

# Early and intensive multidisciplinary rehabilitation incorporating technology, following traumatic, incomplete, spinal cord injury; A Case Study

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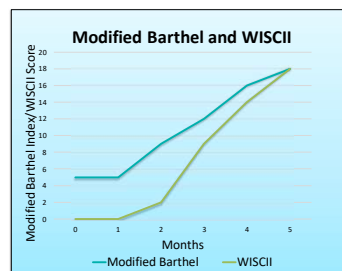
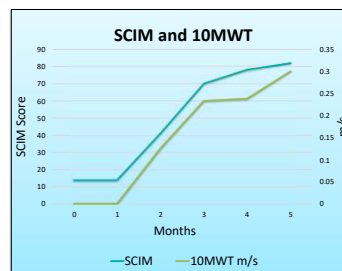
## Background

Research suggests that one-year post injury, 75% of motor incomplete spinal cord lesions (AIS C or D) will recover community ambulation<sup>1</sup>. Rehabilitation in this population should be intensive, delivered acutely and involve multiple health professionals<sup>2</sup>. Development of therapeutic technologies has allowed completion of task specific practice with increased intensity and duration<sup>3</sup>. Robot Assisted Gait Training (RAGT) has demonstrated improvements in walking distance, mobility independence and lower limb strength in incomplete spinal cord injured patients <6 months following injury<sup>3</sup>. Despite this, technology uptake remains low<sup>4</sup>. The functional and ambulatory outcomes of integrating technology into an intensive rehabilitation program early, following traumatic incomplete spinal cord injury remain largely unknown.



## Methods

A single case design was used, comparing functional outcome measures of a patient presenting with C7 AIS A (initial classification), four weeks following traumatic spinal cord injury. The primary outcome measure was the SCIM. This patient was provided with a six day a week, intensive, multidisciplinary inpatient rehabilitation program. Over the course of their six-month inpatient admission, their average weekly therapy hours totalled 25.2, equating to an average of 4.2 hours of daily therapy. Technology was incorporated into the therapy program and accounted for an average of 4.6 hours each week. The patient utilised the Erigo®Pro before progressing to the Lokomat® and finally the Body Weight Support treadmill training device. Therapy was also supplemented with the Functional Electrical Stimulation bike.



## Results

The SCIM demonstrated a 68-point improvement from admission to discharge. Secondary outcome measures; the Barthel Index, demonstrated a 13-point improvement and the WISCII an 18-point improvement. A clinically significant change of 0.175m/s was noted on the 10MWT from inpatient admission to discharge (having been ambulant for three months)<sup>5</sup>. A change of 0.43m/s was noted on the 10MWT from commencement of ambulation to discharge from outpatient therapy (having been ambulant for six months). On completion of the ASIA assessment, the patient's AIS classification progressed from C7 AIS A on inpatient admission to C8 AIS D on discharge. The patient was ambulating independently in the community with a four wheeled frame and household distances, independently with a hiking pole on inpatient discharge.

## Conclusion

This single case study demonstrates that early implementation of technology in traumatic, incomplete, spinal cord injuries is feasible and may lead to improved functional and ambulatory outcomes, over a shorter rehabilitation period than previously noted in the literature. Further research with dose matched control would be required to support this conclusion. Further studies would aid in determining the optimum percentage of technology to be incorporated into multidisciplinary rehabilitation programs for this cohort of patients, keeping in mind that this percentage may vary greatly throughout their rehabilitation admission.

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## References

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