I can hear SAND

by Dr Jennifer Stewart

Not all horses intentionally eat sand as part of their diet, but they do consume a certain amount when grazing pasture that is already grazed down to the roots, or pasture based in loose soil, as they invariably pull up the roots along with dirt/sand with each mouthful.

Hay fed on the ground or even on the sand bedding in the stable can also be a way horses ingest sand, and there are always those horses that are 'vacuum cleaners' that sift through the dirt looking for the very last bit of hay or grain, invariably consuming sand as they go.

Regardless of how the horse consumes the sand, once consumed it passes through the small intestine, but can accumulate in the large intestine, causing irritation and obstruction, diarrhoea, weight loss, colic and poor performance.

WHY does the sand build up and cause problems?

Owing to its density and gravity, sand settles in the lowest portions of the gastrointestinal tract. The density and friction

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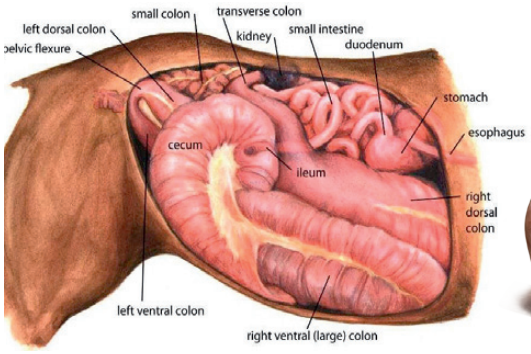
between grains of sand make it hard to move through the gut, and when consumption is constant, even small amounts can cause abrasion, damage and inflammation of the bowel wall and reduce the normal involuntary constriction and relaxation of the muscles of the intestine that create wavelike movements to push the contents forward (peristalsis), such that large accumulations can develop at multiple sites. Food passage slows when it enters the large intestine and combined with the huge volume of the large intestine (~140 litres) and that, in some sections of the tract the intestinal contents flow backwards and forwards, sand can easily accumulate.

When not continually exposed to sand, most horses expel the consumed sand during the normal waves of intestinal contractions. Large amounts of sand compromise this action plus the heavy weight can disorder normal intestinal contractions and lead to displacement and twisting of sections of bowel. Intestinal sand can also become trapped at narrow sections of the gut – leading to impaction and distension of the obstructed bowel with gas, fluid and feed.

These conditions are known as 'sand colic', 'sand enteropathy' or 'sand-related gastrointestinal disease' and can vary from no symptoms to fatal obstructions, twists and displacements. The signs vary between individuals and are often non-specific in that they can also occur in many other disease states.

There are some horses (especially foals and young horses) that do 'eat' sand and dirt deliberately – which is thought to be due to boredom or salt deficiency. Often the soils eaten are high in iron and copper.

Because of the non-specificity of the symptoms of sand accumulation, it is not usually possible to make a diagnosis on clinical signs alone. Your veterinarian may listen to the gut using a stethoscope, perform an internal rectal examination to check for sand-filled organs, do a manure (faecal) sand sedimentation test, or arrange an abdominal ultrasound and/or abdominal radiography. Sand accumulations are often located in segments of bowel that are beyond reach in rectal palpation and only segments within reach can be assessed. The faecal sand sedimentation test is a useful screening tool, but shows only whether there is sand in the manure – it doesn't reveal how much sand is in the gut or the location(s) and can give false negative findings. And, not all horses affected by intestinal sand shed sand in their manure.



The episodes of colic may be *acute* (severe), *chronic* (persisting for a long time or constantly recurring), *intermittent* (irregularly) or *recurrent* (often or repeatedly).

The most common signs are diarrhoea and abdominal pain (colic). Weight loss in your horse or the inability to gain weight, have a poor appetite, depression or poor performance are sometimes seen, and increased wear of the teeth and poor coat condition can also occur.

The sand may have been accumulating over a prolonged period of time before your horse shows any clinical signs and sometimes the signs of colic settle before all the sand has disappeared. However, new episodes of pain can occur after treatment when the sand accumulations start to move through the gastrointestinal tract.

'LISTENING' TO SAND

The propensity of sand to sediment allows us to 'listen' for sand sounds over the lowest part of the belly using a stethoscope. The sounds are produced by friction between sand grains in the bowel during intestinal muscle contractions. They are gritty, of variable duration and intensity, and have been described as similar to the sound produced by a paper bag that was partially filled with sand and slowly rotated, or to that of a soft wave on the beach. Listening (auscultation) is only effective when sand-filled intestines are in contact with the ventral abdominal wall (the underside of the horse). It is performed by placing a stethoscope behind the last part of the breast bone or sternum and listening for upwards of five minutes. The frequency, intensity

and loudness of the sounds are dependent upon intestinal motility and contact of the sand-filled bowel with the belly wall. Listening is not effective in detecting sand accumulations involving intestine anatomically incapable of contacting the ventral body wall.

The minimum quantity of sand necessary to produce sounds is not known, but from clinical experience, the intensity of sand sounds increases with larger accumulations of sand, and coarse sand generates louder sounds than does fine. Although listening for sand sounds can be valuable for 'hearing' sand it doesn't reveal the amount or location(s).

MANURE TEST

The faecal sand or manure test (also known as the 'plastic glove' test!!) is based on the assumption that if a horse eats sand, then the sand will pass out in the manure within a certain period of time. Some studies found that within 11 days of ingesting sand, 70% will have passed out in the manure, but this isn't true 100% of the time.

There are several ways to check for sand in the manure: break 6 manure balls into a litre of water, allow to settle overnight, any more than 1 teaspoon of sand indicates sand accumulation in the gut; alternatively collect 2-4 manure balls in a disposable plastic glove, turn glove inside out and add water, more than 0.6cm of sand is abnormal. The reliability of the results has been questioned because detection of sand means only that the horse has eaten sand – not how much or whether it has sedimented in the gut; false negatives (ie horse has sand in gut but not in manure) can occur; over 50% of normal healthy horses have small amounts of sand in their manure, and sand in the manure shows it's being cleared but not whether there are retained accumulations. This last point can however help monitor the response to treatment and early observation of sand can reduce the examination and treatment costs, as well as the need for invasive treatments such as surgery.

Photo compliments West Coast Veterinarians

Manure in glove on the left is in water and the fingers of the glove filled with sand, while on the right manure balls placed in paraffin oil retained their shape and no sand was visible.

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MINIMISE/REDUCE SAND ACCUMULATION

- The best preventative measure can be in your normal stable management routine. If sand is a problem in your area or your horse has a history of sand colic then feed hay out in hay nets with rubber matting, old carpet or bags under the net to catch the 'droppings', or in feed racks that have a catchment base. Have rubber down under feed bins in the stable.

- In horses showing clinical signs of sand colic, pre- and probiotics are thought to reduce intestinal inflammation and *Saccharomyces boulardii* has been shown to improve the response to conventional treatment in cases of acute inflammation of the whole gastrointestinal tract. The dose rate is 25g twice a day

- A nutritional supplement combining probiotics, prebiotics and psyllium may be an effective preventative treatment for sand enteropathy and sand colic when management alone is not sufficient to prevent intestinal sand accumulation.

- A preventative recommendation is to supplement the feed of clinically normal horses - those not showing indications of sand colic - with psyllium or psyllium and magnesium sulphate as a bulk laxative to prevent sand accumulation. It should not be fed all the time as horses can develop a 'tolerance', which decreases the effectiveness.

There are several methods and it is just a matter of finding the one that works for you and your horse. Discuss the options with your veterinarian. One method is feeding psyllium (0.5 to 1gram/kg bodyweight of the horse, so for a 500kg horse at .5 gram you would feed 250g) a couple of times a week during periods when the horses are in sandy situations; another is to feed (0.5 to 1g/kg bodyweight) for five to seven days every month and, yet another is to feed a larger amount (1g/kg bodyweight) for two consecutive days and repeat this process monthly.

- A study at the Faculty of Veterinary Medicine, University of Helsinki, Finland found a combination of psyllium and magnesium sulphate ($MgSO_4$) was effective in clearing accumulated sand from a horse's large colon. The dose was 1g/kg horse's body weight for both ingredients and, for this research project the dose was administered by nasal tube once daily for four days.

It is vital that water is made available at all times when feeding psyllium to ensure it does not hinder the passage of food through the gut. While water should be available don't add it to the feed that contains psyllium as it makes it difficult for the horse to eat and can clog stomach tubes.

Monitor your feeding practices in the paddock as placing hay on the ground in paddocks with no, or sparse grass cover, increases the risk 6-fold.

- When turning horses out into overgrazed pasture consider supplying extra hay. Research by the University of Florida (USA) indicated that feeding large amounts of hay (2.5% of body weight…10kg for a 500kg horse) uniformly produced the largest sand output of four methods tested.

- Having horses on lush pasture may help in reducing sand accumulation.

- Sandy soils plus long grass increase the risk as roots of long grass are less anchored in sandy than clay soils and horses might ingest more sand when involuntarily picking up these roots.

- Be aware that pastures that have been flooded can cover grass in silty sand.

- When the pastures become overgrazed consider providing extra roughage (hay or non-toxic branches such as those from the Lucerne tree) as underfed horses and those with a low condition score tend to consume more sand.

- A grazing muzzle can be useful as prevention of sand ingestion and may result in resolution of accumulations in some horses.

Have fresh water available as horses drinking from puddles and muddy ponds can increase sand accumulation.

RADIOGRAPHIC EXAMINATION

The most useful tool for detecting sand accumulations is radiographic examination of the horse's abdomen. It can also be used to monitor the effects of medical treatment in removing sand from the large colon and the resolution of sand accumulations. Four overlapping images are usually needed to cover the whole gastrointestinal tract. Accumulations typically appear as opaque masses – with coarse sand more opaque than fine. The size of the radiographic sand accumulations is related to the severity of the colic.

SURGERY

Unfortunately, sometimes none of the diagnostic tests and investigations reveal the true situation and — based on the history, clinical signs and veterinary examination — explorative surgery is necessary. The amount of sand required to induce a clinical problem varies between horses – some have 50kg removed at surgery, while as little as 8 kg has been found in other horses that required surgical intervention for sand/gravel impaction. Sometimes multiple incisions are needed to remove all of the sand. Long-term survival after surgery for sand impaction is around 90%.

DRUGS

Mild cases of sand colic may respond to anti-inflammatory drugs, mineral oil, dioctyl sodium sulfosuccinate, magnesium sulphate, or psyllium mucilloid alone or combined with pre- and

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Sand in the horse's gut

Sand continued...

probiotics. Once treatment has begun, it can take several days before the sand starts to move; the amount of sand passed can vary each day and may continue for many weeks.

The dose of psyllium (which increases contractions in the intestines, pushing food through) varies from 0.5 to 1gram/kg bodyweight of the horse. Depending on how fussy an eater your horse is, it can be fed with chaff or, if needed, molasses or other taste-masking feeds added.

Research has shown that combining pre and probiotics supplements with psyllium increased the sand output. Researchers felt the psyllium increased the gut motility while the pre and probiotics may have reduced the inflammation normally caused by sand accumulation.

Probiotics are living organisms that when ingested exert a beneficial effect beyond nutritional value.

Prebiotics are nondigestible food ingredients that beneficially affect the host by stimulating growth or activity of certain bacterial components of the intestinal microflora. The organisms found to be helpful are the nonspore-forming lactic acid bacteria *(Lactobacillus acidophilus and Enterococcus faecium)* and yeast.

PROGNOSIS

In most cases, if exposure to sand ceases, the healthy large intestine should be able to eliminate 100% of the sand without clinical signs.

In both surgical and nonsurgical cases the prognosis is good, but the condition may recur so understanding the risk factors In both surgical and nonsurgical cases the prognosis is good, but the condition may recur so understanding the risk factors, and taking steps to ensure your horses' management procedures take these into account, is important. As always, if in doubt about your horse's health, especially if you suspect a sand burden, consult your vet to discuss your concerns and the most appropriate steps to take.

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An equine veterinarian with over thirty five years' experience, Jennifer is also a consultant nutritionist and has formulated feeds, custom mixes and supplements for leading international horse feed manufacturers in Australia, India, Ireland, Japan, New Zealand, Philippines, South Africa, Thailand, Turkey and the UAE. Dr Stewart is passionate about equine nutrition and its role in the management, treatment and prevention of many equine disease and she is committed to bringing 'science to the feed bin'. For more information visit

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