

# Orthopaedic ice-skating injuries in a regional hospital in Hong Kong

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**Ice-skating is a popular sport in Hong Kong. Since the opening of our hospital, we have observed a special pattern of injury related to ice-skating. Individuals have had a wide range of injuries including fractures and deep tissue lacerations, many of which have needed operative intervention. Public awareness of the risks remains low. The pattern and mechanisms of injury, management modalities, and contributing factors to the injuries are discussed. Preventive measures and socioeconomic implications are also discussed.**

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*Key words: Skating injuries; Health education; Primary prevention*

## Introduction

Ice-skating is a popular sport in temperate countries. However, with the introduction of artificial ice-skating rinks, it has also become a very popular sport in countries with warm climates. There are a number of publications related to ice-skating in the literature,<sup>1-5</sup> but reports of injuries that occur in warmer countries, especially in the Asia-Pacific region, are scarce.

Since the opening of the Pamela Youde Nethersole Eastern Hospital in October 1993, our department has observed a special pattern of injuries related to ice-skating. There are regular admissions to the department, especially at weekends and on public and school holidays. The injuries include fractures of the lower limb, upper limb, axial skeleton, and deep soft-tissue lacerations related to skate-blades. Many of these injuries require operative intervention. Public awareness as to the hazards, however, remains low.

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The goals of this study were to evaluate the pattern, mechanisms, and contributing factors to injuries sustained. Preventive measures are suggested. It is hoped that this can raise the awareness of the medical profession and the general public to the hazards of ice-skating.

## Material and methods

This is a prospective study of ice-skating injuries. From January 1994 to April 1996, 43 patients with 44 serious orthopaedic injuries were admitted to our department. All of the injured came from the ice-skating rink at Taikoo Shing.

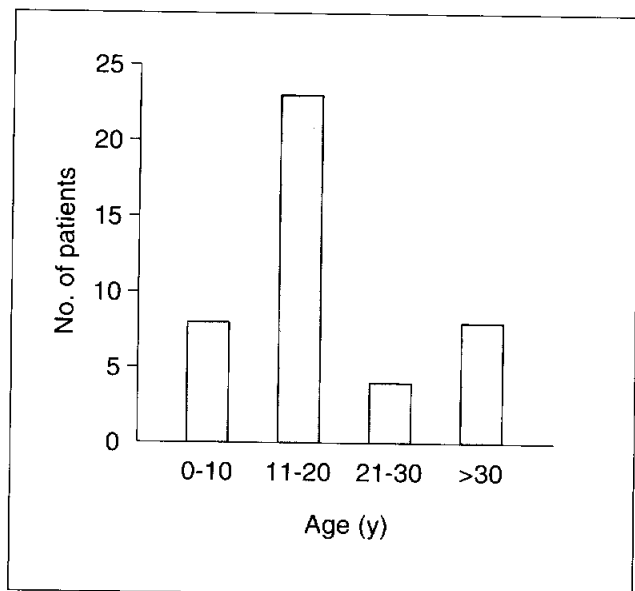
A questionnaire was designed that would evaluate at the time of admission the demographic data of each patient, the pattern of injury, the mechanism of injury (twist/slip/collision), velocity of injury (high or low speed), the time of injury (whether it occurred on a holiday or not), the fitness of the ice-skating boot used, and the experience and training of the injured person. The length of stay of the patient and the total number of operations required were also noted.

## Results

Forty-three patients were admitted to our department during the study period. There were 25 males and 18

females with a male to female ratio of 1.4:1. The youngest patient was four years old and the oldest was 58 years; the mean age was 15.5 years. Figure 1 shows the distribution of the patients by age.

**Fig 1. Age distribution of those injured while ice-skating in Hong Kong**



**Pattern of injury and treatment given**

There were a total of 44 serious orthopaedic injuries—37 were fractures and seven were deep soft-tissue injuries.

Of the 37 fractures, 31 (83.8%) were lower limb fractures. These included 20 fractures of the tibia (which were all spiral in nature) and 11 Pott’s fractures of the ankle. There were five upper limb injuries including four fractures of the distal radius, and one fractured triquetrum. There was one fracture involving the axial skeleton and this was due to a direct fall on the buttocks, which resulted in a sacral fracture. The distribution of fractures sustained are shown in Figure 2.

Of the seven soft tissue injuries, all but one involved the hand. These included two tendon injuries, two deep lacerations, one laceration of the nail bed, one finger tip amputation, and one cut sartorius tendon.

A total of 18 operations were performed, which included 11 open reduction and internal fixations (ORIFs), and seven soft tissue and tendon repairs. The types of treatment given are shown in Figure 3. Such injuries resulted in an average absence from school or

work of 32 days in those younger than 10 years old, 38 days in the age group 11 to 20 years, 17 days in the age group 21 to 30 years, and 20 days in those older than 30 years. The average loss was 32 days.

**Mechanism of injury and possible contributing factors**

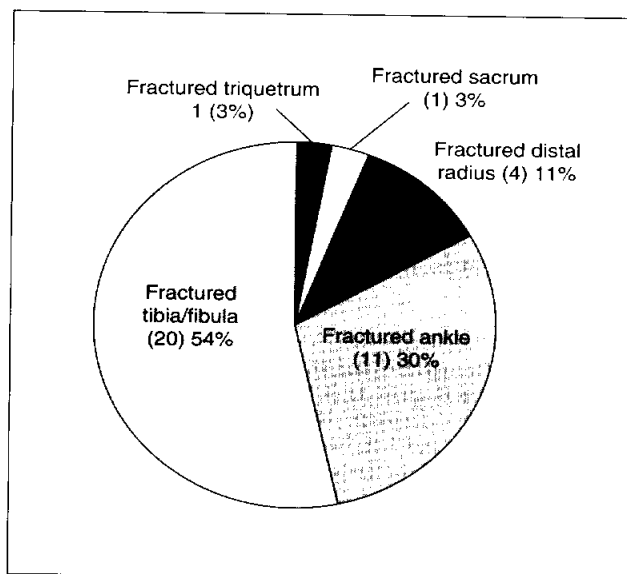
**Mechanism of injury**

The most common preceding event was a slip (15 patients) or a twist (16 patients) resulting in a fall. Six individuals were involved in a direct collision and six injuries were the result of a direct laceration by the skate blade after a minor fall (Fig 4). Four patients attributed their fall to the need to avoid other skaters, and five patients attributed their injuries to ill-fitting skates. As only one injury was sustained during low velocity skating, peer competition is unlikely to be a contributing factor.

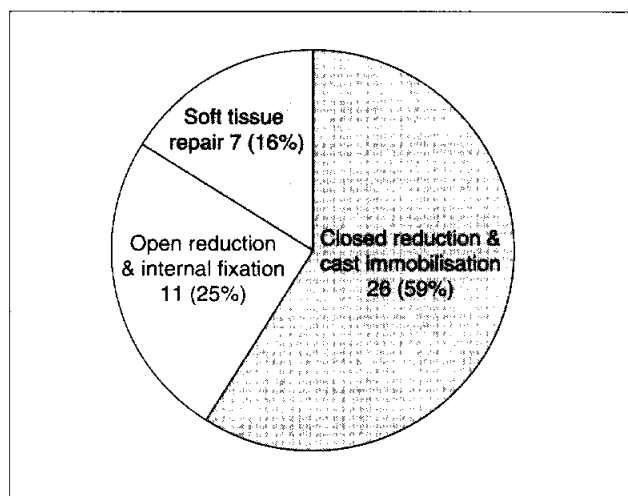
**Condition of skating-rink when injury occurred**

Thirty of the 43 injuries occurred on a public or school holiday; 13 were sustained on weekdays. The increased incidence of injury during holidays may be related to the increased number of participants in the sport during a holiday and, hence, a greater chance of injury. A contributory factor may include more crowded conditions at the rink. Injuries that were the result of direct collision (6), laceration by a skate (6), and those related to avoidance of other skaters (4) might have been able to be avoided in less crowded circumstances.

**Fig 2. Type and proportion of fracture sustained in ice-skating injuries**



**Fig 3. Types of treatment given for ice-skating injuries**



### Skater experience

Most of the injured had little ice-skating experience (Fig 5); only four had been skating more than three times. Most were injured the first time that they skated (28/43, 65%). All but three had had no proper instruction or training on how to skate, how to stop, and how to prevent injuries from occurring while skating.

### Discussion

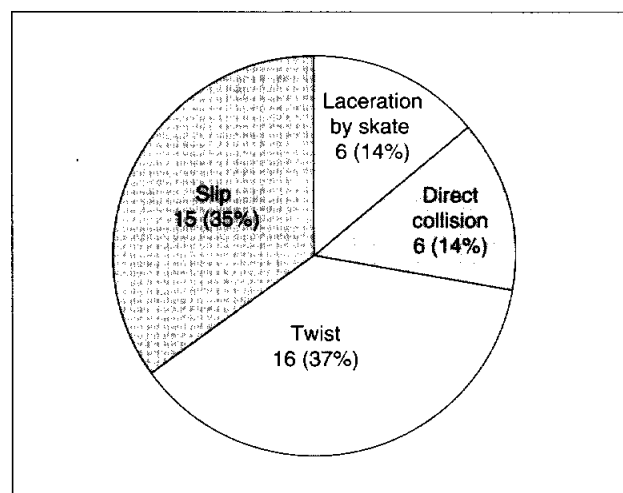
Compared with the incidence of ice-skating injuries in the literature,<sup>1-5</sup> the number of injuries sustained was not particularly high. Many of these injuries, however, were quite serious, needing operative intervention and may possibly result in sequelae such as joint stiffness, epiphyseal arrest, and deformity. They also pose a substantial workload for our department. Public awareness of the risks involved remains low.

Since ice-skating is a popular sport among teenagers, the peak age of injury between 11 to 20 years is understandable; 53% of patients belonged to this group. This is similar to the 58% reported in Oxford<sup>5</sup> but lower than the 75% reported in Birmingham.<sup>1</sup> A second peak occurred in the older age group, mainly in those aged between 30 to 50 years. This is mainly because many parents, who themselves lack formal ice-skating experience, bring their family and children to the ice-skating rink for recreation. One of the injured, the mother of two children, sustained a sacral fracture while trying to save her child from falling. This lack of experience and training not only poses a danger to their children, but also to themselves and to others.

The pattern of injuries, especially with reference to fractures, seems to differ from other series. We had a predominance of lower limb fractures involving the tibia/fibula and ankle (84%) while this incidence was lower in the Oxford series (27%) and the Birmingham series (25%).<sup>5,1</sup> Many patients sustained their injury during a twist and fall but instead of breaking their fall with their forearms and hands, they allowed the force of injury to fracture their ankle and tibia. The fact that most of the fractures were spiral in nature tends to support this. Hence, in order to decrease these severe lower limb injuries (38% of which required operative intervention), skaters must be instructed on how to stop properly, or failing that, how to effectively break a fall.

As regards the mechanism of injury, fall was the main mechanism (72%), which is similar to the Birmingham series (75%).<sup>1</sup> However, we had more casualties due to direct collision (14%) compared with the 5% of the Birmingham series. Those included in our study were more inexperienced, with 65% being first-time skaters, while 41% in the Birmingham series and 23% in the Oxford series were first-time skaters. Only 3% of our skaters had formal training, compared with 8% in the Oxford series.

**Fig 4. Event preceding the injury**

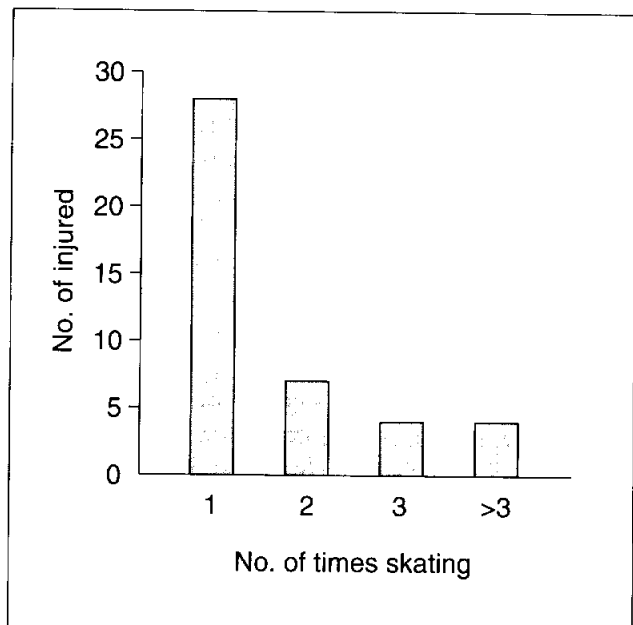


Preventive measures to improve safety should include: proper training or at least instruction to skaters especially on how to stop, how to break a fall, and how to protect themselves (especially the hands by keeping them withdrawn under the body) after a fall; proper skates and instruction on how to wear them must be provided to all skaters; increased public awareness of this potentially dangerous sport (the casual attitude of teenagers and parents should be discouraged); and

the wearing of thick gloves should be advised to decrease the chance of a laceration injury to the hand.<sup>3</sup>

Although the severity of ice-skating injuries seem to be less than those found in skateboard accidents,<sup>5,6</sup>

**Fig 5. Skating experience of those injured**



the number of serious injuries as reported here is considerable. Moreover, nearby ice-skating rinks do increase the workload of local or regional hospitals. For

those that require operation with open reduction and internal fixation, most need further surgery to remove the implants because of the relatively young age of those injured. Those treated by casting also require repeated follow up, radiological examinations, and physiotherapy to be fully rehabilitated. These treatments have significant financial implications for the hospitals involved. Such injuries result in an average absence from school or work of 32 days and have social implications for the entire family.

This paper reports the experience with orthopaedic ice-skating injuries in an Asian-Pacific city. Preventive measures are suggested. Increased public awareness of the potential for serious injuries should be encouraged. The physical impact to the injured and the financial implications of these injuries should not be under-estimated.

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