Helix\textsuperscript{3D} Hip Joint System vs other prosthetic hip joints

Stairs

**Major Findings**

With Helix\textsuperscript{3D} Hip Joint System compared to other prosthetic hip joints:

- Velocity increased by 37% when descending
- Stair descent was possible using the step-over-step strategy

**Clinical Relevance**

Stair ambulation is an activity that is important for amputees with an activity level ranging from K2 to K4. Being able to ascend and descend stairs is a requirement to participate in daily life. Common ways of measuring amputee's ability to ambulate stairs include stair ascent and descent strategy, use of handrail and/or use of an assistive device. Since stair ascent strategy is for hip disarticulated and hemipelvectomy amputees restricted to step-by-step strategy based on missing hip muscles, studies focus mostly on stair descent assessment. Measuring the time required to complete stair descent task can be done as part of a clinical mobility assessment.

**Summary**

The time required to complete the stair descent task decreased by 37% when using Helix\textsuperscript{3D} Hip Joint System compared to an old hip system. Furthermore, all of the 10 subjects were able to descend the stairs with a step-over-step strategy. In comparison, only 2 subjects were able to do so with their old hip system (Ludwigs et al. 2013). Both improvements are not only the beneficial effect of Helix\textsuperscript{3D} but can also be explained by the effect of the change from non-microprocessor controlled knees to C-Leg. With the old hip system, 23% subjects were using C-Leg, whereas with Helix\textsuperscript{3D} 100% of subjects. The acclimatisation period for Helix\textsuperscript{3D} was determined as the time the subjects need to feel adjusted to the new prosthesis and was around 11 weeks.

Ludwigs et al. (2013)