

Reading for FEA in Biology Workshop 2008

PDFs available at: ftp://marlin.bio.umass.edu/pub/dumont/FEA_Reading_2008

Background

Richmond BG, Wright BW, Grosse IR, Dechow PC, Ross CF, Spencer MA, Strait DS. 2005. Finite element analysis in functional morphology. *Anatomical Record*, 283A(2): 259-274.

Rayfield EJ. 2007. Finite element analysis and understanding the biomechanics and evolution of living and fossil organisms. *Annual Review of Earth and Planetary Sciences*, 35:541-576.

Papers for Lunch Discussion Sessions

Monday - Comparative FE Analyses

Dumont, ER, Piccirillo, J, and Grosse, IR, 2005. Finite element analysis of biting behavior and bone stress in the facial skeletons of bats. *Anatomical Record*, 293:319-330.

Dumont, ER, Grosse, IR, and Slater GJ. In Review. Requirements for comparing the performance of finite element models of biological structures.

Tuesday – Sensitivity Analyses

Ross, CF, Patel, BA, Slice, DE, Strait, DS, Dechow, PC, Richmond, BG, and MA Spencer. 2005. Modeling masticatory muscle force in finite element analysis: Sensitivity analysis using principal coordinates analysis. *Anatomical Record*, 283A: 288-299.

Strait, DS, Wang, Q, Dechow, PC, Ross, CF, Richmond, BG, Spencer, MA, and Patel, BA. 2005. Modeling elastic properties in finite element analysis: How much precision is needed to produce an accurate model? *Anatomical Record*, 283A: 275-287.

Anderson, AE, Peters, CL, Tuttle, BD, and JA Weiss. 2005. Subject-specific finite element model of the pelvis: Development, validation, and sensitivity Studies, *ASME Journal of Biomechanical Engineering*, 127: 364-373.

Thursday – Modeling Muscle Forces

Grosse, IR, Dumont, ER, Coletta, C, and A Tolleson. 2007. Techniques for modeling muscle-induced forces on finite element models of skeletal structures. *Anatomical Record*, 290A:1069-1088.

Curtis N, Kupczik K, O'Higgins P., Moazen, M, and M Fagan. 2008. Predicting skull loading: Applying multibody dynamics analysis to a macaque skull. *Anatomical Record*, 291A: 491-501.

Friday – Validation and Accuracy

Kupczik, K, Dobson, CA, Fagan, MJ, Crompton, RH, Oxnard, CE and P O'Higgins. 2007. Assessing mechanical function of the zygomatic region in macaques: Validation and sensitivity testing of finite element models. *Journal of Anatomy*, 210:41–53.

Viceconte, M, Davinelli, M, Taddei, F, and A Cappello. 2004. Automatic generation of accurate subject-specific bone finite element models to be used in clinical studies, *Journal of Biomechanics*, 37: 1597-1605.

Guldberg, RE, Hollister, SJ, and GT Charra. 1998. The accuracy of digital image-based finite element models. *Journal of Biomechanical Engineering* 120: 289-295

Lengsfeld, M, Schmitt, J, Alter, P, Kaminsky, J, and R Leppke. 1998. Comparison of geometry-based and CT voxel-based finite element modeling and experimental validation, *Medical Engineering & Physics* 20: 515–522.

Saturday – FEA and Statistics

Dar, FH, Meakin, JR, and RM Aspden. 2002. Statistical methods in finite element analysis, *Journal of Biomechanics*, 35(9): 1155-1161.

Olsson, AMJ and GE Sandberg. 2002. Latin hypercube sampling for stochastic finite element analysis. *Journal of Engineering Mechanics* 128(1): 121-125.

Food for Thought:

Huiskes, R. 2000. If bone is the answer, what is the question? *Journal of Anatomy*, 197:145-156.