

# Equine Gastric Ulcer Syndrome

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Island Equine Veterinary Services &  
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# The Plan

- Anatomy and physiology of the equine stomach
- What is EGUS?
- Diagnosis of EGUS
- Treatment of EGUS
- Questions and Snacks
- Gastroscopy Demonstration

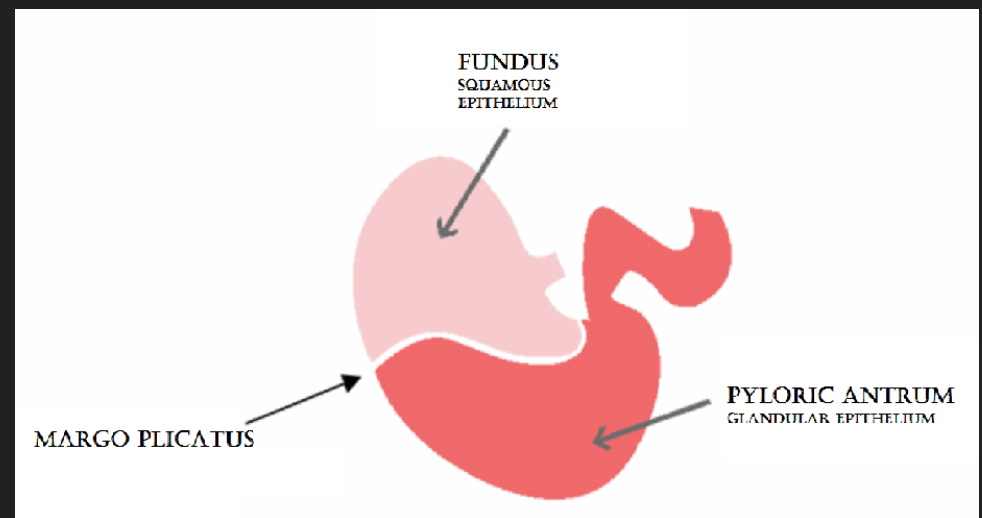


# Anatomy and Physiology of the Equine Stomach

the condensed version

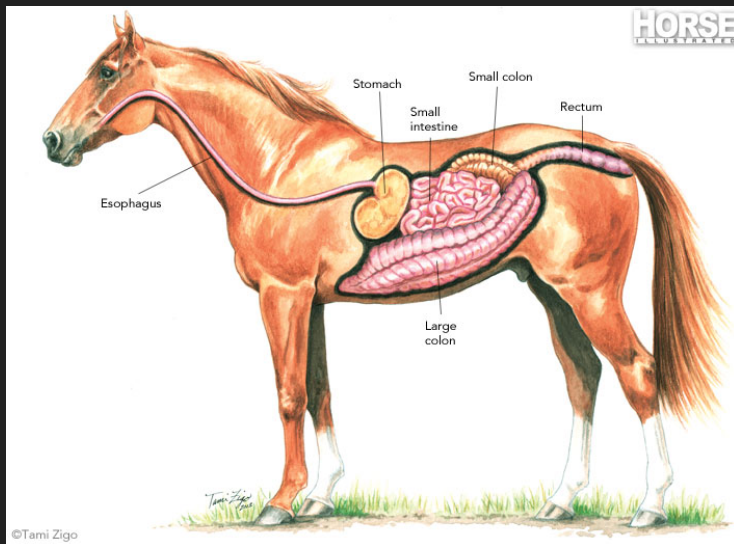
# Anatomy of the Equine Stomach

- The stomach of an average-sized horse can hold 10-15L of fluid/feed
- **Fundus** – the upper portion
  - **squamous epithelium**
  - minimal protections against acid
- **Pyloric antrum** – the lower portion
  - **glandular epithelium**
  - well developed protections against acid
- Divided by the **margo plicatus**
- Lesser curvature and greater curvature





# Physiology of the Equine Stomach



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<http://www.horsechannel.com/images/horse-news-article-images/equine-digestive-system.jpg>

- Horses are **monogastric** animals
  - One stomach, similar to humans, dogs, cats
- **Continuous secretion** of acidic digestive juices
  - ~1.5L per hour
  - Contain hydrochloric acid, digestive enzymes
- Liquid meal empties in ~30 min
- Hay meal can take up to 24hrs to empty

# Physiology of the Equine Stomach

- pH varies within the stomach:
  - Near esophagus ~pH 7.0 (neutral)
  - At margo plicatus ~pH 3.0 - 6.0 (mild to moderately acidic)
  - At pylorus ~pH 1.5 - 4.0 (moderately to extremely acidic)
- Low pH is important for digestion of feed material and serves as a defence mechanism against ingested bacteria, viruses, parasites

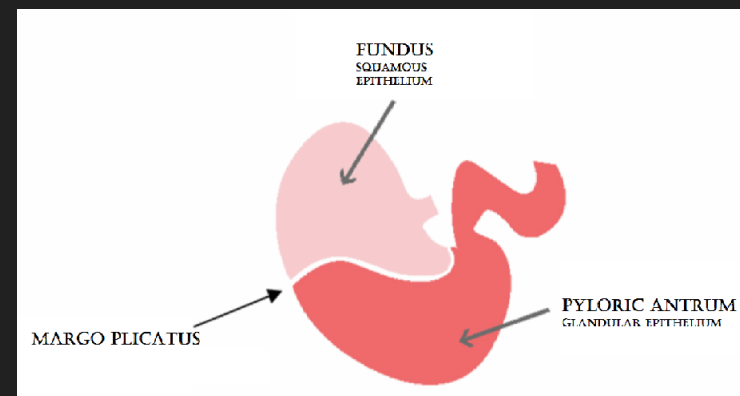


# What is EGUS?

And why do I care?

# EGUS: Equine Gastric Ulcer Syndrome

- Syndrome, not a disease
  - Multiple causes and presentations
- Ulceration of the gastric mucosa
- Two sub-conditions recognized under the same title:
  - Equine **Squamous** Gastric Ulcer Syndrome (ESGUS)
  - Equine **Glandular** Gastric Ulcer Syndrome (EGGUS)



# Symptoms of EGUS

- Decreased appetite, particularly for grain
- Recurrent colic episodes
- Poor weight gain, or weight loss
- Diarrhea
- Low-grade anemia
- Teeth grinding
- Cribbing
- Lack of energy
- Poor hair coat
- Change in attitude
- “Girthy” behaviour
- Poor performance
- Bucking
- Refusing jumps
- Irritation at leg aids
- Asymptomatic

# Causes of EGUS

- Stress
- Non-steroidal anti-inflammatories (bute or banamine) – high doses or long-term use
- High grain, low forage diets
- Chronic pain
- Systemic diseases
  
- Being a horse

# Questions So Far?





# Diagnosing EGUS

Picture time!

# Diagnosis of EGUS



- **Gastroscopy**
- Treatment trials
- Fecal occult blood tests
- Sucrose permeability testing

# Gastrosocopy

- 3 meter endoscope
  - portable options make on-farm diagnosis possible
- Standing, sedated procedure
- Endoscope passed via the nose into the esophagus to the stomach

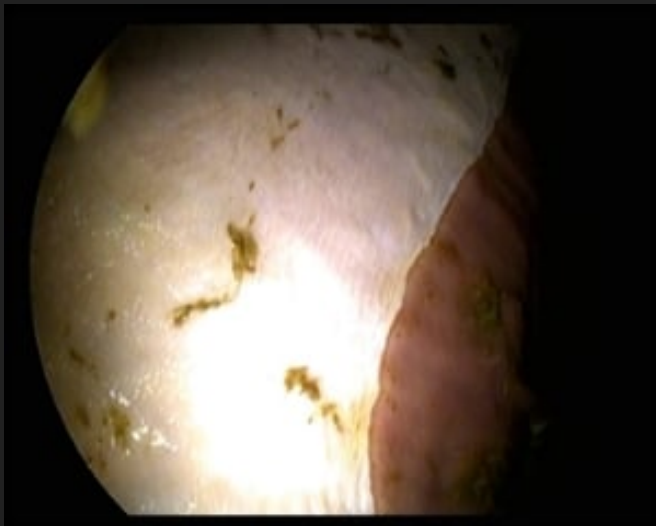
# Grading Gastric Ulcers

	Squamous mucosa	Glandular mucosa
<i>Grade 0</i>	The epithelium is intact and there is no appearance of hyperkeratosis (yellowing of the mucosa)	The epithelium is intact and there is no evidence of hyperaemia
<i>Grade 1</i>	The mucosa is intact but there are areas of hyperkeratosis	The mucosa is intact but there are areas of hyperaemia
<i>Grade 2</i>	Small, single, or multifocal (<5) superficial lesions	Small, single or multifocal (<5) superficial lesions
<i>Grade 3</i>	Large single deep, or multiple (≥5) focal superficial lesions	Large single deep or multiple (≥5) focal superficial lesions
<i>Grade 4</i>	Extensive lesions with areas of apparent deep ulceration	Extensive lesions with areas of apparent deep ulceration

Sykes, BW, & JM Jokisalo (2014) Rethinking equine gastric ulcer syndrome: Part 1 – Terminology, clinical signs and diagnosis. *Equine Veterinary Education* **26**(10): 543-547.

# Grading Gastric Ulcers

- Squamous Epithelium
  - Grade 0 (Healthy epithelium)



<https://static1.squarespace.com/static/548749ede4b0acae10b1a7b1/t/5692ab78d8af10b210efae06/1452452755732/>

- Glandular Epithelium
  - Grade 0 (Healthy epithelium)



[http://www.bwequinevets.co.uk/uploads/Services/Glandular\\_ulcers\\_ulcers\\_-\\_28\\_-35\\_day\\_healing.jpg](http://www.bwequinevets.co.uk/uploads/Services/Glandular_ulcers_ulcers_-_28_-35_day_healing.jpg)

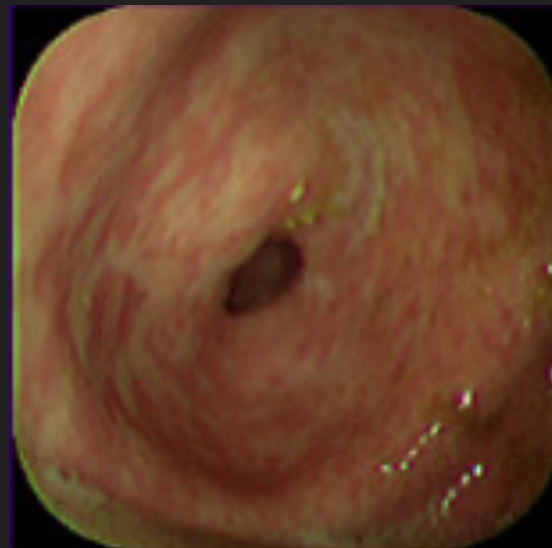
# Grading Gastric Ulcers

- Squamous Epithelium
  - Grade 1 (Hyperkeratinized)



Photo courtesy Dr. Christine Cocquyt

- Glandular Epithelium
  - Grade 1 (Hyperemic)



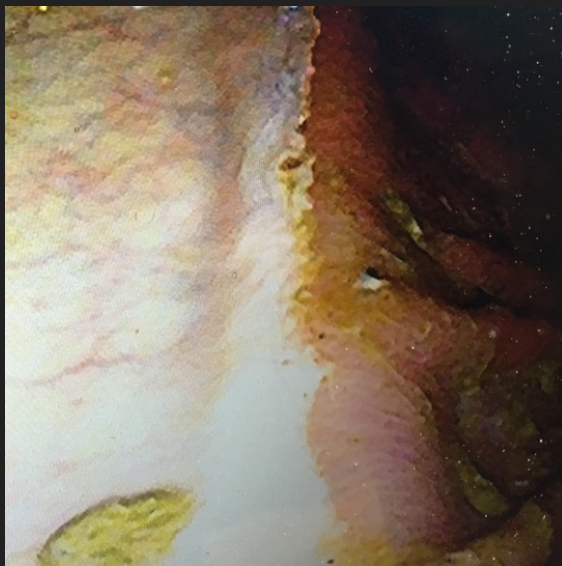
<http://www.bvec.co.uk/images/content/services/diagnostic/gastroendoscopy/gastroendoscopy-6x4-6.jpg>



# Grading Gastric Ulcers

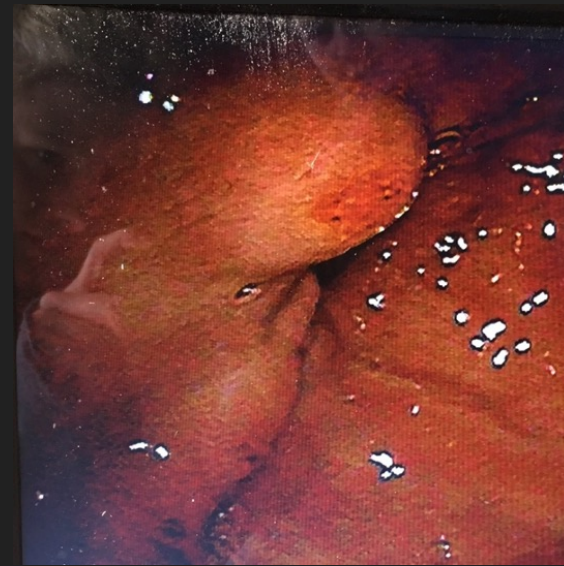
- Squamous Epithelium

- Grade 2 (<5 small, superficial ulcers)



- Glandular Epithelium

- Grade 2 (<5 small, superficial ulcers)





# Grading Gastric Ulcers

- Squamous Epithelium

- Grade 3 (Deep ulcers or >5 superficial ulcers)



- Glandular Epithelium

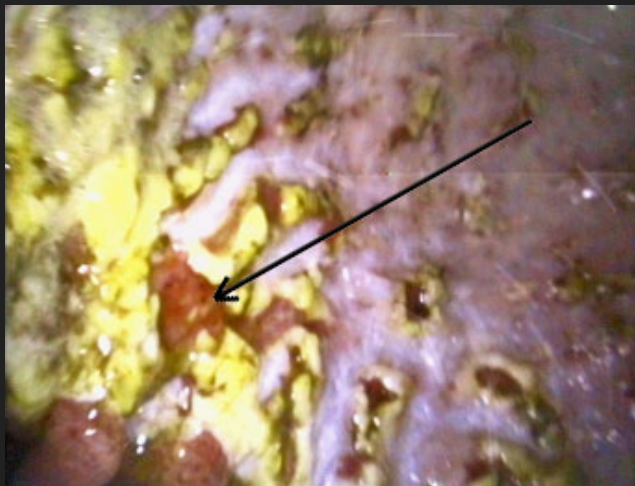
- Grade 3 (Deep ulcers or >5 superficial ulcers)



# Grading Gastric Ulcers

- Squamous Epithelium

- Grade 4 (Extensive ulcers with deep, possibly bleeding ulcers)



[http://www.scott-dunns.co.uk/images/gastric\\_ulcer\\_grade4a.jpg](http://www.scott-dunns.co.uk/images/gastric_ulcer_grade4a.jpg)

- Glandular Epithelium

- Grade 4 (Extensive ulcers with deep, possibly bleeding ulcers)



<http://cdn.thehorse.com/images/cms/2015/07/severe-eggd-use-only-with-associated-story.jpg?preset=medium>

# Treatment Options

# Goals of Treatment

- Increase comfort
- Decrease acidity
- Promote healing
- Prevent recurrence





# Decreasing Acidity

- Diet changes
  - Increased time chewing
    - Why?
  - Alfalfa
  - Decreased grain rations, or smaller volumes per meal



<https://static1.squarespace.com/static/52e05c74e4b0fbab872165d5/t/52e1c86ee4b072693228fc8b/1479263798111/budsy+with+hnn+trailer+size.jpg>

# Decreasing Acidity



- Proton pump inhibitors
  - Omeprazole (Gastrogard)
    - Once daily dosing
    - 28 day treatment course recommended
- H2 histamine receptor antagonists
  - Ranitidine (Zantac)
  - Cimetidine (Tagamet)
    - Three times daily dosing

# Omeprazole

You get what you pay for



# Omeprazole

- Gastrogard
  - Guaranteed concentration of drug
  - In buffered paste
    - Omeprazole is acid sensitive
  - Numerous studies to show efficacy
- Compounded omeprazole
  - Variable concentration of drug
  - Some forms have no buffers
  - May work for some horses, not for others

# Case-in-Point

- Teenaged school horse
- Suspect EGUS (no gastroscopy to confirm)
- Long-term treatment with compounded omeprazole
  - 1 month of full treatment dose
  - 14 months maintenance on half treatment dose



# Case-in-Point

- Teenaged school horse
- Suspect EGUS (no gastroscopy to confirm)
- Long-term treatment with compounded omeprazole
  - 1 month of full treatment dose
  - 14 months maintenance on half treatment dose



# Case-in-Point

- Cost of compounded omeprazole for duration of treatment: ~\$1700
- Cost of Gastrogard for 28 day treatment course: ~\$1400

# Increasing Comfort

- Short-term
  - Sucralfate
  - Antacids (tums, acid-fx, etc)
- Long-term
  - Healing
  - Preventing recurrence



[http://www.petmartpharmacy.com/images/product/10171\\_201111291146563807\\_ma.jpg](http://www.petmartpharmacy.com/images/product/10171_201111291146563807_ma.jpg)

# Promote Healing



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<https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcQp07pGZ6Cj1cal2pDSU7Qz-3jC8dDinkDnNUUEtaRi7HnecciQ>

- Decreasing acidity
- Misoprostol
  - Synthetic prostaglandin
  - Stimulates protective and regenerative aspects of **glandular** epithelium
- Corn oil
  - Increases mucous production of **glandular** epithelium



# Prevent Recurrence

- Diet changes
- Modifying stress triggers or intense exercise where possible
- Antacids prior to exercise
- Preventative acid suppression
  - ¼ treatment dose of omeprazole



<http://canigivemybaby.com/wp-content/uploads/2012/01/can-i-give-my-baby-tums.jpg>



Thank you!



Questions?

