



**MIND THE NET GOALTENDING**  
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## Puck Trajectory and the Hand Placement Debate

When it comes to goaltending knowledge one will never know, in a lifetime, all of the intricacies of playing the toughest position in sports but there are several ideas that all goalies need to know. Understanding the save sequence, the FSP, vertical and horizontal angles, the puck's vs. shooter's perspective, rebound control priority and general game and opposition tactics are key elements that all goaltenders must understand. As an extension of the puck's vs. shooter's perspective, MTN will examine how goalies can use knowledge of puck trajectory to their advantage.

In this case our information will be based on a few different factors. The trajectory that is studied is on a shot from the middle of the ice, in line with the centre of the goal line; the same centre of the net that is key to being square/on angle with the puck. Also, this shot trajectory follows the path of what would be called a "perfect" shot, basically, off the crossbar and in. There are innumerable variables and trajectories that could be discussed but for simplicity sake MTN will focus on the ones outlined above.

All information will be based on a regulation size rink in which there is 60 ft from the offensive blue line to the goal line. Next, from goal line to the top of the crease is a distance of 6 ft. So, the distance from the blue line to the top of the crease is 54 ft. Almost all of the information will be based on a puck trajectory to the centre of the goal line and a goalie positioned at the top of the crease. Why the top of the crease? MTN and many other goalie schools will use the top of the crease as a base for strong, safe positioning for most elite goaltending; give or take a couple of feet.

Now, let's look at some interesting numbers. The net is four feet high or 48 inches. Consider, that even in today's hockey 75-80% of all shots are directed at the bottom 2/3 of the net (32" or lower). Approximately, 70% of all shots are still in the bottom 18 inches of the net. Interestingly, only 7-10% of all goals are scored in the top one foot (12 inches) of the net; as the puck crosses the goalline not where it hits the mesh.

The numbers below will examine shots based on their distance from the top of the crease and the height of the puck to enter just under the crossbar at the top of the crease. This information is the key to this entire article. All information will be displayed in Figure 1 and Figure 2 found below.

*\*\*To give a slightly different perspective we will also look at the puck's trajectory from the offensive zone faceoff dots. Again, the trajectory is going just under the crossbar in line with the centre of the goal line. Due to geometry the height at the nearest crossbar will be higher than the height of the puck at the middle of the goalline.\*\**

*\*\*Just for interest, we measured the shoulder height of one of our 5'9" Jr. A goaltenders in the butterfly, at the top of the crease, at 43" high. Again, proof that shorter goalies are too often misjudged.\*\**

Figure 1

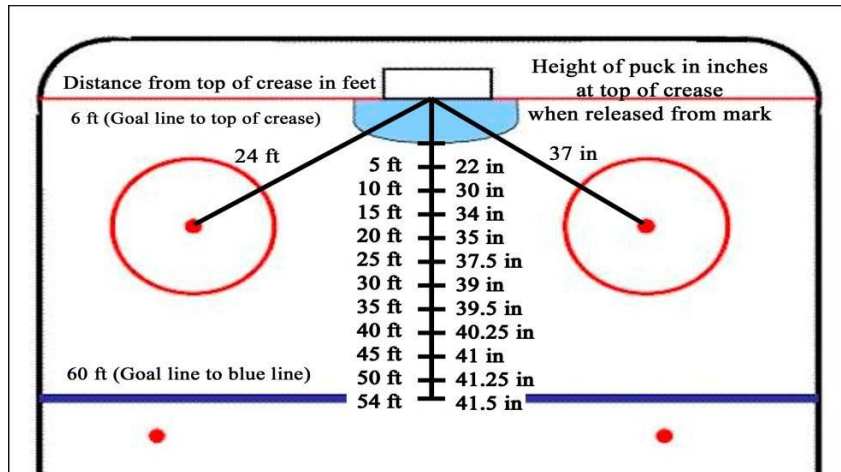
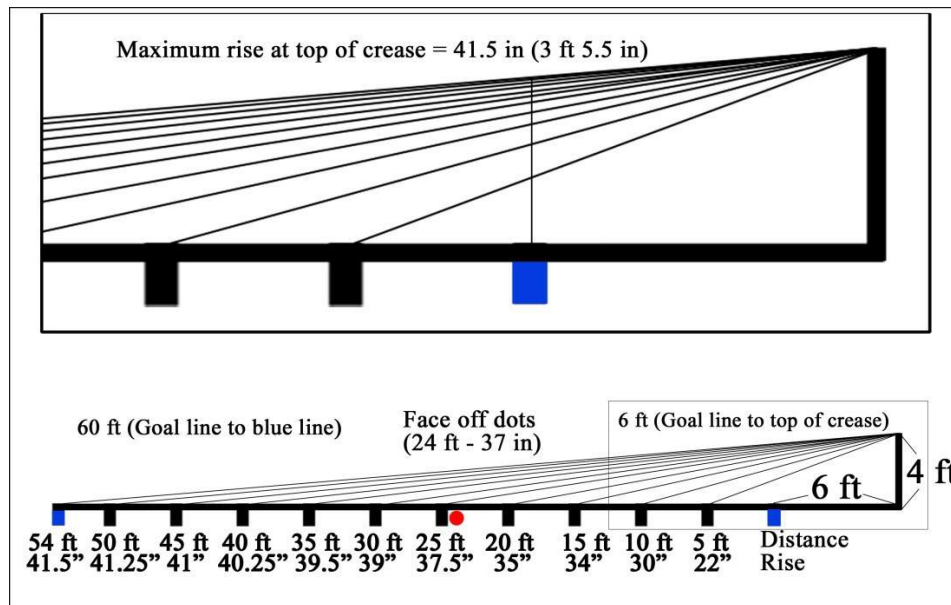


Figure 2



So, what does this information lead to? Probably, more discussion... This information should make goaltenders examine some pre-conceived notions about hand placement in the ready stance, such as the 1-2 o'clock vs. 3-5 o'clock positions. "Active" hands vs. "Compact" hands placement in the butterfly is also a hot button topic in goaltending instruction. Even, the idea of goalies being beat "over the shoulders" the way described on the highlights every night should be examined. Finally, another argument against the pure stand-up goaltender can be derived from this information.

### Fingers Up or Otherwise in Ready Stance

Common trapper positions in ready stance are usually related to the face of a clock. A fingers up position looks at the hand turned to the 1-2 o'clock position. Anything from the 3-5 o'clock position is

considered a lower, but more common trapper position. As we saw previously, the height of a puck, going just under the crossbar, at the top of the crease increases the further the puck is away from the net but is no higher than 41.5 inches. As the puck comes in closer to the net the height gets lower and can be as low as 22 inches (the height of a pair of stacked pads). This shows that a fingers up position may be more effective on long shots but adds a lot of movement as the puck moves in closer. MTN has always preached the idea that the less excess movement a goaltender possesses the less there is to mess up; less possibilities for goals against.

MTN strongly believes that trapper position is a matter of comfort and effectiveness. Most fingers up positions, when viewed from the puck's perspective are found to be covering space outside of the puck's trajectory. Now we see that there is probably a point around the 20-25 foot mark where a fingers up position is likely to be detrimental to a goaltender's game. This makes sense as most goalies that use a fingers up position do NOT hold their trapper at the same height as the top of their pads. If a goalie did bring a fingers up position to the top of the pads they are likely to have lost squareness of the trapper to the puck. MTN feels the trapper should always be covering space, open/facing the puck and work with the goalie's comfort level but it seems the fingers up position is not as strong as a more neutral 3-4 o'clock position.

Finally, if a goalie is working hard to hone their save sequence work they understand the need to make appropriate save selections based on proper reads of shot release and continued puck tracking. If a shot is taken from a further distance goalies have more time to make the save thus they should not be a victim of a glove position that is not considered "fingers up".

#### "Active" Hands vs. "Compact" Hands

Another hot debate in goaltending instruction is the based on hand position while in the butterfly. "Active" hands refers to a hand position in which the hands are held in a plane forward of the body but held just slightly lower than their hand position when in ready stance. Usually "active" hand positions leave the gloves about 6-12 inches above the top edge of the goal pads. The "compact" hands position involves keeping the hands in a plane in front of the body, but the arms are straighter/more forward leaving little to no hole between the pads and the gloves. These butterfly hand positions again seem to make more sense at different distances from the top of the crease. The "active" hand position seems to be more of an effective strategy on shots further than 15 feet away from the top of the crease. Again, from a further distance the goalie should not be blindly dropping with either hand position on shots where they have time to react. The "compact" hands position seems to make more sense on shots from within 15 feet of the crease, especially when you consider that most goalies use a 26" or more paddle length. If a goalie is using a tall paddle length there is a possibility that at close distances the blocker could be covering space near or above the crossbar height when looking from the puck's perspective.

Some complications that come into play depend on whether the original shooter has a possible tip-in option. Again, the goalie must understand the tendencies of tip-in attempts. As well, goalies must look at what happens if they do not get a full piece of the shot. Are goals more likely to go in on a shot that hits the top of the goalie's gloves while the goalie is moving the hand in an upward motion? Are more goals likely with a goalie getting a piece of a shot where the puck hits the bottom of the gloves with the gloves moving in a downward motion? Would it not make sense that pucks are more likely to miss the net with a partial contact while moving the hand up? How many times have goalies seen or experienced a goal that is deflected down into the net on a downward motion of the hands? Unfortunately, MTN cannot offer more than food for thought in this debate.

## “Beat [the goalie] over the shoulders”

How many times have we heard that a shot “beats the goalie over the shoulders”? Probably several times per highlight pack. Please, goaltenders, pay attention to whether the shots actually beat the goalie over the shoulders. This idea is based on the height of the puck in a position that is parallel to the goaltender. In the vast majority of goals scored high the puck is below shoulder height. There are times where NHL goalies are scored on over the shoulder but that is dependent on being further back in the crease, improper butterfly execution, poor timing on a body collapse, bad use of the paddle down position or a desperate situation. If a goalie is at the top of the crease, even right down to PeeWee, there is a very small likelihood of a goal going in “over the goalie’s shoulder”. Most goals scored high are a result of the goalie being off angle if they have a strong top of the crease position rather than the height of the shot.

## The Stand-up Myth

This myth should be dead but there are still pockets of minor hockey coaches that needs to see this information in order to fully understand why goaltending development focuses so much on down movement and coverage. While stand up saves should still be used in some situations, or just to make a goalie less predictable, it is just another argument informed goalie coaches, goalies and goalie parents must use to help change the stand-up myth.

## Conclusion

To conclude, this puck trajectory information is just another key piece of information that goalies must understand when developing their tactical strategies. Although there are still unresolved issues that goalies need to be aware of they need to decide for themselves which approaches will work best for them. Whether a goalie incorporates this information is up to them, but should be based on strong explanations and questioning from coaches and goaltenders themselves.