

Dear Sir,

**Rikhranj I S, Tan C T, Tan S K, Teoh S H, Hastings G W.**  
**Use of Titanium Prosthesis to Bridge a Vertebral Gap**  
**in the Spine--A Preliminary Experimental Study. Ann**  
**Acad Med Singapore 1999; 28:20-4**

In a recent issue of the Annals, Academy of Medicine, Singapore the above-mentioned paper was published. Figures 6 and 7 of the paper plot the displacement of bbovine lumbar motion segments under torsion. We noticed that the "toe" regions of the torque-displacement graphs do not display the usual characteristics present in the testing of segmental lumbar spine. It is well documented that at the "toe" region a non-linear relationship exists, where minimal torque will give rise to large displacement. Tencer et al (1995) attributed this region of non-linearity to intersegmental tissue laxity and introduced the parameter "laxity" measured at 1 Nm. Unless a pre-testing load such as a torque is applied to the segment such that the laxity is taken up or the intervertebral distraction load is applied to minimize laxity, otherwise the usual characteristics should be present. In any case, the stiffness at the "toe region" will not be higher than the stiffness at the elastic region of the graph, as shown in Figures 6 and 7. In fact, the stiffness of lumbar segment is expected to increase with further application of torque, which is characteristic of a non-linear visco-elastic material such as a spine segment. We are puzzled by the graphs, results and the discussion that follows in the paper. We hope the authors can enlighten us.

Yours sincerely,

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## Reply

Dear Sir,

With regards to the query, Mr Tan Juay Seng of the Dept of Orthopaedic Surgery, National University of Singapore stated in his own letter unless a pre-testing load such as a torque is applied to the segment such that the laxity is taken up or the intervertebral distraction load is applied to minimize laxity, otherwise the usual characteristics should be present.

Kindly note in our paper on page 21, paragraph 3, line 7, we had stated that the specimen were pre-loaded with 1 kg and tested at 5, 10 and 25 kg. This states that we had applied a pre-testing load to take up any tissue laxity before the torsion load was applied at 1 kg/N/m<sup>2</sup> at 1 minute intervals and a twist angles noted.

This would explain why the toe region of the torque displacement graph is not as what Mr Tan had expected.

Yours sincerely,

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