SKILL GUIDE · ACCESS & FUNCTIONAL NEEDS

DIY Assistive Equipment Fabrication

The Access & Functional Needs chapter's Tier 3 Assistive Technology Fabrication item calls this a real skill, best learned by working with an occupational therapist or assistive-tech specialist rather than improvised from scratch. This guide covers where that line actually falls: the real organizations that already build and give away assistive devices, simple builds reasonable to make yourself, and what genuinely needs a professional.

Where DIY stops and professional help starts

Occupational therapists and assistive-technology professionals draw a fairly consistent line: customizing or adapting an already-selected, low-risk aid is reasonable to do yourself, while anything load-bearing, structural, or involving custom seating or positioning needs a professional. A grab bar that isn't anchored into a wall stud, or a mobility device modification that changes how weight is distributed, isn't a place to improvise.

WARNING

Never DIY these

Anything load-bearing or structural (wheelchair frame modifications, custom seating, ramps meant to support a wheelchair's full weight) and anything that replaces a properly fitted medical device should go through a professional. Standard PVC pipe, in particular, is not rated as load-bearing and is not food-safe; treat it as a shaping and mounting material only, never a structural or ingestible-contact one.

Real organizations already doing this

Organization	What it does
e-NABLE	A volunteer network of roughly 200 chapters and 10,000+ members who 3D-print free upper-limb devices for people with partial hand or limb differences. Material cost typically runs $25-50 per device, print time 12-16 hours. e-NABLE explicitly recommends working with a medical professional before and after fitting a device.
Makers Making Change (Neil Squire Society)	215+ open-source assistive device designs, with an estimated 30,000+ devices built by volunteer makers since the program launched in 2016.
AT3 Center / ATAP	The national umbrella organizations for assistive-technology reuse and state AT programs; a good starting point for finding a local device-lending or reuse program instead of building from scratch.

Thingiverse's assistive technology design groups are worth browsing too, but they're unmoderated and less vetted than e-NABLE or Makers Making Change; treat designs there with more scrutiny before printing and using one.

Simple builds reasonable to DIY

PVC pipe and fittings are the most common material for low-risk, non-structural adaptive builds, cheap, easy to cut and assemble with basic hand tools, and easy to reconfigure.

1. **Reachers and grabbers:** use 1/2-inch PVC pipe, 2 to 3 feet long, as the shaft. Cut two identical jaw pieces from thin plywood or thick cardboard and mount them to cross like scissors at a fixed pivot point (a bolt through both pieces works as the fulcrum) near the shaft's business end. Run a non-stretching cord (paracord or strong string) from the jaws' non-gripping ends back down the shaft to a pull-handle; pulling the cord rotates the jaws closed. A rubber band stretched across the gripping ends provides the opposite tension, holding the jaws open by default so they close only when you actually pull.
2. **Walker or wheelchair trays:** a flat panel mounted to a PVC frame that clips onto a walker or wheelchair for carrying items hands-free. Size the frame's tubing to slide snugly over or clamp around the walker/wheelchair's own frame tubing (measure its outer diameter first), and secure the connection with hose clamps sized to that diameter rather than PVC cement, so the tray can be removed later.
3. **Switch mounts:** a PVC arm or frame that positions an adaptive switch (for a communication device or powered equipment) within reach of a specific range of motion.

4. **Key turners:** drill a hole through a short length of PVC or a wood dowel sized to hold a bolt, sandwich the key's head between the two halves (or a slotted holder cut to the key's thickness), and secure it with a bolt, nut, and washer rather than epoxy, so the turner can be swapped between keys. The added leverage from the handle length is what does the actual work for someone with reduced grip strength, not the fastening method.

Material	Use
PVC pipe and fittings	1/2-inch for shafts and handles (reachers, key turners); 3/4 to 1-inch for load-spreading frames like a walker tray. Cut with a PVC cutter or hacksaw and deburr the cut edge with sandpaper before use, a rough edge is uncomfortable to grip and can catch on clothing. Use PVC cement only for permanent joints; leave a friction-fit or clamped joint uncemented anywhere you'll need to adjust or disassemble it later.
Foam pipe insulation	Slip over a handle or grip point to build up diameter for easier grasping
Non-slip drawer liner	Wrap or line a grip surface, or place under an item to keep it from sliding
Stud finder	Critical before mounting anything to a wall, including a grab bar; never rely on drywall anchors alone for load-bearing hardware
Basic hand tools (PVC cutter or hacksaw, screwdriver, drill)	All that's needed for the builds above
FDM 3D printer (optional)	Opens up e-NABLE and Makers Making Change's open-source device library directly

A useful reference ceiling, even for improvised builds

The ADA's 1:12 maximum slope standard for wheelchair ramps (one inch of rise for every twelve inches of ramp length) is a reasonable benchmark to check any improvised ramp against, even outside a context where ADA compliance is legally required.

TIP

Sealant-filled inner tubes prevent the flat that strands a wheelchair user

For a wheelchair with pneumatic (air-filled) tires, a puncture is a mobility emergency, not just an inconvenience. A tire sealant made for this (injected through the valve after removing the valve core, then the tire fully inflated) seeks out and seals small punctures as they happen, before the tire even

goes flat. It's a preventive product, not a fabrication project, but it's cheap, doesn't require replacing the tire, and closes a real gap this guide's builds don't otherwise address.

Sources

- e-NABLE network size, device cost, and print time: e-NABLE
- Makers Making Change design library and device count: Makers Making Change
- National AT reuse infrastructure: AT3 Center; Association of Assistive Technology Act Programs (ATAP)
- PVC-based adaptive equipment builds: Equip2Adapt project documentation
- DIY-versus-professional scope of practice: American Occupational Therapy Association (AOTA) scope-of-practice guidance; RESNA wheelchair service provision guidelines
- ADA ramp slope standard: ADA.gov, 2010 ADA Standards for Accessible Design, §405
- DIY reacher/grabber cord-and-jaw mechanism: Engineer Fix; The Tech Interactive
- DIY key turner attachment approach: Thingiverse, Open Assistive Technology
- Tire sealant use in wheelchair pneumatic tires: Adventure Wheels