Causes, predispositions, and pathways of laminitis
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For most of history the causes of laminitis have been based on observations, however, in the last 30 years or so, the number of theories has exploded, with only a few being confirmed by experiments. In the following list, plain text indicates theory only; italics indicates observation; underlined indicates disproved causes; and bold indicates proved causes. The citations may speak for, or against, or both.

Circulation
- AVA shunts
- Coagulopathy
- Mechanical Damage –
  - Road founder
- Lack of circulation from inactivity –
  - Supporting leg
  - Ship travel
  - Being kept in slings
- Trauma to the hoof – crushed under a wheel
- Over-rehydration
- Reperfusion
- Starling forces – edema
- Vasoconstriction
- Vasodilation

Endocrine
- Equine Cushings Disease
- Equine Metabolic Syndrome
- Estrogen –
  - From plants
  - From pregnancy
- Hyperadrenocorticism/cortisol
- Hypothyroidism
- Insulin Resistance
- Insulin
- Mares that do not come into heat
- Mares that are in continual heat
- Testosterone

Enzymes
- MMP2 & MMP
Hoof nutrients (lack)
    Glucose
    Methionine keratin synthesis blocked

Inflammation / edema
    Allergy
    Iron excess

Stress
    Colic
    Cold snaps (John Arkley, Palmer, AK personal communication June 2002)
    Draft/chill
    Drinking cold water when hot
    Heat
    Hypertension
    Parturition
    Standing in cold water after hard riding
    Superpurgation

Toxins
    Avacado
    Bee stings in great number – e.g. 100 (personal observation)
    Black walnut (Juglans nigra)
    Endophytes
    Endotoxins
    Exotoxins
    Histamine
    Hoary alyssum (Berteroa incana)

Infections –
    Allisonella histimiformans
    B. coli
    Bacterial lung infections
    Intestinal infections
    Lyme disease
    Potomac Horse Fever
    Retained placenta
    S. Equi
    Streptococcus bovis
    Viral respiratory infections

Mercury

Overeating –
Acidosis
Beet tops
Barley
Carbohydrates (starch)
Fructans
Grain
Lactic acid
Pasture
Protein
Rattlesnake venom
Red oak
Selenium
Toxic amines

Miscellaneous
Abdominal surgery
Colic
Corticosteroid administration
Deworming/Anthelmintics
Fatty liver
Genetics
High nerving
Kidney disease (Burney Chapman, Lubbock, TX, personal communication, June 1992)
Phenylbutazone
Strasser trim
Tumor necrosis factor
Vaccinations

Of the dozens of suspected causes of laminitis, only four have been shown to reliably create laminitis for the purposes of research (starch, black walnut, fructose, and insulin). Laminitis has also been caused experimentally by subcutaneous injection, or repeated intravenous injection, of histamine; and by lactic acid injected into the rumen of sheep.


5 Zundel A. The horse’s foot and its diseases. New York: Wm. R. Jenkins; 1886. p.172-3


8 Zundel A. The horse’s foot and its diseases. New York: Wm. R. Jenkins; 1886. p.173

9 Zundel A. The horse’s foot and its diseases. New York: Wm. R. Jenkins; 1886. p. 170

10 West C. Bluegrass laminitis symposium: what we know about laminitis. The Horse.com May 01, 2007; Article #9247


15 West C. Bluegrass laminitis symposium: what we know about laminitis. The Horse.com May 01, 2007; Article #9247


19 Pollitt CC. Equine laminitis: a revised pathophysiology. AAEP Proceedings 1999;45:188-192


33 Pollitt CC. Equine laminitis: a revised pathophysiology. AAEP Proceedings 1999;45:188-192


35 Larsson B, Obel N, Aberg B. On the biochemistry of keratinization on the matrix of the horse’s hoof in normal conditions and in laminitis. Nord Vet Med 1956;8:761-776


38 Pitzen D., Some laminitis problems in horses may be caused by excessive iron intake. http://www.animalsafetyproducts.com/drpitzennutritioniron.htm


41 Zundel A. The horse’s foot and its diseases. New York: Wm. R. Jenkins; 1886. p.172


43 Zundel A. The horse’s foot and its diseases. New York: Wm. R. Jenkins; 1886. p.172


50 Zundel A. The horse’s foot and its diseases. New York: Wm. R. Jenkins; 1886. p.174


54 Vanselow RU. Laminitis due to poisonous resistance factors in grass. The Farriers Journal 2009 (April) 137:6-10


63 Garner MR, Flint JF, Russell JB. Allisonella histaminiformans gen. nov., sp. nov. a novel bacterium that produces histamine, utilizes histidine as its sole energy source, and could play a role in bovine and equine laminitis. System Appl Microbiol 2002;25:498-506

64 Turner AW. The etiology of laminitis. Aust Vet J 1937;13:254-256


67 Reilly F. Lyme disease laminitis - why it happens.

http://www.equinemed surg.com/Heiro%20article.html#5
68 Mulville P. Equine monocytic ehrlichioisis (Potomac horse fever): a review. Equine Vet J 1991;23(6):400-4


84 Turner AW. The etiology of laminitis. Aust Vet J 1937;13:254-256

85 Frederick MF, Frederick S. Treating refractory laminitis: a field study of refractory laminitic cases that resolved on pergolide mesylate. In: 14th Annual Bluegrass Laminitis Symposium. Louisville, KY: 2001, p. 159-180


89 Turner AW. The etiology of laminitis. Aust Vet J 1937;13:254


92 West C. Bluegrass laminitis symposium: what we know about laminitis. The Horse.com May 01, 2007; Article #9247


Thomas EF. Autogenous blood therapy in laminitis. No Am Vet 1945;26(May):278-279


