



# A Body-powered Feeding Tower

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ADL/IADL

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# Disclosure

- Financial – no payments were received for the design and construction of this project
- Non-financial – no benefits were received as a result of this project

# Clinical profile

- 55 year old car salesman
- C4 AIS D Central Cord Syndrome plus compartment syndrome in R forearm
- R arm: no active movement; elbow, wrist and fingers fixed in extension
- L arm: anti-gravity shoulder flexion to 30 degrees, extensor rigidity at the elbow with weak mass grasp and lateral pinch
- Impaired strength and coordination in LE: power wheelchair

# 5 months post injury

- Berg Balance Score 49/56
- Dependent in all ADLs

## Strengths

- Patience, determination, willingness to try
- Dynamic standing balance

# Occupational Performance Goals

- LE dressing
- Toileting
- Grooming
- Feeding

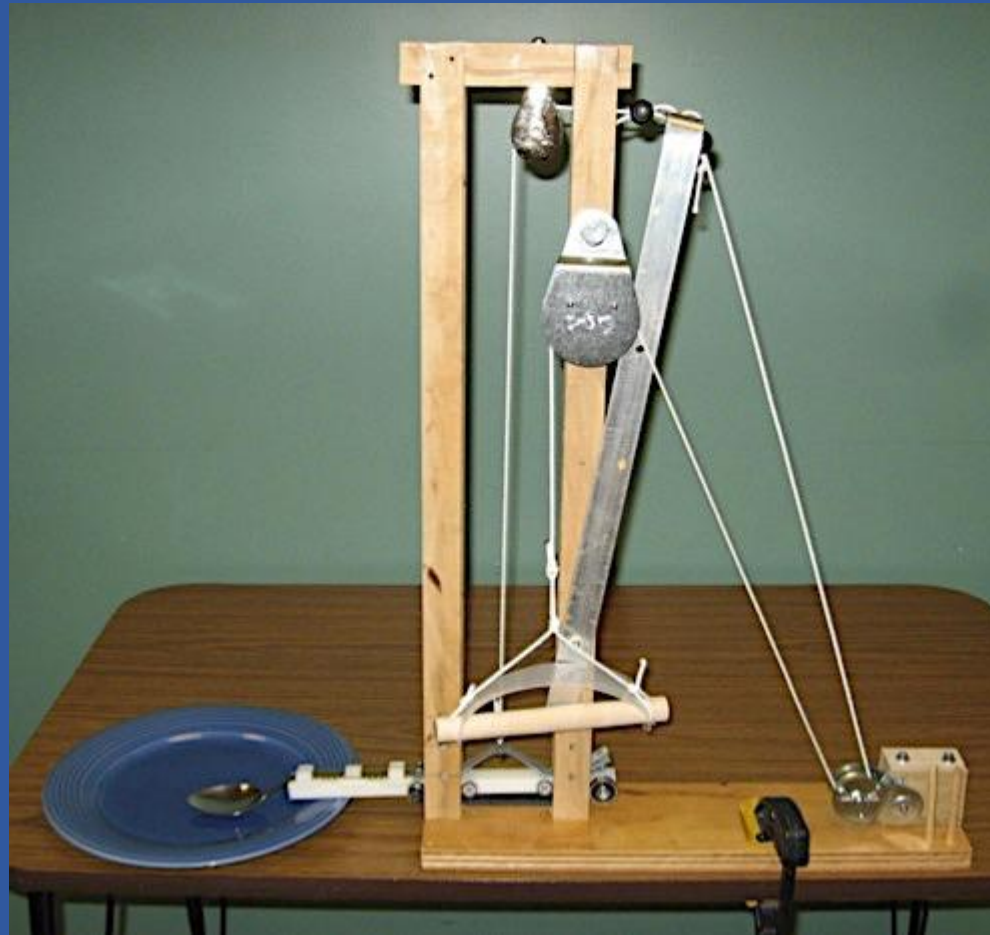
# Existing options for feeding

- Traditional tools like swivel spoon and long-handled extensions together with deltoid assist were ineffective
- Patterson Medical rep. had no feeding devices for demonstration
- Mealtime Partner Feeding System unaffordable at \$7,845

# Design guideline

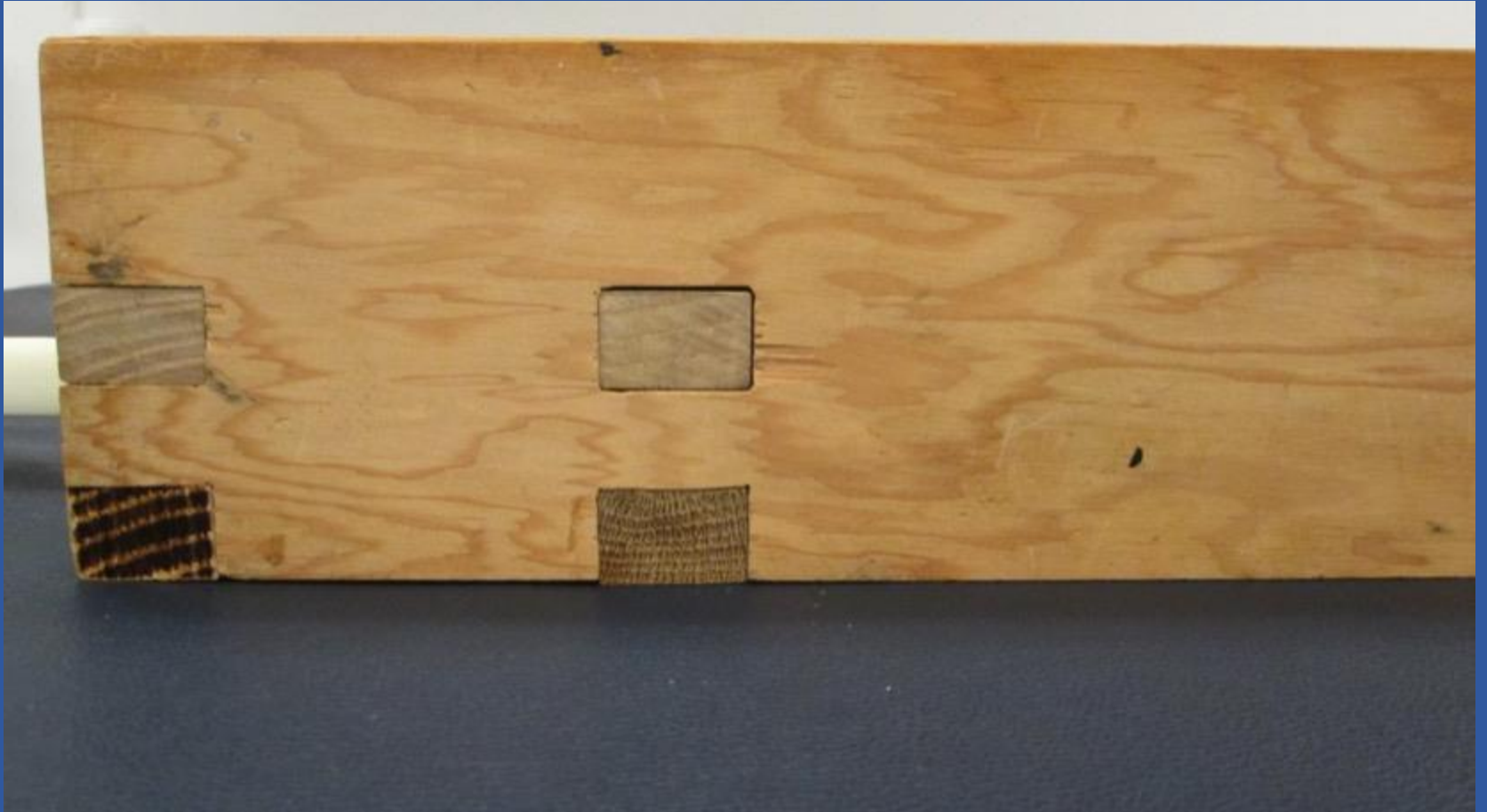
- Utilize client's physical abilities to operate
- Client to eat in standing for more available ROM
- Manually operated
- Inexpensive

# Body-powered Feeding Tower





# Base



# Adjustable height spoon stops



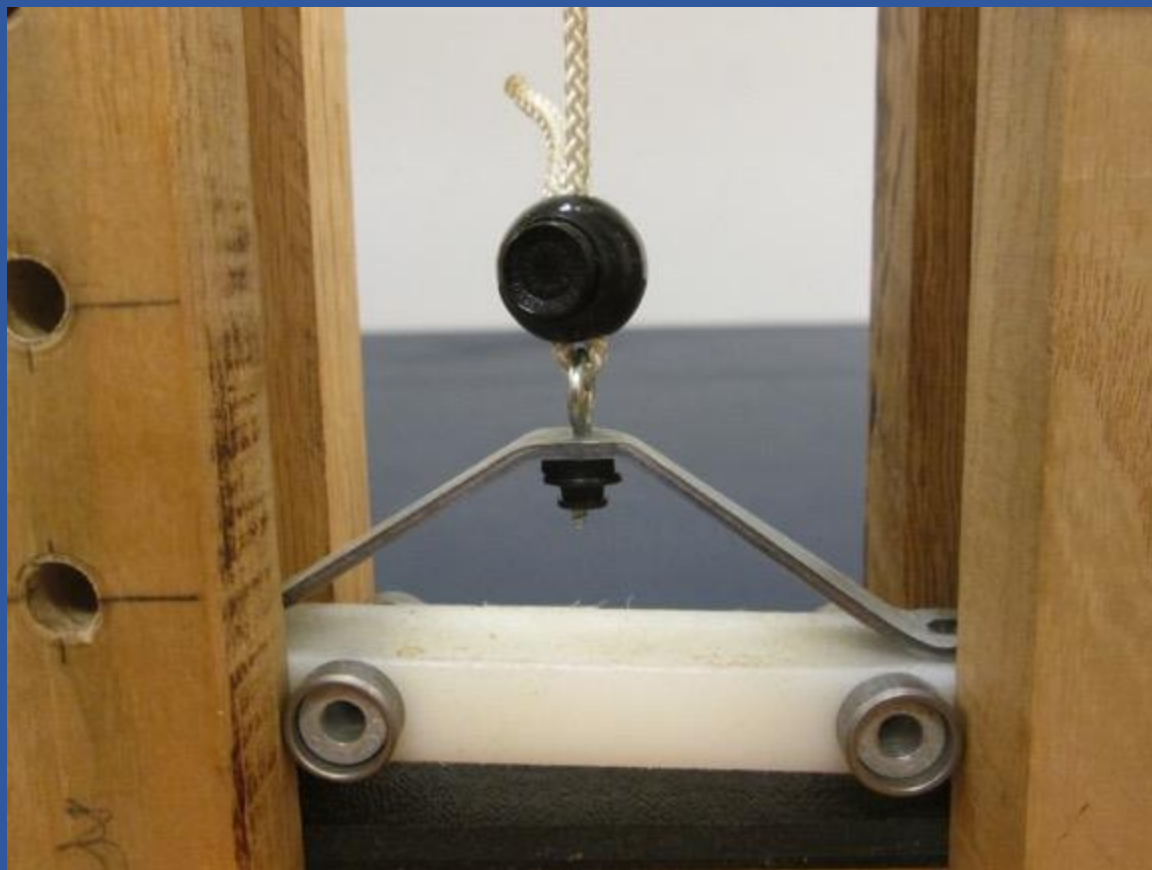
Add uprights and spoonholder platform



# Polypropelene spoonholder with cable clips and bearings



# Spoonholder attachment



# Counterweight



1 ½" pulley mounted off centre



Screw 2 ½" pulley on right post





20" lever arm



# 2" pulley and dowel storage



# Cable securement to lever



# Handle iterations

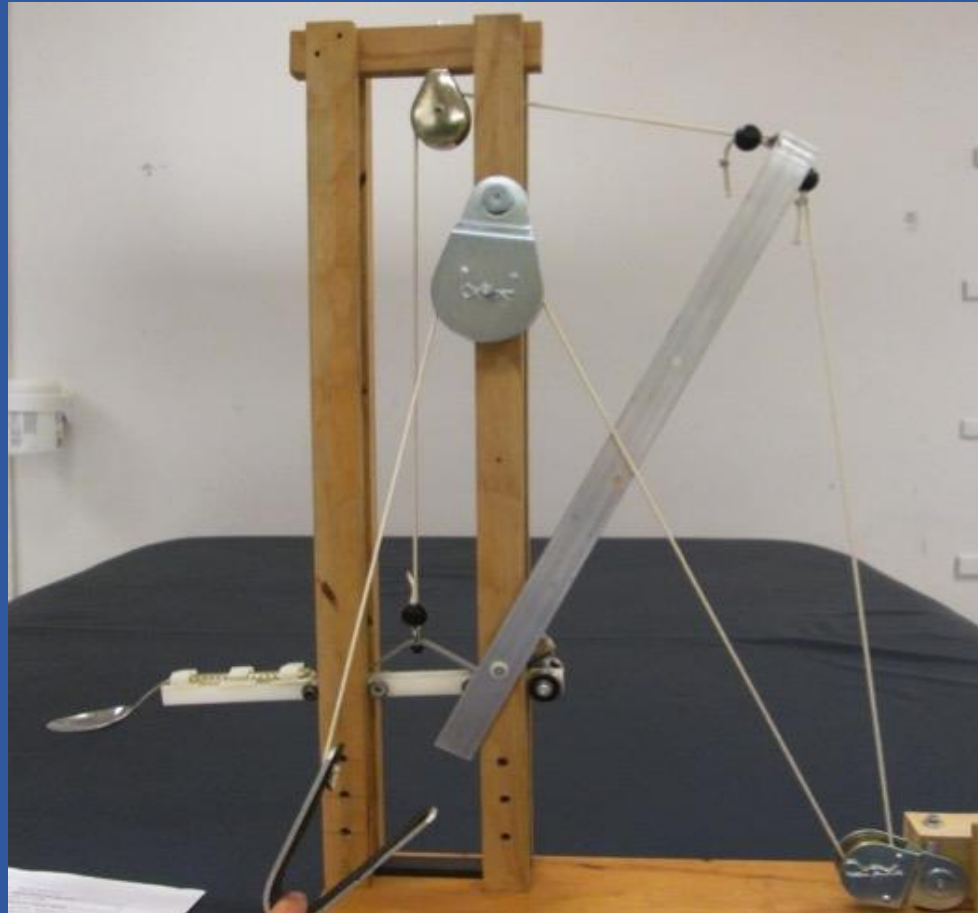


# Hand in handle

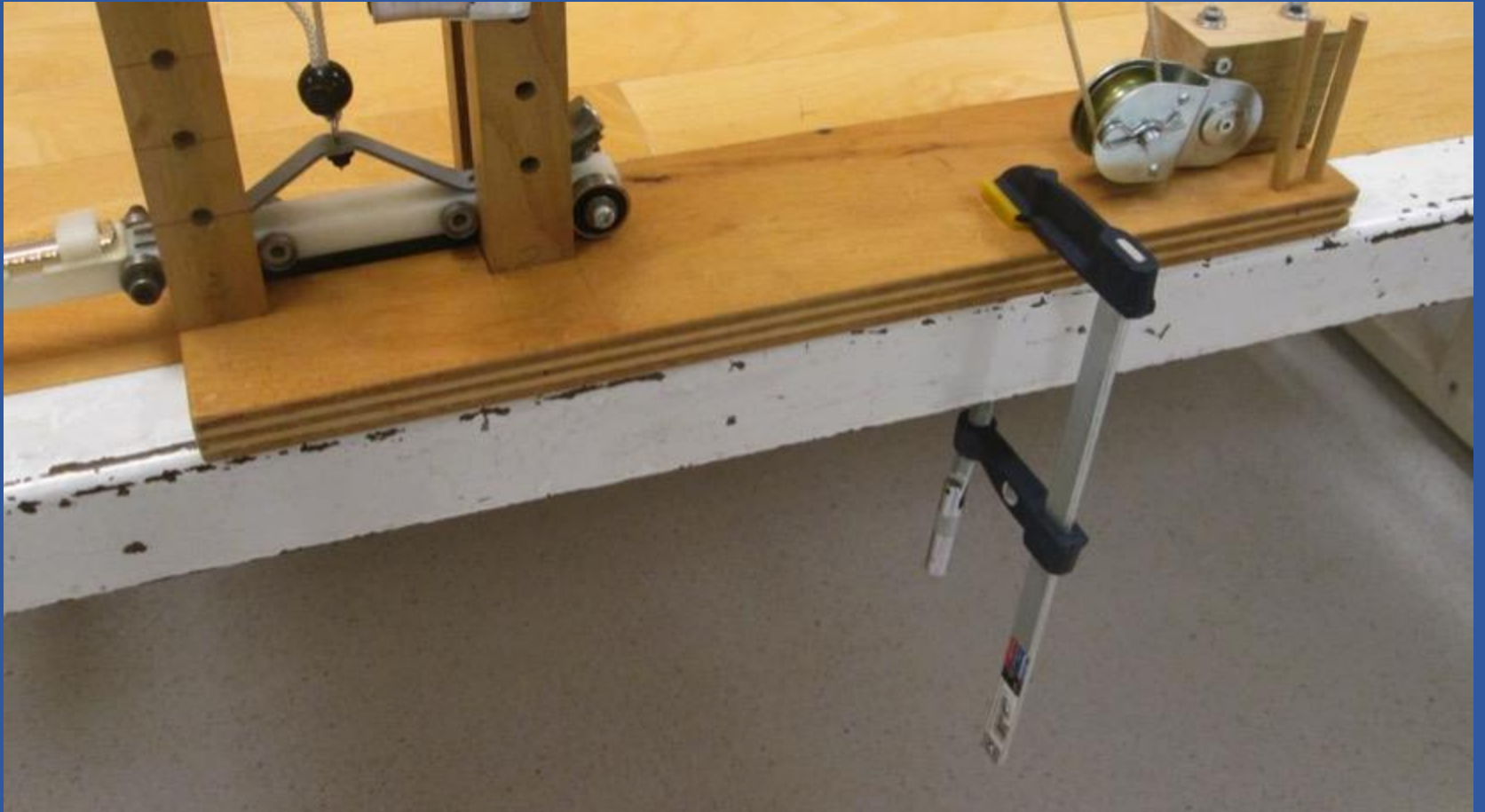




# Cable lines



# Non-slip matting and bar clamp



# Instructions

- On left side of rectangular plywood base cut 4 holes to slot the 4 vertical strips of hardwood; the vertical posts should be 3" apart length-wise and 3/4" apart width-wise. In the hardwood posts, drill 3 holes one inch apart from the bottom end so that 1/4" dowels can be inserted to give alternate levels of stopping for the spoon (depending on height of plate or bowl). Glue and screw the posts in the base.
- Make the spoon holder by attaching the bearing wheels to the polypropylene bar, spaced to have one pair of bearings running up either side of the four posts/uprights (1 1/4").
- Bend the steel bar to form a peaked handle with a 2" angled "tail" on the right to attach the threaded nut as a counterweight. Insert the eye screw to the apex of the metal handle. Screw handle onto spoonholder.



- Attach the cable clips on the protruding left end of the bar to hold the spoon; the middle clip should be orientated in the opposite direction of the 1st and 3rd clip to give the spoon stability. Place the spoon holder in between the uprights.
- Close off the top of the vertical posts by screwing them to a short length of hardwood to make the "tower". To this horizontal piece of wood, attach a 1 ½" pulley to hang slightly offset from the middle of the upright frame--align so the cord will run straight up from the eye screw.
- On the right front upright, attach the 2 ½" pulley.
- Make the lever by cutting a 20" length of aluminum bar and make a right angle bend 2" from the end. Drill a screw hole 3" from the flat end and secure the bar 6" from the bottom of the right front upright. Drill two holes in the bent end to attach the cords.

- On the right hand side of the plywood base, screw the block of hardwood to serve as the attachment point for the 2" pulley; attach the pulley horizontally. Place a screw just above the pulley to stabilize.
- Drill two holes by the hardwood block to be the storage spot for two pieces of dowelling that will be used for the alternate stops.
- Attached a 26" length of drapery cord to the eye screw on the metal handle securing with a ball spring clamp. Run the cord up the frame to the top pulley and attach to one hole in the lever handle; secure with a ball spring clamp.
- To make the handle, cut an 8" length of aluminum bar. Drill a hole at one end to attach the cord. Bend the bar to make a V-shape. Glue non-slip matting to the inside of the hand-hold. Attach a 50" length of cord to the handle and thread over the 2 ½" pulley on the upright, down to the 2" pulley on the hardwood block and then up to the bend in the lever bar. Secure with a spring ball clamp.
- Glue non-slip matting to the underside of the wood base. Secure the feeder to the table with a clamp.

# Materials and Cost

Materials	\$
1 plywood 17" x 4" x 3/4"	3
4 posts of hardwood 24" x 1 1/4" x 3/4" and 1 post 6" x 1 1/4" x 3/4"	8
1 block of hardwood 2 1/2" x 2" x 1 1/2"	.50
1 polypropelene bar 10" x 3/4" x 1/2"	1
1 ABS plastic 5 1/4' x 3/4"	.50
1 steel bar 7" x 1/2" x 1/16"	1
1 aluminum bar 28" x 1" x 1/8"	5
8 bearings	15
1 eye screw	.25
1 2 1/2" SS rope pulley zinc fixed eye	9
1 2" rope pulley zinc fixed eye	5
1 1/2" rope pulley nickel	3
3 cord clips	3
15 screws and washers	4
2 3" x 1/4" dowelling	.50
3 ball spring clamps	3
50" drapery cord	4
1 17" x 4" non-slip matting	1
1 4" x 2" bar clamp	5
<b>TOTAL</b>	<b>\$71.75</b>

# Video

- <http://youtu.be/CXltx287vdA>