Reining in Whiplash

Better Protection for Europe's Car Occupants

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The European Transport Safety Council

The European Transport Safety Council (ETSC) is an international non-governmental organisation which was formed in 1993 in response to the persistent and unacceptably high European road casualty toll and public concern about individual transport tragedies. Cutting across national and sectoral interests, ETSC provides an impartial source of advice on transport safety matters to the European Commission, the European Parliament and, where appropriate, to national governments and organisations concerned with safety throughout Europe.

ETSC brings together experts of international reputation and representatives of a wide range of national and international organisations with transport safety interests to exchange experience and knowledge and to identify and promote research-based contributions to transport safety.

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Executive Summary

This ETSC policy paper on "Reining in whiplash: Better Protection for Europe's Car Occupants" brings together arguments on why whiplash injuries are an increasing social and financial problem to European society and what can be done to tackle this major road safety issue.

The policy paper explains what whiplash injuries are and how they occur by bringing evidence together from current state-of-the-art research programmes on whiplash.

Vehicle safety factors that can have an influence on the occurrence of whiplash injuries are explained. It is shown how new seat and head restraint characteristics can contribute to reducing the number of whiplash injuries. Moreover, state-of-the-art crash test procedures are explained and it is shown how a standard test procedure on whiplash protection would benefit consumers in Europe.

The accelerated take up of whiplash protection should be an EU road safety priority.

The accelerated take up of whiplash protection should therefore be an EU road safety priority. In a first step, the European Commission should request that Euro NCAP introduce whiplash protection assessments as quickly as possible and that Euro NCAP is giving proper credit to good whiplash protection. In a second step, considering the great potential of current best practice whiplash protection systems, similar or better systems should be implemented in all new cars in Europe.

Introduction

Whiplash injuries, also called whiplash associated disorders (WAD), resulting from car accidents are an increasing problem. Whiplash is the most commonly reported injury in motor vehicle crashes and presents a high cost burden to the society in general. It is also resulting in considerable pain and suffering for the victims. Yearly more than a million European citizens suffer neck injuries from rear-end collisions (Cappon et al 2001). Whiplash injures are estimated to cost the European society up to10 billion Euro per year.

WAD are usually not life threatening but are one of the most important injury categories in terms of long-term consequences (Nygren 1984). In modern cars on the Swedish market, whiplash injuries account for approximately 70% of all injuries leading to disability (Krafft et al 2004). Usually, the disorders are of short duration, however, according to certain publications up to 20% of car occupants reporting whiplash injuries will be saddled with life-long problems (Whiplashkommissionen 2006). The injury mechanisms are not fully understood, which makes it difficult to diagnose and difficult to treat. Modern in-vehicle protection systems have shown to reduce whiplash injury risks in rear end collisions with more than 40% (Krafft et al 2004).

Whiplash is the most commonly reported injury in motor vehicle crashes and presents a high cost burden to the society in general.

1 What are whiplash injuries?

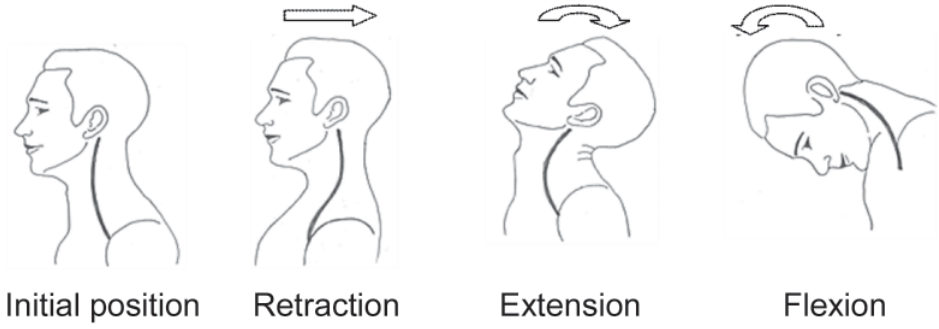
1.1 NECK INJURY IN CONNECTION WITH TRAFFIC ACCIDENTS

Whiplash is the term used to describe the mechanism behind a common type of neck injury associated with a motor vehicle accident. Whiplash associated disorders (WAD) is a used expression for the condition that may follow such an injury (Herrström et al 2000). The Québec Task Force (QTF) on WAD describes whiplash as:

"Whiplash is an acceleration-deceleration mechanism of energy transfer to the neck. It may result from rear-end or side-impact motor vehicle collisions, but can also occur during diving or other mishaps. The impact may result in bony or soft-tissue injuries (whiplash injury), which in turn can lead to a variety of clinical manifestations." (Spitzer et al 1995)

The injury occurs in the fast whiplash motions of the head in both rear-end and frontal impacts but also in lateral impact, rollovers and other mishaps (Krafft et al 2004; Spitzer et al 1995). To date, several hypotheses of injury mechanisms of whiplash injuries have been proposed (ETSC 2001). It seems possible that the injury mechanisms could be similar in rear-end and frontal impacts (Kullgren et al 2000). In a rear-end accident, the unsupported head lags behind the torso due to retraction and then rotates backward, forcing the neck into extension (Kuppa et al 2005) (Figure 1). A shearing movement of the neck has, for instance, been related to lesions of the facet joints (Yang et al. 1997). Svensson et al (1993) suggested an injury mechanism due to transient pressure gradients in the spinal canal during the initial retraction face causing ganglion damage. Hyperextension of the neck, i.e. an exceedance of maximum neck moments and head excursion angles (Mertz and Patrick 1971) is also considered to be an important causation. This mechanism, however, has become rarer with current head restraints. After the backwards motion the head is rebounding and the head and torso complex are moving forward into the belt system; potentially generating another, but much less violent motion of the head and neck.

Figure 1. Phases of head and neck movement during a rear impact



Source: Linder 2001

In typical cases, a whiplash injury causes an acute pain and increasing stiffness in the neck during the first 3 or 4 days. Headache is the second most frequent symptom. There is sometimes radiating pain in the arms, visual disturbances, dizziness, tinnitus, weakness in the limbs, paraesthesia, concentration and memory disturbances as well as other cognitive symptoms. In some cases symptoms will appear only 1 or 2 days after and may also change over time (Herrström et al 2000). Most symptoms heal within a month, however about 5-20% of the cases with initial symptoms heal more slowly or never (Spitzer et al 1995).

1.2 CLASSIFICATION OF WHIPLASH INJURIES

Table 1 shows a classification proposed by the Guidelines for the Management of Whiplash-Associated Disorders. This so called Québec Classification of WAD was devised by the Québec Task Force in 1995 to give guidance in the treatment of whiplash injuries and symptomatology (Anderson et al 2006).

Table 1 The Quebec classification of whiplash associated disorders

WAD Grade	Clinical Presentation
0	No neck complaint. No physical sign(s).
I	Neck pain complaint, stiffness or tenderness only. No physical sign(s).
II	Neck complaint AND musculoskeletal sign(s). Musculoskeletal signs include decreased range of motion and point tenderness.
III	Neck complaint AND neurological sign(s). Neurological signs include decreased or absent deep tendon reflexes, weakness and sensory deficits.
IV	Neck complaint AND fracture or dislocation.

Source: MAA 2001

The classification is an ordered categorical scale with each successive grade being more severe than the previous one. WAD 0 represents the absence of symptoms and clinical findings. WAD I means that the patients felt aching, stiffness or tenderness but that no clinically confirmed injury could be demonstrated. Grade II means that the patient experienced pain and that the examining doctor was able to make musculoskeletal findings (such as limited mobility and tenderness on touch). WAD III indicates that the patient felt pain while at the same time the examining doctor was able to confirm neurological findings (such as poorer reflexes). Finally, WAD IV means that the patient suffers from neck pain together with confirmed fractures and/or luxations of the cervical spine. With all these grades more diffuse symptoms such as hearing problems, tinnitus and memory disturbances could also occur.

However, criticism was levelled that there is no provision for the inclusion of any assessment of the severity of the symptom. This means, that suffering from intense pain with no other signs might be assessed as grade I alongside a patient with only mild pain (Anderson et al 2006).

1.3 CHRONIC WHIPLASH INJURY

Chronic whiplash includes the collection of symptoms and signs that exist in a patient beyond a period in which recovery might normally be expected. The QTF nominated 6 months post crash as defining the transition from acute to chronic injury, whereas other sources use 8 weeks post-crash as definition (Anderson et al 2006). Between 5 and 20% (depending on accident data source and definition of long-term injury) of all cases will end as long-term cases, these few long-term cases are responsible for a majority of the costs (Spitzer et al 1995). It is important to remember that 80-95% of the cases with initial symptoms do heal relatively quickly.

Between 5 and 20% of all cases will end as long-term cases.

Research reports a number of symptoms from patients with chronic whiplash-associated disorders (Whiplashkommissionen 2005). These include:

- Pain and spread of pain
- Restricted neck movement
- Disc degeneration
- Increased muscular tension
- Neurological symptoms (e.g. loss of sensitivity in the arm)
- Otoneurological problems (e.g. eye movement disturbances)
- Psychological problems (e.g. depression and post-traumatic stress)
- Cognitive difficulties

However, the relationship between acute and chronic problems is often diffuse (Whiplaskommissionen 2005). An acute pain may become a more chronic ache which in turn leads to greater sensitivity to pain. Stiffness can turn into greatly restricted mobility. Moreover, it is difficult to show that long-term neck and back problems come from a road accident and not from "ordinary" back and neck problems (Whiplashkommissionen 2005).

In general, the risk of long term problems is higher for women than for men. A Swedish study found that women with whiplash injuries are more likely to develop chronic symptoms of whiplash than men (Krafft 1998). Other factors increasing risk is the seating position in the car – the driver faces the highest risk. Moreover, the positions of the head and the head restraint in the moment of the collision are crucial. Car type and modern safety mechanisms are also very important in reducing the risk of long-term problems. Older people seem to have an increased risk for higher level injuries (EEVC 2005). Finally, even level of education and previous pain problems can be influential factors pointing to later problems (Whiplashkommissionen 2005). However, there is some disagreement on the role of factors being predictive of the incidence and prognosis of long-term WAD (Anderson et al 2006). Probably the socioeconomic factors are mainly related to the possibility to support the pain and suffering coming together with the whiplash injury.

2 A social problem – a social responsibility

2.1 ACCIDENT STATISTICS

Whiplash injuries account for approximately 65% of all injuries to persons in road traffic (Folksam 2006). The risk of sustaining a whiplash injury is higher in rear-end impacts compared to other crash types. Approximately 80% of all injuries occurring in rear-end collisions are whiplash injuries (EASI 2007)[1]. In rear-end impacts it is obvious that whiplash injuries occur frequently even in crashes with low impact severity. Women tend to have a higher injury risk compared with men (Hell et al 1999, Jakobsson et al 2000, Krafft et al 2004).

Whiplash injuries account for approximately 65% of all injuries to persons in road traffic.

Another factor influencing the risk of neck injury in rear-end impacts is the seating position in the car. Studies report a significantly higher risk for drivers than for passengers and rear passengers. Jakobsson et al (2000) assume that the differences between the driver and front passenger could be mainly due to different seating postures. Drivers are probably more likely to bend forward (i.e. away from the seat backrest and head restraint) than passengers. Whereas passengers are more relaxed and probably more likely to rest their head against the head restraint. Moreover, front seat passengers are at a higher risk than rear seat passengers. This is assumed to be due to a more rigid, uniform and less elastic design of the rear seats than the front seats (Jakobsson et al 2000).

2.2 WHIPLASH RELATED INJURIES ON THE RISE

The number of whiplash-related injuries has grown over the last twenty years, despite the fact that the number of people injured in traffic accidents decreased in many countries in this timeframe (Whiplashkommissionen 2005). Data samples from the German motor insurers show that the incidence of whiplash-associated disorders in motor vehicle accidents has almost doubled in the last 20 years (Hell 1999). Similar figures were shown in the UK. The incidence of soft-tissue neck injury for all accidents types was found to have been increasing steadily over the data collection period from 11.2% in 1984 to 22.8 in 1991 (Morris/Thomas 1996). Swedish studies found out that the risk of whiplash injuries leading to long-term disability has doubled comparing recent car models with car models introduced 20 years ago (Folksam 2001).

The incidence of whiplash-associated disorders in motor vehicle accidents has almost doubled in the last 20 years.

There have been a number of hypothesises concerning why this type of injury began to increase. One factor is that for a long time cars were designed in a way that did not result in whiplash movements when a vehicle was run into, because panelling and sections of the car gave way and this led instead to different injuries of a more serious nature. As cars have become safer in general, they have also become more rigid, and as the number of accidents with serious consequences has declined in the 1980s and more particularly in the 1990s, the number of whiplash-related injuries has risen. In a more stable car the collision force is transmitted in a different manner, and the driver and passengers absorb a part of this force at the same time as they avoid being seriously crushed (Whiplashkommissionen 2005). Even if the precise reason for the increase is not understood, it is evident that the protection strategies in modern car seats have decreased the whiplash injury risk in recent years (Krafft et al 2004).

[1] It should be mentioned that some studies show huge disparities concerning whiplash injuries between different countries (CEA 2004).

2.3 SOCIAL DIMENSION OF WHIPLASH-ASSOCIATED DISORDERS

Although the costs to society of whiplash injuries are considerable, they are difficult to calculate (Whiplashkommissionen 2006). A method to calculate the cost to society of whiplash injuries must include at least the following components: First of all, the calculation needs to imply direct costs, meaning medical care costs such as diagnosis, treatment, medication and rehabilitation. Second of all, indirect costs need to be calculated. These include the costs that result from inability to work and disability (e.g. payment of compensation for sickness and loss of income by Social Insurance Agencies and insurance companies) (Whiplashkommissionen 2005).

It is estimated that whiplash injuries cost the European society (EU 15) at least 10 billion EUR a year (EEVC 2005). For Germany, an amount of 2 billion EUR can be assumed (Hell 2001). In the UK, whiplash injuries cost approximately 800 million £ annually (EEVC 2005). In Sweden, the occurrence of whiplash injuries costs approximately 4 billion SEK a year, which is equivalent to 1000 SEK per car in the country (Whiplashkommissionen 2006).

By far the greater part of these costs is for compensation for loss of income resulting from incapacity for work. WAD cost society three times as much as other back and neck injuries.

There are several possible explanations why whiplash injuries cause such loss of income. Those injured are often relatively young compared to other back and neck patients. Moreover, the rehabilitation of long-term whiplash associated disorders remains very difficult. A major financial saving would be achieved by reducing the risk of WAD and particularly chronic whiplash injuries (Whiplashkommissionen 2006).

A chronic whiplash injury can substantially reduce the life quality of the patient.

But whiplash injuries also need to be prevented from a moral point of view. A chronic whiplash injury can substantially reduce the life quality of the patient. Particularly due to the fact that whiplash injuries are still to date often regarded as minor injuries with diffuse methods of treatment, many whiplash sufferers feel that they are not believed or taken seriously (Whiplashkommissionen 2006).

Another important theme of the reports received is the perception of living with permanent pain (Whiplashkommissionen 2006). For many people suffering from a chronic whiplash injury life is quickly changed to hopelessness. Life becomes one long pursuit of periods of relative pain relief. Patients say that they find it hard to plan their lives with regard to either work or social relations. Victims express profound anxiety about the future.

3 Vehicle safety factors

3.1 INFLUENCE OF CAR AND SEAT CHARACTERISTICS

Despite the heavy financial burden to society of WAD and the long-term consequences for whiplash patients, whiplash-related injuries have not attracted the same level of attention in vehicle design for a long time, compared to other road accident injuries in the context of road safety work. The lack of focus can perhaps be explained by the low risk of fatal injuries in those cases. Traditionally both society and car manufacturers have focused on life threatening injuries with highest priority.

Particularly vehicle factors are known to be important in preventing whiplash injuries.

Today excellent opportunities for reducing the number of whiplash injuries exist with different types of road safety measures. Particularly vehicle factors are known to be important in preventing whiplash injuries. These vehicle factors include the structural response of the vehicle, aspects of the seat and head restraint design (Anderson et al 2006).

3.2 VEHICLE STRUCTURAL EFFECTS

In the past decades cars have become safer. Especially car bodies have become stiffer and harder to withstand collisions at high speeds. Both the front and the rear of vehicles are stiffer now. Avery (2001) reported a comparison of vehicles produced during the 1980's, 1990's and 2000's, based on low speed damageability crash tests, which supported this "increasing stiffness" trend. This has led to a significant decrease in the number of deaths in those cars. But on the other hand this development has probably increased the risk of whiplash related accidents especially in the struck car. This is due to the fact that in a more stable car the collision force is transmitted in a different manner, and the driver and passengers absorb a part of this force at the same time as they avoid being seriously crushed. Real world insurance data supports this hypothesis by indicating a corresponding rise in injury risk for these latest stiff vehicles compared with older less stiff vehicles with similar seat designs (EEVC 2005).

3.3 SEAT DESIGN

It has been shown that seat and head restraint design is one of the parameters most influencing neck injury risk (Krafft 1998; Hellstedt and Jansson 2000; EEVC 2005). Seat stiffness, strength and geometry are of vital importance in injury causation (Hell 1998). Also influential is head restraint geometry and their ability to lock in place once adjusted (EEVC 2005).

Seat and head restraint design is one of the parameters most influencing neck injury risk.

More advanced whiplash protection systems based on these findings were introduced since the late 1990's. There are differences between the systems, but the common denominator is that the geometry of the head restraint and backrest changes at the moment of collision (Whiplashkommissionen 2006). This way the seat can contribute to a controlled braking of the upper body, reducing the force of acceleration on the person. In some models, like the Volvo WHIPS System, the seat changes form and position in order to reduce the effect of the collision impact on the neck (Lundell et al 1998). In other systems the head restraint moves forward to protect the neck when the head lags behind (Wiklund et al 1998). Both of these systems have been shown to reduce the whiplash effect significantly (Whiplashkommissionen 2006).

A recent accident follow-up study has investigated the effectiveness of three different head restraint and seat designs in reducing neck injury in rear impacts (Farmer et al 2003):

- *Improved geometry*
  To allow the head restraint to be positioned closer to most occupants heads. This system was adopted by Ford, which was used in this example.

- *Re-Active head restraint*
  To allow the occupant's torso to sink back into the seat during a rear-end crash and engage a mechanism in the seat back. This pushes the head restraint up and toward the back of the head. This system was adopted by Saab (Wiklund et al 1998), General Motors and Nissan.

- *Yielding seat back*
  To reduce the forward acceleration of the torso in rear-end crashes. This system was adopted by Toyota WIL system and by Volvo as the WHIPS system. The WHIPS seat design includes a specially designed hinge below the seat back, which allows rearward movement to reduce the forward acceleration, without the collapse of the seat (Lundell et al 1998). The yielding and energy absorbing seat back is also reducing the rebound of the head and torso.

Overall, neck injuries were reduced, with greater benefits for women than for men. In the Volvo S70 model a 49% reduction was seen compared to similar cars before the WHIPS system was introduced (Farmer et al 2003). There was also a 43% reduction in neck injury claim rates for the Saab, General Motors and Nissan models with the re-active head restraints and an 18% reduction in Ford models with improved geometry.

Effective whiplash protection systems can reduce the risk of a neck injury up to 50%.

A study by Jakobsson et al (2004) found a Whiplash injury reducing effect of the WHIPS of approximately 30% for initial neck symptoms and approximately 50% for neck symptoms lasting more than one year compared to previous Volvo seats. The injury reducing effect is higher for women than for men.

Viano and Olsen (2001) evaluated the Saab SAHR seat in comparison to prior Saab car seats. They found a significant reduction of the Whiplash injury risk. Also a study by the Swedish Road Administration and Folksam corroborates these findings. Saab and Volvo cars grouped together showed an injury reducing effect of 40% with the new systems as compared to the previous ones (Krafft et al 2004).

Other types of head restraint and seat designs, whose performance have yet not been evaluated based on accident data include Pro-active head restraints that are triggered either by the acceleration of the car or the closing velocity of the striking vehicle. They could typically use pre-tensioned springs as an energy source (Keiper-Recaro's Securest 2000). Moreover, several aftermarket devices exist, which essentially consist of cushions placed between the head restraint surface and the head in order to reduce the distance between head and head restraint.

But it should also generally be mentioned that all car seats and head restraints need to be adjusted properly to help prevent whiplash injuries. To reduce the distance between the back of the head and head restraint drivers and passengers should ensure that the top of the head restraint is as high as the top of their head and that the position of the head restraint is as close to their head as possible.

4 New crash tests for whiplash protection

4.1 REAL-LIFE CRASHES

To evaluate the crashworthiness of cars in crash tests it is helpful to first look at data from real-life accidents. In Sweden, researchers from Folksam and the Swedish Road Administration (SRA) therefore used data from "black boxes" installed in real-life crashes to identify test conditions (Krafft et al 2005). The tests should mirror the crash severity that in real-life crashes generates a certain injury risk. The link between change of velocity, the vehicle acceleration and risk of whiplash injury has been evaluated for six car models of the same make, studying 150 crashes including 207 front seat occupants.

Concerning real-life crashes, Folksam and SRA found out that most rear end crashes occur at relatively low change of velocity, below 10 km/h, whereas in crashes where the whiplash injury risk is higher, the change of velocity is 15 km/h and higher (Krafft et al 2005). Mean acceleration seems to be more important than change of velocity in explaining whiplash injury risk. It was found that the risk increases rapidly at a mean acceleration above 4 g. Most injuries with long-term symptoms occur at mean acceleration between 4 and 7 g.

4.2 CRASH TEST PROCEDURES

Between 2003 and 2006 Folksam and SRA conducted four test series using car seats on a sled. The crashes were made at three crash severity levels to measure the protective effect at several crash conditions. Based on findings from the real-life accident data, three test conditions at different velocity and acceleration were chosen (Table 2).

Table 2. Test speed and acceleration

Test	Speed (km/h)	Mean acceleration (g)
1 – Low severity	16	4.5
2 – Mid severity	16	5.5
3 – High severity	24	6.5

Source: Krafft et al 2005

As mentioned before, most injuries with long-term symptoms occur at mean accelerations between 4 g and 7 g. The three crash scenarios used in the tests cover this range. 4.5 g represents low risk but many crashes, 5.5 g represents medium risk and medium exposure, while 6.5 g represents a high risk but low exposure (Krafft et al 2005).

Crash tests show a large variation in terms of safety levels between the different cars and seats.

As a result the crash tests showed a large variation in terms of safety levels between the different cars and seats. Some seats subject their occupants to heavy loads in several areas of impact in the tests. Other seats succeed in protecting the occupants well. Real-life accident statistics show that the best tested whiplash protection systems – like the Saab AHR and the Volvo WhiPS - reduced the risk of long-term problems by up to 40-50%. Interestingly, some cars fitted with whiplash protection systems obtained poor results in the tests. On the contrary, some models without extra built-in whiplash protection had quite acceptable test results.

4.3 EUROPEAN CONSUMER TESTS – CRUCIAL FOR EFFECTIVENESS

The results from the Folksam/SRA show that independent consumer tests of new whiplash protection systems are crucial in order to prove their effectiveness. It is important that test results are available for consumers when buying a car. Therefore whiplash protection evaluation should be included in established crash test programs.

Independent consumer tests of new whiplash protection systems are crucial to prove their effectiveness.

The European New Car Assessment Programme (Euro NCAP) has become the most influential European crash test. Euro NCAP provides motoring consumers with a realistic and independent assessment of the safety performance of cars sold in Europe. As whiplash is an increasingly important social and financial problem for European citizens, ETSC strongly supports the current efforts to include protection in Euro NCAP's car safety ratings. Euro NCAP's results are very important in making the world aware of the safety characteristics of different cars.

A new test procedure proposal for Euro NCAP is currently under development. The proposal builds on experience of separate established whiplash assessment methods used by the International Insurance Whiplash Prevention Group (IIWPG), SRA/Folksam, ADAC and others. Although the current protocol acknowledges a lack of information about injury mechanisms, no time should be wasted in pursuing the introduction of "best practice" and state-of-the-art seat design. According to Folksam, the current whiplash protection systems could lead to a 50% protection effect (Folksam/Vägverket 2006).

ETSC strongly supports the current efforts to include whiplash protection in Euro NCAP's car safety ratings.

Some of the Euro NCAP members – such as the SRA – are also involved in the IIWPG. This Group has as well developed test criteria for rating the effectiveness of whiplash prevention systems, aiming at encouraging vehicle manufacturers to fit safer seats. The IIWPG comprises various insurance industry supported research groups such as GDV and Thatcham. IIWPG members have published seat ratings based on static geometry measurements and dynamic test results since model year 2005 on different national markets. For instance, Thatcham and GDV provided ratings of the 2007 model year for more than 180 seats for the final consumer which received large response from the media.

5 Whiplash protection in Europe – how to get there

European Commission

The European Commission should consider the possibility to adopting a whiplash policy in its road safety strategy and should support Euro NCAP in introducing whiplash protection assessments as quickly as possible. Considering the great potential of current best practice whiplash protection systems, these systems should be implemented in all new cars in Europe. Moreover, the European Commission should promote and ensure high standards for whiplash protection systems. Finally, the European Commission should follow up the protection level of existing and new whiplash protection systems.

The European Commission should adopt a whiplash policy and should support Euro NCAP in introducing whiplash protection assessments.

Member States

National governments should also provide incentives to consumers to purchase cars fitted with whiplash protection systems. Moreover, governments should also play an important role in promoting safety as a criterion for consumers to consider through running awareness campaigns on purchasing cars with whiplash protection systems. Member states being partners of Euro NCAP should support the introduction of a whiplash rating in Euro NCAP.

Euro NCAP

Euro NCAP should consider the possibility to identifying best practice test procedures based on the results from Folksam/SRA and the IIWPG. Rear-end tests and whiplash rating should be introduced in Euro NCAP's tests and rating methods.

Car manufacturers

Car manufacturers should implement best practice protection for whiplash protection in their cars as soon as possible. This would also be supported by the introduction of whiplash protection tests as soon as possible in major international consumer tests, such as Euro NCAP. Where car manufacturers offer specific protection technology as optional equipment, they should take care to clearly describe these options and their function in their sales brochures and web appearances as well as educate their sales personnel

The public should be informed and educated about the proper seating position and seat / head restraint adjustment to allow the seat to develop its protective function to its full extent.

Insurance companies

The Swedish insurance company Folksam has introduced a certain discount to those who insure a car that has scored good results in the tests initiated by the Whiplash Prevention Group. However, the European Insurance Committee (CEA) argues that in most markets safety features built into a vehicle are more likely to benefit the insurer of the driver who was liable for the injury of the occupants of the 'safer' vehicle. The insurer of the 'safer' vehicle is likely to receive a relatively lower premium than the insurer of the 'unsafe' vehicle whose driver was liable and yet whose payout for personal injury would be very likely be lower.

Also other insurers highlight the difficulty that rear-end collisions are typically of a kind where the striking vehicle's party is at fault and their third party loss insurance has to pay for damage or injury in the struck car. They point out that premium discounts would address the insured party whereas improved seat designs would show their efficacy only in the struck vehicle, usually being the party which is not at fault. It will therefore be very difficult to relate premium discounts in third party loss insurance to such damage figures. Motor vehicle own damage insurance would cover only material damage, not bodily injury.

Fleet managers

Non-private purchasers of cars (fleet operators) such as government and local authorities, companies and organisations should focus on whiplash injury risk and should choose among those cars showing best results in tests.

Finally, retrofit devices on the market should be monitored and evaluated more consistently. The motor industry should develop more protection for retrofitting to existing vehicles.

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