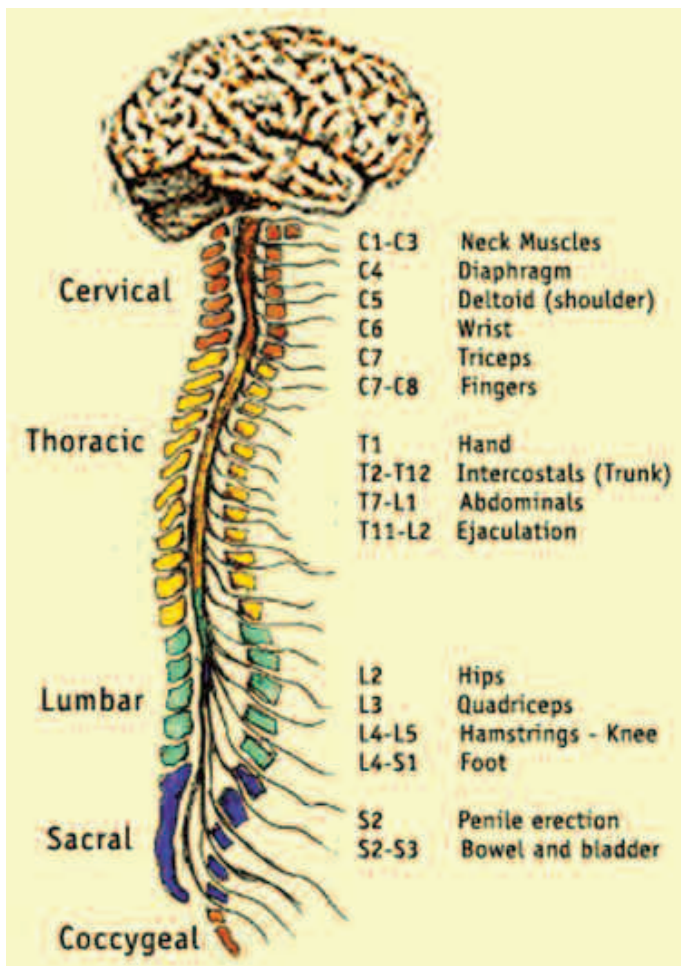


## Best Practices-New Injuries



### Spinal Cord Injury

A Spinal Cord Injury is as an impairment of the spinal cord that leads to multiple physical challenges / disabilities.

Spinal Cord Impairment refers to abnormality in one or more of the following body functions - sensory, motor, bladder-bowel, respiratory, sexual, hemodynamic stability and temperature control.

The degree of abnormality could range from mild reduction to complete absence of functions, depending on the severity of impairment.

Spinal Cord Impairment may be due to any cause, including, but not limited to, traumatic injury on non-traumatic causes.

- Traumatic causes could be road / train accidents, fall from heights, bullet wounds, construction / factory site

accidents, defective surgical processes and sports injuries, to name a few.

- Non-traumatic causes include congenital defects, Spina Bifida, TB of spine, meningo mylocele, brain fever, Transverse Myelitis, tumours, infection, other diseases and any other condition that leads to effects similar to paraplegia and tetraplegia (also referred as quadriplegia).

### Facts about Spinal Cord Injury

- As of now, there is no treatment for spinal cord injury anywhere in the world.
- Complete recovery is extremely rare. Even in the rare instance, it is an act of nature than of any medical process.
- Surgery after an injury does not lead to neurological recovery.
- Alternative treatments do not serve any purpose from a recovery viewpoint and the money spend could be better used to help the person go ahead in life.
- Harnessing physical capabilities that are intact through proper rehabilitation training is the best way out to going ahead in life.
- If hand functions are not impacted, a complete independent life is possible from the wheelchair.
- If the injury level is T10 and below, there is a good possibility of walking with the aid of assistive devices.
- Buying any wheelchair does not serve the purpose. Without assessment by an experienced therapist, do not rush to buy a wheelchair.
- Pressure ulcers or bedsores are the enemy # 1 for a person with spinal cord injury as they impact sitting, standing, walking and functional activity.
- Learning proper bladder & bowel management, upper body strengthening and achieving good sitting balance and independence are key goals after an injury.

**Purpose:** This document seeks to provide information that would be useful, especially to family and friends of a person who has had a spinal cord injury (SCI), as well as the injured. This is also intended to serve as a must-know dos and don'ts for each of us so that we are well prepared to respond appropriately in the event of an accident or fall from heights as well as on occurrence of other causes.

## Key Pointers

Summary of Key Pointers for Managing A Newly Spinal Cord Injured Person

- # 01 Person must be retrieved in safe a manner as possible from the accident site.
- # 02 The whole body must be handled like a log of wood with no flexing of any parts. The head & neck, back and hip & legs must be well supported. Three persons are a must to make sure the person is retrieved and moved safely.
- # 03 Person must be placed in a lying down position and be carried in a stretcher (or stretcher-like contraption) only.
- # 04 In the vehicle, the injured person must be made to lie down only on a flat surface.
- # 05 Sitting must be avoided at all cost.
- # 06 There is no need for first aid.
- # 07 Do not give water or food to an unconscious person. He may die or essential surgery may be delayed.
- # 08 Surgery does not lead to recovery of nerve functions. It only enables early mobilisation.
- # 09 Pressure ulcer prevention protocol must be followed immediately on admission onwards.
- # 10 Get the person to a rehabilitation centre as early as possible to help him move on in life.

### Three stages need complete attention

Immediately after a possible traumatic spinal cord injury, three broad areas need to be the focus:

- # 01 Prevent worsening of the primary pathology (the immediate first damage)
- # 02 Management of the injury and prevention of additional complications, as a result of the injury.
- # 03 Medical treatment & rehabilitation

In certain cases, all of these may start on the first day itself.

## When to suspect SCI?

Immediately following an accident or a fall from height, suspect SCI if one or more of the following red-flag symptoms are present in the person:

- Unconsciousness or intoxication
- Neck or back pain
- Partial or complete weakness of hands and / or legs
- Partial or complete loss of sensations of hands and / or legs

### Stage I - Prevent worsening of the primary pathology (or the immediate first damage)

This should ideally start at the accident site & is also relevant while the injured person is being moved to a hospital.

**Assume spinal cord injury:** At the accident site, the dictum must be that until proven otherwise, you should always assume it as a spinal cord injury if the above mentioned red-flag symptoms are present.

### What you must not do:

- Do not make the injured person sit
- Do not make the person stand.
- Do not give soda, juice, coffee, tea, any other liquid or solid food to an unconscious person; this is the worst thing you can do. It may even cause death. If the injured person has had any liquid or solid food, it may delay surgery.

It may cause complications in anesthesia and surgery. There are many instances of persons suffering brain injury due to having been fed fluids or food.

- Injured person may ask for water but it is not essential. What is essential is quickly and safely taking him to a hospital that has the capability for diagnosis and treatment of spinal injuries.
- Do not go to a local clinic or primary health centre asking for bandage for treating small wounds. Do not take the person home for rest. It could delay the process of diagnosis and treatment.

Delayed transportation of spinal injury patients to a definitive treatment center is associated with less favorable outcomes, longer hospitalizations, and increased costs.(1)

**Positioning & carrying a person:** How will you position the injured person? How will you lift the injured person? How will you carry the patient?

There should not be any additional damage to the spinal cord or any other part due to improper handling immediately after the accident.

While extracting from the site of trauma, the person should not be lifted manually. The persons should continue to be strapped to a rigid, flat surface until reaching the hospital.



During such transfers to a rigid stretcher or a board, care should be taken to treat the whole person as you would a newborn baby, ensuring that the injured person's head, neck, upper & lower back and legs are well supported, and like a log of wood that cannot be flexed.

If a stretcher is not available, please get the next best thing to a stretcher. Create a stretcher-like rigid, flat holder, if nothing else is available. Look for a board, piece of wood or bed sheets, and use them for this purpose.

Use a stretcher and insert the stretcher under the person's body gently by lifting the injured person slightly with the help of three persons – one each to hold the head & neck, upper & lower back, and legs.

The person must be moved to the first point of medical care in the same lying down position only.

In the vehicle, if the injury appears to be in the neck region, in which case the person may have no or limited movement of his arms, a combination of any type of carefully applied rigid cervical collar, with supportive blocks, on a rigid backboard with straps and tape to immobilize the entire body is effective at achieving safe, effective spinal immobilization for transport.

Sandbags with the patient strapped to a rigid backboard are not sufficient and are not recommended as the first line of neck immobilization. Do not ask the person to try and move his neck. The objective is to completely avoid any sort of movement of the neck.(2)

If the injured person has normal hand movements, it is likely the injury will be in the trunk region. Positioning him supine (on his back with head facing the ceiling) should be

enough.

The injured person must be taken to the nearest tertiary care hospital that has ortho or neurosurgical doctors. If possible, go to a hospital that offers spine injury treatment, though such hospitals are few and far between.

How you retrieve a person from the site of the accident, how you carry him to the vehicle and how the vehicle goes – these will be absolutely vital steps. Doing these basic steps improperly will cause additional damage.

Please note that immobilization is not needed for trauma patients who do not have the red-flag symptoms mentioned above, and who fulfill all the following criteria:

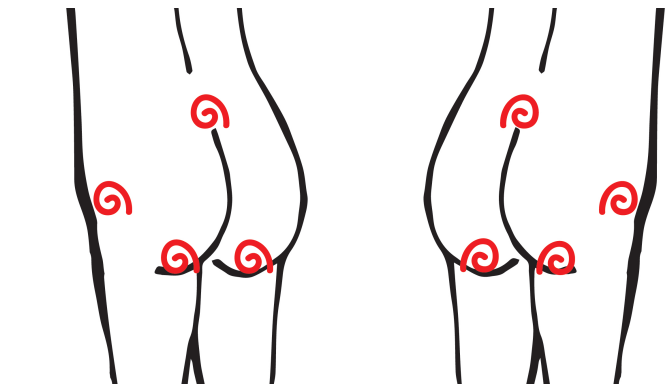
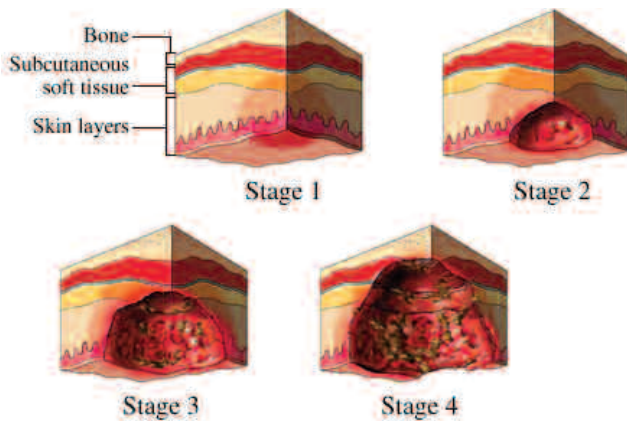
- are awake, alert, and are not intoxicated
- are without neck or back pain/tenderness
- do not have an reduced muscle power or sensations in their arms/legs
- do not have any significant associated injury that might detract from their general evaluation.

### Stage II: Injury management & prevention of additional complications

Once the injured person has been taken to a tertiary care hospital, the patient, his family and friends must cooperate with the doctors to ensure that they get the best possible treatment.

On completing of the initial assessment and x-rays / scans, they should ask for time to talk to the doctor. They must understand the following aspects:

- What is the assessment of neurological status?
- Is it a spinal cord injury?
- If yes, is it complete or incomplete?
- Ask and understand about spinal cord injury, how it will affect movements, sensations, bladder-bowel control and sexual function. A clear understanding of what is possible and what is not is of importance, as it would help the injured person and family prepare themselves better for the challenges ahead.
- Discuss and understand the treatment options available. If it is a complete injury, then surgery is unlikely to alter the neurological status. Surgery for the bone is only to stabilize it and other parts that may have also suffered damage, and avoid prolonged immobilization.
- A big risk that a spinal cord injured person faces, especially at this stage, is the possibility of pressure ulcers or bedsores. Airbeds, Waterbeds, alpha beds



**Most vulnerable five spots for Bed Sores**

and other such variants do not fully address this aspect. Pressure sore prevention protocol is simple and one must make sure the injured person co-operates in the administration of the protocol.

Changing positions every two hours is the protocol at this stage. If this is not being done, please check with the doctors about pressure ulcers and its management, as a pressure ulcer at this stage can delay the rehabilitation of the injured person leading to waste of resources, time and effort.

- Ascertain how the injured person would pass urine. Usually catheterizing and using a urine bag is normal practice to prevent urological complications such as distension of bladder or damage to the kidney. If this is not done, verify if it is safe and good for the patient to void naturally.

If the person has been catheterized, make sure the urine bag is emptied at 500 ml, the injured person drinks at least 2 – 3 litres of water / other liquids, strap the catheter at the waist every day with Micropore tape and handle the catheter as well as bag carefully while turning positions and shifting.

- Proper bowel management is very important. Do whatever it takes to make the person comfortable in the initial period. It could be use of laxatives, suppositories, enema or digital evacuation.

Bowel evacuation could be daily or once in two days as long as the injured person is comfortable. This factor (patient comfort) should be prioritized as you will never have a situation where a person dies of bowel failure while he can of kidney failure or infected pressure ulcers.

- Usually steroids are not necessary. It was a fairly common practice some time ago to use steroids based on an American study. But subsequent analysis and other studies have shown that administration of steroids

in acute SCI is not useful in improving nerve recovery. On the contrary, steroids could raise the risk of infection. So if offered a choice, it would be better to say 'no' to steroids.(3)

**Why you must understand if the injury is complete or incomplete?**

Here is how an injured person is assessed to check if the spinal cord injury is complete or incomplete. If a finger is inserted near the anal region or into the anal opening, and the person is unable to identify the sensation consistently, that means it is a complete injury.

More than half of the spinal cord injuries are complete injuries.(4)

Checking the sensation this way helps with prognostication of what to expect in terms of long-term recovery.

Spinal cord injured persons who have some sensation on day 1 when presenting at the hospital are more likely to improve nerve functions. A few ball-park figures based on actual data from follow-up study in the US:(5)(6)

- Among those with complete SCI at admission, just over 2% persons improve muscle power that enables them to walk independently by 1 year post-trauma.
- Among those with complete SCI at 1-year post trauma, just about 1% persons improve muscle power that enables them to walk independently by 5 years post-trauma.
- Among those with incomplete SCI at admission, more than 30% persons improve muscle power that enables them to walk independently by one year post-trauma.

Thus, it is important to get the correct diagnosis of incomplete or complete injury. A correct diagnosis also helps understand the implications and treatment options offered by the doctors better.



## Surgery or Not

There are instances where persons are advised against surgery, as there no broken bone but only damage to the spinal cord, yet they keep going from hospital to hospital in search of surgery. Patient relatives are often keen on a surgery in the hope that it will fix the nerve injury. So an informed approach is important on this vital issue.

Contrary to the myth that surgery is essential for nerve recovery following SCI, cumulative results of all scientific evidence do not suggest so. If you believe a surgery will bring the nerves back into operation, then that does not happen except in rare instances. There is no scientific evidence to support the belief that people who have complete injury recover nerve function and walk as result of surgery.(7)(8) Among limited evidence available for recommending surgical fixation for neck level SCI, only those surgeries done to stabilize the bones within 24 hours of trauma appear to accord the benefit.(9)

In this background, it has to be stated that surgery does offer provide a few benefits in that the person can be mobilized early (within a week) with proper support and guidance. Without surgery, confinement to bed-rest would be needed, for about two months. This could prolong the risk of other associated complications such as pressure ulcers, blood clots in legs and lung infections.

Surgery would not be necessary if there is no bone injury, or in certain instances of the fractured bone not pressing on the spinal cord, or if surgery is likely to cause more damage than benefits. In such instances, if a reputed doctor is advising against a surgery that could in fact be the best thing to do. Surgery or not, following the skin care protocol of turning every two hours is a must to prevent pressure ulcers.

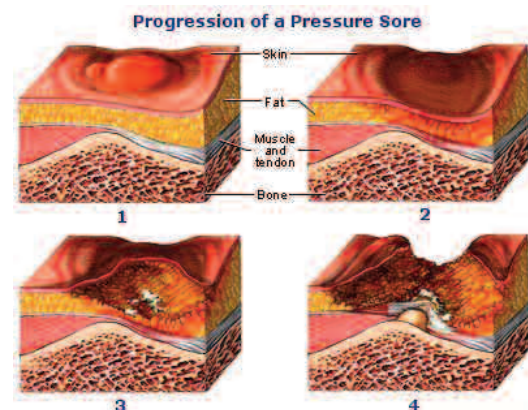
### Post-surgery management is critical

Once cleared by the surgeon, it is perfectly fine to turn a patient after a surgery is done. Surgery is done to mobilize the patient. This turning is first and foremost necessary to avoid occurrence of pressure ulcers or bedsore.

least three persons are required for log rolling – one to support the head, one to support the trunk and one to hold the leg. On the count of 1,2,3, they turn the patient as a log rather than segmental rotation of the head first, body next and legs last. As a log, he is turned to the left or right, and pillows are placed at the back to ensure that he does not roll back.

Persons with complete spinal cord injury are always at risk of pressure ulcers (bed sores). Persons with incomplete injury will be at risk till they get some sensation. So by default in the initial few months turn every spinal injured person once every 2 hours. This has to continue until it is proven that he has recover sensation.

Position changing protocol must also be followed for persons managed non-surgically.



When sitting, to provide some relief for the seating bones (ischium), doing push up once in 10-20 minutes is a must. Each push up must be for about 20 seconds. Doing pushups vertically may be difficult for those who have not been properly rehabilitated. Till proper training is given they can relive pressure by shifting forward, backward or to the sides for about 20 seconds every time.(10)

### Stage III – Medical Treatment & Rehabilitation:

The treatment and rehabilitation aspects should go hand in hand and as soon as possible after the injury. After the surgery, most of the times if there is no associated complication, ten days post the operation, they are ready to be discharged to a dedicated rehabilitation unit.

The goals for rehabilitation for persons who do not have adequate muscle power to walk independently are:

- to achieve maximum possible independence in mobility (indoor and outdoor) using a wheelchair.
- to achieve independence in timely, safe and adequate management of bladder-bowel functions, when natural means of bowel-bladder emptying are not possible.



- to plan and prepare for earliest possible return to a productive vocation using compensatory strategies learnt during the rehabilitation process.

As there is so much to gain from a good rehabilitation program, the earliest they get to a rehabilitation center the better it is because they will be able to get back to life soon.

There is no point in waiting in the hospital and trying some half-hearted physiotherapy, hoping that some improvement will happen. In some places, the trend is they are in ICU for 10/15 days then come to bed for 10/15 days and then go home and try Ayurveda. If such things can be prevented we can avoid further complications in an efficient way.

If the person is well managed initially, then his rehabilitation will normally take about four to six weeks on an average, assuming there are no complications or pressure ulcers. The actual training is only for about three weeks. Every pressure ulcer can take at least an extra month on an average.

We have to get on with life with whatever neurological deficits there, as there is no scientifically proven treatments in the world that promotes nerve function after a spinal cord injury. Whatever improvements happen will happen by themselves though there is no certainty of happening, degree of improvement or timeframe.

#### Key aspects to take care at this stage:

- Go to a good rehabilitation centre, even if it means waiting it out.
- Make sure the four pillars of skin care are practiced if necessary with support. The key aspects are:



- A push up every 10 minutes for 20 seconds or a count of 1 to 20.
- Changing positions every two hours while lying down.
- Checking the skin in the parts where there is no sensation and applying a few drops of coconut oil, especially in the buttock areas.
- Lying prone, if the doctors have permitted.

- Make sure you do not develop pressure ulcers or bedsores when at home and awaiting admission to a rehab centre.
- Be careful while sitting at home at this stage as balance training is much needed.
- Good nutrition – milk, eggs, fruits vegetables and fish / non-fried chicken (if you eat non-veg) will help. Reducing food intake at night will also be a help.
- Work hard on improving your upper body strength with basic exercises.
- At the rehabilitation centre, interact with your therapists and learn to be as independent as possible in activities of daily living – toileting, bathing, dressing, grooming, feeding, transfers and mobility, to name a few.
- Get quality assistive devices if you are going to be walking regularly.
- Get the right wheelchair and cushion based on advice of therapists.
- Think about home, study and work environment and understand from therapists and doctors how to handle possible hurdles.
- Think about employment, possible new vocation or small business options.
- Prepare yourself well to get integrated into the community when you get home.

Please get in touch with The Spinal Foundation Toll Free 1800 425 1210 or Mobile 0 97909 36844 for guidance by peer group members who have long years of experience in living well with spinal cord injury.

**Toll Free**  
**1800 425 1210**  
**Mobile**  
**0 97909 36844**

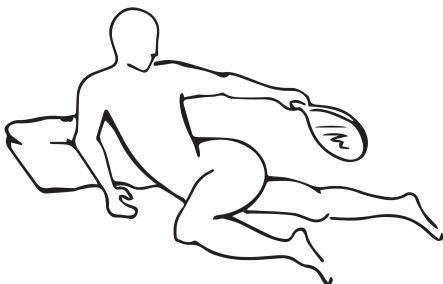
## Pillars of Skin Care

### Push Up



Do a push up every ten minutes for 20/30 seconds when sitting anywhere, on any surface, and irrespective of what you are doing. Sitting without doing a push up is like drunken driving.

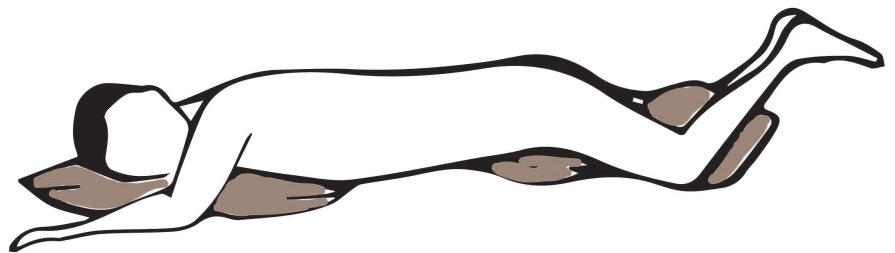
### Practice Everyday



Check your skin, especially lower back and buttock areas. every morning using a mirror (do this yourself or use a caregiver, if needed) and lightly massage by applying a few drops of coconut oil.

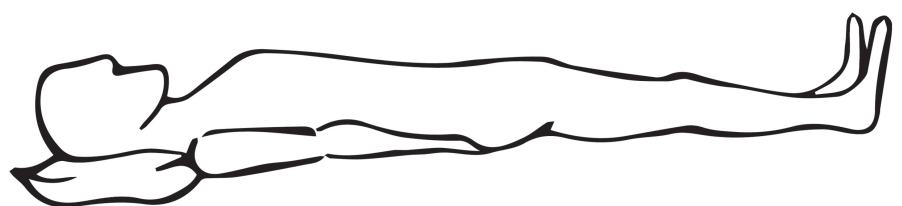
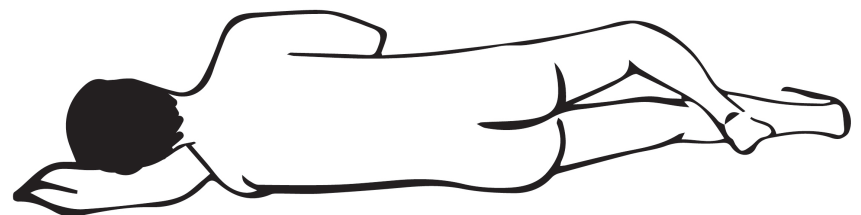
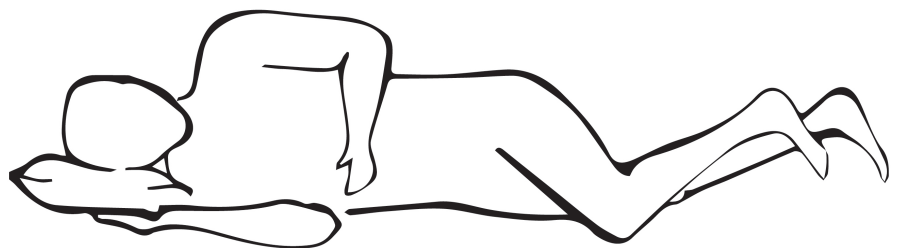
### Good Nutrition

### Prone Position



Lying down in prone position for as long as is possible, especially at night, is the safest. Persons with cervical level injury must check with their doctors whether this position is okay, as a few of them could have respiratory / breathing issues. Lying down in prone position is the safest for a spinal cord injured person as the five most vulnerable spots are completely safe in this position. Make sure you do a push every 2 / 3 hours.

### Position Change every two hours



Turning of position every two hours when lying down in any position (left side, right side and supine) other than prone. This provides pressure relief and helps maintain skin quality.





### 'Stay clear of stem cell based approach to treat spinal cord injury' - Professor Alan Mackay-Sim

There are no stem cell treatments in the world today that have been fully tested in all stages of clinical trials. Part of the process of clinical trials is to report the outcomes and open them to public scrutiny for others to judge. Yet 'treatments' using stem cells for persons with SCI are taking place in several countries, including China, Russia, Brazil and India. Such treatments are not based on scientifically proven evidence that stem cells make a difference, partially or wholly, which means risks and benefits remain unproven.

We know illnesses and injuries can change with time and that a few improve without treatment. There is no concrete evidence that it is stem cell treatment that leads to improvement of any sort in a person with SCI. Clinics offering 'stem cell therapies' do not state what cells they are transplanting, do not provide evidence of how the cells work in animals and whether they work in humans. Statements and testimonials from patients placed on websites or in newspapers are not 'evidence'.

In this backdrop, it is important persons with SCI adopts a rational approach. I understand several persons with SCI are spending vast sums on stem cell 'treatment' in the hope of improvement. This is a sad state of affairs. Persons with SCI must not go in for stem cell based 'treatment' in any part of the world, as there is a long way to go to have a scientifically proven approach that also works. Research in this regard is at a very early stage. The money that is or could be spent on stem cell approach must be used to improve the quality of life in other ways and not wasted in this so-called treatment.

Professor Alan Mackay-Sim is the Director of National Centre for Adult Stem Cell Research in Australia. He is one of the world's foremost authorities on this subject. In an interview published in The Hindu, he explained the current state of stem cell research.

### References:

1. Theodore N, Aarabi B, Dhall SS, Gelb DE, Hurlbert RJ, Rozzelle CJ, et al. Transportation of Patients With Acute Traumatic Cervical Spine Injuries: Neurosurgery. 2013 Mar;72:35–9.
2. Theodore N, Hadley MN, Aarabi B, Dhall SS, Gelb DE, Hurlbert RJ, et al. Prehospital Cervical Spinal Immobilization After Trauma: Neurosurgery. 2013 Mar;72:22–34.
3. Hurlbert RJ, Hadley MN, Walters BC, Aarabi B, Dhall SS, Gelb DE, et al. Pharmacological Therapy for Acute Spinal Cord Injury: Neurosurgery. 2013 Mar;72:93–105.
4. Jackson AB, Dijkers M, DeVivo MJ, Poczatek RB. A demographic profile of new traumatic spinal cord injuries: Change and stability over 30 years. Arch Phys Med Rehabil. 2004 Nov;85(11):1740–8.
5. Marino RJ, Ditunno Jr. JF, Donovan WH, Maynard Jr. F. Neurologic recovery after traumatic spinal cord injury: data from the model spinal cord injury systems. Arch Phys Med Rehabil. 1999 Nov;80(11):1391–6.
6. Kirshblum S, Millis S, McKinley W, Tulskey D. Late neurologic recovery after traumatic spinal cord injury. Arch Phys Med Rehabil. 2004 Nov;85(11):1811–7.
7. Duh M-S, Shepard MJ, Wilberger JE, Bracken MB. The Effectiveness of Surgery on the Treatment of Acute Spinal Cord Injury and Its Relation to Pharmacological Treatment. Neurosurg August 1994. 1994;35(2):240–9.
8. La Rosa G, Conti A, Cardali S, Cacciola F, Tomasello F. Does early decompression improve neurological outcome of spinal cord injured patients? Appraisal of the literature using a meta-analytical approach. Spinal Cord. 2004 Jul 6;42(9):503–12.
9. Fehlings MG, Vaccaro A, Wilson JR, Singh A, W. Cadotte D, Harrop JS, et al. Early versus Delayed Decompression for Traumatic Cervical Spinal Cord Injury: Results of the Surgical Timing in Acute Spinal Cord Injury Study (STASCIS). PLoS ONE. 2012 Feb 23;7(2):e32037.
10. European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel. Prevention and treatment of pressure ulcers: quick reference guide [Internet]. Washington DC: National Pressure Ulcer Advisory Panel; 2009.