

Vehicle Extrication

Student Notes

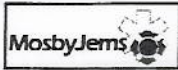


**Department of Fire Services
Massachusetts Firefighting Academy
Direct Delivery Programs**

Carbusters! Version 3.1 Extrication Principles and Vehicle Design



**Steve Kidd
and
John Czajkowski**



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The Golden Hour

- For the best chance of survival, a seriously traumatized patient has about 60 minutes from the time of the accident to delivery to a surgical team.
- The goal is to limit the average time for extrication to 15 minutes. This is both practical and attainable and will greatly enhance the time left in the patient's Golden Hour.



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Personal Protective Gear

- Appropriate head, eye, hand, and foot protection
- Approved coat and pants
- Bloodborne pathogen protection
- Hearing protection
- Respiratory protection

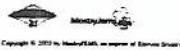


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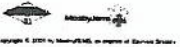
Powered Hydraulic Tools

- Power unit
- Spreader
- Cutter
- Ram
- Chains



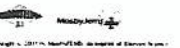
Hand Tools

- Cutting, prying, and lifting
- Electrically driven
- Pneumatic
- Manually operated



Rescue Action Plan

- A Rescue Action Plan allows you to closely plan your actions prior to the response.
- Following a Rescue Action Plan allows the team to work in a safe and timely manner.



Rescue Action Plan

- A good Rescue Action Plan for vehicle rescue will include the following steps:
 - Preparation and response
 - Arrival and scene size-up
 - Hazard control
 - Vehicle stabilization
 - Initial and sustained patient access
 - Disentanglement
 - Patient packaging
 - Patient transport
 - Scene termination and preparation



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Preparation and Response

- Before the Alarm
 - Receive proper training.
 - Learn the correct terminology and use it all the time.
- Response Considerations
 - Time of day
 - Weather conditions
 - Response routes
 - Routes to the hospital
 - Multiple calls
 - Reports of entrapment



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Arrival and Set-up

- Park in a fend-off position.
- Control the traffic.
- Assess hazards.
- Assess the crash before you exit.
- Provide crowd control.
- Conduct inner/outer circle surveys.



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On-Scene Hazards

- Traffic
- Downed electrical lines
- Underground electrical transmission box
- Severed gas lines

Call for utility assistance if needed.



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Inner and Outer Circle Surveys

- | | |
|---|---|
| <ul style="list-style-type: none">■ Outer Circle Survey<ul style="list-style-type: none">- Locate other patients.- Locate other cars.- Locate additional hazards.- Secure safety for inner/circle team. | <ul style="list-style-type: none">■ Inner Circle Survey<ul style="list-style-type: none">- Take a close-up look at the crash.- Make initial patient contact.- Identify patient condition.- Identify degree of entrapment.- Confirm safety before touching the vehicle. |
|---|---|

Remember: Energized electrical wires will kill.



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Hazard Control

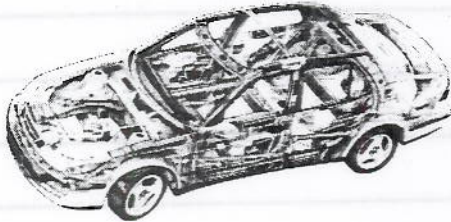
- Control hazards immediately.
- Establish fire hoseline of 100 gpm or greater.
- Cover spilled lubricants.
- Stay clear of unstable vehicles.
- Chock tires to prevent rolling.
- Establish action circle or safe area.
- Establish a tool staging area.



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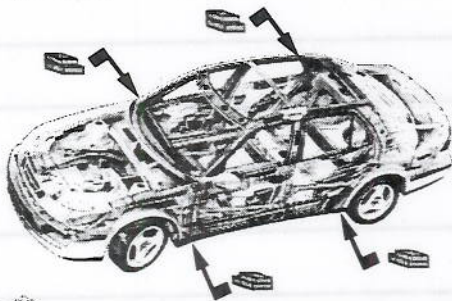
Unit-Body Construction



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Stabilizing an Upright Vehicle with Stepchocks



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Battery Safety

- Disconnecting a battery...
 - Neutralizes the electrical system
 - Stops undeployed airbags
 - Stops electric fuel pumps

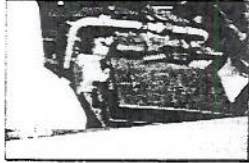
Remember: Disconnect the negative side first.



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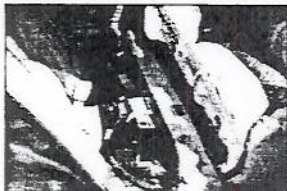


Battery Disconnect



A remote battery disconnect can sometimes be found near the battery or under the hood.

The battery may be located in the engine compartment, cargo area, or underneath the back seat.



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Patient Access

■ Initial Patient Access

- First physical contact with the patient
- Usually accomplished through an open window or door

■ Sustained Patient Access

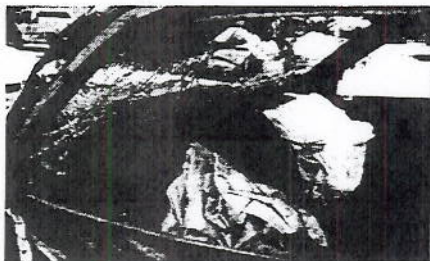
- Accomplished by entering the car *after* it is stabilized
- May involve breaking glass
- Allows for more definitive care



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Airbag Restraint Systems



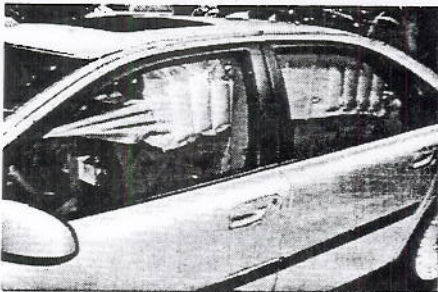
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Inflatable Tubular Structure



Inflatable Curtains



Dual-Chamber Thorax Protection

A dual-chamber side airbag unfolds and fills a large amount of space between the patient and the door.

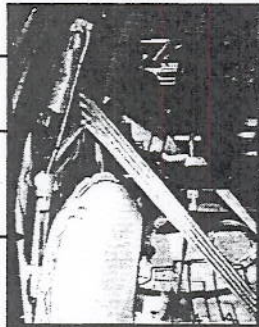


Seat Belt Pretensioners

Retractor

Cable

Pyrotechnic
firing
mechanism



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Interior Rescuer Responsibilities

- Turn the ignition off.
- Pass the keys outside.
- Unlock all doors.
- Open all windows.
- Cover the patient with hard and soft protection.



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Hybrid Cars

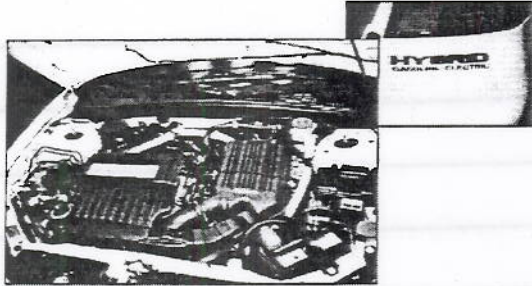
- Hybrid cars use both a gasoline engine and a high-voltage electric engine that is powered by a battery pack.
- The high-voltage circuit is well-protected by fuses.
- The wires for the high-voltage circuit are wrapped in orange.




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Hybrid Cars




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Disentanglement

Most vehicle extrications are accomplished by opening the roof, relocating the sides, and moving the dash assembly.

- Relocate the roof.
- Force the doors.
- Perform third-door conversion.
- Perform total side removal.
- Relocate the dash.


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Patient Removal and Packaging

Once freed from the wreckage, the patient is properly removed, giving due care to his injuries. Anticipate this next step by ensuring a clear path of travel for EMS personnel and preparing the proper equipment so it can be employed without delay.

- Anticipate patient removal.
- Keep the path of egress clear.
- Prepare patient care equipment while extrication is underway.

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Termination and Preparation

Remember your safety guidelines while removing the tools and equipment from the wreckage. Keep your protective gear in place.

- Remove tools and equipment safely.
- Keep protective gear in place.
- Return all equipment to full working order before leaving.
- Be prepared to safely handle another rescue if a crash occurs before you make it back to your station.



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Carbusters! Version 3.1

Hand Tools and Pneumatics



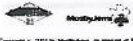
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Hand Tools and Pneumatics

- A good set of hand tools is critical to the overall success on the scene.
- Hand tools are important backups to power tools.
- Hand tools are inexpensive and will allow more units to be equipped for vehicle extrication.
- A well-trained rescue crew will be able to accomplish as much with hand tools as with powered hydraulic tools.



Hand Tools

All tools that are not machine-powered hydraulic systems are considered hand tools. This includes electrical, air-powered, and manually operated hand tools.



Hand Tools

- Hand tools . . .
 - Compliment powered hydraulics.
 - Serve as a backup to powered tools
 - Can be placed on more units
- A well-trained crew can do as much with hand tools.

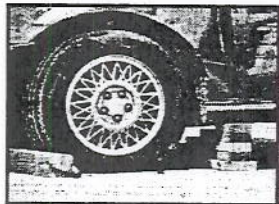


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Stabilization Tools

The need for extrication hand tools will first occur during the stabilization phase of the Rescue Action Plan. These tools include cribbing and tire valve tools.



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Recommended Minimum Cribbing

- Four step chocks
- Twelve 4-inch by 4-inch by 18- to 24-inch wood cribs
- Four wedges
- All cribbing should be made of strong local wood.
- Commercially made products are available.

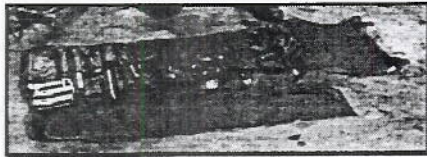


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Hand Tool Kit

A good set of hand tools that is well-organized and easy to access is essential. This kit should be dedicated for rescue purposes only and should be inventoried and maintained daily.



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Hand Tool Kit

- Hack saws with replacement blades
- Spring-loaded center punch
- Windshield saw
- Utility knife with five spare blades
- 12" cold chisel
- 8" flat chisel
- Lumber crayons
- Duct tape
- Offset snips
- 10-piece hex key sets
- Lineman's side cutters
- Battery pliers
- 10" adjustable wrench
- Flat pry bar
- 17" flat-head screwdriver
- 11" Phillips screwdriver
- Locking pliers
- Battery cable cutter



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Tempered Glass

Virtually any tool that has a sharp point to which enough energy can be concentrated will work to break tempered glass. The object is to remove the glass while controlling it as much as possible.



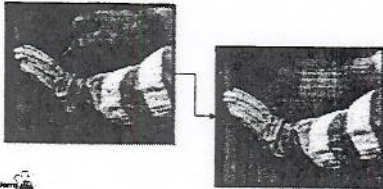
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Tempered Glass Tools

- Spring-loaded center punch
- Axe and Halligan
- Sharp edge of a screwdriver




 Mandatory Safety
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Patient Access

- Unlock all doors.
- Open all windows.
- Turn off the ignition.
- Pass the keys outside.
- Assess the patient.
- Provide hard and soft patient protection.
- Assume spine and airway control.
- Continue to protect and monitor the patient.
- Keep the exterior crews informed.

Remember: Energized electrical wires will kill.

 Mandatory Safety
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Laminated Glass

- The windshield is constructed of laminated glass and is glued in place. It is removed by cutting it with an axe, windshield saw, or reciprocating saw.

In all cases, when removing glass on the vehicle, be sure the patient and interior rescuer are properly protected. Remember to keep your mouth shut when cutting glass. Never run your gloved hand sideways along the broken glass, as severe lacerations can result, even to a gloved hand.

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Roof Removal

For moderate to heavy entrapment situations, moving the roof out of the way early in the operation provides easier sustained access to the patient for disentanglement. It also gives fresh air to the patient and interior rescuers and allows for a possible emergency egress route for the patient if his or her condition deteriorates.



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Roof Removal with a Hacksaw

Preparation Steps

- Choose a saw with fixed blade pins.
- Use high-quality blades.
- Tighten the blade until it “rings” when tapped.
- Always place the best blade in the tool when you put it away.
- Remove loose metal, trim, and glass.
- You may need to tape above and below the cut.



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Roof Removal with a Hacksaw

While Cutting

- Lubricate the blade (optional).
- Avoid seat belt protrusions and any obstacles.
- Use a firm cutting action.
- Lift on the roof near the post that is being cut.
- If a blade breaks or gets stuck, grab another saw and continue cutting.
- Switch out rescuers often.



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Reciprocating Saw

A reciprocating saw is an electrically powered saw used to cut metal and wood. The saw's power source can be either the standard AC or battery power. If it is battery powered, you should keep a few charged batteries handy to extend the operation of the tool. Use a heavy-gauge cord for AC-powered saws to reduce the electrical resistance and allow the tool to run more efficiently.



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Reciprocating Saw

Assess the scene for flammable vapors before using a reciprocating saw; it is a spark-producing tool.

- Quick-change blade feature
- Heavy-duty motor
- Grip big enough for a gloved hand
- Use good-quality blades
- Start with the blade at an angle.
- Keep the base plate against what you are cutting.
- Do not bear down too hard.
- Lift on the piece being cut.



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Hatchback Cars

- Open the hatchback with a key if possible.
- A closed hatch means compressed pistons.
- Neutralize the hydraulic lift pistons.
- Secure with duct tape.
- Some hatches use springs or torsion bar-loaded hinges.
- Avoid cutting the hydraulic cylinder.



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Air Chisels

Air chisels are pneumatic tools that come with an assortment of cutting blades, including chisel and panel cutting blades of various lengths. They make quick work of roof posts and sheet metal on vehicles. They make a lot of noise, so assure the patient before starting the cut and use hearing protection.

Operate air chisels according to manufacturer's guidelines. Running the air pressure above the recommended level will cause major damage to the tool, possibly rendering it useless on the scene.



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Air Chisels

- Use hearing and eye protection.
- Operate according to manufacturer's recommendations.
- Do not exceed recommended air pressure.
- Use the right chisel for the job.
- Keep the gun lubricated at all times.



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Door Opening and Removal

The doors can be removed with hand tools by disassembly, cutting around the latch, and opening the door. Look at how the door is jammed. It may be possible to simply bend some light metal back and open the door normally.

Disconnect the electrical system in case of undeployed airbags.

- Disassembly
- Cut around the striker bolt and latch from the door jamb side.
- Expose the striker bolt and cut with a reciprocating saw.
- Cut the door strap with bolt cutters.



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Come-Along Winch

The come-along has multiple uses on the vehicle rescue scene. It is a basic pulling tool, designed to pull in-line. When attached to rescue chains or straps, a come-along can be used in stabilization to secure a vehicle in place, move obstructing metal and debris, or if needed, move the wrecked vehicle.

As a safety feature, the handle will bend before the winch fails. If you are using a come-along and the handle begins to bend, STOP! The winch has reached its capacity. Use only approved handles in a come-along for this reason.



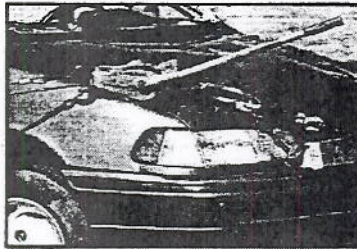
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Door Extension Maneuver

The door may need to be hyper-extended out of the way. If it is too damaged to be walked back, you can use a come-along with rescue chains or straps.

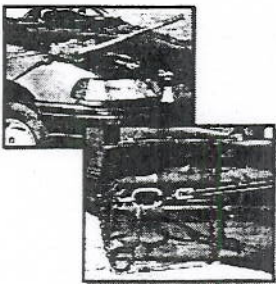


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Door Extension Maneuver



- Anchor to the front of the car with a short chain or strap.
- Wrap a long chain around the door.
- Adjust the chain and attach the hoop to the cable end.
- Operate and pull the door outward.



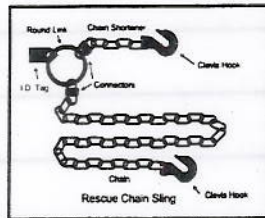
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Rescue Chain Sling Assembly

- Two slings to a set
- Specifically designed for the pulling tool
- ID tag
- Hoop
- Connectors
- Chain
- Hooks

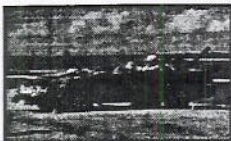


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Side Displacement Maneuver

An entire side of a four-door car can be displaced without much more effort than removing a single door.



- Force front door hinges.
- Loosen the rear door at the latch.
- Cut the bottom of the B-post and remove the doors.

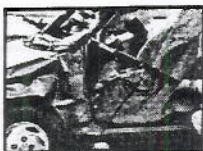


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Dash Lift Maneuver

Even more room can be made by lifting the dash. This is common in high-impact frontal collisions.



- Place a relief cut if necessary.
- Use a jack between the lower B-post and the front upper door jamb.
- Protect the patient and operate the jack.
- Extend the dash 8- to 10-inches beyond normal.



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Third-Door Conversion

If the patient is trapped in the rear of a two-door vehicle, a third-door conversion can provide egress for the patient.



- Use an air chisel to cut from top of rear body panel down to bottom.
- Cut from bottom of B-post to rear cut.
- Cut through bottom of B-post to inner skin of panel.
- Cut inside supports.
- Remove the piece.
- Protect sharp edges.



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Terminating and Securing Tools

Once the patient is transported, remove the tools and make them ready for the next call before leaving the scene. Inspect the tools for any obvious problems before stowing them.

Your goal is to be prepared for the next call before you leave the scene.

At the Scene

- Carefully take the tools down.
- Keep protective gear in place.
- Inspect the tools.
- Replace worn blades.
- Wipe off gross debris.



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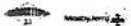


Terminating and Securing Tools

Check the tools and equipment again when back at the station. Clean them thoroughly, oil anything that needs it, and be sure to restock any consumed supplies such as blades, patient covers, etc.

At the Station

- Inspect the tools thoroughly.
- Inspect and clean your protective gear.
- Replace any consumed supplies.
- Conduct a short critique of the call.



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Carbusters! Version 3.1

Extrication Techniques



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John Czajkowski**



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Extrication Techniques

This module concentrates on powered hydraulic rescue tools and their application techniques. Although not solely depended on for handling vehicle entrapment situations, powered hydraulic rescue tools are certainly the most powerful and efficient of all rescue tools.

Training in their practical and safe use is important for all rescuers.

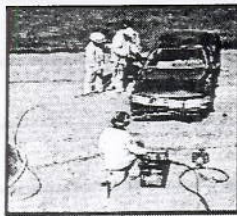


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Powered Hydraulic Rescue Tools

A power unit pumps hydraulic fluid under high pressure through hoses. The pressure moves piston-driven devices such as spreaders and cutters.





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Powered Hydraulic Rescue Tools

- Power unit
- Spreader
- Cutter
- Rams
- Combination tools

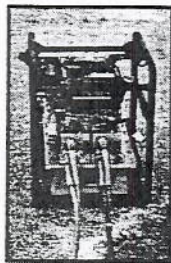




 
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Power Unit

- Motor
- Hydraulic pump
- 20-minutes average run time
- Hoses attached to a manifold
- Hydraulic fluid reservoir

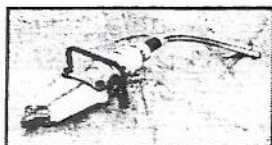




 
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Powered Hydraulic Spreader

- Used primarily to force car doors
- Can be used to spread, clamp, lift, or pull
- May have a chain attachment package



 
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Powered Hydraulic Spreader

- Use good body mechanics.
- This tool will kick back.
- Stay clear of the rear of the tool while opening.
- Do not get trapped between the spreader and the car body.
- Extreme squeeze hazard.
- Crib while lifting.

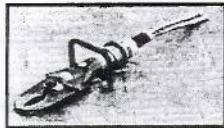


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Powered Hydraulic Cutter

- This is the main metal cutting tool for extrication.
- Check manufacturer's recommendations for cutting capabilities.
- Keep the blades closed while not in use.
- Blades travel to the path of least resistance, so the tool will rotate.



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Powered Hydraulic Cutter

- Align the blades perpendicular to the object being cut.
- Expect the tool to rotate.
- Don't let the blade's tips close on hardened steel.
- Extreme amputation hazard. Do not allow any body part to touch the blades any time the tool is running.

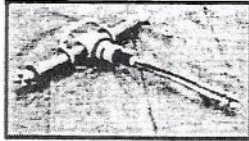



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Powered Hydraulic Ram

- Primarily a pushing tool
- Some models can pull
- When pulling, allow the tool to suspend between the chains so you don't bend the ram
- Keep fingers away from the ends when the tool is under pressure
- Crib as you lift




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Powered Hydraulic Combination Tools

- Tool can spread, pull, and cut because the cutter blades are inside the spreader's arms
- Arms are shorter than regular spreader, so less length of the spread
- Extreme pinch and amputation hazard




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Roof Removal

For moderate to heavy entrapment situations, moving the roof out of the way early in the operation provides easier sustained access to the patient for disentanglement. It also gives fresh air to the patient and interior rescuers and allows for a possible emergency egress route for the patient if his or her condition deteriorates.

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Roof Displacement

- Start at the side opposite the patient.
- Avoid reinforced areas in posts.
- Avoid airbag systems.
- Cut posts at their narrowest point if possible.
- Secure any flapped sections.
- Cover all sharp edges.



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Door Displacement

The object is to get the spreader's tips to the inner skin of the door, get a good push-off point on the doorjamb, and spread it until the door opens.

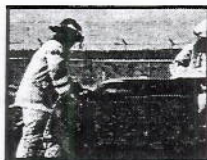
Have cutting capability as a backup.



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Hinge First vs. Latch First



Latch First

Keep clear of an airbag's strike zone!



Hinge First



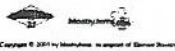
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Sliding Doors

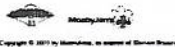
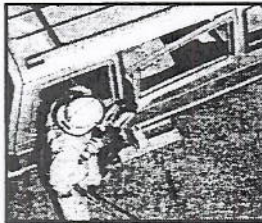
With minivans becoming today's favorite family vehicle, jammed sliding doors are becoming common. These can be displaced and removed quickly.

The key is knowing where the latch and striker bolt are located.



Sliding Doors

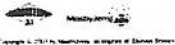
- The latch is usually located closer to the rear of a van.
- Make a purchase point on the latch side.
- Work the spreader's tips to the inner skin.
- Once door is free from the latch, use the cutters to sever the rollers at top and bottom as necessary.



Third Door Pick-Up Trucks

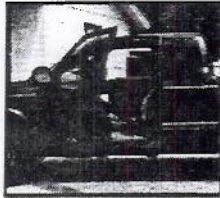
Pick-up trucks with a backward swinging "third door" can present a mild challenge if you have not preplanned their removal.

It may be best to remove the front door from the hinge side first, then work your way back to the latch assembly where the two doors meet.



Third Door Pick-Up Trucks

- It may be best to open the front door at the hinge and work back.
- If a hinge-side-first method is not practical, use a latch-side-first method.
- Rear door latches at top and bottom.
- Cut away the top of the window frame leaving the latch.
- Spread the door at the bottom latch.



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Fifth-Door Maneuver

In severe side impact collisions, it might be more advantageous to create a large side opening. Performing a fifth-door maneuver on a four-door car will provide a substantial access opening for the rescuers and good egress for the patient.



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Fifth-Door Maneuver

- Force the rear door at the latch.
- Cut a notch in B post and spread off sill.
- Pull door out on front door hinges and tie into place or...
- Cut hinges and remove entire side.



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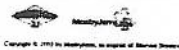


Third-Door Conversion

If the patient is trapped in the rear of a two-door vehicle, a third-door conversion can provide egress for the patient.



- Displace the door.
- Make a relief cut at the top of the panel as far back as possible.
- Make a horizontal cut at the doorjamb and sill.
- Use an air chisel to cut away the outer skin.
- Put the spreader or ram at the floor sill area and spread the panel outward.

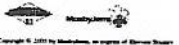


Dash Lift Maneuver

Even more room can be made by lifting the dash. This is common in high-impact frontal collisions.



- Make a relief cut if necessary.
- Use a ram between the lower B Post and the front upper door jamb.
- Protect the patient and operate the ram.
- Extend the dash 8- to 10-inches beyond normal.

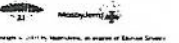


Feet Trapped at Pedals

In some instances, the driver's feet can become trapped between the floor and the pedals. The pedal can be cut away or simply bent back by pulling it from outside the car using two rescuers to provide smooth manual force.

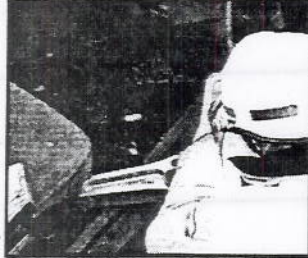


- Cut away the pedals.
- Pull the pedal away from the foot.
- Try cutting away the patient's shoe or boot laces.



Seat Displacement

If the seat is an obstruction for patient removal, attempt to gently slide it back using the adjustment levers. If these are jammed, it may be necessary to move the seat using a spreader.

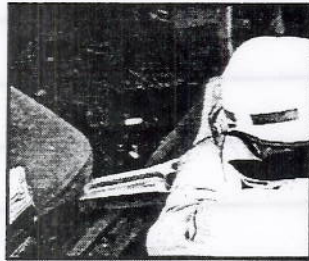


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Seat Displacement

Avoid any firing mechanisms for seat mounted airbags, and stay out of the strike zone for safety.



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Impaled Objects

On rare occasions pieces of a car's interior will become impaled in a patient. If the object that is impaled is still attached to the automobile in any way, it will have to be stabilized and separated from the vehicle.

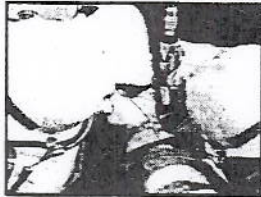


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Impaled Objects

- Start by stabilizing the item.
- Disassembly or cutting are most common options.
- A Whizzer tool is a good choice but causes lots of sparks.
- Check for flammable vapors and have fire suppression at hand.



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Impaled Objects

- Create a heat sink with a wet cloth or commercial heat sink product.
- Wrap the heat sink between the patient and the cut.
- Shield the patient from sparks and debris.
- Consider eye protection for the patient if unable to shield.



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Terminating and Securing Tools

Once the patient is transported, remove the tools and make them ready for the next call before leaving the scene. Inspect the tools for any obvious problems before stowing them.

Your goal is to be prepared for the next call before you leave the scene.

At the Scene

- Carefully take the tools down.
- Keep protective gear in place.
- Inspect the tools.
- Replace used fuel.
- Wipe off gross debris.



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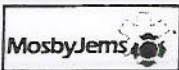


Carbusters! Version 3.1

Patient Considerations and Mechanisms of Injury



**Steve Kidd
and
John Czajkowski**



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Extrication Techniques

This module concentrates on how the patient's situation affects your total Rescue Action Plan.

We will examine how people are injured by the dynamics of vehicle crashes and how the Rescue Action Plan is developed to consider the patient's condition.

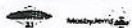
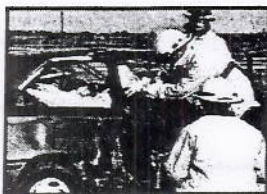


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Rescuer Safety Responsibilities

- You are responsible for your own safety.
- Protect yourself against bloodborne pathogens.
- Keep fellow rescuers safe.
- Keep your patient safe.



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Dynamics of the Vehicle Crash

■ Kinetic Energy

- Measured in pounds of force
- Formula: mass X velocity squared divided by 2
- Speed of vehicle the biggest factor
- Double speed quadruples force
- Kinetic energy of both vehicles is combined in a collision



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Dynamics of the Vehicle Crash

■ Inertia

- An object in motion remains in motion until acted on by an outside force.
- An object at rest remains at rest until acted on by an outside force.



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Effects of Size, Age, Health and Physical Conditioning

- Most vehicles are designed for 90% of the population.
 - Expect different injuries for smaller versus taller persons.
- Age makes a difference.
 - Children are anatomically different than adults--their heads are larger in proportion to their bodies.
 - Older people have more brittle bones.
 - Older people are more prone to concussions.

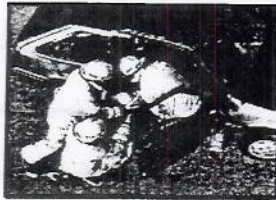


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The Golden Hour

- Defined as the 60 minutes from the time of injury to trauma surgeon.
- Survival chances diminish as time goes on.
- Rapid extrication enhances the Golden Hour.



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Rescue Action Plan: Preparation and Response

- Begins with the person taking the initial call
 - Determine the needs of the call
 - Typical response: fire engine for hazard control and an ambulance for patient care
 - For an entrapment situation, response is escalated
 - Ask the following question:

"Does it look like we will have to cut the car apart to get the people out?"

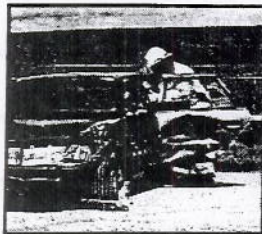


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Arrival and Setup

- Initial Actions
 - Size-up for hazards.
 - Park in a fend-off position.
 - Position transport unit between scene and hospital.
 - Survey the scene.
 - Gather information from witnesses.
 - Make initial access without moving the car.



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Arrival and Setup

■ Initial Patient Assessment

- Airway
- Breathing
- Circulation
- Spinal immobilization
- Bleeding
- Pediatric assessment will be different
- Assess pulses



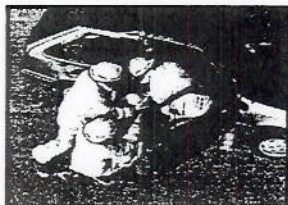
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Rapid Patient Removal

■ Indicators

- Shock
- Patient in immediate danger



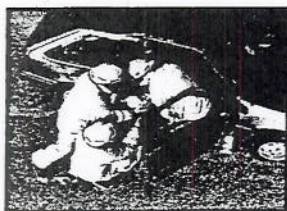
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Rapid Patient Removal

■ Procedure

- Use four rescuers
- Apply C-collar
- Lift patient and slide backboard under
- Rotate patient and align with board
- Lower to backboard and adjust patient
- Remove from vehicle



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Mechanisms of Injury

- Stabilize the vehicle
- Remove the ignition key
- Disconnect the electrical system
- Get a rescuer inside
- Prepare the inside for rescue

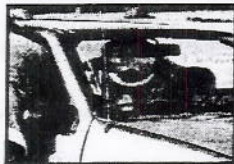


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Check Interior for Signs of Injury

- Interior Indicators
 - Anything out of place that could have struck the patient
 - Windshield damage
 - Steering wheel deformity
 - Broken plastic
 - Broken glass
 - Impaled objects in patient
 - Strange odors



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Deployed Airbag

- If the Air Bag is Deployed
 - Look for signs of chest injury.
 - Internal organs can still be damaged.
 - Look at the airbag for signs that the patient struck it with force.
 - A smaller driver close to the steering wheel is at greatest risk.
 - Look for friction burns to the inner arms, face, and neck.
 - Look for signs of blunt trauma to the face and neck.



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Applying a Cervical Collar

- Check for tracheal deviation.
- Choose the proper size.
- Gently move the patient's head to a neutral position (stop if there is resistance or significant pain).
- Apply the collar.
- Do not lift or pull the head upward.
- Never let go, even with the collar on.

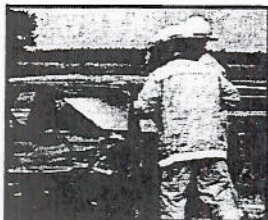


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Protecting the Patient

- Soft Protection
 - Flame-resistant tarp
 - Flame-resistant blanket
- Hard Protection
 - Plywood board
 - Long backboard
 - Polycarbonate board



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Protecting the Patient

- Protect the patient from broken glass and sharp metal.
- Apply a dust mask if the windshield is being cut by a saw.
- Use a non-rebreather mask for oxygen and protection.
- Provide psychological support.

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Prepare to Package and Remove

- Continue care when others can get closer.
- Perform a second patient survey.
- Develop a plan "B" for removal.
- Apply immobilization device.



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Removal Through a Roof Opening

- Tilt the seat back.
- Insert a long backboard between the patient and seat back.
- Rescuer at head is in charge of action.
- Lift on command.
- Lift under the patient's legs.
- Bring the board level and secure the straps.
- Carry away from the car.



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Removal Through a Side Opening

- Feet First
 - This is usually the best method.
 - Especially good when there is trauma to the lower extremities.
 - Apply short immobilization device.
 - Lift the patient at the hips so the device is clear.
 - Position the patient on the board, secure, and remove from the car.



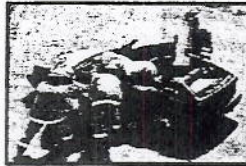
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Removal Through a Side Opening

■ Head First

- Apply short immobilization device.
- Lift the patient at the hips so the device is clear.
- Support the lower extremities.
- Position the patient on the board, secure, and remove from the car.



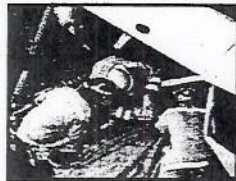
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Removal When Vehicle is on its Side

■ Patient on Bottom Side

- The patient will be against the bottom side door.
- Get as much access as possible.
- Flap or remove roof, depending on the car's position.



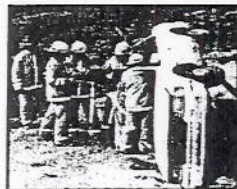
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Removal When Vehicle is on its Side

■ Patient Still Seat Belted on Top Side

- Use a rescuer to support the backboard.
- Remove the patient to the backboard and secure.
- Remove from the car.

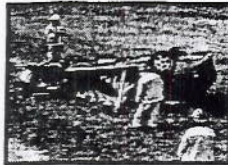


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Removal When Vehicle is Upside Down

- The legs may be trapped behind the dash.
- You may need to manipulate the legs.
- The patient may be pinned between the seat back and roof.
- Spread up with ram to clear airway.
- Patient access is difficult for more than one rescuer.
- If needed, apply a nylon strap or large rope to the patient and carefully pull him on to the backboard.



Patient Transport

- Proper radio report
 - Required by most health care systems
 - Allows the trauma team time to prepare
 - Provides benchmarks for the patient's condition
- Monitor the patient during transport
- Air transport
 - The patient must meet local protocols
 - You may need a special backboard
 - Remember fire protection for helicopter landing zone



Preparing for the Next Incident

- At the Scene
 - Check for missed patients.
 - Use universal precautions during cleanup.
 - Take pictures if possible.
- At the Station
 - Conduct an incident critique.
 - Use the Rescue Action Plan to organize the critique.

Your goal is to be prepared for the next call before you leave the scene.