

Vehicle stability a Change of Practice

Over the years there have been huge advancements in pre-hospital care, one area being the management of spinal injuries caused during road traffic collisions. Along with the introduction of the 'Canadian C-Spine' management tool which has been used for some time in other countries, now being embedded in the UK.

Cervical Spinal Cord Injury

Hallmarks of Cervical SCI

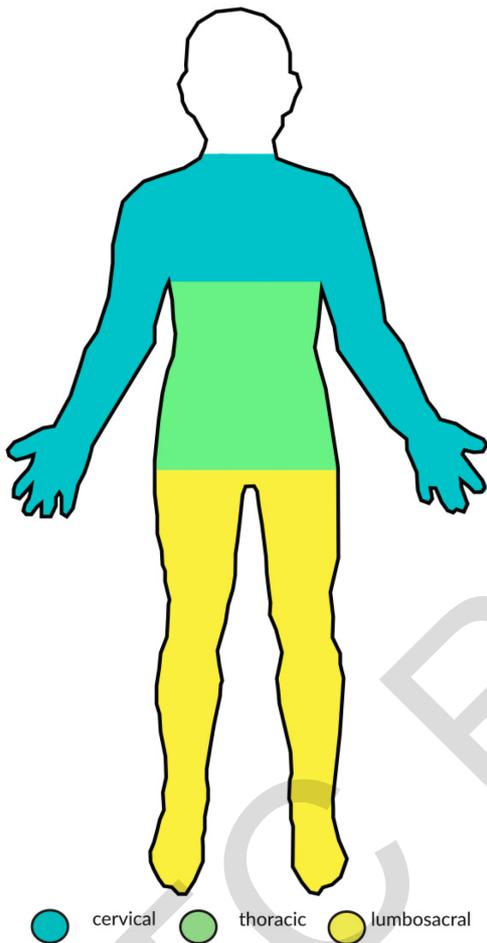
- Characteristic SCI pathology
- Loss of gray and white matter
- Severing of ascending and descending axonal tracts
- Possibility for regeneration due to axons being severed closer to their originating cell body

Impairments by Segment

- C1-C3: head and neck movement, sympathetic nervous system, voluntary respiration; complete paralysis
- C4: shoulder movement, upper and lower limb and torso function, respiration
- C5-C6: triceps, wrists, fingers, torso and lower limbs
- C7-C8: upper limb and upper torso movement, lower torso and limbs

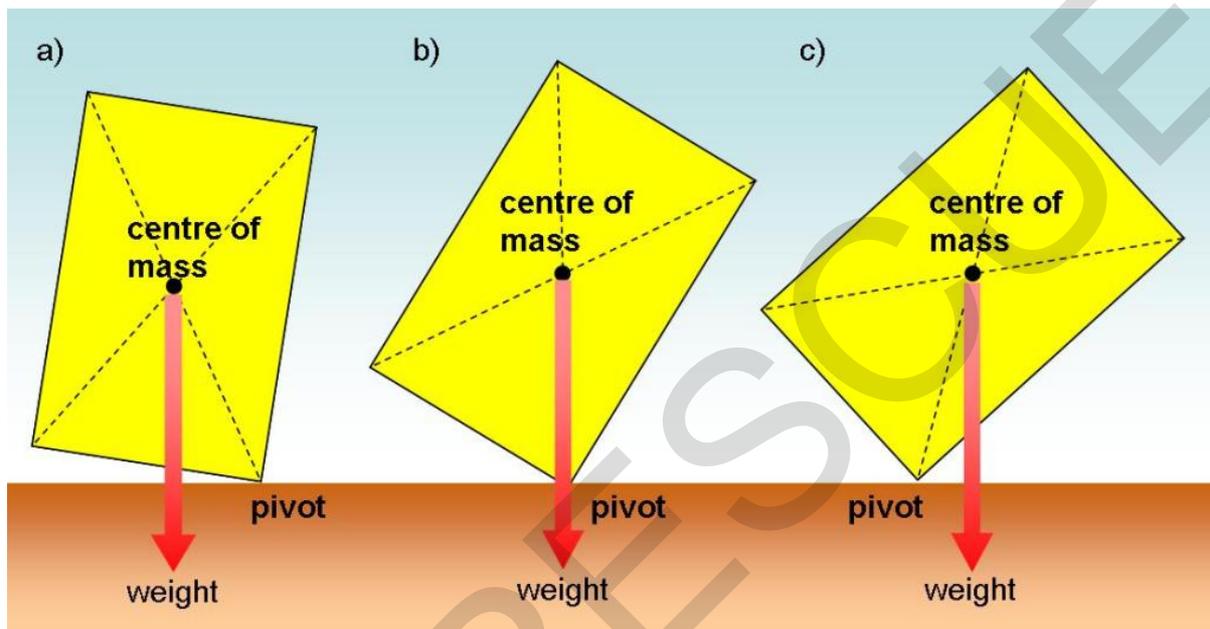
Need for Cervical-Specific Therapies

- Cervical SCI accounts for over 50% of SCI, accounts for less than 20% of SCI models
- Segmental changes in recovery
- Anatomy may make regeneration more plausible
- Quadriplegics rate restoration of hand and arm function as top priority



We have focused strongly on vehicle stability throughout operations so we can maintain a solid working platform during the rescue phase, we also know that good vehicle stability disperses the forces from cutting actions down through the vehicle body and into the ground redirecting these forces away from the casualty.

We also know that stability affects the movement of the vehicle, with the center of gravity playing a big part.



These are all factors that a rescue team should take into account during a rescue, in cases where the vehicle is not on all four wheels and is precariously positioned, good stability needs to be put into place to create a safe working environment.

We are not advocating that stability is not carried out, stability needs to be put in place if the situation requires it.

The question is; do we need to put it in place at every incident? One would suggest yes we do, as stability not only covers the physical aspect of securing a vehicle but also the whole scene (traffic management, hazards, spills, etc.)

When focusing on a vehicle resting on its wheels on flat ground and with new vehicle construction, taking into account modern research and casualty outcomes, do we need to stabilise a vehicle every time?

High centre of gravity

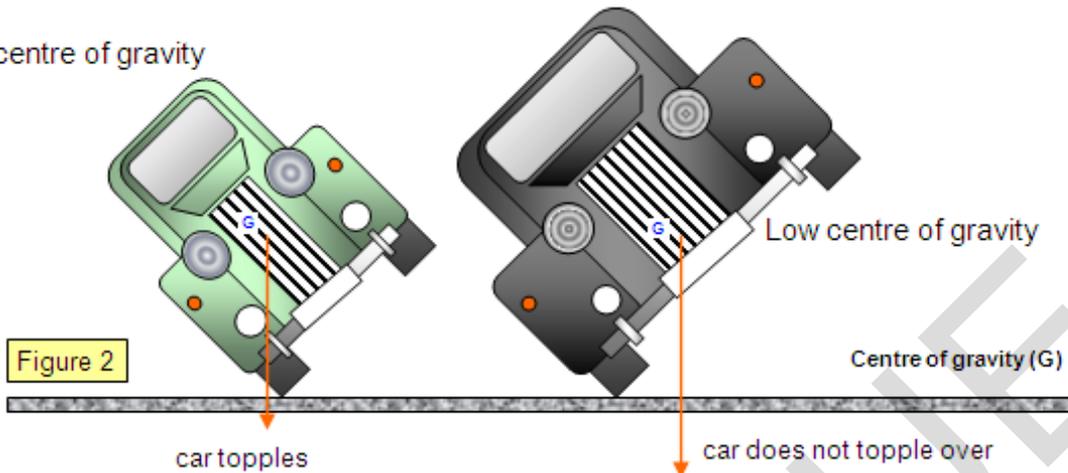


Figure 2

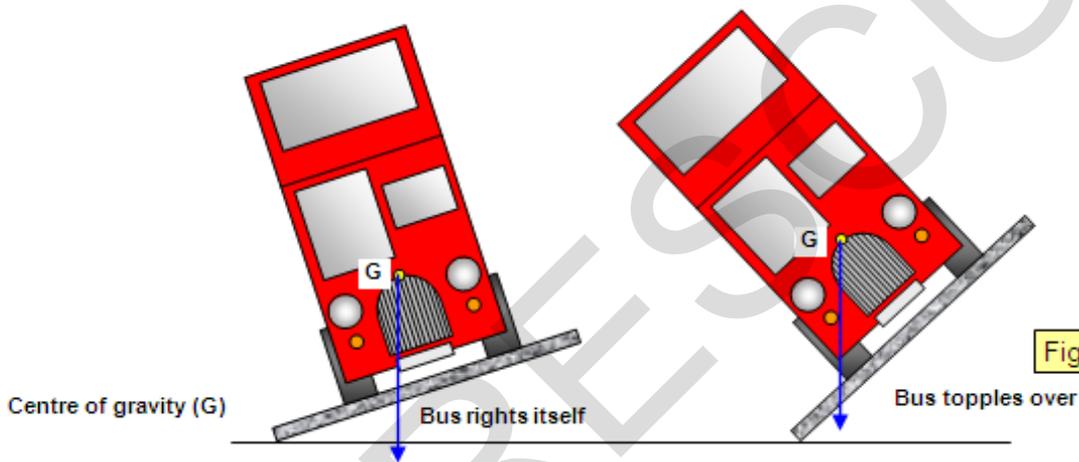
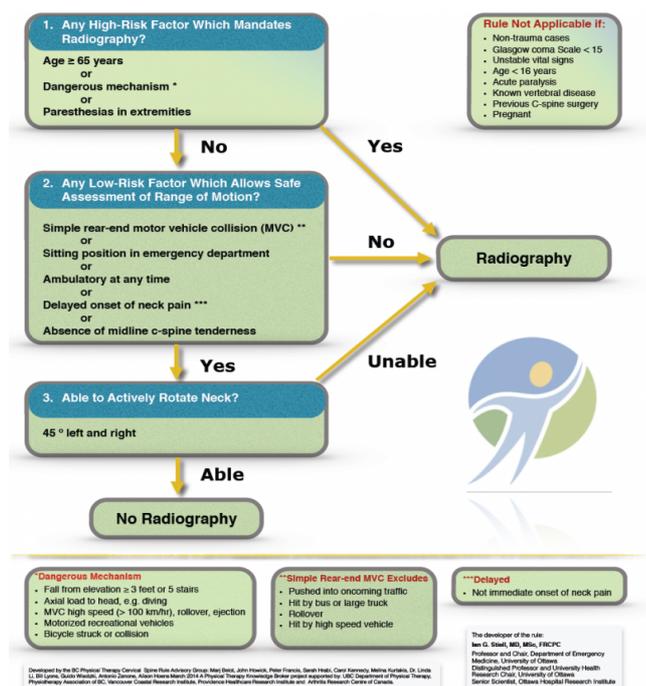


Figure 3

Vehicle structure and shape can play a big part in vehicle stability, we can see positioning will affect the center of gravity and the need to factor this in to vehicle stability techniques or in extreme cases where we need to achieve a lift of the vehicle to free a person.

The Canadian C-spine method has been in use for many years, but not everyone is aware of this methodology, there are fine parameters around its use, one I have experienced with some skepticism, but in summary a very refreshing outlook and way of working, saving time and preventing the overengineering of a simple rescue.

This is a generic C-spine chart from the interweb just to give you an idea if you haven't seen one before.



So, the question is as a starter: For a vehicle resting on its wheels on a flat road;

With modern vehicles that have a much stronger body than years gone past, having more energy absorption and less deformation to the driver/passenger area, is there a need to stabilise every vehicle? Other than the prevention of any forward or backward movement.

Without stabilising a modern vehicle what forces will the passenger still be subjected to and what issues will be faced during space creation if no stability was put in place. Bearing in mind that if deemed necessary thorough C-Spine management will be given if needed.

We have based this around a vehicle on its wheels on a flat surface, common sense would dictate that should the situation be different the vehicle will need to be made safe by means of stability etc. relevant to the situation, type of vehicle, position and geography of the landscape.

Should we stabilise every vehicle all the time? Does it make a difference to casualty outcomes?

We have always done, what we have always done, yes historically it has worked, but is it time to change our methods and thinking? We may have always done it one way, but is that the best way? Time and technology has changed along with advancements in rescue and medical intervention.

If we didn't stabilise the vehicle in some situations, would it compromise the casualty, where is the evidence?

Progress is impossible without change, and those who cannot change their minds cannot change anything.

George Bernard Shaw

Let us know your thoughts rtc.rescue@gmail.com

<https://hgphysics.com/gph/c-forces/2-force-effects/1-moment/stability/>

http://www.schoolphysics.co.uk/age11-14/Mechanics/Statics/text/Stability_index.html

<https://www.youtube.com/watch?v=p39hmvCj1ow>