10 Case Studies of Puncture Risk in HEMA

Content Warning

This report contains several examples of injury including pictures of the injuries and equipment damage in question. Some of these injuries are severe and can be hard reading.

1 Introduction

This document is the primary source of evidence for our upcoming report on Puncture Injury Risks, as part of the Safety Tips product. Injuries and equipment damage from sword penetrations are thankfully relatively rare. The Wessex League – where we have the most detailed injury data because of Jamie MacIver's involvement in running these tournaments has with no instances of this type of injury since starting in 2017 (23 events, >100 individual tournaments).

But while rare enough that any given event may not see them, they are common enough that most practitioners will know someone who has been affected by them. To plug the gap in data, we chose to seek case studies describing specific instances where equipment and/or fencers had been punctured by a thrust. The purpose of this work is to help practitioners, organisers and manufacturers understand the risks involved and decide how to manage them in their own practice, by illustrating possible ways in which puncture may occur.

The limitation of case studies it is not possible to precisely quantify risks, particularly when it comes to the risks of specific equipment as there is no knowledge of the base-level of use (e.g. does the same set of gloves repeatedly come up because it is deficient, or simply because it is highly common). Nevertheless, we feel these case studies provide a useful tool for understanding the inherent risks within our sport and deciding how to mitigate them.

This document simply described the events as told to us by the injured party. For a discussion of common themes and conclusions, see this article on the Historical Fencing Research website.

2 Contributors, Privacy & Consent

Historical Fencing Researched asked for contributions to this report via our subscribers list and Jamie MacIver's personal and instructor Facebook pages. Details were shared and several people were contacted by either Jamie himself or those who had seen the request for contributions. The nature of how these were acquired means that contributions are not from a random sample: despite this, we have contributions from the 5 countries, including USA, 3 European countries and Australia.

All contributors were provided with an explanation of the purpose of publication and approach to anonymisation. They have provided explicit consent for the information below to be made public. All case studies have been made anonymous and do not directly identify the individuals in question. Due to the size and relatively connected nature of the HEMA community, it is likely that many readers may know some of the examples and the individuals involved. We ask that readers preserve their privacy and do not make public comments on the identities of any of the contributors or other individuals identified in the case studies, except in response or in discussions with that individual where they have already identified themselves as being included.

Throughout the document individuals are referred to as "fencer" and "opponent". In all cases the fencer refers to the injured party or owner of the damaged equipment, and it is the fencer who has provided details and consent for the case study.

3 Case Studies

The case studies below are approximately in order of severity. Studies 4-7 have been grouped together due to their similarities to each other in location and severity.

3.1 Partial Penetration of fencing jacket and heavy bruising with an untipped longsword

Context: Internal club sparring
Year: 2021
Weapon: Black Fencer Blunt Longsword
Tip: Flared in one direction

Protective Equipment: SPES 350N Officer Jacket

Fencing Actions & Description:
The opponent's sword usually had a rubber safety tip attached, but it had fallen off earlier in sparring – this was a relatively frequent occurrence with the sword in question but unnoticed by both fencers. The opponent made a committed thrust from a low guard which struck the fencer in the right forearm. The sword penetrated the outer layers of the jacket, although did not fully penetrate the jacket. The residual force from the thrust was sufficient to cause minor injury.

Injury or Damage & Recovery
The outer layer of the jacket was punctured, although the sword did not penetrate the inner layer. The thrust caused an abrasion on the arm with light bleeding and pain. There was no lasting injury for the fencer. Jacket has been semi-retired and is used for light drilling only.

3.2 Puncture of fencing mask bib seam by a spatulated tip longsword

Context: Friendly Sparring
Year: 2025
Weapon: Sigi Standard, no tip.
Tip: Spatulated, untipped

Precise measurements of the sword are unavailable, but Sigi points are typically around 20mm x 4mm or 80mm^2 and flex at around 12kg (pushing from crossguard). Image from the Sigi Forge website.

Protective Equipment: Leon Paul Titan X-Change Mask (level 2)

Fencing Actions & Description:
The fencer positioned for a thrust against their opponent but did not actually make it. In response their opponent thrust to the neck. The fencer reports that the sword did not appear to bend but otherwise the thrust was not especially out of the ordinary.

Injury or Damage & Recovery
X-Change masks have a detachable bib: the sword broke the seam that connects the mask to the X-Change attachment system. Puncture resistant cloth components were themselves not damaged or punctured. The sword bruised the fencer's neck but they were otherwise unharmed. The mask has been retired.

3.3 Shallow puncture to the leg from an untipped rapier

Title: Thrust to the leg with untipped rapier
Context: High-Intensity sparring with clubmate as tournament preparatin
Year: 2025
Weapon: Castille Rapier Blade
Tip: Rounded tip (not flared).

Dimensions unknown, but the image from Castille's website of the same sword is to the right.

The blade was usually used with rubber tip, but this fell off earlier and was un-noticed by the fencers.

Castille Rapier "normal" tip (current)

Protective Equipment:
Plastic "One Standard" knee protection from Armstreet with field hockey shin guards and long socks. Image from Armstreet's website

Fencing Actions & Description:
Fencer and opponent both lunged simultaneously. The opponent's sword made a direct thrust to the leg which struck in a small gap (<2cm) between the knee and shin guard, landing just below the knee to the anterior of the shin bone.

Injury or Damage & Recovery
Puncture injury to the upper shin <1cm in depth. As well as the puncture injury the shock of the impact was transferred through the entire lower leg, leaving the fencer limping for about a week. No professional medical intervention required. The fencer cleaned the wound with alcohol wipes, and kept it wrapped and bandaged underneath their sock then cleaned and dressed again after returning home. The wound fully healed in just under 2 months leaving a scar. The fencer reports that the injury was extremely painful.

3.4 Punctured web of the dominant hand with a rolled tip spadone

Context: Friendly internal club sparring
Year: 2023
Weapon: Regenyei Achille Spadone, 1.85kg mass, 12.5kg flex
Tip: Rolled, untipped. 11mm x 10mm or 110mm^2


Protective Equipment:
Sparring Glove mittens with thin work undergloves from Bauhaus, slightly worn, 1 year old. Only the underglove was struck.

Fencing Actions & Description:
The fencer made a half-extension with their sword towards their opponent. In response, their opponent made a thrust with supinated (nails up) hand which landed on the fencer's hand just above the crossguard. The thrust penetrated both the underglove and hand.

Injury or Damage & Recovery
Shallow and broad puncture injury to the webbing of the hand, between index finger and thumb. Injury immediately started bleeding and required 3 stitches but caused no permanent lasting issues.

3.5 Puncture to the palm at the base of thumb with a Sidesword

Context: Internal Club Sparring
Weapon: Sidesword, type unknown
Tip: Rounded, dimensions unknown
No safety tip was added despite recommendation to tip the sword from from an instructor.

Protective Equipment: Red Dragon Gloves (Image from The HEMA Shop)

Fencing Actions & Description:
Fencer and opponent's blade met in a crossing, and then the opponent immediately performed a thrust to the hand. Fencer attempted to parry with their dagger and the opponent's sword struck them in the palm of the dagger hand beneath the thumb. The sword punctured the hand through the gloves.

Injury or Damage & Recovery
Leather on the palms of the gloves punctured, and then the sword punctured the hand underneath, stopping when it struck the hand bone. Clean puncture, which was bandaged but no hospital treatment sought. Returned to fencing after a few weeks.

3.6 Puncture to the hand through puncture resistant work gloves with a longsword

Context: Moderate intensity internal sparring night
Weapon: Longsword, Ensifer Long (older model)
Tip: Rolled Tip, 11mm x 8mm (88mm^2)

Protective Equipment:
Sparring Gloves (not struck directly) with puncture-resistant "work gloves" as undergloves - gloves failed from a burst seam rather than direct material failure

The gloves are rated as rated as EN388-2X43DP - this is a standard made up of several components with different thresholds. The 4th digit in later part represents puncture resistance, with these gloves measuring as level 3 out of maximum of 4. However it's important to note that only the palm area is tested in the EN388 tests, and there is no test for burst seams in this standard.

In short, the failure point here is not tested for or described in the standard.

Fencing Actions & Description:
The opponent performed thrust to the lower line/hands, which the fencer attempted to counter with their own counter thrust. The point of their opponent's sword went into the top of the hand between index finger and thumb. This point was a gap in the protection on the outer gloves (sparring gloves mittens) and landed on the puncture resistant under gloves bursting the seams, puncturing the hand.

Injury or Damage & Recovery
Hand was punctured to a depth of approximately 2cm. There was significant bleeding but no internal damage. The injury required stitches and fencer had around 2 weeks recovery time before returning to fencing.

3.7 Thrust to the hand with a messer through light leather gloves

Context: Interclub Freeplay Day
Weapon: Regenyei Messer, older type
Tip: Unknown
Protective Equipment: Standard HEMA light padded leather glove (right)

Fencing Actions & Description:
The fencer parried and then attempted to wind their messer point into their opponent's face. During the winding action their opponent chose to strike towards the hand with a cut and then followed up the cut with a thrust. The strike first hit the thumb, and the as the fencer withdrew their hand in pain the thrust connected with it, split the seam of the glove and punctured the hand between the base of the thumb and base of the index finger down to a depth of 3-4cm.

Note: The fencer understood it to be low-intensity controlled with hands off target with a view to exploring the full range of grip options affording on swords whilst using lighter gloves. The fencer later learned that the opponent's club had been instructed to deliberately target the hands by their instructor. There were a number of other safety incidents with the same head instructor on the same day suggesting force and deliberately breaking agreed conventions was a major factor.

Injury or Damage & Recovery

The cut fractured the metacarpal of the thumb, and the thrust that followed split the seam of the glove and punctured the hand between the base of the thumb and base of the index finger down to a depth of 3-4cm. The injury required an x-ray and stitching, fortunately the fracture was minor but the nature of the stab injury meant that it was difficult to properly suture so the recovery time was longer than anticipated (6 weeks). The scar tissue is still visible today, it runs very deeply into the hand and can be felt when the hand is clenched tightly.

3.8 Penetration of jacket and shallow puncture to lower torso from broken longsword blade

Title: Shallow penetration to the toros from broken longsword blade
Context: Tournament, elimination stage
Year: 2015
Protective Equipment: SPES FG 350N
Weapon: Pavel Moc Feder Type C

Tip: Original point was spatulated and taped, but broke. Sword break was relatively straight but still sharp (see image)

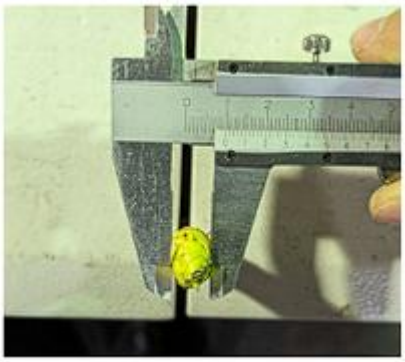
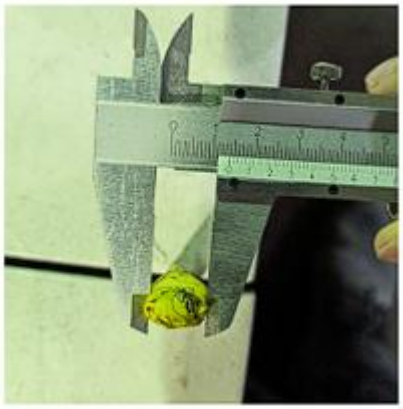
Fencing Actions & Description:
Opponent's sword broke during a thrusting action with a *fleche*. The sword broke mid thrust and they were unable to arrest their movement. The broken sword continued and struck the fencer in the torso, penetrating their jacket near a seam and then the fencer's lower torso.

Injury or Damage & Recovery
Fencer's jacket was completely penetrated through all layers. The outer layer was struck near a seam but appears to have been a penetration of cloth rather than a failure of the seam. The inner part of the jacket was penetrated fully through cloth.

Fencer had a shallow penetration injury to the belly, approximately 3cm across and 1-2cm deep. The injury required immediate medical attention and stitches, with 2 weeks recovery time.

3.9 A rapier penetrating the glove and impaling through the armpit

Context: Internal Club Tournament
Weapon: Rapier, Castille Clamshell with rounded point. Flex 5.6kg (static flex scale method, pushed from pommel)
Tip: Tipped with leather and tape. Tip measured approximately 11mm x 8mm oval shape (69mm^2 area). Untipped the rapier measures 7.8mm x 3mm (17.2mm^2)

Protective Equipment:
Leather glove common in HEMA, no puncture rating. The fencer was wearing an AP light jacket, but the jacket protection was not involved in the injury.

Fencing Actions & Description:
Both fencers lunged simultaneously. The injured fencer (left-handed) extended their arm for a thrust, landing a hit on their opponent's torso. At the same time their opponent (right-handed) delivered a thrust which landed on the fencer's extended hand. The sword point pierced the glove, then travelled up the fencer's arm through the opening in their sleave and struck the fencer in the armpit inside the jacket. Due to the restrictions caused by the fencer's sleave and arm the blade could not flex and punctured the fencer through the armpit.

Injury, Damage & Recovery

Due to both forward momentum and the blade being confined within the jacket, the tip entered the armpit area. Estimated penetration depth: ~70mm, with minimal external bleeding. The wound was only confirmed once the shirt underneath was cut open. The glove and jacket were both damaged in the process and later removed for paramedic access

1a - Puncture Distance (7)

Fencer immediately informed their opponent that the sword had penetrated. The fencer gripped the sword while their opponent released it carefully. First responder assessed on-site to assess the injury and called an ambulance. Paramedics assessed as stabled and removed the jacket. Shortly later the fire department arrived and used an angle grinder to grind off the end of the blade to aid in transportation. Pain relief was administered via IV. The embedded portion of the blade was removed at the hospital and further medical attention to assess the wound was done, but did not require surgery or hospital admission beyond that initial treatment. Recovery from physical injury took approximately a month, but the fencer reported that psychologically speaking for several months afterwards they were not fully comfortable during sparring or other activities. They have now made a full recovery and have returned fully to fencing with no lasting impact.

3.10 Complete penetration of hand and glove with an untipped longsword

Context: Open-Hall Interclub Sparring, at the end of a 2-hour session
Year: 2023
Weapon: Borrowed Regenyei Feder, flex unknown
Tip: Rolled point, untipped. Significant rust buildup on the blade

Precise measurements not available Regenyei Feder standard blades typically are around 11mm x 11mm (Based on Wessex Sword measurements), or ~120mm

Note: the event required swords to be tipped. Neither fencer was apparently aware of the untipped state of their sword. Additionally, the sword had been borrowed from another fencer. It is no known how familiar they were with the sword.

Protective Equipment: Sparring Glove mittens (12 months old), no underglove. The glove was struck on the synthetic material between thumb plates.

Fencing Actions & Description:
The incident occurred at an open hall sparring session, after about 2 hours of fencing. The event involved multiple clubs and standard safety regulations were in place, including the use of full protective gear and mandatory safety tips on swords.

Fencers were paired informally. The fencer had over 10 years of longsword experience but describes their mental state at the time as fatigued and distracted by external factors (upcoming travel). Their opponent was less experienced (estimated <2 years) and in the fencer's opinion appeared frustrated after repeated failed attacks and perceived lack of engagement by the fencer.

The incident occurred during a mutually agreed final set of three exchanges. The fencer stood in a high guard. Their opponent launched a rising thrust from a low guard (Boar's Tooth) targeting the fencers lead hand. In response, the fencer wound to a high guard (Ox) to attempt to avoid the thrust but was struck part way through the motion. The uncovered rusted tip of the opponent's sword penetrated the sparring glove through the synthetic fabric between thumb plates which tore, and then further penetrated the webbing between thumb and forefinger, passing through the palm and exiting near the base of the wrist. Approximately 40cm of the blade protruded from the exit wound.

The Fencer did not initially realise the severity of the injury. Upon rotating his hand into supination, the extent of penetration became visible. By this point, their opponent had partially withdrawn the blade, leaving approximately 5cm exposed.

Injury or Damage & Recovery

The sword was carefully withdrawn to prevent further internal damage. After withdrawal the blade was visibly contaminated with viscera (nerve and muscle tissue), although there was no significant external bleeding. The wound was packed on site, and Fencer A drove directly to the hospital.

Upon arrival emergency doctors performed basic wound management. No deep cleaning was done at the time. Overall the injury included multiple components:

- Severing of motor nerves controlling thumb movement
- Sensory nerves to thumb and index finger severed and torn 3-4 cm proximally
- Complete tearing of thumb muscle
- Snapped ligaments at base of palm

These required surgical intervention, which was scheduled for the day following the incident. This surgery attempted an internal repair; this partially failed due to severe infection likely caused by rust and bacterial contamination from poorly stored equipment.

A later second surgery was performed that included reattachment of torn muscle at the base of the thumb, ligament repair and a nerve graft to restore lost sensation.

Post surgery and recovery time the fencer has made a partial recovery. After 3-6 months they had recovered basic mobility, but have experienced permanent limitations from the injury:

- Only partial recovery of movement and strength in the hand (~85% recovery)
- Unsuccessful nerve graft leading to permanent loss of sensation to thumb and index finger

3.10.1 Fencer's Analysis & Lessons Learnt

The contributor to this case study provided extensive analysis and reflection on the incident. What follows is from the fencer themselves.

3.10.2 Causal Analysis: Human Factors

Fencer
Slip: Did not inspect opponent's weapon for compliance
Contributing factors: Fatigue, distraction due to travel

Opponent
Slip: Failed to notice the lack of tip
Error: Executed a committed, forceful thrust to a vulnerable target area despite rising frustration
Contributing factors: Fatigue, emotional arousal

Sword Owner (Opponent's partner)
Lapse: Failed to ensure the sword was properly tipped and clean

Medical Treatment
Error: wound should have been immediately cleaned and antibiotics used. This may have increased the outcome for the nerve graft.

3.10.3 Causal Analysis: Equipment Factors

Primary: Lack of safety tip allowed sharp, concentrated force to penetrate the glove and hand
Secondary: Severe rust contamination led to infection and compromised surgical outcome. This was worsened by not cleaning the wound by emergency medical staff.
Minor: Absence of underglove may have slightly worsened outcome but unlikely to have prevented penetration

3.10.4 Policy and Behavioural Changes

Following the incident:

- Checklist protocol was emphasized in club sparring procedures, including explicit tip inspections, and ensuring sword flex. Cleaner swords.
- Fencer A now wears underglove consistently
- Fencer A will not spar with fatigued or emotionally compromised fencers outside of competitive contexts

3.10.5 Lessons Learned

1. Visual and physical weapon checks must not be neglected, even in relaxed settings or between experienced fencers.
2. Open hall environments require clearly enforced shared safety standards and culture across clubs.
3. Emotional regulation and fatigue monitoring are critical in managing sparring intensity and risk.
4. Borrowed gear must be held to the same inspection and maintenance standards as personal equipment.
5. Rust and poor storage significantly increase the risk of infection in deep tissue injuries.

3.10.6 Conclusion

This incident underscores the importance of maintaining a robust safety culture, even among experienced practitioners. Human error, fatigue, and lax procedural adherence - particularly in informal settings - can combine to produce severe and lasting injury. Ongoing education, gear inspection routines, and the adoption of a cautious mindset when fencing under compromised conditions are essential safeguards for all practitioners.