Abstract:
45 year old painter was brought with swelling of the palm following a workplace accident. Kanavel’s sign was positive and no external wound was present. X rays showed radio opaque shadows along the fibrous flexor sheath. The palm was explored, and showed paint tracking throughout the length of the flexor sheath. The affected sheath was excised and wound closed primarily. Post op recovery was uneventful and the patient regained full movement of all fingers in a 3 month follow up.

Keyword: Paint gun, tenosynovitis, compressed air

HIGH PRESSURE PAINT INJECTION INJURY TO THE PALM - A RARE CASE HISTORY
A 45 year old painter presented to our department following a workplace accident, details of which he considered trivial. He had been working with a can of paint, following which he sustained this injury. He was a known diabetic and hypertensive, and on oral hypoglycemics for diabetes. He was also on treatment for hypertension. He was a social drinker, and not a smoker. He had sustained an injury to his left hand palm one day earlier at his workplace.

CLINICAL EXAMINATION AND FINDINGS:
Preoperative photo - volar view showing erythema and flexed IP joints

The patient was a right handed male. On examination of the left palm, no external wound was visible. The entire palm was reddened and indurated. All the four fingers, excepting the thumb were held in an attitude of flexion at the interphalangeal joints. Sensation was blunted over the dorsal and volar aspects of all the fingers. Kanavel's sign was positive - with inability to flex fingers actively and with excruciating pain on passive extension. Severe pain was present over the palm, over the flexor tendons of all the fingers. Fusiform swelling was noted along the flexors, predominantly of the mid and index fingers. As the precise details of the workplace accident were still not known, as part of our routine protocol, viability of all fingers were assessed. Fingers were found viable.

PROVISIONAL DIAGNOSIS
Since the patient was a known diabetic, and with a history of what he deemed trivial trauma, a provisional diagnosis of flexor tendon tenosynovitis was made. Since the patient had clinical evidence of compartment syndrome in the interosseous compartment, a decision to explore the palm was taken.

INVESTIGATIONS
Blood sugar was marginally raised. Total counts were raised, with polymorphs dominating the picture. All other blood investigations were within normal limits.

X RAY Pre op X ray. Arrows point to paint streaks seen along the flexor sheaths.

Preoperative photo showing edema of the dorsum and wrist in flexion

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AP and oblique views were taken of the affected hand. X rays showed some unexpected findings. X rays revealed radio opaque streaks extending on the volar aspects of the interphalangeal and metacarpophalangeal joints of the index and middle fingers, streaking along the second and third inter metacarpal spaces.

**REVISION OF DIAGNOSIS:**
the X ray forced a change in diagnosis. On close inquiry, the patient revealed that he had been working with a paint gun, which sprays out compressed paint at a high velocity and pressure. The nozzle of this gun had come into brief contact with the palm. This important history which had been omitted by the patient forced a change in operative plan.

**EXPLORATION AND INTRA OPERATIVE FINDINGS**
Exploratory findings. Red arrow in the photo indicates the neurovascular bundle, and the blue arrow - flexor sheaths encased in white coloured paint.

The palm was explored by zig zags to Brunner's incisions. The digital neurovascular bundles and fibrous flexor sheaths of all the fingers, especially the index, middle and ring were encased in white coloured paint. All the paint was removed from the neurovascular bundles by careful dissection under loupe magnification and the affected fibrous flexor sheaths were excised. A thorough wound wash was given. It was not however possible to remove all the paint. The flecks of paint close to digital vessels were not excised. An irrigation catheter was left in situ and skin wounds closed. The hand was immobilized in a dorsal below elbow slab and an axillary cannula was inserted, to alleviate post operative pain and to relieve spasm of digital vessels post dissection.

*Per operative photo after excision of affected flexor sheath, showing reduction in edema and erythema.*

**POST OPERATIVE COURSE**
Post operative photograph
Immediately post op, the patient's pain and edema reduced dramatically. The flexor sheaths were irrigated thrice daily with sterile saline until the effluent was clear. Post operative course was uneventful, and mobilization started from the 10th post operative day, within the POP slab. Strict glycemic control was maintained, and all the skin wounds healed, and patient regained good finger flexion.

**LATE POST OP PERIOD:**
This patient was reviewed after a period of 5 months from the original injury. He regained full flexion of all fingers and normal sensation in all fingers except the ulnar side of the ring finger. He has since then resumed his routine work and is happy with the result of surgery.

**DISCUSSION AND CONCLUSION:**
High pressure injection injuries are a relatively rare entity, with around 100 cases having been reported in literature. Commonly seen with fuel and paint, these can be extremely damaging to the fingers, and have disastrous complications if left untreated. Complications range from flexor tenosynovitis to damage to the digital nerves, and gangrene of the fingers. The mechanism of injury is predominantly due to chemical irritation and inflammation. These can also cause vasospasm of the digital vessels and venous outflow obstruction. In such cases, a careful and detailed history is of vital importance. These are surgical emergencies. Aggressive early exploration is indicated when the injected substance is highly viscous and corrosive, such as paint or fuel. Injected water does not cause as much tissue damage, and a role for conservative management is present. The tenets of management in such cases are early identification, aggressive early intervention, good post op care and irrigation of the sheath, and early mobilization to achieve optimal results.

**REFERENCES:**

**Commercial paint guns spray paint at pressures up to 5000 pounds per square inch**


2. [Medline].


