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# THE CrossFit JOURNAL

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## The Missing Barbell Link?

Many CrossFit athletes start with a PVC pipe before jumping to a training, women's or full-size Olympic bar. Inventor and CrossFitter R. Don Hollinger introduces one more step to help smooth the transition from PVC to metal.

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February 2010

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All images courtesy of R. Don Hollinger

After a good warm-up, I overhead squatted 400—a PR. I'll never forget that day.

I threw the Olympic barbell down, watched it bounce a few times and danced around like those lifters on YouTube: the ones who are built like fire plugs and prance like they have ants in their shorts. It really felt great!

An OHS of 400 isn't bad for a 62-year-old who has been CrossFitting for about a year. I can remember my first overhead squat with a weightless PVC pipe: I was leaning over so far that it looked like I was going to dive into the pool. I stretched for a month of mornings to be able to keep my arms and torso vertical during the lift. It felt wonderful just to be able to do the exercise properly.

### The Real Story and the Birth of the Hyperlite Barbell

Everything I just said is true—the work, the ecstasy of success, the joy of a job well done, the pride of accomplishing something I couldn't do before. One little detail is missing, however. While the reader might think the "400" was pounds, it was actually ounces, which converts to 25 lb.

Well, it was a lot for me.

The piece of equipment that made this humble PR possible was a 5-lb. Olympic barbell I made out of common hardware or home-improvement-store parts. Even a naked Olympic barbell at 45 lb. was way too much for me. In fact, the standard Olympic barbell was almost twice what I could overhead squat.

At 45 lb. by itself and 65 lb. held the proper distance off the ground with two 10-lb. bumper plates, the Olympic barbell is very imposing to beginners, children and older athletes. I'm an older beginner, and the 45-lb. Olympic barbell was quite intimidating to me. After about a year of CrossFit, I still wasn't able to use the big bar on overhead squats, snatches and warm-ups for other exercises.

I solved this predicament by creating a "stepping stone" barbell that has the same basic characteristics as the full Olympic bar without the high weight. I fabricated a 5-lb. Olympic bar with common plumbing material. I call it the "Hyperlite Bar." Except for its low weight and slightly shorter grip length, it feels and works just like its big brother. It uses the standard Olympic plates with 2-inch holes and standard plate-retaining collars (see Table 1 and figures 1 and 2).



**Table 1: The Hyperlight Barbell vs. the Standard Olympic Bar**

	Weight	Diameter	Grip Width	End Diameter	Max Weight (Bar + Plates)	Cost
Hyperlite Bar	5 lb.	1.05"	50"	2"	65 lb.	About \$20
Olympic Bar	45 lb.	1.10"	51.5"	2"	Hundreds of pounds	\$100-\$1000+

The Hyperlite Bar loaded with two 10-lb. bumpers and 40 lb. of metal plates (65 lb. total) can be dropped from the overhead position without damage to the bar. And that's the real fun: now athletes like me can drop the bar just like an Olympian. After a great effort, a big, crashing barbell bounce is a just reward. Sixty-five pounds is the max needed on the Hyperlite because one can then move to the 45-lb. Olympic bar with two 10-lb. bumper plates. The Hyperlite is a bridge or stepping stone up to the standard Olympic bar.



Fig. 3



Fig. 4



Fig. 5



Fig. 6

## How to Make the Hyperlite Barbell

From your local hardware or home improvement store procure the following per Table 2 below:

**Table 2: Materials Needed**

Name	Nominal Size*	Quantity	Approx. Cost	Length	Figures
Black metal pipe	¾" diameter	1	\$10	5 Feet	Figures 3, 4 & 6
PVC pipe	1" diameter	1	\$2	10" (min.)	Figure 4
PVC pipe	1-1/4" diameter	1	\$2	10" (min.)	Figure 4
PVC pipe	1-1/2"	1	\$2	10" (min.)	Figure 4
PVC pipe	2" diameter	1	\$2	10" (min.)	Figure 4
Sheet metal screws	No. 6	6	\$1	1"	Figure 5
Metal drill bit**	V"	2	-	-	-

\* The diameters listed under "Nominal Size" roughly refer to the inside diameter of the pipe. But, it would be difficult to measure the diameter of any of the plastic or metal pipes and determine the nominal size pipe. Consider the "pipe diameter" to be a name and not an actual measurement property of the pipes. Also, it is important not to confuse the diameter in inches with the length required in inches. Typically, PVC pipe can be purchased in 18-inch lengths for a few bucks or 10-footers for a few dollars more. Extra PVC always comes in handy. If the store will cut it for you, let them do some of the work and get the PVC cut to the lengths I've listed above.

\*\* You only need one V-inch metal drill bit, but they break easily. I broke several of them. To save yourself a trip back to the store, buy extra. They always come in handy. Buy the most expensive ones they have; cheap ones don't last.



### Step-by-Step Construction

**Step 1—** Cut the PVC pipes into “sleeves” as per Table 3, and refer to Figure 6. Most PVC sizes are cut off to 5-inch sleeves, except the 2-inch-diameter PVC, which is cut off to a 0-inch sleeve. Hold the pipe securely in a vice and do the best you can to make a square cut. A hacksaw gets its name because it does a hacked-up job, so don’t worry if it is not perfect. It won’t be.

**Table 3: Measurements for PVC Sleeves**

PVC Size	Qty.	Sleeve Length	Saw Axially
1 inch diameter	2	5 inches	Yes
1-1/4 inch diameter	2	5 inches	No
1-1/2 inch diameter	2	5 inches	Yes
2 inch diameter	2	0 inches	No

**Step 2—** Axially saw through one side of the 1-inch-diameter and 1-1/2-inch-diameter PVC sleeves as per Table 3. Hold about half the sleeve in a vise and cut the half that sticks out from the vise. The end of the sleeve held in the vise cannot be slit because the pressure of the vise pinches the saw blade (Figure 7). Switch the sleeve in the vise and make another cut on the piece that now sticks out from the vise. This second cut will mate with the first cut to form one cut along the entire length of the sleeve. Again, the final combination of cuts might not be pretty, but it will work. This will allow the sleeve to expand as it is installed. Note that not all the sleeves are slit axially. Use your file to de-burr all cuts.

**Step 3—** Place a 1-inch-diameter PVC sleeve over both ends of the 3/4-inch-diameter black metal pipe. Push the PVC sleeve on so it is flush with the outer end of the metal pipe (Figure 8). The axial slit will allow the PVC sleeve to expand to fit over the 3/4-inch-diameter black metal pipe.

**Step 4—** Install a 1-1/2-inch-diameter PVC sleeve over a 1-1/4-inch-diameter sleeve. This is quite an interference fit, and a screwdriver will have to be employed to pry the pipe with the slit apart to get it started (Figure 9). These two sleeves are now a unit and will subsequently be referred to as the “combo PVC sleeve.”

**Step 5—** Find the seam of the metal pipe and mark the end of the pipe so the seam can be easily found (Figure 10). The seam is marked so you can avoid drilling into it. The seam is not homogeneous and comprises uneven metal hardness that will increase the chances of catching and breaking a drill bit.



**Fig. 7**



**Fig. 8**



**Fig. 9**



**Fig. 10**

**Step 6**— Drill one 1/8-inch hole in the 2-inch-diameter PVC sleeve. The hole is in the center of the surface (Figure 11).

**Step 7**— Hold the combo PVC sleeve made in Step 4 in a vise and slide the short sleeve you drilled in Step 6 over it. Hold the short sleeve flush to the end of the combo PVC sleeve and, using the hole you drilled in Step 6 as a guide, drill through the combo PVC sleeve (Figure 12).

**Step 8**— Insert the combo PVC sleeve combination drilled in the above step on the metal pipe with the hole *opposite* the seam in the metal pipe. The metal pipe already has a 1-inch-diameter PVC sleeve on it. Make the combo PVC sleeve flush with the outer end of the metal pipe. Using the drilled hole in the combo PVC sleeve as a guide, drill through the 1-inch-diameter PVC sleeve and metal pipe (Figure 13). By drilling the first hole opposite the seam in the metal pipe, you won't have to drill through the seam, which will reduce the chance of broken drill bits.

**Step 9**— Slide the 2-inch diameter sleeve overtop of the sleeves already on the barbell. This will be a very loose fit. Line up all the previously drilled holes. Install a 1-inch No. 6 sheet metal screw to hold the package together (Figure 14).

**Step 10**— As in Step 8, drill 2 more holes spaced at equal distances around the circumference (about every 120 degrees) and install a No. 6 screw in each (Figure 15). The last 2 screws will warp the 2-inch-diameter PVC sleeve as it is deflected to contact the smaller diameter sleeve underneath. Be sure to tighten the screws sufficiently such that the 2-inch sleeve contacts the combination sleeve underneath.

**Congratulations!** You are now the proud owner of the lightest Olympic bar on the planet. The metal pipe is under very low stress with only 60 lb. of plates and will last forever. The PVC sleeves could wear or loosen with repeated drops, but they can easily be replaced. Because the PVC sleeves are short, spring or mechanical clips should always be used to prevent the plates from falling off during use.



Fig. 11



Fig. 12



Fig. 13



Fig. 14

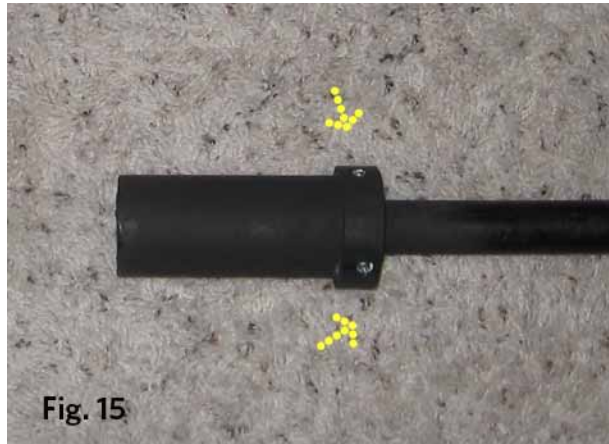


Fig. 15



Fig. 16

Figure 15: The Hyperlite Bar is painted for contrast. The arrows show two of the three attaching sheet metal screws.

### Bumper Plates

This article is about barbells. However, one item that really makes the Hyperlite Barbell useful and fun is a pair of 10-lb. bumper plates. They are well worth the price. They are made entirely of rubber, with a steel or brass bushing in the center that rides on the 2-inch end sleeves of the Hyperlite Bar or Olympic bar. The plates will hold the barbell the correct distance (8.65 inches) off the ground for many CrossFit exercises, establishing a consistent starting position for exercises such as the deadlift, clean and snatch. Combine bumpers with a rubber mat to reduce damage to your concrete floor.

Bumper plates are available from a host of different equipment companies, and I found the best deal is at [Wright Rubber](#).

### Lift Lite for Best Results

Even the unhandy athlete can fabricate the Hyperlite Bar using common bits found at home-improvement stores. The Hyperlite Bar increases the fun factor in a lot of exercises and provides an easier transition for those moving from a PVC pipe to a metal barbell.

I hope this article will be very useful to many CrossFit athletes, especially beginners, children and the elderly. I believe this segment of CrossFit is actually the majority, and the jocks doing three-minute Frans on the *CrossFit Journal* and [CrossFit.com](#) videos are the minority. Therefore, the Hyperlite Barbell can improve the workouts of many CrossFitters as they work up to performing Fran as RX'd.



### About the Author

*R. Don Hollinger, professional engineer, is retired from the automotive industry and a newcomer to CrossFit. After graduation, his activities included motorcycle racing on motocross, ice and flat-track courses. While raising a family, he jogged and rollerbladed. In retirement, when not tinkering, he's CrossFitting, mountain biking and volunteering. In 2007, he earned a master's degree in engineering 30 years after his bachelor's degree, and he has five patents. He can be reached at [xfitdon@gmail.com](mailto:xfitdon@gmail.com).*