Reviewer’s report

Title: Three-Dimensional Finite Element Analysis of Silk Protein Rod Implantation after Core Decompression for Osteonecrosis of the Femoral Head

Version: 0 Date: 26 Jun 2019

Reviewer: Sujit Kumar Tripathy

Reviewer's report:

This is a very good study and worth publication. However a major changes in the format is needed. Please try to make it simple so that it can be easily understood. A detailed review is as follows.

Introduction:
Osteonecrosis of the femoral head is a pathological process that can result from internal or external destruction of the blood supply to the femoral head, resulting in deformation and avascular necrosis of subchondral bone

I don't think it is destruction always? Deformation is a sequelae to avascularity and cell death with cartilage collapse. Deformation should not come first...Please rephrase it...

Conservative, non-operative treatment is only suitable in the early stages of osteonecrosis, and surgical intervention is often required as the disease progresses to prevent further damage to the femoral head, and to avoid or delay the potential need for an artificial joint replacement.

There is no role of conservative treatment anymore....what do you mean by conservative treatment, elaborate and give evidence from recent reviews. CD is indicated in stage 1 and 2 and that is the early pre-collapsed stage....it has limited role once collapse is there....please rephrase the sentence

The classic surgical treatment of osteonecrosis of the femoral head is core decompression, which can effectively reduce the pressure on the femoral head, improve local blood circulation and relieve hip pain [3-5]; however, this can increase the risk of postoperative fracture and further collapse of the articular surface due to a lack of mechanical support.

Which method of CD the authors want to mention here? The classic 8mm/6 mm drill or recent 3mm/4mm mm drill bit. Be specific when the author expect collapse after CD?

core decompression combined with bone impaction grafting or implantation is the main operative approach used, and can increase the strength of the femoral head and reduce the risk of articular surface collapse

The problem in understanding the article is because the author have not mentioned any severity grading system...please mention when CD and bone grafting or metallic rod implantation is needed, steinberg
classification/ficat arlet or ARCO

Implantation options include porous tantalum rods and vascularized fibular grafting,

There are many other procedures for implantation, for example: nonvascularised fibular graft…please use etc.

Methodology:
The study design and experiment was not described in a simple language. It is incoherent and the flow of the study is bit confusion. How biomechanical testing was done? Why it was not tested for tantalum rod? How the machine could read the deformation/what is meshing and how meshing helps in deformation calculation…should be explained. How the computer can read the different properties of the material in femoral bone model in terms of deformation? Please elaborate to make it easy. It is very good to see biomechanical testing and 3d model analysis have been mentioned separately. I still don't understand why six fibula were needed? Model 1,2, 3,4 only mentioned..

Discussion section:
'relatively common'….please provide incidence, to which comparison it is said relatively common, is it relatively common compared to world average ????

"While conservative management is appropriate in the early stages of the disease, implantation following surgical core decompression is the preferred treatment option in more advanced osteonecrosis"…I don't agree with this sentence, there is no role of conservative treatment. Early diagnosis and treatment is the key to success. Core decompression is a treatment in early stage. What is implantation meaning here? Is it fibular graft/tantalum rod or anything else? Give reference that it is the preferred treatment?

Our results should be considered with some caution as some results were based on reported known values and error in the software and calculations used. The elastic modulus, Poisson's ratio and yield stress of silk protein rods and fibulas were acquired from previous biomechanical studies; some inherent error resulted from manual operations during 3D finite element studies, such as finite element mesh size and loading sites; and the stress results were obtained using a difference method, and may have accumulated some error. The above para need to be put in limitation section before conclusion.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.
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Not relevant to this manuscript

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