

# **Evolving AAC and assistive technology provision during neuro-rehabilitation for locked-in syndrome**

## **A Case Study**

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**The Royal Hospital for Neuro-disability**



**Royal Hospital for  
Neuro-disability**

A national medical charity  
Registered charity no. 205907

# Overview

- The Royal Hospital & Compass
- Case study of 'M' – Diagnosis and background
- Case study of 'M' – Communication
- Case study of 'M' – Other EAT and integration
- Conclusions

# Royal Hospital for Neuro-disability

- Based in London, serving all of UK.
- Rehabilitation & longer term care
- 230 Patients & Residents with Head Injury, Stroke, MS, HD & a range of other neurological conditions.



# Compass : Electronic Assistive Technology Service

- 7 team members working with High Tech AAC, Computer Access, Environmental Control and Powered Mobility



Communication  
Aids



Environmental  
Control



Computer  
Access



Powered  
Mobility



Switches  
& Mounting

# Case Study - 'M'

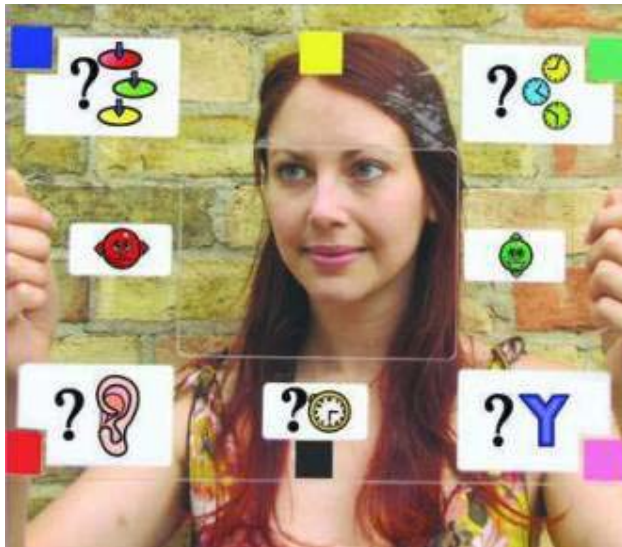
- 56 year old lady.
- Diagnosis of Locked-In Syndrome following brain-stem stroke in December 2008.
- On admission to RHN, in March 2009, M had eye-movement and a weak ability to rotate and side-flex her head. No other movement.
- Unable to speak, but all language skills intact. Tri-lingual in Spanish, English and German.
- No cognitive deficits.

# 'M' - Early intervention

- Positioning in bed and wheelchair extremely important.
  - Therapy team focus on this first before technology team involvement.
- Initial assessment focused on possible switch sites.
  - At this stage only head movement was an option.
- Early in admission simple switch activities introduced with the aim of:
  - Increasing motor range, strength and endurance of head movement
  - Building switch timing skills
  - Providing success in tasks to enhance motivation
  - Providing functional abilities for increased sense of control

# 'M' - Low tech communication

- In parallel to early technology input, Speech and Language Therapy team worked on low-tech AAC.



E-Tran

A	B	C	D		
E	F	G	H		
I	J	K	L	M	N
O	P	Q	R	S	T
U	V	W	X	Y	Z

Manual Listener Scanning

# 'M' - Building switch skills

- Single head switch in bed for nurse call.
  - Operated by head rotation.
  - Directly triggering nurse call.
- Single head switch in bed for TV control.
  - Operated by head rotation.
  - Scanning access to TV functions.
- Single head switch in chair for simple games.
  - Operated by head rotation / side-flexion.
  - Simple switch timing games.
- Single head switch in chair for scanning games.
  - Operated by head rotation / side-flexion.
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- Single head switch in chair for alphabet scanning
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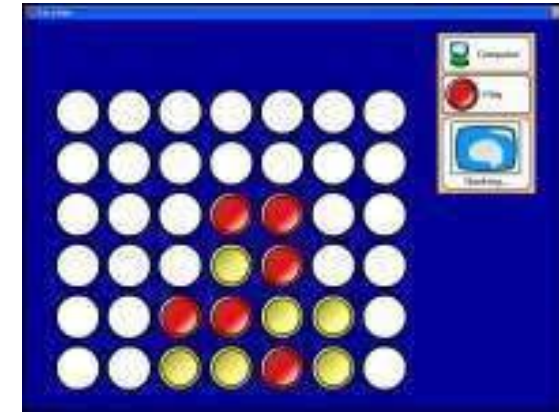
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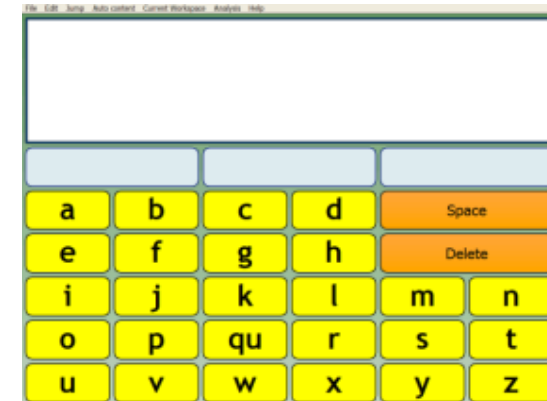
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# Customisation of Grids

- User experience – M realised potential as she was using system.
- Increased ability – confidence with multi-grid system.
- User Preference
  - 2 languages
  - Browser preferences

# 'M' - Changes in on-screen grids



# Then: Single to Two Switch Scan

Therapeutic activity to increase ROM and strength in fingers:

Biometrics Angle X equipment

2 switch scanning - games



# Then Came P10





# The Allure of New C12



# Eye-Gaze Demonstration

Eye-Gaze First Video Here

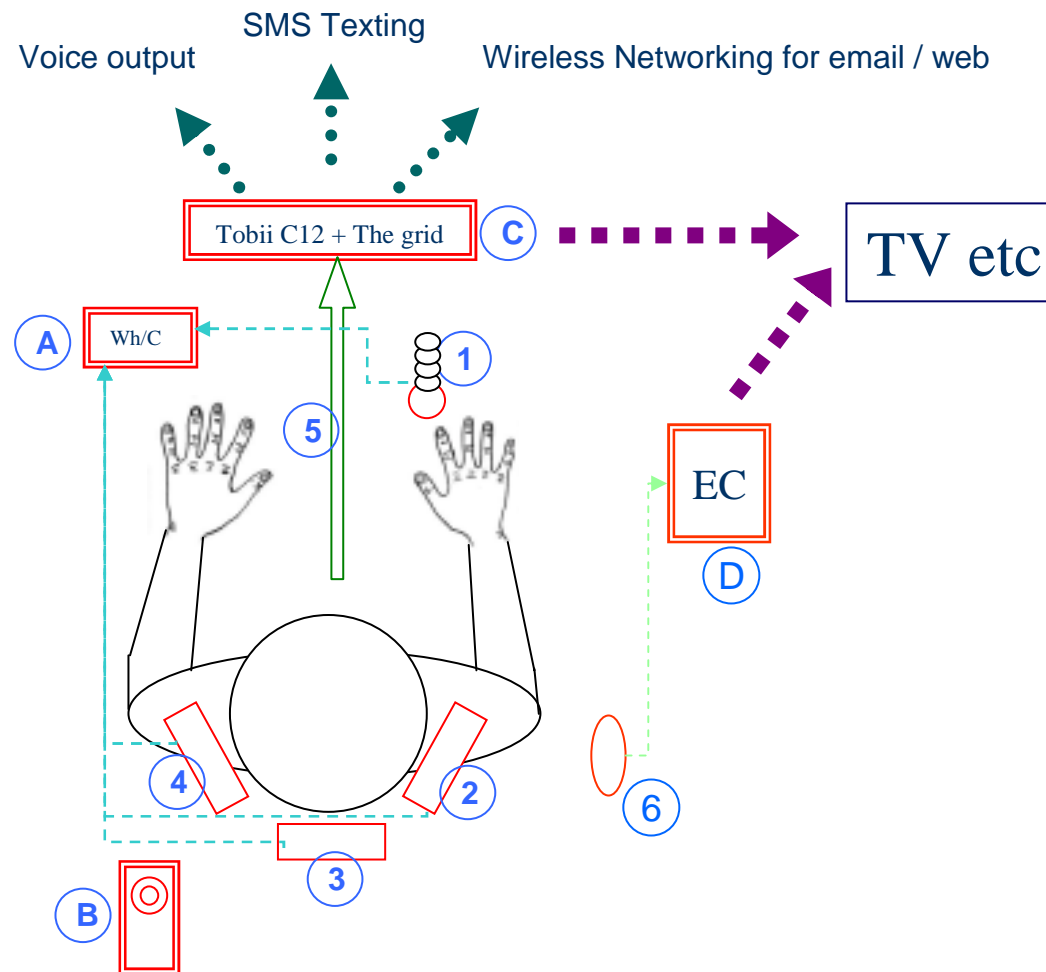
# Powered wheelchair control



# Powered wheelchair control

Driving Video Here

# Integration and interfacing



# Time commitment

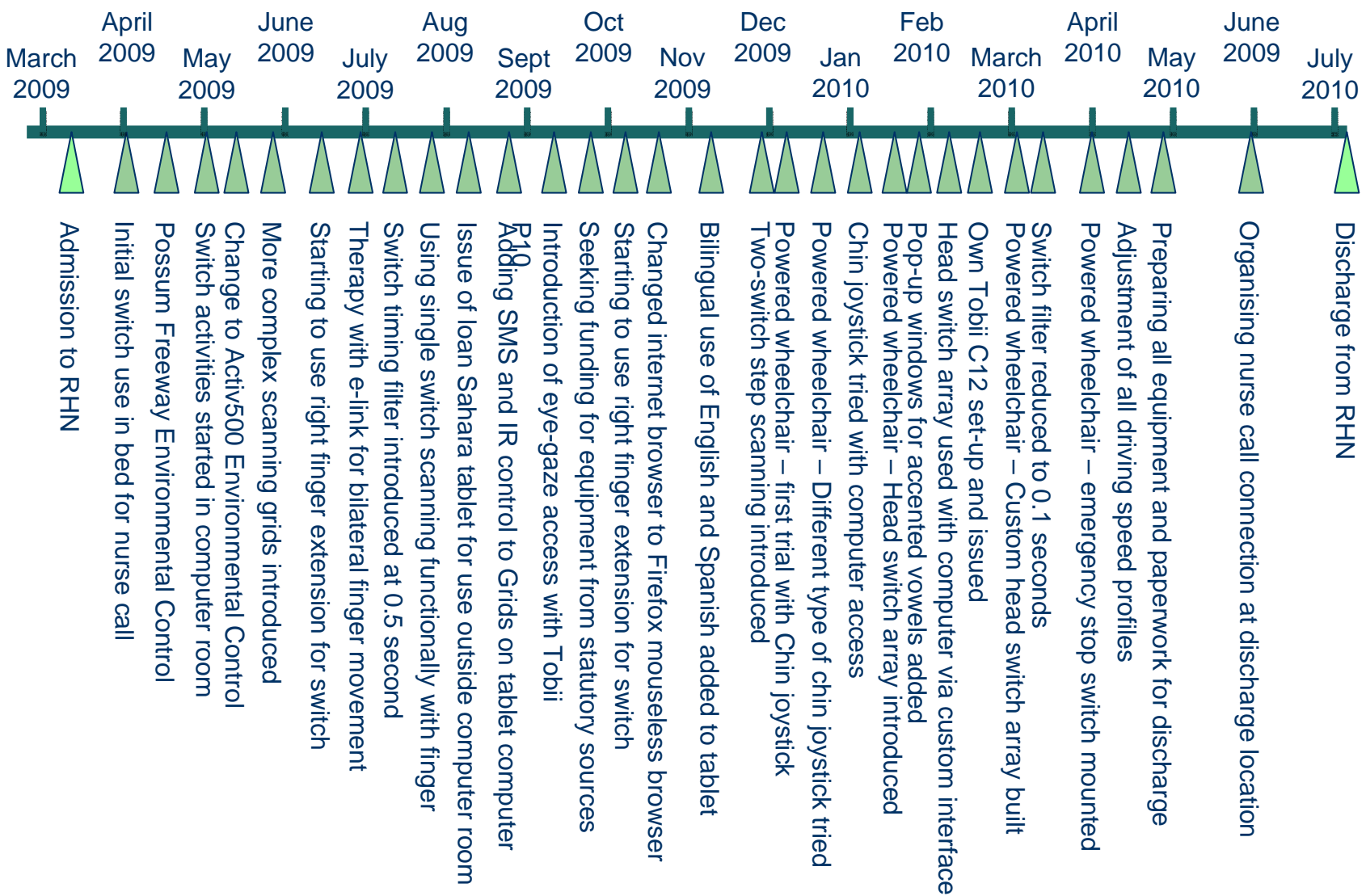
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  - NOT including M practising by herself
  - NOT including family input.....

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# 186 Hours

# Technology input throughout 16 month rehabilitation





# Conclusions

- Introduction of a complex AAC and Assistive Technology set-up is very time consuming and requires skills of a multi-disciplinary team.
- During active rehabilitation is the best time to introduce complex assistive technology as equipment can be modified or replaced to match changing skills.

# Conclusions

- Waiting until the end of active rehabilitation to supply assistive technology would waste the opportunity to provide successful functional activity during rehabilitation and would lose the motivation and confidence that this gives to the patient.
- Full integration is not always appropriate.
- Often high tech solution is not first choice for daily communication.

# Any Questions

