DYNAMIC SHOOTING SUPPORT INSTRUCTION GUIDE

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PRODUCT DEMONSTRATION

https://youtu.be/NwZnTzvjt_c

TOOLS USED

- Ratcheting PVC cutter
- Hacksaw/coping saw
- Heat gun/torch
- Tape measure
- Drill
- ½” drill bit
- Heat resistant gloves
- Diagonal cutting pliers
- Scissors
- Adjustable wrench
- Sandpaper/metal file
- Total build time (3D printing simultaneously):
  - (Including TPU straps)=15hrs 26min
  - (Excluding TPU straps)=9hrs 20min

HELPFUL TOOLS

- Paracord jig
- Clamps
- Metal punch
- Rotary sander/cutter

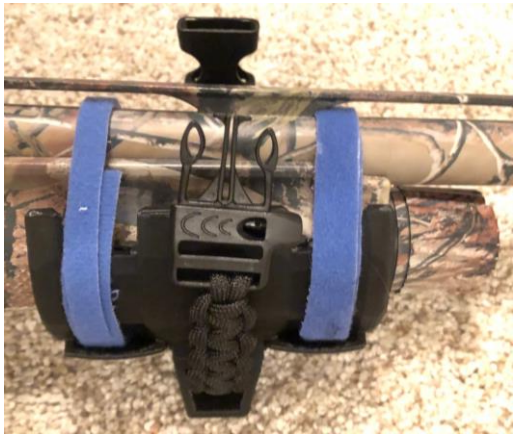
DYNAMIC SHOOTING SUPPORT COMPONENT LIST

Item	qty	price (ea)	total
5"x1/2" bolt	1	$1.58	$1.58
1/2" nut	3	$0.24	$0.72
1/2" washer	1	$1.18	$1.18
1-3/8"x1/2" bearing reducer	1	$6.98	$6.98
1" PVC pipe	(per 10')	$3.86	$3.86
1" PVC pipe 3-way connecter	1	$1.81	$1.81
1" PVC pipe 45 degree elbow	2	$1.14	$2.28
1 1/2" PVC pipe	(per 10')	$5.96	$5.96
1 1/2" PVC pipe 4-way tee fitting	1	$3.25	$3.25
1 1/2" PVC pipe 45 degree elbow	4	$1.79	$7.16
1 1/2" PVC pipe (Threaded Female Adapter)	1	$1.28	$1.28
1 1/2" PVC pipe (Charlotte Pipe Plug)	1	$2.14	$2.14
1 1/2" PVC pipe 2' segment	1	$3.56	$3.56
shelf Liner/toolbox liner	per 4'	$6.98	$6.98
nite ize locking caribiner (heavy duty)*	2	$13.98	$27.96
paracord (heavy duty) 1/4"	per 30'	$10.32	$10.32
paracord (heavy duty) 1/8"	Per 50’	$3.58	$3.58
hobby buckles (1") (4-pack)	1	$6.79	$6.79
3D printed Firearm Base	1	$1.51	$1.51
3D printed TPU Straps	2	$.42	$.84
PVC Cement	per 8oz	$2.98	$2.98
			$97.74

FIREARM BASE ASSEMBLY

- Initiate this process first so it can be printing while assembling the remaining components
- 3D Print base and TPU Straps (Firearm Base STL File)
  - Can also use Velcro straps or zip ties
- Clean off base supports to remove excess material
- Glue shelf liner or foam padding onto base for padding and grip

FIREARM BASE ALTERNATIVE

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3D PRINT PARAMETERS

Slice Settings (Ultimaker Cura)	Firearm Base ($1.51)	Skeet Shooting Strap ($0.42)
3D Printer Type	Creality Ender 3 Pro	Creality Ender 3 Pro
Profile/Layer Height	0.28mm	0.2
Infill Density & Infill Pattern	10% - Gyroid	25% - Grid
Printing Temp & Bed Temp (Celsius)	215 & 60	230 & 60
Material	PLA (Inland)	TPU (Ninjatek Cheetah)
Supports/Pattern/Overhang Angle	Tree Support/Zigzag/35 degrees	N/A
Build Plate Adhesion	Raft	Skirt

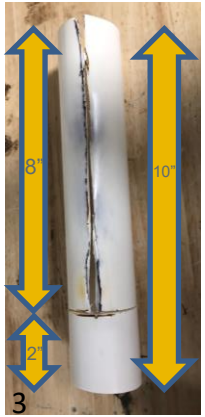
Print Duration	7 hours 3 minutes	2 hours 37 minutes per strap

1 ½” PVC CUT LIST

1 x 53”

6 x 12”

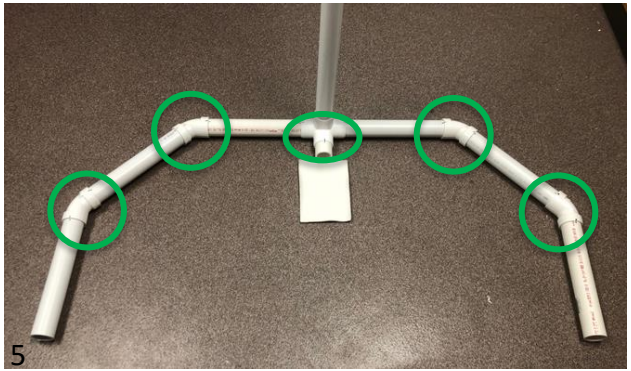
1 x 10”



1. Cut the 1 ½” PVC pipe into the lengths to the left using the ratcheting PVC cutter or a hacksaw. (Figure 1 & 2)
2. On the 10” piece, measure out 8” and cut vertically with hacksaw almost all the way through the pipe until about 1” remaining holding the pipe together at the bottom. (Figure 3)
3. Then cut horizontally down the middle using hacksaw or rotary cutter leaving only 2” just to have enough to slide into the connector. (Figure 3)
4. While wearing appropriate protective equipment, use heat gun to make the PVC pipe malleable and lay it out as flat as possible then allow to cool/harden.
5. Then file the edges to remove burs.

BASE ASSEMBLY

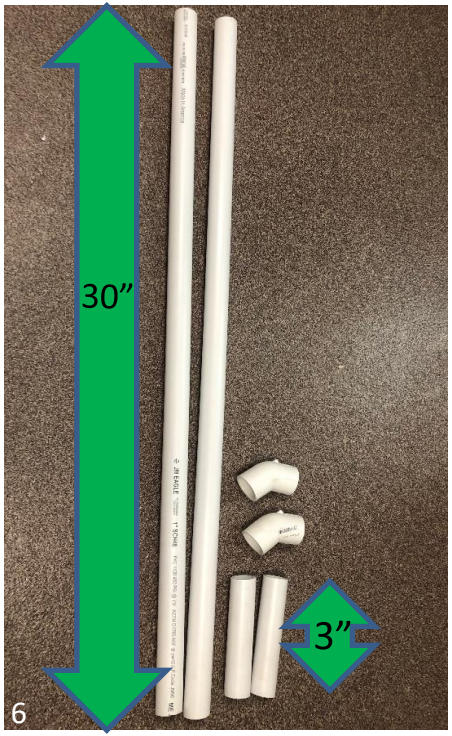
1. Use PVC cement to glue all 6 of the 12” pieces to the elbow joints as seen figure 5.**(Do not glue vertical upright to allow for easy breakdown and transportation)**
2. Glue the 10” (2” round/8” flat) piece into the middle portion of the 4-way connector with the flat portion on the ground.
3. Glue the threaded female adapter to the top of the 53” vertical segment. **(Do not glue threaded portion for easier breakdown)**



*Areas outlined in green are adhered together

1” PVC CUT LIST

1. Use ratcheting PVC cutter or saw to cut 2 pieces 30” long and 2 pieces 3” long.
2. Use ½” drill bit to drill into the top of the 3-way connector and top of the Charlotte pipe plug.
   (Figure 7 & 8)
3. Use ½” drill bit to drill into only one side of both of the 30” lengths of the 1” PVC pipe approximately 1” from the end. (don’t go all the way through to allow for attachment of carabiners) (Figure 9)



OVERHEAD ASSEMBLY

1. Use heat gun to prep 3-way connector then use ½” bolt to press flange bearing into bottom of the connector. (Figure 10)
2. Thread the bolt through the cap (with the head of the bolt in the threaded portion), through the bearing, and through the top of the 3-way connector. (Figure 11)
3. Lock down the nuts to secure in place.
4. Use PVC cement to secure 30” pieces and 3” pieces into elbow joints and 3-way connector joint (ensuring holes for carabiners are oriented on the bottom side of the assembly). (Figure 12 & 13)
5. Install Carabiners (with tensioner positioned to the outside). (Figure 14 & 15)
6. Cut 2 strands of ¼” paracord at 40” each then tie a knot at one end to prevent from sliding through tensioner and tie other end to one of the set of buckles. (Figure 16)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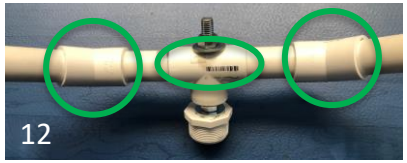
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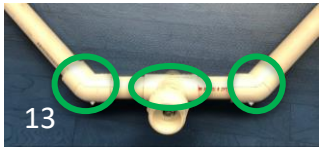
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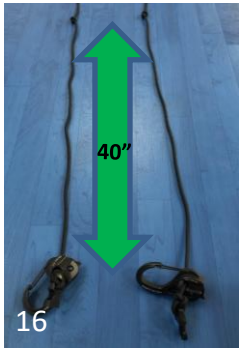

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PARACORD BRACELET FABRICATION

1. Cut 10’ length for 1/8” paracord (using lighter to melt ends to keep from fraying).
2. Fold in half and thread cord ends from the back through the buckle and pull through loop made by middle section. (figure 17)
3. Run cord through the bottom of the firearm base and make sure cords run parallel. (Figure 18)
4. Thread through the top of the buckle on the opposite side and space buckles 10” apart. Bring black strand (left side) over top of both strands and tuck blue strand (right side) over black strand passing underneath both strands and through loop in black strand. (Figure 19)
5. Follow the pattern synching tightly and alternating all the way down to the other buckle with the black strand leading each time. (Figure 20)
6. Once you are close to the end, slide the loose strands through the bracket (ensuring they do not get tangled) and slide the completed portion through the bracket carefully. (Figure 21)
7. Finish threading the remaining portion down to the end. Cut the ends close to the bracelet and melt the ends into the bracelet so it will not unravel. (Figure 22 & 23)

COMPLIMENTARY ADAPTIVE EQUIPMENT

The following tools can be paired with the dynamic shooting support to increase independence even more but are not always required. They are not a part of the design, but can be super helpful if accuracy while shooting is off:

- MAD Shooter's Aid= $22.50
- BMF Activator = $29.99

Source: https://www.flambeauoutdoors.com/Hunting/Accessories/shooter-s-aid

Source: https://www.tacticalinc.com/catalog/product/00150

JUDGING CRITERIA

- **Practicality-** Set up is easy and people that have never shot sporting clays have been able to hit targets in 10 shots or less. It also breaks down into smaller sections for easy transportation.
- **Cost-** Cost is slightly less expensive compared to commercially available devices for standard target shooting applications.
- **Innovation-** Built mostly out of simple and lightweight components that are available at hardware stores or online. Works with manual wheelchairs, power wheelchairs, or track chairs.
- **Replication-** It was designed to be a community resource so people could instruct friends or caregivers in fabrication of the device that may have little or no experience.
- **Durability-** It is extremely durable, and it has been trialed with multiple people over several months in various environments.
- **Aesthetic Appeal-** the basic look reinforces simplistic design, but it can be painted easily to make it more discrete and blend into environments better.

REFERENCES

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