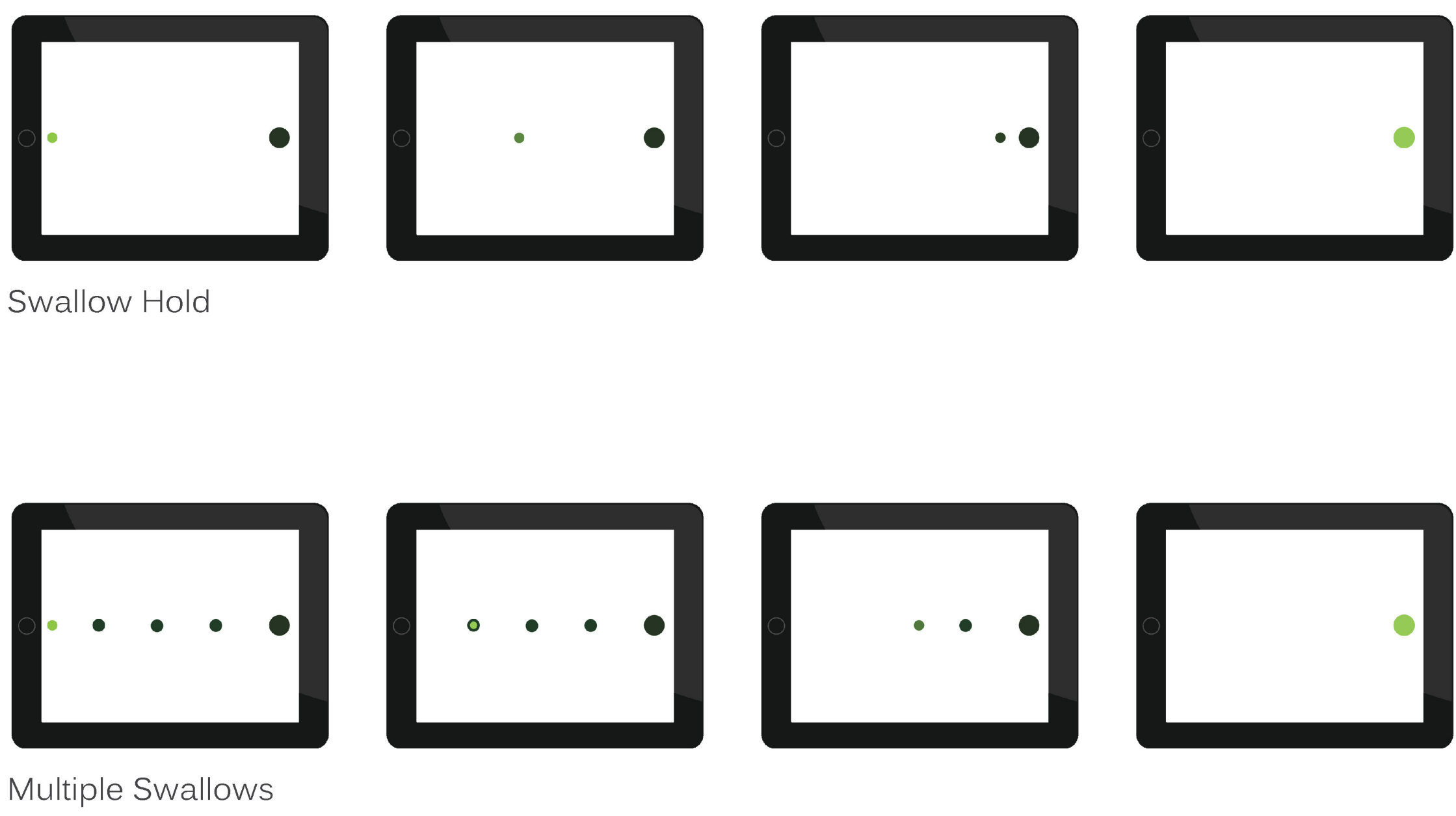


Feedback on Touch Screen User Interfaces

Design Solutions

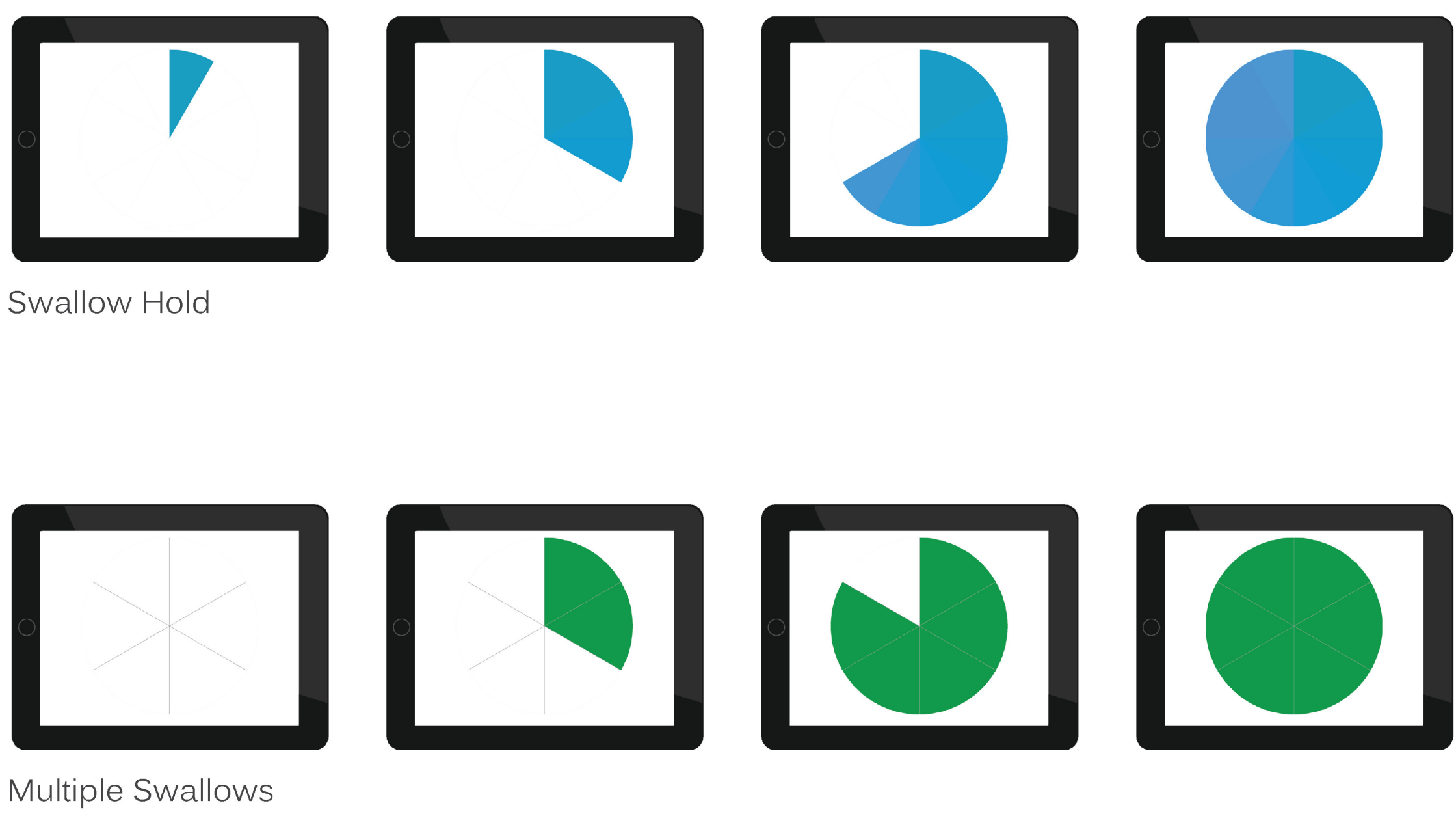
Reach the Target

- Goal:** To reach the target at the far end of the screen.
- Purpose:** Increase the concentration of the patient by focusing on the movement of the item on the screen.
- Swallow Hold:** As patient holds swallow, the small circle moves left to right toward the target.
- Multiple Swallows:** Each swallow moves the circle to the intermediate goals before final target.
- Auditory Feedback:** Using headphones, simple beeps or tones that begin on left side and move toward right as the therapy takes place.
- Haptic Feedback:** Mild and continuous vibration during each swallow.



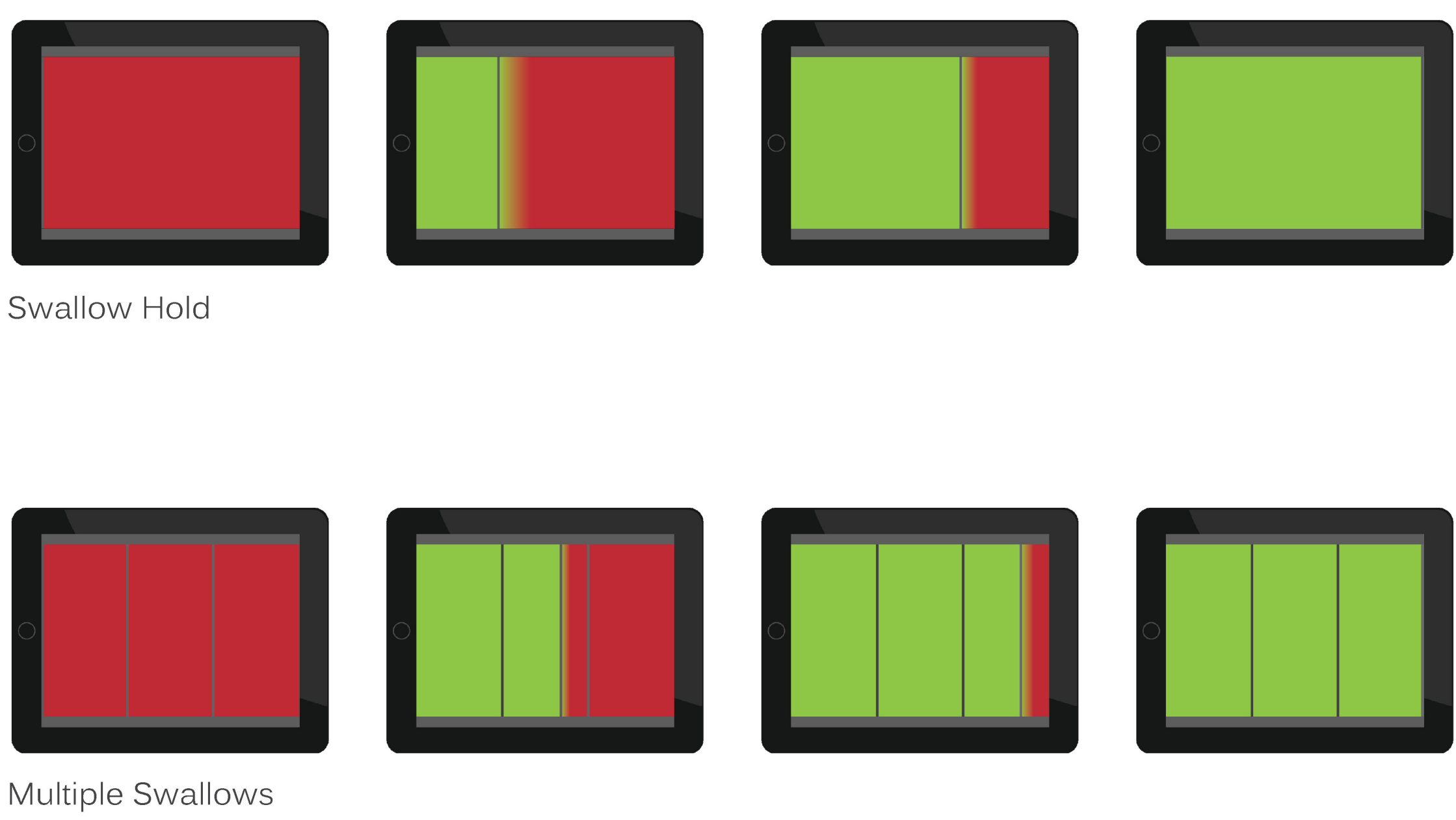
Fill the Circle

- Goal:** To fill the circle on the screen.
- Purpose:** Patient to want to complete the therapy session in order to fill up the image on the screen.
- Swallow Hold:** During swallow hold, the circle is filled in a continuous clock wise direction.
- Multiple Swallows:** At each swallow, the circle will fill up in sections.
- Auditory Feedback:** Scale of ascending musical notes while circle is filled in.
- Haptic Feedback:** Continuous vibration during each swallow.



Sweep the Screen

- Goal:** Change the colour of the entire screen by sweeping a vertical bar across the screen.
- Purpose:** Maximize the concentration of patient and to want to complete the therapy session.
- Swallow Hold:** As the swallow is held, the vertical bar moves left to right changing the colour of the screen.
- Multiple Swallows:** At each individual swallow, each section of the screen will change colour.
- Auditory Feedback:** With headphones, simple beeps and tones that begin on left side and move toward right during the swallowing therapy.
- Haptic Feedback:** Vibration occurs mildly and continuously during each swallow.



Future Research

Short Term

For two of the design solutions “Reach the target” and “Sweep the Screen” where the auditory feedback moves left to right, haptic pads may be used and the would patient place their hands to feel the vibrations move in sync with the visual elements.

Long Term

Currently, the design solutions are simple and very basic. More hands-on research with patients and clinicians will be necessary to find out which might work best. Complexity may be added to the solutions make them more game-like and engaging for the patients.

- Reach the Target:** Circle is a basketball moving across a basketball court or beach ball bouncing along a beach.
- Fill the Circle:** The circle can become a clock face or a pizza.
- Sweep the Screen:** An image of a landscape or friends and family is revealed. Each swallow reveals a panel of a comic.

Conclusion

The study looked at three types of feedback in touch screen user interfaces. These were visual feedback, auditory feedback and haptic feedback and four combinations of these feedback, Visual, Visual + Auditory, Visual + Haptic, and Visual + Auditory + Haptic.

The results strongly indicate that multi-modal feedback had an overall positive effect on the task done by the users in the study. This indicates that proper multi-modal feedback can be used with other devices and health care applications to improve user motivation and participation.

Much more research and study will be needed to further understand and improve how feedback can be better utilized in order to motivate the user to continue using the device, especially with respect with health care applications.