



Case Study:

Connected Care to support Acquired Brain Injury

Background

PK, a 19-year-old at the time, sustained a severe acquired brain injury following a motorbike accident. As a result, PK required 24-hour supervised care and used a wheelchair for mobility. Communication was significantly impaired due to a speech impediment that made telephone use impossible. PK could independently transition between bed, wheelchair, and armchair; however, these transitions posed a substantial risk of falls.

PK's brain injury also led to extreme short-term memory loss, with an inability to recall events from more than a minute prior. This cognitive deficit meant that PK lacked awareness of personal safety and potential hazards, further reinforcing the need for constant supervision.

Change in Living Situation

After 30 years under the care of a dedicated full-time carer, retirement prompted a change in PK's living arrangement. PK was moved into a residential care facility alongside individuals with a range of challenging behaviours. This environment proved distressing and unsuitable for PK, leading to increased anxiety and thoughts of suicide.

Intervention with Remote Monitoring Technology

In search of a more suitable and less restrictive living solution, **Cascade3d** was approached to explore whether remote sensor technology could enable PK to live independently and safely in a private, ground-floor apartment.

PK, who had never experienced independent living, expressed a strong desire to do so. To mitigate risks:

- **Cooking appliances** (oven, microwave, electric hob) were disconnected for safety.
- **Sensors** were installed throughout the apartment, including:
 - On doors and windows (both manual and electrically operated)
 - In every room
 - On key appliances such as the **power shower, kettle, and toaster**

- **Pressure mats** were deployed:
 - On the bed, wheelchair, and favourite armchair
 - To track transitions and monitor duration spent in each location

Outcomes

- **Improved Clinical Response:** Data revealed that PK was not transitioning to the armchair and spent extended periods in the wheelchair. This insight enabled an **occupational therapist** to intervene and provide a **specialized ergonomic wheelchair** with a **pressure-relief cushion**, reducing the risk of pressure sores and cellulitis.
- **Proactive Maintenance:** The sensor system identified a fault in the power shower's heating element. Due to PK's inability to report the issue, this would have otherwise gone unnoticed, highlighting the sensors' value in detecting and addressing silent risks.
- **Evidence for Independence:** Over three years of continuous monitoring, sensor data provided concrete evidence to case workers and a **Lasting Power of Attorney (LPA)** that PK was capable of living safely and autonomously. This led to a carefully considered withdrawal of the monitoring technology, giving PK **full independence** for the first time.

Conclusion

This case demonstrates how **remote sensor technology**, when thoughtfully implemented, can support **positive risk-taking** and empower individuals with significant cognitive and physical impairments to live with **greater autonomy**. PK's journey from high-dependency care to independent living highlights the potential of **informed insights** in transforming quality of life for people with acquired brain injuries.

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