

Assignment 2: Mechanical analysis of a musculoskeletal structure

Summary:

Select a particular example of musculoskeletal (over-)loading and provide a mechanical analysis of that specific case.

You can work alone, or together with one other person.

Tasks:

Part A. Select a particular example of musculoskeletal (over-)loading.

You are free to identify any case that you think is interesting. Yet, you will need my approval before starting the analysis. For that purpose, write a short proposal (can be as short as one or two lines) and send it by email to:

harry.vanlenthe@kuleuven.be

Be as specific as possible, i.e. which structure are you going to analyze and under which specific loading condition.

You are free to identify any case that you think is interesting. You may choose one of the following examples:

- Will a forward fall on the outstretched hand lead to a fracture of the distal radius?
- What loads do the humeri experience during the 'iron cross' position in gymnastics (a person suspended between a pair of hanging gymnastics rings).

Part B: Provide a mechanical analysis of musculoskeletal (over-)loading.

After approval of your proposal you should provide a mechanical analysis of this case and identify whether the musculoskeletal structure under investigation is likely to fail or not.

Specifically,

- estimate the applied forces;
- estimate the stresses and/or strains induced in the structure;
- would, according to your analysis, the musculoskeletal structure fail?

In this analysis it is likely you will have to make quite some assumptions. In many cases, you will have to make quite crude assumptions. That is fine, as long as these assumptions are discussed.

Outcome: a small report, explaining the approach you have taken and the steps in your analysis.

The documentation should be such that other students following this course would be able to follow your analysis.

Send an electronic copy of your report by email to harry.vanlenthe@kuleuven.be

Deadlines

- Part A: Thursday March 27, 14:00.
- Part B: Monday April 21, 14:00.