

COMPARATIVE STUDY REGARDING THE MECHANICAL SYSTEMS IMPROVEMENT USED IN HUMAN LOWER LIMB PROSTHESIS

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In this paper we follow to accomplish a comparative study for mechanical systems improvement from the prostheses structure used in the sight of human lower limb amputee. For this purpose achievement, is necessary to make a structural and functional description of this prosthetic systems which are exist in present. Besides of this, the kinematic parameters of some prosthetic mechanical structure on experimental way it will be determined. This parameters will be determined on a human subject with one amputated leg. The experimental analysis was achieved by using the SIMI-Motion software (figure 1) for the following activities: walking, stairs ascend and descent activity and changing the human body position. The obtained results will be compared with the ones which belong to a human subject without locomotion disabilities (figure 2). Based on this comparative study will be elaborated some conclusions regarding the mechanical prosthetic systems improvement.

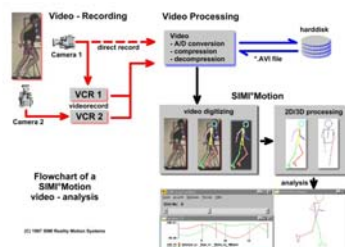


Figure 1. Video – analysis process scheme of SIMI Motion software [4]



Figure 2. Aspects regarding the activities deployment in the experiment: a – walking process; b – Stair ascent and descent process; c –changing the human body position.

References

- [1] Copilusi C., Dumitru N., Ciocan P., *Motion laws determination, on experimental way, of joints from the human lower limb structure for certain activities imposed to the locomotor apparatus*, IMT Oradea Conference. Oradea 2008.
- [2] Linsell, J., *CGA Normative Gait Database*, Limb Fitting Centre, Dundee, Scotland, Young Adult. Available: <http://guardian.curtin.edu.au/cga/data/>
- [3] Riener, R., Rabuffetti, M., Frigo, C., "Stair Ascent and Descent at Different Inclinations", *Gait and Posture*, vol. 15, pp. 32-34, 2002.
- [4] SIMI Reality Motion Systems – Manual www.simi.com
- [5] Theranova Catalog. www.theranova.eu
- [6] Winter, A., *International Society of Biomechanics, Biomechanical Data Resources, Gait Data*. Available: <http://www.isbweb.org/data/>