

Editor Requests:

1: The Abstract has been edited as advised.

2: The Comments Sections has been added as follows:

COMMENTS

(1) Background

Open fractures are uncommon in the UK sporting population, accounting for less than 2% of all sport-related fractures. However they have a high morbidity, which makes the patient group significant. Currently there is limited evidence in the literature describing the epidemiology of open fractures in sport.

(2) Research frontiers

Despite comprising less than 2% of all sport-related fractures, open fractures in sport represent a very significant injury for the athlete, often resulting from a high energy mechanism and being sustained in an environment with high risk of wound contamination. However, due to the limited incidence of this fracture type, minimal research has been previously performed regarding its epidemiology. Given the potential significant morbidity associated with such injuries, an accurate understanding of the range and variety of sport-related open fractures will allow clinicians and sports therapists to better plan treatment protocols, rehabilitation and injury prevention methods for these fractures.

(3) Innovations and breakthroughs

In our study, we analysed the epidemiology of open fractures in sport within our population over a 15-year period. Open sport-related fractures occurred at an annual incidence of 0.01/1000 population. The mean age at injury was 29.2 years; the gender ratio was 7.4:1(male:female). Soccer and rugby were the most common causative sports while fractures of the finger phalanx and of the tibial diaphysis were the most common sites. 14% of the fractures were Gustilo-Grade 3; 8% required plastic surgical intervention. This is the first study to provide a comprehensive description of the epidemiology of this injury type.

(4) Applications

A comprehensive understanding of the predicted patterns of injury and most common causative sports, with this fracture type, can allow sports teams and medical personnel to appropriately plan for such injuries, producing treatment protocols and instigating injury prevention measures. This allows both optimization of the management and outcome of these injuries, as well as potential reduction in their future incidence.

(5) Terminology

An open fractures is a fracture with an associated skin wound which allows the external environment to communicate with the fracture.

The Gustilo-Anderson Classification is a classification system which grades the severity of open fractures into three grades, based on the wound size, the underlying damage to the peri-osteal and neuro-vascular structures, and the ability to achieve direct wound closure^[5]. Please refer to the provided reference for the formal classification^[5].

A Split Skin Graft is a skin graft which comprises the epidermis and a portion of the dermis: the full thickness of the dermis is not excised in this graft type.

An Adipofascial Flap is a portion of adipose and fascial tissue that is based on a perforating artery. This is dissected and elevated from its native location, maintaining the perforator blood supply, and transferred locally to the damage area requiring soft tissue coverage.

A Fasciocutaneous Flap is a portion of skin, subcutaneous tissue and fascial tissue that is based on a perforating artery. This is dissected and elevated from its native location, maintaining the perforator blood supply, and transferred locally to the damage area requiring soft tissue coverage.

Reviewer 1

elegantly done study adds value to existing literature

The authors thanks the reviewer for their comment – no action required.

Reviewer 2

Dear authors, Congratulation for your study. It is very interesting finding. I would consider this study as a classical one.

It would be nice and more comprehensive if the authors could describe the management for particular type of injuries.

This has been added to the Results Section and Table 3 accordingly:

Primary Orthopaedic Management

Regarding the primary index procedures: twenty-two fractures were treated with wound management and cast / splint application; twenty-six fractures with wound management and open reduction internal fixation; eighteen fractures with wound management and intra-medullary nailing; eleven fractures with wound management and Kirschner-Wire Fixation; five fractures with wound management and External Fixator Application; and three fractures with wound management and Tension Band Wire Fixation (Table 3).

Reviewer 3

-it would be nice to see some statistical breakdown and discussion regarding these injuries occurring during practice vs. competition

This data has been added to the Results Section as follows:

Forty fractures occurred during competitive sport, nine during training for competitive sport and thirty-six during recreational sport.

-it would be nice to see some discussion regarding these injuries occurring in professional vs. recreational athletes

This data has been added to the Results Section as follows:

Two fractures were sustained by professional athletes and eighty-three fractures were sustained by recreational athletes.

This topic has then been discussed in the Discussion Section as follows:

Ninety-eight percent of these injuries were sustained by non-professional athletes.

Robertson et al also noted that between 96 to 98% of all sport-related fractures occur in non-professional athletes^[7, 8].

-Line 71. consider changing football to soccer for consistency, since the remainder of the paper refers to soccer

This has been performed.

-Line 153. were the open fractures classified according to the Gustillo classification pre-operatively or intra-operatively after surgical debridement?

The open fractures were classified according to the Gustillo classification intra-operatively after surgical debridement. This has been added to the Material and Methods Section as follows:

The Gustilo and Anderson classification^[5] was used to describe the extent of soft tissue injury associated with the fracture: for all the fractures, the grading of this classification was based on the intra-operative findings after surgical debridement.

-Line 248. correct feels to feel

This has been performed.

-Line 270. it would be nice for the authors to further elaborate why they think their data set had more lower extremity fractures during soccer, which directly contradicts Court Brown's work that showed more upper extremity fractures

This has been added to the Discussion Section as follows:

This contrast is likely explained by the higher energy 'mechanism of injury' required to sustain an open fracture compared to a closed fracture^[1]: within soccer, such higher energy 'mechanisms of injury' most often involve high-speed collisions between players; with soccer being predominantly a lower limb sport, this then increases the likelihood of soccer-related open fractures being sustained in the lower limb^[1, 3, 7].