The" Double Tap" – Multiple Contacts by Ball and Mallet

Rule 13 (a) "… It is a fault if, in striking, the striker …" and *Rule 13(a)(6) "double taps the striker's ball by striking it more than once in the same stroke or allows the striker's ball to retouch the mallet*".

The statements below are abridged and edited parts of the *"Official Rulings on the Laws of Association Croquet"* but are relevant here:

> *"… the fault is made if the subsequent contact is with any part of the mallet, not just the end-face.*
>
> *The striker may cause the mallet to hit the striker's ball twice or more if another ball is nearby and a stroke is played along the line joining the centres of the two balls. If the striker follows through, a multiple impact is certain in a shot played firmly if the separation is less than about 2 inches (50 mm) and may occur (depending on the strength of the shot and the degree of follow through) if the separation is two or even three times as great. The likelihood of a multiple impact may be reduced if the striker stops the mallet on impact or plays at an angle to the line of centres, so that the striker's ball rebounds to the side.*
>
> *However, it is correct to deduce that a close scatter shot is a fault if the striker ball moves a significant distance after a near full-on impact with the scattered ball."*
>
> *"… many, if not most strokes involving multiple contacts between mallet and ball are not perceptible to unaided human observers …".*

Unless a referee possesses hearing well above the average, decisions need and can readily be made on the basis of the understanding of "ball mechanics", that is; understanding how balls react to forces, actually simple physics. It is quite easy to judge if a fault has occurred by observing where the striker's ball finishes after the stroke, however this is an observation skill that is worthy of a little practice.

Example: Place two sets of two balls 50 mm apart, have a competent player play a "stun shot" on each pair:

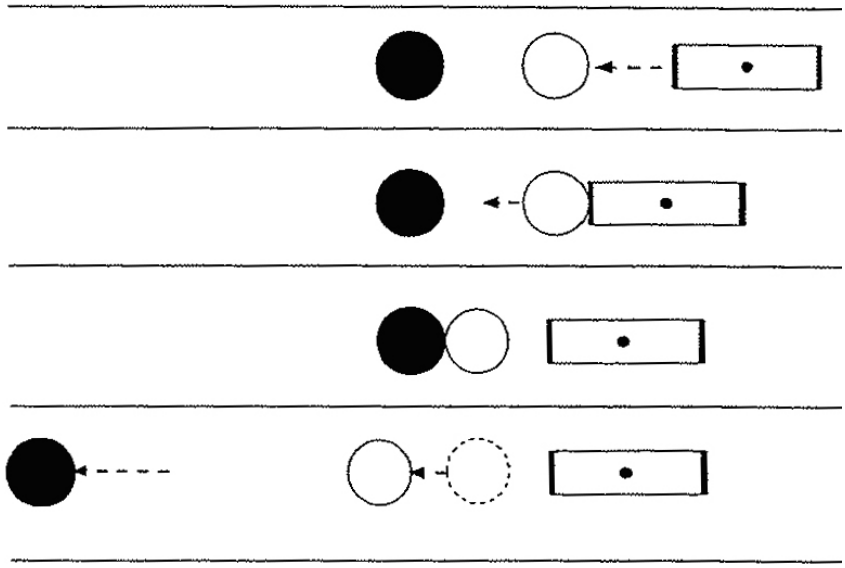
1 Play a "stun shot" and cause the striker's ball to only travel 50 mm or less: this will not be a fault.
2 Play a full stroke with a follow through and cause the striker's ball to travel half as far as the hit ball. This will be a double tap.

Only practice and the use of the carbon paper test (or high speed photography) will convince the skeptic.

If multiple noises occur as a result of the stroke it might be a double tap and the decision is to be made in accordance with the policy adopted by the ACA (see *Section GC E1 Page 1*).

The following pages contain examples of how to judge, by eyesight, if a multiple contact occurs.

Double-tap: Striking the striker ball more than once.

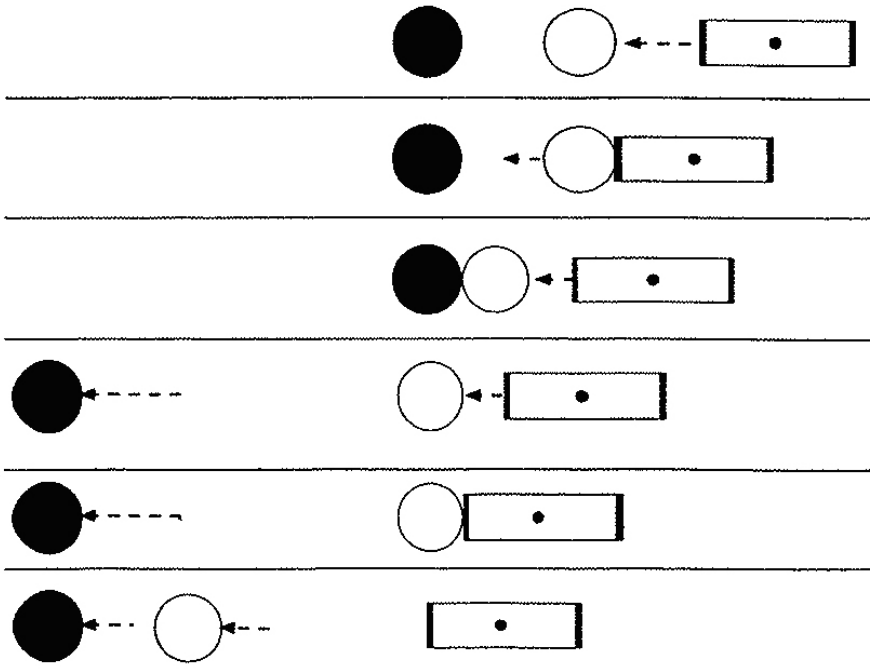


The mallet moves towards the white ball [the striker's ball]

The mallet strikes the white ball

The white ball leaves the mallet face and hits the target [black] ball

The black ball moves a considerable distance and the white ball moves only a short distance – this is a legal stroke



The mallet moves towards the white ball [the striker's ball]

The mallet strikes the white ball

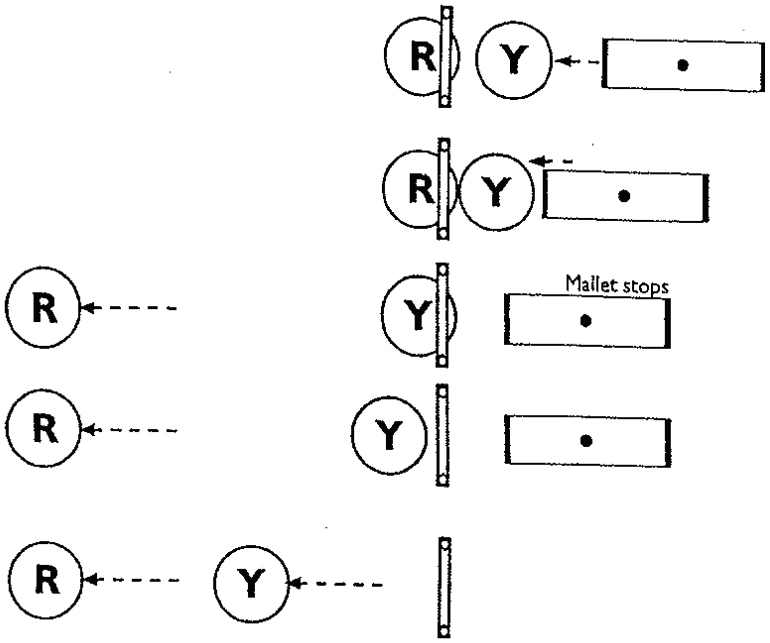
The white ball leaves the mallet face and hits the target [black] ball – the mallet continues to move forward

The black ball moves a considerable distance and the white ball moves only a short distance – the mallet continues to move forward.

The mallet strikes the white ball a second time

The white ball is moved a considerable distance, this is a fault - *Rule 13(a)(6)*

The Visual Double Tap Test



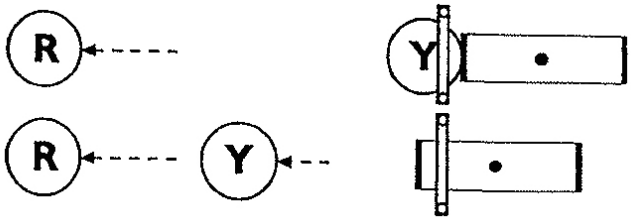
Red is partly through the hoop; yellow is about 25 to 50 mm behind

Mallet strikes yellow which hits red

Yellow finishes in the hoop or yellow finishes just through the hoop

The position of yellow is an indicator of a clean shot

If yellow finishes well past the hoop this is a strong indicator of a double tap



The mallet re-strikes the yellow...

causing extra travel of yellow

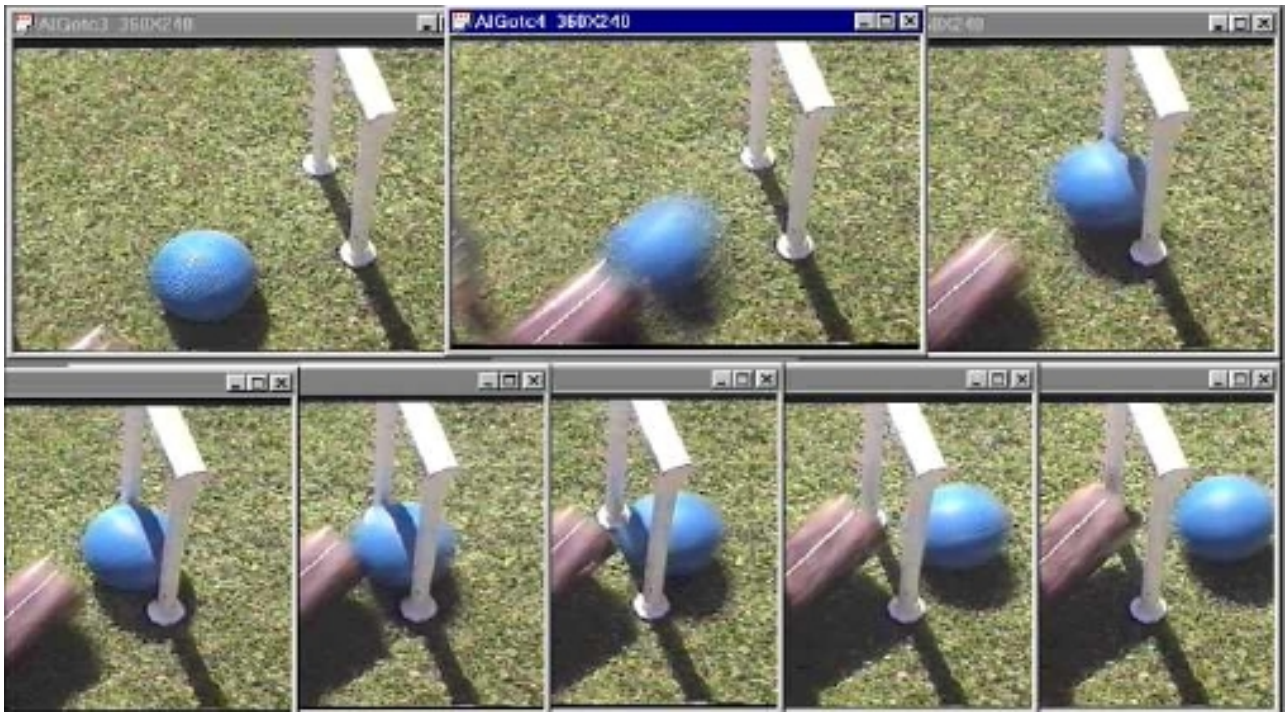
Double Taps While Hoop Running

Listening: A double tap in attempted hoop run may be accompanied by multiple noises which have been described as "unclean sounds". Ideally a clean hoop run from an angle should sound something like "click-click" = two sounds. The first "click" being the mallet striking the ball; the second "click" being the ball hitting the upright. If the sound is "click-grrrrungh-click" it may be a double tap. Referees ought to practice learning how to differentiate between clean and unclean sounds.

Example: Have a competent player using a hammer stroke, strike four balls in succession: two clean and two as multiple taps, with the trainees standing close with their eyes closed. After some practice a competent referee will be able to distinguish the difference.
Repeat the exercise by running a hoop, two as clean strokes and two as multiple unclean strokes.

It is ***only*** by experience and practice that the skill of hearing be developed, therefore if a referee is serious about the art and science of refereeing the referee needs to undertake considerable practice in learning to distinguish these sounds, even so, the task is daunting, as hearing is an uneven attribute and skill amongst us all, therefore it is important to remember the passage from the previous section

If a multiple noise occurs as a result of the stroke it might be a double tap. The 'balance of probability' is to apply in accordance with the prevailing ACA policy on *"Decisions"* (see *Section GC E1*).



This video sequence of a double tap may be seen in actual motion at:
http://users.oxac.uk/~hanscomb/9notes (produced by Dr J Hanscomb).

Double Taps – Observations & Empirical Evidence

This section deals with double taps other than those caused from straight on shots which are dealt with earlier in this Manual.
Making judgments about double-taps is often a daunting task.

Subjective knowledge: Too often a player or referee has a subjective view of what is a fault or not a fault based on how they intuitively feel about the subject (e.g. double taps). During training sessions, when a player is queried after playing a 'parting shot', which looks like and sounds like a double tap, the reply is often *"but I played away from it"*.
The subjective assumption is that 'the act of playing away' absolves the player from a fault.

Empirical evidence: When such shots are repeated, accumulated evidence may prove otherwise. Repeated testing (using the carbon paper test to assist in gathering evidence) and observation of the movement of balls can provide more positive evidence. Referees need to train themselves to be able to recognize most of the occurrences of a double tap by ball movement alone. There is no need to rely on the sound, as this is unreliable. The double sound cannot be detected in a high percentage of instances.

Double Taps are the bane of referees as there are a large number of inexperienced players.

Every time a striker strikes a striker's ball which hits any other ball which is very close, a double-tap is possible.

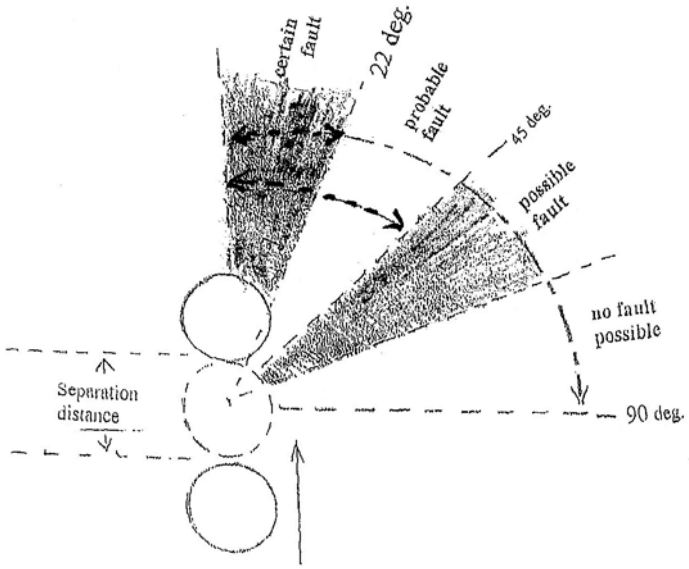
Too many double-taps go unnoticed because the player does not realise that they are committing them.
If and when a double-tap is called on a striker, they often cry *"But I hit away!"*. The effect of such "hitting away" is not very well understood.

Referees these days understand the phenomena of making the judgment when the ball is hit in a straight line. The positive evidence of a straight-line double-tap is that the striker ball will travel further than it ought.

Hopefully all referees have attended a training and/or reaccreditation session where this has been demonstrated. The phenomena can be conclusively proven by the carbon paper test.

However, making a judgment about double-taps when "hitting away" is not so scientifically defined – so hereunder is a set of guidelines based on empirical evidence. This system is not foolproof and for it to be effectively implemented for adjudication purposes some thoughtful physical practice in making decisions needs to be undertaken.

The assumption is that if a striker, strikes the striker's ball and striker's ball hits another ball (the target ball) and departs at an angle of less than 45 degrees and the striker ball travels more than about 10 to 20% of the hit ball's travel distance, it will most likely be a fault (see sketch below).



However this is NOT always positive proof as other factors need to be taken into consideration. In many of the examples the carbon paper test will be sufficient proof but experience shows that this test is not completely positive in all cases and the same experiment/s need to be repeated many times in order to equip the referee with sufficient empirical experience to effectively adjudicate.

The factors to be taken into consideration are:

1 The separation distance of balls.
2 The angle of departure of the striker's ball after they hit.
3 The distance the striker's ball travels relative to the hit ball.
4 The way the stroke is played.
5 The angle of the mallet handle to the vertical

Discussion on these points follows.

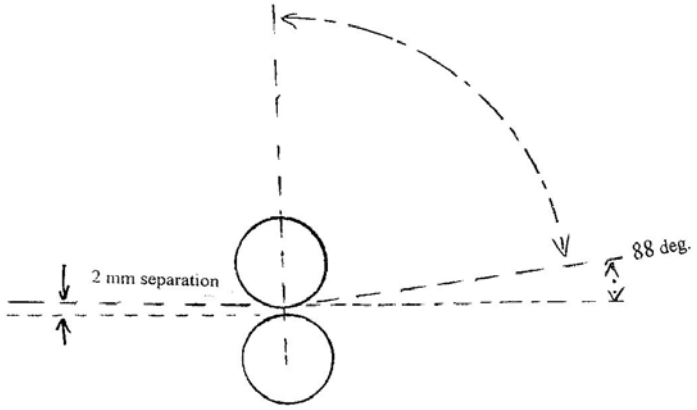
Factor No 1: The separation distance of balls.
Factor No 2: The angle of departure of the striker's ball after they hit.

The basic assumption is that if a striker's ball, at a distance of say 12 mm (1/2 inch) from the hit ball, departs the hitting position at an angle of less than 45° from straight on, it will be a double tap. As the original distance of the striker's ball and hit ball decrease (from 12 to one mm) the angle of

safe departure will need to increase from 45° to approximately 88°. As the distance of the striker's ball and hit ball increases (from 12 to 100mm) the angle of departure will decrease.

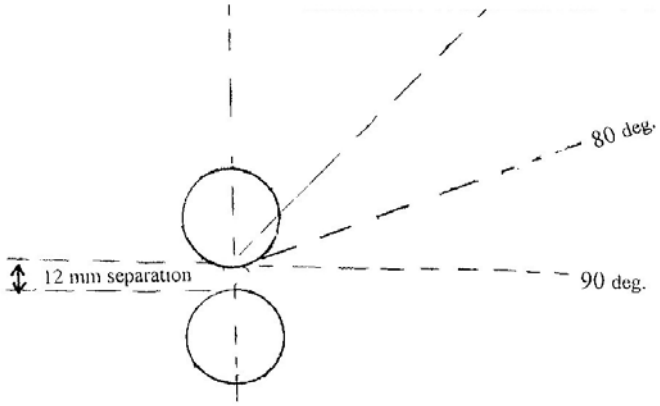
Example A: At a distance of 2 mm from the hit ball, if the striker plays a firm stroke and the striker's ball departs the hitting position at least 2 yards, at an angle of less than 88° from straight on, it will probably be a double tap. In other words; in order for it ***not*** to be a fault:

- It needs to exit the hitting (contacting) position almost at right angles (90°)
- It also means the striker's ball ought to travel at least 20 to 30 times farther than the hit ball as it will just skim the hit ball.



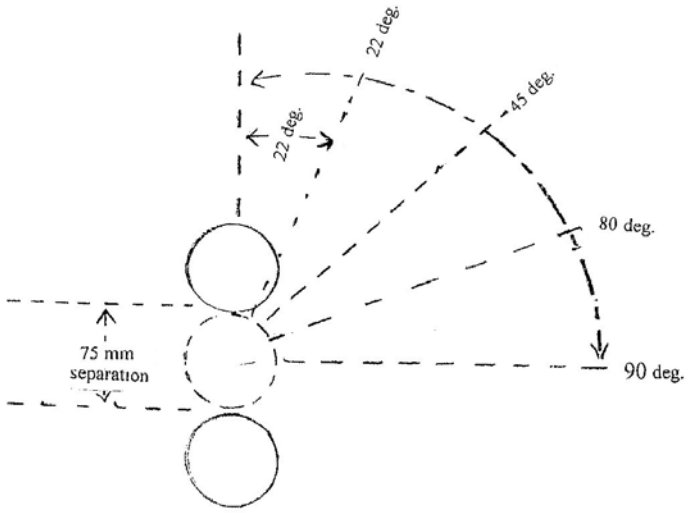
Example B: At a distance of **12** mm (1/2 inch) from the hit ball, if the striker plays a firm stroke and the striker's ball departs the hitting position at least 2 yards, and striker's ball departs the hitting position at an angle of less than 80° from straight on, it will probably be a double tap. In other words; in order for it ***not*** to be a fault:

- It needs to exit the hitting (contacting) position almost at right angles (but not as severe as in Example A).
- It also means the striker's ball ought to travel at least 10 to 20 times farther than the hit ball



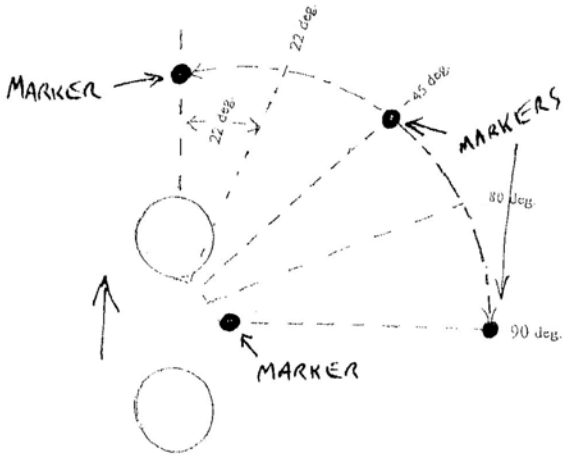
Example C: At a distance of 75 mm (3 inches) from the hit ball, if the if the striker plays a firm stroke and the striker's ball departs the hitting position at least 2 yards, and the striker ball departs the hitting position at an angle of less than 45° from straight on, it will probably be a double tap. In other words; in order for it ***not*** to be a fault:

- It needs to exit the hitting (contacting) position almost along the 45° angle line or greater (towards the 90° line.)
- It also means the striker's ball ought to travel about only 10% of the distance of the hit ball.



Observation: The direction of departure of the striker's ball.
Considerable further experimentation and experience has been gained since the publication of the original draft in Nov 2005, using the carbon paper test to help confirm the validity of the system. However, this method is imperfect and hopefully in the future slow motion (high speed) photography will provide proof.

As an active referee, lately I have been in the habit of placing markers along the 90°, 45° and 0° angle lines of the departure of the striker's ball, in order to assist in the decision making process. If the referee observes that the striker's ball departs in the triangle made by the 45° and 90° angles, there is some indication that it is probably **not** a fault .If the striker's ball departs in the triangle between 0° and 45° this is an **indication** that it is a fault. The word "indication" is used deliberately and further study and practice relative to the above examples (A, B & C) is needed.



Factor No 3: The distance the striker's ball travels relative to the hit ball.

A further piece of evidence is the distance the striker's ball travels after hitting the hit ball. If the striker's ball travels further then the hit ball this is a good indicator that a double tap has not occurred. If the striker ball travels less than the hit ball this is evidence that a double tap has occurred

Factor No 4: The way the stroke is played.

The effect of the stroke action needs to be taken into consideration when making a judgment. A jab with no follow through will tend to skew the striker more towards the 90° angle compared to a

stroke played with a full follow through. The full follow through will tend to propel the striker's ball more towards the zero to 45° angle of departure.

Factor No 5: The angle of the mallet handle to the vertical.

If the handle is tilted forward the possibility of a double tap is increased. However the striker's ball will have forward spin and will travel further, so the test using distances travelled becomes less useful.

How to make a judgment:

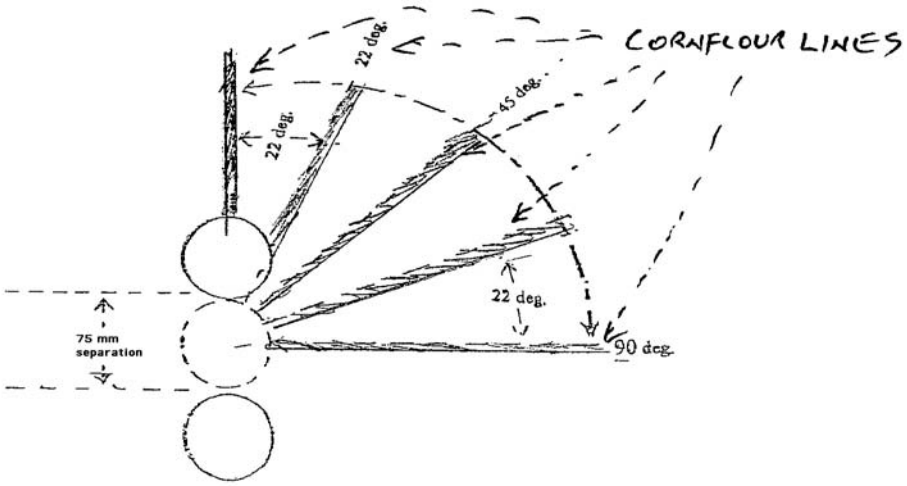
Before the shot occurs ask the striker what type of shot they intend to play
Note the separation distance between the balls.
Calculate (based on the separation distance) the expected safe angle of striker ball departure.
Note what you think is the "safe non DT zone"
Use markers if necessary.
After the stroke
Note the distance the striker ball travelled compared to the hit ball.
Note if the striker played the stroke with a jab, some follow through or a full follow through.
After the stroke is played, call "stop" to give yourself a few moments to replay all the evidence in your mind.
Always remember (if in doubt) apply the current ACA *"Decisions"* policy (Section *GC E1*).
Announce your decision firmly and confidently (don't mumble or whisper) say: "Fault", "OK" or similar; do not ever just walk away. You need to always announce a decision audibly, whatever the occasion, on any refereeing matter.

Cautionary Note: Disclaimer.
Because the player(s) cannot appeal against your decision as a referee you need to remember that the above guidelines are just that; they are guidelines only.

The real need is for referees to practice decision making. Decision making is a skill that is developed from experience, practice and study. As referees, we can and do, study the Laws, Rules, Regulations, manuals and the technical material available to us, but we do not get much opportunity to gain experience. Therefore there is a real need to practice privately. Have a friend play a series of repeated strokes of any type and watch (and hear) the results. Listening is a learned skill; have a friend play a series of double taps at a close run (acute angle) hoop. Listen with your eyes closed and after repeated strokes you might be surprised how much improved is your skill in detecting the different sounds. Decisions about straight-on double-taps on another ball only, can be confidently made by applying the decision making principles illustrated in the Referee's Manual.

The difficult decisions are with potential double-taps where the striker attempts to `hit away', as discussed above. It is in this context that the observation of the reaction of balls, relative to their separation distance (and the other factors discussed above) is where practice is essential.
Also remember 'the balance of probabilities'.

Decisions:
The current ACA policy is to be found in *Section GC E1*.



"The Cornflour Test"

This procedure is to familiarise trainees with the technique of making judgments by observation and not to rely on sound, as it is unreliable. The judgment is based on the **angle** and **distance** the striker ball departs from the point of contact after hitting the target (or hit) ball.

Training procedure: Draw a diagram, using cornflour as shown above (Cornflour will wash off and won't be visible after the next watering).

Equipment required: Two Yardsticks and a very large salt shaker (or similar) containing cornflour.

Place the two 'Yard Sticks' on the lawn, (inside or outside the court) parallel and one inch apart.
Sprinkle the Cornflour between the sticks.
Repeat at 90°, in order to create a right angle.
Repeat at 45°, to divide this right-angle into two segments.
Repeat between each so that the right angle is divided into four approximately 22° segments.
Position two balls at the end of the triangle one to three inches apart.
Conduct the carbon paper test.
A striker ball departing in the 0° to 22° triangle will always show a double tap (DT).
A striker balls departing in the 22° to 45° triangle will probably be a DT.
A striker ball departing in the 45° to 67° triangle will possibly be a DT.
A striker ball departing in the 67° to 90° triangle will never be a DT.

This is a training technique and impossible to use during a game but the same 'triangle' can be achieved by placing four markers as shown previously. Four markers are an acceptable number to use especially if the game is critical and a double tap could change the outcome.
When conducting training sessions suggest you allow the participants to try the carbon paper test; they have great fun trying to beat the system. Always prepare at least 6 mallets with carbon paper strips attached, prior to a session starting.