

# PREVENTING AND TREATING HYDRAULIC INJECTION INJURIES

**HYDRAULIC INJECTION INJURIES POSE A SIGNIFICANT RISK TO ANYONE WORKING NEAR HIGH PRESSURE FLUIDS. INJURIES CAN OCCUR WHEN PRESSURISED FLUID PUNCTURES THE SKIN AND SPREADS BENEATH IT. INITIALLY, THE INJURY MAY SEEM MINOR, OFTEN COMPARED TO A BEE STING. HOWEVER, THIS CAN MASK THE SEVERITY OF THE INJURY, WHICH REQUIRES URGENT MEDICAL TREATMENT.**

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## UNDERSTANDING HYDRAULIC INJECTION INJURIES

Although the risk of injury increases as the pressure of the fluid becomes higher, it is possible that pressures as low as 7 bar (approximately 100 psi) can puncture human skin.

Other factors that increase the risk of hydraulic injection through skin include:

- **Physical proximity:** The closer an individual is to the high-pressure fluid release, the greater the risk.
- **Jet aperture size:** Smaller apertures, like pressure nozzles or pinhole leaks, result in higher velocity fluid jets.

Common fluids involved in these injuries include:

- Hydraulic oil
- Fuel oil
- Water
- Grease
- Paint

These substances are used daily onboard ships and all have the potential to cause hydraulic injection injuries. These injuries not only cause direct tissue damage but can also lead to secondary infections. Depending on the type of fluid involved, they may also be toxic.

Typical shipboard medical equipment and training are insufficient for handling hydraulic injection injuries. It is estimated that permanent damage can occur within 6 hours of sustaining such an injury. The prognosis worsens as treatment is delayed, often leaving amputation of the affected areas as the only remaining solution.

## PREVENTION STRATEGIES

The most common cause of exposure to pressurised fluid is equipment failure, such as burst hoses and failed couplings.

To minimise the risk of hydraulic injection injuries, consider the following preventative measures:

- **Fit protective covers/devices where possible.** These are usually in place as per design, but are occasionally removed and not replaced
- **Regularly maintain the pressurised systems based on situational needs**
- **Label hydraulic hoses, maintain a register and establish replacement criteria, particularly for hoses exposed to the external environment**
- **Store hydraulic equipment, hoses and fittings appropriately between uses- for example, many come with storage cases.**

The other common cause is human error. For example, pointing a pressurised lance at a person/self or using hands to feel for leaks.

To minimise human error, consider the following measures:

- **Raise awareness of this injury type and provide reminders on safe practices when operating portable equipment**
- **Always wear the correct personal protective equipment (PPE).** It is important to note that high pressure fluid can penetrate many materials, so PPE should not be used to justify dangerous practices
- **Never touch pressurised hydraulic hoses directly. Instead, use cardboard or similar materials held at a distance to detect leaks**
- **Ensure systems are depressurised and isolated before conducting any maintenance.**



## INJURIES

Major surgery was required to track and remove the injected hydraulic oil from the person's hand

## EMERGENCY RESPONSE

If a hydraulic injection injury is suspected, seek immediate medical attention. Ideally the injured person should be sent to hospital ashore as soon as possible. When sending a person for medical treatment, provide as much detail about the injury as possible, including the time of injury, pressure exposure, and a safety data sheet of the injected fluid.

Practical medical treatment onboard is limited and is primarily first aid based. This includes controlling any bleeding, applying an ice pack to reduce swelling and pain at the wound site, and keeping the injured person calm. Avoid removing any fluid from the wound, as this could worsen the situation. Do not give the injured person any food or drink, as they may require general anaesthetic for urgent surgical procedures.

While hydraulic injection injuries are rare, their potential severity demands maximum caution when working near high-pressure fluids. Adhering to preventive measures and knowing how to respond can significantly reduce risks and improve outcomes.



**FOR MORE INFORMATION, PLEASE CONTACT**  
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