

The technical name for "bleeding" is exercise-induced pulmonary hemorrhage (EIPH). This describes a condition in which the tiny blood vessels in a horse's lungs rupture due to stress sustained during physical exertion. EIPH occurs in three variations. Simple EIPH is an acute condition resulting from the strain of exercise. Patent pulmonary hemorrhage (PPH) involves bleeding in the lungs as a reaction to an allergen, infection, or due to hypertension. Some horses experience composite bleeding, which is the result of the combined effects of simple EIPH and PPH. PPH is a chronic condition which must be treated with various medications. The effects of simple EIPH heal naturally over the course of several days.

Simple EIPH occurs as the natural consequence of strenuous running due to the layout of the horse's organs and the way the equine body moves during high-speed galloping. The horse's body is divided into two halves. The front end of the horse's trunk contains the heart, lungs, and other major organs. The back half of the horse contains the intestines, which are suspended within the abdomen by ligaments. The two halves are divided by a thin sheet of muscle called the diaphragm.

When the diaphragm contracts, the effect is to increase the volume of the horse's front half, the chest cavity. This increased volume draws air into the lungs. When running, this movement is synchronized such that the horse inhales when his front feet hit the ground and his skeletal structure is stretched to its maximum length. When the horse's front feet leave the ground, the skeletal structure is compressed and the diaphragm relaxes. The constricting chest cavity forces air out of the lungs, and the horse exhales.

Due to the back-and-forth motion of galloping, the horse's intestines swing like a pendulum at the end of the suspensory ligaments. When running at full speed, especially in the fastest sprint races, the movement of the intestines can get out of phase with the movement of the diaphragm in such a way that the intestinal mass is swinging forward as the horse is trying to exhale. This causes the diaphragm to be slammed forward and slightly upward. The diaphragm, in turn, squeezes part of the lungs against the chest wall.

The lungs are filled with alveoli, tiny air sacs, and capillaries, miniscule blood vessels. The alveoli and capillaries are so fine and so interconnected that oxygen from the inhaled air can pass into the bloodstream, and carbon dioxide in the blood can pass out of the blood into the lungs to be exhaled. The capillaries are at their smallest and most efficient near the rear, tapered end of the lungs where they meet the diaphragm.

It is exactly these most efficient, extremely fine capillaries which are repeatedly impacted by the forward-surgng intestinal mass. As they rupture under the stress, the horse's air passages become clogged with blood. Obviously, this causes difficulty in breathing which causes difficulty in running.

Some studies suggest that airborne debris, such as dust and pollen, play a role in EIPH. Increased fluid and mucous or inflammation due to these irritants obstruct the horse's airways and require even harder breathing during a race.

Virtually every equine athlete that is required to gallop for prolonged periods is susceptible to the effects of simple EIPH -- bleeding caused by the strain of exercise. However, the problem is most widespread in thoroughbreds and running quarter horses because they maintain a high speed for up to two minutes or more. The problem is less severe in steeplechasers, standardbreds, and heavy draft horses because they run at slower speeds due to the nature of their competition.

Once EIPH starts in a horse, it tends to be a lifelong problem.

