

The Hidden Risk of Wheelchair Use

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Not knowing how to unfold or even sit in a wheelchair the right way can cause a catastrophic injury to patients, visitors, volunteers, and staff of a healthcare facility.

Wheelchairs are one of the most common assistive devices used in healthcare facilities, from admission to discharge. They are often found at the entrance of a facility for use by both patients and visitors with mobility issues. Hospital volunteers, transport staff, and clinical staff use wheelchairs to take patients to different care areas to have tests performed. Many facilities require that patients be transported in a wheelchair upon discharge. However, not knowing the proper method of unfolding a wheelchair or where to place your hands when sitting down in the seat can cause injuries, specifically to fingers, ranging from lacerations to amputations.

An analysis of reports from the Pennsylvania Patient Safety Reporting System (PA-PSRS^{*}) over the past decade identified 12 adverse events related to finger injuries involving wheelchairs in both inpatient and outpatient settings. Additionally, the U.S. Food and Drug Administration's Manufacturer and User Facility Device Experience (MAUDE) reporting system, which "houses medical device reports submitted to the FDA by mandatory reporters (manufacturers, importers and device user facilities) and voluntary reporters such as health care professionals, patients and consumers,"² contains hundreds of reports involving wheelchair injuries dating back to 2012. These reports indicate different kinds of wheelchairs (e.g., manual, bariatric, transport, and motorized) from myriad manufacturers are associated with these injuries. Although the type of injury and mechanism of injury reported varies from a head injury sustained from tipping over the wheelchair to a laceration from a screw, numerous reports of adverse events involved finger injuries, which are the focus of this safety announcement.

* PA-PSRS is a secure, web-based system through which Pennsylvania hospitals, ambulatory surgical facilities, abortion facilities, and birthing centers submit reports of patient safety-related incidents and serious events in accordance with mandatory reporting laws outlined in the Medical Care Availability and Reduction of Error (MCARE) Act (Act 13 of 2002).¹ All reports submitted through PA-PSRS are confidential and no information about individual facilities or providers is made public.

♦Patient Safety Authority

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A review of event reports in both PA-PSRS and MAUDE indicates that the types of finger injuries reported range in severity and include laceration, nail loss, avulsion, bone fracture, crushing injury, and amputation—sometimes affecting more than one digit. The mechanism of the traumas occurred when the seat was unfolded from a folded position, which is often how a wheelchair is stored. Some of the reports describe the end user of the wheelchair, which includes patients, visitors, volunteers, and staff, placing their hand on the seat to open the wheelchair. Upon doing so, the seat will often snap into place, which may cause a finger to be pinched in the wheelchair frame or hardware on the side or beneath the seat. Additionally, some events detail that these types of injuries resulted from the end user attempting to sit down in a wheelchair with the seat not fully engaged, sometimes by chance, by accident, or to unfold the seat. The trauma resulted from getting the finger caught between the seat and the side panel or armrest of the wheelchair, or between the seat and the frame on the bottom of the wheelchair when sitting down.

Some reports note in the recommendations for improvement that the facility will evaluate the wheelchair for potential hazards, educate staff on proper use of wheelchairs, ensure seats are fully engaged before allowing a patient to sit in the wheelchair, and replace the current wheelchairs with rigid frame wheelchairs.

Analysis of the MAUDE database revealed that events have been filed by various sources, including the manufacturer, the healthcare facility, and sometimes the patient or the patient's family member. In the events that were not reported by the manufacturer, the manufacturer was notified. The responses as to whether the device was evaluated by the manufacturer after a MAUDE event included no response (left blank), "no answer provided," "device not returned to the manufacturer," or "device returned to the manufacturer." Some of the reports included the manufacturers' comments. In the MAUDE events reviewed, none of these comments indicated that there was a manufacturing defect with the device which could have caused the injury. However, several of the manufacturers' comments indicated that their user manual for the wheelchair does caution or warn that hand or pinching injuries can occur if the wheelchair is not unfolded properly or if one attempts to sit in the wheelchair without the seat being fully engaged. In a few of these reports the manufacturer stated the error occurred due to the end user not following the directions.



**“Patient was being discharged.
As patient went to sit in wheelchair,
it was not fully opened.
She placed both of her hands on the seat.
She sat down, the chair
snapped into place,
partially amputating her
right distal 5th digit [pinkie finger].”**

-PA-PSRS Report

In reviewing several of the user manuals involved in these types of events, one manual showed a picture of the correct way and incorrect way of sitting in a wheelchair to avoid fingers being pinched. Another manual has warnings and warning/safety alert stickers that attach to the wheelchair arms that caution to keep hands clear when unfolding the chair; however, this manual does not specify the type of injury that can occur from not following these directions. Many of the manuals report the risk of injury from not unfolding the wheelchair or not sitting in the wheelchair as directed. The extent of the injuries described in the manuals range from injury (not specified) to hand and finger injuries, including pinching, bruising, crushing, or fractures. None of the manuals reviewed identify the risk of amputation.

Just as there are many different intravenous (IV) pumps, there are also many different types of wheelchairs. One would not expect a nurse to be able to operate an IV pump without first reading the instructions for use and receiving training on the pump. Although operating a wheelchair does not seem as complex a task, given the severity of injuries that can occur, it is imperative that staff using this equipment, or any other type of equipment, receive education and training on it prior to patient use.

Additionally, facilities should follow the user manual not only for how to safely operate the wheelchair, but also for any recommendations on routine inspection and maintenance. When purchasing a used wheelchair or a wheelchair from a third party, it is necessary to also obtain the instructions for the product. Also, before purchasing a wheelchair or any type of medical device, do some research on the product. Review the MAUDE database for any reports of adverse events related to the product and request a trial product from the distributor if possible.

Another concern is that in many facilities, wheelchairs are stored at the entrance to be used by patients or visitors with mobility issues. Often, these wheelchairs are folded to conserve space and staff are not available to supervise the use of the wheelchair. Since a wheelchair in a public place may be used by individuals who are likely unaware of the warnings addressed within the user manual, one manufacturer, per a MAUDE report, recommended that a non-folding device be installed if left unattended. Per a report in PA-PSRS, one facility planned to remove wheelchairs that had the ability to fold and purchase only rigid frame wheelchairs.

Healthcare workers utilize many different pieces of equipment every day. Often a healthcare worker is required to demonstrate competency before using a new piece of medical equipment. Regardless of how complex or simple the equipment is, it is imperative that the user of the equipment understand and follow the manufacturer's instructions for use and recognize the risk involved with improper use. This is vital to prevent injury from occurring and to keep our patients, visitors, and staff safe.

References

1. Medical Care Availability and Reduction of Error (MCARE) Act, Pub. L. No. 154, Pennsylvania Department of Health (2002). Accessed August 24, 2022. <https://www.health.pa.gov/topics/Documents/Laws%20and%20Regulations/Act%2013%20of%202002.pdf>
2. U.S. Department of Health and Human Services. MAUDE - Manufacturer and User Facility Device Experience. U.S. Food and Drug Administration website. <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/search.cfm>. Updated July 31, 2022. Retrieved June 13, 2022.

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Safety Tips



- Research the product
- Evaluate the wheelchair for potential hazards
- Read and follow the owner's manual
- Educate staff on proper use of wheelchairs
- Ensure seats are fully engaged before allowing a patient to sit in the wheelchair
- Replace folding wheelchairs with rigid frame wheelchairs that do not fold
- If available, use an anti-fold device
- Follow the manufacturer's recommendations on routine inspection and maintenance

Types of injuries



- Laceration (cut)
- Avulsion
- Nail loss
- Bone fracture
- Crushing injury
- Amputation—sometimes affecting more than one digit