

Soccer-related Facial Trauma: Multicenter Experience in 2 Brazilian University Hospitals

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Background: Soccer is the most popular sport in Brazil and a high incidence of related trauma is reported. Maxillofacial trauma can be quite common, sometimes requiring prolonged hospitalization and invasive procedures. To characterize soccer-related facial fractures needing surgery in 2 major Brazilian Centers.

Methods: A retrospective review of trauma medical records from the Plastic Surgery Divisions at the Universidade Federal de São Paulo–Escola Paulista de Medicina and the Hospital das Clínicas–Universidade de São Paulo was carried out to identify patients who underwent invasive surgical procedures due to acute soccer-related facial fractures. Data points reviewed included gender, date of injury, type of fracture, date of surgery, and procedure performed.

Results: A total of 45 patients (31 from Escola Paulista de Medicina and 14 from Universidade de São Paulo) underwent surgical procedures to address facial fractures between March 2000 and September 2013. Forty-four patients were men, and mean age was 28 years. The fracture patterns seen were nasal bones (16 patients, 35%), orbitozygomatic (16 patients, 35%), mandibular (7 patients, 16%), orbital (6 patients, 13%), frontal (1 patient, 2%), and naso-orbito-ethmoid (1 patient, 2%). Mechanisms of injury included collisions with another player ($n = 39$) and being struck by the ball ($n = 6$).

Conclusions: Although it is less common than orthopedic injuries, soccer players do sustain maxillofacial trauma. Knowledge of its frequency is important to first responders, nurses, and physicians who have initial contact with patients. Missed diagnosis or delayed treatment can lead to facial deformities and functional problems in the physiological actions of breathing, vision, and chewing. (*Plast Reconstr Surg Glob Open* 2014;2:e168; doi: 10.1097/GOX.000000000000129; Published online 13 June 2014.)

Soccer is woven into the fabric of Brazilian culture, embedded in the traditions and the language of the country. A ball on the ground is an invitation to kick¹—in fact, it is almost a *necessity*. Every child in Brazil will at some point receive a ball or a soccer jersey of his favorite team as a gift. Wherever you are in Brazil, soccer is ever present—on

newsstands, in bars and restaurants, on the internet, or playing on the radio in cars and houses (which almost always have their windows open due to the tropical weather). On the day of an important game, wherever you are in this country, you will probably hear the shout of one of the most widely recognized words in the world—“GOAL”—usually followed by

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Received for publication March 8, 2014; accepted May 9, 2014.

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DOI: 10.1097/GOX.000000000000129

countless exploding fireworks. No true Brazilian can hide his curiosity and will ask of any stranger by his side: “Who is winning?” (or even, “Who is playing?”).

It is not surprising then that Brazil has won 5 World Cups (the most of any country since the tournament began in 1930), and, every 4 years, is among the teams favored to win it all. In 2014, the World Cup will make its way back to Brazil for the first time since 1950, and the omnipresent background of soccer in Brazilian culture will once again be brought to the forefront.

As with any sport, soccer provides both agony and ecstasy for its fans—as well as the occasional injury. Orthopedic trauma to the extremities is by far the most frequent injury among soccer players.²⁻⁴ However, due to exposure and the lack of protection for the face, the occasional maxillofacial trauma sustained during soccer games often entails serious facial injuries requiring hospital admissions and invasive procedures. We present here a retrospective review of the types of acute maxillofacial fractures sustained in soccer-related trauma at 2 large University hospital centers in Sao Paulo, Brazil.

METHODS

Institutional review board approval for this study was not required—data were obtained exclusively from nonidentifiable data previously collected for a separate institutional review board–approved study. The present study was designed according to the Declaration of Helsinki. No medical records were accessed. A retrospective review of such data from the Craniofacial Sector of the Plastic Surgery Division at the Universidade Federal de São Paulo (UNIFESP)–Escola Paulista de Medicina and the Plastic Surgery Division at the Hospital das Clínicas–Universidade de São Paulo (USP) was carried out to identify patients who underwent invasive surgical procedures due to acute soccer-related facial fractures. Data points reviewed included gender, date of injury, type of fracture, date of surgery, and procedure performed. Injuries resulting from fights during or after the game were not included in this study.

Disclosure: *The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was waived at the discretion of the Editor-in-Chief.*

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RESULTS

Between March 2000 and September 2013, the total volume of operative facial fractures was 2195 cases (UNIFESP 1556, USP 639). A total of 45 of these patients (31 UNIFESP, 14 USP) sustained soccer-related facial fractures. Forty-four patients were men, and mean age was 28 years. The fracture patterns (Table 1) seen were nasal bones/ascending process of the maxilla (16 patients, 35%) (Fig. 1), zygomatic (16 patients, 35%) (Fig. 2) mandibular (7 patients, 16%), orbital (6 patients, 13%) (Fig. 3), frontal (1 patient, 2%) (Fig. 4), and naso-orbito-ethmoid (1 patient, 2%). Mechanisms of injury included collisions with another player ($n = 39, 86.7\%$) and being struck by the ball ($n = 6, 13.3\%$). All nasal fractures were treated by closed reduction and nasal splints, and all other fractures were treated with open reduction and internal fixation. Average delay between injury and operation was 7.2 days (range, 1–33 days). Time to operation was higher at USP (12.2 ± 9.8 days) than UNIFESP (5.0 ± 4.6 days). Average length of hospital stay was 5.3 days (range, 1–26 days). Hospital stay was significantly longer at UNIFESP (6.8 days) than at USP (2 days). All patients were amateur players and were instructed to return to play in 6–8 weeks.

DISCUSSION

The face persists as a frequent site of trauma derived from social violence. Traffic-related trauma continues to decrease with the advent of better safety devices in automobiles, but the incidence of other etiologies has increased with the growth in popularity of martial arts and contact sports.⁵ Cerulli et al⁶ examined all cases of sports-related maxillofacial trauma that required operative intervention over a 5-year period and found that the sport involved was soccer in 73.9% of cases. The most common cause of injury in their series was elbow-head impact.

Table 1. Patient Demographics and Anatomic Site of Facial Fractures

	Total	UNIFESP	USP
No. patients	45	31	14
Mean age (y)	28	28.2	27.6
Gender			
Male (<i>n</i>)	44	30	14
Female (<i>n</i>)	1	1	0
Anatomic distribution (<i>n</i>)			
Nasal	16 (35.5%)	12	4
Zygoma	16 (35.5%)	11	5
Mandible	7 (15.5%)	4	3
Orbit	6 (13.3%)	4	2
Frontal	1 (2.2%)	0	1
NOE	1 (2.2%)	0	1

NOE, naso-orbito-ethmoidal.

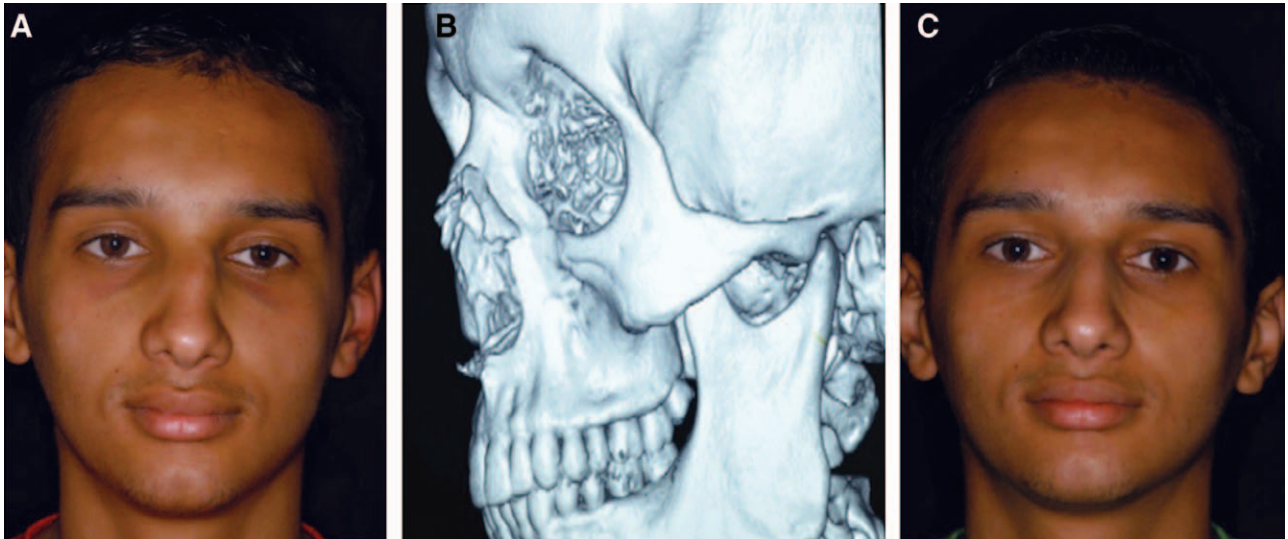


Fig. 1. A, Nasal fracture sustained from head-to-head contact during a soccer game. B, CT demonstrating comminuted fracture of the nasal bones. C, One-year follow-up after closed reduction of the nasal fracture. CT indicates computed tomography.



Fig. 2. A, Left zygomatic fracture sustained 3 days before presentation, with CT showing displacement of the anterior and posterior wall of the maxillary sinus and the zygomatic arch. B, Status post open reduction and internal fixation of the fracture, with CT showing good reduction and restoration of projection. CT indicates computed tomography.

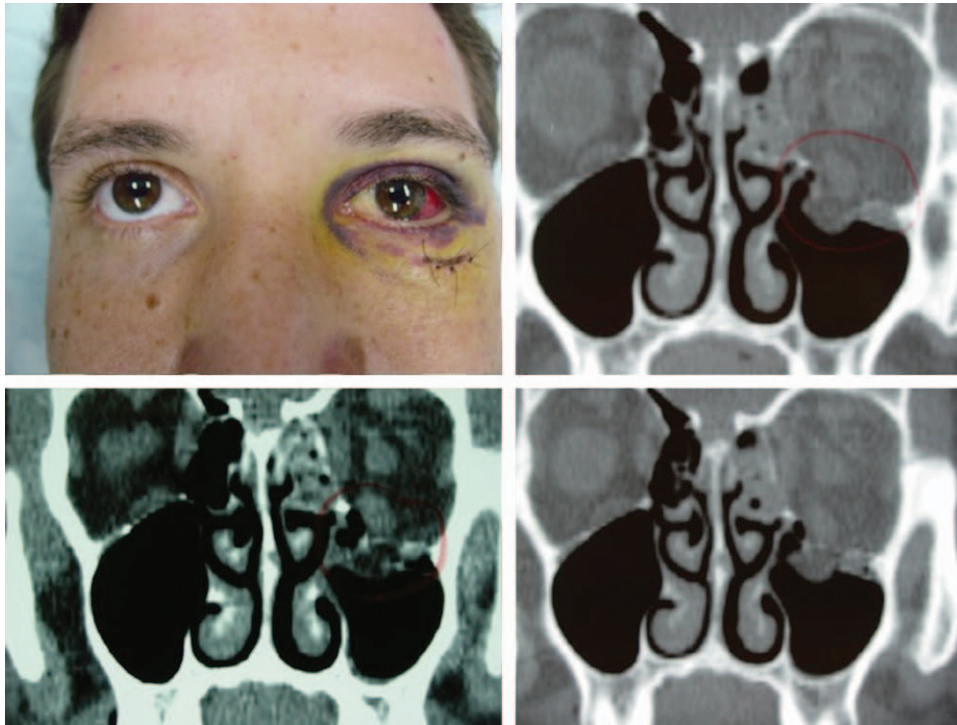


Fig. 3. Orbital floor blowout fracture caused by direct trauma from opposing player's elbow. Clinical appearance and CT showing herniation of orbital fat in the maxillary sinus. CT indicates computed tomography.



Fig. 4. Fracture of the anterior wall of frontal bone caused by head-to-head trauma during amateur soccer game. Direct approach with open reduction and internal fixation performed with miniplates and screws. Final result shows an inconspicuous scar.

A 7-year prospective cohort study of 23 Union of European Football Associations teams found that overall injury rate was 8.0/1000h and 27.5/1000h for match play.⁴ Lower extremity injuries were the most frequent (87%), with head injuries making up only 2% of the total. Muscle injuries were most common

(35%), followed by sprains (18%), contusions (17%), tendinitis (7%), and fractures/dislocations (5%).

On the other hand, a 6-year prospective cohort study of 20 Fédération Internationale de Football Association tournaments⁷ found a head/neck injury rate of 12.5/1000h, which is significantly greater

than that found in the Union of European Football Associations study. However, only 3% of these injuries were fractures, with the vast majority being contusions or lacerations (78%).

Kolodziej et al⁸ retrospectively reviewed 451 players from the German Soccer Association who had suffered injuries during soccer games. The head was affected in 23.9% of cases, and the areas most frequently involved were the facial and occipital regions. Correa et al⁹ analyzed 113 first division matches of the Brazilian Soccer League in 2009, finding that in 84.1% of games at least 1 craniofacial region-related incident happened, with a mean of 2.0 per match. Giannotti et al¹⁰ analyzed hospital admissions due to soccer trauma from the Canadian Hospitals Injury Reporting and Prevention Program, finding that male gender, playing unorganized soccer, soccer outside school premises, playing during the summer/fall, and having multiple body injuries increased the likelihood of hospital admission.

In our series, nasal fractures were the most common soccer-related facial fractures. This is explained by the nose being the most exposed area of the face. Nasal bones are thicker superiorly near the radix and thinner and more prone to fractures inferiorly as they approach the “keystone” area. Fractures in this region were often accompanied by nasal bleeding. Our algorithm for the management of these fractures included careful examination of the nasal cavity. This is essential to assess for septal hematomas that, if not drained, can lead to serious infections and necrosis of the septal cartilage and nasal mucosa (Fig. 5). (See Video 1, Supplemental Digital Content 1, which displays nasal hematoma diagnosis and anesthesia, available at <http://links.lww.com/PRSGO/A39>; See Video 2, Supplemental Digital Content 2, which displays bilateral nasal hematoma incision, available at <http://links.lww.com/PRSGO/A40>; and See Video 3, Supplemental Digital Content 3, which displays septal irregularities due to untreated fracture, available at <http://links.lww.com/PRSGO/A41>.) Our treatment algorithm included closed surgical reduction of the

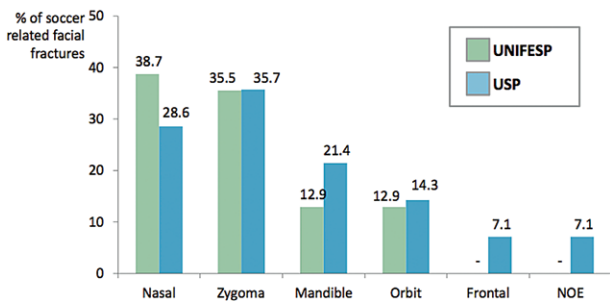
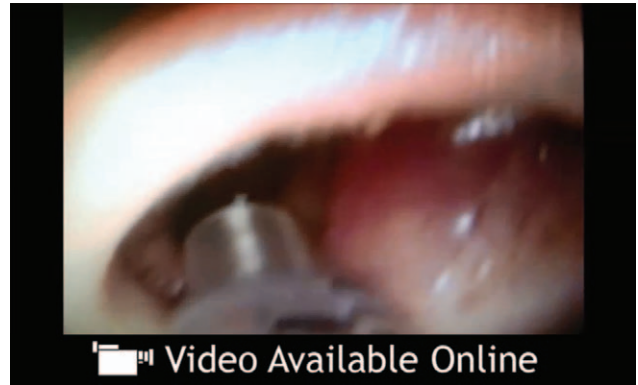
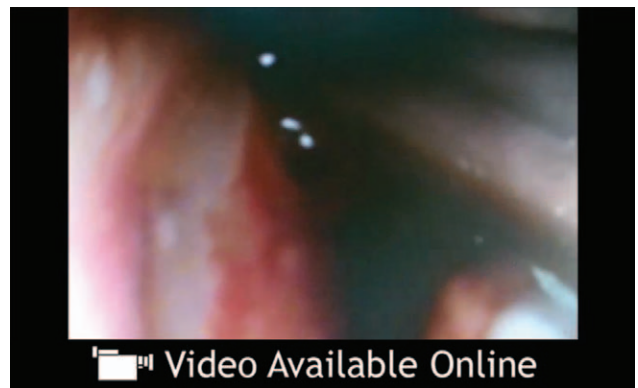


Fig. 5. Distribution of anatomic sites of facial fracture by center. NOE indicates naso-orbito-ethmoidal; UNIFESP, Universidade Federal de São Paulo; USP, Universidade de São Paulo.



Video 1. See video, Supplemental Digital Content 1, which displays nasal hematoma diagnosis and anesthesia, available at <http://links.lww.com/PRSGO/A39>.



Video 2. See video, Supplemental Digital Content 2, which displays bilateral nasal hematoma incision, available at <http://links.lww.com/PRSGO/A40>.



Video 3. See video, Supplemental Digital Content 3, which displays septal irregularities due to untreated fracture, available at <http://links.lww.com/PRSGO/A41>.

fractured bones, followed by nasal packing and a dorsal nasal splint.¹¹ Packing was kept in place for a few days and the splint for a week. Sunscreen use was advocated until the resolution of ecchymoses.

Our study has several limitations. Both centers involved in this study (UNIFESP–Escola Paulista de Medicina and Hospital das Clínicas–Universidade São

Paulo) are referral services in the state of São Paulo (Brazil) usually receiving and treating more complex craniofacial trauma.^{1,2} Because of socioeconomic factors, it is likely that the vast majority of patients with soccer-related facial fractures do not seek medical care. Further, a large percentage of nasal fractures have no clinically evident deviations, and therefore are likely missed by Primary Medical Care Units, resulting in treatment simply with anti-inflammatory and analgesic drugs. Finally, in many cases, patients who are diagnosed with facial fractures and referred to our ambulatory rhinoplasty center for outpatient care may not follow up, again due to socioeconomic factors. In fact, it is very common for patients to present to our ambulatory center with a remote history of nasal fracture and chronic functional problems.

CONCLUSIONS

Although soccer-related maxillofacial fractures are rare, knowledge of their frequency and anatomic distribution is important to first responders, nurses, and physicians who have initial contact with patients presenting with a history of facial trauma sustained while playing soccer. Furthermore, missed diagnosis or delayed treatment can lead to facial deformities and functional problems in the physiological actions of breathing.

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