

A STUDY OF 397 WINDOW COLLISIONS

INTRODUCTION

Probably everyone has had a bird hit a window and wondered about it. I wondered, and as an avian rehabilitator, I received many reports, and was also able to study the 397 cases admitted to us. Here is my summary of the proven or witnessed window collisions from 1977 to 2004, mainly of birds in south-eastern Ontario, varying from large hawks and owls to hummingbirds—80 species in all.

Collisions (with anything) cause different patterns of bodily damage according to the force and velocity involved. The three main scenarios:

(1) ***Body is travelling and hits a stationary object:***

eg., a window, wall, or the side of vehicle. A frequent

haemorrhage occurs because the aorta (largest artery) is fixed in place in the chest, but the heart moves during the deceleration. Tears start in the descending aorta (the injury thought to have caused the death of Princess Diana). Also brain death occurs from sheared blood-vessels in the spinal column as neck is jerked forward or back.

(2) ***Body is travelling and hits a travelling object:***

eg., bird flying towards front of vehicle in motion, or two vehicles colliding head-on.

(3) ***Body is stationary and is hit by a travelling object,*** eg., stone, arrow or shot

- In point (1) this window-collision study ***does not include*** those admissions that hit other stationary objects such as a building, wall, parked vehicle, side of train, pole, fence, wire or unknown object (total of collisions with such other objects: 313 cases)
- In point (2) this window-collision category ***does not include*** vehicle collisions (668 cases) because the pattern of injuries is different if the object is also moving
- This study ***does not include*** any of those cases in (3) where injury pattern is quite different.
- While limiting this study to birds and windows, I tried to only include those collisions that were witnessed or proven by marks or feathers left on the pane, by shattered glass, and of course, the fallen bodies.

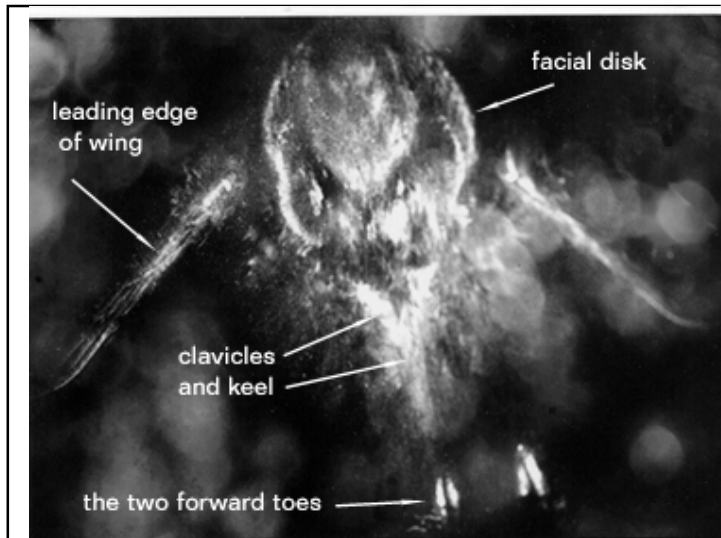


Fig. 1. Imprint of feather-dust on a photographer's window. Small owl, probably a Saw-Whet. Classical points of collision are indicated: the head, the "V" of the paired clavicles, and the keel below. All owls have two toes forward, two back

CAUSES OF WINDOW COLLISIONS

1) Fear—avoidance of potential predator. Examples:

- ◆ *Mourning Dove, January.* Bang! Left feather and body imprint on window. Badly clawed open at the neck and down humerus, which was completely exposed. Escaping from a cat or hawk most likely. Euthanasia.
- ◆ *Ruffed Grouse, April.* Even louder bang. Dead below window. Freshly torn back near shoulder. Hawk very likely.



Black-capped Chickadee on our deck, stunned for a minute. Luckily I already had my camera in my hands

- ◆ *Chickadee at feeder, March.* See photograph

2) Chase or fight. Example:

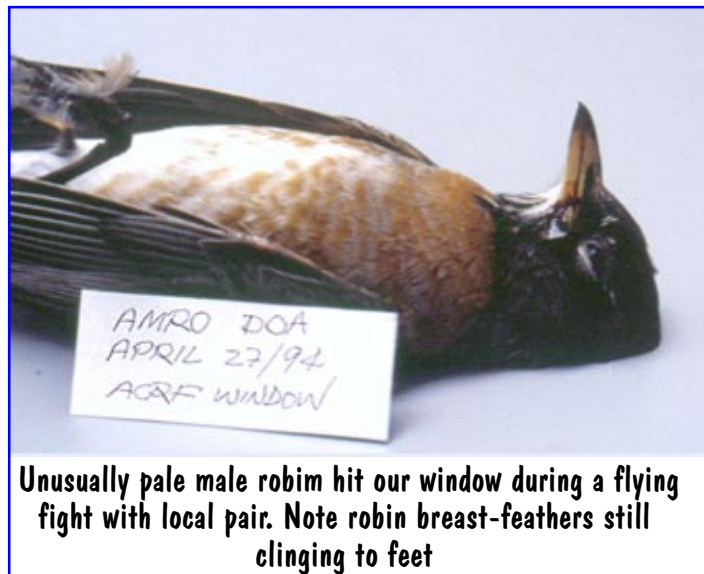
American Robin. March. Freshly dead on our doorstep, feather mark on our window. Bled from mouth a lot on doorstep. Male. Had four robin breast-feathers stuck to feet. Bleeding continued long after death from a huge clot formed under sternum. Apparently in fight with our local male, as “our” pair were patrolling the lawn even as I picked this corpse up. He had a slight cloacal protrusion, which is

indicative of breeding condition. On post-mortem there was much internal haemorrhage. The testes were also enlarged for breeding.

3) Before or after?

Occasionally, there was an injury caused either just previous to, or immediately after, the collision; mainly caught by dog or cat, occasionally struck by a raptor. One bird was hit by car first, then crashed into a window.

Mourning Dove, April. Hit window; bleeding, stunned, fell. Then grabbed by Laborador. Puncture wound on back from Lab’s teeth, and wound that bared a lot of one wing as well. DMSO and Gentomycin slathered on, left in peace. Released about a month later, fine, wild.



Unusually pale male robin hit our window during a flying fight with local pair. Note robin breast-feathers still clinging to feet

INJURIES MOST COMMONLY FOUND

- ◆ brain damage from closed-head injury.....186 cases
- ◆ internal haemorrhage118 cases
- ◆ coracoidal fractures/dislocations 48 cases
- ◆ fractures of the spine (broken back or neck)..... 22 cases (*see photos pg 9*)

122 post-mortems were carried out to establish gender, breeding condition, stomach contents etc., and to find internal injuries.

TYPES OF INJURY, IN ORDER OF FREQUENCY

Central Nervous System: (*observation of behaviour excludes most of the DOA 13.4% of the total 397 collisions. Sometimes there were clear reports of neurological behaviour but bird died before arriving.*)

Symptoms of Central Nervous System damage

- **stun with rapidly resolving concussion**, 71 cases, 67 of them released, **some immediately, others up to 11 days later**
- **“Dysfunctional legs”** my umbrella term for legs that can move, that have **tone** and some strength, but *don't work properly*. Unable to stand normally, or have loss of balance. **28 cases, 10 releases**. some may have been from incomplete cord transection, causing weak sensory response in a leg, e.g., below knee on one side. Some or even many of the unfortunates may have had a vertebral fracture (*See column on Broken Backs*). However, the smaller the bird, the harder to find the post-mortem evidence of a spinal fracture, and I don't do guesses. Who knows what else prevents them from walking properly after a smash on the head?
- **Torticollis. 16 cases, five releases**. All sixteen had evidence of brain damage. Torticollis is twisted neck, a wiry dysfunction of the nerves that control neck muscles. Head often slewed in one direction. Sometimes so bad that the head drags on the ground.
- **Cranial nerve damage (one-sided facial). 13 cases, 9 releases**.
- **Blindness. 7 cases, 3 releases; after brain swelling goes down, vision often returns**.
- **“Rotary travel.” 4 cases, with 2 releases**. Either flying or walking in circles or spirals, clockwise or anti-clockwise movement, but not both. We can guess dizziness caused by damage to the semicircular canals.
- **Fracture of the spine 22**—severe spinal cord injury resulting in paraplegia—usually easy to recognize in life and death (by post-mortem). Legs flaccid or trailing.



Saw-whet Owl, Adult, October. Hit a window 4 am y'day, kept in a paper bag and brought to us in same bag, perched on an overcooked hot dog. Eye "ske-whiff" because iris is out of round. Balance problem, propping body on L wing, wing slightly paralyzed; fell twice. Day 11: can fly in clinic but L. wing slightly stiff. Day 22: banded & released. Weight gain from 85g to 114g

A spinal fracture does not improve, bird gets worse by second or third day as paralyzed bowel fills up and reduces air-sac spaces. Euthanasia is the only answer. *See article on Spinal Fractures*

- **Paralyzed Wing 8 cases.** Four were released. (Saw-whet in photo shows loss of balance and temporary visual disturbance as well.)

***Circulatory System: Internal haemorrhage* 115 cases. But where did the bleeding originate? 58 had blood in the mouth,** but only 5 were proven to have the blood draining through the choanal slit in the palate from the brain area.

43 had blood welling up through the glottis, or had haemorrhages found inside the chest on post-mortem.—There may have been a rupture of large heart vein or artery, often associated with that frontal crash to the sternum or a coracoid bone.

PERFECT REST: THIS IS THE TREATMENT!

See column on What To Do if You Find an Injured Bird for details

- ***Highest priority: least possible interference or disturbance for hours.*** Never use a cage. Give bird the use of a cardboard box, garage, darkened room, whatever is appropriate. Provide a low perch. Prop a diagonal log for woodpeckers and creepers. And then *leave them alone.* Hands off! No peeking or photographing! ***Total rest is the treatment needed for recovery from window collision.***
- If there is bumping about in box several hours later, open box OUTSIDE.
- Best to identify small species if not releasable in half a day or so, and phone for further advice.
- Very common *invisible* damage accompanying any or all collisions: internal haemorrhage. Only way to help is to leave entirely undisturbed, in nest-shaped rest if unable to stand properly, in dark area for some hours. During this period of reduced fear there is an opportunity for the bleeding vessel to clot. Grabbing and handling creates terror and struggling, often releasing the clot and causing bleeding to renew.

Food or water are not priorities. Whatever the bird species, they all need some hours of peace and rest. No water in box. If poor balance, they may drown. I have seen two dazed Saw-whet Owls drown in 1/2" of water.

Later, if not recovering, it is difficult to find or offer acceptable, *recognizable* food, especially live food; so we recommend releasing them the minute they start to fly. They know how to find their own in the wild.

8 were origin of blood unknown.

Of those 58 with blood in the mouth, 47 were alive on admission, and 60% of them were released.

Coracoidal Fractures or Dislocations

42 were fractures of a coracoid bone =23 releases= 55%. If fractured mid or low on the bone, there is a good chance of return to normal flight in about 1-2 weeks. No treatment should be attempted. Fractures near the shoulder seldom recovered good flight.

6 were dislocations of the actual foot of the coracoid, with it being shoved off the sternum and under it right into the chest cavity. Sometimes that part of the sternum was broken right off as well.

There were no releases.

Other Fractures

Total fractures = 106. (This includes 22 of the spine and 42 of the coracoids, all discussed above)

clavicle 5

humerus 7 (1 predator) half of them were proximal fractures.

sternum 5. Three of them also had a fracture or dislocation of a coracoid

tibia 6 (2 were old, pre-collision injuries)

ribs 4

radius & ulna 4

torn crop 4. A full crop sometimes burst like a balloon on impact.

ulna only, 2

keel 2

tarsus 2

femur 3 1 was previous

loss of tail 9. A snatch! 3 dogs, some cats, other predators, and humans trying to catch them. Not a significant loss. Tails of small birds grow back quickly

beak damage 15; notably, 4 cuckoos

Respiratory System : Sub-cutaneous emphysema 11 cases. Releases 4. This is caused by an airsac rupture leaking air up under the skin, causing balloon-like puffiness. It is a sign of violent blow or puncture, e.g. from a collision, cat, or shot. No treatment needed; if bird survives, airsac will heal itself.

SOME STATISTICS

Outcome of cases:

DOA: 53/397 = (13.4%)

died: 70/397

euthanasia: 90/397

released: 180/397 = (45.5%)

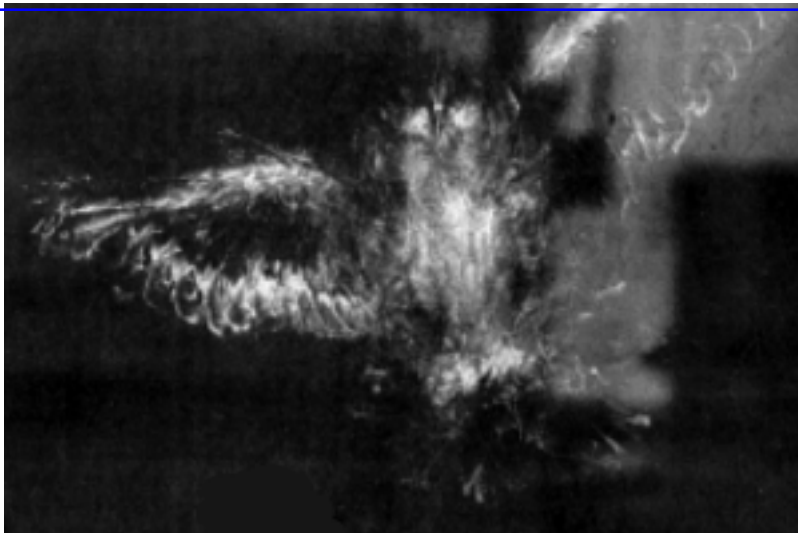
escaped or preyed on 3

AGING

(certainties only) 53% of all 397 were after-hatch-year; that is, in their second year of life or older. Recognizing the age of a bird takes quite a lot of experience! Of the total 397, 18% were not, or could not, be aged.

SPECIES

- Of the 80 species we have recorded, 13 species were raptors. That was a total of 73, of which 56 were hawks and 17 were owls.



Window imprint from a Calgary newspaper. No details given, but large owl. Hardest collision is whitest--face, wing, sternum, and knees or feet, depending on whether owl had feet forward or not.

- Of the hawks, there were buteos, kestrels and merlins, but the vast majority were accipiters— 75%
- Though there were hawks hitting windows every month of the year, there were some notable clusters. Of Sharpshins, 73% hit windows August through November. Of the Cooper’s Hawks, 50% were September through December. Of the goshawks, 87% were October through December. All accipiters were probably migrating and hunting in unfamiliar territory.
- Though owls are stereotyped as nocturnal, five of the owl collisions occurred in full daylight.
- All owl window-collision victims were released
- of the 324 non-raptorial birds, most could be expected to be close to houses because of gardens, trees and feeders. One of the species that was surprising was the Belted Kingfisher. We had eight admissions, all but two with fractures or paralysis; only one of the 8 was released. All eight were young birds of the year, learning. The houses involved must have been near water.



Wing-tip of a pigeon hitting our thermo-pane. Pigeon just boomeranged, uninjured. Have seen this happen several times, even leaving the imprint of the head and eye; but pigeons zoom off unfazed

MOST FREQUENT FLYERS were:

26 Ruffed Grouse.....	2 releases.	13 were DOA (31% of all our RUGR admissions were window collisions!)
20 Downy Woodpeckers.....	5 releases	1 DOA
20 Rose-breasted Grosbeaks...	13 releases	3 DOA
18 Hairy Woodpeckers	6 releases	0 DOA
15 Sharpshinned Hawks.....	8 releases	2 DOA
15 Northern Goshawks	11 releases	1 DOA
14 Mourning Doves.....	7 releases	1 DOA
12 Cooper’s Hawks	11 releases	1 DOA



White-breasted Nuthatch, one of pair, stunned briefly on our deck after hitting glass door. Recovered without help in about 3 minutes. The mate just bounced off

Least Frequent:

pigeons....0 admissions, though several have hit our windows and simply flown off (rubber-necks?)

MOST PREDOMINANT GENDER AND SPECIES BY MONTH (certainties only). Females 86 Males 133

Jan. =23. a few more F than M
Feb. =14. a few more M than F. Several woodpeckers
Mar. =15. spring arrivals start. More M than F
April. =29. More M than F. A lot of Ruffed Grouse
May = 52. More M than F. a lot of Ruffed Grouse and hummingbirds
June. =36. Twice as many F. particularly Cuckoos and Downy Woodpeckers
July. =51. More M than F. Several Rose-breasted Grosebeaks and Common Grackles
Aug. =42. more M than F
Sept.= 35 genders equal
Oct. = 49 Still more M than F. Several Ruffed Grouse and Saw-whet Owls
Nov. =26. Still more M than F. Several Northern Goshawks
Dec. =25 Woodpeckers predominate. Still more M than F

Gender: unknown = 178

PAIRS FLYING TOGETHER

There were four pairs of window-strikers:
Rose-breasted Grosbeaks in September, one died.
Common Grackles, spring, one died. Very moving to see the mate come back and try to revive the dead one.
Purple Finches, both died
White-breasted Nuthatches, January, both recovered quickly. Feeder was close to window

SOME OF THE MOST UNUSUAL CASES

6450 Barred Owl, October

Hit patio-door about noon; heard and found, regurgitated black ? mouse on deck and stayed unmoving about 4 hours., then brought to us. Could walk. Eyes, ears, mouth, nostrils no blood or visible damage. No struggles in hand, but cried plaintively. One wing limp. XR though excellent does not show a problem. After XR and weight owl given quiet unit with a pine-needle box where she collapsed and slept a long time. Probably internal haemorrhage. Next am out of box and ate but still groggy look so only put out in aviary on Day3. No flight at first but by Day 11, flying beautifully. Banded and released back at site by finder that day.

Red-tailed Hawk, male, second-year bird, Kingston, Ontario, December 26

Crashed through exterior double-paned kitchen window and got his throat cut; died immediately. We got the body. A jagged glass piece had sliced clean through his trachea. As well, he had a facial slash and two fractures of his keel and sternum, perhaps from this frontal collision. Internally he was in perfect health. His stomach was empty—he had almost certainly been in full pursuit of a bird.

Not only was this amazing cut-throat accident a first for us, but this hawk had been banded...by me, four months previously. At that time he had crawled out of a sewage treatment pond in Kingston, Ontario, and arrived plastered in stiff, dry muck that prevented him from flying. We had cleaned his feathers, literally scrubbing with a brush at times, hosed him down and turned him out into the rain and sun, where he preened himself to perfection and was released in just five days in excellent health.

At that time, I photographed his foot which had a very old, amputated toe; it proved how well he could hunt with this disability.

Sharp-shinned Hawk, Sept. 11, Springbrook, Ont. Hatch-year female

Hit house window at 4:30 pm. Picked up at once and described as having feathers and blood in talons, and “a hard bone sticking out of its chest.” Puzzle! When we received it we saw they were quite right: there **was** a bone sticking right out of the upper breast, which I recognized as a coracoid, which only birds have. The bone, however, was not hers: it was dry and a bit ripe, along with the remains of its true owner, which had spilled out of the hawk’s ruptured crop and gotten stuck to the breast feathers.

So after eating a bird a day or two before this collision, the Sharp-shin had had a previous collision that had burst open her full crop. Hungrier than ever, she had tried again to secure a little hors d’oeuvres, and bam! Perhaps even at the same house, which had five bird-feeders.

Amazing that despite its badly torn crop which could hold neither food nor fluid, the little hawk had the energy to try again. These small hawks are notorious for dying quickly when deprived of food for even a day or so—they often continue to slide into starvation even while being well-fed. Their rapid metabolism requires them to eat at least 45% of their body weight daily—one window-collision of ours (a male in good weight) on admission ate 10g of mouse in evening of that first day, yet lost 6g of his body weight by morning! And so I was pleased to quickly suture up the female’s crop and watch the Springbrook accipiter eating well again. Banded and released in a week.

Northern Shrike, Nov 25, Seeley’s Bay, Ont.

Good weight. Brought immediately after hitting window. Bleeding from mouth, probably trickling down from brain, as he had temporary cranial nerve damage—left eye blind, left side of face paralyzed. We have found that cranial nerve damage usually recovers. This little predator, not as big as a robin,



My shattered window, 10am, April



Ruffed Grouse dead in flower-bed below my shattered window. Double-panes were 5mm thick each, and he broke through them both. April, died of broken neck (cervical vertebrae 10 and 11.) Male, plump, crop full of pussy-willows and birch buds.

The weeping lady (story above) was lucky to have her window intact!

had been chasing birds—goldfinches or chickadees perhaps from a nearby feeder. Each day I wedged a mouse-corpse into the crack of a small log, and photographed him through the one-way glass door. Unlike hawks, he had no capacious crop and was instead a “grazer,” tearing off small bits often and by his behaviour “thinking” about food a lot; he ate 32% of his body weight daily while with us. In six days he recovered vision and was banded and released.

Chimney Swift, August, Kingston

Hit window of a bank, and made a deposit there. Blood coming from his mouth from inside his chest. Unfortunately did not recover.

Quite unusual to be flying so low; perhaps driven down by a predator. Usually one has to crain one’s neck to see their rapid high flight; from the top of Queen’s University’s highest building I have watched them still above me, swooping about after insects.

This unusual little creature weighs less than a House Sparrow. The tail-tips are long, sharp prongs to balance when clinging vertically inside a dead tree or chimney for nesting. Otherwise it is said that they almost never perch, even snatching off tiny twigs in flight and embedding them with their own sticky saliva to make their nest. Their claws are very sharp indeed; young need them to climb up from the nest. A few fallen into cold fireplaces have been brought to us, and the still-blind nestlings, who have no natal down, can actually hang upside-down onto a human finger by the claws of a single foot. These swifts all have a loud harsh cry, and anatomically have an extremely short humerus—only 9-10mm in my three X-rays!

Most Embarrassing Case

Brought by students and teacher from a public school. Apparently a road stun, easily picked up. When I opened box in our clinic, the grouse flew out at full speed and crashed straight into the window, dead immediately. Post-mortem revealed a fracture of the cervical vertebra a.k.a. broken neck. Distance: only 4.5m. Some lesson!

A Story: Mother and Baby Not doing Well

A lady phoned me one fall day, very distressed. “The baby hit the window,” she wailed, “it isn’t moving at all, and the mother is waiting for it in the tree. I don’t know what to do.”

I pricked up my ears: October, baby? “What kind of bird is it?” I asked.

“Well, it has stripes on its tail and its sort of brownish. I picked it up and I think maybe it’s dead. The mother and baby were flying together, you see, when the baby ran into my picture window and broke his neck; he made such an awful bang! The poor mother hawk!”

“Hawk?” I echoed. “What makes you think they are hawks? What does the bird in the tree look like?”

There was a pause while the damp sounds of nose-blowing took over. “She...she keeps looking at it and won’t go away. She’s dark gray on top and sort of white underneath and has a hooked beak and big claws. The baby has a hooked beak too.”

Having heard this latter description before, I was beginning to understand at last. “Would you like to bring the, er, dead bird to me to identify? Perhaps we will be able to solve that problem, at least.” I had established that she didn’t live very far away.

So presently along came the lady with the ‘baby’. On one point at least she was correct; it was stone dead. But if it was loved by the goshawk it was gastronomically, for it was a full-grown grouse!

There was one further irony. Though she had earlier sympathized with the goshawk as a deprived mother, she now disliked it as a deprived eater. She adamantly refused to complete the natural cycle by returning the plump body for the tenacious huntress in the tree.

Kit Chubb