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Research article

Thoracic aorta stent grafts design in terms of biomechanical investigations into flexibility

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Supplementary

The model established with the boundary and load conditions described in section 2.3 was used to analyze mesh sensitivities. An FE with five mesh densities, where the element sizes were 0.8, 0.7, 0.6, 0.5, and 0.4 mm, associated with 29200, 37500, 41000, 49700, and 71500 elements, respectively, was precomputed to verify the convergence of mesh densities. The processes ran at our high-performance computing server (Inspur, China) with 24 2.6 GHz /10 core CPUs. The maximum reaction moments (RM) and maximum metal stresses were extracted to analyze convergence. The trends of RM and S are depicted in the Figure S1. The computing time of all meshes is listed in Supplementary Table 1 to compare the computational efficiency.

Both the RM and S obtained from the FE meshed with the element size of 0.7 mm exhibited significant differences from the other models. The RM and S obtained from the FEMs with the element sizes of 0.4, 0.5, and 0.6 mm were highly accurate. Hence, the element size selected in this study was 0.6 mm for better accuracy. In another view, the FEM meshed with the element size of 0.6 mm

exhibited a much lower computation cost due to fewer elements than those with the element sizes of 0.4 and 0.5 mm (Table S1).

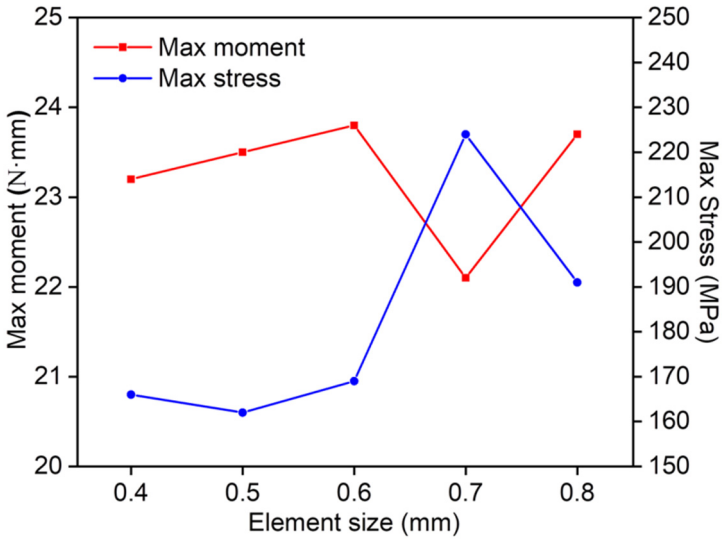

Figure S1. Mesh sensitivities.

Table S1. Computing time.

Element size	Element number	Computing time
0.4 mm	110400	5 h, 30 min
0.5 mm	71500	4 h, 06 min
0.6 mm	49900	3 h, 23 min
0.7 mm	37500	2 h, 57 min
0.8 mm	29200	2 h, 37 min