

# Automobile Headrests Extending Too Far Forward

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## Introduction

Thousands of people are complaining on the internet about car headrests being too far forward if they try to sit completely against the back of the seat, which results in neck and back pain. Almost every car made in 2011 have headrests that are too far forward. Try it for yourself. Sit in any 2011 car and sit completely against the back of the seat. The headrest will bend your neck so that you will be looking at the floor of the car. It seems that the solution of whiplash injury to the spine causes injury to the spine during normal driving.

## Crash Dummy Tests

As can be seen in Figure 1, which was taken from the 2006 crash test by the International Institute of Highway Safety, the crash dummy is NOT sitting completely against the back of the seat. They incorrectly assumed this is the normal seating position and recommended headrests be something like 7 inches forward of the seat so that it will be close to the head. However, it prevents one from sitting completely back against the seat and causes the neck to bend forward.



Figure 1 - IIHS Seat/Headrest Test January 8, 2006

In Figure 2 there is a significant angle of about 30 degrees between the head/neck line and the body line. Constantly bending the head in this manner will likely lead to spinal injury.

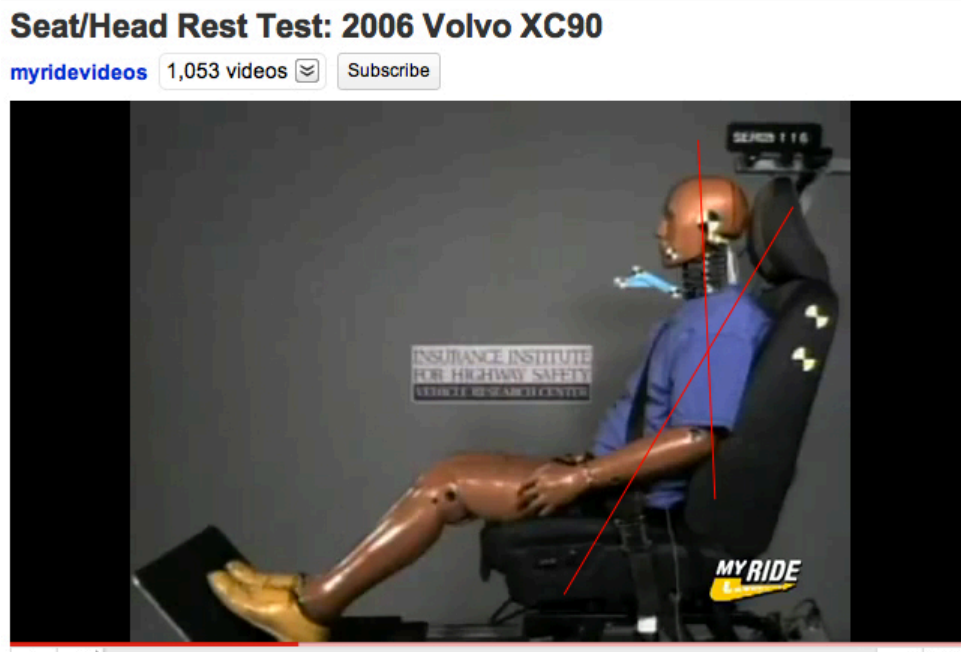


Figure 2 - IIHS Seat/Head Rest Test: 2006 Volvo XC90

## Correct Sitting Position

"First, sitting in the seat itself, **the driver's back should be flat against the back of the seat** with the buttocks squarely tucked into the corner created at the intersection of the seat back and bottom. The underside of the legs should be in contact with the seat bottom. The purpose of this position is to provide as much surface contact between the driver's body and the seat. This has safety benefits as well as providing the driver with the most tactile feedback as possible." - Turnfast - The Road Racer's Reference Center ([www.turnfast.com](http://www.turnfast.com)).

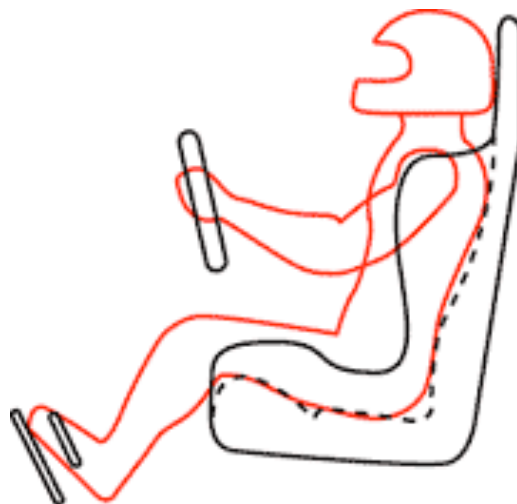


Figure 3 - Racing position recommend by Turnfast - The Road Racer's Reference Center

In Figure 4, one can see that the Recaro racing seat does not have a headrest that is too far forward.

## RECARO Pole Position



**INTEGRATED HEADREST**  
for reliable head protection

**SPECIFICALLY DESIGNED  
SHOULDER SUPPORT**  
for optimum lateral hold

**WELL-DEFINED SEAT CUSHION  
AND SEAT BACK BOLSTERS**  
for excellent vehicle control in  
all driving situations

**BELT GUIDES**  
accepts 4-, 5- or 6-point harnesses

**RECARO SIDEMOUNTS**  
made out of steel or  
aluminum (accessory)

**VARIETY OF COVER VARIANTS**  
in attractive designs

**SEAT SHELL OF GLASS FIBER**  
reinforced plastic material (GRP)

**LUMBAR CUSHIONS**  
for individual support  
of the spinal column

Figure 4 - Racaro racing seat

According to Mercedes Benz, the following is the correct driver's seating position:

*"When adjusting the seat, make sure:*

*you are as far away from the driver's airbag as possible.*

*you are sitting in a normal upright position.*

*you can fasten the seat belt properly.*

***you have moved the backrest to an almost vertical position.***

*you have set the seat cushion angle so that your thighs are gently supported.*

*you can depress the pedals properly."* - [http://www4.mercedes-benz.com/manual-](http://www4.mercedes-benz.com/manual-cars/ba/cars/230/en/in-depth/d10e8177.shtml)

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## Ideal Seat Design

*"Is there an ideal car seat design?"*

*Based on a detailed analysis of information from peer-reviewed scientific journals and texts, automotive engineering reports, and the National Library of Medicine a series of requirements for the optimal car seat design have been developed. Ideally, the optimal car seat should have:*

- 1. adjustable seat back incline (100 deg from horiz is optimal)*
- 2. changeable seat bottom depth (from seat back to front edge)*
- 3. adjustable seat height*
- 4. adjustable seat bottom incline*
- 5. seat bottom cushion with firm (dense) foam*
- 6. adjustable lumbar support (horizontal & vertical)*
- 7. depth pulsating lumbar support, to reduce static load*
- 8. adjustable bilateral arm rests*
- 9. adjustable head restraint with lordosis pad*
- 10. seat shock absorbers to dampen frequencies between 1- 20 Hz*
- 11. front-back seat travel allow diff size drivers to reach the pedals*
- 12. seat back damped to reduce torso rebound in rear impacts."*

*- Alan Hedge, PhD, Prof. Ergonomics Cornell University Ithaca, NY.*

Note in criteria 1., 90 degrees from horizontal is complete vertical. 100 degrees from horizontal is 10 degrees leaning from the vertical position.

## Spinal Injury

Pain is the first indicator that something is wrong. Neck and back pain when sitting indicates the body is in the wrong position. In this case, the neck is about 30 degrees bent forward from the rest of the body, which will likely cause neck and back pain and eventual injury to the spine.

## Solution - General

This solution, in my opinion, is to use an active headrest that will adjust forward during a crash, but not be too far forward during normal driving conditions. If the headrest is an active one, there is no reason for it to be too far forward during normal driving conditions. Manufacturers are currently installing active headrests in their automobiles that are still too far forward during normal driving conditions.

## BMW 328xi

Several solutions have been analyzed. The headrests in the BMW 328xi are too far forward. They are only adjustable up and down. They cannot be reversed. They cannot be replaced with non-active headrests otherwise and air bag warning will chime and the air bags will not work at all. The headrest from the 5-series BMW will not fit in the BMW 328xi.

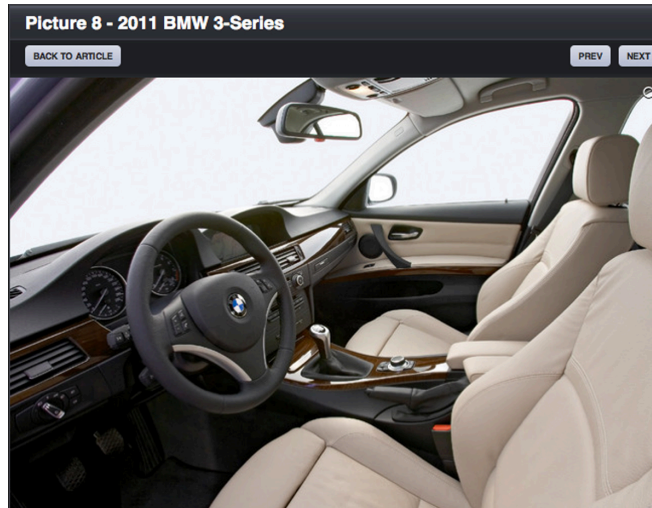


Figure 5 - 2011 BMW 3 Series Manual Headrest (not too far forward)

Figure 5 is a photo of the manual headrests in the 2011 BMW 3 series cars. These headrests are NOT too far forward during normal driving.



Figure 6 - 2011 BMW 3 Series Active Headrests (too far forward)

Figure 6 is a photo of the active headrests in the BMW 3 series cars. These headrests are too far forward during normal driving.



Figure 7 - 2011 BMW 5 Series Active Headrests Actual Photo (4-way adjustable)

Figure 7 is an actual photo of the active headrests used on the BMW 5 or higher series cars. These headrests are 4-way adjustable forward and backwards, and up and down. This is what should be done on all cars.