MODERN FENCING

A Safe Fighting Sport

By Felicity Marsh, Peter Hughes, Clare Halsted & Mary Cohen-Lavarello

It is a common theme within sports that all athletes will strive to improve their performance whenever possible. Fencing is no different in this respect. Fencers will work hard to improve their fitness and fencing technique, and one way to measure this is progress within national rankings. A major component in maximising this improvement is through injury prevention. British Fencing is very active in creating a sporting environment which is as injury risk-free as possible.

Fencing was one of the nine original sports established in the first modern Olympics of 1896 and has been present at Olympic Games ever since. It is thus surprising that there is such limited data on injury risk within the various fencing disciplines with little research into common fencing injuries, how they occur and how they might be prevented. A large American competition study found that a significant injury, requiring time out of the sport, occurred in approximately 0.3 fencers per thousand bouts, showing that fencing is the safest combat-type sport and substantially safer than most contact sports like football or rugby.

The high quality fencing clothing required by the British Fencing Safety Committee does an impressive job protecting against blade related injuries. We should thank the European Committee for Standardisation for setting the high standards that fencing clothing manufacturers comply with (in Europe). To answer the lack of data on fencing injuries and triggered by a serious injury, Dr Raymond Crawfurd, British Fencing's first Medical Officer, started collating injury reports in 1984. From 1998 the process was gradually refined with the introduction of a specific report form to encourage fencers and coaches to report any significant injuries and organisers to complete forms for all athletes injured during competitions. An online form was set up in 2021 which now gathers most of the reports including the Near Miss category.

The BF Medical Committee realised that this was probably the largest fencing injury database in the world, spanning such a long period, and well worth analysing. Fortuitously, Manchester medical student and fencer, Felicity Marsh, was keen to be involved and has looked at all 845 reports (70% male, 30% female) for the period 2000-2023 (excluding the two pandemic years).

This has allowed BF to make calculations of relative risk across all three weapons. The data showed that sabre is associated with significantly more injuries than foil, with foil having significantly more injuries than epee.

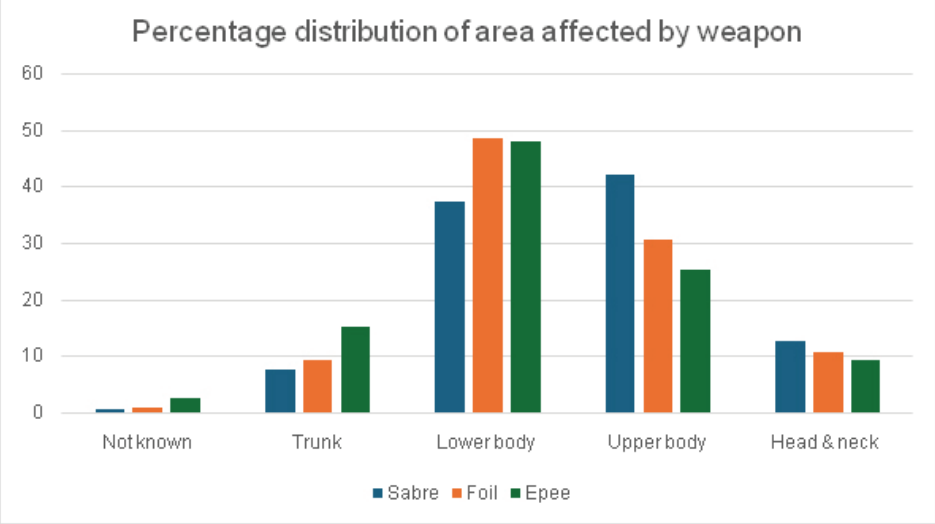
Injuries have been further graded by age, group, sex, circumstances, type and site of injury together with treatment. Most injury reports received are generated from competitions (83%) and it is relatively unusual for injuries from training to be reported. Is this the real situation or are they under-reported? Regular promotion of form completion may help to address this question.

As expected from the skew in fencing participation towards the U18s, this age group generated most reports followed by the 18-30s.

As you can see from Figure 2, the commonest regions for injury were the lower limb (45%) and upper limb (34%). There were however marked differences between the weapons, with upper limb injuries in sabre far more common than in either epee or foil.

It is important to note that just over half of all reported injuries were unrelated to fencing contact. These were linked to general movement, sudden change of direction or contact with inanimate objects. This illustrates the importance of the flooring and keeping the wider piste area free of hazards which has been a priority for BF at major tournaments over recent years.

It also serves as a reminder that the physical preparation of the athlete is a significant factor for risk of injury. It can be tempting to ramp up training in the school holidays, or on a training camp for instance, but if this represents more than a 15% increase in weekly training load, it is well recognised that injury is far more likely. To minimise the risk of injury, fencers should limit weekly training load increases to 10% or less. However, developing physical qualities steadily over time will protect against injuries. Fencing with a "niggle" or through pain is commonly seen in fencing, but can exacerbate the injury.



Analyses of fencing injuries in the UK / A review of the national injury reporting database

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1. Introduction

- Despite being one of only four sports that have maintained a position in the Olympics since the first games[1], there exist few epidemiological studies concerning injury patterns within the sport.
- British Fencing (BF) has a large database for injury reporting, and it introduced the first national-level injury surveillance system for fencing injuries worldwide.
- There has been no literature published on a comprehensive analysis of the BF injury reports over such an extensive time frame as this.
- To challenge the misconception that fencing is a dangerous sport, it is imperative that injury surveillance and subsequent prevention programmes exist.

2. Aims

- To provide descriptive epidemiological data on injuries and near miss incidents reported to BF during the periods 2000-2023.

3. Methods

- There was retrospective analyses of the reports, where relevant data were extracted from a variety of online and paper reports, and stratified according to multiple categories.
- The data were then organised in Microsoft Excel for statistical review.
- Near miss incidents, defined on the BF website as a 'close call that could have been worse' have also been included.
- Medical incidents or illnesses have been excluded.
- The years 2020-2021 have also been excluded due to disruptions caused by COVID-19.
- Ethical approval was granted by the CEO of BF.

5. Conclusions

- Fencing is a safe sport at all ages.
- Serious injuries are rare; <**5** hospital assessments were required per year on average.
- Sabre has the highest risk for injury, Epee the least.
- There is no significant difference in risk between genders.
- Failure in equipment/penetration of protective clothing is rare.
- Soft tissue sprain is the most common injury type- onsite staff must be competent to manage this.
- Results from this analysis strengthen the previously established understanding that fencing remains one of, if not the, safest combat sport[2].

4. Results

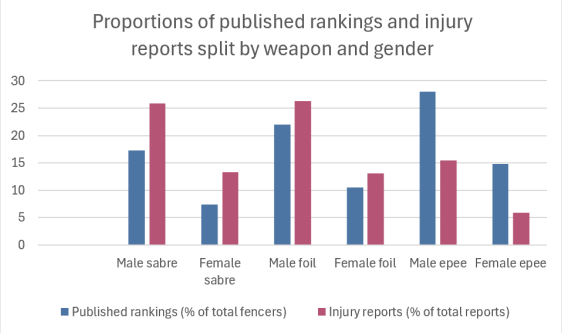

Figure 1. Comparison of injury rates in weapon and gender, using the BF national rankings as a proxy for athlete exposure.

- Using the data from Figure 1, a **χ2** test found Sabre to be the most injury prone weapon, Epee the least ($p<0.05$).
- Another **χ2** test found there to be no statistically significant difference between injury risk in each gender ($p<0.05$).

Totals

- **845** injury reports in total (not including all near miss incidents).
- **64.4%** Male, **30.5%** Female. (5% gender not known).
- **25.1%** Sabre, **25.4%** Foil, **14.1%** Epee. (35.3% weapon was not known/not applicable).

Injury type, location and environment

Figure 2

- **83.3%** of injuries occurred during a competitive setting.
- Only **33.5%** of injuries were specific to fencing.
- The most prevalent injury type was **strains/sprains** (1/3 of total), followed by **bruising** and **abrasions/open wounds.**
- On average, there were <**3** confirmed fractures/dislocations/ soft tissue ruptures per year.

- Only **1.7%** of injuries involved a broken blade.
- **5%** of injuries involved penetration of protective gear.

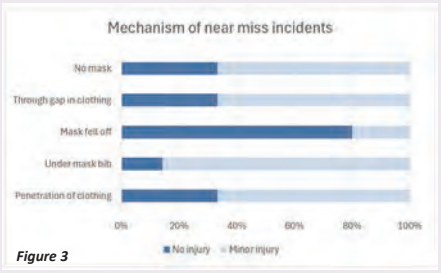

Figure 3

Near Miss incidents

- There were **33** near miss incidents, **12** of which caused no injury**, 21** involved a minor injury relative to the risk involved.

Treatment methods

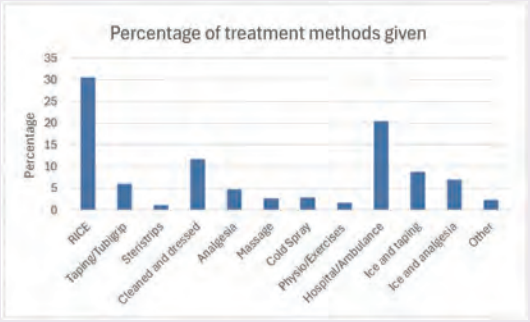

Figure 4 shows that the majority of treatment methods can be given onsite.

An example of a **near miss incident-** blade penetrated protective clothing, luckily no injury occurred to fencer.

References

1. Caine DJ, Harmer Peter, Schiff Melissa, IOC Medical Commission. Epidemiology of injury in Olympic sports. Wiley-Blackwell Pub; 2009.
2. Swatowska M, Akbaş A, Juras G. Injuries in high-performance fencers: a review. Arch Budo. 2020;16:261.

Approximately a third of all injuries reported were strains or sprains (33%). Open wounds including abrasions, cuts and penetrative injuries were next common (19%) and then bruises (17%). These three injury patterns cover over two-thirds of all injuries. This information is very useful to competition organisers planning first aid provision. Wound cleaning and dressing products, strapping and ice are all invaluable at all venues to deal with the primary treatment of these common injuries. It should be emphasised that most injuries are minor and from the reports only 12% of injuries resulted in hospital attendance at some point. In contrast, a large 2019 French study of judo injuries reported 35% hospital level injuries.

Approximately 40% of injuries were related to weapon contact either from the blade or from guard blows or clashes.

Clearly the most serious injury risk is associated with potential blade penetration. In fencing, a penetrative injury is defined as any injury where there is a failure of protective clothing such that the blade has gone through the material. This happened in 42 injuries, making up approximately 5% of reports. Where the specific weapon was recorded, approximately 60% were sabres, 25% foils and 20% epees. Note that in some cases the clothing will have prevented a worse injury.

Blade breakage obviously increases the risk. Fourteen injuries involved a broken blade, with two of these injuries to spectators not wearing protective clothing. The message here is keep well away from active fencers unless you are also well-protected. There is also potential for injury through gaps in the protective equipment (under the bib of the mask, through body wire holes etc). Injury risk through gaps showed a similar distribution with sabre more than foil more than epee. Taking all penetrative injuries as a whole, approximately a third of these required hospital treatment.

Near Miss - what is this? An event that could have caused significant injury but did not. Especially important are incidents involving the head, neck and chest areas, where there is more potential for life changing injury. For the 21 year study period, 33 near miss events have been identified, 12 of which caused no injury, with a further 21 causing minor injury. Of these near-misses, 9 were penetrative in nature, 7 caused by blades going under the protective bib, 5 from the mask falling off, 6 through gaps in equipment and 6 to individuals who were not wearing masks either as spectators, coaches, referees or fencers in between fights. See Figure 3.

The Safety Committee reviews injury data at least annually with the aim of improving safety via the BF Safety Guidelines or by recommending rule changes. For example around 2014, it became apparent that there had been a noticeable increase in penetrative hand injuries associated with unbroken sabre blades. Similar observations had been made internationally, which eventually prompted the FIE to mandate a new 800N standard for sabre gloves and BF to adopt it. Injury reporting identified 16 penetrative sabre glove injuries in the UK in the 10 years prior to this change, and only 4 such injuries since: supporting the decision to strengthen the gloves.

An example of the value of near miss reporting was the series of instances of masks falling off during fights, reported in the UK and abroad. Leon Paul played an important role here. Once convinced of the problem, the FIE ruled that all masks should have two point fixation to reduce the risk of injury associated with displacement.

Current British Fencing safety guidance advises that in individual lessons, pupils must always wear a mask and gloves but not necessarily full protective clothing, provided a risk assessment has been carried out. The instructor must always wear the full protective clothing of a coach. During 21 years of reports, there were only two injury reports from a one-to-one lesson situation, supporting this guidance.

Our reporting process continues to provide invaluable data on injury epidemiology in fencing. The more data we have on injury trends the better we can respond with new initiatives to protect our fencers. The Medical Committee thus urges all those involved in the sport to report injuries, whether in competition or training, to continue to build this world-leading database and thanks to all of you who have diligently sent in reports over the years.

Link to Injury Reporting Form