
Supporting narrated video (NV) demonstrations, high-speed video (HSV) clips, technical proofs (TP), and all of my past articles can be accessed and viewed online at billiards.colostate.edu. The reference numbers used in the articles help you locate the resources on the website. If you have a slow or inconvenient Internet connection, you might want to view the resources from a CD-ROM or DVD. Details can be found online at: dr-dave-billiards.com.

This is the fifth article in a series dealing with “[How to Aim Pool Shots \(HAPS\)](#),” a three-disc instructional-DVD set I recently created with fellow *Billiards Digest* columnist Bob Jewett. HAPS covers cut-shot aiming systems, how to adjust for cut-induced throw, how to aim without guessing when using sidespin (english), and how to aim specialty shots including caroms, kisses, combos, rail cut shots, and elevated-cue shots. Also included are numerous simplified and effective systems for aiming kick and bank shots. An outline of the entire HAPS series along with video excerpts from each DVD can be viewed online at: dr-dave-billiards.com/aiming.

This month, we will look at how to compensate for throw when aiming a combination shot, where the cue ball (CB) hits one object ball (OB) into another to pocket the 2nd OB. First, it is important to realize that combination shots can be a lot tougher than they look, because any error on the first hit grows into a larger error on the 2nd hit, so aiming must be precise. Generally, the easiest way to aim combos is to simply apply whatever aiming system you use ... twice. One technique is the ghost-ball cue-pivot method demonstrated in online videos **NV D.9** and **NV 7.1**. You first place the cue tip at the necessary ghost-ball position for the 2nd OB. Then pivot the cue to visualize the necessary line of aim for the 1st OB. Then place the tip at the required ghost-ball position to send the 1st OB along this line. Pivoting the cue to the CB then gives the necessary line of aim for the shot.

With a combination shot, if the OBs are close or if fast speed is used, the 1st OB will be mostly sliding into the 2nd OB because it doesn't have enough time of distance to develop forward roll. As demonstrated on Disc I of HAPS, cut-induced throw is largest for stun shots like this. If you don't compensate your aim for throw, you will miss small-gap combos. Maximum throw is about 1 inch per foot, and it occurs with slow-speed stun shots. **Diagram 1** shows an example where an understanding of these concepts is important. The 4 ball must be aimed well left of the pocket, because the 1 ball will throw the 4 to the right. The ball-overlap centered-contact-point aiming method covered on Disc I of HAPS is easy to use to help aim shots like this where the balls are close together (to find the necessary line of aim for the 1 ball into the 4). For more information, see “[double-the-distance or double-the-overlap aiming method](#)” under “aiming” in the FAQ page at billiards.colostate.edu.

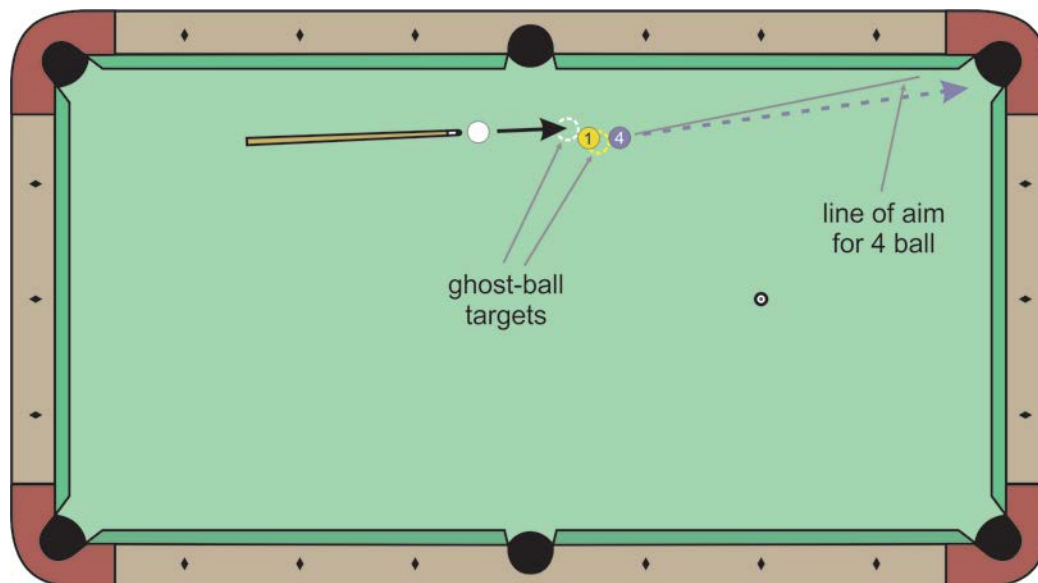


Diagram 1 Small-gap combo with throw

When two OBs are frozen, throw can be used to change the direction of the 2nd OB over quite a large range of angles. **Diagram 2** illustrates two examples where throw is necessary to pocket frozen combinations. Before we discuss the shots, let's first cover some basics. First of all, when OBs are frozen, the 1st OB is guaranteed to have stun into the 2nd, allowing for maximum throw. Also, cutting the 1st ball to the left of the "line of centers" between the OB would throw 2nd ball to the left, and cutting the 1st ball to the right would throw the 2nd ball to the right. A pure "line of centers" hit would result in no throw whatsoever. Up to about a ½-ball hit, the amount of throw increases with the amount of cut. Throw is also generally larger with slower speeds, especially when close to a ½-ball hit. For more info on throw, see the [throw resource page](#) in the FAQ section at billiards.colostate.edu. In Diagram 1a, the line-of-centers direction heads well right of the pocket, so we need to throw the 3 quite a lot to the left, by cutting the 1 ball to the left. Here, we want to use slow-speed and a ½-ball-hit between the 1 and 3 to create maximum throw. Remember, to get a ½-ball hit, aim the center of the 1 at the edge of the 3. The 3 can be easily thrown to the pocket with this aim using slow speed. In Diagram 1b, the line-of-centers direction heads well short of the pocket, so the 4 ball must be thrown to the left. Again, because we need a large amount of throw here, it is best to use a ½-ball hit between the 2 and 4, and use slow speed.

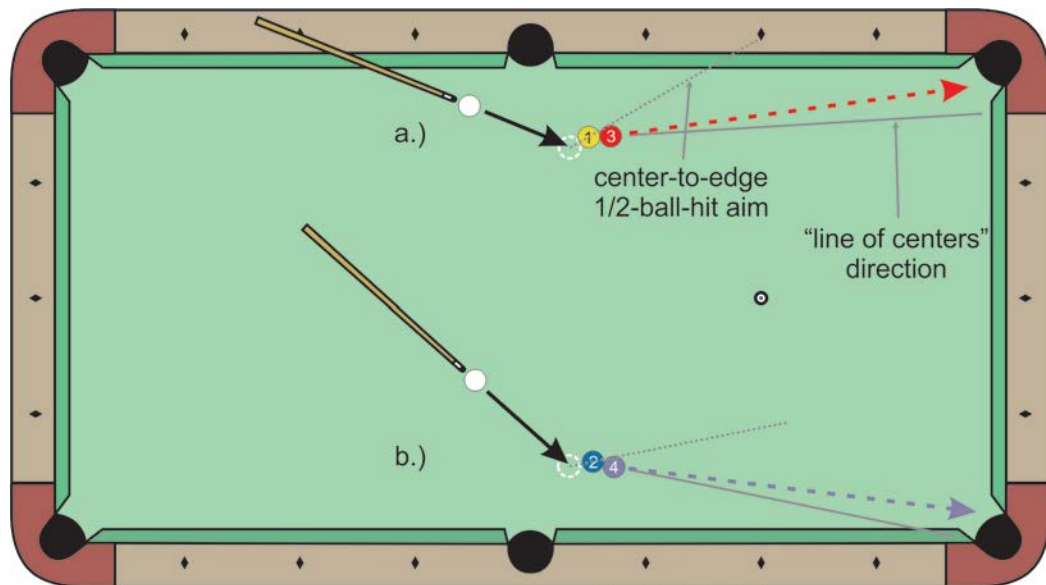


Diagram 2 Frozen-combo throw

Diagram 3 shows an example where the line-of centers of the frozen balls heads straight to the pocket. With a square hit on the 1-ball, which is close to a ½-ball hit on the 3, the 3 would get thrown way off line (to the right of the pocket). This type of shot requires a line-of-centers hit on the 1-ball. Again, with a line of centers hit, the frozen OB is not thrown at all. When this shot is hit properly, the 1-ball should not move very much (if at all). That indicates that the line-of-centers hit was very accurate. With no sideways motion of the 1 ball, there is no throw of the 3 ball and it heads straight to the pocket.

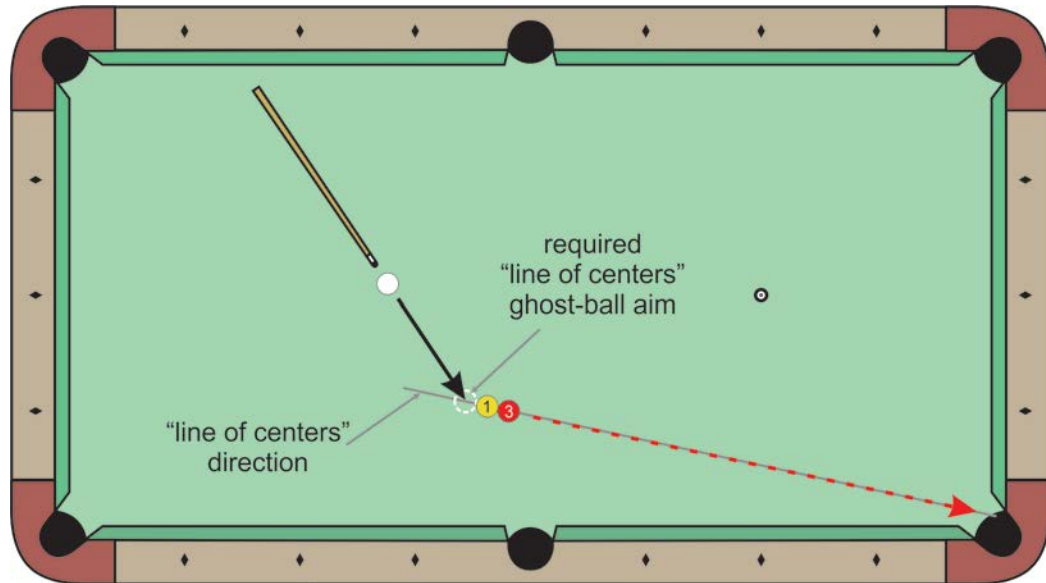


Diagram 3 Frozen combo with no throw

Demonstrations of all of the shots in this article can be viewed in online video **NV E.5**. As always, you should check out the video and try out the shots yourself the next time you are at a table. Reading is good, watching is better, and trying is best.

I hope you are enjoying my series of articles dealing with the “How to Aim Pool Shots (HAPS)” DVD collection. If you want to view video excerpts from the entire DVD set, check out online videos **NV E.1** through **NV E.8**. Enjoy!

Good luck with your game,
Dr. Dave



normal video

- [NV 7.1](#) – Aiming a combination shot
- [NV D.9](#) – How to Aim Pool Shots - from Vol-II of the Billiard University instructional DVD series
- [NV E.1](#) – Fractional-Ball Aiming, from HAPS I
- [NV E.2](#) – Back-Hand (BHE) and Front-Hand English (FHE), from HAPS I
- [NV E.3](#) – Using "Gearing" Outside English to Eliminate Throw, from HAPS I
- [NV E.4](#) – Carom-Shot Trisect-Draw System, from HAPS II
- [NV E.5](#) – Combination Shot Throw Adjustment, from HAPS II
- [NV E.6](#) – Rail Cut Shot Aiming, w/ and w/o Sidespin, from HAPS II
- [NV E.7](#) – Mirror Kick-Shot Aiming System, from HAPS III
- [NV E.8](#) – 1/3-More-Than-Twice Bank-Shot Aiming System, from HAPS III

PS:

- I know other authors and I tend to use lots of terminology, and I know not all readers are totally familiar with these terms. If you ever come across a word or phrase you don't fully understand, please refer to the [online glossary](#) at billiards.colostate.edu.

Dr. Dave is author of “[The Illustrated Principles of Pool and Billiards](#)” book and DVD, and co-author of the “[Video Encyclopedia of Pool Shots \(VEPS\)](#),” “[Video Encyclopedia of Pool Practice \(VEPP\)](#),” “[How to Aim Pool Shots \(HAPS\)](#),” and “[Billiard University \(BU\)](#)” instructional DVD series.