



## CT-7 TRACTION ANALYSIS

### OBJECTIVE:

Determine performance details and the functional traction ability of the CT-7 LEG TRACTION SPLINT.

Although every patient is different in size and injury and every responder is different in size and strength; this report attempts to determine an average of these factors to generate an overall picture of the functional traction ability of the CT-7. This study will analyze time, traction amounts and the extension distance of the traction mechanism.



### TRACTION MECHANISM DESCRIPTION:

The traction rod extends from within the splint's carbon tubing (1). Therefore it runs along side the patient's leg and does not go beyond the bottom of the foot, even at maximum extension. The traction method utilizes an acme threaded ROD and NUT assembly that is spun by hand to increase or decrease the length of the splint, thus applying more or less traction pressure on the leg as it counters the ischial strap attached to the patient's hip (2). It is important to note that the NUT only spins when it encounters direct rotational force from a hand (3). The pressure on the nut from an internal bungee creating friction between the Nylon and Carbon keeps it secure. The coarse and angled thread between the NUT and ROD also helps achieve this. Shake and vibration tests are also available along with blood and dirt application tests.

1.)



2.)



3.)





### **TEST DESCRIPTION:**

The CT-7 traction mechanism gets connected to a dynamic weight sensor device. This scale is spring loaded to mimic the traction forces of the leg in a human with a fractured femur. The opposite end of the scale is affixed to the Ischial strap, the same way it would be attached to a patient. Details of the measuring device are below.

Various subjects are then timed spinning the traction mechanism while attached to the scale. The time each subject takes to reach each traction milestone is recorded. The milestones for amounts of traction are: 10lbs, 20lbs\*, 30 lbs and 35lbs. Most emergency medical agencies agree that the appropriate amount of traction typically required should be equal to 10% of the patients body weight. That equation has been applied to this analysis in determining the appropriate weight range. 10 lbs being common for a female or pediatric (100lbs of weight). 20 lbs being common for an active male adult service member\*. The 30 & 35 lbs are then provided to show the splints capability of providing traction on large and even obese adults.

Along with the time to reach each traction point, the extension distance of the traction rod was also measured. This is to give a reference for how far the rod must be extended to achieve various traction results. It is only for reference. Some patients may need more or less extension based on the details of their injury and the patients size.

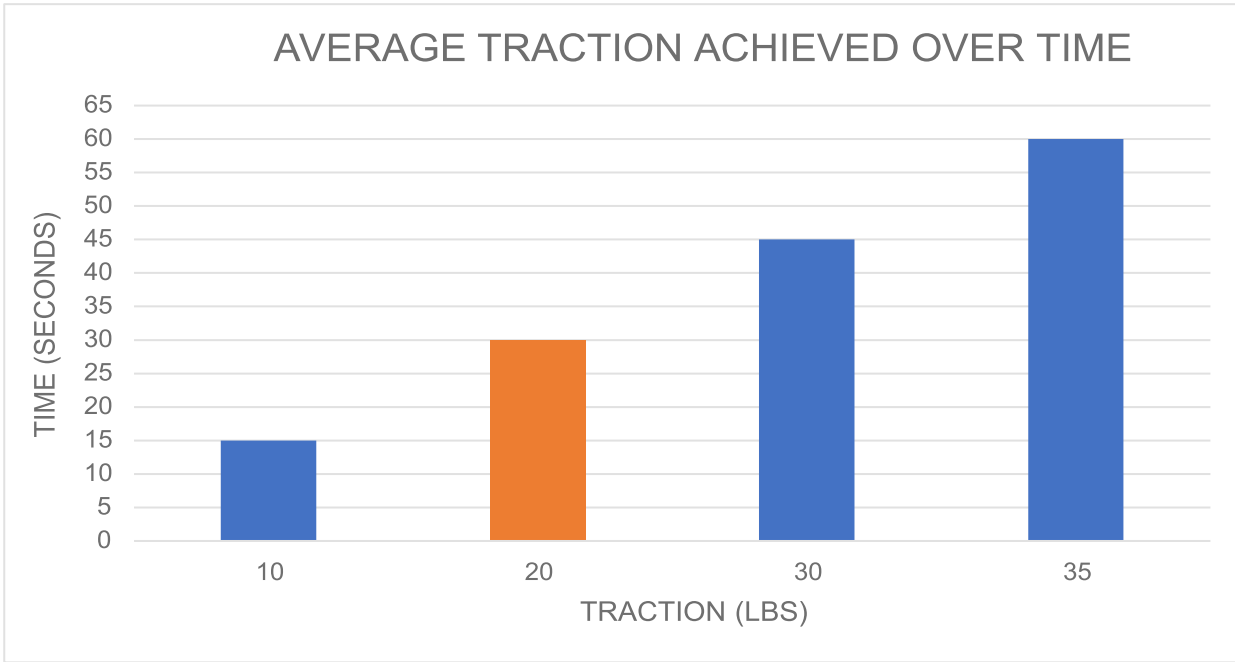
RAPALA TUBE SCALE- Calibration verified in house using weights verified by digital scales. Uses an Anodized housing with stainless steel spring, hook and handle. (see pictures page 4&5)

### **RESULTS:**

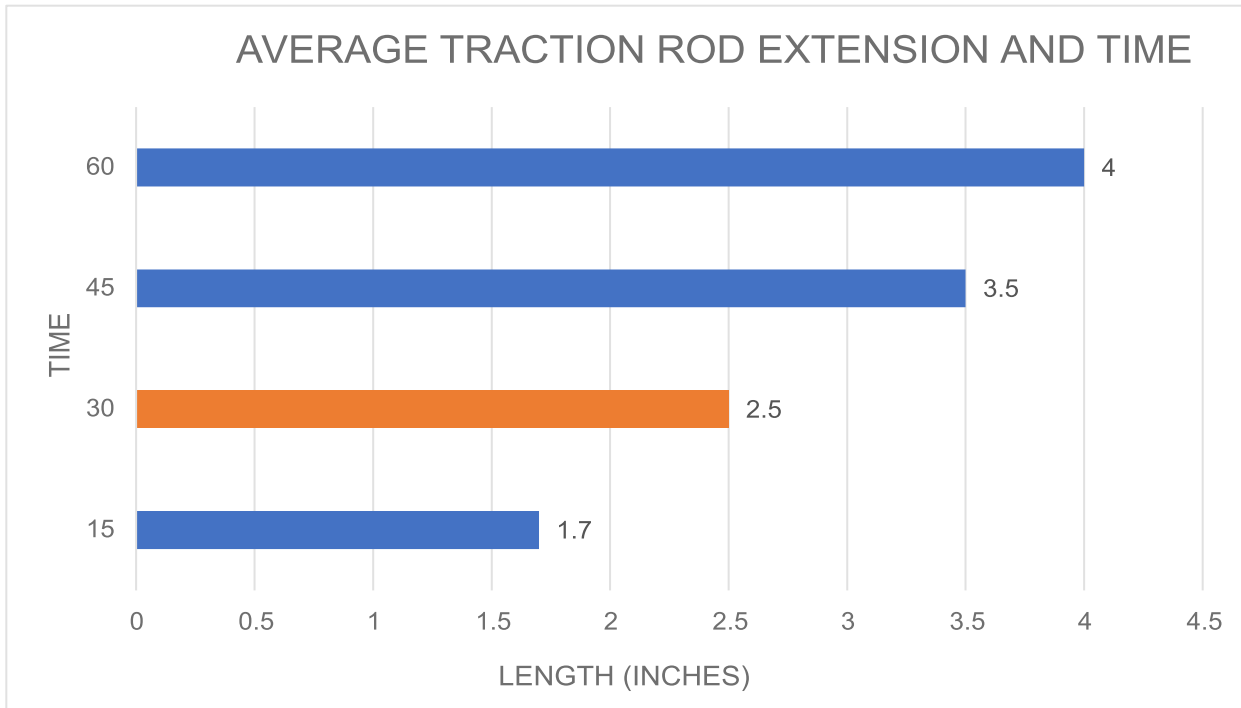
The average of TEN different subjects completing the timed traction procedure as defined above are in the following pages. These subjects consisted of adult males and females of various sizes.

They all used one hand to spin the NUT while the splint was in a stationary position.

The direction to extend the splint, applying traction, is made clear by the arrows located on the traction NUT.



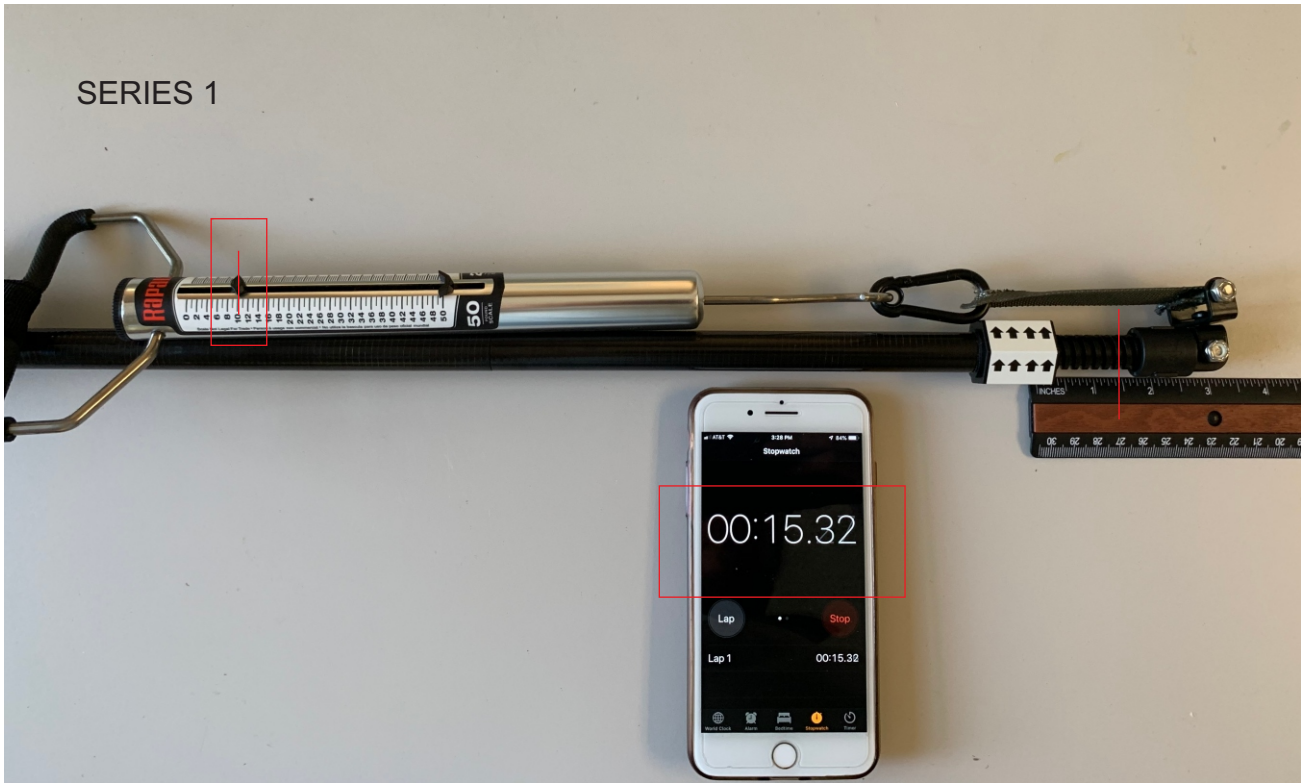
	SERIES 1	SERIES 2	SERIES 3	SERIES 4
TIME (SECONDS)	10	20	30	35
TRACTION (LBS)	15	30	45	60



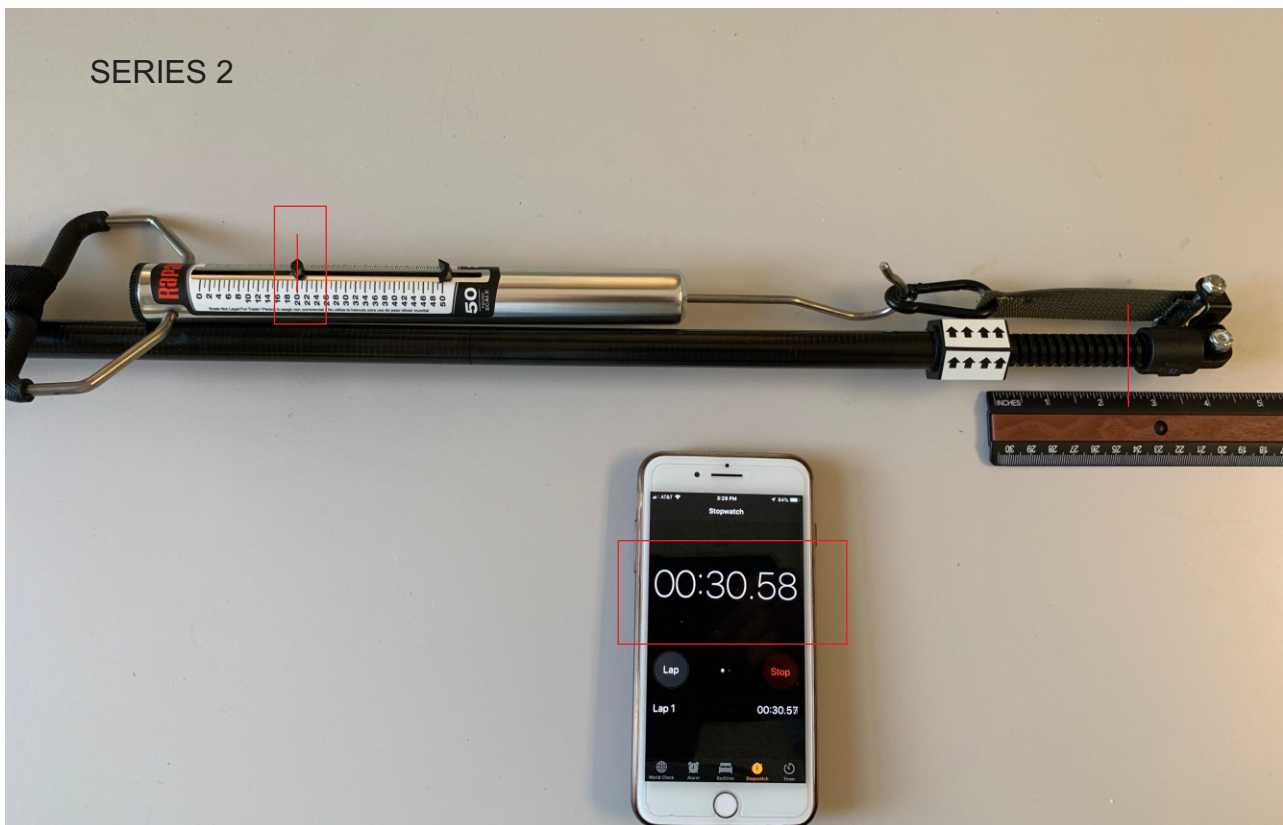
	SERIES 1	SERIES 2	SERIES 3	SERIES 4
TIME (SECONDS)	15	30	45	60
EXTENTION (INCHES)	1.7	2.5	3.5	4

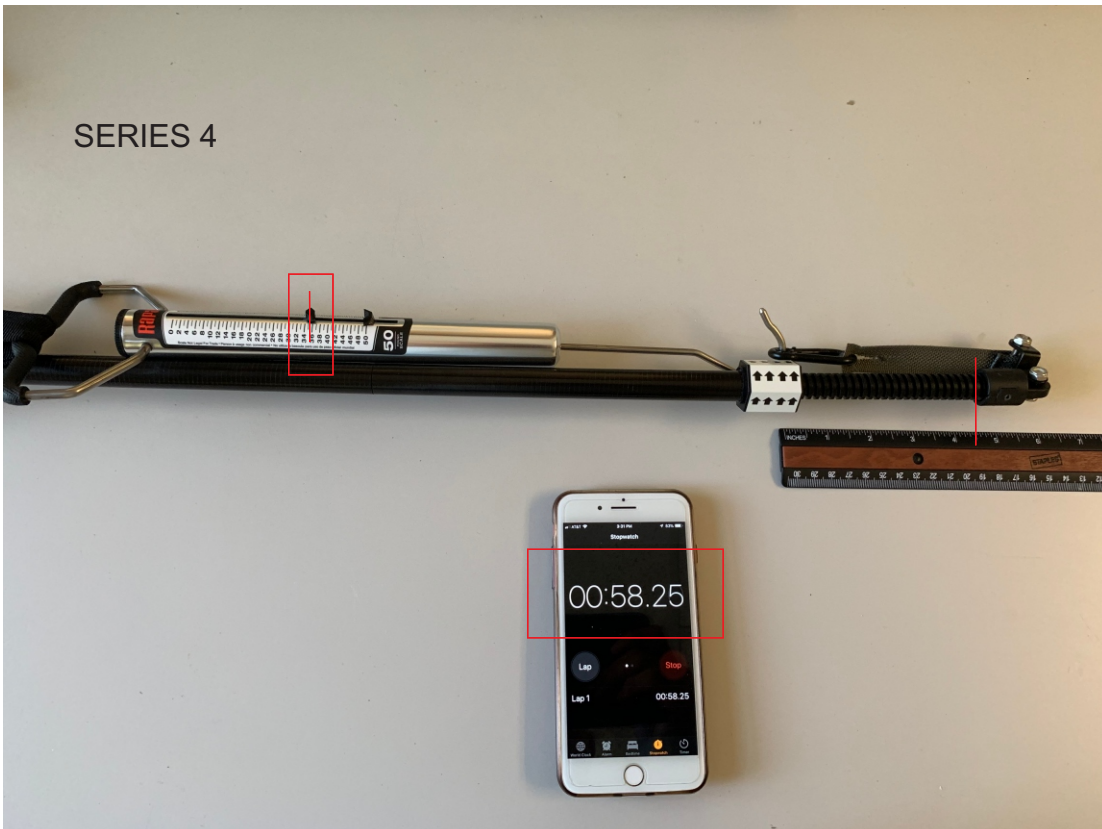
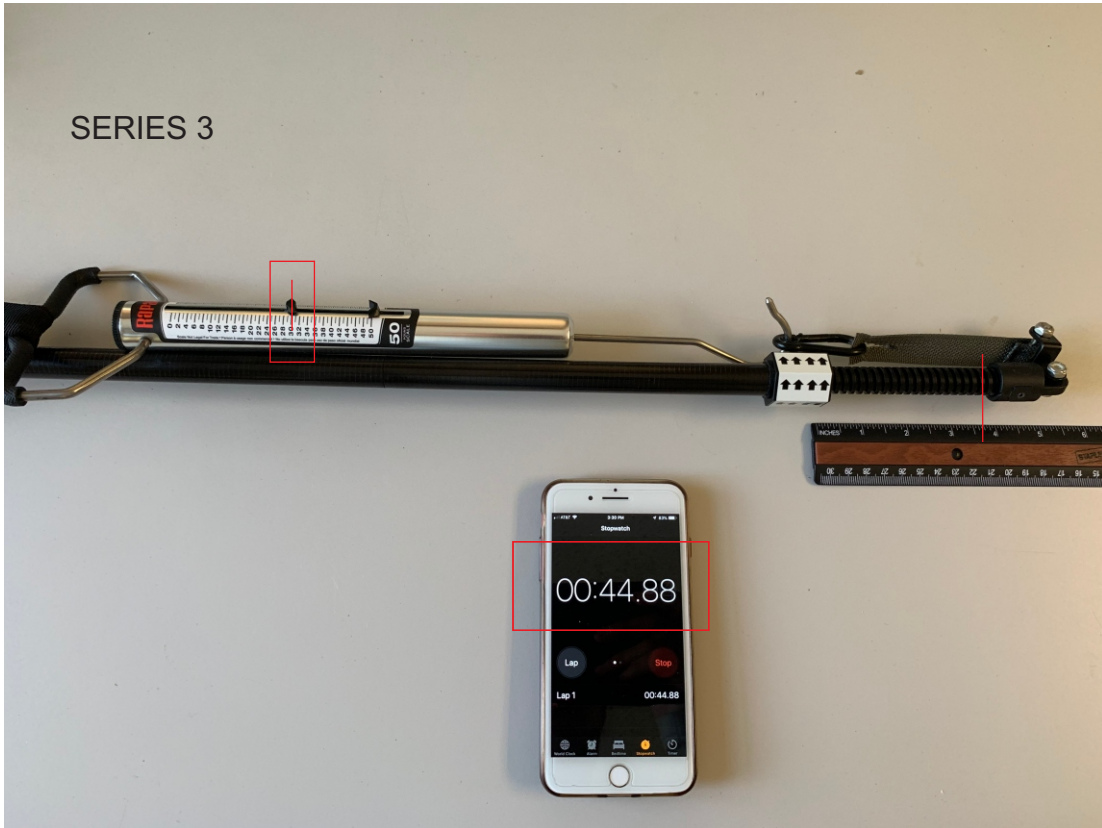


SERIES 1



SERIES 2







## **CONCLUSION:**

All test subjects were able to apply adequate amounts of traction onto the scale using the CT-7 traction mechanism in a reasonable amount of time.

- The average person took 15 seconds to apply 10 lbs of pressure.
- The average person took 30 seconds to apply 20lbs of pressure.
- The average person took 45 seconds to apply 30 lbs of pressure.
- The average person took 59 seconds to apply 35 lbs of pressure.

The splint does not bend or flex in any manner during any of these pressure differences. The carbon tubes remain straight and rigid. The precise nature of the ROD and NUT traction splints allow careful traction to be applied to small/pediatric patients while also providing adequate amounts of traction for large adults in the same precise manner; in a reasonable amount of time.

