

Tuznik, R.N., B.S.N., for data collection. The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Air Force, the Department of Defense, or the U.S. Government.

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You're the flight surgeon attached to a red air F-16 squadron. You are tasked to deploy for 7 wk to Guam followed by Australia for separate training exercises. Secondary to manning concerns, you will be the only medical member for the 130-member deployment made up of both flyers and nonflyers.

During your mission medical brief, an F-16 pilot approaches you about a new wound on the dorsal surface of his hand. On exam you notice an open wound with some minor erythema around the border and serosanguinous drainage. His range of motion, strength, and sensation are intact and he has little to no pain. The rest of his exam is unremarkable. He states the injury occurred 2 d ago at the gym when a light weight was dropped on the area. The member does not report any other concerns or symptoms. You are able to get the patient in for an X-ray of the affected area, which was reported as normal. The deployment is tasked to depart in 48 h, and it is unlikely that you will be able to follow up with the patient before that time.

1. What would be the most appropriate treatment in this given scenario?

- A. Wound care education and supplies.
- B. Antibiotic therapy.
- C. Activity restriction for affected limb.
- D. All the above.
- E. A & C.

ANSWER/DISCUSSION

1. D. Although a full workup was not accomplished due to time constraints, the initial presentation indicates a local soft tissue infection

that would benefit from antibiotic therapy.⁸ Close follow-up and appropriate wound care could eliminate the need for antibiotics, but these options are likely not available in this situation.

If this pilot drops out of the exercise it could potentially affect the success of training as a whole. A specific number of sorties are planned for each day's training, so it is important to treat in a way that would limit complications. The pilot will likely have little to no negative side effects to the antibiotics, but the treatment could make a significant difference in recovery time.

2. This pilot is tasked with flying a jet on the first leg to Guam. What is the best course of action regarding his flight status?

- A. Duties not to include flying.
- B. Remain on flight status for the upcoming movement.
- C. More information is needed for the decision.

ANSWER/DISCUSSION

2. C. Many factors will come into play that would not be as important in a standard medical appointment at home station. A decision will need to be made regarding the likelihood and timing of recovery. This

^{*} U.S. Air Force. Official Air Force aerospace medicine approved medications. 2018 Sep. 25. [Accessed 1 Oct. 2018]. Available from <https://kx2.afms.mil/kj/kx4/FlightMedicine/Documents/Forms/ShowFolders.aspx?RootFolder=%2Fkj%2Fkx4%2FFlightMedicine%2FDocuments%2FStandards%2FAircrew%20Medication%20Lists&FolderCTID=0x0120004DEB19A0C597EF4794DF99094B5AD8FC&View=%7BE6B00DAE%2DE012%2D41B4%2DB351%2DDDE160D7DA68D%7D> to those with access.

DOI: <https://doi.org/10.3357/AMHP.5314.2019>

will help the movement commander decide if the pilot will continue in the mission.

In this particular case, the patient had little to no symptoms and would likely recover quickly. The antibiotic chosen for treatment is an important decision, as a 3-d trial may be needed to rule out idiosyncratic reactions.^{*} If the patient had previously ground tested the medication he could fly as long as he had no physical symptoms that would prevent accomplishment of his flight duties.

The movement to Guam was uneventful and after 4 d you catch up to the pilot to evaluate the status of his hand. The pilot reports no pain or symptoms and his hand feels great. On examination you see the wound has closed and is healing nicely, with complete resolution of erythema. The patient is off all medications at this point and has been flying the training missions without issue. Considering the situation resolved, you let the pilot know to follow up with any other concerns or change in the status of his hand.

The next few weeks of training in Guam are successful, with minor medical issues among the 130 members for which you are responsible. The movement to Australia is also successful, with one minor medical response needed.

In Australia you are staying on a Royal Australian Air Force base and have no local U.S.-run medical facilities. A few days into the training mission in Australia, you receive a call from the pilot, who is very concerned and asks to see you in clinic. You immediately go meet the pilot for an evaluation. Upon reaching him you reach out to shake his hand and he instead holds up his hand, showing significant global swelling up to the wrist. You can also see the previous wound has opened up and is draining serous fluid (Figs. 1 and 2).

You ask what happened and he reports that yesterday he was trying to get back into working out after the injury. He had accomplished an arm workout that required gripping and utilization of the previously injured hand. The workout was uneventful, but he woke up this morning with significant global swelling in his hand. On further exam you see the patient has good distal pulses and no symptoms of nerve compression. You determine that he will need to be seen in a hospital setting.



Fig. 1. Lateral view.



Fig. 2. Palmar view.

3. Given your location and resources, what is the most appropriate next step in getting your patient to a higher level of care?

- Contact the local Australian flight medicine clinic to help you determine the best location to take your patient.
- Contact International SOS for direction on where to take the patient.
- Look up the location of the closest emergency room in the area and take the patient directly there.
- Contact your home base medical group for advice on your next step to help care for the patient.

ANSWER/DISCUSSION

3. B. International SOS is the organization that will direct and pay for local medical expenses. It is important to reach out to the organization early and often for guidance on facilities, payment options, and unplanned issues.⁵ Having previously made contact with the local Australian flight medicine clinic, you can reach out to them to determine their opinion on the best location for your patient to be seen. Keep in mind who is paying the bills, though, and cross check the choice with International SOS to prevent any issues.

It is determined that the best location to take your patient is a private hospital about 30 min away. You take your patient to the emergency room and they begin the initial workup on the patient. After an hour into your patient's visit, the hospital administrator approaches you about payment. You let the administrator know that International SOS will cover the expenses for the visit. The administrator responds by saying the payment must be received in the next hour or the patient will have to leave. After a few frantic calls to International SOS, you are able to reach an acceptable situation with the hospital for the patient to stay.

His clinical course in the emergency room started with lab work and imaging of the hand. He was placed on broad spectrum antibiotics and was admitted to the ward for further evaluation for infectious disease and orthopedics. The patient will not be seen by any specialists until the following day, so you leave contact information with him and let him know you will be back the next day.

When you arrive at the hospital the next day you learn the infectious disease provider has already evaluated your patient and has taken him off all antibiotics because his lab work did not demonstrate any signs of infection. This seems concerning to you considering your patient's hand is not any better and seems potentially worse.

The orthopedic surgeon then arrives, and after his evaluation he is also concerned with the removal of all antibiotics from the patient. You contact the infectious disease provider and express your concerns. He reiterates his previous assessment, but agrees to place the patient on a broad spectrum antibiotic, as he can see no harm in this preventative step.

Over the next 48 h the pilot's hand continues to worsen. Both specialists are unable to determine a cause for this progression. At this point the patient develops a rapidly progressing median nerve compression that cannot be managed medically. Later that day he is taken to the operating room to release the carpal tunnel, which is successful.

The next day the orthopedic surgeon follows up with the patient. He asks the patient if he can evaluate his unaffected hand. He then takes the patient's index finger and bends it back until it touches his forearm (Fig. 3). Then he pinches the patient's skin and applies some tension, stretching the skin out. The patient was unaffected by these exam movements, stating that he has always had some hypermobility.

4. What is the likely diagnosis based on these exam results?

- A. Dehydration.
- B. Klinefelter syndrome.
- C. Ehlers-Danlos syndrome.
- D. Manchester syndrome.

ANSWER/DISCUSSION

4. C. The discovery of the patient's connective tissue disorder clarifies the appropriate treatment needed. The patient's lymphatic system is unable to correct the edematous tissue progression without compression. After a few days of wearing a compression glove, the patient's symptoms were significantly reduced and he was released from the

hospital. After a few more days of healing, the patient follows up with you to get back on flight status.

Ehlers-Danlos syndrome can present with a wide range of symptoms that can vary in clinical significance.^{1,4,6} In this particular case, the member did not demonstrate any abnormal signs or symptoms until after a soft tissue injury.

AEROMEDICAL DISPOSITION

With the assumption the patient returns back to his preinjury state, is he able to return to active flight status?

Ehlers-Danlos syndrome is not addressed specifically as a stand-alone condition that would require a waiver in the Air Force standards. It can predispose members to other conditions like keratoconus, which would need to be evaluated.²

Standards from other military branches as well as the Federal Aviation Administration coincide with the Air Force's focus on the topic. Unless it prevents the member from safely performing his or her flight duties, a specific waiver is not needed.^{3,7,9}

After fully recovering from his injury, a local review of his condition was accomplished by his local flight surgeon and the chief of aerospace medicine. It was determined that the member did not have any disqualifying conditions and could be returned to flight status without the need for a waiver.

Doxey RJ. You're the flight surgeon: Ehlers-Danlos syndrome. *Aerospace Med Hum Perform.* 2019; 90(6):583–586.

ACKNOWLEDGMENT

The author would like to thank Dr. Charles Shurlow, State Air Surgeon, Ohio Air National Guard, for his professional advice and review of this article. The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Air Force, the Department of Defense, or the U.S. Government.

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Fig. 3. Maneuver performed by orthopedic hand surgeon.

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