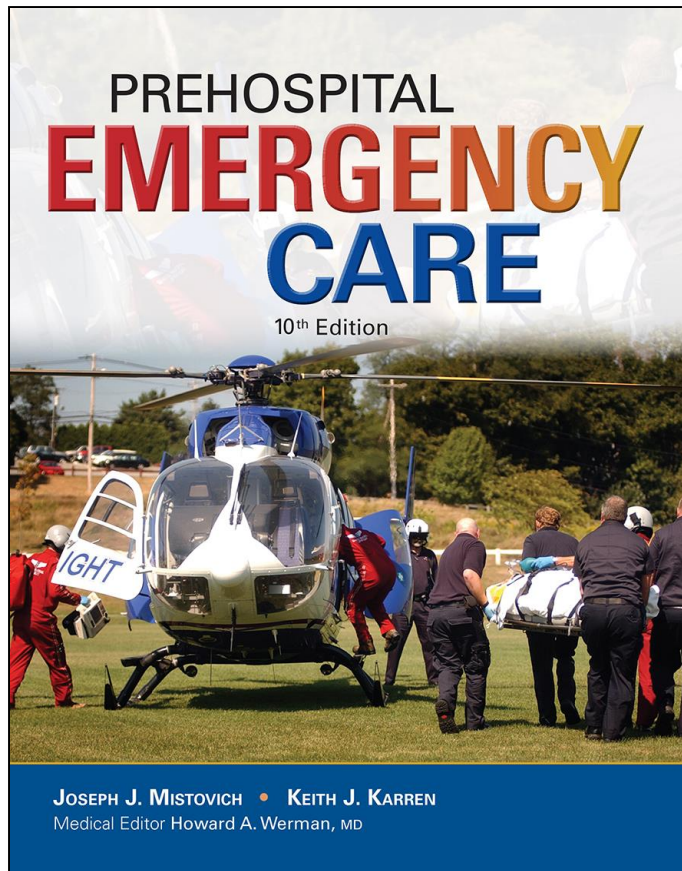


# PREHOSPITAL EMERGENCY CARE

TENTH EDITION



## CHAPTER 6

### Lifting and Moving Patients

# Learning Readiness

- EMS Education Standards, text p. 92

# Learning Readiness Objectives

- Please refer to page 92 of your text to view the objectives for this chapter.

# Learning Readiness

## Key Terms

- Please refer to page 93 of your text to view the key terms for this chapter.



# Setting the Stage

- Overview of Lesson Topics
  - Body mechanics for safe lifting
  - General guidelines for lifting and moving
  - Lifting and moving patients
  - Packaging for transportation
  - General guidelines for carrying patients on backboards and stretchers

# Case Study Introduction

EMTs Brett Nye and Annie Garber have just arrived on the scene of a 60-year-old man who was injured when he slipped and fell down 12 wooden steps, landing on a concrete basement floor. As they take measures to protect the patient's spine and conduct their assessment, Brett estimates that the patient, who is over six feet tall, weighs about 260 pounds.

# Case Study

- What factors should Brett and Annie consider in deciding how to get the patient from the basement into the ambulance?

# Introduction

- Nearly every patient contact requires lifting and moving patients.
- Improper lifting and moving can lead to EMT and patient injuries.
- EMTs can take a number of measures to reduce the risk of injury.

# Body Mechanics for Safe Lifting

- Body mechanics are the safest and most efficient methods of using the body to gain a mechanical advantage.
- There are four principles of body mechanics.

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# Body Mechanics for Safe Lifting

- Keep the weight of the object as close to your body as possible.

*continued on next slide*

Using proper body mechanics, the weight is kept close to the body as it is lifted.



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# Body Mechanics for Safe Lifting

- To move a heavy object, use the leg, hip, and gluteal muscles, and contract the abdominal muscles.
- "Stack" your shoulders, hips, and feet in vertical alignment.

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# Body Mechanics for Safe Lifting

- Reduce the height and distance of the lift or move as much as possible.

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Reduce the height or distance through which the object must be moved. Get closer, reposition it, or move it in stages.



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# Body Mechanics for Safe Lifting

- Apply the principles of body mechanics to lifting, carrying, moving, reaching, pushing, and pulling.
- Keep the spine in alignment.
- Whenever possible, substitute equipment for manual force.

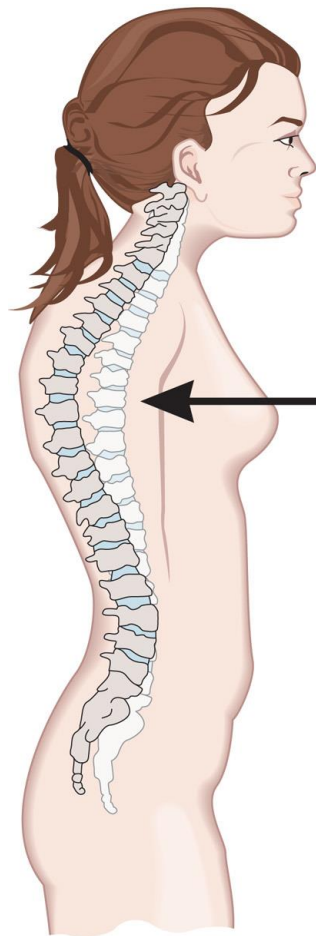
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# Body Mechanics for Safe Lifting

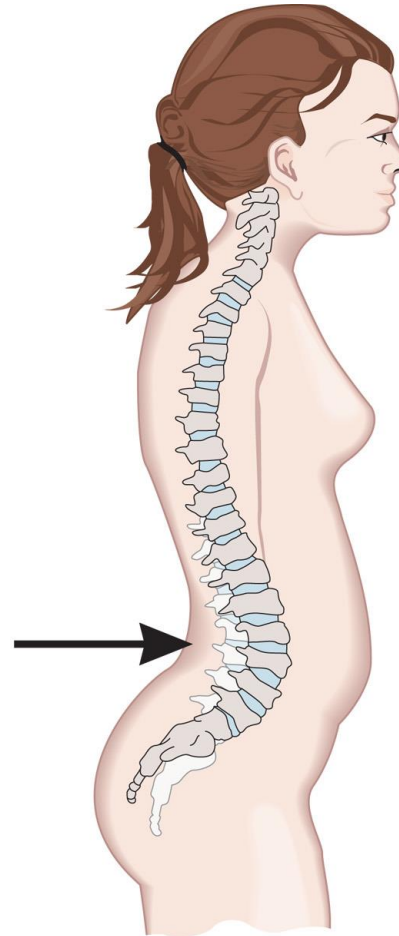
- Posture and fitness
  - Poor posture and fitness can fatigue back and abdominal muscles, increasing the risk of injury.

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Extremes of poor posture are excessive lordosis (swayback) and excessive kyphosis (slouch).



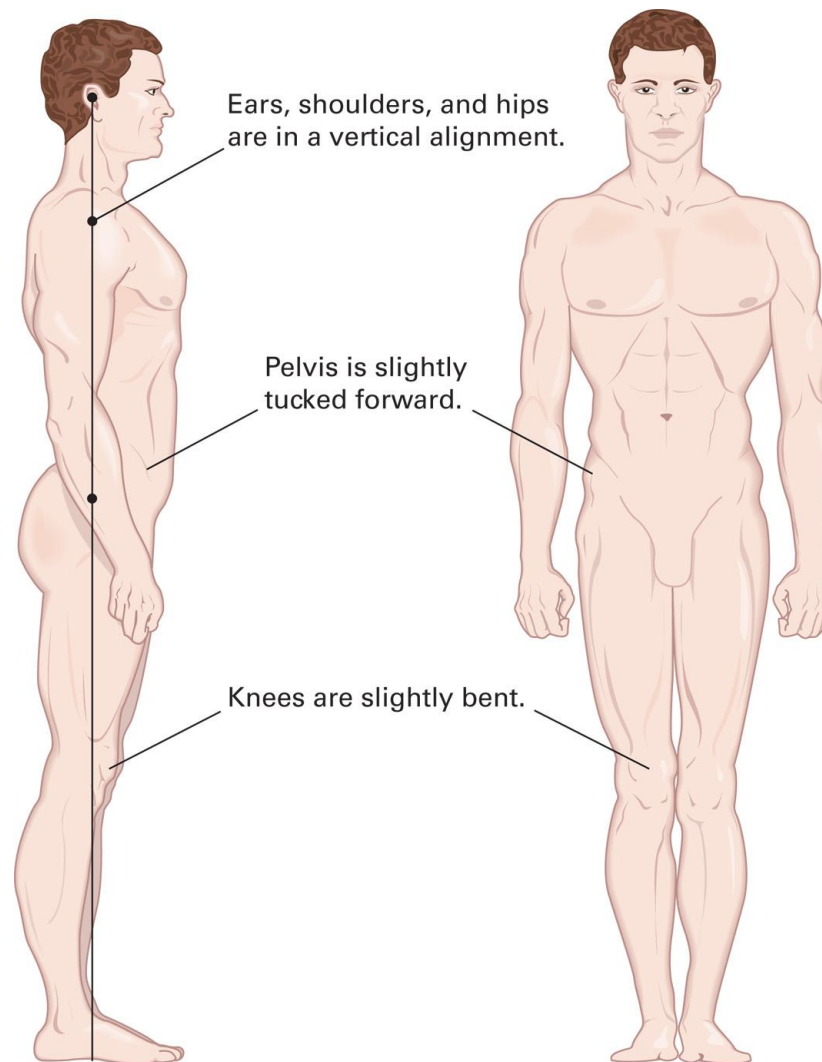
Excessive kyphosis  
(slouch)



Excessive lordosis  
(swayback)

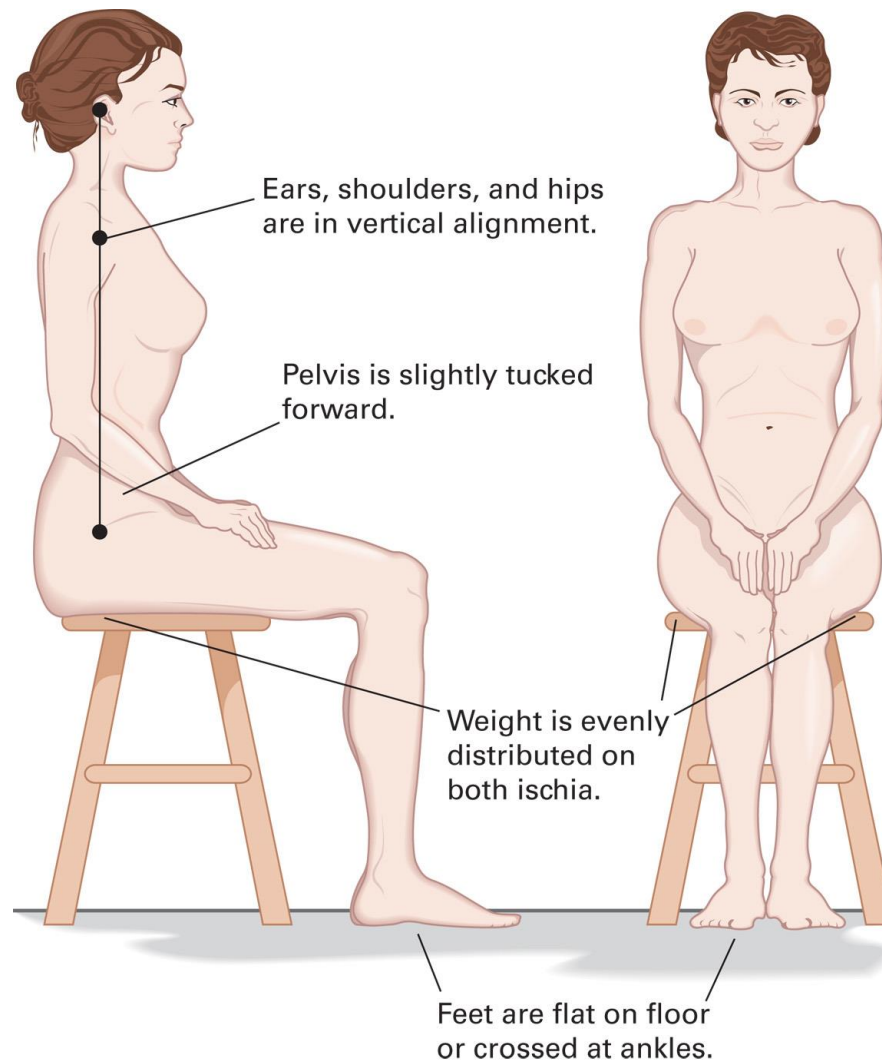
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Proper standing posture.



*continued on next slide*

Proper sitting posture.



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# Body Mechanics for Safe Lifting

- Good body mechanics cannot fully compensate for poor physical fitness.
- Good physical fitness includes flexibility, strength, cardiovascular conditioning, and nutrition.

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Click on the word from the highlighted word pair in each statement to complete each statement most accurately.

1. To lift a heavy object, use the muscles of the:

legs

back

2. An excessive lumbar curve, resulting in swayback, is called:

kyphosis

lordosis

*continued on next slide*

# Body Mechanics for Safe Lifting

- Communication and teamwork
  - All team members must be properly trained.
  - Team members for a lift should be physically matched.
  - Communicate and coordinate throughout the lift.
  - Tell the patient what you are doing.

# General Guidelines for Lifting and Moving

- Know your abilities and limitations.
- Consider the weight of the patient and of the equipment being used.
- Use an even number of rescuers.
- Anticipate muscle fatigue.

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# General Guidelines for Lifting and Moving

- When possible, use wheeled stretchers or rolling devices.
- Keep the weight close to your body.
- Keep your body in alignment and your back in locked-in position.
- Do not twist while lifting.

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# General Guidelines for Lifting and Moving

- The power lift
  - The power lift offers the best defense against injury and protects the patient with a safe and stable move.
  - It is useful for rescuers with weak knees or thighs.
  - Keep your back locked and avoid bending at the waist.
  - Use the power grip.

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In the power grip, palms and fingers should come in complete contact with the object and fingers should be bent at the same angle.



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# General Guidelines for Lifting and Moving

- The power lift
  - Follow these steps:

*continued on next slide*

# EMT SKILLS 6-1

## Power Lift

*continued on next slide*



Get in position. Your feet should be about shoulder width apart, turned slightly outward, and flat on the ground.



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Use a gloved finger to pull a cuff out and down on the other glove. Do not touch the inside of the glove.



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As you return to a standing position, make sure your back is locked in and your upper body comes up before your hips.



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# General Guidelines for Lifting and Moving

- The squat lift
  - The squat lift is an alternative technique if you have a weak leg or ankle.
  - In performing this technique, avoid bending at the waist.

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In the squat lift, your weaker leg stays slightly forward and you push up with your stronger leg.



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# General Guidelines for Lifting and Moving

- One-handed equipment-carrying technique
  - Keep your back in a locked position.
  - Maintain proper body mechanics.
  - Avoid leaning to the opposite side to compensate for the imbalance.

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One-handed carrying technique.



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# General Guidelines for Lifting and Moving

- Reaching
  - Get as close to the object being lifted as possible to decrease the effort needed.
  - Limit reaching to 15 to 20 inches in front of your body.
  - Keep the back locked in and do not twist.

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# General Guidelines for Lifting and Moving

- Pushing and pulling
  - When possible, push rather than pull.
  - If you must pull
    - Keep the load between your shoulders and hips, and close to your body.
    - Keep your back straight and slightly bend your knees.

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# General Guidelines for Lifting and Moving

- Pushing and pulling
  - When pushing
    - Push from the areas between your waist and shoulders.
    - If the weight is below waist level, kneel to avoid bending.
    - Keep your elbows bent, with arms close to your sides.
    - Do not push or pull an object that is overhead.

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**TABLE 6-1****Summary of Proper Body Mechanics**

- Use teamwork, equipment, and imagination to make sure you are always in the position of using proper body mechanics.
- Use the power lift and power grip techniques as a best defense against injury.
- Reduce the height or distance through which an object must be moved. Lift in stages if necessary.
- Lift an object as close to your body as possible to avoid back injury.
- Avoid using back muscles to lift.
- Use legs, hips, and gluteal muscles plus abdominal muscles for safe, powerful lifts.
- While you are carrying an object, keep shoulders, hips, and feet in alignment.
- Use the proper posture—ears, shoulders, and hips in vertical alignment—when standing and sitting.
- Improve personal physical fitness to build strength and manage stress.

# Lifting and Moving Patients

- Three categories of moves
  - An **emergency move** should be performed when there is *immediate danger to the patient or to the rescuer*.

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# Lifting and Moving Patients

- Three categories of moves
  - An **urgent move** is performed when the patient is suffering an *immediate threat to life* and must be moved quickly and transported for care.

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# Lifting and Moving Patients

- Three categories of moves
  - A **nonurgent move** is one in which *no immediate threat to life* exists and the patient can be moved in a normal manner when ready for transport.

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# Lifting and Moving Patients

- Types of emergency moves
  - Armpit-forearm drag
  - Shirt drag
  - Blanket drag

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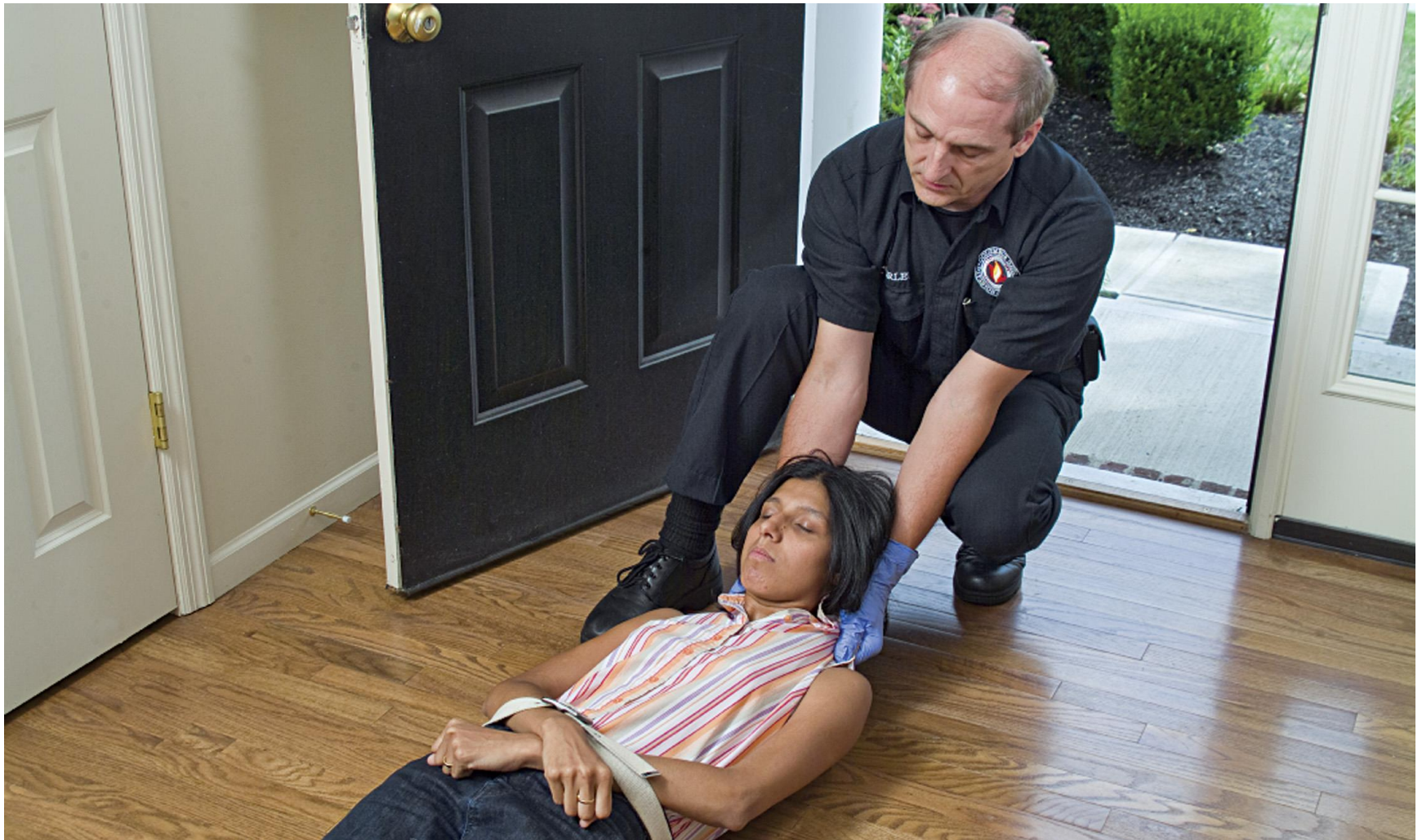
The armpit-forearm drag. Slide your hands under the patient's armpits and grasp the forearms. Drag along the long axis of the patient's body.



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The shirt drag.



*continued on next slide*

The blanket drag.



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# Lifting and Moving Patients

- Rapid extrication is used in patients with any abnormality of the airway, breathing, oxygenation, or circulation and for those with critical injuries and illnesses.

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# Lifting and Moving Patients

- Rapid extrication indications include:
  - Altered mental status
  - Inadequate respiratory rate or tidal volume
  - Indications of shock

*continued on next slide*



# Lifting and Moving Patients

- Rapid extrication indications include:
  - Injuries to the head, neck, chest, abdomen, pelvis
  - Fracture of both femurs
  - Major bleeding

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# Lifting and Moving Patients

- Nonurgent moves
  - The best way to move a patient is the easiest way that will not cause injury or pain.
  - Never walk a patient who becomes light-headed or sweaty upon standing or who is having chest pain or respiratory problems, or who has an injured lower extremity or suspected spinal injury.

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# Lifting and Moving Patients

- Nonurgent moves
  - Direct ground lift
  - Extremity lift
  - Direct carry method
  - Draw sheet method

*continued on next slide*

# EMT SKILLS 6-2

## Direct Ground Lift



Position your arms under the patient. Be sure to cradle the head. If a third rescuer is available, he should slide both arms under the waist while the first two rescuers move their arms up and down as appropriate.





Lift the patient to your knees and roll toward your chests.





On signal, move the patient to the carrying device.



# EMT SKILLS 6-3

## Extremity Lift



One rescuer should put one hand under each arm and grasp the wrists. The other should slip hands under the knees.



Both rescuers should move up to a crouching and then standing position.



# EMT SKILLS 6-4

## Direct Carry



Position your arms under the patient and slide the patient to the edge of the bed.





Lift the patient and curl toward your chests.





Rotate and place the patient gently on the carrying device.



# EMT SKILLS 6-5

## Draw Sheet Method



Reach across the stretcher and grasp the sheet firmly.





Slide the patient gently onto the carrying device.



# Case Study

Brett and Annie determined that the patient's injuries were potentially serious, but that he did not have any immediate problems with his airway, breathing, or circulation. They recognized that the mechanism of injury put the patient at risk for spinal injury, and also that they would require assistance because of the patient's size and because it would be necessary to carry him up the stairs.

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# Case Study

As Brett completed the assessment, Annie radioed for additional personnel to assist with lifting.

*continued on next slide*

# Case Study

- What equipment should the EMTs anticipate they will need to lift and move the patient?

# Packaging for Transport

- Once the patient is stabilized, select and prepare a carrying device and move the patient to the ambulance.

*continued on next slide*

**TABLE 6-2****Patient-Carrying Devices**

Device	Advantages	Disadvantages
<b><i>Wheeled stretcher</i></b>	Enables movement without carrying Accommodates variety of positions, heights, and lengths Safe traversal of stairways and curbs Can be lifted or lowered from ends or sides Durable Mechanically simple Comfortable	X-ray opacity Difficult to maneuver over uneven ground Adds significant amount of weight when lifting is necessary
<b><i>Portable stretcher</i></b>	Lightweight Compact Excellent for use as auxiliary stretcher Can be used in spaces too confined or narrow for wheeled stretcher Some models have folding wheels and posts for easier movement Easily loaded and off-loaded Can be folded for storage	Must be carried Metal styles interfere with some X-rays
<b><i>Stair chair</i></b>	Good for use on stairways, narrow corridors and doorways, small elevators Some models can be converted into portable stretchers Newer models have tracks that eliminate carrying down steps	Must be carried (older models) Does not accommodate trauma patients Should not be used for patients with altered mental status or lower extremity injury Fairly complex Consumes considerable space

**TABLE 6-2 Patient-Carrying Devices**

<b>Backboard</b>	Good spinal immobilizer	Must be carried
	Good lifting device	Usually must be left with patient
	Can float	Unstable for moves up or down inclines
	Lightweight	Uncomfortable
	Compact	
	Can serve as CPR surface	
	Mechanically simple	
	X-ray translucency	
	Can be carried and loaded from ends or sides	
	Integrates well with various other equipment	
<b>Scoop stretcher</b>	Can be used in confined areas in which other stretchers will not fit	Must be carried
	Allows easy application of restraints	Requires padding of head and body prominences
	Integrates well with various other equipment	Metal scoop stretcher should be prewarmed if air temperature is cold
		Not recommended for patients with suspected spinal injury
<b>Basket stretcher</b>	Good for traversing rough terrain	Consumes considerable space
	Can be fitted with flotation harness for water rescue	Must be carried
	Extremely durable	Bulky
	Can be carried from sides or ends	High cost
	Integrates well with various other equipment	Usually must be left with patient
		Metal style interferes with some X-rays
<b>Flexible stretcher</b>	Especially useful for narrow and restricted hallways	Needs special training for use in rope or ladder rescues
	Can be carried from sides or ends	Must be carried

# Packaging for Transport

- Wheeled stretcher
  - Can accommodate up to 650 pounds
  - Limited to use on smooth terrain
  - Fasten all straps to secure the patient.
  - Never leave a patient unattended.

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Two-rescuer stretcher carry.



*continued on next slide*



Four-rescuer stretcher carry.



*continued on next slide*



Wheeled stretcher, lift-in type. (© Ferno Corporation)



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Wheeled stretcher, roll-in type. (© Ferno Corporation)



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# Packaging for Transport

- Bariatric stretchers and devices
  - Designed to hold up to 1,600 pounds

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# EMT SKILLS 6-8

## Moving a Patient on a Stair Chair

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Moving a patient up stairs in a stair chair—spotter above.



*continued on next slide*

Moving a patient down stairs in a stair chair—spotter below.



*continued on next slide*

# Packaging for Transport

- Portable stretcher
  - Useful to carry patients in confined spaces or for calls involving more than one patient

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Portable ambulance stretcher with continuous tubular metal frame.



*continued on next slide*



Pole stretcher, or canvas litter.



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# Packaging for Transport

- Stair chair
  - Useful for narrow corridors and doorways, small elevators, and stairs
  - Do not use for patients with altered mental status, spinal injury, or lower extremity injury.

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A stair chair with a mechanical track allows easier patient movement over stairs.



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A power stair that can move patients up to 500 pounds. (Photo: © Ferno Corporation)



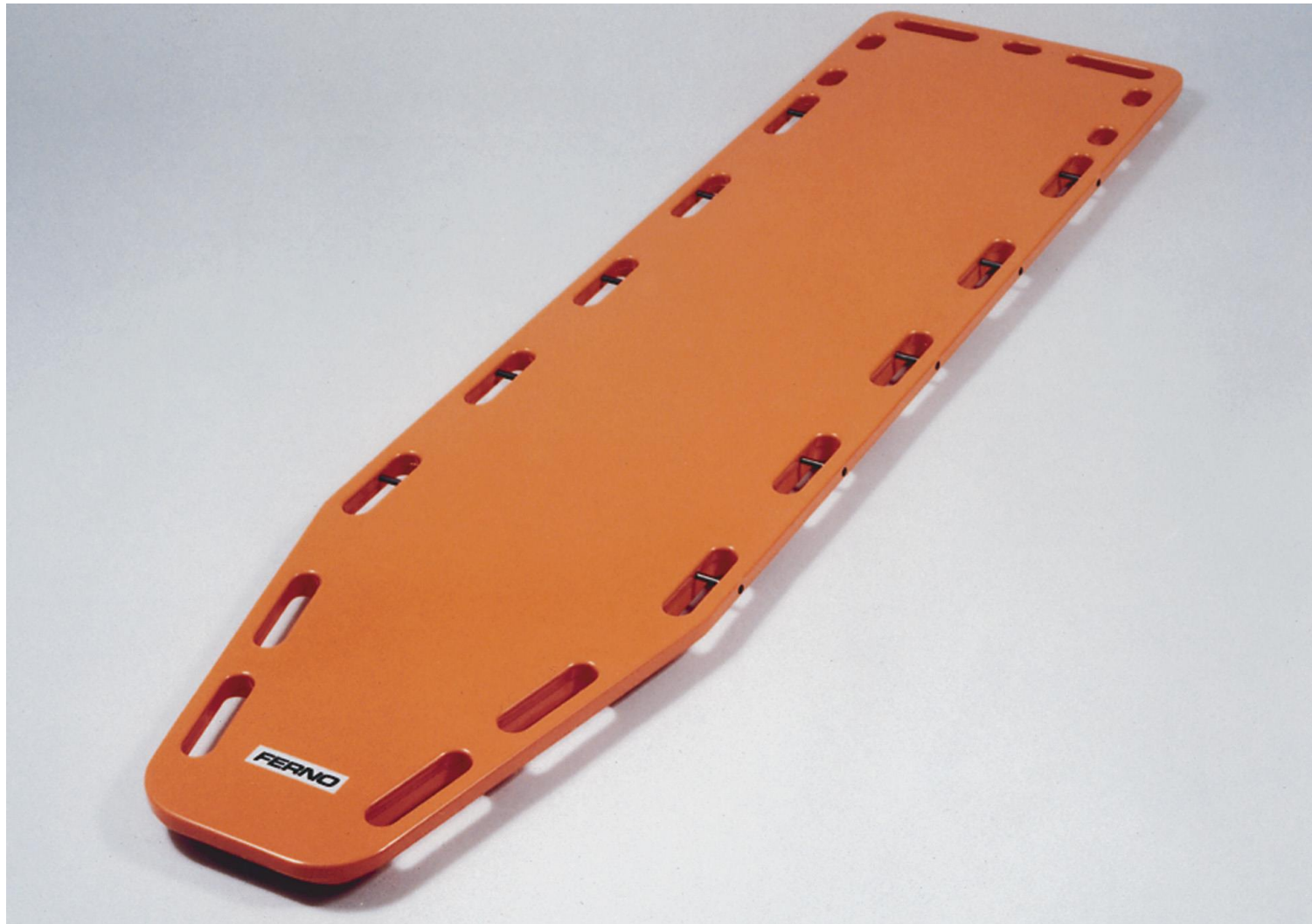
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# Packaging for Transport

- Backboards
  - Used for spinal immobilization
  - Short spinal immobilization devices are used for noncritical patients with suspected spine injury who are found in a sitting position.
  - A full-body vacuum mattress also can be used for spinal immobilization.

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Long backboard.



*continued on next slide*



Kendrick Extrication Device (KED). (© Ferno Corporation)



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Full body vacuum mattress can be used for immobilization or for moving the patient. The patient is then secured to the rigid, conforming vacuum mattress.



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# Packaging for Transport

- Scoop stretcher
  - Can be assembled and disassembled around the patient
  - Not recommended for patients with spinal injury

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Scoop stretcher.



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# Packaging for Transport

- Basket stretcher
  - Also called Stokes basket
  - Accommodates scoop stretchers and most backboards
  - Can be placed on a wheeled stretcher

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Using a basket stretcher to move a patient over rough terrain.



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# Packaging for Transport

- Flexible stretcher
  - Also called a Reeves stretcher
  - Useful in restricted spaces

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Flexible stretcher.



*continued on next slide*



Click on the best device for moving an unresponsive patient from an upstairs bedroom to the ground floor.

A. A stair chair

B. A wheeled stretcher

C. A scoop stretcher

D. A short backboard

*continued on next slide*

# Packaging for Transport

- Patient positioning
  - Patients are most commonly placed in supine or sitting position.
  - Special considerations based on the patient's condition include:

*continued on next slide*

# Packaging for Transport

- Unresponsive with no head or spinal injury
  - Left lateral recumbent position
  - Facilitates keeping the airway clear

*continued on next slide*

# Packaging for Transport

- Chest pain or difficulty breathing
  - Position of comfort
  - Usually sitting up, unless the patient is hypotensive

*continued on next slide*



# Packaging for Transport

- Suspected spinal injury
  - Immobilize the spine
- Shock
  - Supine position

*continued on next slide*

# Packaging for Transport

- Nausea or vomiting in an alert patient
  - Sitting or left lateral recumbent
- Third trimester pregnancy
  - Avoid supine position; use left lateral recumbent

*continued on next slide*

# Packaging for Transport

- Other special considerations for patient positioning
  - Infants and toddlers should be placed in a car safety seat when possible.
  - Take extra care to avoid injury with elderly patients.
  - Accommodate patients with physical disabilities.

*continued on next slide*

# Packaging for Transport

- Packaging for air transport
  - Patients exposed to hazardous materials must first be decontaminated.
  - Manage the airway prior to the aircraft's arrival.
  - Leave the chest accessible to monitor breathing.

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# Packaging for Transport

- Packaging for air transport
  - If a backboard must be used, select one that the aircraft can accommodate; ensure the patient is well-secured to the backboard.
  - Secure all equipment, blankets, sheets, etc.
  - Communicate with the patient and prepare him for the noise of the aircraft.

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# Packaging for Transport

- Packaging for air transport
  - Cover the patient's eyes, ears, and exposed wounds to protect them from the rotor wash.
  - Consider wetting the landing zone to keep dust and debris at a minimum.
  - Rescuers must remove hats and loose clothing.

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# Packaging for Transport

- Packaging for air transport
  - Do not approach the aircraft unless instructed to do so; observe all safety precautions and stay clear of the tail rotor.
  - Lay any IV bags on the patient instead of holding them up.
  - Minimize the number of people approaching the aircraft.

# Carrying Patients

- Use of a wheeled stretcher is preferred, but if that is not possible, follow these guidelines for use of backboards and portable or flexible stretchers:

*continued on next slide*



# Carrying Patients

- Use a minimum of three straps to secure the patient.
- Secure the patient's hands to prevent him from reaching out.
- Carry the patient feet first down steps or downhill.
- Carry the patient head first up steps or uphill.

*continued on next slide*

# Carrying Patients

- Know your limitations and your partner's.
- Know the limitations posed by the situation and seek assistance.
- Communicate with your partner and team.
- Keep the patient's weight as close to your body as possible.

*continued on next slide*

# Carrying Patients

- Two-person carry
  - Position one person at the patient's head and one at the feet, with the stronger person at the head.
  - The rescuers must be facing each other, the EMT at the foot must walk backward.
  - If there is a third person, use him as a spotter.

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# Carrying Patients

- Two-person carry
  - In this carry, the patient's sides are not stabilized.
  - Rescuers may quickly fatigue.

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# Carrying Patients

- Four-person carry
  - One rescuer at the head
  - One rescuer at the foot, facing away from the rescuer at the head
  - A rescuer on each side, facing forward
  - Alternatively, two rescuers at the head and two at the foot

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# Carrying Patients

- Carrying a supine patient on stairs
  - A stair chair is preferred, but not always feasible.
  - Ensure that the patient is secured to the device.
  - Secure the patient's hands.
  - Use a spotter.

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# Carrying Patients

- Carrying a supine patient on stairs
  - Carry the patient feet first down stairs and head first up stairs.
  - Going downstairs, the EMT at the foot has his back toward the stairs.
  - Going upstairs, the EMT at the head has his back toward the stairs.

*continued on next slide*

# Carrying Patients

- Neonatal isolette
  - Used for transportation of newborns
  - Engages in the stretcher mounts of the ambulance



# Case Study Conclusion

A rescue engine with a crew of four arrived to assist Brett and Annie. The team log-rolled the patient and then secured him to a long backboard. The stairs were narrow and difficult to navigate, but the four firefighters, two at each end of the backboard, were able to carry the patient up the stairs, with Brett and Annie acting as spotters.

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# Case Study Conclusion

Once they were at the top of the stairs, the firefighters placed the patient on a wheeled stretcher and secured him to it for transfer to the ambulance. Brett continued care on the way to the hospital, while Annie notified the receiving facility that they would require lifting assistance on arrival.

# Lesson Summary

- Lifting and moving patients are key EMT skills that require special techniques.
- Know the capabilities of the crew and equipment when organizing lifts and moves.

*continued on next slide*

# Lesson Summary

- Work to avoid injury to the crew and patient.
- Communicate constantly to ensure a smooth, safe process.