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Validation of Human Analogs for Crash Protection System Testing and Evaluation

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First the good news: I'm not going to use the whole tweny minutes, so you will be able to make your airplanes. Now for the bad news: we really should have better methods for validating the models we use.

We have good Hybrid III dummy validation, I think. That's the best human analog we have and there have been iterations and reiterations of validation of the head and neck of the Hybrid III, and then the Hybrid III dummies by comparison with human data. There also have been one or two papers in which the attempt was made, particularly by Wismans and Kallieris, to validate the response of cadavers. But wait a minute, only one or two attempts to validate the response of cadavers?

Almost all of our injury data come from cadaveric experiments. Well, how do we know that the cadaver even acts like a living human does? We have one paper I like and I think it's a pretty good paper. I refer to the "Comparison of Human Volunteer and Cadaver Head-Neck Response in Frontal Flexion" by Wismans, Philipens, Van Oorschot, Kallieris, and Mattern. But these are all the papers! Where are all the other attempts to validate the cadaveric response? I don't recall seeing one.

Now, if you have a human analog which cannot be shown to act like a living human being does, then you've got a real problem. You're just talking about theroretical approaches to theoretical problems. When it comes to mathematical models, there have been some good attempts to validate the mathematical models of the head and neck by comparison with living human data. But there are a great many models presented even today of the human head and neck and they are not validated against anything. Well, wait a minute, how can you use an unvalidated model to make any statements at all?

My submission to you is that you should be very, very careful about doing so. Take the question of injury prediction for example. We can't measure injury mechanisms on living human beings. Can't be done: it's illegal, it's immoral, it's unethical. So you have to use some indirect approach and the indirect approach means measuring the living human

dynamic response of the head and neck or other portions of the body, and also doing the testing on primates. But, wait a minute, we're not even allowed to do primate research anymore. That's right.

Well, how are you going to get the injury data? I submit to you that you can't and I think we ought to quit being pusillanimous about this and quit caving in to the public. We ought to go out and demand the right to protect the public against crashes. Maybe that's too strongly worded. "Request," would that be better?

No slides, no sound bites, no video and not even very much time. That's essentially all I have to say. Finally, in closing, I only hope that you will consider these poor remarks as being a platform for further validation of human analogs.

DISCUSSION

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No Questions