

A RETROSPECTIVE LOOK AT OUTCOMES OF RAPTORS WITH OCULAR TRAUMA



January 21, 2023
Raleigh, NC

Wildlife Rehabilitators of North Carolina

DATA DRIVEN CASE MANAGEMENT

AAV 2014

“A Retrospective Look at Outcomes of Raptors with Spinal Trauma”

Score	Clinical signs	% Released
1	Mild paresis, ataxia, kicking and grasping strongly	58
2	Severe paresis/paralysis. Deep pain present	7
3	No deep pain. Legs flaccid. No vent tone	0

BACKGROUND

- Ocular trauma with resultant damage is very common in raptors admitted to rehab facilities.
 - CRC data – 45% have significant damage to at least one eye
 - LSU retrospective study -1998 to1999 - 75% had ocular lesions
 - Uofl CVM 2012 – about 50%
- Cause of injury – almost always trauma/HBC

CURRENT STUDY






- Prognosis is not easy to predict
- Goal: to identify prognostic indicators and to predict likelihood of recovery

ANATOMY

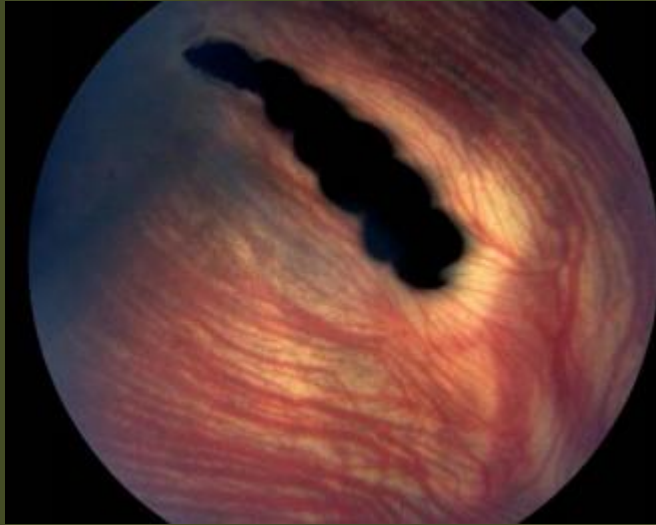


- Large size
- Pecten
- Avascular retina – retinal detachment is irreversible

SEVERITY SCORE

Score	Color	Clinical signs
0		Blind
1		Very severe damage – Lots of floating debris and blood in PC. Difficult or impossible to visualize retina/pecten. May have large areas of detachment. Often described as “soupy”.
2		Significant damage – Large areas of floating debris and blood. Can visualize some retina.
3		Very minor damage – Some wispy areas of floating debris and maybe a small blood clot. Retina appears mostly normal.
4		Completely normal eye

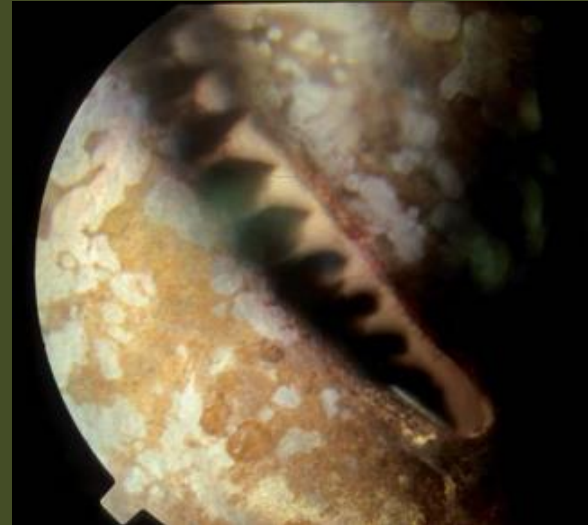
FUNDIC EXAMINATION



Score 4



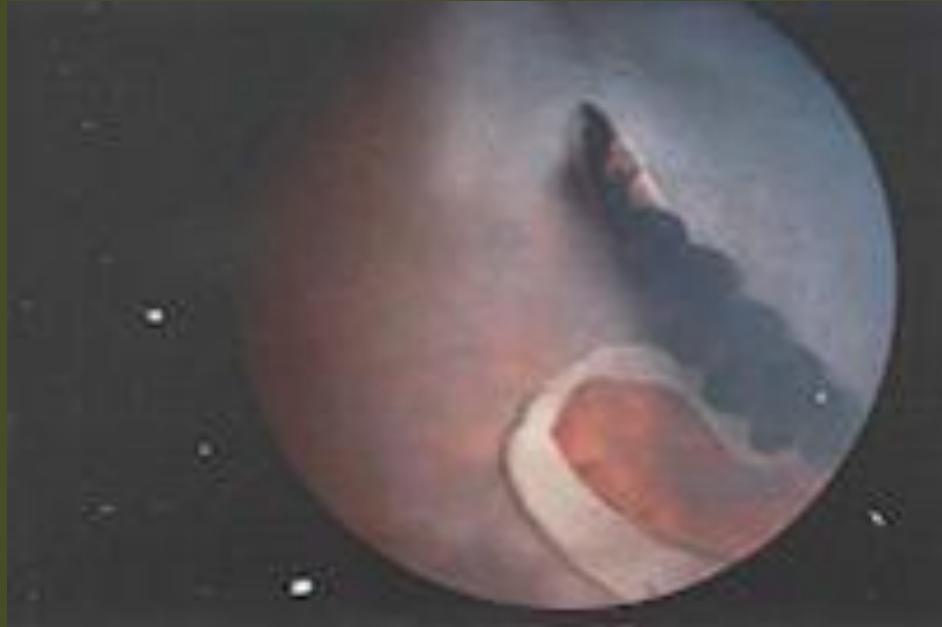
Score 0-1



Chronic

Borrowed from Bayon, 2007

FUNDIC EXAMINATION



Score 2 - yellow


Raptor Ophthalmology Powerpoint - Mark Mitchell, Univ of Illinois CVM

SEVERITY SCORE

Eye exam

Date: 2015-02-25 Examiner: ces/kmc

RIGHT **LEFT**



PLR: + Menace: + PLR: + Menace: +

Stain: DNE Stain: DNE

Notes: unable to focus on retina, "soupy" with floating debris and blood

Notes: small amount of wispy floating debris ventrally

Delete [Show abbreviations](#) Ok Cancel

RaptorMed™ – www.raptormed.com

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SEVERITY SCORE

November 01, 2014	RIGHT	LEFT
October 17, 2014	RIGHT	LEFT
October 10, 2014	RIGHT	LEFT
October 02, 2014	RIGHT	LEFT
October 01, 2014	RIGHT	LEFT

RaptorMed™ – www.raptormed.com

DATA

- Retrospective study
 - 299 cases over 18 months
- Looked at several variables
 - Species and nocturnal/diurnal
 - Severity score on intake
 - Improvement in severity score
 - Final outcome

DATA

- Only included cases that were obviously due to trauma
 - Based determination on evidence of acute trauma (blood, fractures, etc) and the appearance of the lesions (floating debris and blood vs chronic retinal lesions).
- Only concerned with posterior chamber damage (i.e. chorioretinitis)
 - Not obvious without a thorough exam

DATA ANALYSIS

- Species with enough data to analyze
 - Nocturnal
 - Eastern screech owl – EASO
 - Barred owl – BDOW
 - Diurnal
 - Cooper's hawk – COHA
 - Red-shouldered hawk – RSHA
 - Red-tailed hawk - RTHA

DATA ANALYSIS

- 154 of 299 cases considered releasable
 - Non-releasable D24/E24/EOA/DOA
- Average score - non-releasable = 2.9/8
- Average score - releasable = 4.8/8

ADMISSION SCORE VS OUTCOME

All animals

Score	Outcome
Not released	3.08
Released	4.87

Unpaired t test. $p < 0.0001$

Only releasable animals

Score	Outcome
Not released	4.2
Released	4.87

Unpaired t test. $p < 0.0272$

Statistically significant but a little too close to be clinically useful.

When broken down by species, not much better.

FINAL SCORE VS OUTCOME

Score	Died (%)	Euth (%)	Released (%)
1	0	100	0
2	25	75	0
3	0	100	0
4	12.5	12.5	75 ¹
5	0	0	100
6	5	19	76
7	0	7	93
8	0	18 ²	82

← Only one good eye

Contingency table. Chi-Square test.
p = 0.0003

¹ One-eyed owls are releasable. 63% and 49% survived 6 weeks and 3 months, respectively. Scott, D. A Retrospective Look at the Survival of Birds of Prey Released from a Rehabilitation Center in North Carolina. EAAV. Weisbaden. 2013

² Perfect eyes do not guarantee release – look for other problems associated with head trauma

IMPROVEMENT VS SPECIES

Species	Improvement
EASO	0.33
BDOW	1
COHA	2
RSHA	1.86
RTHA	2.38

Species	Improvement
Nocturnal	0.8
Diurnal	2.03

Unpaired t test. $p < 0.0001$

For both eyes – maximum score = 8

SPECIES VS OUTCOME

Species	Release rate (%) Of all birds	Release rate (%) Of only releasable birds
EASO	32	73 ²
BDOW	19 ¹	57
GHOW	18 ¹	67
COHA	48	75 ²
RSHA	31	58
RTHA	18	53

¹ Large owls are more likely to be non-releasable on admission

² Smaller eyes may be less likely to be damaged or possibly heal better.

TREATMENT PROTOCOL

- Meloxicam 0.5 mg/kg BID x 10 days
- Dexamethasone 2 mg/kg IM once at admission
- Supportive care
- Repeated fundic exams
- Visual tests (vision strips, live prey, etc).

November 01, 2014	RIGHT	LEFT
October 17, 2014	RIGHT	LEFT
October 10, 2014	RIGHT	LEFT
October 02, 2014	RIGHT	LEFT
October 01, 2014	RIGHT	LEFT

CONCLUSIONS

- 0-4 point severity score
 - Useful to track progress
 - Of releasable birds, the average intake score **CANNOT** be used to predict outcome
 - **NEED A MORE OBJECTIVE SCORING SYSTEM**
 - Scoring system is subjective. Depends on:
 - Experience of examiner
 - Instrument used
 - Lesions present
 - Species – smaller eyes hard to examine

CONCLUSIONS

- Large owls more likely to have non-releasable injury on admission
- Birds with smaller eyes (EASO, COHA) are more likely to be released.
- **Diurnals are more likely to improve.**
 - An eye with a score of 1 or 2 in a hawk can improve significantly. If you can't visualize the retina, wait and see...
 - Ultrasound is helpful in looking for retinal detachments when the posterior chamber is full of debris and blood.

ACKNOWLEDGEMENTS

Gregg Miller - Central Piedmont Community College

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THANK YOU



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