MINUTES OF MEETING OF SPINAL CORD INJURY SPECIAL INTEREST GROUP

11 October 2006 – Freemasons Hall, Manchester

Dr Stephen Rattenbury - Seat Belts and Spinal Cord Injury

Dr Stephen Rattenbury, the leading expert in the country upon the interaction of seat belts and serious injury, particularly spinal cord injury.

Seat belts are effective in preventing ejection of passengers and the injuries that ejection would have caused. Ejection through windows of a vehicle, or even the sun roof, can cause very severe injuries including spinal cord injury, the extent of the injury often being dependent upon the nature of the objects struck by the ejected passenger.

Seat belts are not designed to help with forces from the rear and particularly if there is a large rear-end force and the seats collapse then it is possible for a seat belted passenger to suffer very serious injury or be ejected from the vehicle. It is therefore very important to analyse the precise mechanics of the injury and the seat belt before assuming that an ejected passenger was not wearing a seat belt.

If collision involves side impact only then that is generally less likely to cause spinal cord injury.

Whilst belts do restrain passengers very well in front impact accidents they do not assist if the roof crushes and they can potentially make the likelihood of injury worse in a role over because the belt will have the effect of keeping the passenger in an upright position and thus liable to crushing forces. If the injury would have been sustained regardless of the use of a seat belt then it is possible to escape a finding of contributory negligence for failing to wear a seat belt.

If you take instructions from a client who has sustained spinal cord injury, and there is likely to be a question mark with regard to the use of a seat belt, then urgent steps should be taken to preserve the vehicle as it can produce vital evidence.

Once instructed Dr Rattenbury would need to see the vehicle, assess the damage to consider the likely forces that would have been operating upon the passenger and then to obtain evidence indicating how the injury was inflicted. The consultant in spinal injuries is a very helpful member of the investigation team as he will be far better placed to interpret scans and x-rays and to understand the nature of the forces that could have caused the particular spinal injury with emphasis upon the loading that was put to the spine.

Hospital records are particularly helpful, especially the admission records with references to surface injuries. Unfortunately nursing records and other clinical records do not always deal with the superficial injuries where there is a major injury present such as spinal cord damage and it may be important to rely upon evidence given by family members as to superficial injuries. The superficial injuries can help the experts understand the forces on the body, particularly in cases involving ejection and could help indicate whether injury was likely to have been caused during the ejection process.

In certain circumstances the belt itself can cause neck injuries if there is a side impact and the side structure of the vehicle fails which can result in a very high load being put on the neck. This is a rare occurrence but does happen sometimes and therefore this emphasises the importance of an inspection of the vehicle.

Injuries to the cervical spine are usually as a result of compression forces caused when an unrestrained passenger has been thrown forwards and struck part of the vehicle structure or been ejected from the vehicle. It can also be caused by roll over or the roof caving in which may not have been prevented by seat belt use.

Injuries to the mid thoracic spine are usually caused by impact to the back and an element of compression, often caused again by ejection or striking part of the vehicle. It is important to have good medical input and a careful analysis of the nature of the damage to the spinal column, particularly the spinal processes which can be damaged by direct impact or from severe extension and the ligaments effectively pulling away part of the processes (avulsion fracture).

Belts normally prevent excessive loads to the top of the back in the majority of collisions but offer no protection against objects flying in the car including front seat passengers who can be struck by rear seat passengers.

Lumbar spinal fractures are not usually as severe as higher breaks as they result in less paralysis. However, they can still be devastating for the individual. Occasionally injuries to the lumbar spine can be caused when the car leaves the ground in an accident and then lands heavily with a resulting high compression force through the buttocks. Seat belts will not prevent these forces.

Injuries from lap belts are not so common in this country although they are still a feature of older cars and are more common in US claims. If only a lap belt is being used then the body can flex forward and cause spinal cord injury at L3/L4/L5. There is usually associated damage to the abdomen where the belt has dug in.

It is very important that each case is analysed on its merits and general statistics with regard to seat belt use and serious injury is not normally very helpful and can potentially be very misleading. If an engineer is properly to analyse the extent to which a seat belt may or may not have helped prevent injury as a result of an accident then the evidence must dependent upon the facts in that particular case. It is important to get as much data together as possible and as much evidence to assist the engineer. As a word of warning it should be noted that police and ambulance records do not always accurately record whether or not a passenger was wearing a seat belt at the time of the accident and police forces have generally now dropped the tick box regarding seat belt use.

Dr Stephen Rattenbury was thanked for his most informative speech by the Co-ordinator of the Special Interest Group, Warren Collins. Dr Rattenbury can be e-mailed stephenrat@aol.com.

A very comprehensive executive committee update was given by Muiris Lyons.