

## Reference

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# Evaluation of the Benefits of a New Prosthetic Hip Joint System in Activities of Daily Function in Patients after Hip Disarticulation or Hemipelvectomy

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## Products

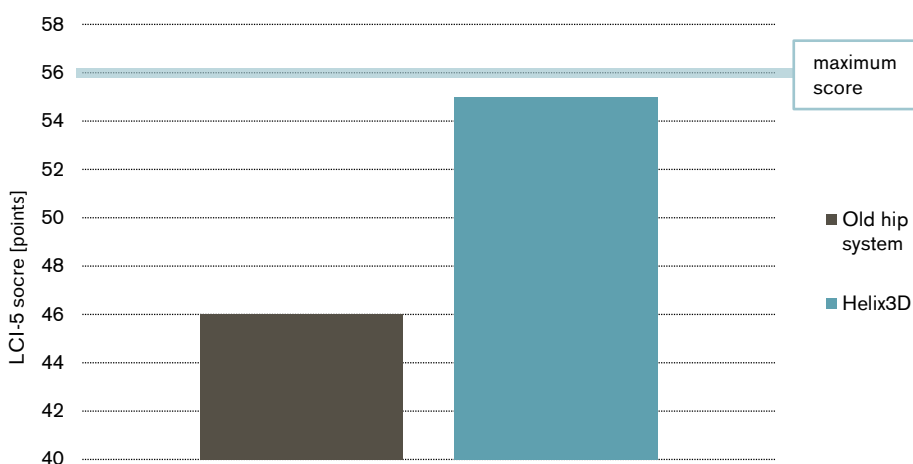
### Helix<sup>3D</sup> vs old hip system

## Major Findings

With Helix<sup>3D</sup> Hip Joint System compared to old hip system:

- **Increased mobility and independence by 20%**
- **Increased walking velocity when descending stairs by 37% and when walking down ramps by 40%**
- **Less need for walking aids and for help of caregivers**

### Improved mobility and independence with Helix<sup>3D</sup>



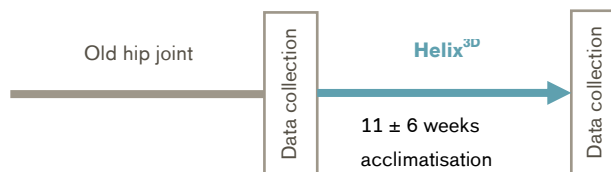
Locomotor Capability Index 5 (LCI-5) score assesses the mobility and independence of lower-limb amputees based on 14 activities of daily living (ADLs). The maximum possible score is 56 points.

## Population

Subjects:	11 disarticulation and 2 hemipelvectomy amputees
Previous prosthesis:	69% 7E7, 23% littig hip, 8% 4-bar-knee joint mounted in revers
Amputation causes:	not reported
Mean age:	17 – 71 yrs
Mean time since amputation:	not reported
MFCL:	8% K1, 54% K2, 38% K3

## Study Design

Observational, pre- to post-test design:



For most of the subjects not only the prosthetic hip joint was changed, but also the prosthetic knee joint; With the old hip joint, 23% of subjects were using C-Leg and 77% of subjects were using non-microprocessor controlled knees. With Helix<sup>3D</sup>, all subjects were using C-Leg.

## Results

Activities								Participation	Environment
Level walking	Stairs	Ramps, Hills	Uneven ground, Obstacles	Cognitive demand	Metabolic energy consumption	Safety	Activity, Mobility, ADLs	Preference, Satisfaction, QoL	Health economics

Category	Outcomes	Results for Helix <sup>3D</sup> compared to an old hip system	Sig.*
Level Walking	10 m walk test (n=10)	Walking velocity tends to be increased from 0.76 to 0.83 m/s.	+
Stairs	Time to walk down eight steps (n=10)	<b>Time required completing the task decreased by 37%.</b>  All subjects walked down with the step-over-step strategy when using Helix <sup>3D</sup> . With the old hip system, only 2 subjects were able to do so.	<b>++</b>  n.a.
Ramps, Hills	Time to walk up and down a ramp (11° grade) (n=10)	<b>Time required walking down a ramp decreased by 40%.</b> Time required walking up a ramp decreased by 13%.	<b>++</b> +
Activity, Mobility, Activities of daily living (ADLs)	LCI-5 (14 ADLs)	<b>Score improved by 20% (from 46 to 55).</b>  No changes in subscore 'basic ambulation skills'. <b>Improvements in subscore 'advanced ambulation skills'.</b>	<b>++</b>  0 <b>++</b>
	Questionnaire containing 6 activities that are demanding for hip disarticulation and hemipelvectomy amputees	<b>Improvement in score.</b>	<b>++</b>
	Determination of mobility level	1 out of 1 MFCL K1 subject improved to MFCL K2. 4 out of 7 MFCL K2 subjects improved to MFCL K3.	n.a.
	Functional assessment specific for the use of a hip prosthesis	All of the assessed functions were rated as improved: <b>Comfort while standing</b> <b>Safety at loading response</b>	<b>++</b> <b>++</b>

Category	Outcomes	Results for Helix <sup>3D</sup> compared to an old hip system	Sig.*
		<b>Ease of initiation of swing phase</b>	<b>++</b>
		<b>Walking velocity</b>	<b>++</b>
		<b>Safety while standing</b>	<b>++</b>
		<b>Reaching the extension stop</b>	<b>++</b>
		<b>Starting to walk from a standing position</b>	<b>++</b>
		<b>The overall assessment is improved.</b>	<b>++</b>
	Independence and walking aid	Subjects needed help from relatives or caregivers was reduced from 4 to 1 subject out of 13.	n.a.
		7 subjects needed walking aid with the old hip system. 4 out of 7 subjects showed a reduction in the support of walking aids with Helix <sup>3D</sup> . At the one year follow-up, 3 out of 7 subjects showed even a further reduction in the support of walking aids.	n.a.

\* no difference (0), positive trend (+), negative trend (-), significant (++/--), not applicable (n.a.)

### Author's Conclusion

"In summary, the results of the LCI-5, the functional assessments, and walking velocity demonstrate significant improvements with the Helix<sup>3D</sup> Hip Joint System as compared with conventional pelvic socket prostheses. This suggests that increased mobility and independence offered by this new prosthetic system with Helix<sup>3D</sup> Hip Joint, C-Leg, instructions for the prosthetic alignment, and recommendations for the pelvic socket may improve the outcome of the amputee's rehabilitation." (Ludwigs et al. 2013)

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