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## Short Communication

## A retrospective analysis of zygomatic fracture etiologies

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## ABSTRACT

**Background:** Zygomatic fractures are some of the most frequently encountered facial fractures. However, the relationships between the trauma etiology, the zygomatic fracture patterns, and patient ages have not been described.

**Methods:** Patients treated for isolated malar fractures, between 2004 and 2011, at Keio University Hospital were reviewed in this study. Comparative statistical analyses were conducted, based on the classification of the zygomatic fractures, their causes, and patient ages;  $p < 0.05$  was considered significant.

**Results:** In total, 113 patients, aged 16–82-years-old (mean age (SD), 39.8 (17.0)-years-old), including 74 men were analyzed. Patients in their teens and 20s had injuries that were predominantly sports-related (48.8%). With increasing age, the ratio of sports injuries decreased and the number of falls causing injury increased. The frequency of injuries caused by motor vehicle collisions remained reasonably constant across the age groups. Comparing the ratio of shear type fractures with patient ages revealed that 4/13 injuries among patients in their 20s and 30s were of this type, whereas the proportion of shear fractures increased in patients over 40 (17/28,  $p < 0.05$ ).

**Conclusion:** The severities of the zygomatic fractures, their causes, and the associated patient ages were closely related. Based on this study, possible prevention strategies for zygomatic fractures need to be considered.

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## Introduction

Facial fractures commonly result from various traumatic insults to the face, and can occur in isolation or concomitantly with other injuries. Among facial fractures, zygomatic fractures are some of the most frequently observed types.<sup>1</sup> The epidemiology of zygomatic fractures is constantly changing and is variable across populations. A number of studies have described the etiology of these fractures.<sup>1–4</sup> However, the relationship between the trauma etiology and the resulting zygomatic fracture pattern has been primarily anecdotal. The primary aim of the current study was to analyze the relationships between the trauma etiologies, the zygomatic fracture patterns, and patient ages.

## Patients and methods

A retrospective review was conducted between 2004 and 2011, to examine patients operated for isolated tripod zygomatic fractures at the Keio University Hospital. Patients with only zygomatic arch fractures, multiple complex fractures, or non-tripod zygomatic fractures were excluded.

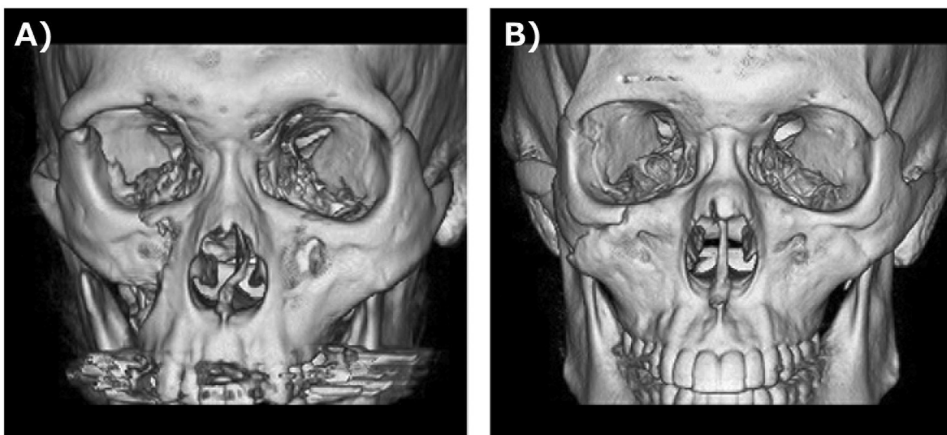
For each patient, the available clinical notes and high-resolution computed tomography scans were reviewed. The “trauma etiologies” were divided into 6 categories: sports, motor vehicle collisions, falls after drinking, falls due to other reasons, assaults, and others. The zygomatic fracture pattern type was classified, based on the zygomaticofrontal suture, as either shear or greenstick<sup>5–7</sup> (Figure 1).

To investigate the relationship between fracture pattern types and fracture etiologies, and the relationship between fracture pattern types and patient ages, comparative statistical analyses were used using Pearson’s chi-square test.

## Results

Operations were conducted on 113 patients with isolated tripod zygomatic fractures. The patients ranged in age from 16 to 82 years (mean  $\pm$  SD age,  $39.8 \pm 17.0$  years), and included 74 men. The etiologies and zygomatic fracture patterns are shown for each age group in Table 1.

Among patients <30 years of age, 48.8% of the injuries were sports related; specifically, rugby (6), ice hockey (5), baseball (3) and basketball, martial arts, and skiing (2 each) accidents were reported to have caused the injuries (Table 2). The shear fracture pattern was not associated with sports-related injuries where the patient wore facial protection, including martial arts and ice hockey. Sports-related injuries due to sports where facial protection was not worn, accounted for 8/15 patients with shear injuries, significantly more than those receiving greenstick fractures ( $p < 0.05$ ).



**Figure 1.** Two types of zygomatic fractures were defined based on the condition of the zygomaticofrontal suture; shear type (A) and greenstick type (B).

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