

# International Clinicians Spotlight Techniques and Strategies for Individuals with Complex Communication Needs



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# AAC Strategies for a Patient with Locked-In Syndrome for 16 Years



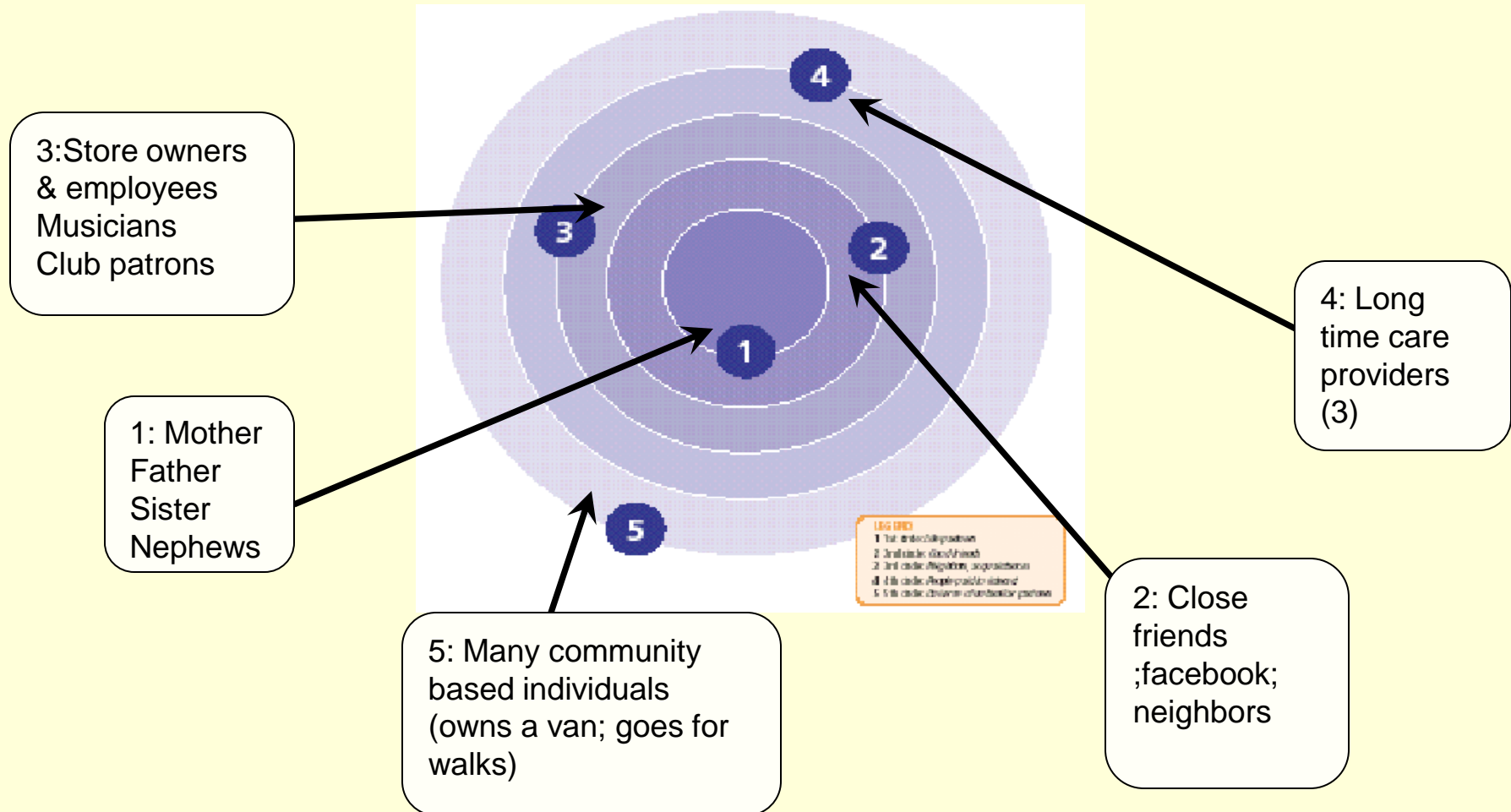
- Greg
- 42 years old
- Sustained brainstem stroke when 26 years old
- Lives with mother
- Has 3 long-time care providers

# Present communication strategies

- Partner-dependent alphabet scan
- Eyes up = yes
- Eyes down/eyelids shut = no
- Single vocalization
- Voicing on laughter



# Social Networks: Communication partners in all circles



# Communication Needs

- Interact verbally with unfamiliar people.
- Write poetry.
- Initiate conversation.
- Independently read and discuss books.
- Independent use of computer for Facebook and surfing Internet.
- Independent purchase power.
- Employment.

# Communication Abilities

- Fluent in English and German.
- Completed 4 years of university.
- No cognitive impairment, just motor impairment.
- No volitional movement of body below the neck.
- Limited movement of head from side to side and up/down ( $10^\circ$ ).
- Eye control.

# Evaluation of commercially available speech generating devices

- Wants text generation, mouse functions.
- Does not think he would use functions of phone, camera and mp3 player on devices.
- Is concerned about the productivity rate with an eye gaze system.
- Is concerned with the portability of a system (making it wheelchair tray friendly).
- Questions whether device causes a barrier between him and his listener.

# MEGABEE



# Dynavox EyeMax

- Dwell and switch mode
- ZYGO CM-9 lever switch placed at right temple



# MyTobii P10

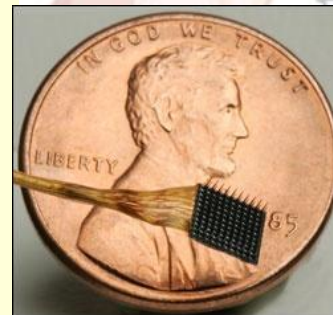
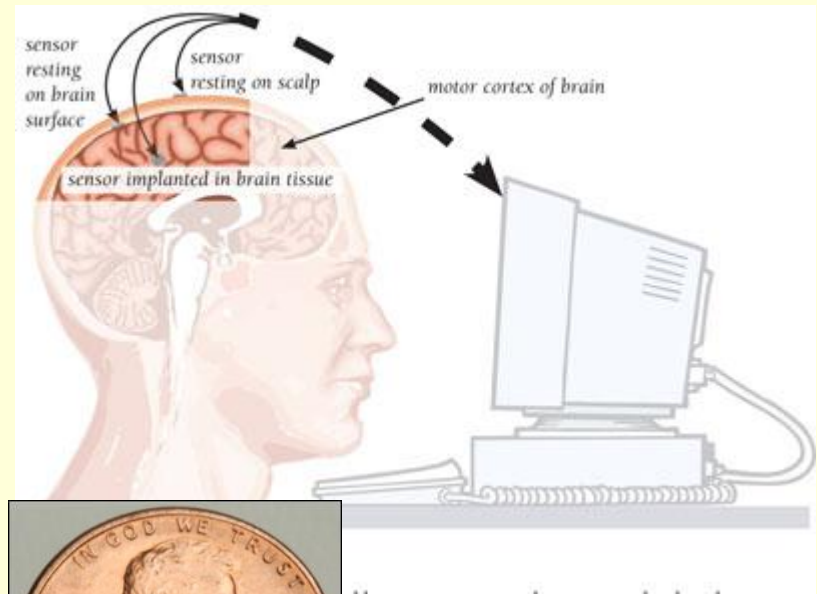


# Brain-Computer Interface

- What is a brain-computer interface (BCI)?
- BCI functions
  - Written/spoken communication
  - Environmental control
  - Prosthesis control
  - Non-medical uses
- Who uses BCI for communication?

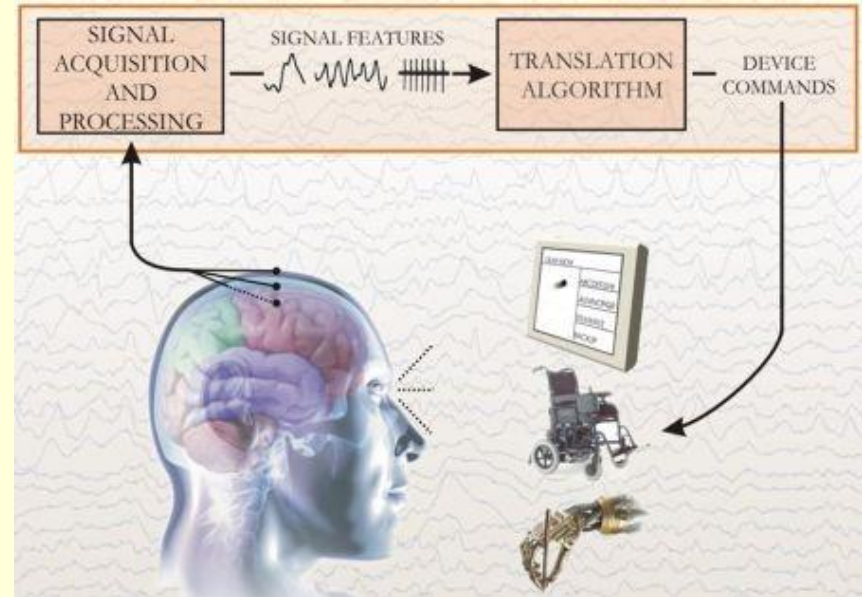
# Invasive BCI

## BrainGate



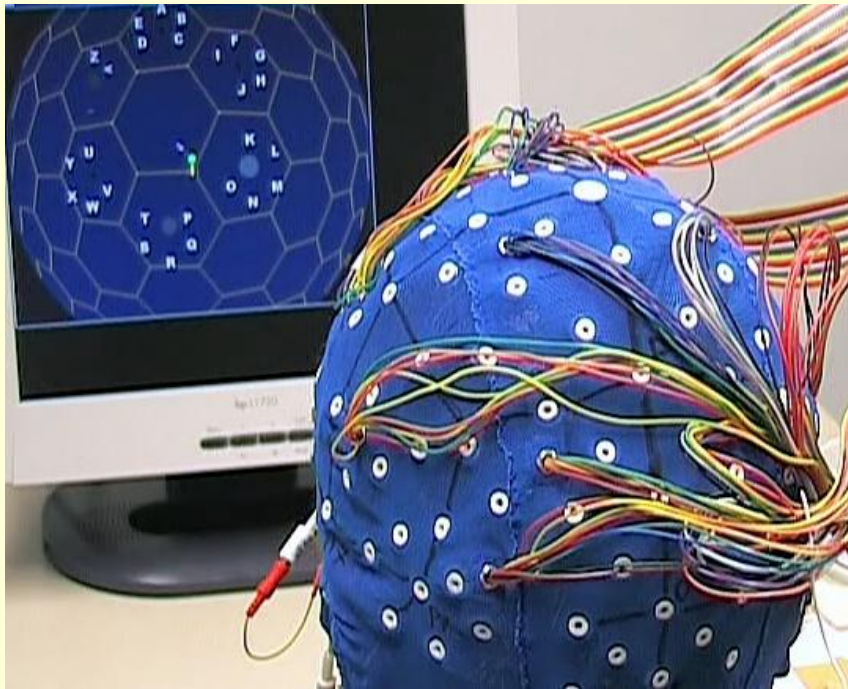
# Non-invasive BCI

EEG-cap with 28 electrodes

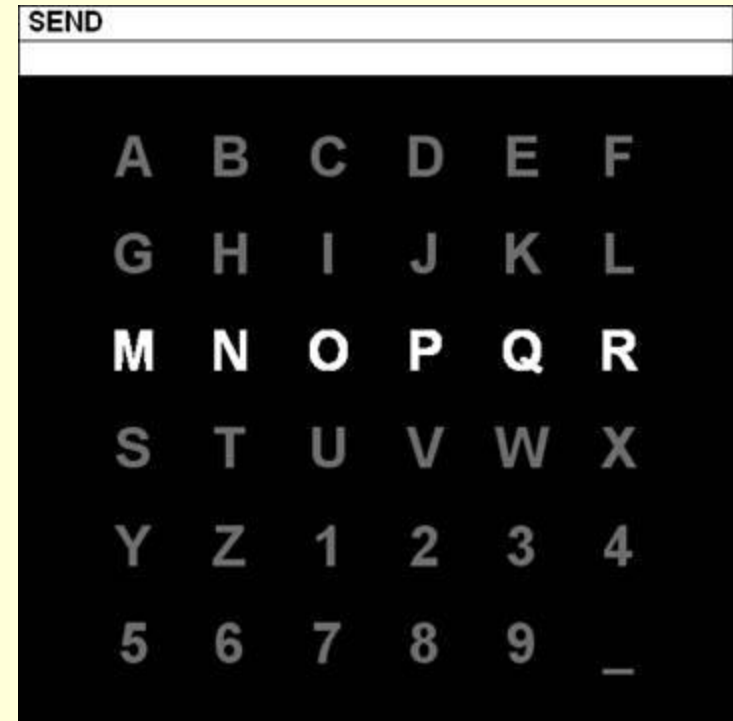


# Currently available spelling interfaces

Berlin BCI speller



P300 speller



# The RSVP BCI system

## *(Rapid Serial Visual Presentation BCI)*

### **Signal processing**

- User wears an electrode cap that classifies electricity of brain activity.
- System captures event related potentials for single events that are flashed on the computer screen. (letters presented from 50-200 ms each).

### **Natural language processing**

- Presenting one letter at a time in the center of the screen.
- Using n-gram letter sequence prediction for spelling with large word corpora.
- Will try with word and word-part prediction also.

# Greg's first attempt with the RSVP BCI system, July 2010



# Many needs...many strategies

- BCI will become another electronic access option for AAC users in the near future.
- AAC offers a full range of electronic and non-electronic options to individuals with severe motor challenges.
- Message to persons with locked-in syndrome: You will always be able to communicate.