

The Poohsticks phenomenon

[Robert Knight](#), retired consultant physician¹

¹ 1 Rutland Gate Mews, London SW7 1PH

Copyright © 2004, BMJ Publishing Group Ltd.

See commentary "[Modelling emboli with floating fir cones](#)" on page 1433.

See commentary "[A Fee-Nom-in-Hum and an Expotition](#)" on page 1434a.

This article has been [cited by](#) other articles in PMC.

Transient ischaemic attacks often have very similar, sometimes identical, characteristics. This implies that the same area of the brain is rendered ischaemic at each attack. The cause is usually an atherothrombo-embolism. To produce stereotypical episodes of ischaemia, such emboli must lodge in the same small artery each time. As the embolus starts from a point far from its eventual destination, how do many emboli reach the same artery?

The probable explanation is that currents and eddies in a major blood vessel are similar at different times. So, emboli released into the internal carotid artery at the same point, but at different times, might be expected to arrive at the same destination, or at least many might.

This suggestion is hard to test, but the picture is in some ways similar to what happens in a river or stream. This is how the concept of the “Poohsticks” phenomenon was derived.

No better place could be thought of to investigate this important hypothesis than at Pooh Bridge in Ashdown Forest, East Sussex. The game of Poohsticks was invented here by Winnie-the-Pooh and was first played by him and his friends Rabbit, Piglet, and Roo.¹ They collected fir cones and then, standing on one side of the bridge, each dropped a cone into the water. They ran to the other side of the bridge to wait for the cones to appear. The owner of the first cone to appear was the winner. The game is now played all over the world. Quite early on, fir cones were replaced by sticks—hence the name of the game.



[Figure 1](#)

Pooh Bridge in Ashdown Forest, where Winnie-the-Pooh—and more recently, medical researchers—played Poohsticks

[Figure 2](#)

Chart showing results of test run, with A to F representing sites where cones ended up



Methods and results

[Go to:](#)

A team of investigators from Guy's Hospital, London, assembled at Pooh Bridge. We were armed with a large supply of pine cones (chosen for their more regular shape than sticks), painted red for easy identification.

We did a test run, dropping 20 cones, at intervals of two seconds, from the same place on the bridge into the stream below. We watched their progress from the banks. Most of the cones came to rest about 200 m downstream in two distinct areas. There were three smaller clusters, and one cone got stuck early on.

A chart was drawn of the stream, and observers were stationed on the banks, close to the points where the cones had come to rest in the test run (see areas A to F on the chart). We then dropped 100 cones into the water at precisely the same point each time, at intervals of one second. Their progress was watched carefully, and we noted the places where they stopped.

Nine cones ended their journey at point A, none at B, 5 at C, 3 at D, 31 at E, and 23 at F (see chart); 29 cones were unaccounted for and were assumed to have drifted farther downstream. Thus, 31% of the cones arrived at one destination and 23% at a second. The likelihood of this happening by chance is very small ($P < 0.0001$).

Comment

[Go to:](#)

Pine cones (“emboli”) dropped into the stream at the same point were carried by currents and eddies downstream and ended up at a range of destinations, some of which were reached more often than others. This process is similar to what happens when emboli are released into the bloodstream. Emboli arising from a point in the heart or the aortic arch will travel to a range of destinations. Some will be swept to other parts of the body—temporarily causing minute, harmless, and unrecognised ischaemia—but others, and those from the internal carotid artery, will arrive at the brain. On the basis of the Poohsticks experiment, it is not surprising that many of them are carried to the same destination, a small artery, causing repeated ischaemia with the same clinical features.

Notes

[Go to:](#)

Contributors: Rose Turner dropped the pine cones into the water. Tim Rockall drew the chart. Tim Mant, Hilary Pritchard, Eleanor Farrell, and the nursing staff of Bright Ward, Guy's Hospital, made the observations. Marion Knight painted the cones. RK conceived the study, wrote the paper, and organised the travel arrangements to Pooh Bridge; he is also the guarantor.

Funding: None.

Competing interests: None declared.

Ethical approval: Not needed.

References

[Go to:](#)

1. A A Milne. The house at Pooh Corner. London: Methuen, 1928.

Articles from The BMJ are provided here courtesy of **BMJ Group**