

# European Trainer

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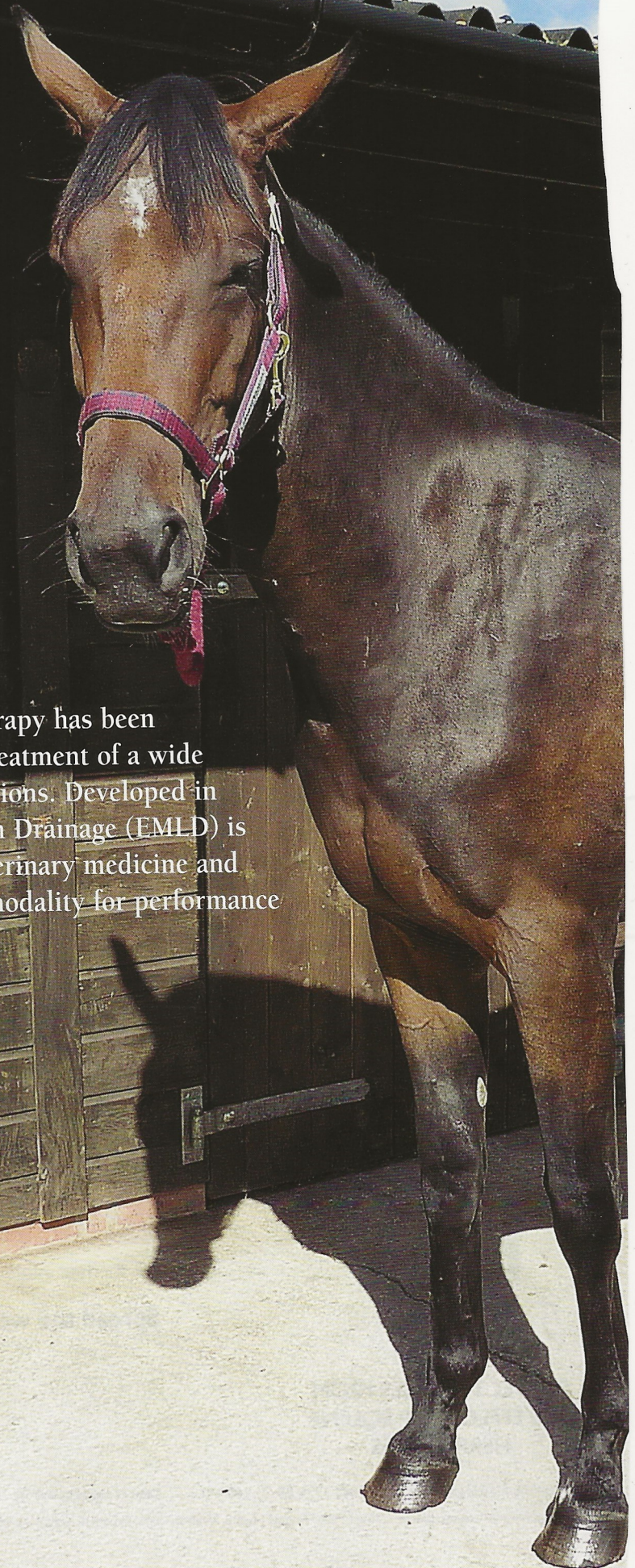


# Equine Manual Lymphatic Drainage

**Clinical applications  
for the equine athlete**

Manual Lymphatic Drainage therapy has been established for decades in the treatment of a wide variety of human medical conditions. Developed in Germany, Equine Manual Lymph Drainage (EMLD) is slowly gaining a foothold in veterinary medicine and becoming a popular treatment modality for performance horses on the continent.

WORDS AND MAIN PHOTOS: REBECCA BLENTOFT





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MLD is proving to be effective in the treatment of lymphatic insufficiency as well as improving recuperation times after injury or periods of high exertion. Here we will examine the role of the equine lymphatic system, how it differs from that of the human, and describe the clinical applications of this relatively new therapy.

**Understanding the lymphatic system and its function**

The lymphatic system is an extensive system of vessels and nodes that plays a crucial role in maintaining fluid balance within the body by collecting and returning interstitial fluid to the venous system of the blood. Interstitial fluid fills the spaces between muscles, organs, and other cellular structures, and allows substances such as oxygen and nutrients to travel through it to reach the cells. Arterial filtrate and larger particles such as cell debris, bacteria, dead blood cells, pathogens, toxins, and protein molecules are collected by the lymphatic system from the interstitium through small, initial lymphatic vessels (ILVs). These ILVs begin blind in the tissues rather like the fingers of a glove and are joined by anchoring filaments to the collagen fibres of the connective tissue. These form a network of superficial lymph capillaries draining first to pre-collectors and then to the larger collector vessels. Each single unit, or angion, fills up with lymph until the internal pressure stimulates muscle cells to push it through a valve into the next angion. These valves are designed to prevent lymphatic backflow into the previous angion and therefore they dictate the direction of lymph flow.

The lymphatic system does not have an organ to act as a pump to help with the

circulation of the lymph. It relies upon extrinsic factors such as muscular contraction, arterial pulsation, the peristaltic action of the intestinal system and increased thoracic pressure during deep respiration to stimulate lymphatic flow. Intrinsic factors include the contractions of the muscle fibres of the collector vessels and the rate of absorption of lymph by the ILVs.

Areas of ILVs, pre-collectors, and subcutaneous collectors work together in

*“Horses prove to be excellent subjects for EMLD, responding far more effectively than humans. As there is no muscle below the knee or hock it is possible to stimulate both the superficial and deep collectors from the tarsus to the hoof”*

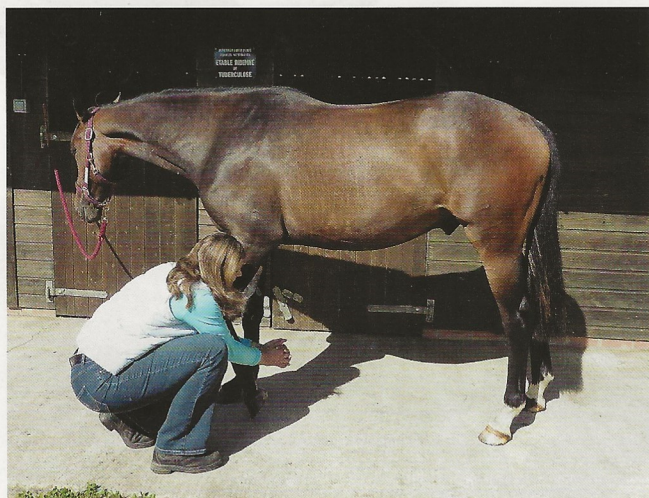
designated skin territories, delineated by lymphatic ‘watersheds.’ Each of these skin territories drains to a specific group of lymph nodes. Lymph from one skin territory will generally not travel across these watersheds into other skin territories unless the neighbouring territory becomes very congested. In these instances, the lymphatic system can use anastomoses – small connecting vessels – to cross the watersheds and enable lymph to pass.

The superficial lymphatic system drains the dermis and the skin, whilst the deep lymphatic system drains the mucosa, nerves, tendons, tendon sheaths, joints, and muscles. Each internal organ also has its own specific deep drainage pathway. Lymphatic fluid slows and becomes more concentrated when it enters a lymph node. Nodes act as biological filters and play an important part in immunological response, being responsible for the manufacture of T-lymphocytes. The cleaned and filtered lymph re-enters the blood supply via the external jugular veins.

**Major differences between human and equine lymphatic systems**

Although there are similarities between human and equine lymphatic systems, there are some profound differences between them, the misunderstanding of which can lead to the health of the horse being compromised. The horse has evolved from a small flight animal designed to be in almost constant motion, to the animals we utilise today. Although there have been great changes in the external appearance of the horse, its physiology remains largely similar to that of its earlier ancestors. One study of feral populations of horses has shown them to be walking between 6 to 8 kilometres per 16-hour day, although it must be understood that if food is limited or scarce, horses can travel 30 kilometres a day. Modern methods of keeping horses stabled, with limited time for free exercise and concentrated physical training sessions, can lead to compromised lymphatics and its associated complications.

One of the main differences in the equine lymphatic system is the significantly lower number of smooth muscle cells compromising the wall of the collector vessels. Research has revealed that equine collectors within the cutis



A horse receiving Lymphatic Drainage technique





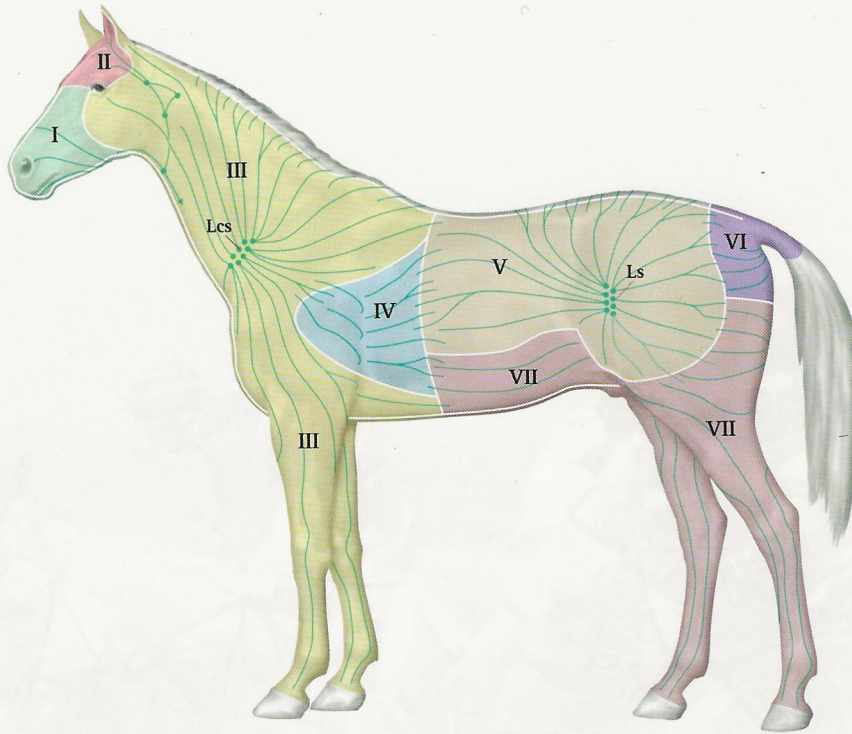


Diagram illustrating the lymphatic skin territories of the horse, delineated by lymphatic watersheds (depicted by white lines)

are comprised of 40% elastic fibres – markedly more than in humans – and the cutis represents the horses’ own “compressive bandage.” This means that the horse requires far more physical movement in order to activate its lymphatic retraction apparatus and encourage the transport of lymphatic fluid. The elastic fibres are assisted by a “pump mechanism” in the hoof and the fetlock joint, which assist lymph travel up the collector vessels. This high proportion of elastic fibres may have developed because there are no muscles in the lower limbs of the horse to aid with the contraction of the vessels.

Therefore, when a horse is standing still, the transport capacity of the lymphatic system

decreases significantly. The rate of lymph flow will be reduced and lymph flow by volume will drop. This puts the standing horse at a distinct disadvantage with regard to recovery from injury or exertion. In addition, the horse has an extremely high number of lymph nodes – roughly 8,000 (4,000 of which are in the ascending colon), compared to an average of 600 in the human. The equine lymphatic system is therefore compromised when access to ad lib food is restricted, as the lymphatics of the duodenum are stimulated by the continuous flow of forage through the intestines. As lymph slows down and concentrates upon entering each node, horses have a greater propensity for lymphatic

“bottlenecks” than other mammals.

As swollen legs in horses are generally not considered an illness, many owners will try to reduce swelling by using stable bandages over padding. However, in 2006 a large veterinary study on the effect of different types of bandaging on the lymphatic vessels was undertaken. This involved injecting a continuous stream of contrast medium (dye) into the lymphatic vessels of horses under sedation and x-raying the effects. Horses bandaged with the stable bandages were found to have significantly impeded lymph flow, compared to those bandaged with specially designed compression stockings. Horses’ tendons have been shown to contain a high density of lymphatic vessels to blood vessels. This highlights the need for further increased awareness of the clinical effects of bandaging on lymphatic performance. The authors of the study recommended that in the future, the materials and construction of both veterinary and equine sports bandages be reconsidered.

### Horses are ideal candidates for EMLD

Horses prove to be excellent subjects for EMLD, responding far more effectively than humans. As there is no muscle below the knee or hock it is possible to stimulate both the superficial and deep collectors from the tarsus to the hoof. In humans, it is more difficult to stimulate the deep collectors due to a much thicker subcutaneous layer.

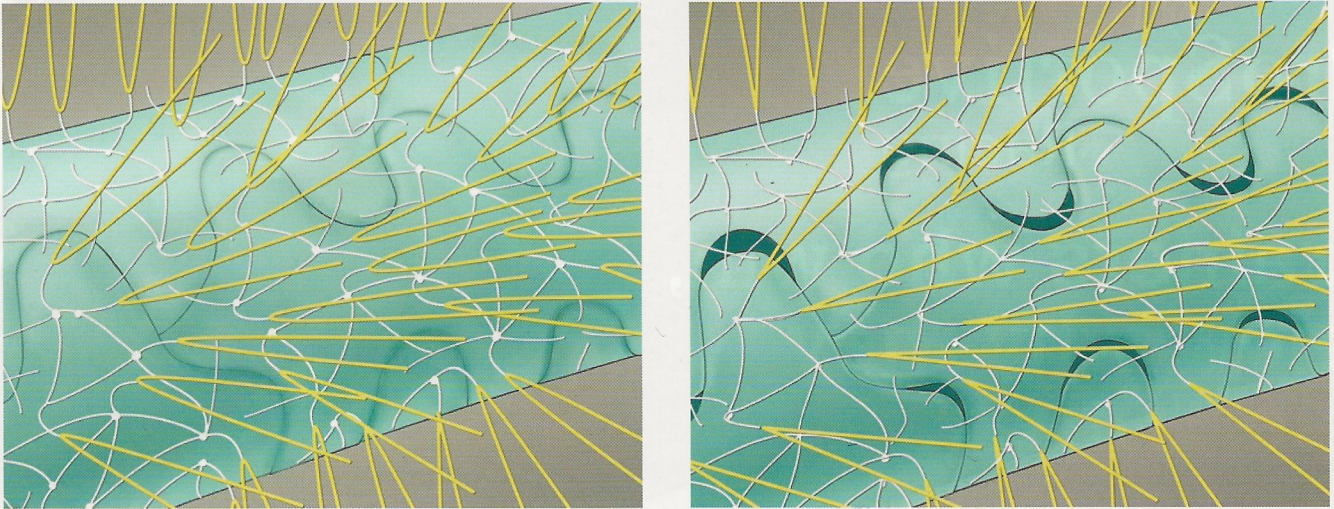
### How does EMLD work?

EMLD is a highly specific massage technique that works by stretching the skin in the direction of lymphatic flow in a biphasic, rhythmical manner in order to increase the rate of interstitial fluids being drawn into the ILVs. Each movement consists of a “push” phase, whereby the ILVs are emptied into the pre-collectors, and a “relief” phase, whereby the ILVs are dilated by the anchoring filaments in order that fluid can flow into them. Practical training and experience is required by



A horse receiving Lymphatic Drainage technique





Representative diagram of a lymphatic collector vessel anchored in the interstitium by filaments (shown in yellow). Shown in a closed position (a) and an open position (b)

therapists in order to learn the specialised hand movements. If EMLD is employed with disregard to the specific direction of lymph flow, the correct rhythm and speed, or to the required relief phase, EMLD can be ineffectual and, at worst, detrimental to administer.

There are specific treatment protocols for each area of the horse, although the therapist will often need to adjust the length of time spent on specific areas depending on the quality and feel of the oedematous areas. The first step in treatment requires the activation of the superficial cervical lymph nodes, as this increases the direction of flow from the left thoracic duct to the jugular vein, where cleaned lymph returns to venous system of the blood. Therapists use anastomoses to push lymph from one skin territory to the next.

*“EMLD is a highly specific massage technique that works by stretching the skin in the direction of lymphatic flow in a biphasic, rhythmical manner in order to increase the rate of interstitial fluids being drawn into the ILV”*

Myofibroblasts exert a “pacemaker” activity in lymphatic vessels, which might explain why EMLD is so effective and is able to stimulate collectors outside, as well as inside, the area where the technique is applied.

EMLD must ideally be performed daily for the first phase, and after results are seen this can be reduced to 2-3 times per week, until the oedema has diminished. In cases of chronic cellulitis or lymphangitis, prophylactic EMLD is usually recommended.

Compressive bandaging is used as part of Combined Decongestive Therapy (CDT) for the treatment of oedema. Specialised short-stretch bandages are used as they exhibit a low resting pressure when the horse is standing and increase pressure only when the horse is in motion. Bandages are applied over 100% cotton wool roll as it stops the bandage from sliding off, and it is padded out to provide a cylindrical profile. The bandage is applied with graduated pressure from the hoof upwards, to encourage lymph flow out of the limb. Horses are then trotted up to check the efficacy of the bandage, and may be turned out in an arena or dry and even pasture. Ideally, bandages are applied after exercise and an EMLD treatment, and if possible, the horse is exercised again after bandaging. The most beneficial gait for such exercise is a slow canter, as the negative intra-thoracic pressure generated is higher.

Therapists may augment EMLD with other treatment modalities, such as the use of Deep Oscillation™ which uses an electro-static charge to gently “shuffle” cells and is beneficial in softening protein fibrosis and improving healing times. The use of Kinesio tape (see “Working the Kinesio tape therapy magic” in Issue 32) can also be used to increase effectiveness by encouraging lymphatic fluid to keep draining after each treatment session. Both Deep Oscillation™ and Kinesio tape are well tolerated by horses, but there are currently no scientific studies that conclusively prove their effectiveness in augmenting EMLD.

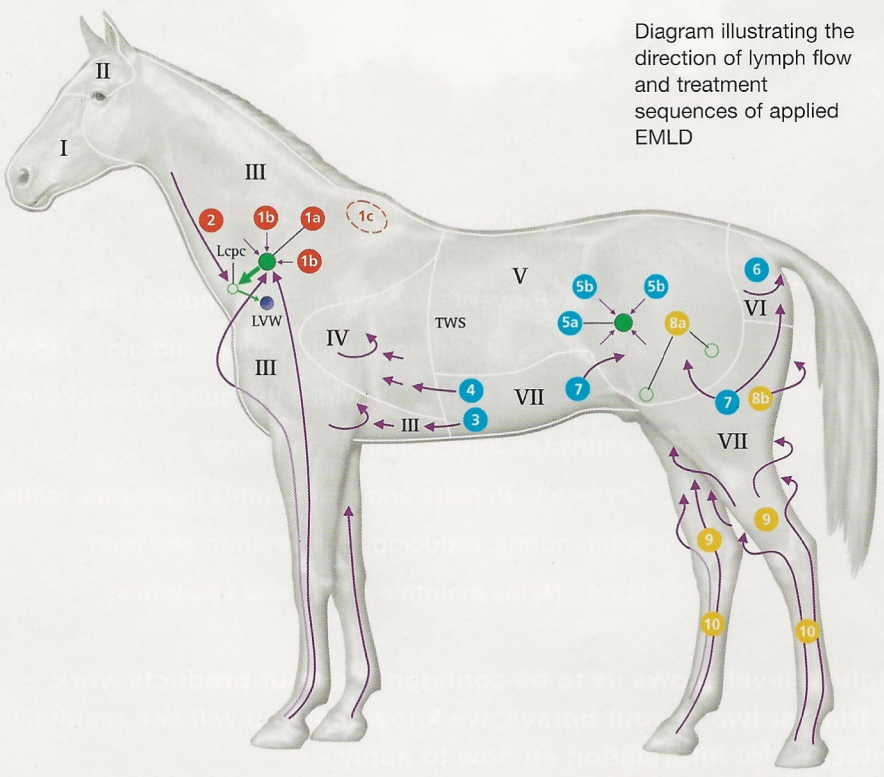


Diagram illustrating the direction of lymph flow and treatment sequences of applied EMLD



The therapy is effective in a wide variety of clinical applications:

- Reduction in recovery times after periods of high exertion, leading to less stiffness or soreness. Human MLD used as a prophylactic for professional athletes increases lactate elimination and this has also been confirmed in equines.
- Reduction in recovery times from surgery or injury, due to faster removal of exudates and inflammatory cells. EMLD is effective in encouraging the healing of poorly healing wounds and can also reduce scarring.
- Significantly reduced recovery times in the treatment of tendinitis. It has been shown EMLD encourages the new collagen fibres to align longitudinally. The horse's lymphatic system removes and transports the excess interstitial fluid from the tendons, which provides the first important step in the regeneration of the tendon.
- The treatment of acute and sub acute laminitis by reducing the inflammatory response, reducing toxins, and alleviating pressure on the pedal bones and hoof capsule.
- The treatment of equine rhabdomyolysis (azoturia) and tying up syndrome, with treated horses showing less muscle symptoms and faster recovery.
- The treatment of recurrent vasculitis, cellulitis, and lymphangitis, after the infective stage is under control. The treatment of horses on enforced long-term box rest, lessening the chance of developing ventral oedema or swollen legs.

**Therapeutic uses of EMLD**

The treatment of chronic pastern dermatitis (mud fever), which is often a precursor to lymphangitis and can be a sign of an already compromised lymphatic system.

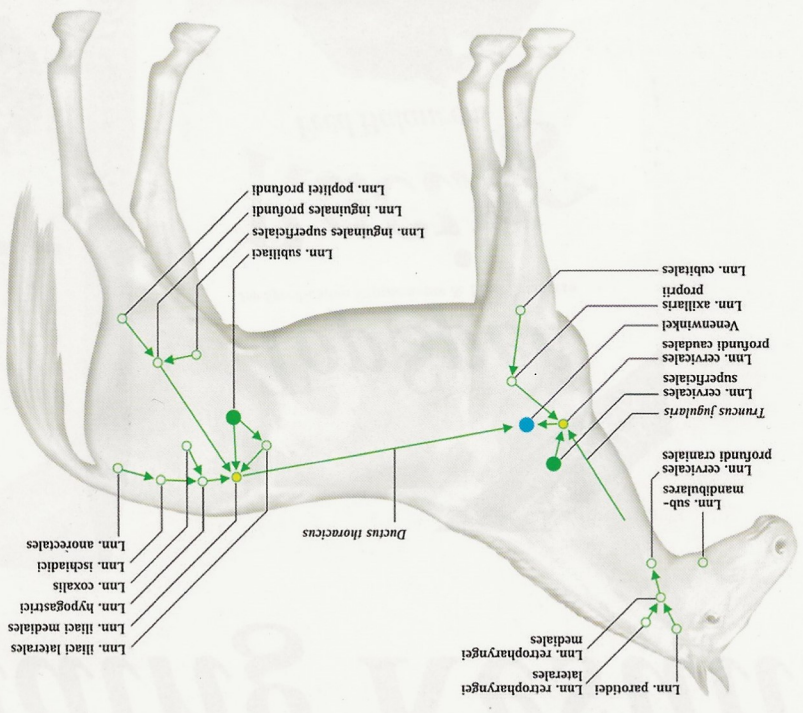
- The treatment of 'filled legs' (idiopathic or hereditary primary lymphoedema), which may be a precursor to latent primary lymphoedema.
- The treatment of equine lymphoedema complex, which is similar in pathology and treatment to human lymphoedema.

Lymphoedema can be divided into primary or secondary types, the former being a congenital insufficiency of the lymphatic system and the latter being as a result of damage from either injury or infection. Primary lymphoedema can be latent, meaning that it is not noticed until the lymphatic system becomes exhausted or is put under increased pressure via injury or infection. Both types of lymphoedema can be classified according to severity on a scale ranging from latent lymphoedema through to elephantiasis.

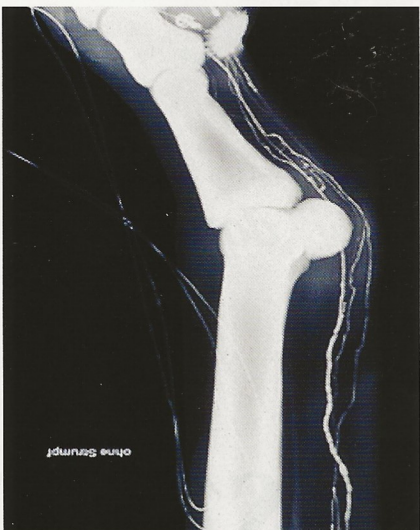
**Contraindications of EMLD**

EMLD is contraindicated in cases of acute infection, as increased rate of flow could potentially cause infection to spread. It is contraindicated in cases of left cardiac insufficiency due to additional lymph fluid increasing cardiac pre-load. Recent thrombosis is contraindicated due to possible risk of dislodging clots, as well as any cancer or neoplastic disease, in case of inducing metastasis.

Diagram illustrating the major groups of lymph nodes in the equine, and the deep drainage pathways returning to the superficial cervical lymph nodes



Indirect lymphangiography with specialised compression stockings. The flow of dye through the collectors is still visible



Indirect lymphangiography without any bandaging. The flow of dye through the collectors is clearly visible



Indirect lymphangiography with stable bandages. Disruption in the flow of dye in the collectors is clearly visible





**EMLD trained therapists in the UK**

Therapists in the UK must first train in Human MLD to CDT level, usually via respected MLD academies such as Vodder and Foeldi.

The EMLD course is run by The European Seminar of Equine Lymphatic Drainage (ESEL) and only therapists who have satisfied the ESEL Board of Examiners will have met the requirements to practice.

Therapists should hold certificates of insurance, and veterinary permission needs to be given before any treatment commences. It is important to realise that the terms 'EMLD' and 'MLD' are not protected as pertaining to a certain standard of training in the UK. This

allows people to be able to claim to be able to administer MLD, when in fact they are doing something very different.

**In conclusion**

EMLD is a relatively new therapy, but has been used successfully since the 1930s in human medicine. On the continent, human MLD has many therapeutic applications and of the 4,500 human physiotherapists in Germany, most will know how to administer MLD.

The subsequent development of the EMLD technique and many research programmes has been mainly due to the pioneering work of Professor Berens von Rautenfeld, a veterinary

surgeon working within the Medical School at University of Hannover.

More research is needed in order to increase the range of clinical applications of EMLD. Horses are very receptive to the therapy as it is gentle enough to work around painful wounds or incision sites. It has no adverse side effects and does not contravene any anti-doping legislation, so it allows horses in competitive sport to be treated at any time. ■

**Acknowledgements**

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