

The Outcome of Reconstruction of Anterior Sinus Wall in Maxillary Fractures - A Clinical Prospective Study

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Received: January 05, 2023

Published: February 09, 2023

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Abstract

Introduction: Limited literature exists on the outcome of reconstruction of the traumatized anterior sinus wall and the overall benefits hence a study was conducted.

Aim: To evaluate the efficacy of reconstruction of anterior sinus wall in maxillary fracture.

Material and Methods: The study was conducted in 27 patients with midfacial fractures involving the anterior wall of maxillary sinus who came to Sanjay Gandhi Institute of Trauma and Orthopaedics. Fixation of the fractured segments was done with titanium miniplates like routine in both the study and control group along with reconstruction of the fractured anterior sinus wall with titanium mesh in the study group alone. Clinical and radiological evaluation was done to examine in the differences between the study and control group in view of sinusitis.

Results: At 1st week, 4th week and 3 months post-operatively, the clinical and radiological features of sinusitis along with paraesthesia was found to be higher in the control group than in the study group and was statistically significant at the 4th week postoperative.

Conclusions: In larger bone defect of the anterior sinus wall, reconstruction can be considered for better aesthetic outcome, avoidance of paraesthesia and overall comfort during post operative period of 3-4 months.

Keywords: Maxillary Sinusitis; Anterior Maxillary Wall; Titanium Mesh; Midface Fractures; PNS Xray

Abbreviations

PNS XRay: Paranasal Sinus Xray

Introduction

Most midfacial injuries cause substantial defects of bone in the anterior walls of the maxillary sinus as it consists of fine/slender bone with less strength due to the load over it during normal functions such as mastication is moderate. Bone defects causes the disruption of the inner sinus lining mucosa with alterations in ventilation and aeration of the sinus leading to secondary

complications such as sinusitis, pressure sensibility with pain in cranial proclination, long standing purulent secretion, recurrent rhinitis, and edema of the cheek [1].

Such extensive bone defects can result in soft tissue prolapse/herniation into the sinus along with the formation of soft tissue and facial asymmetry with alterations in facial contour; unnecessary septa development, formation of cysts and chronic sinusitis, also altered sensations or parasesthesia of the infraorbital nerve, chronic facial pain, displacement of the orbital floor [2].

To avoid these above functional and aesthetic complications along with displeasure, reconstruction of maxillary sinus anatomically with large defects of the maxillary sinus walls is necessary to preserve the lumen of the sinus as well as the contours of the face [1].

Reconstruction of the walls of the maxillary sinus results in conservation of respiratory epithelium and sufficient restoration of ventilation and drainage of the maxillary sinuses [3].

Limited literature exists on the outcome of reconstruction of the traumatized anterior sinus wall and the overall benefits to the patients, hence we have planned to conduct a study to evaluate all of the above.

Materials and Methods

This clinical prospective comparative study was conducted on subjects reporting to the Department of Faciomaxillary Surgery, Sanjay Gandhi Institute Of Trauma And Orthopedics, Bangalore with midfacial fracture involving anterior maxillary sinus wall from September 2021 to September 2022.

Study group was recognized as patients with midfacial fracture undergoing reconstruction of anterior sinus wall and control group was patients with midfacial fracture involving anterior sinus wall but not undergoing the reconstruction.

Inclusion criteria of the subjects for the study were

- Patients diagnosed with midfacial fractures involving the anterior wall of maxillary sinus.
- Patients above the age of 18years
- Willing individuals (both male and female) with an informed consent.

Exclusion criteria of the subjects for the study were

- Medically compromised patients.
- Patients with associated bone pathology.
- Patients with pre-existing maxillary sinusitis prior to the trauma.
- Patients with previous history of midface trauma, major reconstructive maxillofacial surgeries (grafting, partial resection), maxillary sinus lift procedures.

This study followed the Declaration of Helsinki in medical protocol and ethics. Also, the study was approved by the Regional Ethical Review Board of Sanjay Gandhi Institute of Trauma and Orthopaedics.. Presurgical evaluation including thorough clinical examination, case history, photographs and radiographic analysis of the patient was done [Figure 1].

Figure 1: Case1- Clinical picture taken in casualty, pre-operative showing right eye circumorbital and malar edema.

Figure 2: Case1- Post-operative picture in frontal and worm's view of 2 weeks showing malar prominence that is maintained and patient had no signs or symptoms of maxillary sinusitis

Under general anesthesia, the maxillary vestibular incision was employed to expose the fracture site. The fracture was reduced into

its anatomical position. In the study group, reconstruction of the fractured anterior sinus wall was done with titanium mesh [Figure 4] [Figure 9] along with it if zygomaticomaxillary buttress is involved fixation with the titanium plates and screws of 2mm size [Figure 9]. In the control group, routine fixation of the buttress was followed without the reconstruction of the anterior wall [Figure 13]. Titanium mesh was cut according to the site of the defect and adapted well to the sinus wall, fixation was done with the 6 mm screws of 2mm or 1.5 mm size. Closure was done in layers.

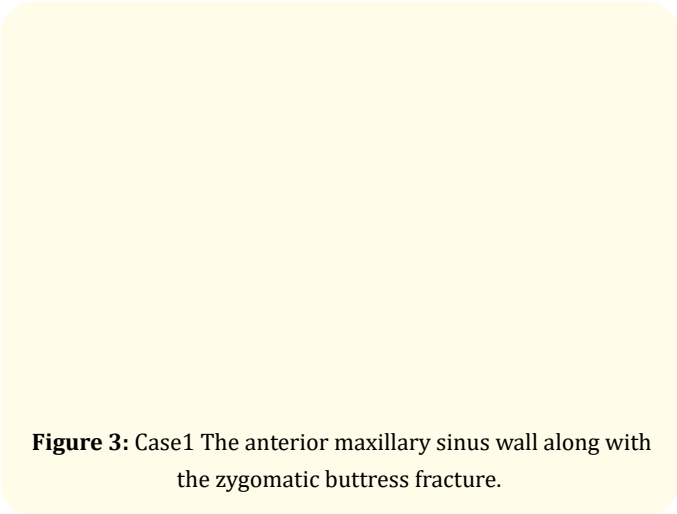


Figure 3: Case1 The anterior maxillary sinus wall along with the zygomatic buttress fracture.

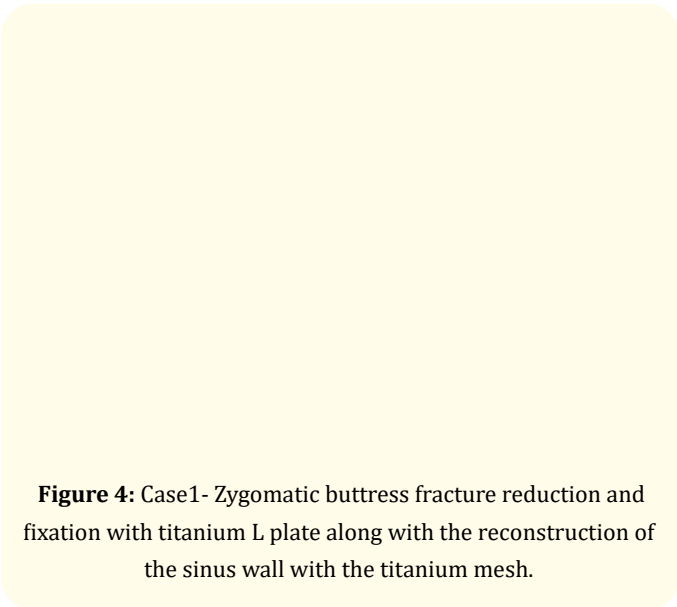


Figure 4: Case1- Zygomatic buttress fracture reduction and fixation with titanium L plate along with the reconstruction of the sinus wall with the titanium mesh.

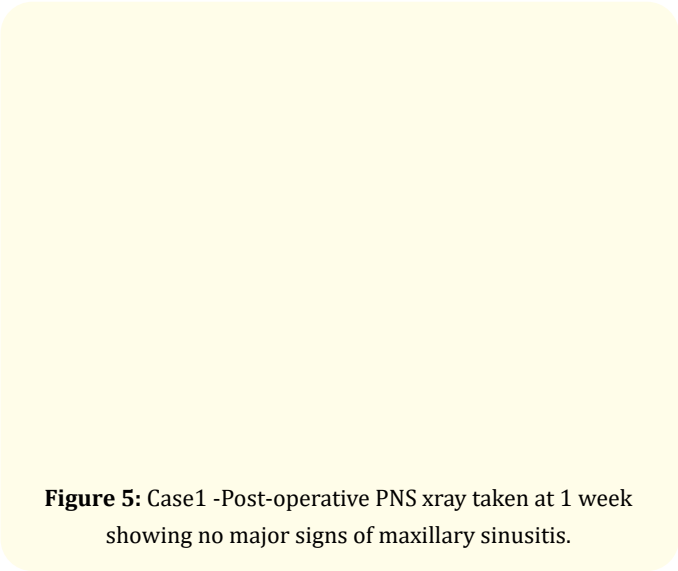


Figure 5: Case1 -Post-operative PNS xray taken at 1 week showing no major signs of maxillary sinusitis.

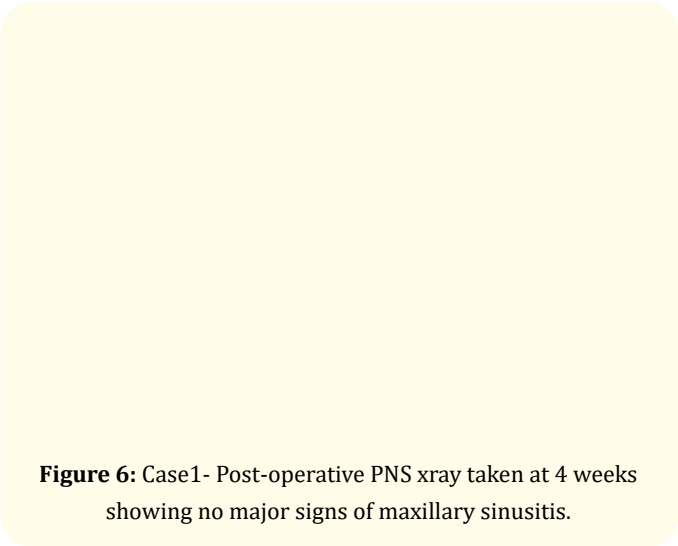


Figure 6: Case1- Post-operative PNS xray taken at 4 weeks showing no major signs of maxillary sinusitis.

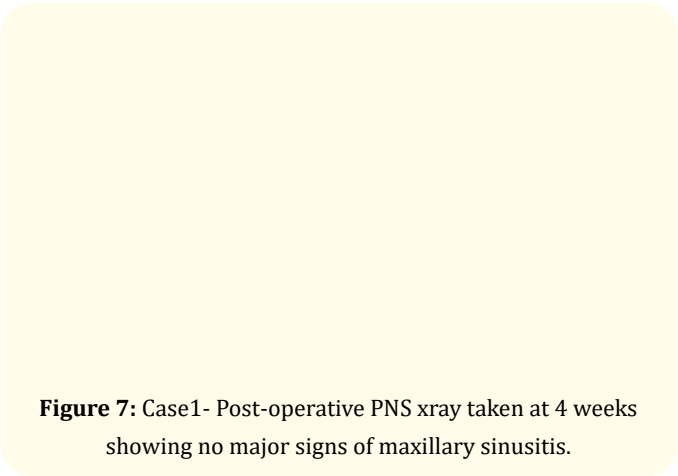


Figure 7: Case1- Post-operative PNS xray taken at 4 weeks showing no major signs of maxillary sinusitis.

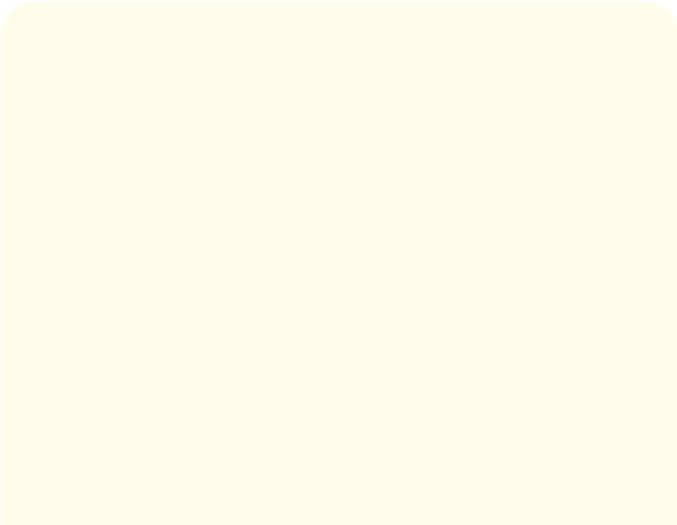


Figure 8: Case2- Fractured anterior maxillary sinus exposed through the right maxillary vestibular incision.

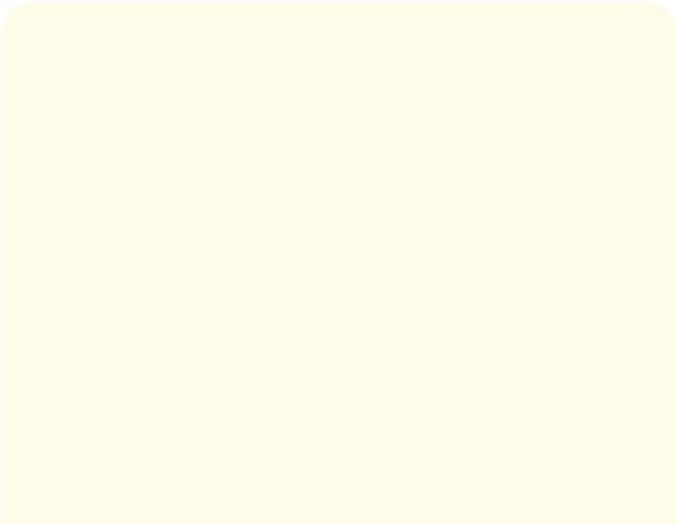


Figure 9: Case2- Reconstruction of anterior maxillary sinus wall with titanium mesh. In this case fixation of fractures was done with mesh only, plates was not needed.

All patients was continued on a postoperative course of antibiotics and analgesics, soft diet. Postoperative radiograph-water’s view X-ray was taken [Figure 5].

Patients of both the groups were followed up clinically [Figure 2] and radiologically after 1 week, 4 weeks and 3 months post-operatively [Figure 10].

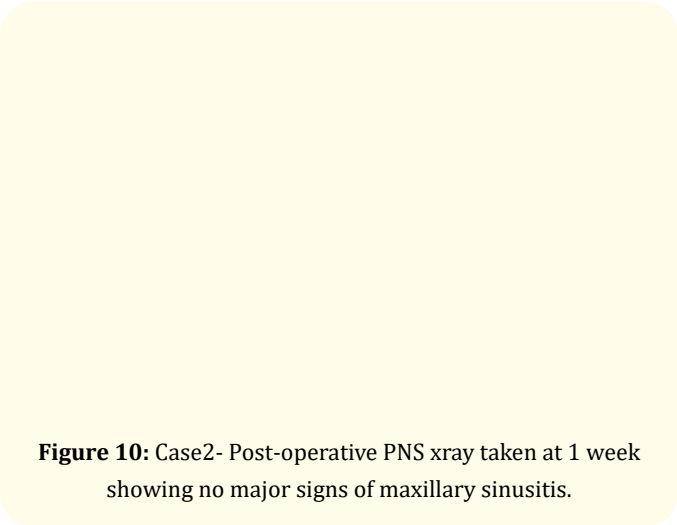


Figure 10: Case2- Post-operative PNS xray taken at 1 week showing no major signs of maxillary sinusitis.

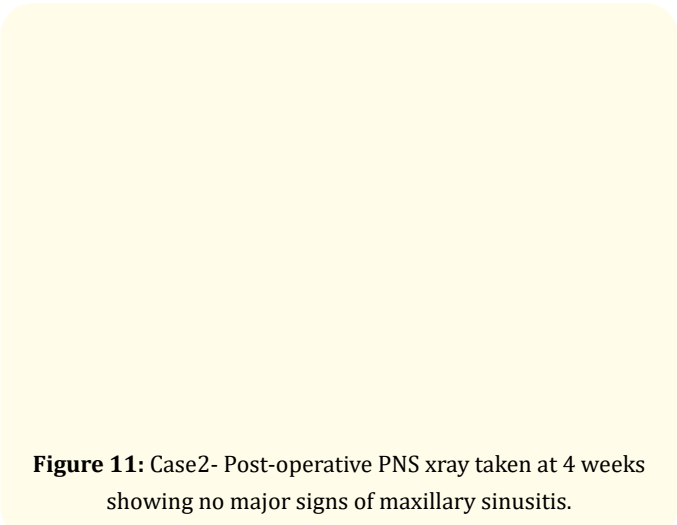


Figure 11: Case2- Post-operative PNS xray taken at 4 weeks showing no major signs of maxillary sinusitis.

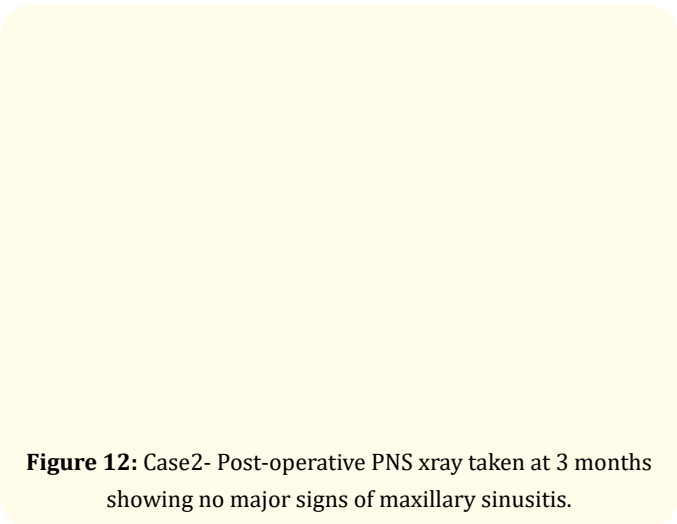


Figure 12: Case2- Post-operative PNS xray taken at 3 months showing no major signs of maxillary sinusitis.

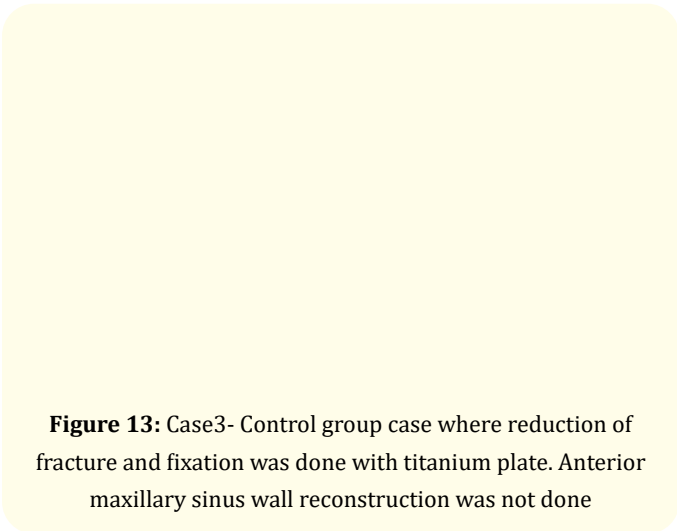


Figure 13: Case3- Control group case where reduction of fracture and fixation was done with titanium plate. Anterior maxillary sinus wall reconstruction was not done

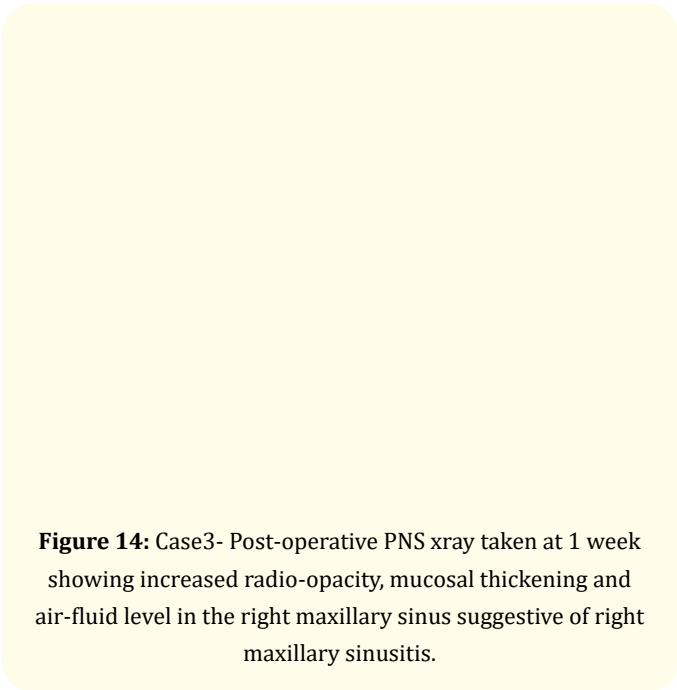


Figure 14: Case3- Post-operative PNS xray taken at 1 week showing increased radio-opacity, mucosal thickening and air-fluid level in the right maxillary sinus suggestive of right maxillary sinusitis.

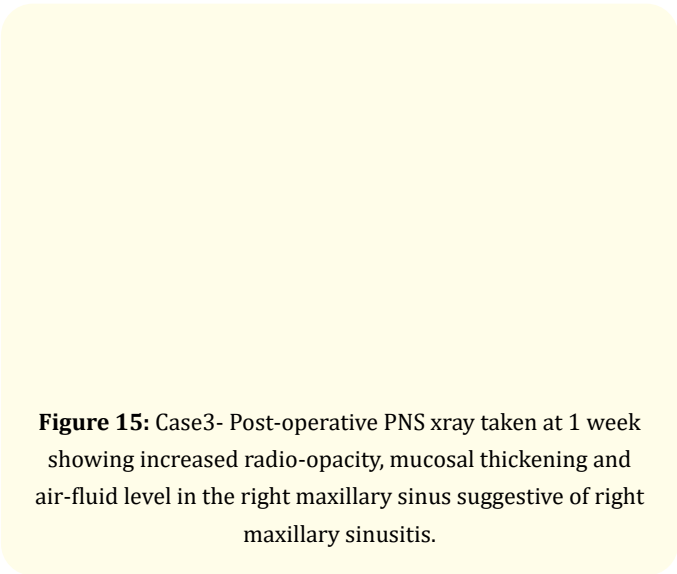


Figure 15: Case3- Post-operative PNS xray taken at 1 week showing increased radio-opacity, mucosal thickening and air-fluid level in the right maxillary sinus suggestive of right maxillary sinusitis.

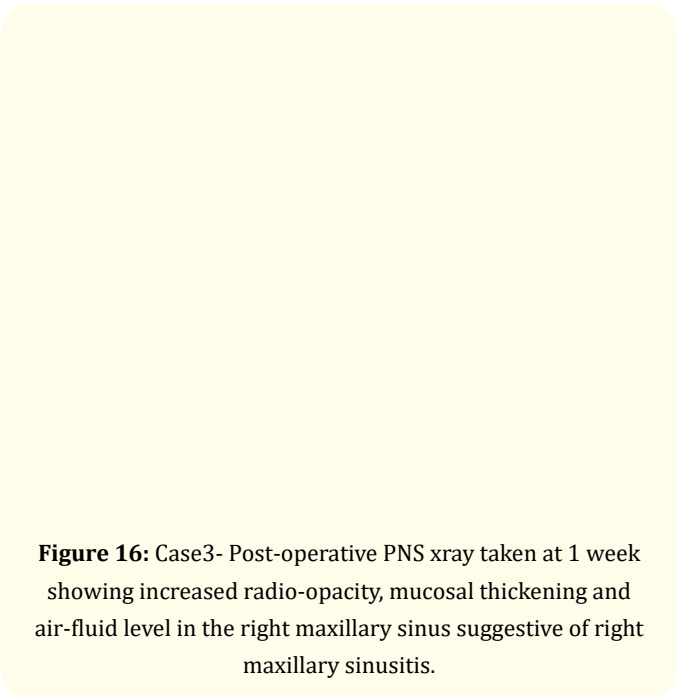


Figure 16: Case3- Post-operative PNS xray taken at 1 week showing increased radio-opacity, mucosal thickening and air-fluid level in the right maxillary sinus suggestive of right maxillary sinusitis.

Patients were evaluated post-operatively for below signs of maxillary sinusitis to assess clinical outcome post reconstruction of traumatized anterior sinus wall in both the groups

- Infraorbital pain
- Tenderness in the cheek region
- Pressure changes on the cranial proclination
- Paraesthesia in the cheek
- Rhinitis
- Nasal discharge
- Maxillary toothache
- Pain or tenderness on percussion of the maxillary teeth.

To assess the radiological outcome by Water’s view X-ray the below variables was evaluated by the same radiologist at all the times,

- Clouding or radioopacity in the sinus region
- Air-fluid level in the sinus
- Mucosal thicknenning.

The differences in clinical and radiological outcome in study and control group were assessed when compared with the above parameters.

Results and Discussion

The healing was satisfactory in all the patients. No major intra-operative or post-operative complications were noted. Study group

had 12 patients with 10 male and 2 female, control group had 15 patients with 14 male and 1 female. The patients were in the age group of 22- 54 years. All the patients were followed up to the duration approximately of 5-6 months.

The statistical analysis was done by frequency distribution, Chi square test to evaluate the p value and bar graphs.

The clinical and radiological parameters that were evaluated for maxillary sinusitis were greater in the control group than the study group.

Infraorbital facial pain with tenderness

In this study, the infraorbital facial pain and tenderness in the cheek/malar region was assessed by palpation of the cheek region and was recorded to be higher in control group when compared to study group. At 1st week pain was seen in 12 patients (80%) of control group whereas in 8 patients (66.7%) in study group, at 4th week in 7 patients (46.5%) in control group and 1 patient (8.3%) which was statistically significant ($p < 0.05$) in study group. 2 patients (13.3%) and 1 patient (8.3%) had infraorbital facial pain at 3 months post-operative which was comparative and not much statistical difference [Table 1 and Figure 17].

Infraorbital facial pain with tenderness					
	Yes N (%)	No N (%)	Total	Chi square	p-value
1 st week					
Control group	12 (80.0)	3 (20.0)	15	0.617	0.43
Study group	8 (66.7)	4 (33.3)	12		
4 th week					
Control group	7 (46.7)	8 (53.3)	15	4.698	0.03*
Study group	1 (8.3)	11 (91.7)	12		
3 months					
Control group	2 (13.3)	13 (86.7)	15	0.168	0.68
Study group	1 (8.3)	11 (91.7)	12		

Table 1: The percentage of infraorbital facial pain with tenderness in both the groups.

Figure 17: The percentage of infraorbital pain with tenderness in both the groups.

Pressure changes

The typical pressure changes on cranial proclination due to maxillary sinusitis was assessed in both the groups and found to be higher in control group when compared to study group. At 1st week pressure changes were seen in 7 patients (46.7%) of control group whereas in 3 patients (25%) in study group, at 4th week in 9 patients (60%) in control group and 1 patient (8.3%) which was statistically significant ($p < 0.05$) in study group. 2 patients (13.3%) and 1 patient (8.3%) had pressure changes at 3 months postoperative which was comparative and not much statistical difference [Table 2 and Figure 18].

Pressure changes					
	Yes N (%)	No N (%)	Total	Chi square	p-value
1 st week					
Control group	7 (46.7)	8 (53.3)	15	1.34	0.24
Study group	3 (25.0)	9 (75.0)	12		
4 th week					
Control group	9 (60.0)	6 (40.0)	15	7.63	0.005*
Study group	1 (8.3)	11 (91.7)	12		
3 months					
Control group	2 (13.3)	13 (86.7)	15	0.16	0.68
Study group	1 (8.3)	11 (91.7)	12		

Table 2: The percentage of pressure changes in both the groups.

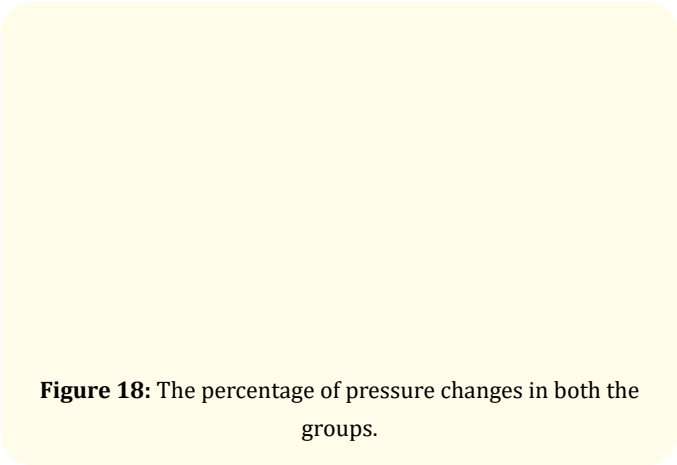


Figure 18: The percentage of pressure changes in both the groups.

Paraesthesia

The paraesthesia in the infraorbital region was assessed in both the groups and found to be slightly higher in control group when compared to study group. At 1st week paraesthesia was seen in 5 patients (33.3%) of control group whereas in 3 patients (25%) in study group, at 4th week in 3 patients (20%) in control group and 1 patient (8.3%) in study group. 3 patients (20%) and 1 patient (8.3%) had pressure changes at 3 months post-operative which was comparative and not much statistical difference [Table 3 and Figure 19].

Paraesthesia					
	Yes N (%)	No N (%)	Total	Chi square	p-value
1 st week					
Control group	5 (33.3)	10 (66.7)	15	0.22	0.63
Study group	3 (25.0)	9 (75.0)	12		
4 th week					
Control group	3 (20)	12 (80)	15	0.71	0.39
Study group	1 (8.3)	11 (91.7)	12		
3 months					
Control group	3 (20)	12 (80)	15	0.71	0.39
Study group	1 (8.3)	11 (91.7)	12		

Table 3: The percentage of paraesthesia in both the groups.

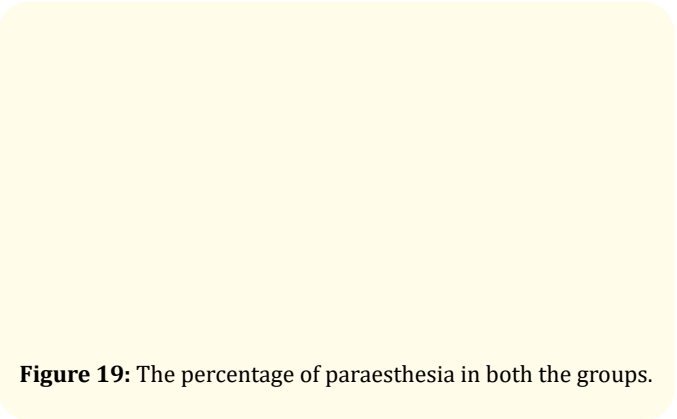


Figure 19: The percentage of paraesthesia in both the groups.

Nasal discharge

The nasal discharge was assessed in both the groups and found to be higher in control group when compared to study group. At 1st week nasal discharge was seen in 9 patients (60%) of control group whereas in 5 patients (41.7%) in study group, at 4th week in 10 patients (66.7%) of control group and 3 patients (25%) in study group which had significant statistical difference (p < 0.05). At 3 months postoperative, 2 patients (13.3%) and 1 patient (8.3%) still had nasal discharge which was comparative and not much statistical difference [Table 4 and Figure 20].

Nasal discharge					
	Yes N (%)	No N (%)	Total	Chi square	p-value
1 st week					
Control group	9 (60.0)	6 (40.0)	15	0.89	0.343
Study group	5 (41.7)	7 (58.3)	12		
4 th week					
Control group	10 (66.7)	5 (33.3)	15	4.63	0.031*
Study group	3 (25.0)	9 (75.0)	12		
3 months					
Control group	2 (13.3)	13 (86.7)	15	0.16	0.681
Study group	1 (8.3)	11 (91.7)	12		

Table 4: The percentage of nasal discharge in both the groups.

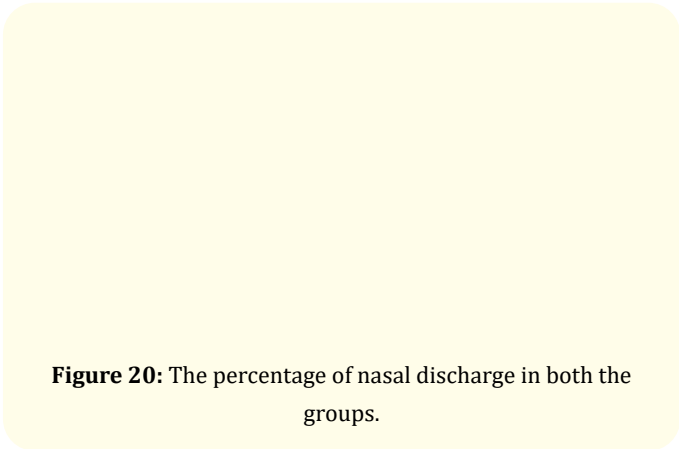


Figure 20: The percentage of nasal discharge in both the groups.

The maxillary tooth ache and tenderness

The maxillary tooth ache and tenderness was assessed in both the groups and found to be higher in control group when compared to study group. At 1st week it was seen in 7 patients (46.7%) of control group whereas in 3 patients (25%) in study group, at 4th week in 8 patients (53.3%) of control group and 1 patient (8.3%) in study group which had significant statistical difference ($p < 0.05$). At 3 months postoperative, 3 patients (20%) and 1 patient (8.3%) still had continued maxillary toothache and tenderness which was comparative and not much statistical difference [Table 5 and Figure 21].

Maxillary toothache					
	Yes N (%)	No N (%)	Total	Chi square	p-value
1 st week					
Control group	7 (46.7)	8 (53.3)	15	1.34	0.24
Study group	3 (25.0)	9 (75.0)	12		
4 th week					
Control group	8 (53.3)	7 (46.7)	15	6.07	0.01*
Study group	1 (8.3)	11 (91.7)	12		
3 months					
Control group	3 (20.0)	12 (80.0)	15	0.71	0.39
Study group	1 (8.3)	11 (91.7)	12		

Table 5: The percentage of maxillary tooth ache with tenderness on percussion of the upper posterior teeth in both the groups.

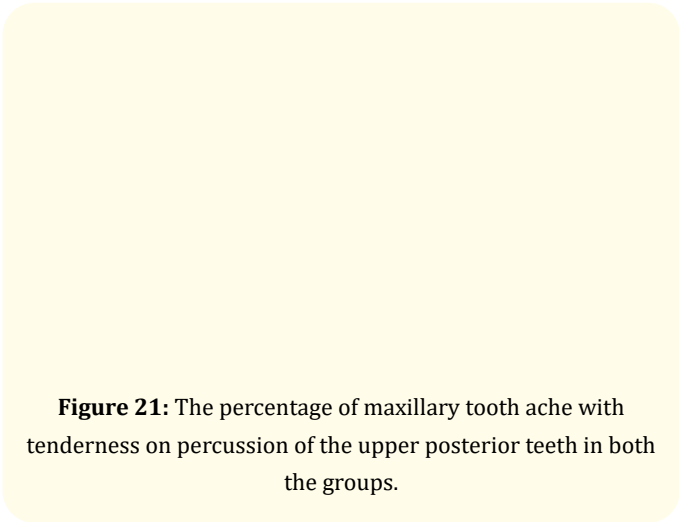


Figure 21: The percentage of maxillary tooth ache with tenderness on percussion of the upper posterior teeth in both the groups.

Radioopacity

The mucosal thickening, air fluid level and radio-opacity was evaluated on the PNS (Water's view)skull Xray to assess the radiological outcome of the treatment and found to be higher in the control group when compared to study group at 1st week, 4th week and 3 months post-operatively but was statistically significant at the 4th week postoperative.

The radioopacity was assessed in both the groups and found to be higher in control group when compared to study group. At 1st week it was seen in 13 patients (86.7%) of control group whereas in 10 patients (83.3%) in study group, at 4th week in 9 patients (60%) of control group and 2 patients (16.7%) in study group which had significant statistical difference ($p < 0.05$). At 3 months post-operative, 4 patients (26.7%) and 1 patient (8.3%) still had radioopacity of the maxillary sinus which was comparative and not much statistical difference [Table 6 and Figure 22].

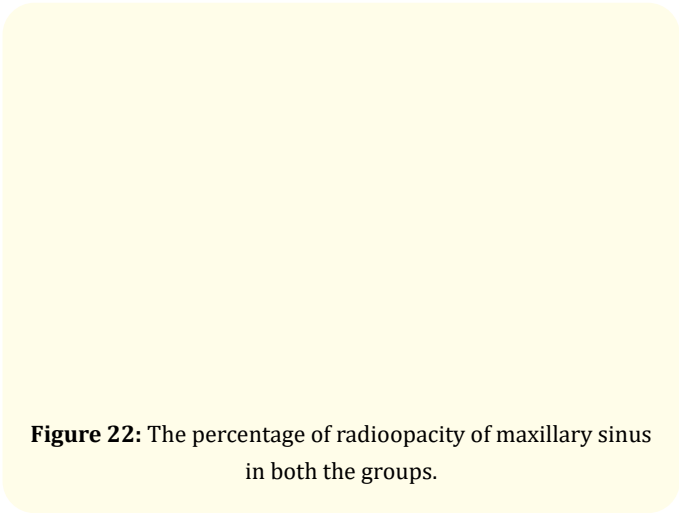


Figure 22: The percentage of radioopacity of maxillary sinus in both the groups.

Radio-opacity					
	Yes N (%)	No N (%)	Total	Chi square	p-value
1 st week					
Control group	13 (86.7)	2 (13.3)	15	0.058	0.80
Study group	10 (83.3)	2 (16.7)	12		
4 th week					
Control group	9 (60.0)	6 (40.0)	15	5.18	0.02*
Study group	2 (16.7)	10 (83.3)	12		
3 months					
Control group	4 (26.7)	11 (73.3)	15	1.48	0.22
Study group	1 (8.3)	11 (91.7)	12		

Table 6: The percentage of radio-opacity of maxillary sinus in both the groups.

Air-fluid level

The air-fluid level was assessed in both the groups and found to be higher in control group when compared to study group. At 1st week it was seen in 13 patients (86.7%) of control group whereas in 10 patients (83.3%) in study group, at 4th week in 12 patients (80%) of control group and 4 patients.

(33.3%) in study group which had significant statistical difference ($p < 0.05$). At 3 months post-operative, 3 patients (20%) and 1 patient (8.3%) still had air-fluid level on PNS (Water's view) Xray which was comparative and not much statistical difference [Table 7 and Figure 23].

Mucosal thickening

The mucosal thickening was assessed in both the groups and found to be higher in control group when compared to study group. At 1st week it was seen in 13 patients (86.7%) of control group whereas in 10 patients (83.3%) in study group, at 4th week in 8

Air-fluid level					
	Yes N (%)	No N (%)	Total	Chi square	p-value
1 st week					
Control group	13 (86.7)	2 (13.3)	15	0.058	0.80
Study group	10 (83.3)	2 (16.7)	12		
4 th week					
Control group	12 (80.0)	3 (20.0)	15	6.013	0.01*
Study group	4 (33.3)	8 (66.7)	12		
3 months					
Control group	3 (20.0)	12 (80.0)	15	0.719	0.39
Study group	1 (8.3)	11 (91.7)	12		

Table 7: The percentage of air-fluid level in both the groups.

Figure 23: The percentage of air fluid level of maxillary sinus in both the groups.

patients (60%) of control group and 2 patients (16.7%) in study group which had significant statistical difference ($p < 0.05$). At 3 months post-operative, mucosal thickening was found on PNS xray in 3 patients (20%) and 1 patient (8.3%) which was comparative and not much statistical difference [Table 8 and Figure 24].

Figure 24: The percentage of mucosal thickening of maxillary sinus in both the groups.

Mucosal thickening					
	Yes N (%)	No N (%)	Total	Chi square	p-value
1 st week					
Control group	13 (86.7)	2 (13.3)	15	0.05	0.80
Study group	10 (83.3)	2 (16.7)	12		
4 th week					
Control group	8 (60)	7 (40)	15	3.84	0.04*
Study group	2 (16.7)	10 (83.3)	12		
3 months					
Control group	3 (20)	12 (80)	15	0.719	0.39
Study group	1 (8.3)	11 (91.7)	12		

Table 8: The percentage of mucosal thickening of maxillary sinus in both the groups.

Discussion

Maxillary sinus injuries are consistently noted in the the midfacial trauma due to high impact injuries. In our study the midfacial injury cases were due to road traffic accidents mainly. Lefort and zygomaticomaxillary complex cases had associated fracture of anterior maxillary sinus wall. The maxillary sinus walls are thin as they do not bolster up immense occlusal load, during

normal functions the load transmission is craned by the perinasal and zygomatic buttress [2]. The ensuing complications post traumatic injury to the maxillary sinus walls are unwanted septa development, formation of cysts and chronic sinusitis, there are also sensory disturbances of the infraorbital nerve, chronic facial pain, displacement of the orbital floor and even possible alterations in the facial contour.

Along with the above complications, large bone defects can result in soft tissue herniation into the sinus with scar tissue formation. These complications can be detected with thorough clinical and radiological investigations.

Clinical examination is one of the utilitarian methods in the diagnosis and subsequent follow-up of complications of maxillary sinus fractures, including sinusitis. The extant of symptoms such as infraorbital facial pain, nasal or postnasal leaking, pressure sensibility, sensitivity to changes of weather, edema of the lower lid, pain on cranial proclination and nasal blockage is correlated to sinusitis [4].

The radiologic examinations give more objective results in the diagnosis of complications of maxillary sinus fractures. Although plain radiographs can show fractured regions, thickening of sinus mucosa, foreign bodies, and radio-opacification of sinuses, CT can reveal more subtle and comprehensive findings related to the complications of maxillary sinus fractures.

The exhaustive characteristic feature of maxillary sinus such as 2 or 3 dimensional volumetric analysis, the area of bone defect, the place of mucosal thickening, locations of foreign bodies, minute soft tissue herniation and the causes of sinus opacification can be evaluated in axial, sagittal and coronal view in computed tomographic radiographs [4-6].

The maxillary sinus mucosa has a commendable regenerative potential except in cases of large loss of bone continuity [2]. The injured maxillary sinus lining has the ability to be completely reformed by regeneration with ciliated columnar epithelium and membrane with glands within 3-5 months but disparity in time for complete wound healing exists due to extent of mucosal damage of sinus [7,8].

Ballon., *et al.* in their study have emphasised that reestablishment of the rigid osseous base for the regeneration or healthy reparative changes of the mucosa is a cardinal requirement. Though the mucosa has high regenerative potential, lack of a rigid base either original native fractured bone or alloplastic/synthetic material such as titanium, or resorbable material will lead to reformed lining that has replacement connective and scar tissue that which forms the new anterior sinus wall [2].

Not many studies exist regarding the studies of maxillary sinusitis post trauma, in a study conducted by Ballon [2] the complications of maxillary sinusitis in patients without the reconstruction of anterior wall was around 18% and with the reconstruction was 6% which was in comparison with the our study where the overall clinical symptoms of maxillary sinusitis was around 13.3% in study group and 8.3% in the control group at 3 months. This reparative tissue is otherwise the original mucosal layers, consists more of a ciliated epithelium that are flattened on a lamina propria showing fibrosis and devoid of serous glands [2].

In our study we have treated study group cases with large bony defect of the anterior wall of maxillary sinus by reconstruction with titanium mesh and fracture fixation of the zygomaticomaxillary buttress with titanium plates and screws. In the control group, anterior sinus wall was not reconstructed only the fracture fixation was done at the buttress with titanium plates and screws.

Though the duration for complete healing of the sinus in both the groups varied from 3 to 6 months. The patients in the control group faced discomfort during the healing phase atleast upto 3 months post surgery as they had clinically symptomatic maxillary sinusitis which needed analgesics and antihistamines.

In the control group healing prolonged, whereas the patients with reconstruction of the sinus wall with titanium mesh were mostly devoid of signs and symptoms of sinusitis immediately post surgery and the healing was comparatively faster. The healing also depends on the extent of the wall defect, pre- existing minor asymptomatic sinus wall inflammation.

Clinical symptoms causing discomfort to the patients such as nasal discharge, upper posterior teeth pain and facial pain were noticed in both the groups during the healing phase at 1st week but was distinguishable and significantly more in number in the

control group at 4 weeks, this can be due to the continuation of irritation of sinus mucosa leading to its inflammation because of various reasons such as entrapped fractured anterior bone wall or soft tissue entrapment and no accurate sealing of the sinus which disrupts the ventilation/aeration of the maxillary sinus.

The infraorbital facial pain and tenderness was assessed at 1st week immediate post surgery, this clinical symptom can be either due to customary surgical operative site pain or sinusitis. But at 4 weeks when the usual operated region pain subsides, the existing typical facial infraorbital pain is due to the subsistence of maxillary sinusitis and which is seen more in the control group.

The soft tissue prolapse or herniation into the maxillary sinus was avoided after the titanium mesh placement and hence the zygoma/malar projection was well maintained post operatively and the depression due to soft tissue loss was avoided.

In our study, percentage of paraesthesia noted in study group was lesser than the control group, 2 patients in the control whereas 1 in the study group. This can be attributed to the certitude that fracture of the anterior wall of maxillary sinus results in entrapment of the nerve or direct injury to perineurium/entire nerve or inflammation around causing the nerve irritation leads to the transient paraesthesia. Providing a firm base/support such as titanium mesh can avoid the further direct entrapment or injury to the nerve and there is faster recovery and regeneration [9-11].

Air fluid level is a clear indication of acute sinusitis or acute exacerbation of chronic sinusitis [12] which can be appreciated well on the radiographs. In our study on PNS xray, air fluid level was observed immediately post-operative in both the groups but at 4th week the cases with air fluid level significantly decreased. At 3 months time even control group showed reduction in air fluid level suggestive of diminution of sinusitis.

The Pns (Water's view) xray was done by the same technician at all the time, variables of exposure for the digital detector was kept constant of 40 kilovolts and 4 milli ampere seconds and the tube angulation was standardly maintained to avoid any discrepancy in the final results between the groups.

For further evaluation, our study can be continued with two and three dimensional computed tomography radiographs for better understanding.

Conclusion

Even though maxillary sinusitis resolves within 3-6 months of time in almost all cases as sinus mucosa has innate high regenerative potential. When there is a larger bone defect of the sinus wall, reconstruction can be considered along with the reduction and fixation of midfacial fracture for avoidance of symptoms of sinusitis such facial pain, rhinitis, pressure changes on cranial proclination, maxillary posterior teeth pain during the healing post-operative phase in addition to maintenance of integrity of infraorbital nerve that would assuage the paraesthesia of cheek region. Along with this, the reconstruction of anterior maxillary sinus in midfacial fracture restricts the soft tissue prolapse into the sinus which results in better aesthetic outcome of the midface region.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest

All the authors declare that they have no conflict of interest

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Ethical Approval

All procedures performed in the study were in accordance with the ethical standards of the institution and with 1964 Helsinki declaration (and its later amendments).

showing increased radio-opacity, mucosal thickening and air-fluid level in the right maxillary sinus suggestive of right maxillary sinusitis.

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