Purpose
1. To see whether improved function and brain reorganization demonstrated in an earlier, clinic-based stroke rehabilitation study [1,2] could be replicated in the home.
2. To determine whether improved hand function and brain reorganization stem from repetitive movement or from cognitive processing associated with learning how to move the finger accurately.
3. To understand why complex tasks, such as tracking, that require cognitive processing appear to promote greater neuroplastic change than simple tasks [3].
4. To pilot a home-based tracking training system that could be used without a therapist present.

Design requirements
1. Hand and wrist involved in a tracking task that requires concentration.
2. Electronic box with microcontroller interfaces sensors and control buttons to PC via serial port.
3. Visual Basic program on PC implements tracking task and experiment control.
4. Voice, 2-way video and data tele link via web cam, cell phone, and land-line dial-up internet.

System overview
2. Electronics box with microcontroller interfaces sensors and control buttons to PC via serial port.
3. Visual Basic program on PC implements tracking task and experiment control.
4. Voice, 2-way video and data tele link via web cam, cell phone, and land-line dial-up internet.

Evaluation
System placed in homes of 24 subjects with chronic stroke and impaired finger motion. 20 of 24 enrolled in formal treatment assessment study. 24 subjects with chronic stroke and impaired finger motion.

Treatment evaluation measures
- Box and Block Test
- Jebsen-Taylor Hand Function Test
- Range of Motion
- fMRI: Voxel count, Intensity, Laterality index

Useability
- Telephone interview survey (n=13)
  - 13 said “computer easy to use”
  - 9 said “system interfered with daily life”

References

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