Results

Our study included 40 patients presenting to the ENT outpatient clinic in Benha University Hospital complaining of nasal obstruction due to deviated nasal septum. The nasal obstruction was usually associated with other symptoms e.g. headache, snoring, post-nasal discharge, hyposmia or sneezing.

These 40 patients were randomly divided into 2 groups (A and B) as regard the line of management except those with caudal deviations who were joined to group B.

- Patients of **group A** underwent endoscopic septoplasty.
- Patients **of group B** underwent traditional septoplasty.

Each of these patients was subjected to full evaluation including history taking, clinical ENT examination, diagnostic nasal endoscopy and active anterior rhinomanometry both pre- and post-operatively. Results are summarized as follow:

a) Pre-operative assessment:

As regard age and sex distribution our results showed that:

Group A : included 20 patients: 11 males (55%) and 9 females (45%) their ages ranged from 17 to 44 years with a mean age of 27.13 ± 9.43 years.

Group B : included 20 patients: 8 males (40%) and 12 females (60%) their ages ranged from 16 to 43 years with a mean age of 28.8 ± 8.56 years. ***(Table 1,2).***

1) Subjective assessment :

- **Nasal obstruction :**

Mean duration of complaint (mainly nasal obstruction) of **group A** was 31.47 ± 26.17 months and the mean duration of complaint of **group B** was 23.47 ± 15.56 months ***(Table 3).***

As regard side of nasal obstruction there were 14 patients in **group A** who were complaining of unilateral nasal obstruction and 6 patients were bilaterally obstructed.

In **group B** there were 12 patients complaining of unilateral nasal obstruction and 8 patients were bilaterally obstructed. ***(Table 4).***

As regard severity of nasal obstruction:

In **group A** 13 patients were severely obstructed and 7 patients were moderately obstructed.

In **group B** 9 patients were severely obstructed and 11 patients were moderately obstructed***. (Table 5).***

In addition to nasal obstruction there were associated symptoms:

- **Snoring** :

In **group A** : 9 patients were complaining of snoring and 11 were free.

In **group B** : 9 patients were complaining of snoring and 11 were free.

- **Headache** :

In **group A** : 14 patients were complaining of headache and 6 were free.

In **group B** : 11 patients were complaining of headache and 9 were free.

- **Post-nasal discharge :**

In **group A** : 6 patients were complaining of PND and 14 were free.

In **group B** : 8 patients were complaining of PND and 12 were free.

- **Epistaxis :**

No patient was complaining of epistaxis.

- **Hyposmia :**

In **group A** : 6 patients were complaining of hyposmia and 14 were free.

In **group B** : 5 patients were complaining of hyposmia and 15 were free.

- **Sneezing :**

In **group A** : 4 patients were complaining of sneezing and 16 were free.

In **group B** : 5 patients were complaining of sneezing and 15 were free. ***(Table 6).***

2) Objective assessment :

- **Endoscopic examination:**

In **group A** : 9 of the deviations were broadly based deflections (45%), whereas 7 of the septal deformities were isolated spurs (35%). In 4 patients more than one type of septal deformity was encountered (20%). Any case of anterior septal dislocation was excluded from this group.

In **group B** : 8 of the deviations were broadly based deflections (40%), whereas 3 of the septal deformities were isolated spurs (15%). Also 5 of the septal deformities were isolated anterior septal dislocation (25%). In 4 patients more than one type of septal deformity was encountered (20%). ***(Table 7).***

- **Total nasal resistance:**

Mean total pre-operative nasal resistance (at inspiration) was measured in both groups. It was 0.4815 ± 0.1543 in **group A** and 0.5069 ± 0.1382 in **group B** with no significant difference between pre-operative values of both groups ***(Table 8).***

b) Operative data:

The duration of the operation was variable in **group A** from 15 minutes in isolated septal spur up to 27 minutes in broadly based deflections or more than one septal deformity. But, in **group B**, it is ranged from 22 up to 34 minutes with no significant difference between both groups. ***(Table 9).***

c) Post-operative care:

All patients were hospitalized up to 2 days.

Group A: 2 patients (10%) had mild epistaxis upon removal of the packs 48 hours post-operatively that was controlled by insertion of ephedrine packs for few minutes. Pain and discomfort were experienced in 2 patients (10%). No smell of bad odour. Neither septal hematoma nor septal perforation was diagnosed.

Group B: 3 patients (15%) had mild epistaxis upon removal of the packs 48 hours post-operatively that was controlled by insertion of ephedrine packs for few minutes. Pain and discomfort were experienced in 4 patients (20%). 3 patients (15%) had a smell of bad odour due to infection and crustations. 1 case (5%) of septal hematoma was diagnosed but incision and drainage was done and the patient was improved. No septal perforation was diagnosed. ***(Table 10).***

d) Post-operative evaluation:

Repeated regular examinations were done in the ENT outpatient clinic of Benha University Hospital for 6 months. Post-operative evaluation was done after 6 months.

1) Subjective assessment:

The subjective assessment scores pre- and post-operative for individual symptoms were compared and classified into resolved, improved, same and worsened ***(Table 11).***

Endoscopic septoplasty was found to be more effective in treating symptoms especially nasal obstruction.

- **Nasal obstruction** :

In **group A** : 90% of patients were benefited.

In **group B** : 55% of patients were benefited.

- **Headache** :

In **group A** : 71.43% of patients were benefited.

In **group B** : 58.33% of patients were benefited.

- **Snoring** :

In **group A** : 77.77% of patients were benefited.

In **group B** : 42.86% of patients were benefited.

- **Post-nasal discharge :**

In **group A** : 50% of patients were benefited.

In **group B** : 62.5% of patients were benefited.

- **Hyposmia :**

In **group A** : 50% of patients were benefited.

In **group B** : 40% of patients were benefited.

- **Sneezing :**

In **group A** : 50% of patients were benefited.

In **group B** : 40% of patients were benefited.

2) **Objective assessment:**

- **Endoscopic examination:**

Nasal endoscopic examination was done frequently for follow up for each patient. The nasal endoscopic findings on last available follow up (after 6 months) were:

In **group A**:

Persistent posterior deviation was present in 1 patient only (5%). Only 2 patients had nasal crustations (10%). No persistent contact with turbinates was detected. No nasal synechiae, septal hematoma nor perforation was present.

In **group B**:

Persistent posterior deviation was present in 7 patient (35%) and spurs were present in 5 patients (25%). Nasal crustations were present in 3 patients (15%). Persistent contact with turbinates was present in 7 patients (35%). Nasal synechiae were detected in 3 patients only (15%). Neither septal hematoma nor perforation was present.

- **Total nasal resistance:**

Mean total nasal resistance (at inspiration) was measured in both groups. It was 0.1837 ± 0.0324 in **group A** and 0.2279 ± 0.0422 in **group B** with high significant difference between postoperative values between 2 groups and high significant difference between pre and postoperatively in each group separately ***(Table 8).***

Study of effect of splinting :

In splinted group, 5 patients (25%) experienced discomfort after pack removal. Extrusion of splints occurred in one patient (5%). Also one patient (5%) had nasal synechiae. No septal hematoma nor septal perforation was present.

In non-splinted group, one patient (5%) experienced discomfort after pack removal. One patient (5%) had septal hematoma but incision and drainage was done and the patient was improved. 2 patients (10%) had nasal synechiae. No septal perforation was present.

Table (1): Sex distribution of the studied cases

Sex	Endoscopic	Percentage	Traditional	Percentage
Male	11	55%	8	40%
Female	9	45%	12	60%
Total	20		20	

Chi square test shows no significant difference in sex distribution in both groups ($p = 0.342$).

Table (2): Mean age and standard deviations of studied cases in both groups

Age (years)	Endoscopic	Traditional
Mean	27.13	28.8
Standard deviation	9.43	8.56

T test shows no significant difference between the mean age in both groups ($p = 0.56$).

Table (3): Mean duration and standard deviations of complaint in both groups

Duration (months)	Endoscopic	Traditional
Mean	31.47	23.47
Standard deviation	26.17	15.56

T test shows no significant difference between the mean duration of nasal obstruction of both groups ($p = 0.24$).

Table (4): Side of nasal obstruction in both groups at presentation

Side of nasal obstruction	Endoscopic	Percentage	Traditional	Percentage
Unilateral	14	70%	12	60%
Bilateral	6	30%	8	40%
Total	20		20	

Chi square test shows no significant difference in both groups as regard side of nasal obstruction ($p = 0.512$).

Table (5): Severity of nasal obstruction in both groups at presentation

Severity	Endoscopic	Percentage	Traditional	Percentage
Severe	13	65%	9	45%
Moderate	7	35%	11	55%
Total	20		20	

Chi square test shows no significant difference in both groups as regard severity of nasal obstruction ($p = 0.21$).

Table (6): Number of patients having associated symptoms at presentation

Complaint	Endoscopic	Percentage	Traditional	Percentage	P
Snoring	9	45%	9	45%	0.52
Headache	14	70%	11	55%	0.51
PND	6	30%	8	40%	0.51
Epistaxis	0	0	0	0	
Hyposmia	6	30%	5	25%	0.72
Sneezing	4	20%	5	25%	0.71

Chi square test shows no significant difference in both groups as regard Snoring, headache, post-nasal discharge (PND), Hyposmia and sneezing.

Table (7): Types of septal deformities in both groups at presentation

Type of septal deformity	Endoscopic	Percentage	Traditional	Percentage
Septal spur	7	35%	3	15%
Broadly deviated septum	9	45%	8	40%
Multiple septal deformities	4	20%	4	20%
Septal dislocation	0	0%	5	25%

Chi square test shows no significant difference in type of septal deformity in both groups ($p = 0.31$).

Table (8): Pre- and post-operative means of total nasal resistance in both groups

	Endoscopic	Traditional	P value	Significance
Pre-operative	**0.4815**	**0.5069**	**0.6377**	**N.S.**
Post-operative	**0.1837**	**0.2279**	**0.0033**	**H.S.**
P value	**0.0093**	**0.0086**		
Significance	**H.S.**	**H.S.**		

T test shows no significant difference between pre-operative means of total nasal resistance in both groups but it shows highly significant difference between pre- and post-operative values in each group separately. Also, there is highly significant difference between post-operative results in both groups.

Table (9): Time of the operation in both groups

Time of the operation (minutes)	Endoscopic	Traditional
Range	15 – 27	22 – 34
Mean	21	28
Standard deviation	4.31	4.65

T test shows no significant difference between the mean time of the operation in both groups (p = 0.276).

Table (10): Early post-operative complications during 1st week

Complications	Endoscopic	Percentage	Traditional	Percentage	P
Epistaxis	2	10%	3	15%	0.624
Pain & discomfort	2	10%	4	20%	0.377
Smell of bad odour	0	0	3	15%	0.168
Septal hematoma	0	0	1	5%	0.487
Septal perforation	0	0	0	0	

Chi square test shows no significant difference in early post-operative complication during 1st week in both groups.

Table (11): Comparison of the subjective results between both groups (6 months post-operative) based on the pre- and post-operative visual analogue scores

Symptoms (No. of cases E/T)		Endoscopic				Traditional				P	Significance
		Benefited		Not Benefited		Benefited		Not Benefited			
		R	I	S	W	R	I	S	W		
Obstruction (n=20/20)	No.	13	5	1	1	7	4	5	4	0.0464	Sig.
	%	65%	25%	5%	5%	35%	20%	25%	20%		
Snoring (n=9/7)	No.	4	3	2	0	1	2	3	1	0.276	N.S
	%	44.4%	33.3%	22.2%	0%	14.29%	28.57%	42.86%	14.29%		
Headache (n=14/12)	No.	6	4	3	1	4	3	5	0	0.423	N.S
	%	42.86%	28.57%	21.43%	7.14%	33.33%	25%	41.67%	0%		
PND (n=6/8)	No.	1	2	3	0	3	2	2	1	0.598	N.S
	%	16.67%	33.33%	50%	0%	37.5%	25%	25%	12.5%		
Hyposmia (n= 6/5)	No.	0	3	3	0	0	2	3	0	0.659	N.S
	%	0%	50%	50%	0%	0%	40%	60%	0%		
Sneezing (n=4/5)	No.	0	2	2	0	0	2	3	0	0.709	N.S
	%	0%	50%	50%	0%	0%	40%	60%	0%		

Chi square test shows significant difference in nasal obstruction between both groups, but there is no significant difference between both groups in snoring, headache, post-nasal discharge (PND), hyposmia or sneezing.

NB: E= endoscopic, T= traditional, R= resolved, I= improved, S= same and W= worsened.

Table (12): Nasal endoscopic findings on last available follow-up

Nasal endoscopic findings on last available follow-up	Endoscopic		Traditional		P	Significance
	No.	Percentage	No.	Percentage		
Persistent deformity						
a) Anterior deviations	0	0%	0	0%		N.S
b) Posterior deviations	1	5%	7	35%	0.031	Sig.
c) Spurs	0	0%	5	25%	0.0317	Sig.
Persistent contact with turbinates	0	0%	7	35%	0.0143	H.S
Nasal crustations	2	10%	3	15%	0.543	N.S
Nasal synechiae	0	0%	3	15%	0.0678	N.S
Septal hematoma	0	0%		0%		N.S
Septal perforation	0	0%		0%		N.S

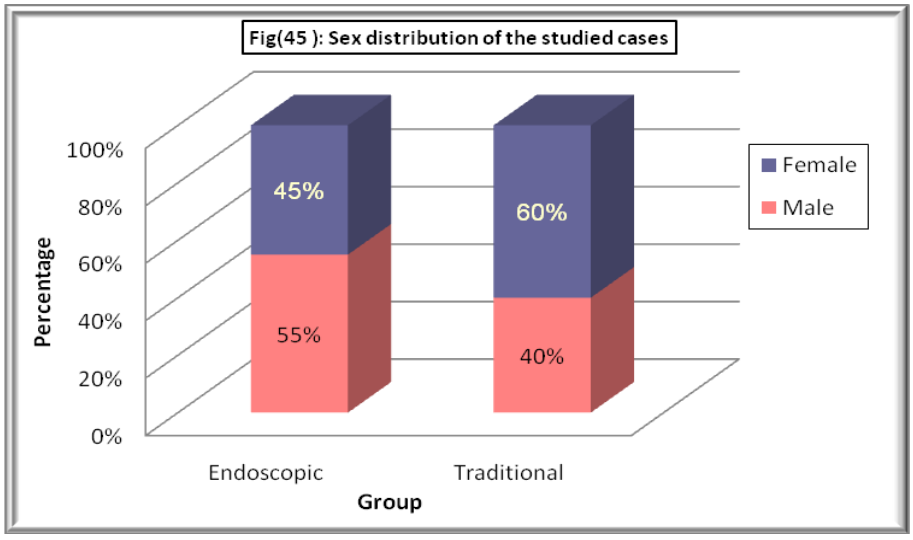
Chi square test shows significant difference between both groups in :

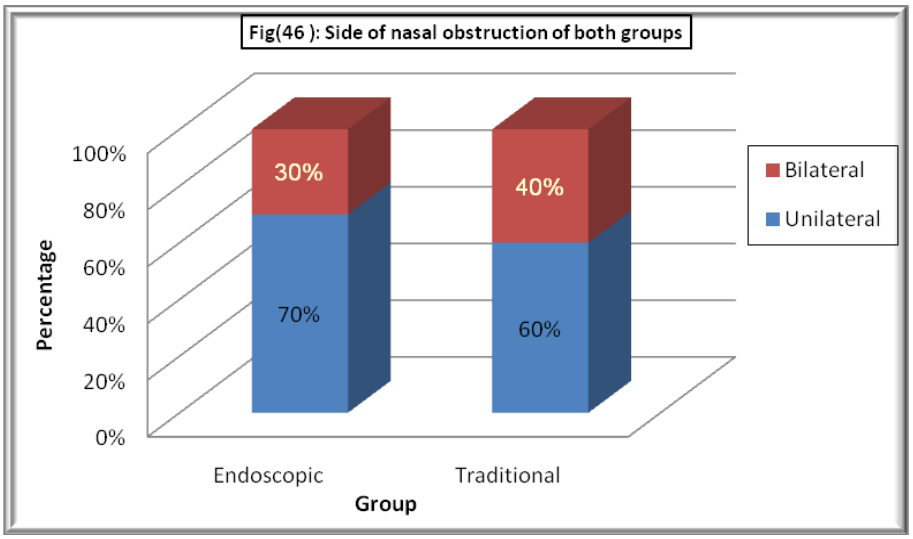
- Posterior deviations.
- Spurs.
- Persistent contact with turbinates.

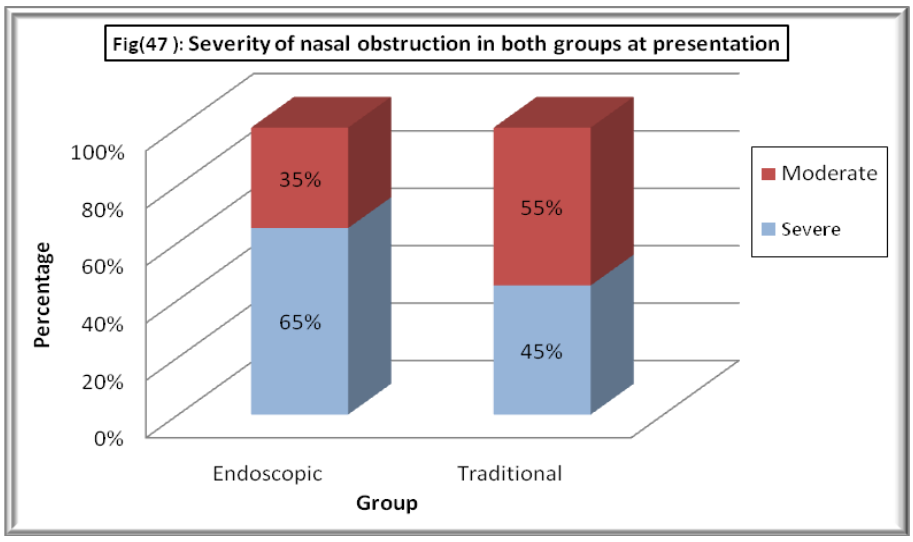
Table (13): Study of effect of Splinting

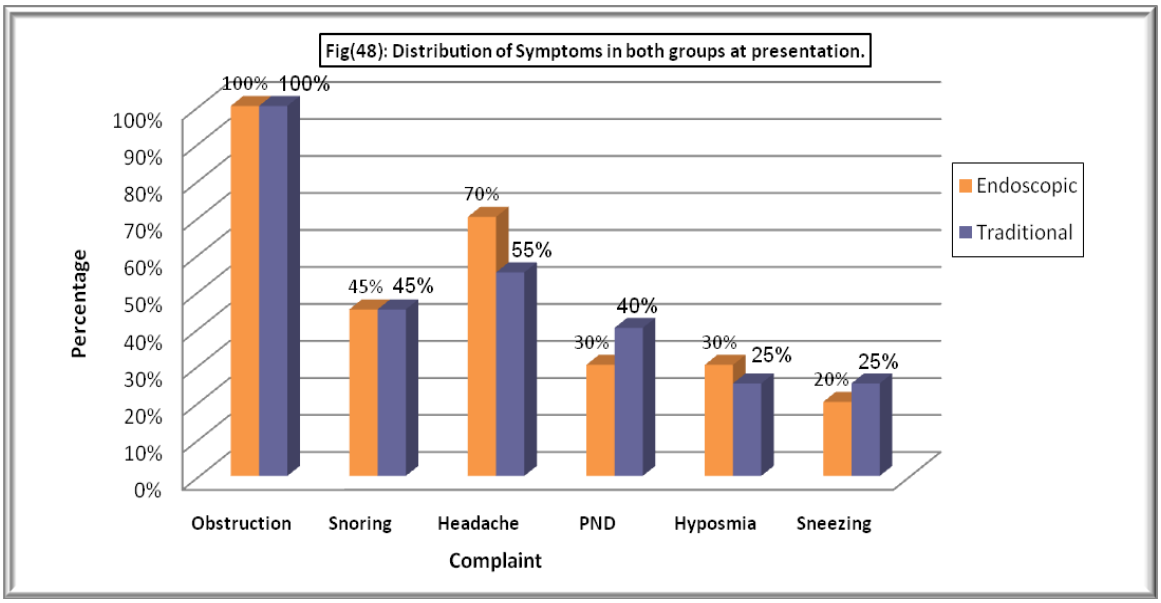
	Splint		No splint		P	Significance
	No.	Percentage	No.	Percentage		
Discomfort after pack removal	5	25%	1	5%	0.0273	Sig.
Splint extrusion	1	5%	0	0	0.487	N.S
Septal hematoma	0	0	1	5%	0.487	N.S
Septal perforation	0	0	0	0		
Nasal synechiae	1	5%	2	10%	0.558	N.S

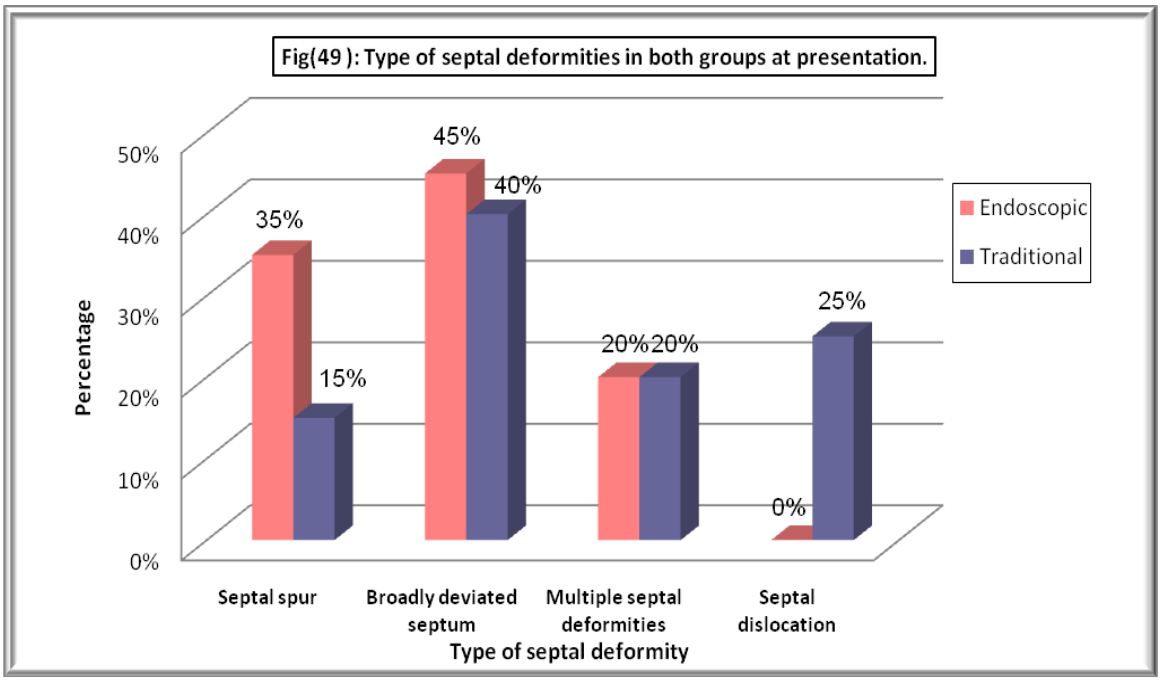
Chi square test shows no significant difference between splinted patients and non-splinted patients as regards splint extrusion, septal hematoma, septal perforation and nasal synechiae. But shows significant difference as regards pain and discomfort felt by patients after pack removal.

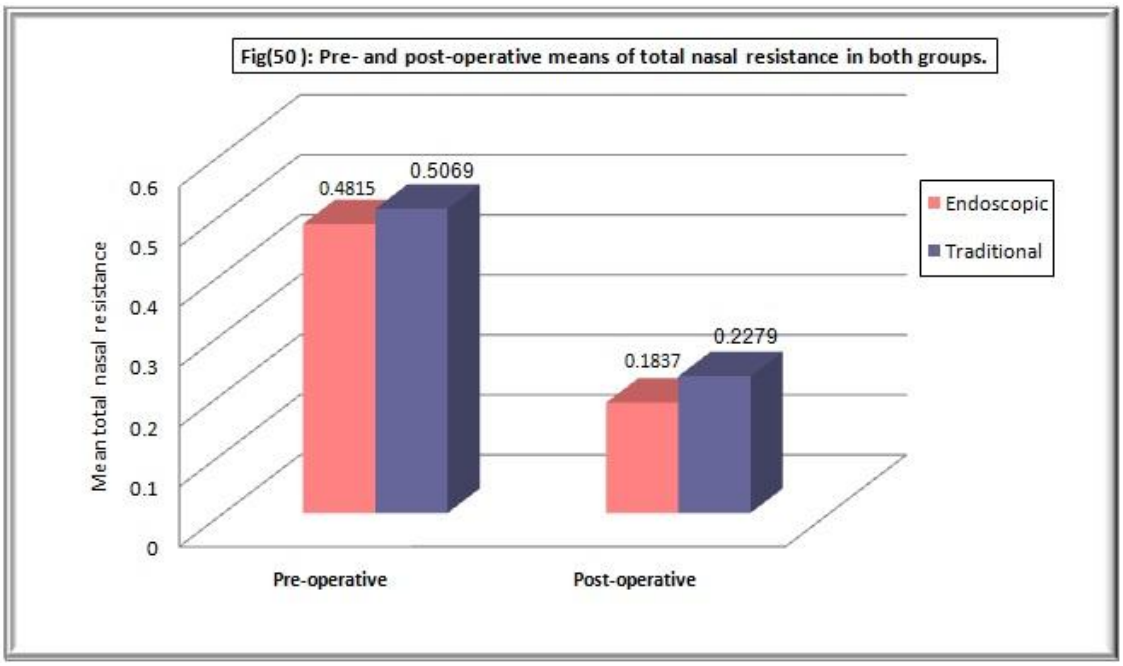

Fig(45): Sex distribution of the studied cases
100%
80%
60%
40%
20%
0%
Percentage
45%
55%
60%
40%
Female
Male
Endoscopic
Traditional
Group

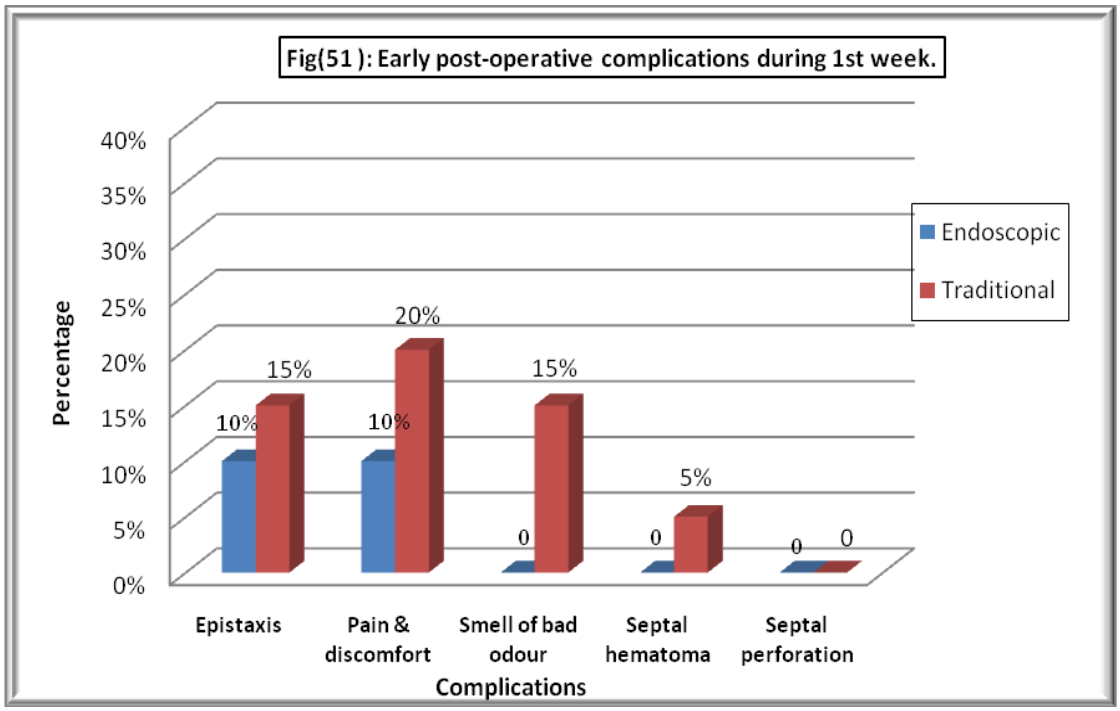

Fig(46): Side of nasal obstruction of both groups
100%
80%
60%
40%
20%
0%
Percentage
30%
70%
40%
60%
Bilateral
Unilateral
Endoscopic
Traditional
Group


Fig(47): Severity of nasal obstruction in both groups at presentation
100%
80%
60%
40%
20%
0%
Percentage
35%
65%
55%
45%
Moderate
Severe
Endoscopic
Traditional
Group

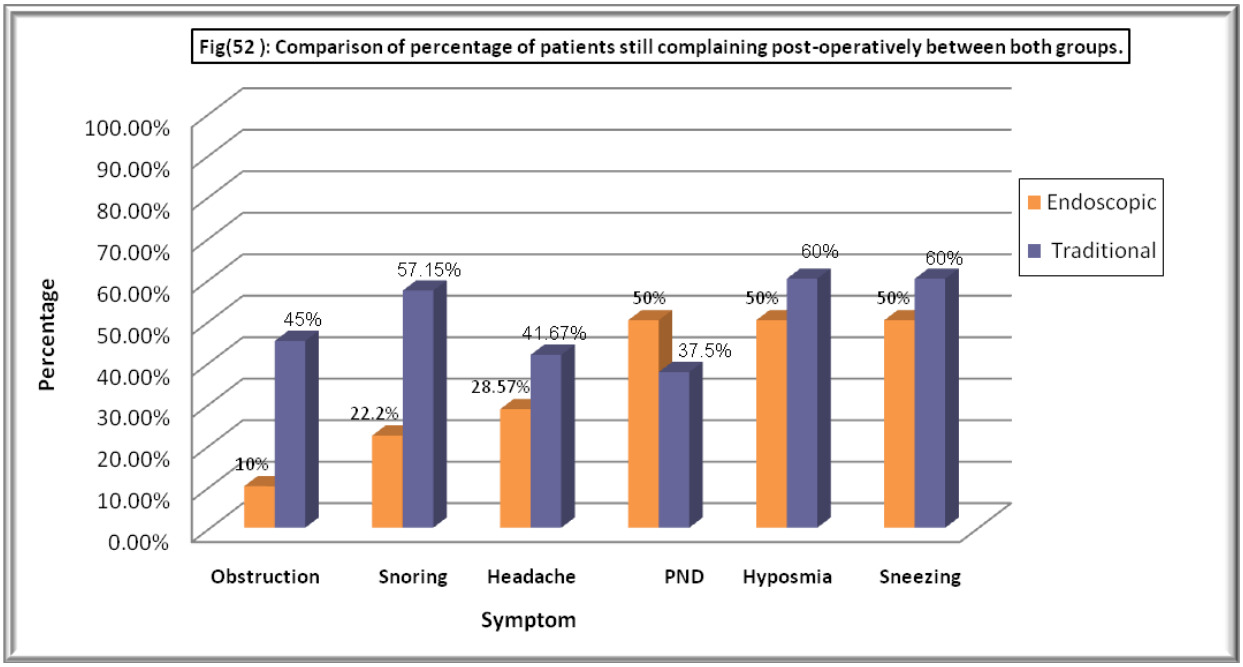

Fig(48): Distribution of Symptoms in both groups at presentation.
Percentage
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
100% 100%
45% 45%
70%
55%
30%
40%
30%
25%
20%
25%
Obstruction
Snoring
Headache
PND
Hyposmia
Sneezing
Complaint
Endoscopic
Traditional


Fig(49): Type of septal deformities in both groups at presentation.
Percentage
50%
40%
30%
20%
10%
0%
35%
15%
45%
40%
20%
20%
0%
25%
Septal spur
Broadly deviated septum
Multiple septal deformities
Septal dislocation
Type of septal deformity
Endoscopic
Traditional

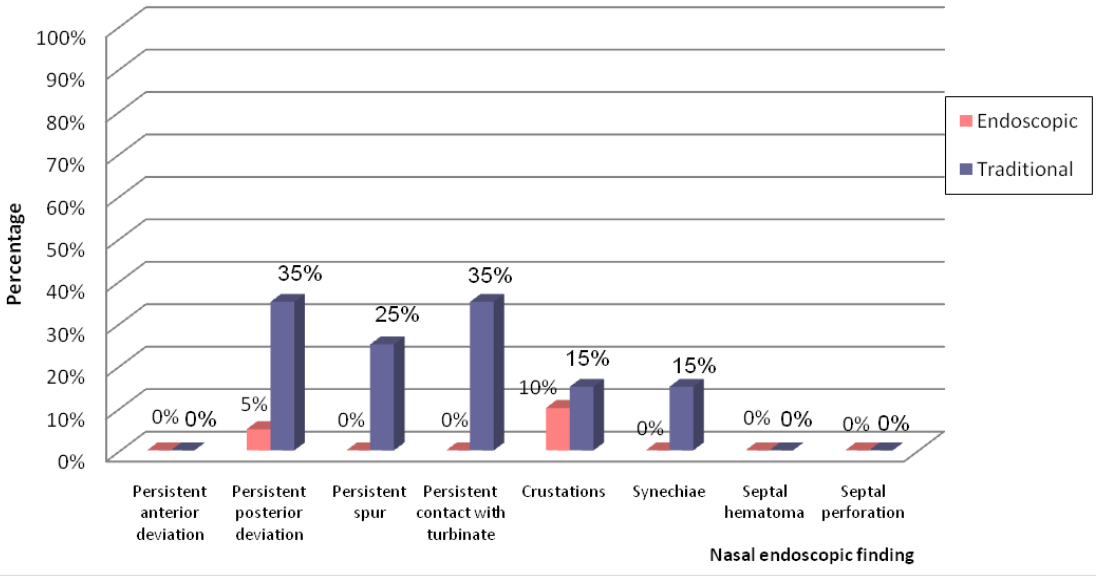

Fig(50): Pre- and post-operative means of total nasal resistance in both groups.
Mean total nasal resistance
0.6
0.5
0.4
0.3
0.2
0.1
0
0.4815
0.5069
0.1837
0.2279
Endoscopic
Traditional
Pre-operative
Post-operative

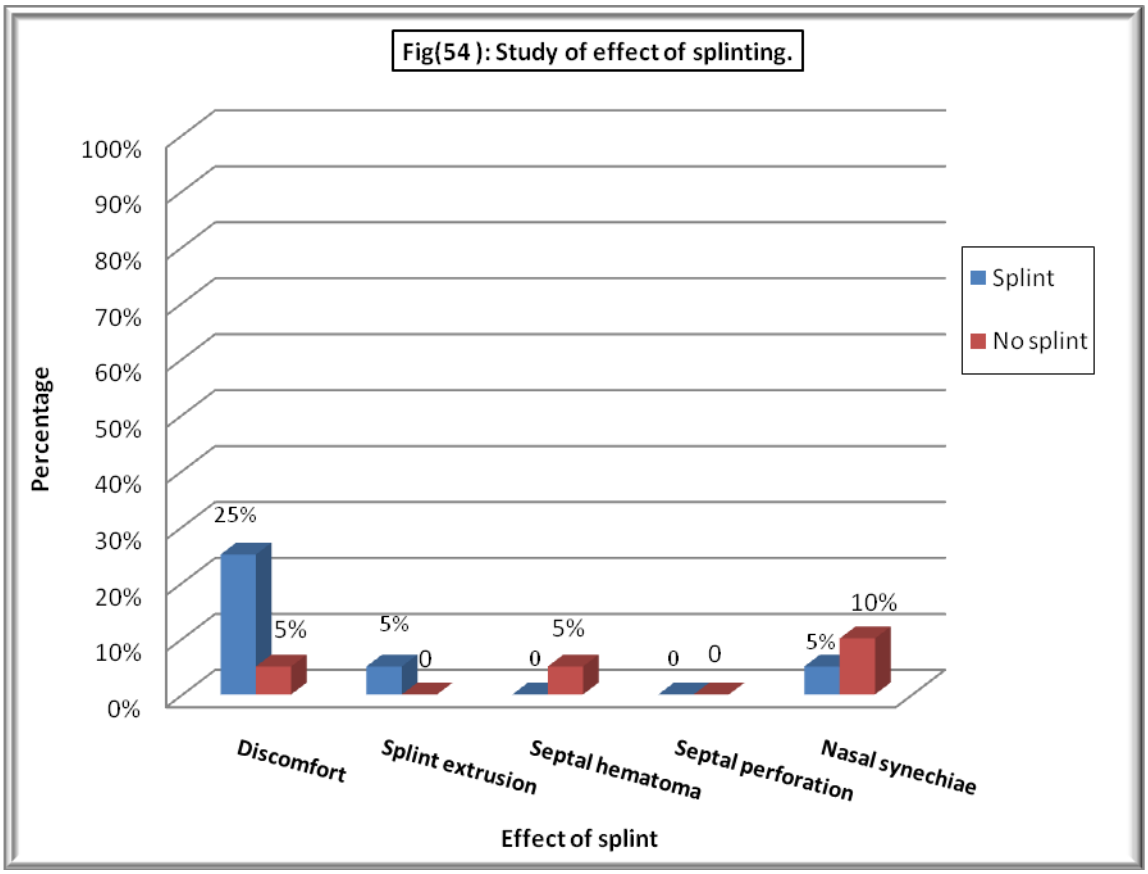

Fig(51): Early post-operative complications during 1st week.
Percentage
40%
35%
30%
25%
20%
15%
10%
5%
0%
10%
15%
10%
20%
0
15%
0
5%
0
0
Endoscopic
Traditional
Epistaxis
Pain & discomfort
Smell of bad odour
Septal hematoma
Septal perforation
Complications

Fig(52): Comparison of percentage of patients still complaining post-operatively between both groups.



Fig(53): Nasal endoscopic findings on last available follow up.




Fig(54): Study of effect of splinting.
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage
Splint
No splint
25%
5%
5%
0
0
5%
0
0
5%
10%
Discomfort
Splint extrusion
Septal hematoma
Septal perforation
Nasal synechiae
Effect of splint