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HIGH-LEVEL CERVICAL INJURY & PLAY

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WHY PLAY?

Play is the primary occupation of childhood (Bundy et al., 1993).

After Cervical SCI, losing access to the occupation can be a major and unseen effect to development.

1 in 3

assistive devices are abandoned. Self initiated play improves use of access method (Phillips & Zhao, 1993).

15–20 mo

of use before eye-gaze accuracy peaks. This is long skill build that play sustains (Borgestig et al., 2016)

340 youth

across 3 pediatric SCI centers: tetraplegia meant less participation and lower social QoL than paraplegia (Riordan et al., 2015)

METHODS OF ACCESS

Matching volitional movement, cost, and positioning to most reliable method of play and interaction with the environment.

01 Mouth stick

- Requires neck control, less control for higher skilled activities
- Low cost, high level of autonomy

02 Sip-and-puff

- Higher cost, larger learning curve
- Increased engagement with higher skill activity

03 Head switch / array

- Mid level cost, moderate learning curve
- Highest flexibility with movement from finger, head, or other points of contact.

04 Eye gaze

- Highest level of independence, high learning curve
- Requires no volitional movement

05 Chin control

- Moderate learning curve, higher cost for tech access.

06 Voice / dictation

- High autonomy, no movement needed.



ACTIVITY TOOLBOX

NO TECH LOW TECH HIGH TECH

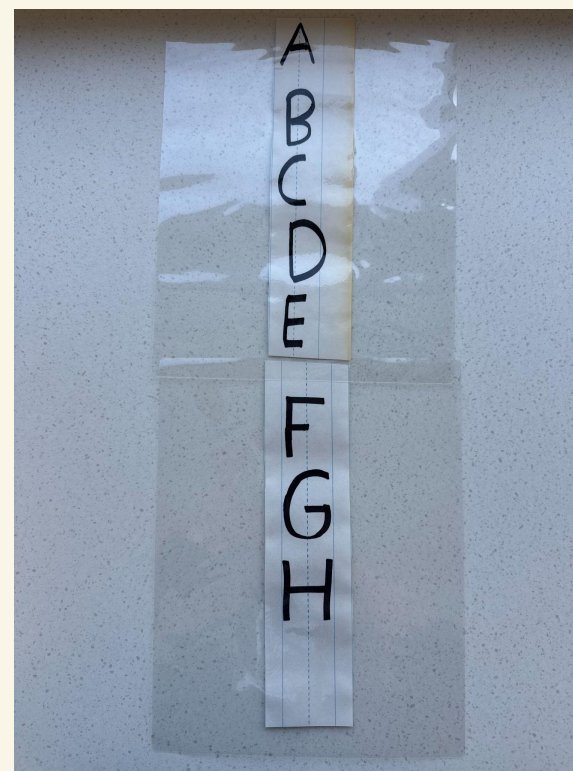
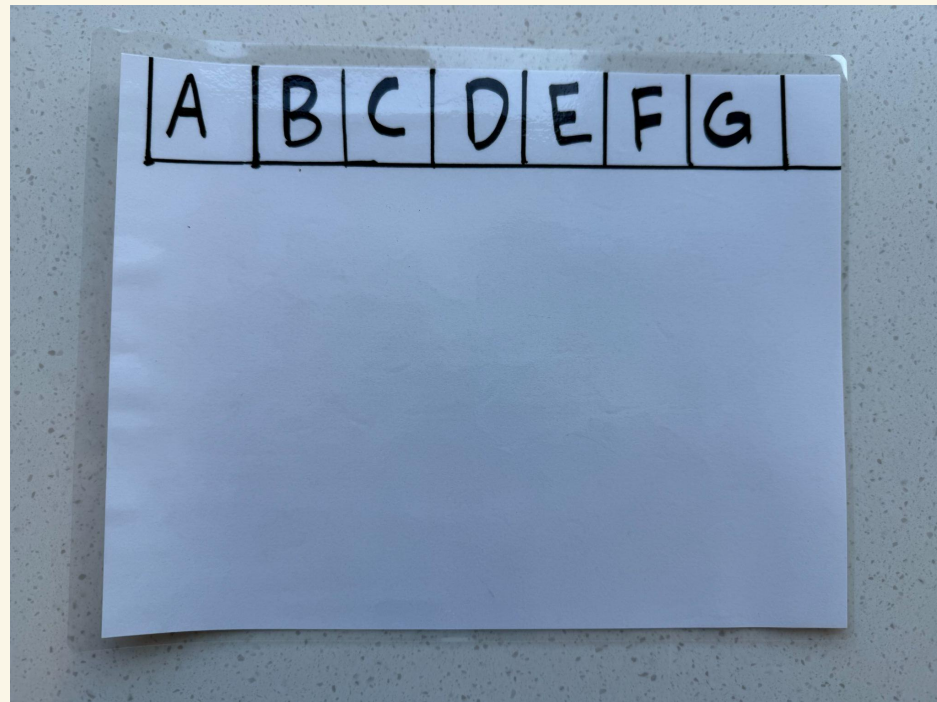
NO TECH ACTIVITIES

Coordinate boards

Battleship style grid. Player calls out squares. Overlay templates for games like Connect 4

Partner education

The partner is the mover. Purely an assistant, never influences play. Refraining from comments or suggestions is essential for this.

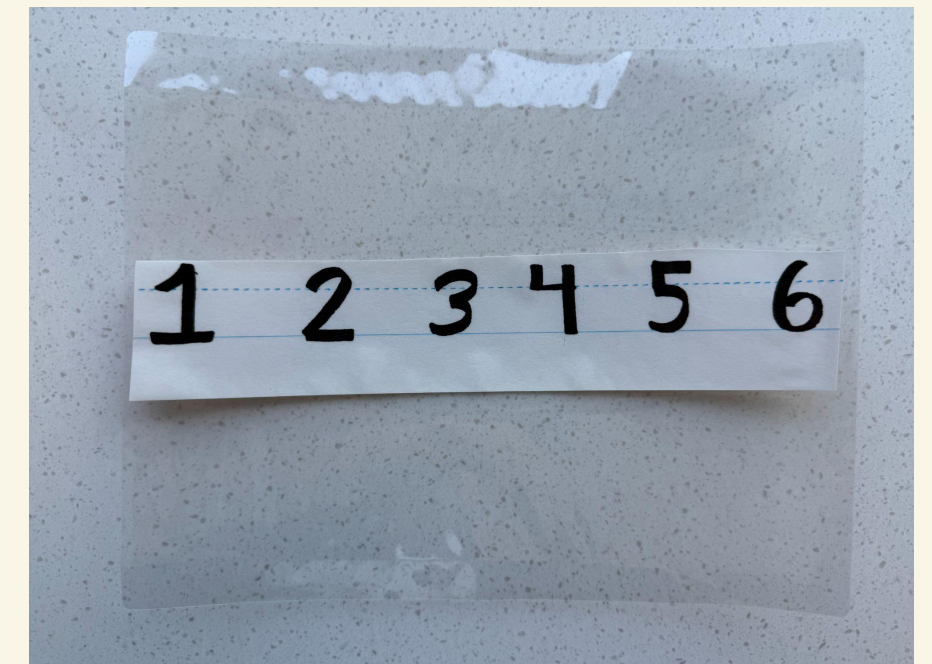


Dictation friendly games

Battleship, checkers, 20 Questions, trivia. Verbal play.

Visual seeking

I Spy, Where's Waldo, Spot It. Also beneficial for scanning and eye gaze skills for tech usage later.



LOW TECH ACTIVITIES

01 Mouth stick

page-turning, touchscreen, keyboard, art; requires neck control

02 Adapters

Stylus, paintbrush, paper clip, magnets. All can be attached to mouth sticks to facilitate difference styles of play.

03 Head pointer + magnetic "fishing"

Cervical rotation, endurance, strengthening in flexion and extension.



HIGH-TECH ACTIVITIES

1 One switch

Cause & effect: Press= Jump

Timed games Moving past obstacles requires cervical movement in desired direction

Go / no go Exercises cervical control



[Amazon.com](https://www.amazon.com/Abilenet-Hitch-2-0-Computer-Switch-Interface/dp/B000068801), 2026

2 Two switches

Directional play Pong, racing

Scan & select one moves, one chooses

Hardware: Xbox Adaptive Controller + switches



Xbox, 2026

DEMO

A single web page that runs the switch games. Keyboard-mapped, works offline, built for the Hitch setup.

<https://switch-play.pages.dev/>

01 **Dash & Flapper**

one switch timing (Geometry Dash / Flappy Bird style)

02 **Fruit Chop**

one switch go / no-go (Fruit Ninja)

03 **Pong & Racer**

two switch directional play

04 **Built-in adaptations**

adjustable speed, remappable keys, no fail practice mode

THANK YOU

Questions & discussion?

Template from [SlidesGo.com](https://www.slidesgo.com)

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