

Patient Satisfaction After Closed Reduction of Nasal Fractures

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Objective: To evaluate the outcome of closed reduction from a patient's point of view, because there is increasing evidence that closed reduction of nasal fractures fails to address deformities of the cartilaginous nasal framework and the septum.

Methods: We performed a retrospective study of 62 patients who underwent a closed reduction of nasal fracture between July 1, 2002, and June 30, 2005. All patients were interviewed regarding the esthetic and functional outcomes after closed reduction.

Results: Eighteen patients (29%) expressed dissatisfaction with the esthetic outcome of the reduction, and 18

(29%) said they would consider further surgery to correct the residual nasal deformity.

Conclusions: A stringent preoperative assessment of the nasal fracture, other nasal deformities, and nasal function is essential before offering patients a simple closed reduction of their nasal fractures. A septorhinoplasty, as the definitive procedure, should be offered to patients when a closed reduction is deemed unable to address all deformities.

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THE NOSE, AS THE MOST prominent part of the face, is the feature most vulnerable to facial trauma.¹ Illum et al² noted that 39% of facial traumas involved the nose. The standard treatment for a nasal fracture is a closed reduction, conventionally within 7 days for children and 10 days for adults.³⁻⁶ This method, although simple, fails to address deformities of the cartilaginous framework and the nasal septum caused by the injury. Increasing evidence shows that patients have persistent aesthetic concerns about the outcome and obstructive symptoms after closed reductions. In a prospective study by Murray and Maran⁷ of 756 patients who underwent a closed reduction of a nasal fracture, 41% of the patients had a postreduction nasal deformity. Although many studies have focused on the surgeon's assessment of the outcome of a closed reduction for a nasal injury, the aim of our study was to evaluate the outcome of a closed reduction from a patient's point of view based on a patient interview.

Alice Ho Miu Ling Nethersole Hospital in Hong Kong between July 1, 2002, and June 30, 2005. Operation logbooks for the period of the study were reviewed and a database constructed. Patients were interviewed by telephone by a trained research assistant (W.C.). Patients were asked a series of questions regarding their experience and satisfaction. The interview questionnaire was composed of 3 sections. The first section dealt with the demographics and socioeconomic background of the patient. The second section dealt with the preoperative phase and the third section with the postoperative phase. Patients were asked to rate their overall satisfaction with the process of the closed reduction, the current state of their nasal function, and their opinion of the aesthetic outcome of the reduction. The patients' satisfaction was measured in terms of their objective opinion of their nasal deformity, if they had one, such as depression or elevation of one or both nasal bones, depression or elevation of the nasal dorsum, and deviation of the nasal pyramid from the midline and nasal symmetry. The patients' subjective opinion as to whether their nose looked natural and, if not, how the appearance or aesthetics of their nose affected them was noted. A 5-point numerical scale was used to quantify the level of satisfaction and severity, with 1 being defined as very satisfied and least severe and 5 as very dissatisfied and most severe.

Patients who expressed dissatisfaction and/or the desire for further surgery to address a functional or aesthetic problem were invited to attend an outpatient consultation, during which a full evaluation of the nasal func-

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METHODS

We performed a retrospective study of patients who underwent a closed reduction of a nasal fracture at the Prince of Wales Hospital and the



Figure 1. Typical study patient of Chinese origin.

tion and an aesthetic assessment were made. Revision surgery was offered to patients on indication.

Data were analyzed with SPSS statistical software, version 12.0 (SPSS Inc, Chicago, Ill). The paired-sample *t* test was used to calculate preoperative and postoperative means \pm SDs and 95% confidence intervals.

RESULTS

All patients were Chinese except one, who was Indian (Figure 1). Four patients were excluded from the study because of 1 or more of the following: incorrect contact telephone number, psychosis, inability to speak Chinese or English, and unwillingness to be interviewed. Sixty-two patients completed the interview questionnaire. The response rate was 94%. Fifty patients were male (81%) and 12 (19%) were female. Their mean age was 27.7 years (range, 12-67 years) (Figure 2). Causes of the nasal fractures were sports injuries (45%), physical altercations or assaults (23%), and motor vehicle crashes (10%). Thirty-six patients were operated on by otorhinolaryngologists and 26 patients by trainees under strict supervision by specialists.

The patients' satisfaction was measured in terms of (1) the patients' objective opinion as to the severity of their nasal deformity, if they had one; (2) symptoms of nasal obstruction; and (3) the patients' subjective opinion as to whether their nose looked natural and, if not, how much the appearance of their nose affected their facial cosmesis. The mean score for the nasal deformity was 3.08 preoperatively and 1.62 postoperatively. The mean score for aesthetic concern was 2.97 preoperatively and 1.54 postoperatively. The mean score for nasal obstruction was 2.03 preoperatively and 1.36 postoperatively. A statistically significant difference was found in preoperative and postoperative scores for the 3 factors measured (Table and Figure 3).

Dissatisfaction is defined as a patient's individual postoperative score being equal to or higher than the mean preoperative scores in the corresponding category (Figure 4). Eight patients (13%) were dissatisfied with their nasal deformity, 7 (11%) were dissatisfied with the aesthetic appearance as a result of nasal deformities, and 13 (21%) were dissatisfied with their nasal patency. Eighteen patients (29%) indicated that they would like revision surgery to correct an aesthetic and/or nasal airway problem.

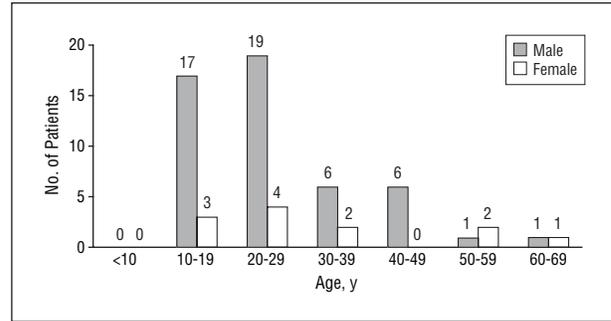


Figure 2. Age of the study patients.

Table. Comparison of Satisfaction Scores Before and After Closed Reduction*

Variable	Score, Mean \pm SD		95% Confidence Interval
	Preoperative	Postoperative	
Nasal deformity	3.08 \pm 0.86	1.62 \pm 0.80	1.21-1.71
Cosmetic deformity	2.97 \pm 1.08	1.54 \pm 0.79	1.14-1.72
Nasal obstruction	2.03 \pm 1.11	1.36 \pm 0.80	0.43-0.92

*A 5-point numerical scale was used to quantify the level of satisfaction and severity, with 1 being defined as very satisfied and least severe and 5 as very dissatisfied and most severe. For all comparisons, $P < .05$.

Of those who requested revision surgery, 4 (24%) wanted surgery for both cosmetic and functional reasons, 6 (35%) wanted surgery for nasal obstruction alone, and 8 (47%) wanted surgery for aesthetic reasons alone. Interestingly, not all of the patients who were dissatisfied with the outcome of the closed reduction wanted corrective surgery, and not all of the patients who wanted further surgery were dissatisfied with the outcome of the closed reduction. Of those patients dissatisfied with the outcome, 11 (18%) requested further surgery and 7 (11%) declined further surgery. Of those patients who were satisfied with the outcome, 7 (11%) requested further surgery and 37 (60%) declined further surgery.

COMMENT

In this study, most of the patients were young males, and the causes of the nasal injuries included motor vehicle crashes, sports injuries, and physical assaults, which are consistent with a previous study.⁴ Closed reduction significantly improved the severity of the nasal deformity, the subjective aesthetic outcome, and nasal obstruction. In the preoperative scoring, most patients rated the severity of their nasal obstruction as 1, implying that nasal obstruction was their least concern before intervention. Other clinical variables, such as nasal allergy or chronic rhinosinusitis, can cause nasal obstruction, which may alter the patient's perception of a good outcome.^{8,9}

A closed reduction of a nasal fracture is a relatively simple procedure that requires the repositioning of the nasal bones in 3 dimensions: elevation of depressed bones, depression of elevated bones, and restoration of the sym-

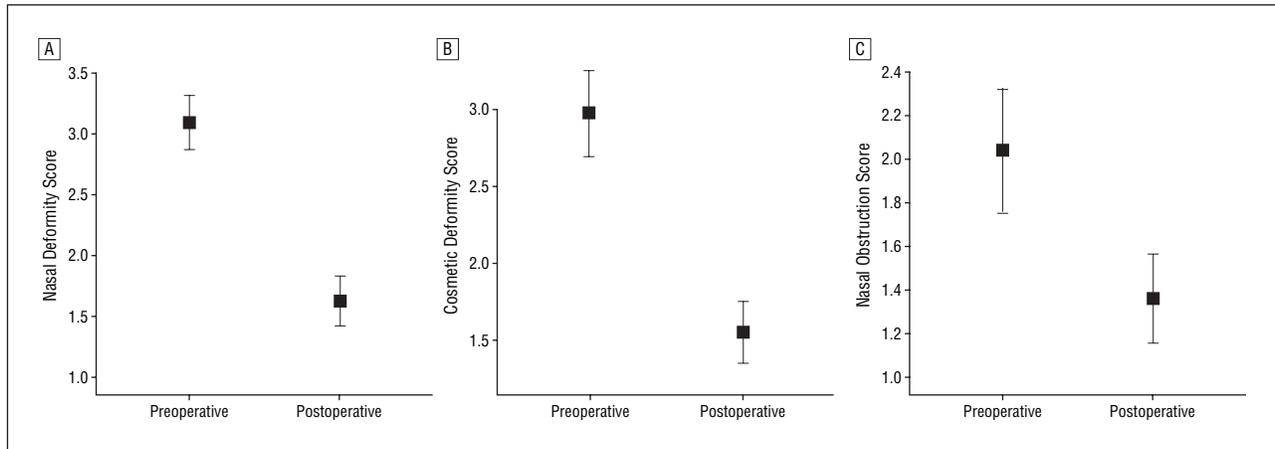


Figure 3. Mean preoperative and postoperative scores regarding nasal deformity ($P < .05$) (A), cosmetic deformity ($P < .05$) (B), and nasal obstruction ($P < .05$) (C). Error bars indicate SDs.

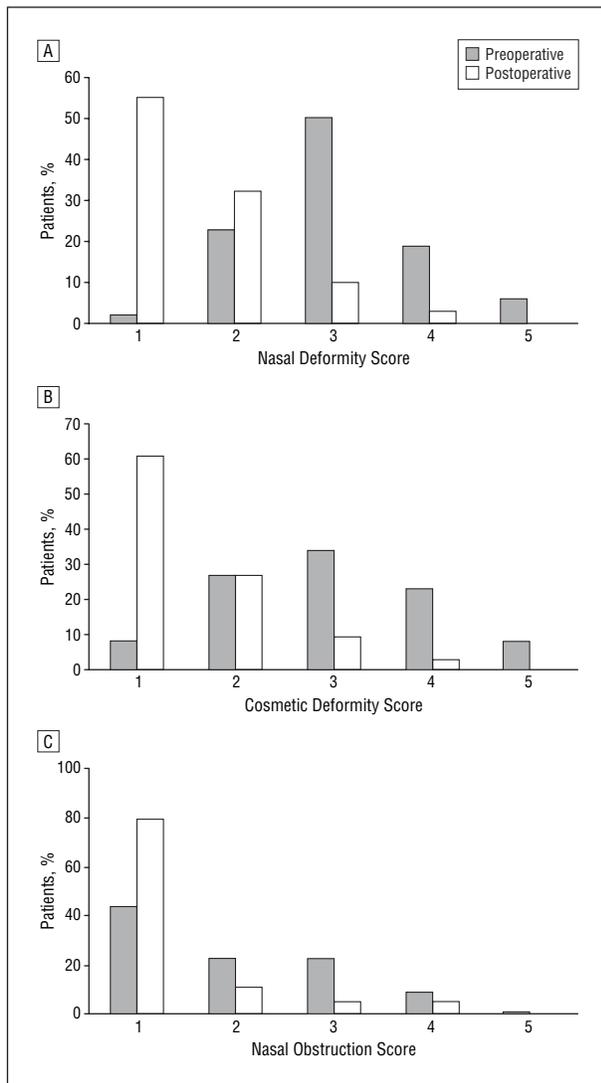


Figure 4. Patient satisfaction with nasal deformity (A), cosmetic deformity (B), and nasal obstruction (C).

metry of the nasal pyramid and its midline alignment. Because one otorhinolaryngology team worked in the 2 hospitals at which the surgery took place, the reduction

technique was standardized to allow consistency among different surgeons. Trainee physicians always work under the supervision of specialists.

Overall, 18 patients (29%) were dissatisfied with the outcome of the closed reduction, and 18 (29%) wanted to undergo revision surgery. According to previous studies,^{7,10} the incidence of postreduction nasal deformities that require rhinoplasty or septorhinoplasty ranges from 14% to 50%.

Not all patients who were dissatisfied with the outcome of the closed reduction wanted revision surgery, and not all patients who wanted revision surgery were dissatisfied with the outcome of the closed reduction. In this study, we found that the main reason patients who were dissatisfied with the outcome of the closed reduction did not want to undergo revision surgery was the fear of general anesthesia. This finding is consistent with previous studies, which showed that most patients were usually unwilling to undergo a subsequent operation.^{11,12}

More than half of the patients were satisfied with the outcome of the closed reduction and did not want any further surgery. Despite expressing satisfaction, many patients commented that they had a mild nasal deviation or a mild nasal hump. Their expression of satisfaction may be related to their reluctance to undergo a subsequent operation. Indeed, Staffel¹³ noted that patients with nasal bone fractures were less demanding than were cosmetic rhinoplasty patients. Chinese patients, who constituted most of the patients in this study, usually have a relatively low dorsum, making a mild nasal deviation or mild nasal hump of little concern to them.

In conclusion, our study showed a significant improvement in the nasal deformity, nasal aesthetic, and nasal airway in patients with a nasal fracture who underwent a closed reduction. However, a number of patients were dissatisfied with the outcome of the closed reduction,¹⁴ and a number of patients wanted to undergo revision surgery to correct their nasal deformities.

Fernandes¹² stated that it was possible to predict which closed reductions would fail to correct all the deformities of the nasal trauma. On the other hand, it is not possible to confidently predict which patients who have a good reduction at the time of surgery will eventually have a good outcome. A stringent preoperative assessment is

paramount, before patients are advised to undergo a closed reduction of a nasal fracture. A septorhinoplasty may be offered as a definitive and/or elective procedure when the postinjury assessment suggests that a closed reduction of the nasal fracture may be inadequate to address all the deformities.

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