Reviewer’s report

Title: Modeling of Failure Mode in Knee Ligaments Depending on the Strain Rate

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Reviewer: Dr Dominique Pioletti

Level of interest: A paper whose findings are important to those with closely related research interests

Advice on publication: Accept after revision, which I do not need to see

Major
1. Page 9: Please clarify why the bone stress is equal to the ligament stress especially in the situation where the system under consideration is not static (strain rate applied).
2. It has been previously reported (for example by the group of Woo) that the orientation of the bone-ligament-bone during uniaxial test plays a significant role in the obtained stress-strain curve. Did the authors have checked this parameter between the different studies used. If not, this limitation should be discussed.
3. The viscosity behavior of ligaments has been shown to be dependent on the type of ligament (for example see Pioletti et al., 1998). It would then be useful to analyse the failure mode also in function of the ligament type (ACL, PCL, MCL, LCL).
4. The clinical motivation for this work given in "Background" was: " .. to help protect against injury, and guide reconstruction and rehabilitation". In this context, what bring the results of this study?

Minor
1. Background: the meniscus plays also a major role in the stability of the knee.
2. Page 4. "Bone also has non-linear behavior, but it has small extension compared to the ligament." A more elegant way of saying that would be to mention that the elastic modulus is higher in bone than in ligament.
3. Page 8. On which basis the authors can write that " Which failure occurs in mode II is likely defined more by individual variation than by fundamental biomechanics"?
4. Page 9: Why do the authors need to define a new variable A for the constant strain rate?
5. Figure captions. Generally all the figure captions should be extended in order to bring more accessible information to the reader.
Fig 1 and 2 should use "Stress-strain" instead of "Strain-stress" to be consistent with the text.
Figure 2: stress should be given in MPa to be consistent with the text.

Competing interests:

None declared.