

## Effective whiplash protection systems can reduce the risk of a neck injury with 50%

**Whiplash injuries resulting** from rear end crashes are very common. In Sweden, a disability resulting from a whiplash injury is the most common disabling injury in modern cars. Therefore, prevention directed towards this kind of injury is very important for the road user. During the 70s, conventional headrests were introduced. The protective effects of these devices have been found to be small, 5-10%. More advanced systems were introduced on a few car models in the late 90s. The main feature of these systems is that the geometry of the headrest and/or the seat back is modified during the impact, thus reducing the risk of a whiplash type motion of the head.

**A study from** Folksam and the Swedish Road Administration (SRA) shows, that the recently introduced whiplash protective systems, by Volvo and Saab, reduce the risk of long term disability whiplash injury by 40%. In the study, more or less identical cars with and without whiplash protective systems were compared. As both Volvo and Saab cars without whiplash protective systems, were generally better than the rest of the car fleet, the effect of new systems if all cars had whiplash protective systems, could be a 50% reduction of disabling injuries.

## What can I do to reduce the risks of a whiplash injury?

**There are several** things to do to reduce the risk of a whiplash injury

- Choose a car with documented effective whiplash protective system
- Adjust the headrest so that the upper part of the headrest is at least in line with the top of the head.
- Minimise the distance between the headrest and the head, by sitting upright
- Keep the distance to the car in front of you

## Crash tests and how they were done

**Facts from real life accidents**, where the car was equipped with a black box (crash recorder), has created the background for how whiplash protection systems can be evaluated in crash tests. So far, the main efforts within the car to minimise whiplash injuries in rear end impacts, has been concentrated to the car seat. Therefore, the tests have been conducted with the car seats on a sled, with a dummy specialised for whiplash tests (BioRID 2).

**Euro NCAP, the** European crash test co-operation is developing a method to test how car seats protect from whiplash injuries. This round of tests is performed following the proposed procedures as of summer 2006. Euro NCAP is developing their procedures learning from these tests. The tests are performed in co-operation with Thatcham in the United Kingdom. Thatcham also performed the testing.

**Three crash tests** were performed at different impact severity levels in order to give a robust validation of the protective performance of each seat (16 km/h/4.5g, 16 km/h/5.5g and 24 km/h/6.5g). In each test, the dummy readings in seven different aspects were used for the validation. Each aspect is related to three different phases of the dummy movement in the crash. In general, the crash tests show that there is a large variation between the protective performances of each seat. There are seats that expose the occupant for a high risk in several of the aspects that were measured. Other seats demonstrate a high level of protection. We recommend cars where the rating is in the "green group".

**The mass of** a specific vehicle influence the risk for whiplash injury in a rear end collision. The risk is higher in a light weight car compared to a heavy car. These results are therefore not completely comparable for cars with major weight differences.

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# Whiplash injury December 2006

# How do car seats protect from whiplash injuries, results 2006

Car make and model	Group	Points
Volvo V50	Green	4
Volvo S80 model year 2007	Green	6
Saab 9-3	Green	10
Honda Civic	Green	13
Audi A6 model year 2007	Green	13
Mazda 5	Green	13
Peugeot 307	Green	14
Audi A4 model year 2007	Green	14
Ford Focus II	Green	16
Ford S-Max	Green	16

Car make and model	Group	Points
Subaru Legacy	Yellow	21
Volkswagen Passat	Yellow	21
Renault Clio	Yellow	22
Toyota Prius	Yellow	24
Seat Altea	Yellow	24
Mercedes A-class	Yellow	25
Audi A6 model year 2006	Yellow	25
Volkswagen Golf	Yellow	25

Car make and model	Group	Points
Mercedes C-class	Red	26
Audi A4 model year 2006	Red	26
Fiat Grande Punto	Red	27
Lexus IS	Red	27
Nissan Almera	Red	29
Citroën C1	Red	30
Toyota Yaris	Red	30
Škoda Octavia	Red	31
Mercedes M-class	Red	31
BMW 3-series	Red	31
BMW 5-series	Red	32
Citroën C5	Red	32
Opel Astra	Red	32
Volkswagen Fox	Red	32



Foto: Autoliv



Group	Points	
	Min	Max
Green	0	17
Yellow	18	25
Red	26	32

The score of a seat is derived from some geometry parameters and seven seat parameters measured in three crash tests. A seat can get from 0-32 points. Lower points are better.