

How water works



Lapping it up: swimming requires an extended back posture, for which racehorses – such as Mongolian Khan from the Murray Baker stable in New Zealand, pictured here – are often best suited

It has long been recognised how humans can benefit from hydrotherapy, and research is ongoing in the equine sector. **David Rowland MRCVS** shares the science behind this use of water

THE health benefits of hydrotherapy for humans are well documented.

Hydrotherapies such as water-treadmill exercise and swimming are known to enhance cardiovascular and muscular function, decrease limb pain and inflammation, reduce limb loading and improve joint motion.

In the equine world, however, many questions are still to be answered. It is hoped that ongoing research will add scientific weight to the perceived beneficial effects of various aquatic therapies.

Great effects

THE term hydrotherapy refers to the use of water – hot, cold, as steam or as ice – to enhance health and wellbeing. The effects of cold therapy include constriction of blood vessels (vasoconstriction) and reduced blood flow, resulting in a decrease in bleeding and

swelling. Nerve conduction is also lessened, reducing pain. A lower metabolic rate in turn reduces cell death from hypoxia (insufficient oxygen), which helps preserve tissue viability and can shorten healing time.

Cold therapy can be achieved via several methods, including cold hosing and ice packs.

● To be most effective, tissue temperatures must be reduced to between 15°C and 19°C (tissue damage can occur at temperatures below 10°C).

● Cold therapies can be effective to tissue depths of up to 4cm, depending on blood supply and fat thickness.

● Timing is critical. Cold therapy is most effective when applied immediately after acute injury; after 48 hours the benefit is much less. During this 48-hour window, 10-20 minutes of cold hosing or iced water treatment is advised with breaks of between 30 minutes and four hours separating sessions.

● Commercial cold packs for

horses are constantly evolving, although studies in the cooling of human skin have shown that the application of “wet ice” (chopped ice wrapped in a wet cloth) is at least as effective as “dry ice” (ice flakes in a plastic bag).

● Never apply ice for a prolonged period of time or directly on to the skin. Use a damp cloth as a buffer to protect tissue and dissipate the cold.

How it works

● Hydrotherapy is based on the combined effect of five variables: buoyancy, viscosity, hydrostatic pressure, temperature and salt concentration.

● Buoyancy is a lifting force. In horses, water at the level of the shoulder produces a 50-60% reduction in bodyweight. Increased buoyancy reduces the effects of loading forces on the joints and the surrounding muscles, tendons and ligaments. This helps reduce pain and inflammation, and

encourages better joint motion.

● Viscosity encourages greater use and control of muscles.

Water is 800 times more viscous than air. The increased effort needed to move through water requires increased muscle activity, which improves muscle strength and joint stability.

● Hydrostatic pressure facilitates neuromuscular (nerve and muscle) function by stimulating nerves and receptors in joints. This can reduce oedema (fluid swelling), enhance joint motion and relieve pain.

● Temperature can have a dual effect. Warm water will improve muscular blood flow and stimulate lymphatic drainage. Cold water will reduce blood flow, lessening inflammation and pain.

● Salt concentration delivers anti-inflammatory and pain-relieving effects. The osmotic effect of salt draws swelling from inflamed tissues. In one study, horses with known lower

Pictures by Vince Caligiuri/Getty Images and Lucy Merrell



Simple cold-water hosing remains the trusted remedy for tired or filled legs

limb injuries were stood in cold saltwater baths (5-9°C) for 10 minutes, three days a week, for four weeks. Healing of digital flexor tendon and suspensory ligament lesions was apparent, both clinically and on ultrasound scans. In the same study, visual improvements in the degree of soft tissue swelling were apparent within the first eight days.

● Exercising a horse in water provides a medium in which these factors can be altered to tailor individual rehabilitation programmes for specific musculoskeletal conditions.

Total immersion or not?

SWIMMING can have a cardio-respiratory benefit in equine fitness development. Horses are not natural swimmers, however, and not all will adapt well to this training method.

When swimming, a horse moves with an extended back posture. In my experience racehorses tend to cope best with this, whereas some dressage horses and showjumpers that are trained

to work in a flexed back outline may be less suited to this form of exercise.

An underwater treadmill is another fitness option, although the muscle patterns a horse uses on a treadmill are different from those on the ground. The horse is committed to the speed set by the apparatus, which may lead to compensatory changes in the way he moves and cause further issues.

When walked in the sea or through a river, a horse uses muscle patterns nearer to those of propulsion on land and can regulate his own speed. However, be aware of tides and dangerous currents at the beach or in fast-moving rivers, and always check underwater footing.

Another important factor is the depth of the water. If this is kept quite low, the horse is encouraged to pick his feet up in a similar way to when doing pole work. Yet if the water is deep, the muscle pattern changes and horses are more prone to move with an extended back posture similar to that used when swimming. **H&H**

● The British Horseracing Authority (BHA) issues a certificate of approval for equine pools meeting criteria in areas including staff, health and safety, public liability insurance, security, hygiene and vaccination status of equine pool users. Visit: www.britishhorseracing.com

Working on a treadmill

EQUINE underwater treadmills are becoming popular in the sport horse world. Benefits include:

- improving the horse's range of movement,
- building muscle with minimum stress on the front legs/hooves, and
- it is low intensity, and so suitable for fit horses and those recuperating after injury.

Dressage superstar Valegro (Blueberry) enjoys a weekly – twice in the build-up to a championship – Aqua Fir water treadmill session at Hartpury College (pictured below).

“Carl [Hester] and Charlotte [Dujardin] like the water treadmill because it makes Blueberry move through the range of movement they are looking for in his work, but in a nice, relaxed and non-intensive way,” explains Fizz Marshall, manager of Hartpury's Equine Therapy Centre.

Blueberry has the water around hock height. “The treadmill encourages horses to ‘sit’ behind, which is what you're looking for in a dressage horse. It makes them drive with the hind legs and helps them to take the weight off the front legs,” adds Fizz.

Horses work much slower in the Aqua Fit compared to walking over land, allowing time to go through the bigger range of movement that is desired.

“With a longer stride duration and a lower stride frequency, the horse takes bigger, longer steps and the water encourages the hind legs to step underneath, giving more power. This helps to build up the important muscles in the hind quarters and over the lumbar area of the back,” says Fizz.



Valegro works on an underwater treadmill frequently because it allows a wide range of movement in a non-intensive way