VEHICLE ENTRAPMENT RESCUE

and

PRE-HOSPITAL TRAUMA CARE

The World's first structured study into vehicle entrapment rescue and pre-hospital trauma care

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Vehicle Entrapment Rescue
And
Pre-Hospital Trauma Care

A retrospective structured study 1991-1993

By,

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As the availability for immediate care becomes more widespread a fresh approach is needed when reviewing R.T.A. policy. When confronted with the seriously injured entrapped casualty, the medical attendance will be hard pressed to retrieve and stabilise the patient. All too often casualty care can be neglected or the casualty's release waited on, before invasive care is administered. In the absence of 'rapid accessing' or sound 'controlled release management', the physical requirements to carry through these functions will not be available.

Aggressive resuscitation and invasive intervention needs space. Introducing advanced airway therapy and monitoring the patient requires a combined effort. Realistic positioning of the ventilator, cardiac monitor, oximeter and giving set, must be catered for, along with the medical presence and their ancillary equipment. The placement of extrication devices and splintage are all part of the commitment.

To err on the side of caution will offer the greatest benefits in contending with the suspected cord injury and the wrongly assessed 'lesser injured' patient.

It will also consolidate the rescue team's ability to recognise and contend with life threatening injuries and complications. Attempted retrieval of the victim cannot be hoped for where certification is emblazoned upon the mind or where the rescue effort is not rehearsed.

By L M Watson
Vehicle Entrapment Rescue and Pre-hospital Trauma Care

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Abstract

Objective:
To explain the preferred methods of advanced vehicle entrapment rescue. In 7,500 cases per year the UK fire services work alongside medical services in the rescue of trapped car occupants. To afford a clearer understanding of the methods of physical rescue employed by the Fire Service by medical crews and a working understanding of Advanced Life Support for all Fire fighters.

Methods:
A retrospective study of all the patients involved in road vehicle entrapments attended by the Royal London Hospital, Helicopter Emergency Medical Service (HEMS) between April 1991 and June 1993.

Results:
Since the start of our computerised records in April 1991 HEMS attended a total of 737 road traffic accidents of which 90 (12%) involved entrapments. This represents 40 cases per year.

Five patients died on scene. 32 patients median ISS 17 (range 1 - 59) were transported by helicopter to the Royal London Hospital, of which 4 subsequently died, median ISS 44 (range 24 - 59). The remaining 53 patients were transported to the nearest hospital.

A total of nine patients died representing 10% of the total.

In 45 (50%) cases the patient was not extricated within 30 minutes, nor were there special circumstances accounting for delay.

Conclusion:
Advanced vehicle entrapment rescue is to create rapid access to the casualty, in order to stabilise the patient, and secure their release with the minimum of delay, without doing further harm. Immediate uncontrolled release of casualties is only indicated if their life is in immediate danger from their surroundings. Proper assessment, primary survey and successful resuscitation of the casualty depends on realistic rapid access to
the patient. This is best done by primary roof removal, the preferred method of gaining access to patients, and protocols and methods of controlled extrication are further described. Rapid access, primary survey and stabilisation, prior to a controlled release is the advocated method. Any extrication, without advanced invasive life support techniques, such as intubation or insertions of chest drains should be completed within 30 minutes. In 45 cases (50%) we failed to meet this standard. This establishes a definite need for more exact extrication training, preferably combined interactive training, for fire Services, paramedical and medical crews.
STUDY AND ANALYSIS

VEHICLE ENTRAPMENT RESCUE AND PRE-HOSPITAL TRAUMA CARE

45 Minutes PAPER;
by Len Watson
Author of ‘RTA persons trapped’ Vehicle Accident Rescue

LOGIC: An understanding of the UK scene

As a structured study, 'Vehicle Entrapment Rescue and Pre-hospital Trauma Care' was conducted with a known level of commitment, which was cultured as events progressed and one where the success can be measured retrospectively in the fatality and serious injury rate. Turn-outs for the Helicopter Emergency Medical Service (HEMS) are via the ambulance service, where a paramedic screens all in-coming emergency calls. The study relates to rescue in a highly populated environment (7.5 million population with a daytime commuter population in excess of 2.5 million), where the city land mass is under 700 square miles, with all areas relatively well serviced with hospitals.

Wearing of front and rear seat belts are compulsory and the speed limit for motorways (freeways) is 70 MPH. However, motorways are our safest roads and it is the urban trunk road, which comprise of either dual carriageways, with and without dividing barriers and medium strips, and our other major roads with two way traffic, that are the high risk areas. City limits run 30, 40, 50 and 60 MPH depending on the built up area.

The fatality rate is divided equally between the daylight hours and the hours of darkness. 1/3 of all our serious accidents are single vehicle accidents, where the vehicle comes in contact with a pointed object, tree, post, lamp standard (street lighting), road furniture (stop signals, signs etc.) or a stationary object.

This must also be viewed against the backdrop that the UK, in terms of actual road miles, has the densest road traffic network in the world. 1990 saw 2,300 car user fatalities and a Fire Service 'hands-on' extrication entrapment involvement of approximately 7,500. This makes Britain, in terms of vehicle population in relation to road miles travelled, one of the safest countries in the world to travel by road.

In contrast, European and Japanese vehicles relate to your compact and sub-compact North American automobile and we also produce mini models. Accident entrapments within these vehicles present many variations, all of which hold at least one thing in
common, 'ergonomic design'. One may say a future prospect which is already knocking at your door.

The head-on/front 1/4 oblique (fender to fender) and side impact (T-bone) accident, where the vehicle remains on road and in an upright position, accounts for at least 75% of all vehicle accident entrapments. The head-on or front 1/4 oblique impact, with displacement of the engine compartment, road wheel and steering geometry into the passenger space is often very prevalent. Pinning of the lower limbs are common and can be very severe, with no hope of a speedy release.

It is not the extreme to see the engine driven into the interior, the feet encased by folding in the floorboard, wrapping over of the rocker panel and enfolding of the front doorpost, or to find more than one casualty pinned in the wreckage. Grievous insult can usually be measured by bodywork intrusion, mitigating in-built safety restraints and reducing available access in an already compact space. Mass differential between the smaller compact and the larger sedan and semi trailer leaves little to the imagination.

The HEMS is based central to the City at the helipad on top of the Royal London Hospital. At present it only services the population during daylight hours. The medical capability of the HEMS unit carries casualty care far beyond paramedical intervention. Retrieval of the entrapped victim has in the truest sense been given the ultimate profile, with an average fire service response time of under five minutes anywhere in the capital, a total casualty care policy is well on the way to being a virtual reality.
THE RESCUE SCENE COMING TOGETHER ON AN URBAN TRUNK ROAD IN LONDON AT THE INITIAL STAGES OF THIS DOUBLE ENTRAPMENT

Not all entrapped victims are seriously injured and we see here a Holmatro rapid intervention set has been used to gain initial access by forcing the drivers door.
Vehicle Entrapment Rescue and prehospital trauma care

A.B.M. WILMINK
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Introduction

Every year there are around 190,000 people injured in road traffic accidents in the UK travelling in cars. There are annually around 2,300 fatalities of car inhabitants involved in road traffic accidents. Per year over 26,000 car users involved in an RTA, sustain serious injuries 1). In 7,500 cases per year the fire services are involved in the rescue of car occupants, due to some form of vehicular entrapment 2-3). The fire service being officially recognised as the primary rescue service in the UK, is invariably involved in any RTA with persons trapped inside a vehicle.

Immediate life threatening injuries, involve airway and breathing problems and major haemorrhages. Injuries causing chronic disability often involve the spinal cord. More than half of spinal cord injuries (SCI) are caused by motor vehicle crashes 4). American studies show that in accidents severe enough to require the vehicle to be towed, 33% of the patients will sustain a severe neck injury 5). In cases of vehicular entrapment this figure must be equal or higher, due to the greater impact which caused the invading of the passenger space. Around 40% of spinal fractures have associated neurologic damage 6-7). The vast majority of the SCI are incomplete SCI 7). A significant number of the associated neurologic injuries occur or are aggravated during emergency extrication and transport of the patient 8-9). Immaculate physical rescue and prehospital trauma life support will not only safe lives, but can also potentially prevent chronic disability for a great number of patients. Good co-operation between the Fire services, the ambulance crews, and doctors working in the prehospital setting is essential. This co-operation depends on clear and unequivocal communications and a sound understanding of the nature of the job each rescue service has to do, the priorities and work methods of each service.

Personnel of the London Fire Brigade’s North East Area Command are undergoing a pilot training scheme in the principles of advanced extrication, Basic Trauma Life support and prehospital trauma care, to enable fire crews to anticipate and assist efficiently in the trauma life support of trapped persons. Equally important is a reciprocal understanding of the methods of physical rescue of the Fire service, by all medical and ambulance crews who will possibly attend vehicle entrapments. To our knowledge there is no organised structured training of ambulance crews and doctors working in the pre hospital setting in methods of physical rescue in cases of vehicle entrapment. The knowledge of medical personnel is therefore dependent on "on the job experience" and may, as a result, vary widely.
The Helicopter Emergency Medical Service (HEMS) is the only helicopter service in the UK with an experienced trauma doctor on board. It is despatched by the London Ambulance Service to serious accidents requiring medical attention at scene. HEMS is dispatched by a paramedic who screens all the incoming emergency phone calls to LAS control centre. The dispatching criteria include RTA’s in which a patient is trapped or ejected, where there is an associated fatality, or where the passenger space is invaded. The training of all new HEMS doctors includes a course in advanced vehicle entrapment rescue, by an instructor of the London Fire Brigade.

Methods

A retrospective study of all the patients involved in vehicle accident entrapments from April 1991 till June 1993 was undertaken to establish the number of entrapments, the average time a person was trapped in vehicle, and the associated injuries. The method of advanced vehicle entrapment rescue, as it emerged from the co-operation between HEMS and the London Fire Brigade, will then be discussed.

Results

Since the start of our computerised records in April 1991, HEMS attended a total of 737 serious road traffic accidents of which 90 (12%) involved vehicle entrapment, an average of 40 cases per year. The average time a person was trapped was 44 minutes. 5 patients died on scene. 32 patients median ISS 17 (range 1 - 59) were transported by helicopter to the Royal London Hospital of which 4 subsequently died median ISS 44 (range 24 -59), and the remaining 53 patients were transported to the nearest hospital.

A total of nine patients died, representing 10% of the total.

Chart 1 shows the entrapment time.

Table 2 shows the primary survey of injuries.

Chart 2 shows a breakdown of the injuries identified on scene.

Discussion

Advanced vehicle entrapment rescue

In rural areas the head on/front 1/4 oblique and side impact accident where the vehicle remains on road and in an upright position, account for 75% of all vehicle accident entrapments. In built-up areas the same accident types account for 90% of all entrapments 3-15). The head on impact with displacement of the engine compartment into the passenger space is often associated with lower leg fractures, the feet of the driver can be trapped between the pedals. In case of dashboard trauma, which is typically seen in the head on impact, patella fractures, shaft of femur fractures, posterior hip dislocation and a pelvis fracture must be suspected. If there is damage to the windscreen or centre of the steering wheel, or if the casualty did not wear a seatbelt, head injuries and cervical spine injuries are more prevalent. A bent steering wheel is an indication for chest and abdominal injuries.
The 1/4 oblique impact is associated with the same injuries. In case of severe collapse of the windscreen pillar and front doorpost post abdominal and chest injuries are more likely.

The side impact is typically associated with injuries, on the side of the accident damage. The chances of head and cervical spine injury are higher, due the fact that head restraints and seat belts are ineffective in side impacts. Not only is the passenger space usually more invaded in comparison to the head on or front 1/4 oblique impact but there is less space between the victim and the side structure of the vehicle in the first place and this is often associated with more severe injuries.

Vehicle entrapment can be distinguished in two different categories. The first category is superstructure entrapment. The casualty is actually pinned down in the vehicle by the deformity in the superstructure, the need for physical rescue is obvious in this case. The second category is restricted space entrapments. The casualty is not actually pinned down in the vehicle, but there is restricted space to manoeuvre the casualty. The need for physical rescue is injury related. With serious accidents it is absolutely certain that the casualty has no injuries, there is, in theory, a possibility to remove a casualty without any form of physical rescue. Normally there are obvious injuries and severe occult injuries must be suspected, so manoeuvring casualties without proper stabilisation carries great risks. The need for physical rescue cannot be overemphasised. It is better to gain wider access to the casualty by removing parts of the vehicle, than risking further damage to the casualty by manoeuvring them.

Vehicle entrapment rescue means dismantling parts of a car in order to gain access to and extricate a trapped person. Advanced vehicle entrapment rescue is to create a rapid and suitable access to the casualty, in order to stabilise the patient and to secure their release in line with advanced trauma life support and suitable methods of extrication, and the protection of further damage to their injuries. According to the circumstances physical rescue can be in two different forms. The first form is immediate release. ‘Immediate release’ is necessary whenever a casualty’s life is in immediate danger from their surroundings:- In case of fire, submersion, toxic fumes or hazardous materials. Or in case of a police directive or medical emergency i.e. where a casualty has circulatory arrest and CPR cannot be commenced in the car. Uncontrolled immediate release carries risks to aggravate the patients injuries and should therefore only be carried out in case of an absolute emergency. The second form of advanced vehicle entrapment rescue is rapid accessing, stabilisation of the patient and controlled release.

‘Rapid accessing’ is the initial act of gaining realistic access to the casualty by physically removing the roof structure. This can be achieved in a number of ways i.e. complete removal, flap back, flap forward etc. However, in the interest of efficiency it becomes vital to conduct roof removal with the minimum amount of cutting, as multi cut operation becomes time consuming. Rapid accessing needs to be conducted quickly and safely. The vehicle needs to be secured and stabilised and a set programme for glass management adhered to. The casualty and attending medics need to be protected using soft clear plastic. With close proximity cutting, hard protection in the form of a plywood board or rigid plastic sheet must be
used to disperse the load of the tool coming inadvertently in contact with the casualty and afford defence against metal and rigid plastic fragmentation.

Primary roof removal is mandatory, because it is the quickest way to create optimal access to the patient. It creates good and realistic access to assess a casualty. It allows proper cervical spine immobilisation, assessment of airway and breathing problems, and if necessary, it allows intubation of the patient whilst maintaining cervical spine control. It also caters for the insertion of chest drains while the patient is still in the car and the fitting of extrication devices is also considerably facilitated by removal of the roof. Normally primary roof removal, alongside scene assessment, risk control and vehicle stabilisation, should take a trained fire crew no more than 3 - 5 minutes. Extricating a seriously injured person, trapped in a vehicle, without roof removal is negligent, unless in case of the need for an immediate release. Once the roof structure is removed or flapped, clear plastic sheeting can be utilised as necessary to protect the casualty from the elements or downdraught from the air ambulance.

Controlled release normally follows primary roof removal. The concept of progressively dismantling the vehicle (removing the sides, relocating the front of the vehicle and stripping the interior) to gain the optimum space in the shortest period of time, has proven the most effective form of rescue, offering the greatest benefits to casualties and rescuers alike. To reduce the time factor in conducting controlled release, physical rescue squads can work around attending medical personnel, with the understanding that a necessary 'immediate release' can be called for at any time during the extrication.

Successful advanced vehicle entrapment rescue depends on good co-operation between the medical team and Fire services. There should be one person in charge of the Fire service and one for the medical crews. Communications between the two services should ideally be limited to these two persons, each then directing their own crew. When forcing doors, spreading or cutting with hydraulic tools, it may be necessary for personnel to alter their stance or move position to allow physical rescue squads room to manoeuvre. In stripping the interior, removal of the rear seat cushion may necessitate the medic to move and continue treatment from another direction for a short period of time. Similarly, a vital degree of appreciation needs to be realised in the release of impingement in the front footwell. Amidst all the frustration of the extrication, the firefighter may need access to the footwell for a considerable period of time in order to release the actual pinning.

While the extrication continues three general commands should immediately be obeyed by everyone. The first command is "SHUT DOWN". This is a call for silence and will result in a quick and efficient shut down of all generators and engines, in order to auscultate a patient to diagnose breathing problems. The second command is "HANDS OFF". This command requires all rescue activity on the vehicle to cease, in order to prevent any contact jarring or moving the vehicle, necessary during invasive procedures i.e. intubations, in cases of difficult venous access, insertion of chest drains or anaesthetics and analgesia in cases of superstructure entrapment. Command three, to "STAND CLEAR", necessitates all personnel to stand back from the wreckage during defibrillation 3-15).
'RAPID INTERVENTION'

In the vast majority of serious accident situations, where the victim has sustained injury and is likely to have suffered serious occult injuries, primary roof removal is mandatory. It creates realistic access to the casualty, allowing proper cervical spine immobilisation, assessment of airway and breathing problems and where necessary, intubation of the patient whilst maintaining C-spine control. It also caters for surgical procedures and the insertions of chest drains in the seated casualty while the extrication effort continues.
Primary assessment of the casualty should be carried out immediately on arrival of medical or paramedical personnel. This should be conducted before any attempts to physically remove the casualty are made, unless there is immediate danger to the casualty’s or rescuers lives. In situ assessment should follow advanced trauma life support protocols and may require 'SHUT DOWN'.

The order of priority is:-

1. Airway assessment, which is best done by attempting communication with the patient. The conscious, alert casualty will maintain and protect his own airway. In obtunded casualties airway support is usually necessary and should be provided with cervical spine immobilisation. The upper airway may be supported with manoeuvres such as the chin lift and jaw thrust which can be easily performed with the seated casualty. Oxygen is mandatory and should be administered early in the management of the trapped patient. Further airway support can be provided if necessary by insertion of oral or nasopharyngeal airways. Oropharyngeal suction may be required to clear saliva or blood and in the obtunded patient broken or false teeth and any other foreign bodies should be removed.

2. The cervical spine should be immobilised with a correctly fitting rigid cervical collar and further stability provided by supporting the neck from behind or in front maintaining inline immobilisation, especially while the vehicle is being moved, rocked or jarred.

3. The breathing rate and pattern needs to be rapidly assessed. The respiratory rate may be reduced and require augmentation with a bag-mask combination. The use of supplemental oxygen is once again mandatory. Rapid respiratory rates may indicate the presence of chest trauma causing pneumothorax and/or haemothorax. Assessment of the chest will usually require auscultation with a stethoscope and require a 'shutdown'. Needle thoracentesis and chest drain insertion can usually be performed with the casualty in situ and is facilitated by early roof removal and a 'hands off' called for to stop physical rescue activity on the vehicle.

4. Circulatory assessment is usually conducted alongside assessment of the chest and rapid weak pulses indicate a compromised circulation. Initial management may require a 'hands off' for the insertion of two secure large bore intravenous cannula to cater for the administration of adequate volumes of fluids. Continuous cardiovascular and respiratory monitoring is required throughout the extrication.

5. Initial airway management may be inadequate to provide total protection of the airway and intubation may be required. This is best performed from behind the casualty following roof removal, although it is possible to intubate from the right side of the casualty. The administration of anaesthetic drugs should only be carried out following adequate circulatory resuscitation, especially in the seated casualty.
6. Cardiorespiratory arrest may require 'immediate release' unless access to and reclinig of the casualty permits adequate cardiopulmonary resuscitation.

7. Following this, an assessment of bony injuries are required, allowing planning for extrication and provision of adequate analgesia.

**Spinal immobilisation**

The method of extrication in patients with spinal injuries is vital, as only a minority of patients have symptoms of a complete trans-section of the spinal cord. 7) Careless handling and insufficient protection of the spinal cord may further damage an incomplete injury. In 55% of our series of patients with a spinal injury there was a concomitant head injury 8), with a decreased level of consciousness. These patients require even greater care because of the decreased tone in the neck muscles. It is therefore necessary that all casualties due to RTA's wear a rigid collar. The slightest suspicion of a cervical spine injury is an indication for the application of a rigid cervical collar, irrespective of the mechanism of injury. Soft collars should not be used as they offer no protection 10). Rigid collars alone restrict up to 60% of flexion-extension and 50% of rotation and lateral bending 11) In combination with the short board technique (SBT), or one of the extrication splints, f.i. the Kendrick Extrication Device (KED), flexion-extension is restricted up to 80% and rotation and lateral bending approximately 60% 12). These findings emphasise the need for additional immobilisation measures to protect the spine. This can be done by manual immobilisation of the head in a neutral position, or by one of the extrication splints in case of a difficult extrication. In-line traction should be discouraged as it increases subluxation in case of unstable hyperextension injuries such as atlanto-occipital dislocation, or Hangman's fractures 13). We prefer the Russell Extrication Device (RED) for difficult extrications. The base plate is made of rigid polypropylene and the straps can be completely disconnected from the device. It is therefore easier to slide behind the back of the victim, when seated in a car, than the KED, and it is easier and quicker to apply than the short spinal board. Extrication splints only immobilise the cervical spine. They offer no protection to the lower spinal column.

Our method of spinal protection in the extrication of a casualty with a suspected spinal injury in case of vehicular entrapment is: immobilising the cervical spine with a rigid collar and RED. In case of an RTA with a casualty with a suspected spinal injury it is mandatory to remove the roof of the car, because the restricted space makes adequate spinal protection during the extrication virtually impossible, since most cars have insufficient room between the seat cushion and the roof to fit an extrication device without adversely moving the casualty.

A rigid cervical collar can be applied while a second person manually immobilises the head. Further spinal immobilisation is achieved by sliding an extrication device behind the back of the casualty, and fixating of the head and torso with the straps. After removing the rear seat cushion, support the front seat casualty in the sitting position and part recline the seatback. A long spine board can then be slid between the casualty and the seatback and both front seatbacks fully reclined. The spine board can now be re-aligned and slid a few inches under the patient from behind and the patient's torso slowly reclined onto the spine board. The patient can then be slid up the spine board.
The fitting of the extrication device is made much easier by removing the roof and side of the vehicle.

Side and roof removal creates the optimum space for administering advanced life support while efforts are made to release the legs.
to the desired position and lifted free of the wreckage. This manoeuvre can also be performed from the side of the vehicle, after removal of the door(s) and centre post or rear 1/4 panel in the 2dr saloon. In this case the casualty must be rotated carefully like a log until they can be reclined on the spine board. In this way it is easy to slide the patient out on the spine board-

[see fig.5:1-4]. Restricted space alone, without actual impingement of the patient, is an indication for dismantling a vehicle.

Efficiency

Rapid access by initial 'flapping' or removal of the roof structure should take less than 5 minutes. Primary survey of the casualty, applying a cervical collar and obtaining iv access can be completed in an additional five minutes. Fitting an extrication device with the roof off, should take no more than 10 minutes. At the same time the side of the car can be removed. Final extrication of the casualty, including pedal removal and crush release of the lower limbs, positioning the long spine board and subsequent casualty removal, should be completed within the next 10 minutes.

In conclusion, any extrication without the need for advanced invasive life support techniques, such as intubation or insertion of chest drains, can be completed within 30 minutes. It is felt by those directly involved in the study, that these times are wholly rationalised to the operational scene. However, in terms of future performance, extrication should be looking to improve upon these time evaluations.

Conclusion

Advanced vehicle entrapment rescue is to create suitable and rapid access to the casualty, in order to stabilise the patient, and to secure their release in line with advanced trauma life support. No injured person should be moved until they are properly assessed, and where appropriate immediate care administered. Proper assessment, primary survey and successful resuscitation of the casualty depends on suitable rapid access to the patient. This is best done by primary roof removal. Immediate release of casualties is only indicated if their life is in immediate danger from their surroundings. Otherwise rapid access, primary survey and stabilisation, prior to a controlled release is the preferred method.

Any extrication, without advanced invasive life support techniques, such as intubation and/or insertions of chest drains should be completed within 30 minutes. In 45 cases (50%) we failed to meet this standard. This establishes a definite need for more exact extrication training, preferably combined interactive training, for fire Services, paramedical and medical crews.

To afford a reasonable level of performance where BTLS and/or invasive procedures become a necessary part of the rescue effort [fig.6], definite extrication strategy in line with ALS teaching has to be adopted and practical efficiency must cater for suitable timely intervention. A stabilised casualty on ALS, has added a new dimension to extrication and the initiative, which is now a known quantity, must ultimately be rehearsed as part of the rescue programme, to afford optimum success at any given time, anywhere in the Country.
FRONT 1/4 OBLIQUE IMPACT

fig 1.

IMMEDIATE RELEASE

WHERE A CASUALTY'S LIFE IS IN IMMEDIATE DANGER FROM THEIR SURROUNDINGS, IMMEDIATE PATIENT REMOVAL ONLY FOR:-

1. FIRE
   FIRE SPREAD FROM UNCONTROLLABLE FIRE

2. SUBMERGENCE

3. TOXIC FUMES
   HIGH THRESHOLD FOR ASPHYXIATION/TOXICITY

4. HAZ MAT
   DIRECT CONTACT WITH CAUSTIC/CORROSIVE/POISONOUS THROUGH ABSORPTION

5. POLICE DIRECTIVE
   UNCONTROLLED CIVIL DISTURBANCE/TERORIST ACTIVITY

6. MEDICAL REQUIREMENT
   WHERE A CASUALTY CAN NOT BE STABILISED IN THE FIELD, VF OR ASYSTOLE.

WHERE A CASUALTY IS TRAPPED BY THE SUPERSTRUCTURE AND IN SUSPENSION, NOT BREATHING WITH NO DETECTABLE PULSE AND NOT A VICTIM OF VISIBLE SOLID ORGAN OR BRAIN DESTRUCTION, COMMENCE IN-CAR CPR. USING THE TOOLS AT YOUR IMMEDIATE DISPOSAL, ATTEMPT TO RELEASE THE CASUALTY BY THE QUICKEST MEANS POSSIBLE.
RAPID ACCESSING  Fig.3

PRIMARY ROOF REMOVAL

COMPLETE ROOF REMOVAL

fig 3:1

ROOF FLAP BACK

Fig 3:2

ROOF FLAP FORWARD

Fig 3:3
Chart 1  PRIMARY SURVEY OF INJURIES

![Bar chart showing entrapment time vs number]

Entrapment Time vs Number.

Table 1  ENTRAPMENT TIMES V’s NUMBER

<table>
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<th>Entrapment time</th>
<th>&lt;30mins</th>
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<th>60-120mins</th>
<th>&gt;120mins</th>
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<td>44</td>
<td>16</td>
<td>2</td>
<td>90</td>
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<td>Injuries defined on scene</td>
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<td>Head / Cervical spine</td>
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<td>13</td>
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<td>1</td>
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</tr>
</tbody>
</table>

Injuries diagnosed by primary survey on scene.

Chart 2  BREAKDOWN OF INJURIES IDENTIFIED ON SCENE
Space making evolutions in the controlled disassembly of the vehicle away from the casualty.

USING THE LONG SPINE BOARD
USING THE LONG SPINE BOARD

Fig 5:2

METHOD: OVER THE REAR

The trauma board/long spine board has been in use for some considerable time all over the world and offers unique assistance when lifting casualties from vehicle wreckage. With entrapment extrication, the long spine board and extrication device must be used in the ideal mode and conform to trends in casualty care to achieve the best results. Practice will prove and reprove this approach to patient extrication.

METHOD: THROUGH THE SIDE

This method necessitates side removal, the removal of the rear seat cushion and the front seatback fully reclined to the horizontal position. Alternatively, the front seatback will need to be forcible removed.
Where the vehicle has suffered frontal damage only, the long spine board offers a distinct advantage in manoeuvring a casualty from the wreckage of the 2 door saloon. The trauma board can be introduced from the rear of the vehicle and the patient reclined slowly onto the board. Utilising the extrication device and lifting carefully under the legs, the casualty can be slid up the board into the desired position and lifted free of the wreckage.

Fig 5:4

Fig 6

With life threatening injuries, a definite extrication strategy in line with ALS teaching has to be adopted and practical efficiency must cater for suitable timely intervention.
Glossary

ALS
Advanced life support

Analgesia
Various drugs for the relief of pain in a conscious patient.

Anaesthetics
The administration of various pain killing drugs

Auscultate
Mostly used for the chest, a method of examining the body by listening.

BTLS
Basic trauma life support

Chest drains
A wide bore plastic cannula (tube) surgically inserted within the chest to drain air and fluid from the chest cavity.

Collar
Rigid collar for supporting the neck.

Concomitant
Existing or occurring as an attendant feature or circumstance.

Controlled release management
The philosophy of extricating an entrapped casualty suffering with life threatening injuries in line with current trends and advanced life support intervention. Dismantling of the vehicle away from the casualty rather than manoeuvring the victim from the vehicle.

Defibrillation
Use of direct current electric shock to restore effective cardiac function.

'Hands off'
The temporary cessation of extrication work to prevent jarring or rocking the vehicle to comply with a medical directive.

Intubation
The placement of a plastic tube within the windpipe to ensure an open airway and sealing off the windpipe from foreign matter.

'Immediate release'
A necessary requirement for the immediate removal of the victim under the threat of immediate death.
Kendrick extrication device
*Purpose designed device used in conjunction with a hard cervical collar for fitting around the torso and neck of the seated casualty, to protect the cervical spine from unwanted/uncontrolled movement.*

Primary survey
*The initial assessment of the casualty’s vital signs.*

Rapid accessing/primary roof removal
*Method for gaining realistic access to the majority of entrapped victims of vehicle accidents for medical intervention.*

Russell extrication device
*Purpose designed device used in conjunction with a hard cervical collar for fitting around the torso and neck of the seated casualty, to protect the cervical spine from unwanted/uncontrolled movement.*

SCI
*Spinal cord injury*

'Shut down'
*A call for silence necessitating the temporary shut down of all generators and engines to comply with a medical directive.*

'Stand clear'
*An established directive prior to defibrillating a patient.*

Subluxation
*Incomplete dislocation of a joint.*

Trans section
*Complete lesion of the spinal cord.*

Venus access
*Surgical procedure (iv cut down) for gaining access to a vein.*
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1. Logic/Key – Understanding the user guide
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6. Seat adjustment and seat removal
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10. Occupational safety and SRS – Introduction, vehicle extrication and dynamic risk assessment and management
11. Frontal airbags
12. Seatbelt pretensioners
13. Side impact protection bags
14. Head protection systems and inflation curtains

* These areas cover extrication evolutions with undeployed SRS/SIPS where the battery cannot be disconnected.

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