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CAD Quiz #6

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Win a Prize!

Having just graded the tests for our 2001 Advanced Cervical Acceleration/Deceleration - whiplash (CAD) program, it occurred to me that it has been a while since our last CAD quiz. So, here we go. And just for some added motivation, we'll give the first responder with a perfect score (or the highest overall score) a Center for Research into Automotive Safety and Health (CRASH) polo shirt. They are very cool.

We'll post the answers to the quiz on our website (www.srisd.com) a few days after this edition of *Dynamic Chiropractic* is mailed out. Meanwhile, email your answers to us at [info -at- srisd.com](mailto:info@-at-srisd.com) as soon as possible.

1. The current known threshold of injury for all adult humans in rear collision crashes is a delta V (change in velocity) of:
 1. 9 mph
 2. 5 mph
 3. 2.5 mph
 4. 15 mph
 5. The threshold of injury for all adult humans is unknown.
2. Which of the following crash metrics is most meaningful in assessing the potential injury risk to the occupants of a crashed vehicle?
 1. Delta V of the vehicle
 2. Acceleration of the vehicle
 3. Delta V of the occupant
 4. Acceleration of the occupant
3. In a large German database of reconstructed CAD injury crashes, the largest group of injuries occurred in which category of velocity change?

1. 2-6 mph
 2. 6-9 mph
 3. 9-15 mph
 4. 15-21 mph
4. Regarding question #3, which is the most correct statement?
1. Vehicle property damage in this speed range would be extensive.
 2. Vehicle property damage in this speed range would be moderate.
 3. Vehicle property damage in this speed range would be minimal.
 4. None of these is correct.
5. Of the following, which is not considered a risk factor for poor outcome in whiplash?
1. Rear vs. other vector impact
 2. Female gender
 3. Use of a shoulder harness
 4. Hypertension
6. How many CAD injuries occur in the U.S. every year?
1. 1 million
 2. 2 million
 3. 3 million
 4. 5 million
7. What proportion of these whiplash-injured persons are treated by DCs, according to the Insurance Research Council?
1. <5%
 2. 10%
 3. 30%
 4. 50%
8. Based on current best evidence, the most common cause of balance disorders and dizziness in whiplash patients is:
1. Brain stem injury
 2. Vestibular injury
 3. Proprioceptive disturbance

4. Myofascitis

9. A recent large Canadian health survey revealed that persons with a history of CAD injury have higher incidences of all of the following health problems except:
 1. Neck pain and headaches
 2. Depression and hypertension
 3. Allergies and breathing disorders
 4. Cardiac and gastrointestinal disorders

10. CAD patients often complain of blurred vision. Which of the following statements is true?
 1. This form of blurred vision is usually not correctable with refraction (corrective lenses), and should alert the clinician to possible nonorganic issues.
 2. Although the cause of this problem is not fully known, the error is one of accommodation and poor light adaptivity, and is not correctable with refraction.
 3. CAD patients generally become more myopic after whiplash trauma, for reasons that remain obscure.
 4. None of the above.

11. The term, "cervicobrachial syndrome," is synonymous with which of the following?
 1. Cervical disc protrusion/herniation with radiculopathy
 2. TOS
 3. CTS
 4. None of the above

12. During the initial stages of trauma in a rear-impact crash, the cervical spine is primarily subjected to which type of loading?
 1. Compression
 2. Tension
 3. Torsion
 4. Shear

13. During the initial stages of trauma in a rear-impact crash, it has been found that the cervical spine forms which shape?
1. C-shape
 2. Reverse C-shape
 3. S-shape
 4. Reverse S-shape
14. Crash testing at our institute and elsewhere has revealed that smaller females (120 lbs.) generally experience twice the head acceleration of larger males (180 lbs.). This is explained best by what statement?
1. Males have more muscle mass in their necks.
 2. Females generally react slower to trauma than males.
 3. Subjects with lower body mass have less inertia and therefore offer less resistance to the forward moving car.
 4. We actually have no idea why this occurs.
15. If a CAD patient has neck pain, stiffness and some paresthesia in his or her upper extremity, what is the grade of his injury according to the now widely accepted grading system?
1. Grade 1
 2. Grade 2
 3. Grade 3
 4. Grade 4
16. Nearly all reports in the past decade have shown that the incidence of whiplash is:
1. Decreasing rapidly
 2. Decreasing steadily
 3. Unchanged
 4. Increasing steadily

Bonus Question (This will separate the men from the boys and women from the girls!)

17. In auto crash reconstruction, we can use an equation to estimate a vehicle's speed from tire skidmarks.

The equation is:

$$V_i = \sqrt{V_e^2 - 2ad}$$

where V_i represents the skidding car's initial velocity in feet per second (fps) before the brakes were locked-up; V_e represents the car's ending velocity (which, in the case of the skidding car, is zero fps); a is acceleration in fps^2 ; and d is the distance of the skid in feet. This equation can be algebraically rearranged to solve for other variables, of course.

So here's the question: A man jumps out of a perfectly good airplane at an altitude of 8,000 feet. Unfortunately, his parachute fails to open, as does his reserve chute, and he burns into the ground without any assistance. How fast is he traveling when he hits the ground? (Hint: rearrange the equation to solve for ending velocity and assume his initial velocity is zero fps; the acceleration due to the Earth's gravitational field is 32.2 fps^2 - and don't worry about variation due to altitude.)

1. About 718 mph
2. About 488 mph
3. About 82 mph
4. None of the above is correct.

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