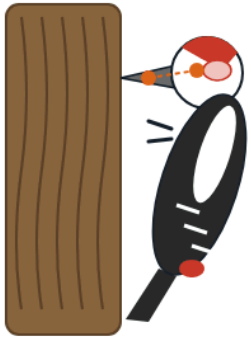
That is why

Why don't woodpeckers get concussions?

The head works like a stiff hammer, not a cushion, and the brain is too small for each peck to hurt it.

A Caught on camera: one stiff hammer



about 20 km/h

up to 30 hits a second

Beak and eye were tracked

They braked together, at the same rate. In some birds the eye area braked even harder: the opposite of padding.

No cushion between them

6 birds, 3 species | 109 pecks | up to 4,000 frames a second

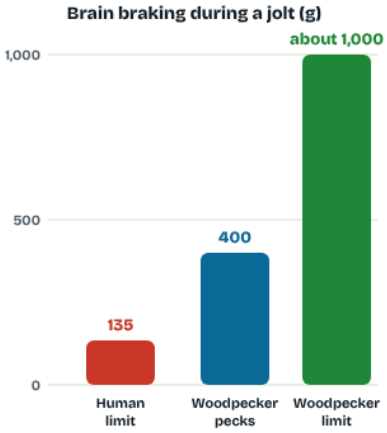
Why padding would fail

In computer models of a head that soaks up the shock, the beak sank much less deep into the wood. "If the beak absorbed much of its own impact, the unfortunate bird would have to pound even harder."

The Lancet, 1976

Birds filmed in zoos in Austria, Switzerland, Germany and Italy, and in a lab in Canada.

B Why a small brain is safe



Shorter brain, less pressure

When the head stops, the brain presses on the front of the skull. A longer brain presses harder. A woodpecker brain is about one-seventh the length of ours, so its danger line is about 7 x 135 g.

C How safe, and why

1 A wide margin

To risk a concussion, it would have to hit twice as fast, or strike wood four times as stiff.

2 Small and quick

A small brain feels less stress, and each hit is over in an instant, so a bigger jolt can be tolerated.

3 Built-in limits

Bigger heads, faster strikes or harder trees would make brain injury more likely.

A stiff head delivers the blow; a small brain shrugs it off.

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