Grease-Gun Injuries of the Hand

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Injuries caused by grease or oil injected into the fingers and hand are uncommon. Since the first description in 1937, eighteen case reports appeared in the English literature; four injuries were caused by injection of oil and fourteen injuries were caused by injection of lubricating film. Photographs of a few other injuries, together with brief descriptions of them, have been included in textbooks of hand surgery. It is undoubtedly correct in his belief that such injuries occur more often than they are reported. We have treated five patients with grease-gun injuries of the hand during the past six years. The purpose of this paper is to report our experience with these injuries, to emphasize their seriousness, and to stress that medical-surgical treatment is the best method of treatment.

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Case 1 (Figs. 1-A through 1-F): An aircraft mechanic, thirty-three years old, was first two days after grease, under pressure of 3,000 pounds per square inch, had entered the volar surface of the right long finger at the proximal flexion crease. The entire long finger and the distal part of the palm were swollen. The dorsal skin over the proximal segment of the finger was blistered and the index, long, and ring fingers were numb.

![Image of a hand with labeled areas](image1.png)

**Fig. 1-A**

Case 1. The dorsal skin was blistered and swollen forty-eight hours after grease had entered the volar surface of the long finger.

![Image of a hand with labeled areas](image2.png)

**Fig. 1-B**

Fig. 1-B: The dorsum of the finger was filled with grease, the mechanical removal of which was facilitated by use of a curette. Note the ischemic necrosis on the dorsum.

![Image of a hand with labeled areas](image3.png)

**Fig. 1-C**

Fig. 1-C: The volar soft tissues were infiltrated with grease, but the tendon sheath was intact. A probe is beneath the digital nerve.

The long finger was opened through a mid-lateral incision. The dorsal and volar soft tissues of the finger were distended with thick grease, but the tendon sheath was intact. The palm, which was opened through a separate incision, was also filled with grease. As much grease as possible was removed from both the finger and the palm with a curette and by sharp excision. The wounds were loosely closed and healing was uncomplicated.

Eleven months after injury extension of the finger was normal and voluntary flexion brought the finger tip to within one-quarter inch of the mid-palmar crease.

Only four of the eighteen cases reported in the literature were treated by early and adequate surgery. In these four there was a reasonably satisfactory result, although no patient had a full range of motion in the injured finger. By contrast, when similar injuries were treated by conservative measures, amputation was usually required.
thirty-three years old, was first a inch, had entered the volar side of the long finger and the distal part of the finger was blue.

hours after grease had entered the palm was exposed through a separate incision. The soft-tissue spaces tended with grease and adjacent neurovascular bundles were compressed. Immediate division is mandatory to prevent irreversible ischemia.

much grease as possible was removed with a curette, and all impregnated non-essential tissue was removed of the grease was impossible.

seven months after injury, all fingers extended normally. The long finger flexed to within quarter inch of the mid-palmar crease.

Case 2: A machinist, who worked on oil well pipelines, was seen after unrefined oil delivered at pressure of 15,000 pounds per square inch through a one-thirty-second-inch opening struck his right index finger on the radial side of the middle flexion crease. The hand swelled. Roentgenograms

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Case 3 (Figs. 2-A through 2-C): A gas station attendant, twenty-nine years old, was forty-eight hours after a jet stream of grease from a lubricating gun had penetrated the palmar aspect of the base of his left long finger. The patient stated that half a cup of grease had previously been expressed from the wound opening. At operation, the flexor-tendon sheath was found to be distended from the finger tip to the proximal part of the palm. Large amounts of grease and air were expressed from the wound, and the flexor-tendon sheath in the finger and palm was distended with grease in the palmar ruptured, and grease extravasated into the soft tissues.

Fig. 2-A: The appearance of the tendon after partial removal of the sheath. Grease within the sheath exuded from the opening.

Fig. 2-C: The appearance of the finger thirteen months after injury. Motion remains extremely limited.

Decompression by removal of the foreign material will usually prevent gangrene. Since complete removal is not possible, some fibrosis and scarring usually occur. If the flexor-tendon sheaths are directly involved, as in the following case, considerable loss of function is more likely.

Case 3 (Figs. 2-A through 2-C): A gas station attendant, twenty-nine years old, was forty-eight hours after a jet stream of grease from a lubricating gun had penetrated the palmar aspect of the base of his left long finger. The patient stated that half a cup of grease had previously been expressed from the wound opening. At operation, the flexor-tendon sheath was found to be distended from the finger tip to the proximal part of the palm. Large amounts of grease and air were expressed from the wound, and the flexor-tendon sheath in the finger and palm was distended with grease in the palmar ruptured, and grease extravasated into the soft tissues.

Fig. 2-B: The appearance of the tendon after partial removal of the sheath. Grease within the sheath exuded from the opening.

The appearance of the finger thirteen months after injury. Motion remains extremely limited.
Finger and palm was distended with grease. Immediate removal of the sheath was indicated into the soft tissues. Partial removal of the sheath was made. The diagnosis of gas gangrene was made. The index finger was already gangrenous, and the metacarpal of the index finger. The grease had extended along the radial side of the hand, although surrounded by the dorsum of the proximal segments of long fingers. Healing was uneventful. Some fibrosis and scarring involved, as in the following case.

Case 4. The left hand twelve years old, was lubricating gun had penetrated the palm. The wound of entry was in the palm. The tendon sheath was distended with grease. The tendon sheath had been punctured with grease. All grease was removed through two incisions—one in the palm. The tendon sheath was excised, but narrow pulleys in the proximal segments of the finger were preserved. The palmar incision was loosely closed over a small wound of entry. On examination ten days after injury there was numbness of the finger, swelling in the distal part of the palm, and marked stiffness of all fingers. First-aid treatment had consisted in expressing a jet of lubrication oil from a high-pressure grease gun had penetrated the volar surface of the left long finger. First-aid treatment had consisted in expressing material will usually prevent, some fibrosis and scarring involved, as in the following case.

Case 4 (Figs. 3-A through 3-C): An airplane factory worker, fifty-two years old, was seen ten days after injury there were numbness of the finger, swelling in the distal part of the palm, and marked stiffness of all fingers. At operation, the tendon sheath of the long finger was found to be filled with grease; complete removal of the grease was impossible and the tendon sheath was excised. The wounds healed with-
Fig. 4-A: Case 5. Photograph shows a necrotic wound with exposed profundus tendon, five
after grease penetrated the long finger near the distal flexion crease.

Fig. 4-B: The finger was salvaged by resurfacing with an abdominal pedicle flap.

out complication, but five months after injury there was still marked stiffness of all fingers.

In neglected cases, amputation is often the best treatment, but occasional
reconstruction is indicated and the result rewarding.

CASE 5 (Figs. 4-A and 4-B): An oil well worker, thirty-three years old, was seen five
after a jet stream of carbonox—a mixture of soda lime, dry clay, oil, and water—delivered at
pounds of pressure, had penetrated the volar surface of the right long finger near the distal
crease. Initial treatment was reported as being wound débridement. Examination showed
extensive defect of the skin with exposed flexor tendons—the result of unrelieved ischemia.

After resurfacing the volar surface of the distal part of the finger with an abdominal pedicle flap, the distal joint was fused, the profundus tendon was excised, and the sublimis tendon freed from scar tissue. Useful function was restored and the finger tip flexed voluntarily to one inch of the mid-palmar crease. The finger tip, however, was numb due to irreparable damage.

SUMMARY

Grease-gun injuries are an undesirable side effect of our modern machine. Since methods of high-pressure lubrication are used in automobile, airplane, and missile industries, more such injuries can be expected. The seriousness of the injuries should be recognized so that prompt and adequate treatment can reduce the resulting disability.

Grease-gun injuries of the hand are best treated by immediate surgical removal of as much of the grease as possible. This will prevent ischemic gangrene and reduce fibrosis and scarring.

REFERENCES

Fig. 4-B

and with exposed profundus tendon, flexion crease.

With an abdominal pedicle flap.

He was still marked stiffness of all fingers.

In the best treatment, but occasionally rewarding.

Mr. thirty-three years old, was seen five times and five days after injury due to dry clay, oil, and water—delivered to the right long finger near the distal end. Debridement. Examination showed—result of unrelied ischemia. Part of the finger with an abdominal pedicle was excised, and the sublimis tendon and the finger tip flexed voluntarily. However, was numb due to irreparable effect of our modern machines. Are used in automobile, airplane, expected. The seriousness of this will prevent ischemic gangrene.

This will prevent ischemic gangrene.

References


