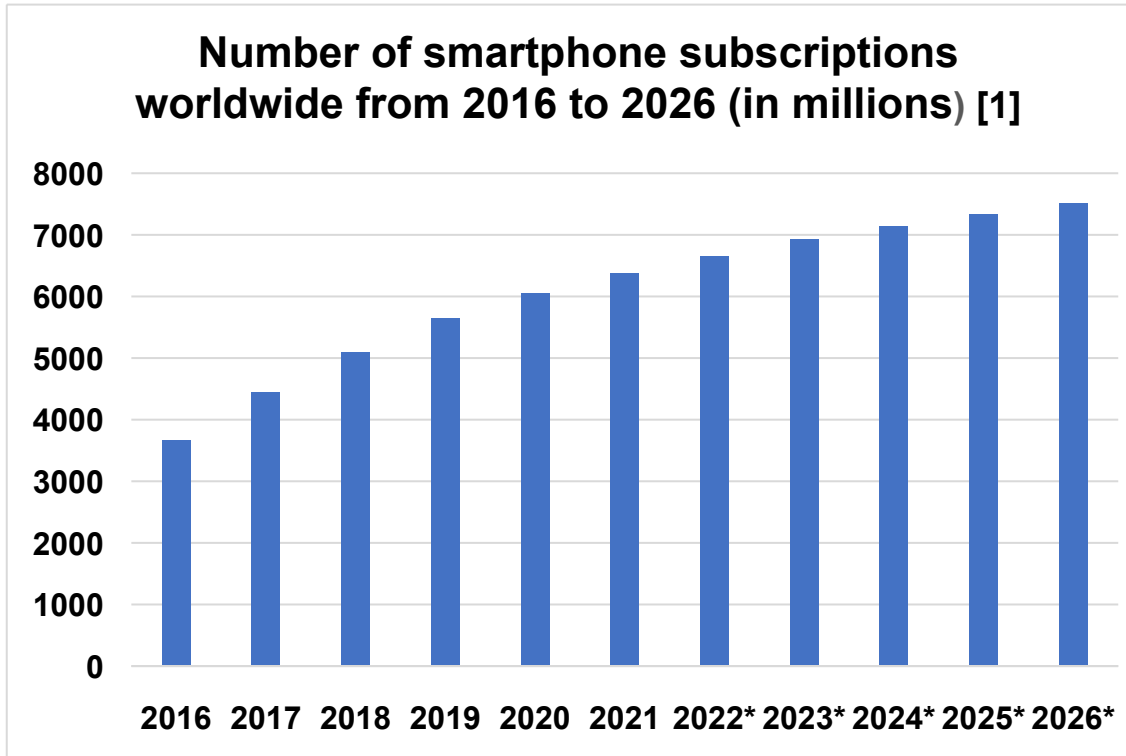




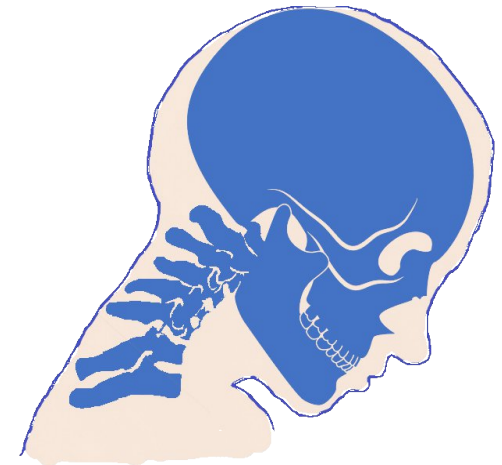
Biomechanical analysis of head and cervical posture when viewing mobile phone (a pilot study)

Ivanna Kramer, Arezoo Rahimian, Tannaz Takavar, Sabine Bauer

Motivation & State of the art



Frequent forward head flexion can result in cervical spinal degeneration [2] and cause back, eye and neck pain [3].



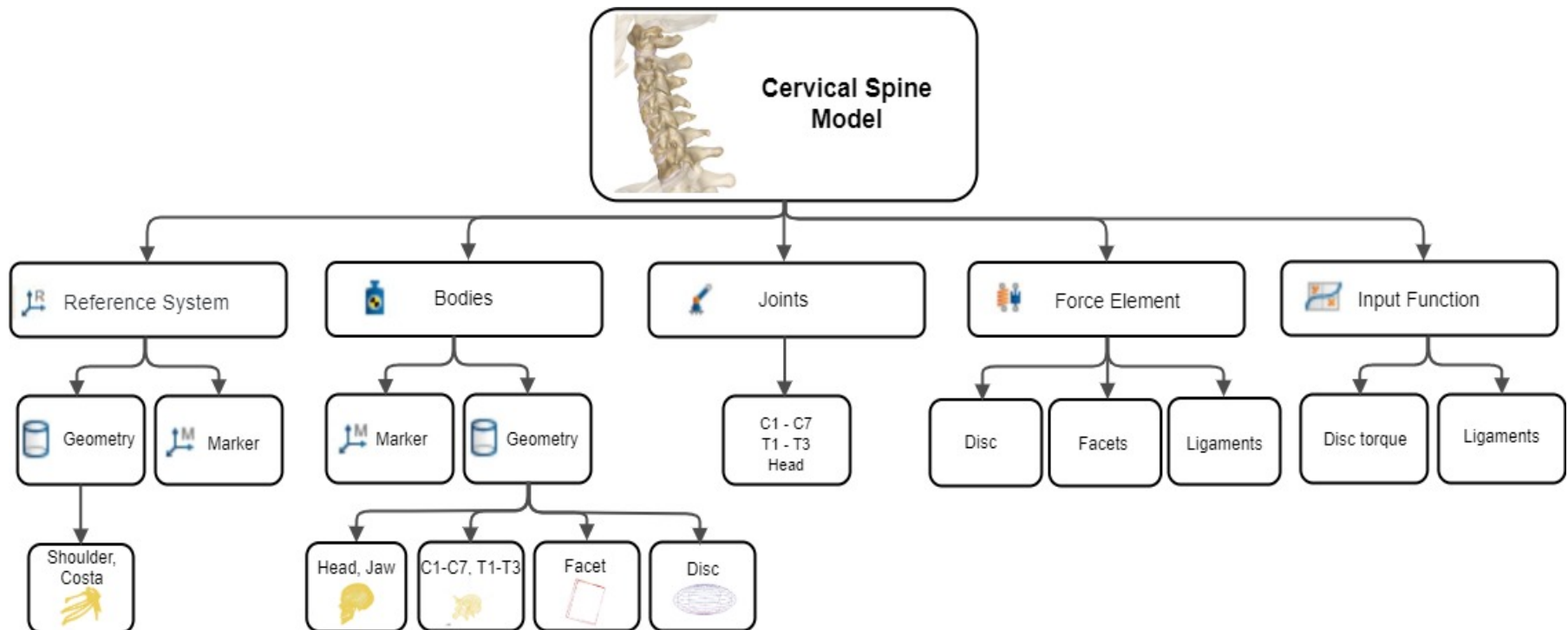
[1] <https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/>

[2] David D, Giannini C, Chiarelli F, Mohn A. Text Neck Syndrome in Children and Adolescents. *Int J Environ Res Public Health*. 2021;18(4):1565. Published 2021 Feb 7.

[3] Straker, L., O'Sullivan, P., Kendall, G., Sloan, N., Pollock, C., Smith, A., & Perry, M. (2006, July). IT kids: exposure to computers and adolescents' neck posture and pain. In *Proceedings from: International ergonomics association 16th annual meeting*.

Method

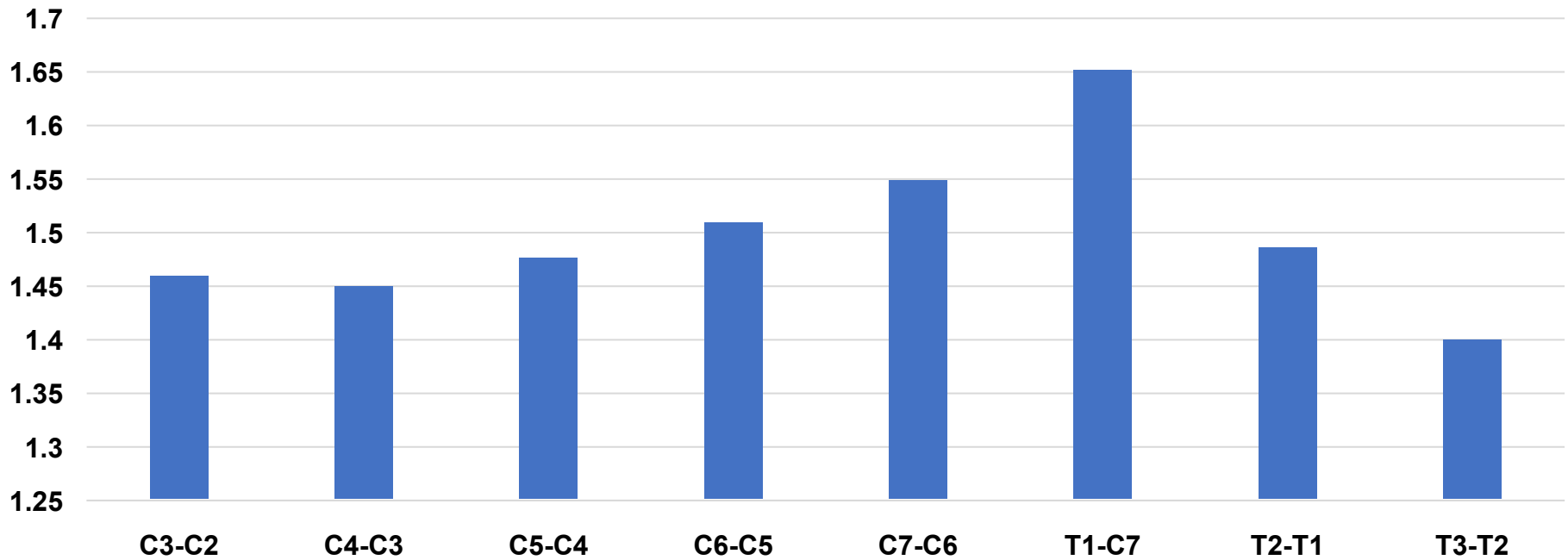
Calculation of intervertebral disc and ligament loads in the neutral head position and in the head-down position using Multi-Body Simulation of the cervical spine model. The flexion angles of the corresponding vertebrae are taken from [1].



[1] Ordway NR, Seymour RJ, Donelson RG, Hojnowski LS, Edwards WT. Cervical flexion, extension, protrusion, and retraction. A radiographic segmental analysis. Spine (Phila Pa 1976). 1999 Feb 1;24(3):240-7..

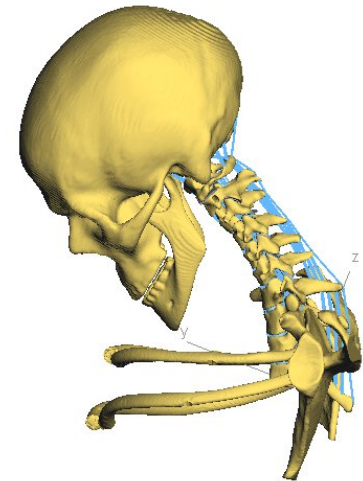
Results

**Percentage change of the disc vertical pressure
(head-down position compared with neutral position)**



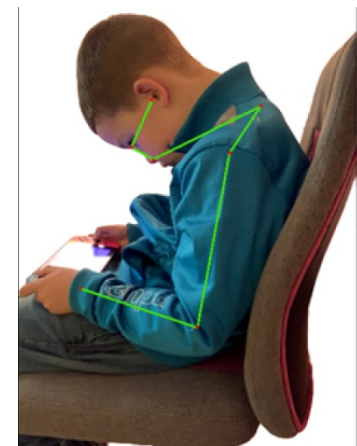
Conclusion / Discussion

- The disc loads in the head-down position are almost twice as high as in the neutral head position



Future Work

- Our main goal is to develop a tool that estimates biomedical parameters of spine using RGB-D data and determines the inter-spinal loads in the cervical spine in the forward head position.
- Model validation is challenging, due to missing studies about loads in the cervical spine in neutral and in the head-down position.



36th ANNUAL MEETING

CERVICAL SPINE RESEARCH SOCIETY – EUROPE

