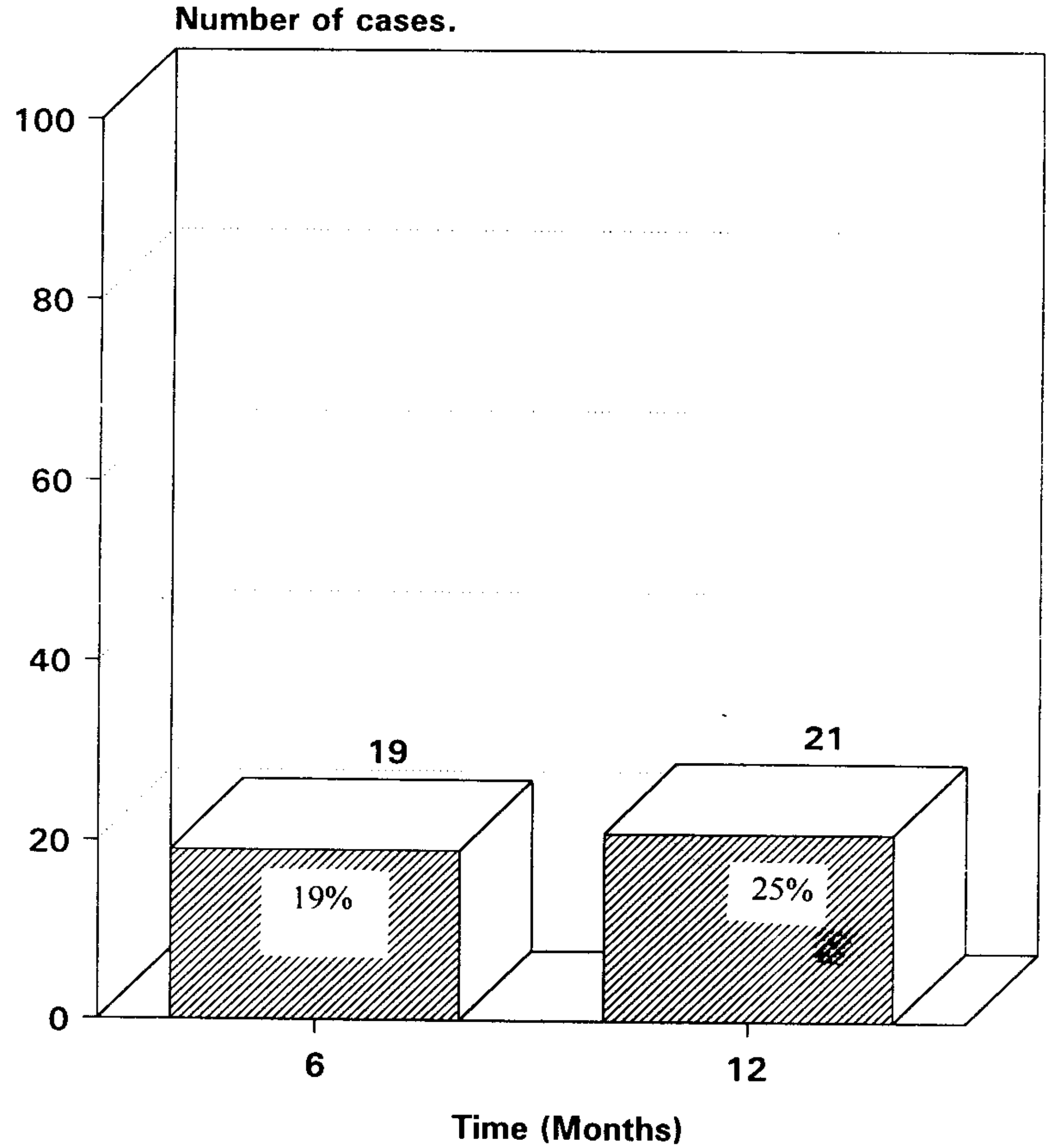

Fig (14): **Post-operative no decreased mean resistance.**

Table (11): Means and standard deviations of Rhinomanometric (mean inspiratory resistance) values pre-operative and postoperative 6 and 12 months.

Mean resistance inspiratory	No.	($\bar{X}$)	± SD	Test of significance	
Time				Paired t	p
Pre-operative	100	0.729	0.19	-	-
Post-operative					
6 months	100	0.334	0.12	17.63	< 0.001
12 months	84	0.344	0.13	16.24	< 0.001

Significant

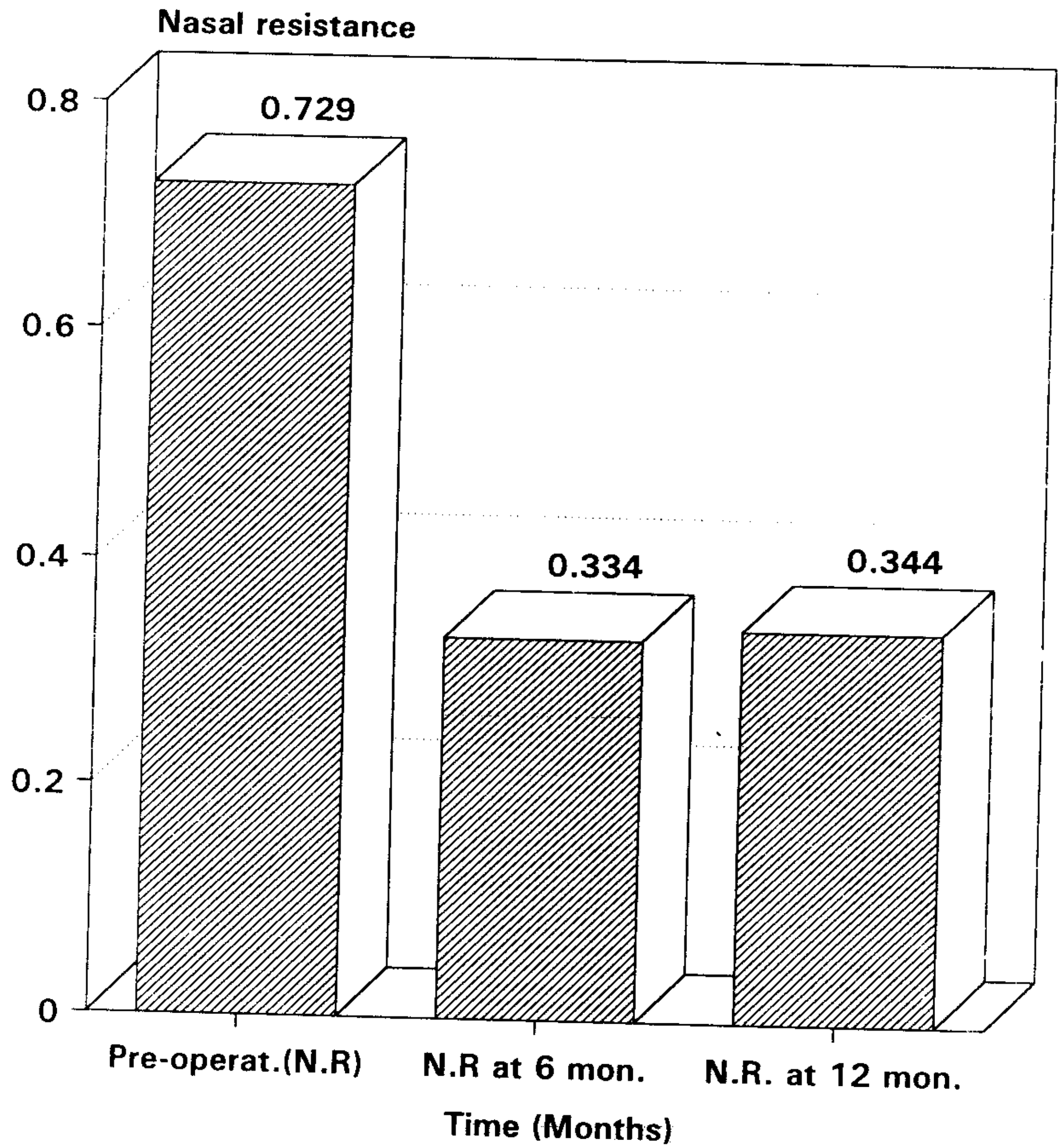

Fig. (15):Pre-operative and postoperative nasal resistance (N.R.).

Table (12): Mean resistance of cases according to Rhinomanometric evaluation after 6 months and 12 months Post-operatively.

Mean resistance	Decreased		Not decreased		Total	
Time	No	%	No	%	No	%
After 6 months	81	81.0	19	19.0	100	100
After 12 months	63	75.0	21	25.0	84	100
Test of Significance	$Z_1 = 0.86$ $P > 0.05$		$Z_2 = 0.46$ $P > 0.05$		-	-

Insignificant.

As regards postoperative complications: 12 patients (12%) had minor postoperative bleeding resolving spontaneously.

- There was no serious postoperative bleeding requiring re packing or blood transfusion.
- There was no signs of atrophic changes in all cases followed up postoperatively.
- 6 patients (6%) developed intranasal adhesions required division.

Pre - and Postoperative $\bar{X} \pm$ S.D. of air flow.

Case Number	Age	Pre-operative air flow	Post operative air flow	
			6 months	12 months
1	27	120	180	200
2	24	60	110	110
3	26	60	130	130
4	31	120	190	220
5	24	100	130	160
6	26	70	120	120
7	30	110	150	150
8	28	70	90	110
9	28	120	180	200
10	25	110	140	140
11	40	110	140	140
12	33	7 0	70	70
13	26	110	160	170
14	23	60	100	110
15	21	50	70	70
16	29	130	220	220
17	27	60	90	--
18	28	90	120	140
19	28	100	100	--
20	26	100	130	130
21	28	90	150	150
22	24	80	80	80
23	25	110	140	140
24	27	60	90	90
25	26	80	120	--
26	33	90	130	150
27	24	80	110	--
28	34	120	180	180
29	36	130	190	200
30	28	60	100	--

Cont .

Case Number	Age	Pre-operative air flow	Post operative air flow	
			6 months	12 months
31	27	50	80	80
32	27	90	120	130
33	22	90	110	100
34	25	70	90	90
35	31	110	160	160
36	24	60	90	90
37	29	110	130	140
38	33	120	140	120
39	34	50	50	--
40	40	60	90	90
41	24	50	70	70
42	26	110	170	--
43	35	100	140	160
44	28	80	110	110
45	40	90	120	--
46	23	50	50	50
47	23	70	90	90
48	31	120	180	200
49	24	70	90	--
50	30	90	150	160
51	30	120	200	200
52	26	130	180	220
53	26	60	110	--
54	28	80	110	110
55	26	110	150	180
56	30	60	90	90
57	26	90	140	150
58	26	120	120	--
59	27	100	150	160
60	27	70	100	100

Cont.

Case Number	Age	Pre-operative air flow	Post operative air flow	
			6 months	12 months
61	33	120	180	180
62	31	60	90	90
63	22	60	80	--
64	24	50	100	100
65	24	110	110	116
66	26	60	80	--
67	27	70	120	120
68	38	90	110	110
69	23	110	150	150
70	36	60	90	90
71	40	120	120	180
72	28	70	90	90
73	39	60	90	90
74	23	70	90	90
75	36	110	170	170
76	28	90	130	130
77	41	100	100	100
78	28	120	180	180
79	26	80	110	80
80	26	50	80	--
81	25	70	120	120
82	29	60	60	60
83	31	60	90	100
84	30	110	160	180
85	33	60	90	90
86	26	70	120	120
87	29	90	90	90
88	30	60	90	90
89	33	100	160	160
90	22	70	90	100
91	23	60	90	90
92	31	110	120	--
93	26	70	110	110
94	26	60	90	60
95	28	90	120	140
96	37	80	80	80
97	43	80	140	160
98	29	100	150	--
99	24	60	60	60
100	25	80	80	80
		$\bar{X}$ = 85.37 S.D. = 23.95	$\bar{X}$ = 118.7 S.D.=36.09	$\bar{X}$=126.31 S.D.=43.04

Pre and post operative $\overline{X} \pm$ S.D. of mean nasal resistance (N.R.).

Case number	Sex M : Male F : Female	Age	Pre-operative N.R.	Post opertive N.R 6 months	12 months
1	M	27	0.982	0.266	0.201
2	M	24	0.454	0.161	0.112
3	F	26	0.578	0.245	0.245
4	M	31	0.662	0.286	0.276
5	M	24	0.972	0.342	0.267
6	M	26	0.676	0.250	0.236
7	F	30	0.789	0.789	0.787
8	F	28	1.139	0.388	0.382
9	M	28	1.195	0.441	0.373
10	M	25	0.523	0.512	0.523
11	M	40	0.926	0.257	0.248
12	F	33	0.367	0.347	0.347
13	M	26	0.627	0.159	0.161
14	M	23	0.368	0.368	0.368
15	F	21	0.782	0.154	0.154
16	M	29	0.618	0.267	0.259
17	F	27	0.714	0.207	---
18	M	28	1.048	0.294	0.291
19	M	28	0.601	0.601	----
20	M	26	0.936	0.380	0.312
21	M	28	1.138	0.382	0.381
22	F	24	0.374	0.374	0.374
23	M	25	0.309	0.309	0.309
24	M	27	0.682	0.248	0.228
25	M	26	0.422	0.216	---
26	M	33	0.735	0.283	0.283
27	F	24	0.656	0.280	---
28	M	34	0.419	0.419	0.419
29	M	36	0.942	0.361	0.355
30	M	28	0.584	0.233	---

Cont.

Case number	Sex	Age	Pre-operative N.R.	Post opertive N.R 6 months	12 months
31	M	27	0.511	0.511	0.511
32	M	27	0.724	0.272	0.272
33	F	22	0.723	0.339	0.511
34	F	25	0.594	0.248	0.594
35	M	31	1.243	0.463	0.386
36	F	24	0.943	0.408	0.334
37	M	29	0.842	0.325	0.325
38	M	33	0.642	0.224	0.642
39	M	34	0.588	0.588	---
40	F	40	0.766	0.321	0.326
41	F	24	0.724	0.282	0.300
42	M	26	0.842	0.322	---
43	M	35	0.711	0.241	0.241
44	F	28	0.626	0.138	0.185
45	M	40	0.742	0.242	---
46	F	23	0.586	0.586	0.586
47	F	23	0.724	0.351	0.292
48	M	31	0.544	0.544	0.544
49	F	24	0.831	0.386	---
50	M	30	0.911	0.313	0.311
51	M	30	1.052	0.443	0.313
52	M	26	0.736	0.293	0.736
53	F	26	0.863	0.401	---
54	F	28	0.823	0.314	0.276
55	M	26	0.766	0.324	0.311
56	F	38	0.754	0.334	0.178
57	M	26	0.755	0.322	0.274
58	M	26	0.498	0.498	---
59	M	27	0.805	0.306	0.304
60	M	27	0.838	0.432	0.335
61	M	33	0.668	0.286	0.287
62	F	31	0.679	0.316	0.201

Cont .

Case number	Sex	Age	Pre-operative N.R.	Post opertive N.R 6 months	12 months
63	F	22	0.722	0.218	---
64	F	24	0.924	0.311	0.293
65	M	24	0.411	0.411	0.411
66	M	26	0.681	0.196	---
67	M	27	0.768	0.218	0.237
68	F	38	0.490	0.490	0.469
69	M	23	0.732	0.243	0.247
70	F	36	0.866	0.316	0.321
71	M	40	0.684	0.682	0.282
72	F	28	0.722	0.244	0.186
73	F	39	0.843	0.411	0.398
74	F	23	0.761	0.322	0.372
75	M	36	0.793	0.301	0.301
76	F	28	0.694	0.313	0.333
77	M	41	0.742	0.325	0.323
78	M	28	0.813	0.246	0.246
79	F	26	0.635	0.635	0.635
80	F	26	0.683	0.286	---
81	M	25	0.567	0.254	0.254
82	F	29	0.546	0.546	0.546
83	F	31	0.754	0.331	0.332
84	M	30	0.921	0.311	0.301
85	F	33	0.836	0.364	0.364
86	F	26	0.728	0.268	0.266
87	M	29	0.431	0.431	0.431
88	F	30	0.718	0.312	0.312
89	M	33	0.688	0.246	0.246
90	F	22	0.864	0.426	0.421
91	F	23	0.764	0.322	0.321
92	M	31	0.911	0.228	---
93	F	26	0.728	0.328	0.326
94	F	26	0.653	0.218	0.653
95	M	28	0.921	0.311	0.311
96	M	37	0.843	0.321	0.322
97	M	33	0.934	0.344	0.343
98	M	29	0.788	0.266	---
99	F	24	0.983	0.268	0.271
100	M	35	0.683	0.238	0.683
--	--	--	$\overline{X}$ = 0.729	$\overline{X}$ = 0.334	$\overline{X}$ = 0.344
--	--	--	SD = 0.19	SD = 0.12	SD = 0.13

DISCUSSION

Surgical reduction of the turbinates may be performed by a number of different methods.

The techniques include out fracture, partial and total inferior turbinectomy, surface cautry, cryosurgery, submucous diathermy, submucous resection of turbinate bone and injection of sclerosants.

In selecting the most appropriate technique, the surgeon must balance the possibility of achieving long term success against the risk of complications.

A number of authors examined the issue of success both short and long term.

The results of such studies were frequently inconclusive and failed to indicate a technique that gives consistently superior results ***(Williams et al., 1991).*** For example, satisfactory results have been published for submucous diathermy ***(Simpson and Groves 1958, Haake and Hardcastle, 1985)*** turbinate resection ***(ophir et al., 1985, Meredith 1988)*** laser turbinectomy ***(Selkin, 1985).***

The inferior turbinate is important for humidification and regulation of the temperature of the inspired air.

The operation of the present study, submucous resection of the inferior turbinate bone, achieves its effect by causing marked reduction of the inferior turbinate with the preservation of the mucosa of the inferior turbinate and its physiological properties.

This matches well with ***Moore et al. (1985) and Williams et al. (1991)*** who reported that inferior turbinate should be resected as conservatively as possible by submucous resection of turbinate bone and that total inferior turbinectomy should be avoided.

Williams et al. (1991) stated that submucosal techniques were developed in response to overcome the undesired effects of turbinectomy namely its role in the development of atrophic rhinitis.

Conservation of the mucosa overlying the turbinate was considered to be extremely important to avoid that complication.

Comparison of the results and complications of the present study of submucous turbinate resection with reported results and complications of other operations studied for shrinkage of the inferior turbinates may give a valid conclusion.

In the present study of submucous turbinate bone resection, 100 patients with non allergic vasomotor rhinitis were operated upon and followed up for one year.

The determination of the effectiveness of the operation was based on subjective evaluation in all patients selected for this study.

In addition, all patients were evaluated objectively for the symptom of nasal obstruction by peak nasal inspiratory flow rate and by anterior rhinomanometry.

In the present study, the patients were followed up for one year at 6 months and 12 months postoperatively.

This study showed subjective relief of nasal obstruction in 83% of patients after 6 months and in 81% of patients after 12 months.

The objective assessment by the peak nasal flow rate and rhinomanometry showed satisfactory improvement similar but not the same as that obtained by subjective assessment 84.5% and 75% respectively.

Total inferior turbinectomy, as a method of relieving nasal obstruction caused by the inferior turbinate, reported success rates varied from 63 to 94 percent ***(Courtiss et al., 1973, Fry 1973, Martinez et al., 1983, Ophir et al., 1985).***

The main disadvantage of submucosal diathermy is the high rate of recurrence of nasal obstruction on the long run.

Selkin (1985) compared relief of nasal obstruction using laser turbinectomy to that obtained from submucous resection of the turbinates. He found that intraoperative and postoperative bleeding was less with laser turbinectomy than with submucous resection of turbinates.

In the study of Co_2 laser turbinectomy in the treatment of nonallergic vasomotor rhinitis done by ***Mladina et al. (1991)*** the subjective patient assessment of nasal patency pointed to obvious success (91%).

The operation, however, requires expensive instrumentation which may not be available in many medical centers.

The complication of synechiae formation was encountered ***(Elwany and Harrison, 1990)*** and remain the problem of atrophic changes following tubinectomy.

The effect of inferior turbinate out fracture on nasal resistance to airflow produced unpredictable and statistically insignificant changes to nasal airway resistance and any improvement gained by this procedure was very short lived ***(Thomas et al. 1988).***

It was hoped that the combination of subjective assessment by patient evaluation of his nasal breathing and objective assessment would yield also a valid conclusion.

In the present study, subjective evaluation was done in all patients at 6 months postoperatively (100%) and 84 patients presented at one year postoperatively.

The operation showed subjective relief of nasal obstruction in 83 patients (83%) after 6 months while at 12 months postoperatively, 81% of cases presented showed subjective improvement in nasal breathing.

This success rate is consistent to great extent with the findings obtained by ***Pollock and Rohrich (1984) and Schmold et al. (1985).***

Pollock and Rohrich, (1984) used this technique with more than 94% of patients with nasal obstruction showed complete relief.

Schmold et al. (1985) reported that more than 70% of patients showed marked improvement of nasal breathing after submucous resection of inferior turbinate bone.

Also, ***House, (1951) Tremple (1960) and Principato (1979)*** reported good results of this technique improving the nasal airflow.

This can stress the good results that could be obtained by submucous turbinate bone resection.

It was noted, in this study that 6 months postoperatively, success rate of the operation in improving nasal obstruction was 83% while 12 months postoperatively it was 81%.

Failure rate might be attributed to other causes of nasal obstruction as posterior septal deviation, or straight but thick septum, concha bullosa, hypertrophy of the middle turbinate descending toward the nasal floor to block the nose, hidden polyp and collapsed valve area.

This is consistent with the analysis of the causes of postoperative nasal blockage reported by ***Ophir et al. (1985) and Fanous (1986)*** who added that no reason for the patient disappointment could be found in some patients because nasal passages were wide and clean.

One patient showed improvement in his nasal breathing after 12 months follow-up while at 6 months follow up he did not show improvement. This conversion might be explained by continuation of the process of fibrosis and scarring of the inferior turbinate with more shrinkage and airway became patent. This patient also showed decreased nasal resistance and increased flow rate at 12 months follow-up.

16 patients (19%) showed no subjective improvement, 12 months postoperatively.

Of these sixteen patients, 3 cases were initially improved at 6 months postoperatively then airway resistance increased again after one year.

This may be explained by the fact that the operation of submucous turbinate resection produced shrinkage of the inferior turbinate leading to patent airway and relief of obstructive symptom, shown at 6 months postoperatively. Hypertrophy of the inferior turbinates continued abolishing this short term relief of obstruction i.e. continuation of the process of vasomotor rhinitis., or might be due to recurrent attacks of rhinosinusitis they suffered from during this period.

Bumsted, (1984) had expressed the opinion that it was impossible to cure vasomotor rhinitis since this disorder is an exaggerated physiologic process rather than a disease, therefore it appeared at that time that there was no method of treatment that could be considered completely satisfactory for this disorder.

It was also noted that 5 patients with subjective improvement at 12 months postoperatively showed no decrease in the nasal resistance measured rhinomanometrically.

This might be due to minimal area was created for air entry leading to relief of obstruction but not significantly decrease the resistance, or it may be due to an error in the measurement.

It was reported that the use of anterior rhinomanometry might provide Questionable results due to distortion of the nares and nasal valve area that was often produced by the use of this technique.

This was statistically insignificant. In addition to subjective evaluation, all patients selected for this study were evaluated objectively for nasal obstruction by peak inspiratory flowmetry and rhinomanometry.

Jalowayski et al. (1983) stated that while the history and physical examination were reasonable diagnostic indicators, an objective means of evaluation was needed. They reported that Rhinomanometry measures nasal obstruction objectively and reliably and confirmed the effectiveness of intranasal surgery.

In the present study, rhinomanometric evaluation showed success rate i.e. postoperative decrease in the nasal resistance, 81% at 6 months postoperatively and 75% at 12 months postoperatively.

It was noted that 4 patients, 6 months postoperatively, showed subjective improvement while not improved objectively. This might be due to creation of minimal area for air entry that could not decrease nasal resistance significantly or distortion of the nares and nasal valve area had been produced by anterior rhinomanometry.

It was also noted that 6 cases with decreased nasal resistance at 6 months postoperative follow-up showed same pre-operative value i.e. no decrease in the nasal resistance after one year. Of the 6 cases, 3 cases were subjectively improved.

This was explained as follows: The operation reduced size of the inferior turbinate markedly with subsequent decrease in the nasal resistance noticed after 6 months, but due to tissue reaction and process of vasomotor rhinitis, mucosal swelling occurred leading to increase in size of the turbinate returned the nasal resistance to the same pre-operative value.

Valarie and Lund, (1992) reported that the problems of accuracy and reproducibility and cost effectiveness have limited the popularity of rhinomanometry. However, objective evaluation of improvement in obstructive symptoms by rhinomanometry provided objective evidence of the relative changes in nasal resistance produced by submucous turbinate bone resection and allowed comparison of the subjective results to the results objectively measured by rhinomanometry.

The number of patients not improved rhinomanometrically in this study should serve as an impetus for us to continue to improve patient selection and/or intranasal surgical techniques.

In this study, the peak nasal inspiratory flow meter was used to assess nasal breathing pre- and postoperatively.

According to ***Holmstrom et al. (1990)*** it had the advantage of being inexpensive, quick and easy to perform and it was useful for repeated examinations.

McCombe et al. (1992) used it with the subjective assessment of airway obstruction in their comparative study to reduce inferior turbinate.

This study showed increased flow rate after 6 months in 86 patients (86%).

Failure in the remaining cases may be due to the previous mentioned causes e.g. concha bullosa.
After one year, success rate i.e. increase flow rate was 84.5%.

The remaining percent of patients also showed no subjective improvement and no decrease in the nasal resistance.

It was noted that one case, showing no increase in the nasal flow at 6 months postoperatively, showed increased flow at 12 months postoperatively with subjective improvement and decreased nasal resistance.

In the present study, the complications of submucous turbinate bone resection were the relatively more bleeding during the operation, mild transient postoperative bleeding and postoperative discomfort and headache which could be considered minor consequences. The bleeding during the operation was to some extent troublesome.

Injection of local vasoconstrictor, adrenaline 1/100,000 had decreased the chance for bleeding. Also using adrenaline 1/100,000 packs helped to control intraoperative bleeding.

Pollock and Rohrich, (1984) stated that although elevation of mucoperiosteal flap was mode easier, submucous resection of the inferior turbinate was technically more difficult which might be attended by relatively more bleeding.

Despite this handicap, they stated that submucous resection of the turbinate remained the procedure of choice.

Bleeding posteriorly never occurred because the posterior remnant was not excised. Postoperative bleeding was mild and transient with no cases required re-packing or blood transfusion.

There was no case suffered from atrophic changes postopertively as the mucosa of the turbinate was preserved.

The postoperative discomfort and headache were due to nasal pack. This was confirmed by ***El-Wany et al. (1986).***

The present study confirmed that submucous resection of inferior turbinate bone is an ideal method of shrinkage of the inferior turbinate with subsequent patent nasal airway and relief of obstructive symptoms with preservation of nasal mucosa and its physiological properties and minimal complications.

Saunders (1982) stated that in patients suffering from vasomotor rhinitis there was no reason that submucous resection of the turbinate bone should not be effective.

He recommended it and prefered it to other methods where there was no obvious cause for nasal obstruction and when allergic disorder was not responsible.

Martinez (1989) claimed submucous turbinate resection more functional than other possible techniques.