

NEANN LONG SPINE BOARD



TRAINING MANUAL

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INTRODUCTION

INTRODUCTION

The Long Spine Board (**LSB**) provides one of the most versatile tools available for the prehospital environment allowing for multiple uses including a patient lifting device, transfer platform, patient protection during vehicle cutting, spinal immobilisation, leg or pelvic fracture splint, extrication tool, etc. Whilst there have been many attempts to replace it, no other single device has been as durable or able to perform the many tasks the LSB can undertake.

The following manual presents a range of applications of the LSB in the prehospital setting. Before application of the LSB, a patient assessment should be undertaken (pg 9), unless the patient is actual time critical and requires rapid assessment and transport.

TERMINOLOGY

Prehospital personnel (including Paramedics, First-aiders, Rescue Officers and other persons performing activities in the prehospital setting) will for standardisation, all be referred to as '**Officer/Officers**' throughout this manual.

The Long Spine Board will be abbreviated to '**LSB**' throughout this manual.

Spinal cord injuries will be abbreviated to '**SCI**' throughout the manual.

TRAINING

Officers should realise that there is no substitute for training and experience, thus all Officers must be thoroughly trained in the use of the LSB.

The ideal situation is to have all Officers in the team qualified to manage all the steps presented in this manual. If unqualified Officers are present at a scene, they must perform under strict supervision of a qualified team Officer.

Frequent exercises need to be held to ensure that training levels are maintained. Practice will lead to a high level of competence and safety.

It is recommended that initial training of Officers is to include, but is not limited to:

1. Review of this instruction manual.
2. A minimum of 3 applications of each procedure presented in this manual in a training environment under direct supervision of an appropriately trained supervisor before use on actual patients.

It is recommended that ongoing training of Officers is to include, but is not limited to:

1. Three monthly practical review of each procedure presented in this manual in its intended environment,
2. Twelve monthly theoretical & practical review of each procedure.

Officers using this manual without proper initial & ongoing training may place the patient and themselves at risk of injury, including permanent SCI to the patient.

EQUIPMENT

Officers must be familiar with all items of equipment they use, the way the equipment operates and the equipment's limitations. Every Officer should be competent to check and maintain equipment in the field.

COURSE MANUAL

This course manual is written for Officers who have previous first aid knowledge. It is designed for Officers with a minimum Level Two - Workplace First Aid Course.

ADDITIONAL COPIES OF THIS MANUAL

This manual can be downloaded at no charge under the copyright conditions on page two of this manual as a 5 mg PDF file from the Emergency Technologies website at www.neann.com/lbmanual.htm.

The manual is best printed in colour.

There is no limit to the number of copies a person and / or organisation may print, nor to the distribution of the PDF file under the copyright conditions stated on page two of this manual. The copyright does prohibit photocopies of this manual being made. This is to ensure that only high quality copies are available.

USING THIS MANUAL

This manual offers the reader a detailed photographic guide into the management of the potential or actual SCI.

The manual is designed to be used in conjunction with a proper spinal management course, and should not be used in isolation.

The instructions supplied in this manual are for use only by properly trained Officers and serve as a guideline only.

If any conflict exists between information presented in this manual and your organisations protocols, follow your Medical Directors' recommendations.

FIELD APPLICATION

OF THE

LONG SPINE BOARD

INTRODUCTION

When assessing the trauma patient in preparation of the application of the LSB, a standardised and complete process of examination needs to be developed that will indicate to the examining Officer a potential or actual SCI. Information gained from a thorough examination, signs & symptoms found and mechanism of injury are all essential for determining the patient management requirements.

PATIENT APPROACH

When assessing the potential SCI patient and in preparation for the application of the LSB, the Officers follows the current basic approach to trauma assessment when appropriate:

1. **First Officer** undertakes a full assessment of the patient before application of spinal equipment. This includes:
 - Check safety, scene, and situation.
 - A **Second Officer** brings the cervical spine into the neutral in-line position (unless contra-indicated) and performs manual in-line stabilisation of the patient's head, whilst the **First Officer** continues the assessment.
 - Perform Primary Survey:
 - i. **Response**
 - ii. **Airway**
 - iii. **Breathing**
 - iv. **Circulation (Pulse & Major Bleeds)**
 - Perform Basic Care:
 - i. **Rest,**
 - ii **Reassure**
 - iii. **Oxygen**
 - iv. **Position**
 - v. **Pulse Oximeter**
 - vi. **EGC Monitor**
 - Perform A Vital Signs Survey:
 - i. **Conscious Status Assessment** - **Eye Opening**
 - **Verbal Response**
 - **Motor Response**
 - ii. **Perfusion Status Assessment** - **Pulse**
 - **Blood Pressure**
 - **Skin**
 - iii. **Respiratory Status Assessment** - **Rate**
 - **Rhythm**
 - **Effort**
 - **Sounds**
 - **Speech**

- Perform A Secondary Survey:
 - i. Motor / Sensory x 4
 - ii. Head
 - iii. Spine
 - iv. Chest
 - v. Abdomen
 - vi. Pelvis
 - vii. Legs
 - viii. Arms

- Check AMPLE:
 - i. **A**llergies
 - ii **M**edications
 - iii. **P**ast medical history
 - iv. **L**ast oral intake
 - v. **E**vents leading up to injury

- Apply Spinal Equipment as required:
 - i. Cervical Collar
 - ii Cervical Extrication Device
 - iii. Long Spine Board
 - iv. Full Spine Immobilisation³⁹⁻⁴⁰

LONG SPINE BOARD

TECHNIQUES

INTRODUCTION TO THE LOG ROLL

The log roll technique is one of the most commonly used manoeuvres for moving a patient onto a Long Spine Board (LSB), as there is a current belief that it maintains adequate spine alignment, whether the patient is found in the supine, prone or lateral position. It's popularity is due to the manoeuvre's ability to:

- a) Allows removal of the patient's clothing from the anatomical region the patient is lying.
- b) Allows the patient to be fully examined, including the region upon which the patient is lying.
- c) Allows the patient to be rapidly placed onto the LSB.

This gives the log roll the nickname 'Flip-And-Strip'. Difficulties tend to occur in using the log roll when injuries to the chest, pelvis, legs or arms are present. In these cases alternative methods of moving the patient such as the Straddle Lift: Side (pg 30) or the use of a Scoop Stretcher should be sought.

In recent times, the log roll has come under increasing scrutiny due to the amount of spinal movement that has been documented in studies.¹⁻³ Manoeuvres such as the Canadian Log roll or Haines manoeuvre that require an arm to be raised above the head are potentially dangerous to an unstable spinal fracture below the level of the cervical spine due to the thoracic / lumbar sagging,¹ and should therefore be avoided if it is at all possible.

A second method of log rolling that places both arms across the chest also results in thoracic / lumbar sagging, but less than the previous methods.¹⁻²

At present the safest techniques, based on current research, is for the patient's arms to be fully extended and placed by the patient's sides with the palms facing inwards.^{1,3} While some thoracic / lumbar sagging will occur, it is minimal and less than other methods currently use.

With this new technique, approximately 10% of people will complain of slight pain in the arms as the patient is rolled onto the LSB. This pain is temporary with no lasting effects.⁴ To further assist with the proper alignment and in reducing spinal column movement during the manoeuvre, the patient should be requested to stiffen up until placed on the LSB.

Finally there is evidence that other methods of moving the patient onto the LSB i.e. the Straddle Lift: Side (pg 30) causes less movement on the healthy volunteer than the log roll.⁴⁻⁵ Alternatively the use of a good quality rigid Scoop Stretcher will provide less movement than a log roll, if used in the correct setting.

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LOG ROLL - 4 PERSON

The following method of log roll which uses the arms by the side to splint the body, has been shown through x-ray studies to be the safest log rolling method currently available.¹ Techniques which elevate the arms above the head or place the arms across the chest result in thoracic / lumbar spine sagging,¹⁻³ and should therefore be avoided whenever possible.

In this procedure, the Officer's limb closest to the patient's head will be referred to as the Officer's upper limb, and the Officer's limb closest to the patient's feet will be referred to as the Officer's lower limb.

Training Requirements:

4 x Staff
 1 x Patient
 1 x Cervical Collar
 1 x Long Spine Board (LSB)
 1 x Blanket
 1 x Towel
 1 x Hand / Wrist Airsplint

Procedure



Step 1

While Manual In-Line Stabilisation is maintained by Officer 1 at the patient's head, Officer 2 applies a Cervical Collar, and places the LSB alongside the Officer 1. The Manual In-Line Stabilisation is maintained until full spine immobilisation is achieved as a Cervical Collar will at best provide only 50% immobilisation.⁵⁻¹⁰



Officer 2 kneels at the patient's mid-torso, straightens the patient's arms with the patient's palms facing in next to the torso. Palm-out may result in elbow joint damage during the roll. Officer 2 then grasps the far side of the patient at the shoulder and just above the elbow.

Officer 2 at the torso is in charge and sets the pace for the log roll since they lift most of the weight.



Officer 3 kneels next to Officer 2 and grasps the patient's pelvic bone. Officer 3's lower hand grasps both trouser cuffs at the ankles. If shorts or skirt are being worn, tie a figure-of-eight around the ankles with a triangular bandage and grasp the triangular bandage. Officer 3 also places their lower foot up against the patient's legs, just below the knees for the patient's lower legs to roll onto during the log roll, to prevent the patient's pelvis drooping.

LOG ROLL - 4 PERSON



Officer 4 kneels on the opposite side of the patient at the patient's pelvic level. Officer 4's upper hand is placed on the patient's upper arm and Officer 4's lower hand is placed on the patient's upper leg.

Step 2

With Officer 2 at the chest in charge, the patient is carefully log rolled until right angles to the ground.

Officer 1 at the head watches the patient's torso turn and maintains manual support of the head, rotating it exactly with the torso.

Officer 3 at the patient's legs assists with rotation of the patient's torso and takes the weight of the patient's pelvis, again watching the torso. The patient's lower legs roll onto Officer 2's lower foot to prevent pelvic drooping.

Step 3

Before rolling the patient down onto the LSB, and if appropriate, cut away the clothing covering the patient's back and examine this area for injuries.

A folded blanket running the length of the patient's posterior body (head to feet) can be placed against the patient to improve comfort after the patient is laid back on the LSB.¹⁵⁻¹⁸ This will also assist in the later removal of the patient off the LSB.

**Step 4**

Officer 4 slides the LSB in against the patient's back and elevates the side of the LSB furthest from the patient at a 45° angle towards the patient's back. Align the patient's shoulders level with the shoulder markings on the LSB.

LOG ROLL - 4 PERSON

Step 5

Lower the patient and elevated side of the LSB down onto the ground together, with the LSB assisting to maintain alignment of the patient, again with Officer 2 at the patient's torso setting the pace. The LSB therefore acts a body splint for lowering the patient.

Step 6

Keeping the patient in the neutral in-line position, gently adjust the patient's position sideways so that the patient is centred on the LSB.

Step 7

Apply appropriate padding under the patient's head and lumbar spine to maintain proper alignment of the spinal column¹¹ and for comfort.¹² Immobilise the patient onto the LSB for transport (pg 109).¹⁹

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LOG ROLL - 2 PERSON

The following method of log roll which uses the arms by the side to splint the body, has been shown through x-ray studies to be the safest log rolling method currently available.¹ Techniques which elevate the arms above the head or place the arms across the chest result in thoracic-lumbar spine sagging,¹⁻³ and should therefore be avoided whenever possible.

The 2 person log roll has not been examined in any x-ray studies and therefore its use should be used only when other proven methods of placing a person onto the Long Spine Board (LSB) are not possible.

In this procedure, the Officer's limb closest to the patient's head will be referred to as the Officer's upper limb, and the Officer's limb closest to the patient's feet will be referred to as the Officer's lower limb.

Training Requirements:

2 x Staff
 1 x Patient
 1 x Cervical Collar
 1 x Long Spine Board (LSB)
 1 x Triangular Bandage
 1 x Blanket
 1 x Towel
 1 x Hand / Wrist Airsplint

Procedure

Step 1



While Manual In-Line Stabilisation is maintained by Officer 1 at the patient's head, Officer 2 applies a Cervical Collar, and places the LSB alongside the Officer 1. The Manual In-Line Stabilisation is maintained until full spine immobilisation is achieved¹ as a Cervical Collar will at best provide only 50% immobilisation.²⁻⁷



Officer 2 now kneels at the patient's mid-torso on the side to which the patient is to be log rolled. The patient's legs are tied together and the knees bent up to a 90° angle.

LOG ROLL - 2 PERSON

**Step 2**

The patient's arms are extended beside their torso with their palms facing inwards.⁸⁻¹⁰ Officer 2's upper arm grasps the far side of the patient at the shoulder.

Officer 2's lower arm grasps the patient's hip just distal of the wrist and runs their arm along the patient's upper legs which will help assist with the log roll.

Officer 2 also positions their lower foot so that on log rolling the patient, the patient's knees will rest of Officer 2's foot to reduce the patient's pelvis drooping.

**Step 3**

The patient is carefully log rolled until they are at right angles to the ground. Officer 2 at the patient's torso is in charge and sets the pace (since he they have bear most of the weight). Officer 1 at the head watches the torso turn and maintains neutral in-line support of the head, rotating it exactly with the torso.

Before rolling the patient down onto the LSB, and if appropriate, cut off the clothing covering the patient's back and examine this area for injuries.

**Step 4**

A folded blanket running the length of the patient's posterior body (head to feet) can be placed against the patient to improve comfort after the patient is laid back on the LSB.¹³⁻¹⁶ This will also assist in removing the patient from the LSB. Officer 2 slides the LSB in against the patient's back and elevates the side of the LSB furthest from the patient at a 45° angle towards the patient's back. Align the patient's shoulders level with the shoulder markings on the LSB.

**Step 5**

Lower the patient and elevated side of the LSB down onto the ground together, with the LSB assisting to maintain alignment of the patient, again with Officer 2 at the patient's torso setting the pace. The LSB therefore acts a body splint for lowering the patient.

LOG ROLL - 2 PERSON



Straighten out the patient's knees. Apply appropriate padding under the patient's head and lumbar spine to maintain proper alignment of the patient's spinal column¹¹ and for comfort.¹² Immobilise the patient on the LSB for transport (pg 109) .¹⁷

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LOG ROLL - 4 PERSON PRONE

When the patient presents in a semi-prone position (as shown below), a method similar to that for a supine patient is used for the log roll, incorporating the same initial alignment of the patient's limbs.¹⁻³

Points To Remember:

1. The patient is rolled away from the direction in which his face initially points.
2. A Cervical Collar cannot be applied as the head will not be re-aligned with this manoeuvre.
3. Remaining in the prone position will limit the patient's ability to breath due to continual pressure on the rib cage.
4. Arching of the spine will occur with each of the patient's breaths whilst in the prone position.
5. ALS skills are harder to achieve in the prone position.

In this procedure, the Officer's limb closest to the patient's head will be referred to as the Officer's upper limb, and the Officer's limb closest to the patient's feet will be referred to as the Officer's lower limb.

Training Requirements:

4 x Staff
 1 x Patient
 1 x Long Spine Board (LSB)
 1 x Blanket
 1 x Towel
 1 x Hand / Wrist Airsplint

Procedure

Step 1



Officer 1 at the head positions themselves at a 45° angle to the patient. Manual In-Line Stabilisation is achieved with Officer 1 placing their distal hand under the patient's head and their proximal hand on top of the patient's head.

A Cervical Collar cannot be placed into position as with this log roll, the head cannot be re-aligned.



Officer 2 kneels at the patient's mid-torso on the side that the patient is to be rolled and extends the patient's arms down the torso with the patient's palms facing inwards, then grasps the far side of the patient at the shoulder and just above elbow.

LOG ROLL - 4 PERSON PRONE



Officer 3 kneels at the patient's knees, grasps the hip just distal to the wrist and tightly grasps both trouser cuffs at the ankles. If shorts or a skirt are being worn, tie a figure-of-eight around the ankles with a triangular bandage and grasp the triangular bandage. Officer 3 also places their lower foot up against the patient's legs, just below the knees for the patient's lower legs to roll onto during the log roll, so as to prevent the patient's pelvis drooping.



Officer 4 kneels on the opposite side of the patient at pelvic level. Officer 4's upper hand is placed on the patient's upper arm and Officer 4's lower hand is placed on the patient's upper leg.

Step 2

The patient is carefully log rolled until at right angles to the ground. Officer 2 at the torso is in charge and sets the pace (since Officer 2 bears most of the weight).



Officer 1 at the head watches the torso turn and maintains Manual In-Line Stabilisation of the head, rotating it exactly with the torso.

Officer 3 at the legs assists with rotation of the patient's torso by taking the weight of the pelvis, again watching the torso. The patient's lower legs roll onto Officer 3's lower foot to prevent pelvic drooping.

Step 3

Before rolling the patient down onto the LSB, and if appropriate, cut away the clothes covering the patient's front and examine this area for injuries.



A folded blanket running the length of the patient's body (head to feet) can be placed against the patients front to improve comfort after the patient is laid back on the LSB.⁴⁻⁷ This will also assist in the later removal of the LSB.

Officer 4 slides the LSB in against the patient's back and elevates the side of the LSB furthest from the patient at a 45° angle towards the patient's back. Align the patient's shoulders level with the shoulder markings on the LSB.

LOG ROLL - 4 PERSON PRONE

**Step 4**

Now lower the patient and the LSB down onto the ground together, with the LSB assisting to maintain alignment of the patient, again with Officer 2 at the patient's torso setting the pace.

**Step 5**

Keeping the patient in the neutral in-line position, gently adjust the patient's position sideways until centred on the LSB.

Immobilise the patient onto the LSB for transport (pg 109).⁸

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LOG ROLL - 5 PERSON PRONE 180°

When the patient presents in a semi-prone position (as shown), the Officers may wish to carry out the following manoeuvre which rolls the patient onto their back. It incorporates the same initial alignment of the patient's limbs as other log rolls - arms by the patient's side.¹⁻³

Points To Remember:

1. The patient is log rolled away from the direction in which the patient's face initially points.
2. A Cervical Collar is not applied until the patient is in the supine position on the LSB.
3. With this log roll, if appropriate, cut off the clothes covering the patient's back and examine it before the log roll begins.
4. Remaining in the prone position will limit the patient's ability to breath due to pressure on the rib cage.
5. Arching of the spine will occur with each of the patient's breath whilst in the prone position.

In this procedure, the Officer's limb closest to the patient's head will be referred to as the Officer's upper limb, and the Officer's limb closest to the patient's feet will be referred to as the Officer's lower limb.

Training Requirements:

5 x Staff
 1 x Patient
 1 x Cervical Collar
 1 x Long Spine Board (LSB)
 1 x Blanket
 2 x Towel
 1 x Hand / Wrist Airsplint

Procedure

Step 1



Officer 1 positioned at the patient's head, positions their arms in anticipation of the full rotation that will occur. Officer 1 positions at a 45° angle to the patient, with arms placed so that the elbow to the side the patient will be rolled onto is in line with the patient's inner shoulder to roll. Manual In-Line Stabilisation is achieved. Officer 1 placing their distal hand under the patient's head and their proximal hand on top of the patient's head.



Officer 2 kneels at the patient's mid-torso, on the other side to which the patient is to be rolled, and extends the patient's arms down the patient's torso. Officer 2 places their upper hand under the patient's shoulder and the lower hand under the patient's abdominal region level with lower ribs.

LOG ROLL - 5 PERSON PRONE 180°



Officer 3 kneels on the same side as Officer 2 at the patient's thigh, slides their upper hand under the patient's pelvic region, and lower hand under patient's upper leg. Bandaging the legs together may assist with the log roll. Officer 3 also places a rolled up towel against the patient's leg just below the knees for the lower legs to roll onto during the log roll to prevent pelvic drooping.



Officer's 4 & 5 kneel on the side to which the patient is to be rolled and place a blanket over the posterior of the patient for padding on the LSB to improve comfort⁶⁻⁹ & to assist later LSB removal.

Officer 4 kneels at the patient's mid torso grasping the patient's opposite side shoulders and opposite lower chest. Officer 5 kneels at the patient's thigh grasping the patient's opposite pelvis and opposite mid femur.

A LSB is rested on the knees of Officer 4 & 5 so that the side of the LSB furthest from the patient is elevated at an angle of 45°. The LSB's shoulder marking is aligned with the patient's shoulders.

Step 2



The patient is carefully log rolled until the patient's back is placed on the LSB. Officer 2 at the patient's torso is in charge and sets the pace as Officer 2 bears most of the patient's weight.

Officer 1 at the patient's head watches the patient's torso turn and maintains the current position of the head, rotating it exactly with the patient's torso. Only after the patient is completely log rolled onto their back is the patient's head then slowly re-aligned to the neutral in-line position unless contra-indicated.



Officer's 2 & 4 both assist with rotation of the patient's torso. Officer's 3 & 5 both assist with rotation of the patient's pelvis, ensuring the patient's pelvis rotates in-line with the patient's torso. The patient's lower legs are rolled onto the towel to prevent the patient's pelvis drooping.

LOG ROLL - 5 PERSON PRONE 180°

**Step 3**

Whilst rotating the patient, Officer's 4 & 5 steadily shuffle backwards until the LSB and patient are flat on the ground.

Keeping the patient in the neutral in-line position, gently adjust the patient's position sideways until centred on the LSB.

**Step 4**

Officer 1 now re-aligns the patients head into the neutral in-line position unless contra-indicated.

**Step 5**

Apply appropriate padding under the patient's head and lumbar spine to maintain proper alignment of the spinal column⁴ and for comfort.⁵

A Cervical Collar is now applied, and the patient immobilised to the LSB for transport (pg 109).¹⁰

LOG ROLL - 5 PERSON PRONE 180°**Bibliography**

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STRADDLE LIFT - SIDE

The Straddle Lift - Side is the preferred technique for placing a patient onto a Long Spine Board (LSB)¹ and can be used with the patient found in either the supine, prone or lateral positions. It is especially useful for patients with injuries preventing a log roll or where the Scoop Stretcher cannot be applied. The Straddle Lift - Side can also be used very effectively on rough ground or uneven surfaces that would again prevent the application of the Scoop Stretcher or the use of a log roll. From an OH&S point of view, the Straddle Lift appears to offer a very safe lifting technique when performed correctly¹.

Points To Remember:

1. When lifting, Officers' elbow should rest on their legs to remove the strain from the Officers' back.
2. If applying the LSB, the patient needs to be lifted only 2 - 5 cm off the ground.
3. Padding using blankets is recommended for LSB comfort and to reduce pressure sores.²⁻⁵ Blankets should be placed on the LSB before insertion.
4. If using a Scoop or a thick LSB, the patient will need to be lifted slightly higher for the patient to clear the frame.

In this procedure, the Officer's limb closest to the patient's head will be referred to as the Officer's upper limb, and the Officer's limb closest to the patient's feet will be referred to as the Officer's lower limb.

Training Requirements:

**6 x Staff
1 x Patient
1 x Cervical Collar
1 x Long Spine Board (LSB)
1 x Blanket
1 x Towel
1 x Hand / Wrist Airsplint**

Procedure

Step 1



Place the LSB above the patient's head and in-line with the patient's body. Alternatively, the LSB can be slid under from the patient's foot end if access above the patient's head is not possible. Officer 1 positions at the patient's head and squats down on their knees with one leg on either side of the LSB so that the LSB can be slid through Officer 1's legs. Manual In-Line Stabilisation of the patient's head is performed by Officer 1 with elbows resting on their legs for stability. A Cervical Collar is also applied. The Manual In-Line Stabilisation is maintained until full spine immobilisation is achieved¹ as a Cervical Collar will at best provide only 50% immobilisation.

STRADDLE LIFT - SIDE



Officers 2 & 3 kneel on either side of the patient's torso. Officers 2 & 3 pull the patient's clothes at the shoulders firmly to the sides with their lower hands to allow their upper hand to easily slide under patients shoulders. **DO NOT** lift patient's shoulder upward during this procedure. Officer 2 & 3's upper elbow should rest on their upper thigh to avoid strain on the Officer's back during the lift. Officer's 2 & 3's lower hand should be placed under the patient's lumbar spine.



Officer's 4 & 5 kneel on either side of the patient's mid thigh. Officers 3 & 4 pull the patient's clothes at the patient's bottom firmly sideways with lower hand to allow their upper hand to slide easily under patient's bottom. **DO NOT** lift patients bottom upward. Officer's 4 & 5's upper elbow should rest on their upper thigh to avoid strain on their back during the lift.

Officer 6 is positioned above the patient's head to slide the LSB into place. Before inserting the LSB, Officer 6 should place a blanket onto the LSB for improved comfort²⁻⁵ (taped at the foot end to ensure the blanket stays in place during LSBs insertion under the patient). A hand/wrist airsplint should be placed on top of the blanket where the patient's lumbar spine will be positioned.



Step 2

With Officer 1 at the patient's head in-charge, Officers 1 to 5 lift the patient by slightly flexing their arms upwards, lifting the patient only enough for Officer 6 to slide the LSB under the patient.



Step 3

Officer 6 then slides the LSB underneath the patient. The curve of the LSB will allow the LSB to slide correctly under the patient aligned with the LSB markings.

The patient is then immobilised to the Board for transport (pg 109).⁶

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STRADDLE LIFT - ABOVE 4 PERSON

The Straddle Lift - Above is a technique to place a patient onto a Long Spine Board (LSB) where space or the number of rescuers is limited, and can be used with the patient found in either the supine, prone or lateral positions. It is especially useful in confined spaces where there is insufficient room to perform other manoeuvres such as Straddle Lift - Side, log roll or to apply the Scoop Stretcher. The Straddle Lift - Above can also be used very effectively on rough ground or uneven surfaces that would again prevent the application of the Scoop Stretcher or the use of a log roll.¹ From an OH&S point of view, the Straddle Lift appears to offer a very safe lifting technique when performed correctly.

Points To Remember:

1. When lifting keep the arms and back straight, and use your quadriceps to do the lift.
2. When applying the LSB, the patient needs to be lifted only 2 - 5 cm off the ground.
3. Padding using blankets is recommended for LSB comfort and to reduce pressure sores.²⁻⁵ Blankets should be placed on the LSB before insertion.
4. If using a Scoop Stretcher or a thick LSB, the patient will need to be lifted slightly higher for the patient to clear the frame.

Training Requirements:

4 x Staff
1 x Patient
1 x Cervical Collar
1 x Long Spine Board (LSB)
1 x Blanket
1 x Towel
1 x Hand / Wrist Airsplint

Procedure



Step 1

Place the LSB above the patient's head and in-line with the patient's body. Alternatively, the LSB can be slid under from the patient's foot end if access above the patient's head is not possible. Officer 1 positions at the patient's head and squats down on their knees with one leg on either side of the LSB so that the LSB can be slid through Officer 1's legs. Manual In-Line Stabilisation of the patient's head is performed by Officer 1 with elbows resting on their legs for stability. A Cervical Collar is also applied. The Manual In-Line Stabilisation is maintained until full spine immobilisation is achieved¹ as a Cervical Collar will at best provide only 50% immobilisation.

STRADDLE LIFT - ABOVE 4 PERSON

Officer 2 is positioned above the patient's head to slide the LSB into place. Before inserting the LSB, Officer 6 should place a blanket onto the LSB for improved comfort²⁻⁵ (taped at the foot end to ensure the blanket stays in place during LSBs insertion under the patient). A hand/wrist airsplint should be placed on top of the blanket where the patient's lumbar spine will be positioned.

**Step 2**

Officer 3 straddles over the patient's torso and faces side-on to the patient. Officer 3 then squats down and places their hands underneath the patient's armpits. Officer 3's arms should rest on their inner legs with their back and arms kept straight.



Officer 4 (at the same time as Officer 3) straddles over the patient's upper legs and faces the same way as Officer 3. Officer 4 then squats down and places their hands underneath the patient's bottom. Officer 4's arms should rest on their inner legs with their back and arms kept straight.

**Step 3**

With Officer 3 in charge (as Officer 3 bears most of the weight), Officer 1 at the head lifts by slightly flexing both their elbows. Officer 3 at the patient's chest and Officer 4 at the patient's pelvis keep their arms and backs straight and lift the patient approximately 2 - 5 cm of the ground by flexing their quadriceps only.



Officer 2 then slides the LSB underneath the patient. The curve of the LSB will allow the LSB to slide correctly under the patient, aligning the LSB shoulder markings with the patient's shoulders.



STRADDLE LIFT - ABOVE 4 PERSON**Step 4**

The patient is then immobilised to the LSB for transport (pg 109).⁶

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STRADDLE LIFT - ABOVE 2 PERSON

The Straddle Lift - Above (2 Person) is a technique to place a patient onto a Long Spine Board (LSB) used on the non-suspected spinal patient where space or the number of Officers is limited. The technique can be used with the patient found in either the supine, prone or lateral positions. It is especially useful for medical patients in confined spaces where there is insufficient room to perform other manoeuvres such as Straddle Lift - Side, log roll or to apply the Scoop Stretcher. The Straddle Lift - Above (2 Person) can also be used very effectively on rough ground or uneven surfaces that would again prevent the application of the Scoop Stretcher or the use of a log roll.¹ From an OH&S point of view, the Straddle Lift appears to offer a very safe lifting technique when performed correctly.¹

Points To Remember:

1. When lifting keep the arms and back straight, and use your quadriceps to do the lift.
2. When applying the LSB, the patient needs to be lifted only 2 cm off the ground.
3. Padding using blankets is recommended for LSB comfort and to reduce pressure sores.²⁻⁵ Blankets should be placed on the LSB before insertion.

Training Requirements:

2 x Staff
1 x Patient
1 x Long Spine Board (LSB)
1 x Blanket
1 x Pillow
1 x Hand / Wrist Airsplint

Procedure



Step 1

Officer 1 places the LSB above the patient's head in-line with the patient's body. Officer 1 positions themselves beside the LSB.



Step 2

Officer 2 straddles the patient's torso facing Officer 1, squatting down and is positioned at the patient's torso and places a pillow under the patient's head (if non trauma) or towel (if trauma). Officer 2 supports the patient's head as Officer 1 slides the LSB under the patient's head.

STRADDLE LIFT - ABOVE 2 PERSON**Step 3**

Officer 2 now repositions their hands underneath the patient's armpits. Officer 2's arms should rest on their inner legs, with their back and arms kept straight.

Officer 2 lifts the patient's torso by slightly flexing their quadriceps, but only enough to slide the LSB underneath the patient's torso. Officer 1 stops sliding the LSB when it touches the patient's bottom. The curve of the LSB will allow the LSB to slide correctly aligned under the patient.

**Step 4**

Officer 2 now moves down to the patient's pelvis and straddles the patient, squatting down and placing their hands underneath the patient's bottom. Officer 2's back and arms are kept straight.



Officer 2 then lifts the patient's pelvis by slightly flexing quadriceps. Officer 1 then slides the LSB underneath the patient's bottom and legs until the patient's shoulders are correctly aligned with the shoulder markings on the LSB.

The patient is then secured to the LSB for safety during transport.

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BACKBOARDING THE STANDING PATIENT

Studies show that approximately 17 - 25% of patients with spinal injuries are walking at the scene of the motor crash.¹⁻³ The following technique shown, which is often referred to as the 'Standing Long Board', allows Officers to place the patient in the lying position with little movement of the spine when compared to other methods currently practiced. Either a Long Spine Board (LSB) or Scoop Stretcher can be used for this procedure. It should also be noted that a patient in a standing position will still be up to 5 cm shorter as the weight of the head and torso compress the patient's vertebra together. It is therefore essential that the patient be placed in a supine position as soon as possible to uncompress the spinal column.

The Standing Long Board technique is not just limited to use in the traumatic SCI patient, but can also be used with other patients such as those with back pain or other injuries who find it too painful to get to a lying position without assistance.

By reversing the procedure, the Standing Long Board is an effective way of standing a patient up from the lying position and uses a safe lifting technique. Such cases may include the 'floor-to-bed', chronic C.V.A. or M.S. patient who has fallen and simply requires assistance to stand up.

Training Requirements:

3 x Staff
1 x Patient
1 x Cervical Collar
1 x Long Spine Board (LSB)
1 x Blanket
1 x Towel
1 x Hand / Wrist Airsplint

Procedure



Step 1

Officer 2 maintains Manual In-Line Stabilisation until the patient is properly immobilised onto the LSB^{2-5, 11} Officer 1 applies a Cervical Collar. The Manual In-Line Stabilisation is maintained as best as possible until full spine immobilisation is achieved¹¹ as a Cervical Collar will at best provide only 50% immobilisation²⁻⁵.

Officer 1 then inserts a LSB behind the patient.

BACKBOARDING THE STANDING PATIENT**Step 2**

Officer 3 inserts blanket between patient and the LSB for improved patient comfort,⁶⁻¹⁰ and places a towel for padding between the patient's head and LSB as required to prevent hyperextension of the patient's head.

**Step 3**

Officers 1 & 3 stand on either side of the patient, with each Officer placing their inner arm under the patient's armpits. Officers 1 & 3 grip the handles of the LSB slightly higher than armpits. This will help prevent the patient sliding down the LSB when the LSB is lowered. Officers 2 & 3's other hand should hold the LSB at the top handle to give additional support and stability whilst the LSB is lowered to the ground.

**Step 4**

Officers 1 & 3 slowly the lower the LSB backwards until the LSB is on the ground.



BACKBOARDING THE STANDING PATIENT**Step 5**

Finally immobilise the patient to the LSB for transport (pg 109).¹¹

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BACKBOARDING THE SITTING PATIENT

The following technique allows the Officers to place a patient in the sitting position onto a Long Spine Board (LSB) with less movement or stress placed on the spinal column when compared to other manoeuvres currently practiced.

Training Requirements:

**3 x Staff
1 x Patient
1 x Cervical Collar
1 x Long Spine Board (LSB)
1 x Blanket
1 x Towel
1 x Hand / Wrist Airsplint**

Procedure



Step 1

With Officer 1 maintaining Manual In-Line Stabilisation of the head, Officer 2 applies a Cervical Collar to the patient. If possible, Officer 1 maintains Manual In-Line Stabilisation until the patient is properly immobilised onto the LSB, as a Cervical Collar is inadequate to immobilise the cervical spine.²⁻⁵



Step 2

Officer 2 inserts the LSB behind the patient.

BACKBOARDING THE SITTING PATIENT**Step 3**

Officer 3 places a blanket between the LSB & patient for improved comfort when lying on the LSB.⁶⁻¹⁰ Place a towel for padding between the patient's head and the LSB as required to prevent hyperextension.¹

**Step 4**

Officers 2 & 3 kneel on either side of the patient, and holds the LSB by gripping the handholds slightly lower than the patient's armpit. Officer 2 & 3's other hands should hold the LSB one handhold above the patient's shoulders to assist with supporting the LSB whilst lowering it to the ground. Due to the LSBs position, Manual In-Line Stabilisation is not possible whilst lowering the LSB to the ground, so extreme care must be taken during the lowering procedure as a Cervical Collar alone is insufficient to prevent cervical spine movement.²⁻⁵

**Step 5**

Officers 2 & 3 slowly the lower the LSB and patient backwards until they are on the ground.

**Step 6**

Officer 1 re-establishes Manual In-Line Stabilisation until the patient is properly immobilised to the LSB.²⁻⁵ Finally, slide the patient up the LSB (30 cm at a time) until the patient's shoulders are correctly aligned with the shoulder markings on the LSB. This is achieved by Officers 2 & 3 place one hand under the patient's armpits (avoid pushing the patient's shoulders anteriorly as this moves the patient's spinal column), and their other hand is placed over the pelvis to slide the patient. To prevent the LSB from sliding with the patient, place one foot on the edge of the LSB.

BACKBOARDING THE SITTING PATIENT**Step 7**

Finally immobilise the patient to the LSB for transport (pg 109).¹¹

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REMOVAL FROM AN ARMCHAIR

The following method offers a safe lifting technique for removing a patient who due to a medical condition, is unable to remove themselves from an arm chair.

Training Requirements:

2 x Staff
1 x Patient
1 x Armchair
1 x Long Spine Board (LSB)
1 x Blanket
1 x Pillow

Procedure



Step 1

Position the armchair so that there is adequate room for the armchair to be tilted backwards.



Step 2

Officer 1 tilts the patient forward, whilst Officers 2 slides the LSB down behind the patient's back.

Officer 2 slides a blanket between the patient and the LSB for improved comfort.

REMOVAL FROM AN ARMCHAIR

**Step 3**

Lean patient back onto the LSB. A pillow can be inserted behind the patient's head to improve LSB comfort during transport.

**Step 4**

Officers 1 & 2 each place their front hand on the front of the armchair and their rear hand on the back support of the armchair.

Officers 1 & 2 then tilt the armchair backwards until the rear of the chair is resting firmly on the ground.



Do not hold the LSB at any time during this step.

**Step 5**

Holding the patient under their arms and knees, carefully slide the patient onto the LSB until correctly positioned.

Secure the patient to the LSB for transport.



LOG ROLLING THE UNCONCIOUS PATIENT

This manoeuvre allows the rapid placement of a unconscious medical patient onto the Long Spine Board (LSB) in the lateral position with minimal effort by the Officer.

This technique is designed for the curved LSB only and will not work with flat LSBs.

<u>Training Requirements:</u>	1 x Staff 1 x Patient 1 x Long Spine Board (LSB) 2 x Towel
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Procedure



Step 1

Officer 1 places the LSB at head of patient.



Step 2

Officer 1 carefully rolls the patient onto their back.



Step 3

Officer 1 places the patient's proximal arm out and bend at the elbow so that the patient's hand is resting under the patient's head. Place the patient's distal arm across their upper chest, and bend the patient's distal knee up.

Slide the LSB partially under the patient until the LSB's curved line is level with edge of patient's torso. If the LSB too far under the patient, the patient will come off the other side of the LSB. The LSB should now be sitting up at an angle.

LOGROLLING THE UNCONSCIOUS NON TRAUMA PATIENT

**Step 4**

Grasping the patient's upper hand and knee, roll the patient towards the LSB .

The curve of the LSB will greatly assist the patient rolling onto the LSB .

**Step 5**

The patient can now be secured to the LSB for transfer.

Padding using a towel will be required underneath the patient where ever the patient contacts the edge of the LSB to prevent pressure points.

PAT-SLIDE THE SITTING PATIENT

The Sitting Pat-Slide technique can be used to transfer patients from numerous positions such as bed to stretcher, stretcher to wheelchair and vice versa. The manoeuvre can also be used to transfer obese patients, who, due to medical conditions (eg respiratory distress) cannot be laid flat for using the hospital Pat-slide or poles.

<u>Training Requirements:</u>	2 x Staff
	1 x Patient
	1 x Long Spine Board (LSB)
	1 x Stretcher
	1 x Trolley

Procedure



Step 1

The Officers place their stretcher beside and parallel to the trolley with a gap of approximately 90 to 120 cm. The Officers stretcher is slightly higher than the trolley the patient will be moving onto, so that gravity will assist with the transfer.



Step 2

Officer 1 slides the LSB underneath the patient's bottom, and rests the other end of the LSB on the trolley.

PAT-SLIDING THE SITTING PATIENT**Step 3**

Officer 1 crosses and grasps the patient's arms, then supports the patient from behind. Officer 2 holds the patient's ankles.

When ready, Officers 1 & 2 slide the patient down the LSB.



With gravity assisting, there should be no actual lifting of the patient during the slide.

**Step 4**

Once the patient is on the trolley, raise the trolley's head to support the patient in the sitting position.

**Step 5**

Finally remove the LSB from under the patient.

PAT-SLIDE THE LYING PATIENT

The following technique allows the Officers to transfer a patient in the lying position onto a Long Spine Board (LSB), with less movement or stress placed on the spinal column when compared to other manoeuvres currently practiced. It is used in a similar manner to the fibreglass Pat-Slide found in many hospitals for transferring patients from beds to stretchers.

Points To Remember:

The LSB has a number of advantages over the hospital Pat-Slide which include:

- As the patient is placed on a rigid platform, the LSB rather than the patient is slid across onto the stretcher. As there is less movement of the patient during the transfer, there is reduced manipulation of the patient's injuries and a reduction in pain felt by the patient during the transfer.
- The patient can be kept on the LSB during transport, thus reducing the need to log roll the patient as often.

Training Requirements:

2 x Staff
1 x Patient
1 x Long Spine Board (LSB)
1 x Blanket
1 x Stretcher
1 x Trolley

Procedure



Step 1

Place both the stretcher and trolley beside and parallel to each other. Ensure both the stretcher and trolley are adjusted to the same height

PAT-SLIDING THE LYING PATIENT

**Step 2**

Both Officers slide the LSB's head end across from the stretcher to the trolley.

**Step 3**

Both Officers then slide the LSB's foot end across from the stretcher onto the trolley.



VEHICLE
EXTRACTION
TECHNIQUES

INTRODUCTION

The introduction of the Long Spine Board (LSB) in prehospital setting allows for vast improvements into the standard of spinal care, and greatly eases patient removal from motor vehicles.

In many cases, extraction of the patient onto a LSB was found to be eased if a patient was placed into a jacket style Cervical Extrication Device (CED). Not only will the CED provide extremely effective cervical and partial thoracic / lumbar spine immobilisation, it will also ease the extrication by "placing handles on the patient". If the patient does not meet the definition of an 'Actual Time Critical' patient; **OR** the patient is trapped & is classed as Actual Time Critical, but the CED will not delay on-scene time, then a CED should be applied where appropriate.

PRINCIPLES OF EXTRACTION

In determining the method of patient removal (egress) from a vehicle, the two basic principles should be applied:¹⁻⁴

1. MAINTAIN SPINAL ALIGNMENT

- to minimise spinal cord injury and paralysis

2. MINIMAL BODY TWISTING

- to reduce further injuries and reduce fracture movement & pain

By adopting these two principles, all Officers at the scene of an motor vehicle crash (both RESCUE and AMBULANCE staff) are able to rapidly establish the method and direction of patient removal. This reduces confusion between organisations at the scene of how the patient is to be extracted, allowing organisations to quickly determine set-up areas, and assists Rescue personal in making rapid decisions into stabilisation and allows correct cutting techniques to be implemented. Scene delays due to poor scene co-ordination and unnecessary vehicle cuts have the potential to decrease patient survival.²⁻³

Principles of extraction are demonstrated in the following section.

Bibliography

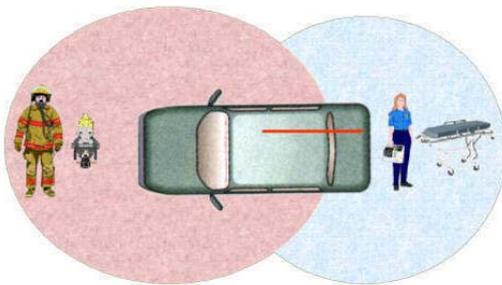
1. Joint Royal Colleges Ambulance Liaison Committee: UK Prehospital Clinical Guidelines Procedure 14: Long Board
2. Trunkey
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SCENE SETUP

Overcrowding and poor placement of equipment at the scene of an scene by Rescue and Ambulance Officers (causing scene cluttering & trip hazards requiring multiple movements of equipment) can result in delays in the extraction to the detriment of the patient.¹⁻² By following the basic principles below, these problems can be reduced by limiting crossover work areas, as well as making a safer and more efficient working environment.

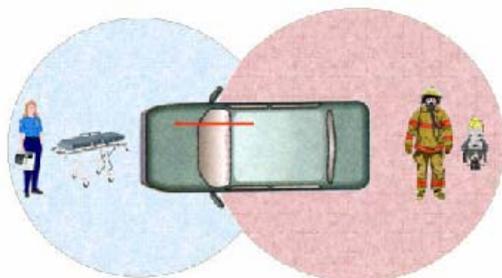
Basic principles of equipment placement is to position ambulance equipment and staff in the direction the patient will be extracted, whilst placing the rescue equipment staging area at the 180° opposing position.

Some basic examples include:



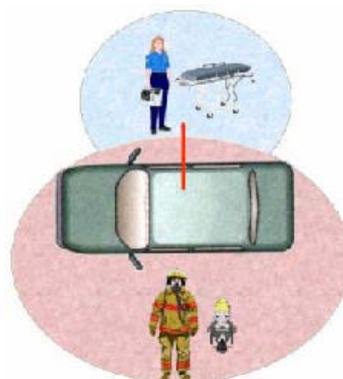
Rear Extraction

- Ambulance equipment & Officers set-up are placed at the rear of the vehicle.
- Rescue staging area & Officers are placed at the front of the vehicle.



Front Extraction

- Ambulance equipment & Officers set-up are placed at the front of the vehicle.
- Rescue staging area & Officers are placed at the rear of the vehicle.



Side Extraction

- Ambulance equipment & Officers set-up are placed at the side of the vehicle the patient will be extracted from.
- Rescue staging area & Officers are placed on the opposite side of the vehicle.

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Impact of on-site care, prehospital time, and level of in hospital care on survival in severely injured patients.

REAR WINDOW EXTRACTION FRONT SEAT

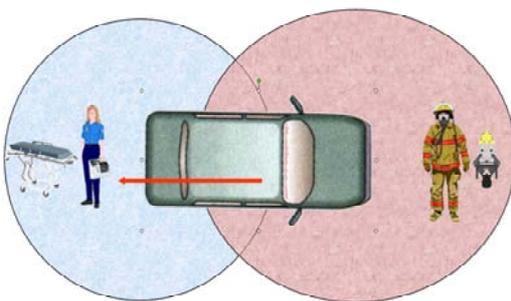
The following technique has been found, through extensive trials, to be the preferred method for patient extraction when the patient is found sitting normally in the front seat of a vehicle. The advantages of this method are spinal alignment (to protect the spinal cord) is maintained, and body twisting (which can further aggravate fractures and other injuries) is minimised as compared to other techniques available.

Training Requirements:

6 x Staff
1 x Patient
1 x Cervical Collar
1 x Cervical Extrication Device (CED)
1 x Long Spine Board (LSB)
1 x Rope
2 x Blanket
1 x Stretchers
Vehicle Cutting Equipment

Scene Setup

With the patient in this scenario being extracted out through the rear window, the following general principles should be applied whenever practical:



- Ambulance equipment staging area should be setup at the rear of the vehicle on the 5 m outer circle.
- Rescue equipment staging area should be setup at the front of the vehicle on the 5 m outer circle.
- Fire protection with a live hose is again placed on the 5 m outer circle, but at 45° to the front of the vehicle so as not to interfere with the Rescue staging area.

REAR WINDOW EXTRICATION - FRONT SEAT

**Step 1**

Perform Manual In-Line Stabilisation of the patient's head and apply a Cervical Collar.

**Step 2**

Apply a CED if the patient is not time-critical, or the patient is time critical but the application of the CED will not delay the extraction. The CED will immobilise the cervical spine, as well as provide handles to ease the lifting and sliding of the patient.¹⁻⁷

If the patient is time critical and the CED will delay extraction, consider application of the CED as a lifting device (application of the chest and groin straps only) which takes less than 2 minutes to apply, if the benefit of preventing gross twisting of the spine, and the prevention of back injury to the Officers undertaking the extraction is justified.

If a CED is not applied, manual in-line stabilisation needs to be maintained until the patient is properly immobilised onto a LSB (pg 109).¹⁻⁹

Tie the patient's legs together as outward rotation of the legs will cause pelvic girdle movement and therefore movement of the spinal column.

Step 3a

Removal of the lower section of the steering wheel is an option that will create additional space for the removal of the driver, and prevents the common problem of feet getting caught during the extraction.

REAR WINDOW EXTRICATION - FRONT SEAT

**Step 3b**

To allow for the removal of a patient through a rear window, an opening needs to be made. Generally removal of, or the faster process of breaking the rear window will be adequate.

**Step 3c**

If the rear window removal provides insufficient space for the patient to be extracted through, spreading of the back window with the hydraulic spreaders, ram or high-lift jack will crush the rear seat down and push the roof up, making significant space for patient removal.

**Step 3d**

Alternatively a forward roof flap will provide additional space when access to the patient from the sides is limited.

Rear roof flaps should be avoided as they will block the exit for the patient.

The current practice of door removal, will in many cases, not provide any assistance in the extraction of the patient unless the legs are trapped, but will simply increase scene time and should be avoided if there is no clear benefit.¹⁰⁻¹¹

**Step 3e**

If the patients legs are trapped under the dash, additional cutting including the door removal and a dash roll may be necessary to free the patient.

REAR WINDOW EXTRICATION - FRONT SEAT

**Step 3f**

If the seat back will not rotate downward, cutting the seat's back support will allow the seat back to lay fully down

**Step 4**

Place a blanket over the window edge and boot to allow the LSB to easily slide in and out of the vehicle. Failure to do this may result in severe LSB vibration during extraction.

Place the LSB on top of the blanket in readiness for insertion behind the patient once the patient's seat is rotated back.

The option of pre-strapping the LSB with each strap attached at one end will speed up and ease securing patient to the LSB once the patient has been extracted.

**Step 5**

Place a rope through the back upper handle of the CED. This will be used to pull the patient up the LSB.

**Step 6**

Keep the patient sitting upright and lay the seat back fully. Do not allow the patient to rotate downward with the seat as the seat winding downward will cause jerking to the patient.

Slide the LSB into the seat.

REAR WINDOW EXTRICATION - FRONT SEAT

**Step 7**

Slide the patient up the LSB in slow 30 cm movements using the rope, as well as Officers on each side of the patient to assist the slide, and to ensure the pelvis and legs stay aligned with the patient's torso.

**Step 8**

Slide the patient up the LSB until the patient's shoulders are level with shoulder markings on the LSB.

**Step 9**

Raise the foot of the LSB to a horizontal position and slide the LSB out of the vehicle until it is sitting in a stable position on the boot of the vehicle.

**Step 10**

Now immobilise the patient to the LSB.⁹

If a CED has been applied correctly, it is considered that further head immobilisation will generally not be necessary as the CED is currently considered to have splinted the cervical spine adequately.¹⁻⁷ However body immobilisation for protection of the thoracic and lumbar spinal cord will still be necessary.⁹

REAR WINDOW EXTRICATION - FRONT SEAT

**Step 11**

The patient can now be safely carried away from the vehicle to the Ambulance stretcher.

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Impact of on-site care, prehospital time, and level of in hospital care on survival in severely injured patients.

REAR SIDE WINDOW EXTRACTION

FRONT SEAT

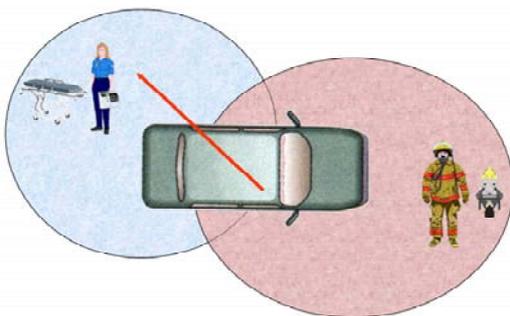
The following technique offers an alternative extraction method when the patient is found sitting normally in the front seat of a vehicle, but cannot be extracted out the rear window of a vehicle.

Training Requirements:

6 x Staff
1 x Patient
1 x Cervical Collar
1 x Cervical Extrication Device (CED)
1 x Long Spine Board (LSB)
1 x Rope
2 x Blankets
1 x Stretcher
Vehicle Cutting Equipment

Scene Setup

With the patient in this scenario being extracted out a rear side window the following general principles should be applied whenever Practical:



- Ambulance equipment staging area should be setup at the rear of the vehicle on the 5 m outer circle.
- Rescue equipment staging area should be setup at the front of the vehicle on the 5 m outer circle.
- Fire protection with a live hose is again placed on the 5 m outer circle, but at 45° to the front of the vehicle so as not to interfere with the Rescue staging area.

REAR SIDE WINDOW EXTRACTION - FRONT SEAT

**Step 1**

Perform Manual In-Line Stabilisation of the patient's head and apply a Cervical Collar.

**Step 2**

Apply a CED if the patient is not time critical, or the patient is time critical but the application of the CED will not delay the extraction. The CED will immobilise the cervical spine, as well as provide handles to ease the lifting and sliding of the patient.¹⁻⁷

If the patient is time critical and the CED will delay extraction, consider application of the CED as a lifting device (application of the chest and groin straps only) which takes less than 2 minutes to apply, if the benefit of preventing gross twisting of the spine, and the prevention of back injury to the Officers undertaking the extraction is justified.

If a CED is not applied, manual in-line stabilisation needs to be maintained until the patient is properly immobilised onto a LSB (pg 109).¹⁻⁹

Tie the patient's legs together as outward rotation of the legs will cause pelvic girdle movement and therefore movement of the spinal column.

**Step 3**

Place a rope through the back upper handle of the CED, which will be used to pull patient up the LSB.

REAR SIDE WINDOW EXTRACTION - FRONT SEAT

**Step 4a**

Removal of the lower section of the steering wheel is an option that will create additional space for the removal of the driver, and prevents the common problem of the feet getting caught during the extraction.

**Step 4b**

To allow for the removal of a patient through a rear side window, some additional space often needs to be made. Generally removal of the back 1/4 window will be required.

**Step 5**

Keep the patient sitting upright and rotate the back of the drivers seat fully down.

The front passenger seat should be slid forward and then the back of the seat rotated forward as much as possible to create additional space for LSB insertion.

REAR SIDE WINDOW EXTRACTION - FRONT SEAT

**Step 6**

Place a blanket over the rear passenger side window ledge to allow the LSB to easily slide in and out of the vehicle. Failure to do this may result in severe LSB vibration during extraction of the patient. Place the LSB on top of the blanket and slide the LSB through the closed door and into the seat.

The option of pre-strapping the LSB with each strap attached at one end will speed up and ease securing the patient to LSB once the patient has been extracted.

**Step 7**

Begin the slide out of the vehicle by positioning Officers at:

Officer 1 on the outside of the vehicle - drivers side, assists in the rotation of the patient's pelvis & legs during the extraction.

Officer 2 from behind supports the patient's head in the initial movement, and also assists in the rotation of the patient during the extraction.

Officer 3 from inside the vehicle passenger side assists in the rotation of the patient during the extraction.

Officers 4, 5 & 6 are positioned on the outside of the vehicle in the direction the patient will be extracted and will assist in the sliding of the patient out of the vehicle.

**Step 8**

Rotate the patient onto their side and onto the LSB.

It is essential the patient's pelvis and legs be rotated sideways as well during the side roll to prevent lateral bending of the spinal column.

REAR SIDE WINDOW EXTRACTION - FRONT SEAT

**Step 9**

Slowly slide the patient up the LSB in 30 cm movements using the rope to assist. Officers should be placed on either side of the patient if possible to assist the slide, and to ensure the patient's pelvis and legs stay aligned with their torso.

**Step 10**

Slide the patient up the LSB until the patient's shoulders are level with shoulder marking on the LSB.

**Step 11**

Raise the foot end of the LSB and slide the LSB out of the vehicle until it is sitting in a stable horizontal position on the window ledge of the vehicle.

REAR SIDE WINDOW EXTRACTION - FRONT SEAT

**Step 12**

Now immobilise the patient to the LSB (pg 109).⁹

If a CED has been applied correctly, it is considered that further head immobilisation will generally not be necessary as the CED is currently considered to have splinted the cervical spine adequately¹⁻⁷. However body immobilisation for protection of the thoracic and lumbar spinal cord will still be necessary.

The patient can now be safely carried away from the vehicle to the Ambulance stretcher.

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REAR WINDOW EXTRACTION

BACK SEAT

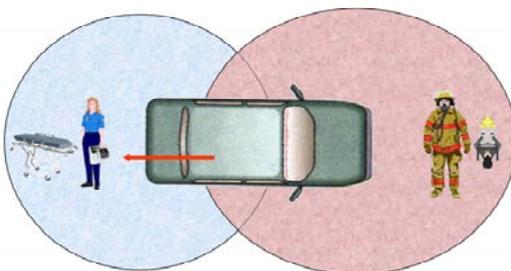
The following technique has been found through extensive trials, to be the best method for patient extraction when the patient is found sitting normally in the back seat of a vehicle. The advantages of this method are spinal alignment (to protect the spinal cord) is maintained, and body twisting (which can further aggravate fractures and other injuries) is minimised as compared to extraction through a side near door.

Training Requirements:

5 x Staff
1 x Patient
1 x Cervical Collar
2 x Triangular Bandages
1 x Long Spine Board (LSB)
1 x Rope
1 x Blanket
1 x Stretchers
Vehicle Rescue Equipment

Scene Setup

With the patient in this scenario being extracted out through the rear window the following general principles should be applied whenever practical:



- Ambulance equipment staging area should be setup at the rear of the vehicle on the 5 m outer circle.
- Rescue equipment staging area should be setup at the front of the vehicle on the 5 m outer circle.
- Fire protection with a live hose is again placed on the 5 m outer circle, but at 45° to the front of the vehicle so as not to interfere with the Rescue staging area.



REAR WINDOW EXTRACTION - BACK SEAT

**Step 1**

Perform Manual In-Line Stabilisation of the patient's head and apply a Cervical Collar.

**Step 2**

Apply groin straps on each leg of the patient using triangular bandages.

The groin straps must be placed in the gluteal fold to obtain proper stability for the extraction.

**Step 3a**

To allow for the removal of a patient through a rear window, an opening needs to be made. Generally removal of, or the faster process of breaking the rear window will be adequate.

**Step 3b**

Alternatively a forward roof flap will provide additional space when access to the patient from the sides is limited. A clear benefit needs to be demonstrated for time required to perform this manoeuvre.²⁻³

Rear roof flaps should be avoided as they will block the exit for the patient.

REAR WINDOW EXTRACTION - BACK SEAT

**Step 4**

Place a blanket over the window edge and boot to allow the LSB to easily slide in and out of the vehicle. Failure to do this may result in severe LSB vibration during extraction.

Lean the patient forward and insert the LSB behind the patients back.



The option of pre-strapping the LSB with each strap attached at one end only will speed up and ease securing the patient to LSB once they have been extracted.

**Step 5**

Officers should be positioned in the following way:

Officer 1 stands at the back of the vehicle, places one foot on the boot of the vehicle and the other foot on the bumper of the vehicle. Officer 1 hands should hold the top handles of the LSB.

Officers 2 & 3 are positioned either side of the patient, kneeling on the boot of the vehicle, and with the arms closest to the LSB holding the groin straps. Officers 2 & 3's outer arms cross over and hold the LSB, locking their inner arm to the LSB so that during the extraction, the patient's position is maintained on the LSB.



Officers 4 & 5 are positioned inside the vehicle on either side of the patient. Officers 4 & 5 place one hand under the patient's knees to control the knees during the LSBs backward rotation to ensure the patients knees remain in the bent position. Officers 4 & 5 each place their other hand on the patient's ankles to prevent the patient's feet getting caught under the front seats.

REAR WINDOW EXTRACTION - BACK SEAT

**Step 6**

Begin the slide out of the vehicle by:

Officer 1 pushes himself off the vehicle's boot and whilst doing this, lifts the LSB 30 cm upwards (to allow the patient's feet to clear the front seat) and then pivots the head of the LSB down until the LSB is horizontal and resting on the boot of the vehicle.



Officers 2 & 3 ensure they continue locking their arms to the LSB during the LSB's movement so the patient does not slip down the LSB.



Officers 4 & 5 ensure the patient's knees remain in the bent position during the manoeuvre so as no pressure is placed on the spine. Once the LSB is in the horizontal position, the patient's knees should almost be touching the roof.

**Step 7**

Slowly slide the patient up the LSB in 30 cm movements with Officers on each side of the patient to assist the slide, and to ensure the pelvis and legs stay aligned with the torso. Officers 4 & 5 slowly straighten the legs as the patient is slid up the LSB.

REAR WINDOW EXTRACTION - BACK SEAT

**Step 8**

Now immobilise the patient to the LSB for transport (pg 109).¹

**Step 9**

The patient can now be safely carried away from the vehicle to the Ambulance stretcher.

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Review Of Trauma And Emergency Services Report 1999
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Sci Am 1983;249:28.
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J Trauma 1993;34:252—61.
Impact of on-site care, prehospital time, and level of in hospital care on survival in severely injured patients.

VERTICAL LIFT **FROM A SEAT**

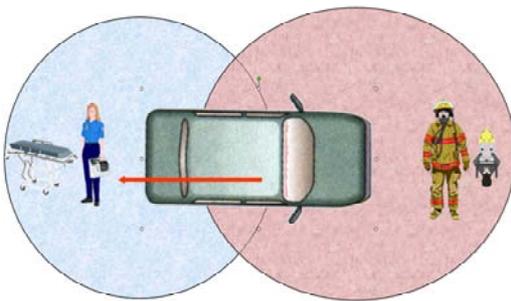
The following technique is an option when the doors are jammed and will be difficult to open, the seat won't recline backwards (such as in a utility vehicle), and roof removal provides the easiest egress for the patient. It is adaptable to both front and rear seat patients. This technique is however the most difficult of all the extraction techniques taught in this manual, and is easier to achieve if the patient is placed in a jacket-style Cervical Extrication Device (CED) with handles. The advantages of this method are spinal alignment (to protect the spinal cord) is maintained, and body twisting (which can further aggravate fractures and other injuries) is minimised as compared to a side door extraction.

Training Requirements:

4 x Staff
1 x Patient
1 x Cervical Collar
1 x Cervical Extrication Device (CED)
1 x Long Spine Board (LSB)
1 x Blanket
1 x Stretcher
Vehicle Cutting Equipment

Scene Setup

With the patient in this scenario being extracted out the rear of the vehicle, the following general principles should be applied whenever practical:



- Ambulance equipment staging area should be setup at the rear of the vehicle on the 5 m outer circle.
- Rescue equipment staging area should be setup at the front of the vehicle on the 5 m outer circle.
- Fire protection with a live hose is again placed on the 5 m outer circle, but at 45° to the front of the vehicle so as not to interfere with the Rescue staging area.



VERTICAL LIFT FROM A SEAT

**Step 1**

Perform Manual In-Line Stabilisation of the patient's head and apply a Cervical Collar.

**Step 2**

Apply a CED if the patient is not time-critical, or the patient is time critical but the application of the CED will not delay the extraction. The CED will immobilise the cervical spine, as well as provide handles to ease the lifting and sliding of the patient.¹⁻⁷

If the patient is time critical and the CED will delay extraction, consider application of the CED as a lifting device (application of the chest and groin straps only) which takes less than 2 minutes to apply, if the benefit of preventing gross twisting of the spine, and the prevention of back injury to the Officers undertaking the extraction is justified.

If a CED is not applied, Manual In-Line Stabilisation of the patient's head needs to be maintained until the patient is properly immobilised to a LSB (pg 109).¹⁻⁹

**Step 3a**

Removal of the lower section of the steering wheel is an option that will create additional space for the removal of the driver and prevents the common problem of their feet getting caught during the vertical lift.

VERTICAL LIFT FROM A SEAT

**Step 3b**

If access to the patient's lower legs is difficult, side door removal can be undertaken.

Door removal however is not essential for the manoeuvre to be successful. Therefore Officers must consider time vs. benefit.¹⁰⁻¹¹

**Step 3c**

Folding the roof forward, or the less preferred option of complete roof removal will be required for the extraction of the patient from the vehicle.

Cutting of the front window for complete roof removal (required in new vehicles) creates significant amounts of glass dust and sharp hazards to the patient and Officers.

**Step 4**

Officers lean the patient slightly forward and slide the LSB into the seat from behind.

**Step 5**

Once the LSB is inserted, lean the patient back onto the LSB.

VERTICAL LIFT FROM A SEAT

**Step 6**

Begin the slide out of the vehicle on a LSB by positioning Officers at:

Officers 1 & 2 at the patient's head end hold the top half of the LSB with one hand, and hold the side handles of the CED with their other hand.

Officer 3 & 4 at the patient's pelvic end grab the bottom edge of the CED with one hand, and support under the patient's knees with their other hand.

**Step 7**

The patient is slid up the LSB in one quick action.

When the patient is 3/4 of the way up the LSB, the LSB is rotated backwards to a horizontal position.



Continue sliding the patient up the LSB 30 cm movements until the patient's shoulders are level with shoulder markings on the LSB.

**Step 8**

Now immobilise the patient to the LSB (pg 109).⁹ If a CED has been applied correctly, it is considered that further head immobilisation will generally not be necessary as the CED is currently considered to have splinted the cervical spine adequately.¹⁻⁷ However body immobilisation for protection of the thoracic and lumbar spinal cord will still be necessary.



VERTICAL LIFT FROM A SEAT

**Step 9**

The patient can now be safely carried away from the vehicle to the Ambulance stretcher.

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Impact of on-site care, prehospital time, and level of in hospital care on survival in severely injured patients.

OPPOSITE WINDOW EXTRACTION FROM A SEAT

The following technique offers an alternative for when the patient is found sitting normally in the front or back seat of a vehicle, but the patient cannot be extracted out the rear window.

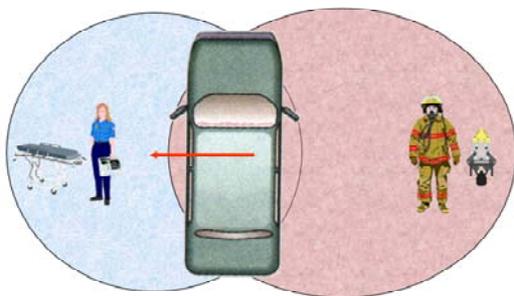
The procedure is also excellent as a rapid extraction technique when no cutting tools are available, and a rear window extraction is not an option (such as in a utility vehicle).

Training Requirements:

6 x Staff
1 x Patient
1 x Cervical Collar
1 x Cervical Extrication Device (CED)
1 x Long Spine Board (LSB)
1 x Rope
2 x Blankets
1 x Stretcher
Vehicle Cutting Equipment

Scene Setup

With the patient in this scenario being extracted out the side window, the following general principles should be applied whenever feasible:



- Ambulance equipment staging area should be setup at the extraction side of the vehicle on the 5 m outer circle.
- Rescue equipment staging area should be setup at the side opposite to the extraction of the vehicle on the 5 m outer circle..
- Fire protection with a live hose is again placed on the 5 m outer circle, but at the front of the vehicle so as not to interfere with the Ambulance or Rescue staging area.

OPPOSITE WINDOW EXTRACTION FROM A SEAT**Step 1**

Perform Manual In-Line Stabilisation of the patient's head and apply a Cervical Collar.

**Step 2**

Apply a CED if the patient is not time-critical, or the patient is time critical but the application of the CED will not delay the extraction. The CED will immobilise the cervical spine, as well as provide handles to ease the lifting and sliding of the patient.¹⁻⁷

If the patient is time critical and the CED will delay extraction, consider application of the CED as a lifting device (application of the chest and groin straps only) which takes less than 2 minutes to apply, if the benefit of preventing gross twisting of the spine, and the prevention of back injury to the Officers undertaking the extraction is justified.

If a CED is not applied, manual in-line stabilisation of the patient's head needs to be maintained until the patient is properly immobilised onto a LSB.¹⁻⁹ Tie the patient's legs together as outward rotation of the legs will cause pelvic girdle movement and therefore movement of the spinal column.

**Step 3a**

If Rescue is available, removal of the steering wheel will create additional space for the extraction of the driver, and prevents the patient's legs & feet getting caught during the roll out.

OPPOSITE WINDOW EXTRACTION FROM A SEAT

**Step 3b**

To allow for the removal of a patient through a side window, additional space can be made by performing a vertical spread in the window, although this is often not required.

Opening the door, whilst creating additional space, will however cause the angle of the LSB to be lowered and increase lateral bending of the spine.

**Step 3c**

A forward roof flap or full roof removal will also provide additional head space, when access to the patient from the sides is limited, or the dash has been crushed in on the patient.

Again if there is no clear benefit, a forward roof flap or full roof removal should be avoided due to added scene time.¹⁰⁻¹¹

**Step 4**

Place a blanket over the side window ledge to allow the LSB to easily slide in and out of the vehicle. Failure to do this may result in severe LSB vibration during extraction of the patient.

Place the LSB on top of the blanket and slide the LSB through the window opening and onto the seat the patient is sitting on.

The option of pre-strapping the LSB with each strap attached at one end only will speed up and ease securing the patient to LSB once the patient has been extracted.



OPPOSITE WINDOW EXTRACTION FROM A SEAT

**Step 5**

Place a rope through the back upper handle of the CED, which will be used to pull patient up the LSB.

**Step 6**

Begin the slide out of the vehicle on the LSB by positioning Officers at:

Officer 1 on the outside of the vehicle - drivers side, assists in the rotation of the patient's pelvis & legs during the extraction.

Officer 2 from behind supports the patient's head in the initial movement, and also assists in the rotation of the patient during the extraction.

Officers 3, 4 & 5 are positioned on the outside of the vehicle in the direction the patient will be extracted and will assist in sliding the patient out of the vehicle.

**Step 7**

Rotate the patient onto their side onto the LSB.

It is essential the patient's pelvis and legs be rotated sideways as well during the side roll to prevent lateral bending of the patient's spinal column.

**Step 8**

Slide the patient up the Board in 30 cm movements using the rope. Officer 1 should remain at the patient's feet if possible to assist the slide, and to ensure the patient's pelvis and legs stay aligned with the torso.

OPPOSITE WINDOW EXTRACTION FROM A SEAT

**Step 9**

As the patient is being slid up the LSB, slowly rotate the patient onto their back.

**Step 10**

The patient is slid up the LSB until the patient's shoulders are level with the shoulder markings on LSB in preparation for immobilisation.

Raise the foot end of the LSB until the LSB is horizontal.

**Step 11**

Now immobilise the patient to the LSB (pg 109).⁹

If a CED has been applied correctly, it is considered that further head immobilisation will generally not be necessary as the CED is currently considered to have splinted the cervical spine adequately.¹⁻⁷ However body immobilisation for protection of the thoracic and lumbar spinal cord will still be necessary.

**Step 12**

The patient can now be safely carried away from the vehicle to the Ambulance stretcher.

OPPOSITE WINDOW EXTRACTION FROM A SEAT**Bibliography**

1. Cline
Journal Of Emergency Medicine 1990
Comparison Of Rigid Immobilisation Collars
2. Cline
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A Comparison Of Methods Of C-Spine Immobilisation Used In Patient Extrication And Transport
3. Graziano
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Radiological Comparison Of Prehospital Cervical Immobilisation Methods
4. Howell
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Practical Radiographic Comparison Of The Short Spine Board And The Kendrick Extrication Device
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6. Manix
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8. Chandler
Annals Of Emergency Medicine October 1992
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9. Victorian Ministerial Task Force on Trauma
Review Of Trauma And Emergency Services Report 1999
10. Trunkey
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J Trauma 1993;34:252—61.
Impact of on-site care, prehospital time, and level of in hospital care on survival in severely injured patients.

SIDE EXTRACTION LEANING ON A DOOR

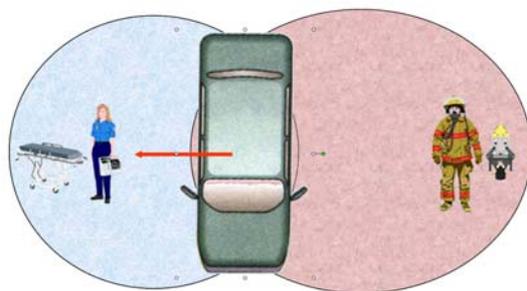
The following technique offers an option when the patient is sitting with their back leaning against a door. The advantages of this method are spinal alignment (to protect the spinal cord) is maintained, and body twisting (which can further aggravate fractures and other injuries) is minimised.

Training Requirements:

4 x Staff
1 x Patient
1 x Cervical Collar
1 x Long Spine Board (LSB)
1 x Stretcher
Vehicle Cutting Equipment

Scene Setup

With the patient in this scenario being extracted out a side door, the following general principles should be applied whenever feasible:



- Ambulance equipment staging area should be setup at the extraction side of the vehicle on the 5 m outer circle.
- Rescue equipment staging area should be setup at the side opposite to the extraction of the vehicle on the 5 m outer circle.
- Fire protection with a live hose is again placed on the 5 m outer circle at the front of the vehicle so as not to interfere with the Ambulance or Rescue staging area.

SIDE EXTRACTION - LEANING ON A DOOR

**Step 1**

Perform Manual In-Line Stabilisation of the patient's head and apply a Cervical Collar.

**Step 2a**

Lean patient forward off the door and fully open beyond the normal hinge position if possible. Place the LSB in behind the patient and rest the LSB on the seat. Lean the patient back onto the LSB.

Push the door forward out of the way for improved access for the extraction.

**Step 2b**

If the door is jammed closed, lean patient forward off the door, cut the doors window frame, slide the Board through the open window and rest the LSB on the seat.

Lean the patient back onto LSB, but ensure the LSB is not resting on the door.

Forcefully open the door.

Consider undertaking full door removal only if there is a time vs benefit of the additional space for the extraction of the patient.²⁻³



SIDE EXTRACTION - LEANING ON A DOOR

**Step 3**

Begin the slide out of the vehicle by positioning Officers by:

Officer 1 remains on the inside of the vehicle and will assist in the movement of the patient's legs during the extraction.

Officer 2 remains on the outside of the vehicle and will insert the LSB, and will assist Officers 3 & 4 in the extraction of the patient.

Officer s3 & 4 place themselves on the outside of the vehicle, assisting in the slide and extraction of the patient onto the LSB.

**Step 4**

Rotate the LSB downwards into a horizontal position.

Once the LSB is in the horizontal position, slide the patient along the LSB in 30 cm movements until the patient's shoulders are level with shoulder markings on the LSB.

**Step 5**

Now immobilise the patient to the LSB (pg 109).¹

The patient can now be safely carried away from the vehicle to the Ambulance stretcher.

**Bibliography**

1. Victorian Ministerial Task Force on Trauma
Review Of Trauma And Emergency Services Report 1999
2. Trunkey
Sci Am 1983;249:28.
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3. Sampalis JS,
J Trauma 1993;34:252—61.
Impact of on-site care, prehospital time, and level of in hospital care on survival in severely injured patients.

SIDE DOOR EXTRACTION FROM A SEAT

The following technique should be used as a last resort for when the patient is found sitting normally in the front or back seats of a vehicle, but the patient cannot be extracted out the rear window.

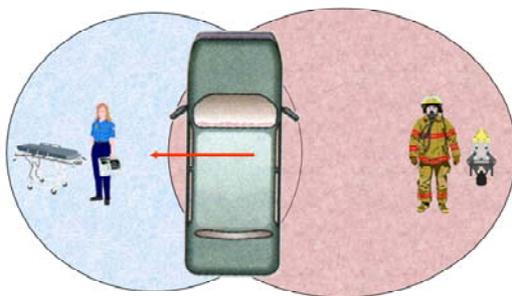
This method causes significant spinal and body twisting (which can further aggravate spinal cord function, fractures and other injuries), and is an increased OH&S risk to Officers undertaking the extraction as compared to other techniques offered.

Training Requirements:

6 x Staff
1 x Patient
1 x Cervical Collar
1 x Cervical Extrication Device (CED)
1 x Long Spine Board (LSB)
1 x Stretcher
Vehicle Cutting Equipment

Scene Setup

With the patient in this scenario being extracted out the side door, the following general principles should be applied whenever feasible:



- Ambulance equipment staging area should be setup at the extraction side of the vehicle on the 5 m outer circle.
- Rescue equipment staging area should be setup at the side opposite to the extraction of the vehicle on the 5 m outer circle.
- Fire protection with a live hose is again placed on the 5 m outer circle, but at the front of the vehicle so as not to interfere with the Ambulance or Rescue staging area.

SIDE DOOR EXTRACTION FROM A SEAT

**Step 1**

Perform Manual In-Line Stabilisation of the patient's head and apply a Cervical Collar.

**Step 2**

Apply a CED if the patient is not time critical, or the patient is time critical but the application of the CED will not delay the extraction. The CED will immobilise the cervical spine, as well as provide handles to ease the lifting and sliding of the patient.¹⁻⁷

If the patient is time critical and the CED will delay extraction, consider application of the CED as a lifting device (application of the chest and groin straps only) which takes less than 2 minutes to apply, if the benefit of preventing gross twisting of the spine, and the prevention of back injury to the Officers undertaking the extraction is justified.

If a CED is not applied, manual in-line stabilisation of the patient's head needs to be maintained until the patient is properly immobilised onto a LSB.¹⁻⁹

Tie the patient's legs together as outward rotation of the legs will cause pelvic girdle movement and therefore movement of the spinal column.

**Step 3a**

If Rescue is available, removal of the steering wheel will create additional space for the extraction of the driver, and prevents legs & feet getting caught during the slide out.

SIDE DOOR EXTRACTION FROM A SEAT

**Step 3b**

To allow for the removal of a patient through a side door, an opening needs to be made.

Push the door open fully to provide an adequate opening.

**Step 3c**

An alternative to the above is full door removal, but as this takes additional time, a clear benefit is needed to justify this added scene time (such as the requirement for a dash roll due to the legs being trapped under the dashboard).¹⁰⁻¹¹

**Step 3d**

The height of a patient sitting in a seat, is often higher than the roof line of the door. This requires the patient to be quashed down or tilted sideways to get out of the vehicle for this procedure. If the seat cannot be lowered adequately to clear the patients head, consider flapping the side of the roof.

**Step 3e**

A forward roof flap or full roof removal will also provide additional head space, when access to the patient from the sides is limited, or the dash has been crushed in on the patient.

Again if there is no clear benefit, a forward roof flap or full roof removal should be avoided due to added scene time.¹⁰⁻¹¹

SIDE DOOR EXTRACTION FROM A SEAT

**Step 4**

Position Officers at:

Officer 1 is placed behind the patient to assist in the rotation of the patient during the extraction.

Officer 2 is placed on the inside of the vehicle and grasps the handle of the CED to lift the patient for LSB insertion under the patient.

Officer 3 is placed on the outside of the vehicle and grasps the handle of the CED to lift the patient for LSB insertion under the patient.

Officer 4 is placed on the outside of the vehicle and inserts the LSB under the patient's bottom when Officers 2 & 3 lift the patient.

**Step 5**

Begin the slide out of the vehicle by keeping the patient in a sitting position and:

Officer 1 from behind supports the patient's head in the initial movement.

Officer 2 inside the vehicle assists in the rotation of the patient's legs the extraction.

Officer 3 grasps the inner side handle of the CED as soon as it can be reached.

Officer 4 holds the outer side handle of the CED at the beginning of the slide and will assist in the rotation & control of the torso of the patient during the extraction.



Officer 5 & 6 support the end of the LSB.

The patient is slid slowly in 30 cm movements along the LSB and slowly rotated ensuring the patient's pelvis and legs are kept in alignment to the torso.



SIDE DOOR EXTRACTION FROM A SEAT

**Step 6**

Once the patient is 1/2 way along the LSB, the patient is laid down onto the LSB.

**Step 7**

The patient is slid up the LSB until the patient's shoulders are level with the shoulder markings on LSB in preparation for immobilisation.

**Step 8**

Now immobilise the patient to the LSB (pg 109).⁹

If a CED has been applied correctly, it is considered that further head immobilisation will generally not be necessary as the CED is currently considered to have splinted the cervical spine adequately.¹⁻⁷ However body immobilisation for protection of the thoracic and lumbar spinal cord will still be necessary.⁹

The patient can now be safely carried away from the vehicle to the Ambulance stretcher.

SIDE DOOR EXTRACTION FROM A SEAT**Bibliography**

1. Cline
Journal Of Emergency Medicine 1990
Comparison Of Rigid Immobilisation Collars
2. Cline
Journal Of Trauma 25:649-653 1985
A Comparison Of Methods Of C-Spine Immobilisation Used In Patient Extrication And Transport
3. Graziano
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11. Sampalis JS,
J Trauma 1993;34:252—61.
Impact of on-site care, prehospital time, and level of in hospital care on survival in severely injured patients.

VEHICLE ON SIDE EXTRACTION

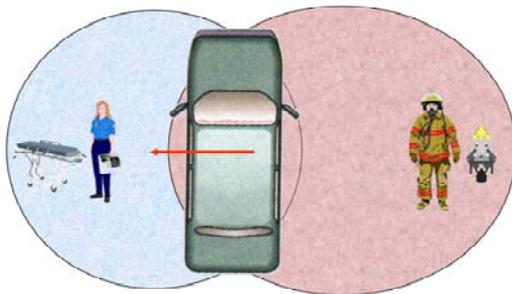
The following technique offers one of numerous options for a vehicle on it's side.

Training Requirements:

5 x Staff
1 x Patient
1 x Cervical Collar
1 x Blanket
1 x Long Spine Board (LSB)
1 x Stretcher
Vehicle Cutting Equipment

Scene Setup

With the patient in this scenario being extracted out the roof, the following general principles should be applied whenever practical:



- Ambulance equipment staging area should be setup at the extraction side of the vehicle on the 5 m outer circle.
- Rescue equipment staging area should be setup at the side opposite to the extraction of the vehicle on the 5 m outer circle..
- Fire protection with a live hose is again placed on the 5 m outer circle, but at the front of the vehicle so as not to interfere with the Ambulance or Rescue staging area.



VEHICLE ON SIDE EXTRACTION

**Step 1**

Once the vehicle has been stabilised, Officers can enter the vehicle and perform Manual In-Line Stabilisation of the patient's head and apply a Cervical Collar.

The use of a jacket style Cervical Extrication Device (CED) is very limited in these cases unless the patient is found in an upright sitting position.

**Step 2**

To allow for the removal of a patient, a number of options are available.

Complete roof removal offers the greatest access to the patient and the safest work area for Officers.



Roof removal is undertaken by:

1. Cutting the upper side A, B & C pillars, removing or cutting the windscreen, making two relief cuts in the roof and then folding the roof down.
2. A can opener is then used to remove the roof at the crease, with the remaining sharp edges covered with sharps protection.



This roof removal technique has the advantage of the side of the vehicle in which the patient is lying on (including door and window) remains intact.



VEHICLE ON SIDE EXTRACTION

**Step 3**

Place the LSB on top of the sharps protection. The addition of a blanket over the sharps protection will further allow the LSB to slide easily in and out of the vehicle. Failure to do this may result in severe LSB vibration during extraction.

**Step 4**

The patient will usually be found on their back or side, however LSB insertion is similar in either situation. To insert the LSB under the patient, the patient will need to be lifted using a modified Straddle Lift - Side technique:

Officer 1 places the LSB at the patient's head.

Officer 2 positions at the patient's head and stabilises the patient's head for the LSB's insertion.

Officers 3 & 4 are positioned on either side of the patient at the patient's torso, placing their hands under the patients shoulders and pelvis.

Officer 5 positions at the patients feet and will assist the legs onto the LSB.

When ready, Officers 2, 3 & 4 raise the patient 3-5 cm whilst Officer 1 slides the LSB under the patient.

VEHICLE ON SIDE EXTRACTION

**Step 5**

Officers begin the slide out of the vehicle onto a LSB by:

Officer 1 continues to support the LSB.

Officer 2 continues to stabilise the patient's head during the slide out of the vehicle onto the LSB.

Officer 3 & 4 positioned on the either side of the LSB assist in the sliding of the patient out of the vehicle by grasping the patient's clothing at the shoulders and waist.

Officer 5 positioned at the patients feet assist the patient's legs onto the LSB.

The patient is slid up the LSB in 30 cm movements until the patient's shoulders are level with the shoulder markings on LSB in preparation for immobilisation.

**Step 6**

If the patient was extracted on their back, immobilise the patient to the LSB (pg 109).¹

However if the patient was extracted on their side (as depicted here), carry the patient to a safe place and log roll the patient onto their back, then immobilise to the LSB (pg 109).¹

The patient can now be safely carried to the Ambulance stretcher.

**Bibliography**

1. Victorian Ministerial Task Force on Trauma
Review Of Trauma And Emergency Services Report 1999

VEHICLE OF ROOF REAR EXTRACTION

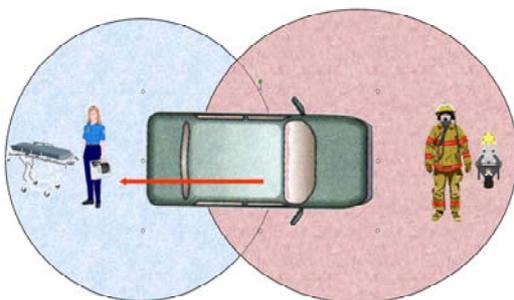
The following technique offers an option for a vehicle on it's roof when the patient has been released from their seatbelt and fallen onto the roof of the vehicle with their head and torso pointing towards the rear of the vehicle. The advantages of this method are spinal alignment (to protect the spinal cord) is maintained, and body twisting (which can further aggravate fractures and other injuries) is minimised as compared to other techniques available.

Training Requirements:

4 x Staff
1 x Patient
1 x Cervical Collar
1 x Blanket
1 x Long Spine Board (LSB)
1 x Stretcher
Vehicle Cutting Equipment

Scene Setup

With the patient in this scenario being extracted out the rear of the vehicle, the following general principles should be applied whenever feasible:



- Ambulance equipment staging area should be setup at the rear of the vehicle on the 5 m outer circle.
- Rescue equipment staging area should be setup at the front of the vehicle on the 5 m outer circle.
- Fire protection with a live hose is again placed on the 5 m outer circle, but at a 45° angle to the front of the vehicle so as not to interfere with the Ambulance or Rescue staging area.

VEHICLE ON ROOF - REAR EXTRACTION

**Step 1**

Once the vehicle has been stabilised, Officers can enter the vehicle and perform Manual In-Line Stabilisation of the patient's head.

If the patient is in the prone position (lying on their front) as depicted here, a Cervical Collar cannot be applied.

The use of a jacket style Cervical Extrication Device (CED) is very limited in these cases unless the patient is found in an upright sitting position in the vehicle.

**Step 2a**

To allow for the removal of a patient through a rear window, an opening needs to be made. Generally removal of, or the faster process of breaking the rear window will be adequate.

**Step 2a**

To allow for access to the patient, the doors of the vehicle will need to be opened.

In rare cases full side removal will be required for adequate access to the patient, but a clear benefit is needed to justify the extra time.²⁻³

Please Note: In this scenario, a full side removal has been undertaken to allow improved viewing of the extraction technique.

VEHICLE ON ROOF - REAR EXTRACTION

**Step 3**

Place a blanket over the broken glass to allow the LSB to easily slide in and out of the vehicle. Failure to do this may result in severe LSB vibration during extraction.

The patient will usually be found on their stomach or side, however LSB insertion is similar in either situation. To insert the LSB under the patient, the patient will need to be lifted using a modified Straddle Lift - Side technique:

Officer 1 places the LSB at the patient's head.

Officer 2 positions at the patients head and stabilises the patient's head for the LSB's insertion.

Officers 3 & 4 are positioned on either side of the patient at the patient's torso, each placing one hand under the patient's shoulders and the other hand under the pelvis.

When ready, Officers 2, 3 & 4 raise the patient 3-5 cm whilst Officer 1 slides the Board under the patient until it stops (usually about the patients waist level).



VEHICLE ON ROOF - REAR EXTRACTION

**Step 4**

Begin the slide out of the vehicle by:

Officer 1 continues to support the LSB.

Officer 2 continues to stabilise the patient's head during the slide out of the vehicle onto the LSB.

Officers 3 & 4 positioned on the either side of the Board assist in the sliding of the patient onto the Board by grasping clothes at the shoulders and waist.

The patient is slid up the LSB in 30 cm movements until the patient's shoulders are level with the shoulder markings on LSB in preparation for immobilisation.

Once the patient is correctly positioned on the LSB, slide the LSB out of the vehicle and place it on the ground.

**Step 5**

If the patient was extracted supine (on their back), immobilise the patient to the LSB (pg 109).¹

However if the patient was extracted on their side or stomach (as depicted here), carry the patient to a safe place and log roll the patient using the log roll 5 person prone 180° technique to get the patient supine, then immobilise (pg 109).¹

The patient can now be safely carried to the Ambulance stretcher.

**Bibliography**

1. Victorian Ministerial Task Force on Trauma Review Of Trauma And Emergency Services Report 1999
2. Trunkey
Sci Am 1983;249:28.
Trauma.
3. Sampalis JS,
J Trauma 1993;34:252—61.
Impact of on-site care, prehospital time, and level of in hospital care on survival in severely injured patients.

VEHICLE ON ROOF SIDE EXTRACTION

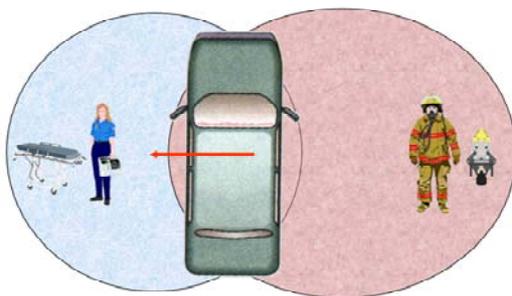
The following technique offers an option for a vehicle on it's roof when the patient has been released from their seatbelt and fallen onto the roof of the vehicle with their head and torso pointing towards the side of the vehicle. The advantages of this method are spinal alignment is maintained, and body twisting (which can further aggravate fractures and other injuries) is minimised as compared to other techniques available.

Training Requirements:

4 x Staff
1 x Patient
1 x Cervical Collar
1 x Blanket
1 x Long Spine Board (LSB)
1 x Stretcher
Vehicle Cutting Equipment

Scene Setup

With the patient in this scenario being extracted out the side of the vehicle, the following general principles should be applied whenever feasible:



- Ambulance equipment staging area should be setup at the extraction side of the vehicle on the 5 m outer circle.
- Rescue equipment staging area should be setup at the side opposite to the extraction of the vehicle on the 5 m outer circle..
- Fire protection with a live hose is again placed on the 5 m outer circle, but at the front of the vehicle so as not to interfere with the Ambulance or Rescue staging area.



VEHICLE ON ROOF - SIDE EXTRACTION

**Step 1**

Once the vehicle has been stabilised, Officers can enter the vehicle and perform Manual In-Line Stabilisation of the head.

If the patient is in the prone position (lying on their front) as depicted here, a Cervical Collar cannot be applied.

The use of a jacket style Cervical Extrication Device (CED) is very limited in these cases unless the patient is found in an upright sitting position in the vehicle.

**Step 2a**

To allow for the removal of a patient, the doors of the vehicle will need to be opened.

**Step 2b**

Full side removal will provide excellent access to the patient and ease the extraction.

Please Note: In this scenario, a full side removal has been undertaken to allow improved viewing of the extraction technique.

**Step 2c**

Rotating the seat's back support fully rearwards will also create additional space for the extraction.

VEHICLE ON ROOF - SIDE EXTRACTION

**Step 3**

Place a blanket over the roof ledge to allow the LSB to easily slide in and out of the vehicle. Failure to do this may result in severe LSB vibration during extraction.

The patient will usually be found on their stomach or side, however LSB insertion is similar in either situation. To insert the LSB under the patient, the patient will need to be lifted using a modified Straddle Lift Side technique:

Officers 1 & 2 are positioned on either side of the patient at the patient's torso, each placing one hand under the patient's shoulders and the other hand under the patient's pelvis.

Officer 3 positioned at the patient's head continues stabilising the patient's head for the LSB insertion.

Officer 4 places the LSB at the patient's head.

When ready, Officers 1, 2 & 3 raise the patient 3-5 cm whilst Officer 4 slides the LSB under the patient until it stops (usually about the patients waist level).



VEHICLE ON ROOF - SIDE EXTRACTION

**Step 4**

Officers begin to slide the patient out of the vehicle on the LSB by:

Officer 4 continues to support the LSB.

Officer 3 continues to stabilise the patient's head during the patient's slide out of the vehicle onto the LSB.



Officers 1 & 2 positioned on the either side of the LSB assist in the sliding of the patient onto the LSB by grasping the patient's clothes at the shoulders and waist.

The patient is slid up the LSB in 30 cm movements until the patients shoulders are level with the shoulder markings on LSB in preparation for immobilisation.

Once the patient is correctly positioned on the LSB, slide the LSB out of the vehicle and place it on the ground.

**Step 5**

If the patient was extracted supine (on their back), immobilise the patient to the LSB (pg 109).¹

However if the patient was extracted on their side or stomach (as depicted here), carry the patient to a safe place and log roll the patient using the log roll 5 person prone 180° technique to get the patient supine, then immobilise (pg 109).¹

The patient can now be safely carried to the Ambulance stretcher.

Bibliography

1. Victorian Ministerial Task Force on Trauma Review Of Trauma And Emergency Services Report 1999

VEHICLE OF ROOF EXTRACTION FROM A SEATBELT

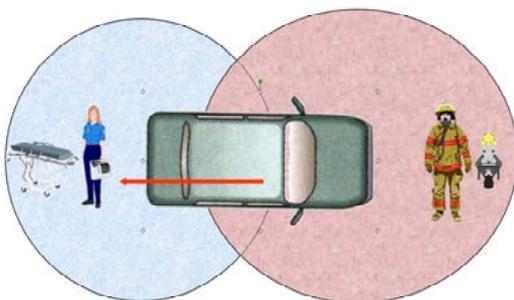
The following technique offers an option for a vehicle on it's roof with the patient still strapped in their seatbelt. The advantages of this method are the removal from the seatbelt can be achieve rapidly compared to other methods, spinal alignment is maintained, and body twisting (which can further aggravate fractures and other injuries) is minimised as compared to other techniques available.

Training Requirements:

5 x Staff
1 x Patient
1 x Cervical Collar
1 x Blanket
1 x Cervical Extrication Device (CED)
1 x Long Spine Board (LSB)
1 x Stretchers

Scene Setup

With the patient in this scenario being extracted out the rear of the vehicle, the following general principles should be applied whenever feasible:



- Ambulance equipment staging area should be setup at the rear of the vehicle on the 5 m outer circle.
- Rescue equipment staging area should be setup at the front of the vehicle on the 5 m outer circle.
- Fire protection with a live hose is again placed on the 5 m outer circle, but at 45° angle to the front of the vehicle so as not to interfere with the Ambulance or Rescue staging area.

VEHICLE ON ROOF - EXTRACTION FROM A SEATBELT

**Step 1**

Once the vehicle has been stabilised, Officers can enter the vehicle and perform Manual In-Line Stabilisation of the patient's head.

**Step 2a**

To allow for the removal of a patient through a rear window, an opening needs to be made. Generally removal of, or the faster process of breaking the rear window will be adequate.

**Step 2b**

To allow for access to the patient, the doors of the vehicle will need to be opened.

In rare cases full side removal will be required for adequate access to the patient, but a clear benefit is needed to justify the extra time.²

Please Note: In this scenario, a full side removal has been undertaken to allow improved viewing of the extraction technique.

VEHICLE ON ROOF - EXTRACTION FROM A SEATBELT

**Step 3**

Officers are positioned at the following places:

Officers 1 & 2 are positioned on either side of the patient's torso - Officer 1 outside the vehicle and Officer 2 inside the vehicle.

Officer 3 & 4 are positioned on either side of the patient's pelvis - Officer 3 outside the vehicle and Officer 4 inside the vehicle.

Officer 5 is positioned at the rear of the vehicle and controls the insertion of the LSB under the patient.

**Step 4**

Officer 3 positioned at the patient's pelvis rotates the back of the seat rearwards as far as it will go as it is providing no support for the patient.

**Step 5**

Officer 1 & 2 positioned at the patients torso then insert a jacket style Cervical Extrication Device (CED) under the patient. Using the CED as a torso splint, rotate the patients torso upwards towards the back of the seat. It may be of benefit if time persists to attach the chest straps for improved stability.



It will be necessary for the patients head to be carefully rotated to the side by Officer 5 for application of the CED.

VEHICLE ON ROOF - EXTRACTION FROM A SEATBELT

**Step 6**

Officer 5 positioned at the rear of the vehicle places a blanket over the broken glass of the rear window to allow the LSB to easily slide in and out of the vehicle. Failure to do this may result in severe LSB vibration during extraction. Officer 5 then inserts the LSB through the rear window and into the steering wheel for stability, and for reduced dropping height of the patient when released from the seatbelt.



Officer 3 positioned at the patient's pelvis assists Officer 5 ensuring the LSB is inserted into the steering wheel.

**Step 7**

Officer 4 cuts the patient's seatbelt.

Officers 3 & 4 positioned at the patient's pelvis uses the seatbelt to lower the patient onto the LSB, and ensure the patient's legs rotate either side of the steering wheel.



Officers 1 & 2 positioned at the patient's torso, at the same time, support the patient in the horizontal position with the CED, slowly lowering the patient onto the LSB in conjunction with Officers 3 & 4.



VEHICLE ON ROOF - EXTRACTION FROM A SEATBELT

**Step 6**

Begin the slide out of the vehicle on the LSB by:

Officers 1 & 2 positioned on the either side of the patient's torso assist in the sliding of the patient onto the LSB by grasping handles on the CED.

Officers 3 & 4 positioned on the either side of the patient's pelvis assist in the sliding of the patient onto the LSB by grasping the patients clothes at the pelvis.

Officer 5 continues to support the LSB to prevent the LSB from slipping out of the steering wheel.

The patient is slid up the LSB in 30 cm movements until the patients shoulders are level with the shoulder markings on LSB.

Once the patient is correctly positioned of the LSB, slide the LSB carefully out of the steering wheel and out of the vehicle, placing it on the ground.

**Step 7**

With the patient extracted prone (on their stomach) carry the patient to a safe place and log roll the patient using the log roll 5 person prone 180° technique to get the patient supine, then immobilise (pg 109).¹

The patient can now be safely carried to the Ambulance stretcher.

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FULL
SPINE
IMMOBILISATION

Place adequate padding under the patient's lumbar spine and head to fill the gaps formed by the anatomical curvature of the spine.



In adults, firm padding using a folded towel or similar (**NOT PILLOWS**) is generally required under the patient's head to prevent hyperextension of the cervical spine,^{14, 17} while in children under 8 years of age, padding under the torso rather than the head is generally required to prevent hyperflexion of the cervical spine.¹⁹⁻²⁰ Some adults and children will however require no padding.



For the patient's lumbar spine, a hand / wrist airsplint (which is inflated once in position) is the easiest method of padding under the lumbar region.

NOTE

Position Speed-Clip Straps near the LSB within easy reach.

To ease and rapidly speed up application of straps, it is best to stand straddled over the patient.

In a potential or actual SCI, one person should also continue Manual In-Line Stabilisation of the head until the head blocks (Step 7) are attached. A Cervical Collar alone has been shown in numerous studies to be ineffective in maintaining adequate cervical spine immobilisation.²¹⁻²⁴

Step 2



The Officer applies first and second yellow straps across the patient's chest in a crossing application with the adjustable ends at the patient's pelvis. Following application of the straps, there should be just enough slack to allow one hand to be placed between the patient's chest and the strap. The straps should be placed over the patient's clavicle and attached to the pelvic hand hold on the opposite side.

These first two straps will prevent upward sliding of the patient's body when the LSB is tilted head down, or when the brakes of the vehicle are applied during transport. They will also help prevent lateral movement of the patient's torso if the LSB needs to be tilted sideways.²⁶



Step 3

Place a yellow strap across the patient's pelvic bone or iliac crest. Ensure that the strap goes over the pelvic bone rather than the soft abdomen otherwise abdominal organ damage may occur.

This pelvic strap will help prevent lateral movement of the patient's spinal column.



Step 4

Using the blue strap, the Officer applies a 'Figure Of Eight' around the patient's ankles to prevent downward sliding of the patient on the LSB that may occur if the foot end of the LSB is tilted downwards, or when the Ambulance accelerates. This strap will also help prevent lateral movement of the patient's legs.



Step 5

Place the red strap across the patient's femur. Extra padding using rolled up towels on each side of the patient's legs may be required for patients with small legs. If the patient's legs are able to move laterally, spinal column movement including the cervical spine can still occur.²⁵



Step 6

One further strap can be placed loosely over the patient's chest region so as to support the patient's upper arms from flopping around, to help prevent lateral spinal column movement;⁹ and to help prevent the patient's upper arms from moving above shoulder height. Raising the patient's arms above the shoulder level as required for such manoeuvres as the Canadian Log roll is in general **CONTRA-INDICATED** in SCI, as studies have shown this causes sagging of the thoracic and lumbar spine.²⁶⁻²⁷



Step 7

Once the patient's body is secured properly to the LSB, **ONLY THEN** is the patient's head secured to the LSB. Ensure the correct amount of firm padding (using a towel, not a pillow) is under the patient's head to maintain the patient's spine in the neutral in-line position (generally around 2 - 7 cm in an adult). Now place either commercially available Head Blocks or home made Head Rolls (using rolled blankets or towels) on each side of the patient's head. Using 2 - 5 cm tape, tape the Head Blocks and patient's head to the LSB going initially across the Cervical Collar and then across the patient's forehead. The tape should not be placed over the patient's lower jaw as this will clamp the jaw closed therefore interfering with airway management.



Summary

The patient can now be log rolled, tilted, vertically or horizontally lifted, stood up, etc with almost no movement to the patient's body and spinal column. This should be maintained until an X-Ray can confirm or exclude the presence of an unstable spinal column.

The curved LSB will also allow for slight tilting of the LSB every 20 minutes to assist with pressure area care (a procedure that cannot be achieved when the patient is laid on a stretcher or flat LSB).

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ALTERNATIVE STRAPPING TECHNIQUES

Depending on the patient's injuries and the purpose of strapping, the positions of the straps may need to be changed from the application presented previously (pg 110).



Potential or Actual SCI With Leg Fractures

If a patient has leg fractures, then the lower leg straps will not be able to be used to prevent downward sliding of the patient's torso.

Instead of the leg & ankle straps to stop the torso sliding down the LSB or Scoop Stretcher, use groin straps as shown. Straps over the upper and lower legs will still be required to stop lateral movement of the patient's legs and help secure the fracture.



Securing A # NOF Or # Pelvis

To secure a patient with a # NOF or # Pelvis to a LSB or Scoop Stretcher, both shoulder straps, femur strap and a figure-of-eight ankle strap will still be required to stop the patient's torso sliding up and down the LSB or Scoop Stretcher.

Modification is however made to the pelvic strap by using a cross over strapping method over the pelvis as depicted in the photo. While these straps place no pressure over the NOF / pelvic area, they adequately splint the area to the LSB or Scoop Stretcher, immobilising the joints above and below the fracture sight.

With proper padding under the patient using 1 - 2 blankets, lumbar support and padding under the head, the patient can remain on the LSB or Scoop Stretcher for an extended period of time in comfort.

ACCESSORIES

FOR

FULL SPINE IMMOBILISATION

To assist with Full Spine / Body Immobilisation, additional equipment to the Long Spine Board and Scoop Stretcher is required. It is also helpful if all this additional equipment is prepared and stored in a single Carry Bag, so that the accessory items can be easily carried to the patient and no time is wasted searching for the equipment.

The following spinal immobilisation accessories listed below, should be considered:

SPINE IMMOBILISATION EQUIPMENT CARRY BAG

Items carried include:

- *Full Set Of Cervical Collars*
- *Velcro Speed Clip Straps - 5 x Yellow Straps*
- *- 1 x Blue Ankle Strap or 8 x Clip-Lock Belts*
- *- 1 x Red Femur Strap*
- *3 x Towels - 1 for padding under the head*
- 2 for padding out the femurs
- *2 x Head Blocks or Double Towel Rolls*
- *2 x Head Immobilisation Tape (2.5 or 5 cm width)*
- *1 x Blanket or commercially available Board Padding*
- *1 x Hand / Wrist Airsplint with Extension Tubing - to pad under lumbar spine*
- *1 x Rapid Extrication Strap*

LONG SPINE BOARD

MAINTENANCE

LONG SPINE BOARD **MAINTENANCE**

Maintenance of the Neann Long Spine Board (LSB) should include the following:

DAILY CHECKS

The LSB should be examined for damage as part of the daily vehicle checked. This should include:

- Observing the LSB for cracks
- Examining the fibreglass pins for cracks

MAINTAINING SLIDING SURFACE

The surface of the LSB has been designed to provide a slippery surface for sliding the patient on & off, or up & down the LSB. It is essential that this surface be maintained for proper performance of the LSB.

To maintain this surface, each month (or sooner if necessary), lightly rub the surface of the LSB with a vehicle cut and polish compound.

CLEANING

The NEANN LSB should be cleaned using the following method:

- Marks on the Board can be removed using a vehicle cut and polish compound and lightly rubbing the marked area until removed.
- Blood and body fluid contamination cleaning should use the following steps:

*Blood - Soak by placing a wet sponge on stain immediately after contact. If available, an antibacterial solution (Milton's) should be added to the water.
Repeat as necessary, then gently clean off residual stains with light spray of Nifty.
Allow to dry thoroughly before use.
Dispose of cleaning items appropriately.*

*Vomit - Gently sponge with hot water immediately after contact. If available, an antibacterial solution (Milton's) should be added to the water.
Repeat as necessary, then gently clean off residual stains with light spray of Nifty.
Allow to dry thoroughly before use.
Dispose of cleaning items appropriately.*

The Speed Clip Straps should be cleaned using the following method when contaminated with blood and /or body fluids:

The cleaner in keeping with normal practices should put on personal protection barrier equipment such as gloves, safety glasses, face masks, etc..

Small areas of contamination:

Blood - *Soak by placing a wet sponge on stain immediately after contact. If available, an antibacterial solution (Milton's) should be added to the water.
Repeat as necessary, then gently clean off residual stains with light spray of Nifty.
Allow to dry thoroughly before use.*

Vomit - *Gently sponge with hot water immediately after contact. If available, an antibacterial solution (Milton's) should be added to the water.
Repeat as necessary, then gently clean off residual stains with light spray of Nifty.
Allow to dry thoroughly before use.*

Larger areas of contamination:

Blood - *Soak by placing effected panels in cold water. An antibacterial solution (Milton's) should be added to the water.
Let effected part soak for 20 minutes.
Using Nifty, gently sponge of residual stains.
Allow to dry thoroughly before use .
Dispose of cleaning items appropriately.*

Vomit - *Soak by placing in hot water. An antibacterial solution (Milton's) should be added to the water.
Using Nifty, gently sponge of residual stains.
Allow to dry thoroughly before use.
Dispose of cleaning items appropriately.*

In very heavy saturation, the soak the straps in cold water with an antibacterial solution (eg Milton's) for 2 hours, rinse and then emerse again and bring up to a temperature of 90 degrees Celsius and maintain for 10 minutes. Using Nifty, gently sponge of residual stains. Dry thoroughly before use.