



# TRAVERS

*'An essential exercise to create long lasting postural change'*

***MANUAL***

## **Foreword**

This document is the result of many years of research and personal experience world wide. I sincerely hope that it will be useful to your personal learning experience and contribute to your personal training and development. This document goes together with the video assigned to you in the Online Support Program. Make sure to first watch the video and use the manual as an additional learning tool. I wish you a lot of fun and lightbulb moments diving into these materials.

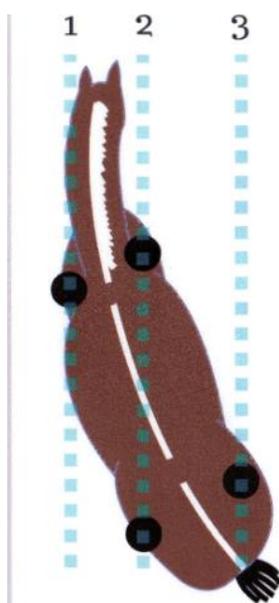
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# INTRODUCTION



The travers – or haunches in - belongs to the family of lateral movements. Lateral movements make it possible to target specific limbs, muscles and joints. This allows for improving overall balance and straightness. Furthermore, it enhances shoulder freedom as well as gait regularity and quality in preparation for true collection.

Lateral movements are also very suited for rehabilitation purposes. Through proper execution, you can release the lumbosacral, hip, stifle and hock joints as well as spinal dysfunctions and a tight abdominal wall.

The travers can be seen as the opposite of the shoulder-in: in the shoulder-in the horse moves with the shoulder inwards while crossing the inside hind limb over the outer. The opposite is true for a travers where

the horse travels with the haunches inwards and crossing the outside hind limb over the inner. This way, the outside hip lowers whereas the inside hip travels forwards. The travers can be performed on either three of four tracks.

The haunches-in is closely related to the shoulder-in and both movements enhance the quality of each other. For example, when the horse falls over the outside shoulder in the haunches-in, this can be restored with a quick shoulder-in movement to straighten up.

As with all lateral exercises, **the essence of the haunches-in lies in a correct lateral bending coupled with axial rotation.** Whereas the placement of the shoulders to the inside naturally induces this movement, the practise of haunches-in has a greater risk of inducing inverted rotation. It is therefore key to always remember the essence and restore proper lateral bending when needed. To minimize the risk of inverted rotation, the haunches-in is best performed on the inside track of the wall or through it's close cousin the renvers – which will be described below.

**The haunches-in can be performed both on the ground and ridden on circles, corners and straight lines in all gaits.** However, since most horses naturally tend to bring their haunches inwards during the canter, it is generally more beneficial to apply the shoulder-in in this gait.

## VARIATION

**A variation of the travers is the renvers** in which the horse performs the travers with the croup to the wall. A renvers on the left, is technically a right haunches-in with the croup to the wall instead of the shoulders. The renvers is more difficult to perform as the horse has no support of the wall and thus requires greater self-carriage. Furthermore, the renvers is closely related to the shoulder-in as well. A renvers can be initiated through a few steps of shoulder-in – which places the shoulders inwards and haunches to the wall – after which you simply only change the bend. So in a left shoulder-in, you can create the renvers through keeping the same coordination of the limbs, but changing the bend to the right.

Furthermore, the haunches-in is a **key building block of the half pass, pirouette, flying change and true collection** later on.



## HISTORY

The exercise has been employed since the early ages of dressage. From a historical perspective, there were two types of travers:

1. Those in use for the exercise of war
2. Those in use for pleasure and art in school

From a military perspective, the travers was used during man-to-man combat in which the hindquarters were placed inwards to follow the weapon line, adding the power of both hind limbs to the weapon. Furthermore, by placing the haunches inwards, the head of the horse was not in the way of the weapon. Finally, the haunches-in was practised in military academies as a building block for other battle movements such as the flying change, half pass, canter pirouette and Terre-a-Terre.

It is not exactly known who invented the exercise. However, the practise of travers was already described as early as the 16<sup>th</sup> century. **Antoine de Pluvinet** (1555-1620) used the single pillar for the passade on the volte in which the haunches are closer to the centre of the circles than the shoulder.

Interestingly, some influential classical masters such as **Salomon de la Broue** (+/- 1530-1610), **William Cavendish** (1593-1676) and **Francois Robinchon de La Guérinière** (1688-1751) placed some critical notes on this exercise. In his book *École de la Cavalerie*, the latter French riding master wrote:

*“Those that put the head of the horse to the wall to teach him to go to one side, make a great mistake...This method rather makes him work mechanically than in obedience to the hand and heels; when he is removed from the wall, and an attempt is made to make him go to one side in the middle of the manege, having no object in view, he obeys the hand and heels but very imperfectly, though they are the only guides that ought to be used to conduct the horse in all his paces (...) Another disorder that takes its rise from this practise - \*referring again to the travers\* - , instead of passing the outer leg over the inner one, he often passes it under, for fear of striking the leg that is upon the ground with the shoe of the foot in motion, and for fear of hitting his knees against the wall, when he raises his leg to carry it forward and puts it over the other. Monsieur de la Broue is of this opinion, for he forbids the use of the wall to teach a horse to go to one side unless he be heavy in hand, and*

*so far is he from recommending this lesson, that he expressively says the horse then must be two paces from the wall, so that his head would be at about four feet distance (...)*

*I therefore cannot conceive why horsemen place a horse with his head to the wall, and then force him to go sideways by means of the leg, the spur and even the chambriere –\* a long dressage whip\* – held by a man on foot; it seems to me much more reasonable to avoid all this embarrassment, and the disorders which arise from it, by placing the croup to the wall – \*the renvers\* - ; a lesson that is derived from the shoulder-in.”*

Later on, in the 19<sup>th</sup> century it was **Gustav Steinbrecht** (1808-1885) who assumed that horses have more narrow shoulders than hindquarter and therefore tend to move in a haunches-in tendency when asked on the straight line. He therefore developed the shoulder-fore as a counter movement to enhance straightness.

So in summary, a few of the greatest classical masters doubted the value of the travers on the straight line along the wall. It is not a coincidence that all these revolutionary horsemen contributed to the invention of shoulder-in. They were geniuses in already sensing the phenomenon of correct versus inverted rotation long before science could catch up.

However, we must also take into account that the knowledge and skills to educate a horse properly is not as prevalent as it was back then. Many horses are heavy on the forehand and reins. Furthermore, due to advancements in breeding, the modern day [sport] horse differs to the more baroque and compact time of horses in the past. I would thus like to argue to apply the practise of travers with common sense in line with the training phase of which the horse is at a particular movement. For teaching purposes and those horses very heavy on the forehand, the travers on the straight line can prove to be a useful tool. However, once certain phases in the training has been established, one must evolve. From the phase of teaching, you dive into the phase of shaping and improvising. From there, it is most beneficial from a biomechanical perspective to apply the haunches-in on the inner track off the wall – or through the practise of renvers.

## STRAIGHTNESS

As all horses are asymmetrical to some extent, the travers can be applied to straighten the horse. However, as mentioned before, most horses appear to be triangular shaped, meaning the shoulders are more narrow than the hips. This makes it impossible for the horse to fully travel straight. It is therefore that most horses naturally display a 'haunches-in' tendency through both corners and on a straight line along the wall. This requires thoughtful application of the exercise by the trainer who's task it is to recognize whether it is beneficial for the purpose intended.

To fight asymmetry, the haunches-in can be applied for those horse who drift sideways with the hind quarters – disengaging – or fall heavily on the inside shoulder.

Doing a lot of transitions between the shoulder-in and haunches-in improve coordination and balance as it is exactly in this moment where the horse finds straightness. Therefore the haunches-in is a key tool in achieving straightness.



*Horse with 'triangle' shape. In this posture haunches-in is not suited to achieve straightness.*

## STEP-BY-STEP PROCESS

The basic aids include inner intention, body posture, voice, rein and whip aids.

### **GROUNDWORK – ONE REIN (CAVESSON)**

1. Prepare the exercise by either turning into a corner - or example from the short side to the long side - or following the arena wall coming out of a 10m circle. In both of these positions the shoulders will 'hit' the straight first and therefore already naturally induce a haunches-in posture.

2. If you're moving forwards, start to move backwards facing the horse. Place yourself a bit more in front of the horse's shoulders without blocking them. Make sure to not position yourself next to the horse as this would incline the horse to move inwards and confusing it with a shoulder-in position.

Straighten your own shoulders and have a strong inner picture of what you're about to ask.



3. Either halt or slow down the walk through a lifting half-halt depending on the horse's preference.
4. Check the straightness – basic vertical balance - of the front limbs and a sound head/neck carriage – ears slightly at least slightly above whither height and without any overbend. Correct where needed.
5. Give a traversal whip cue. Position the whip in such a way that you can both 'energetically' control the forward movement of the inside shoulder as well as point over to the outside haunch. Use it only as a visual pointer stick at first. If the horse is not responding or does not understand, you can slightly 'tap' with the whip on the outside haunch to guide the horse towards the right direction. Release timely.



From there, you can vary approaches if your horse does not seem to understand:

- If the traversal whip aid doesn't appeal to your horse at first, you can position your horse in a slight counter bend towards the outside as this will naturally help to bring the haunches in.

- Lastly, if none of the approaches seem to work, you could give a direct whip aid from the outside as the horse knows this from the shoulder-in cue. As soon as the horse responds, move the whip over transversally.

- It must be noted that most methods also include the use a reflex mechanism at C6/C7 to establish a travers cue. However, due to the proximity of the brachial plexus and the amount of issues I often encounter in this area I do not use this technique as I find it counterproductive.



6. Reward every good try. Remember, the initial phase is crucial for the horse's understanding of the aids and the associated physical and mental response to make sure that you're know what you're rewarding and what not.
7. As soon as the horse understands the traversal aid of bringing the outside hind limb under, start focusing on the quality of the exercise and make sure the front limbs are moving forwards. So advance from teaching phase – establishing communication via aids – to the optimizing phase in which you focus on the correct shape and posture for physical benefit of the exercise with essence in mind.

If the horse falls unto the inside shoulder, correct this with your body posture and a slight combined whip and rein aid to replace the weight back to the outside front limb in the moment the inside front limb is in the air.



If the horse pushes over the outside shoulder, restore with a shoulder-in aid.

8. Take the horse slowly with you step-by-step and build up. Keep quality over quantity

9. Assist with an inside whip cue on the inside girth area to induce lateral bend.
10. Enjoy the process and don't tire the horse too much 😊

### **WORK IN HAND & LONG-REIGNING – TWO REINS (CAVESSON OR BRIDLE)**

From the position of two reins, the travers can be practiced both on the inside and on the outside of the horse. Especially working on the outside of the horse will be valuable to transition into long-reigning and testing the freedom and self-carriage of the shoulders.

#### **When moving backwards on the inside of the horse:**

1. Follow the same process as described under groundwork, but instead use the outside rein to control the outside front limb if needed.
2. Make sure to not pull on the inside rein and that the hand stays slight above the bit or cavesson noseband. You can take the reins in one hand if you find this difficult.

#### **When moving forwards on the outside of the horse:**

1. Start by leading your horse from the outside so that you are positioned between the arena wall and the horse.
  - It is easiest to keep the whip in the outside rein hand
  - Make sure both hands are slightly above the cavesson noseband or bit to avoid downwards pressure.
2. Position the horse as explained in the groundwork section under point 1,3 and 4.
3. that the hand stays slight above the bit or cavesson noseband. You can take the reins in one hand if you find this difficult.
4. Give a direct whip aid on the outside haunch. Because you are moving on the outside of the horse, the whip aid is direct instead of traversal. Slightly tap if needed.
5. Keep track of the independent forward stepping of the front limbs and the correct bending to the inside - away from you.
  - You can make a slight opening half halt on the inside rein for lateral flexion if needed. However make sure not to pull on the inside rein for any bending purposes. You can take the reins in one hand if you find it difficult.

- You can use the outside rein to bring the outside shoulder forward if needed if the horse is tilting or pushing against you.
  - If you keep losing the bend, you might consider going back on the inside of the horse to restore or ask for a couple of steps shoulder-fore and try again.
6. Once the shape feels good, you can increase distance by placing yourself further backward and thus prepare for a long-rein position.
  7. Enjoy the process and don't tire the horse too much 😊

### **RIDING – TWO REINS & SEAT (CAVESSON OR BRIDLE)**

1. Since the essence is lateral bending, please follow the same basic outlines for the seat as provided in the manual about this topic. As a quick summary, the seat should remain neutral with proper range of motion matching that of your horse.

2. Position the horse as explained in groundwork section under point 1,3 and 4.
3. Straighten your shoulders – be careful of tilting in the waist - in the direction of travel of your horse's shoulder. Stay vertical over your seat bones while placing your outside hip – and thus leg - slightly backwards giving an outside leg aid to ask the outside hind limb inwards in the moment it is in the air.



- Be dynamic in your aid. Timing is more important than the amount of pressure. Always remember that you can only influence the direction if the limb is in the air and thus always apply aids with a quick release-repeat pattern – if needed.
- Assist with a slight inside leg aid in the girth area if needed to avoid collapsing through the inside shoulder and maintain inside bend. Imagine a rhythm of inside-outside-inside-outside.
- You can use an outside rein and seat aid to bring the outside shoulder forward or more inwards – shoulder-in aid - if needed if the horse is pushing over the

outside shoulder

- You can use an opening inside rein if needed to restore lateral flexion.
  - Never use the inside rein against the horse's neck to restore a dropping shoulder as this will only induce inverted rotation. Rebalance vertically instead if this happens.
  - You can assist with a direct outside whip aid if needed if you feel you have a tendency to 'cramp' or hold your breath too much. Remember, you are riding directly on the horse's heart and lungs so better to softly use the whip – as the horse knows this from groundwork – than to squeeze its ribcage together.
  - Assist with a lifting half halt of both reins if needed when the horse pushes through the chest or tightens behind the bit and/or cavesson.
4. Use the dynamic integration of the shoulder-in when needed to restore possible inverted rotation. Sometimes you need to think – momentarily shoulder-in to produce a good travers.
  5. Enjoy the process and don't tire the horse too much 😊

## CHALLENGES & TROUBLESHOOTING

### 1. Inverted rotation

This is by far the main challenge and this is why it is important to teach the shoulder-in first. As a general rule, it can be corrected by replacing the shoulders back in front again. It can be caused by the preferential or asymmetric rotation of the horse itself, the overbending of the head/neck and/or disturbance of your seat- and rein aids:

- In case of preferential or asymmetric rotation of the horse you can restore correct bending through the use of the shoulder-in and guidance of your seat and rein aids.

On the ground, you can use your whip over the outside shoulder. However, Inverted rotation is hardest to restore when using one rein so it might be best to switch to either in-hand or ridden work before continuing to groundwork.

When working with two reins, you can use both the whip and outside rein. If

ridden, you can use your outside thigh and leg as well as your shoulders and outside rein to guide the horse into the proper circular posture.

- If the inverted rotation is induced by overbending of the head/neck, gently push the nose back in front of the sternum with correct opening of the jaw. Range of motion for lateral bending is greatest in the cervical spine and this is why horses overbend their necks so easily. Therefore, make sure to never 'over ask' the stelling as it's usually less than you think. If you too much with the inside rein, overbending will be the result. So remain soft in the inside rein It might help to visualize your hands are not attached to the head and neck of your horse, but rather that it is attached to the shoulders of the horse.

When working with one rein, you can gently use your hand to push the nose back and use the whip to control the outside shoulder at the same time.

When working with two reins and ridden, you have to give the inside rein forward while making a slight turning half-halt with the outside rein.

- If the inverted rotation is caused by disturbance of incorrect seat- and rein aids you will have to work on those that hinder the horse most. The more you can master your own body, the better you will be able to guide the horse.

If your riding, make sure to not advance your inside leg as this will push the spinous process to the outside. Advance from outside thigh and open space on your inside thigh for your horse to 'fill-up' that space'.

## **2. Long and low in the neck**

The travers prepares for collection and thus should induce a more elevated posture. If the head/neck is too low – beyond the point of whither – the thoracic sling cannot engage and the horse might be able to bring the leg sideways, but not lower with proper bending through the joints.

Restore a long and low position by a producing lifting half-halt aimed to engage the thoracic sling to restore balance and open space for the hind quarters.

## **3. Tilting of the head.**

Always check if the ears are levelled. Tilting usually is a sign of spinal misalignment and thus incorrect rotation. It can be caused by limiting reins, or inadequate preparation of the lateral flexion and shoulder-fore/shoulder-in.

Check if you're not holding your horse too much and that there is no over bending.

If the tilt remains, go back to vertical balance and opening the jaw with lateral flexion and try again.

**4. Moving on too many tracks.**

When a horse moves beyond four tracks, the exercise will lose functionality and could even do harm. Very often this is caused by too much aids of either legs, whip or seat. Minimize the aids and restore the proper alignment by asking the horse a couple of steps forward and straight. If the horse is too stiff, the lateral bend is hard and therefore it might choose to 'overdo' the sideways as a way of pushing and avoiding the bend. Slow down the horse even more and focus on even less angle (2,5 tracks is enough in the beginning) and build up the flexibility so that eventually the horse can travel onto three tracks properly.

**5. Ending up in a shoulder-out.**

The front limbs should remain moving forwards. If the horse pushes over the outside shoulder, you end up with a 'shoulder-out' instead of a 'haunches-in'. Visually speaking, the horse stills travels on three tracks but it is a mere lookalike as this movement induces inverted rotation.

If this happens, bring the outside front limb in and forward again by 'catching' it with a shoulder-in aid in the moment the leg comes into the air and forward. As soon as the leg steps forward again, release the aid and continue with the exercise.

**6. The horse won't bring his haunches-in.**

You can ask for a slight counter-bend; this makes it easier for the horse to bring its haunches-in. However, keep in mind that should only be a temporary 'phase' to help the horse. Once the horse understands to bring the haunches in, advance forward by focusing on proper shape and coordination for functionality.

**7. The outside leg steps under, but doesn't lower.** A horse can perfectly bring the leg in while keeping it straight. Therefore, it is really key to keep in mind that in a correct haunches-in, the stepping under is not sufficient. The horse shoulder also lower and bend through the joints evenly. Slow down the pace to really encourage the lowering and assist with a few upwards half halts to engage the thoracic sling if necessary.

**8. The inside hip doesn't come forward.** If this happens, there usually is a problem with the correct bending. Ask a few steps straight forward, slow down the pace or restore a bit of shoulder-fore before returning to the exercise.

### 9. Ending up in a leg yield along the wall instead.

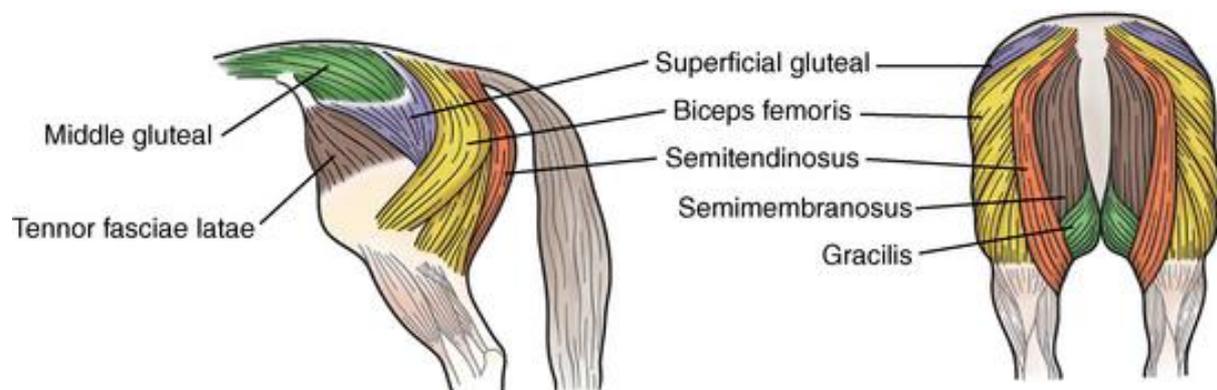
The inside hind limb and hip should step forward. If the entire body starts to step sideways, the bend gets lost and then results in leg-yielding along the wall instead. See point 4 as well. Try to restore the correct lateral bend and close the angle of the exercise.

### 10. Fatigue.

The exercise takes time to develop. So focus on communication first and then develop the correct shape. Small errors will be improved once the horse starts to understand the aids and the exercise. Remember to take it step by step. Encourage the good tries and reward the good steps.

## RELEVANT STRUCTURES

As you are aware by now, the body is interconnected. Therefore, lateral bending requires full engagement of the entire body and mind of both rider and horse. However, below you can find some of the most important muscles and soft tissue activated through the travers.



### ACCESSORY GLUTEAL

**Function(s):** Assisting the middle gluteal and aiding in abduction of the femur.

**Origin(s):** Ilium

**Insertion(s):** Lateral aspect of the great trochanter (femur)

**Innervation:** Gluteal

**Notes:** This muscle is often considered a deeper portion of the middle gluteal and now always mentioned in anatomy books or simply referred to as 'deep'. However, although certainly assisting the middle gluteal in function, it should be considered an individual entity separate to the middle gluteal. For example' the leading hind limb at the gallops alters the

boney insertions of the accessory gluteal in racehorses and this is emphasized by turning at speed.

### **SUPERFICIAL GLUTEAL**

**Function(s):** Adducting the hind limb and flexing the hip joint while placing tension on the gluteal fascia.

**Origin(s):** Tubercosae in partial partnership with the tensor fasciae latae  
Gluteal fascia in vicinity of the sacral tuberosity.

**Insertion(s):** 3<sup>rd</sup> trochanter.

**Innervation:** Caudal and cranial gluteal

**Notes:** As the name suggests, this is the most superficial of the four gluteal muscles. It can be easily palpated. The muscle consorts with the Biceps Femoris.

### **MIDDLE GLUTEAL**

**Function(s):** Extending and abducting the hip. When the femur is fixed, it raises the trunk.

**Origin(s):** Ilium; Aponeurotic covering of the Longissimus Dorsi, Gluteal Fascia; Dorsal Sacroiliac ligaments.

**Insertion(s):** Great trochanter of the femur.

**Innervation:** Cranial gluteal

**Notes:** This is a massive muscle and also the strongest of the gluteal muscle group. It forms the bulk and contour of the horse's rump and lumbar as it tapers dorsally towards and over the last 1-4 ribs. This is referred to as the 'gluteal tongue' and often atrophies when the sacroiliac subluxes. The tongue tapes to <1mm in its attachment into the Longissimus Dorsi.

Furthermore, It has a deeper portion which is not always mentioned in anatomy books or referred to as 'deep'. However, research performed by Sharon May-Davis showed this muscle being an individual entity separate to the Middle Gluteal.

The middle gluteal is strengthened by several tendinous sheets passing through the muscle.

### **DEEP GLUTEAL**

**Function(s):** Adducting the limb while rotating medially.

**Origin(s):** Ilium and Sacro sciatic ligament

**Insertion(s):** Femur - Convexity of the greater trochanter

**Innervation:** Cranial gluteal

**Notes:** It is a strong thick muscle with multiple tendinous fibers running transversely along its length. Some of these fibers connect to the cranial aspect of the capsule that covers the hip joint.

### **PIRIFORMIS**

**Function(s):** Assisting the middle gluteal and rotating the femur laterally.

**Origin(s):** Caudal sacrum and Sacrotuberous ligament.

**Insertion(s):** Passes over the greater trochanter of the femur to insert via a separate tendon to that of the middle gluteal on the caudal femur.

**Innervation:** Cranial gluteal

**Notes:** The *piriformis* blends with the *middle gluteal* at its origin. This muscle is often overlooked in anatomy books or considered irrelevant, but its size indicates otherwise.

### **BICEPS FEMORIS**

**Function(s):** Extending and abducting the hind limb. Extending the hip, stifle and hock and flexing the stifle.

**Origin(s):** First origin: 3<sup>rd</sup>-5<sup>th</sup> sacral dorsal spines; 1<sup>st</sup> caudal vertebrae; gluteal fascia, sacroiliac ligament and Sacrotuberous ligament.

The 2<sup>nd</sup> and primary origin arises from the Ischiatic tuberosity.

**Insertion(s):** Patella, lateral patellar ligament, femur, tibia crest, fascia latae and calcaneus.

**Innervation:** Caudal gluteal, ischiatic and fibular.

**Notes:** This muscle is one of a group of three known as "the Hamstrings". Due to its multiple points of attachment, it is a very complex multi-functional muscle. Rightfully regarded as the most powerful, its other two well-known partners are the *Semitendinosus* and *Semimembranosus*. Beginning with two heads, it quickly forms a single mass that soon divides into three parts. These quickly become visible in their division as it descends the leg.



Scar tissue deep in the M. Biceps femoris

However, its dorsal origin being so intimately connected to the *Superficial gluteal* has caused some confusion with other text. The divisions as they descend towards their insertions can separate and upon palpation feel like holes within the structure. This is often seen in Grand Prix dressage horses and appears quite manageable without too much ado.

### **SEMITENDINOSUS**

**Function(s):** Extending the hip, hock and stifle and also flexing the latter one.

**Origin(s):** Pelvic head → ventral aspect of the Ischiatic tuberosity.  
Vertebral head → spinous processes of the sacrum, transverse processes of the 1<sup>st</sup>-2<sup>nd</sup> caudal vertebrae, Sacro sciatic ligament and the tail fascia.

**Insertion(s):** Calcaneal tuberosity, crural fascia and the tibia crest.

**Innervation:** Caudal gluteal and Ischiatic.

**Notes:** It is considered the 2<sup>nd</sup> strongest hamstring and lays between Biceps Femoris and Semimembranosus. Due to its location, it is susceptible to distal fibrotic myopathy. Furthermore, blunt traumas to the Ischiatic tuberosity, such as bumps during floating, can dislodge the Semitendinosus from its origin.

### **SEMIMEMBRANOSUS**

**Function(s):** Adducting the hind limb and extending the hip

**Origin(s):** Pelvic head → ventral to medial aspect of ischiatic tuberosity  
Vertebral head → Sacro sciatic ligament, 1<sup>st</sup> and/or 2<sup>nd</sup> caudal vertebra

**Insertion(s):** The two bellies of the muscle unite to insert at three places; the medial epicondyle of the femur, the medial collateral ligament of the stifle, medial condyle of the tibia and the media fascia.

**Innervation:** Ischiatic

**Notes:** Like the Semitendinosus the main origin arises from the Ischiatic tuberosity. Being the most medial of the hamstring group, it is susceptible to sliding stops or skidding and therefore fibrotic myopathy.

### **RECTUS FEMORIS**

**Function(s):** Flexing the hip joint whilst extending the stifle joint.

**Origin(s):** Ilium of the pelvis → cranial to the deep gluteal.

**Insertion(s):** Patella

**Innervation:** Femoral

**Notes:** The Rectus Femoris is the largest of the four quadriceps group, but in several anatomy books it is incorrectly referred to as the *Vastus Lateralis*.

### **VASTUS LATERALIS**

**Function(s):** Extending the stifle

**Origin(s):** Shaft of femur → lateral and cranial surface

**Insertion(s):** Patella in common with *Rectus Femoris*.

**Innervation:** Femoral

**Notes:** This is the second head of the quadriceps group and the most lateral one. Notably wider through the belly and narrower at its origin and insertion, this muscle works in unison on the patella with the *Rectus Femoris*.

### **VASTUS INTERMEDIUS**

**Function(s):** Extending the stifle

**Origin(s):** Shaft of the femur → cranial surface

**Insertion(s):** Patella and femora-patella joint capsule

**Innervation:** Femoral

**Notes:** The Vastus Intermedius is extensively blended with the Vastus Medialis. In many textbooks this muscle is thus frequently referred to as the Vastus Medialis and thought of as one with the same muscle rather than as an individual.

### **VASTUS MEDIALIS**

**Function(s):** Extending the stifle

**Origin(s):** Shaft of the femur → medial surface.

**Insertion(s):** Patella, patella cartilage, medial patellar ligament and the Rectus femoris tendon.

**Innervation:** Femoral

**Notes:** This muscle closely blends with the *Vastus Lateralis*. It is regarded as the first in the quadriceps group. Being the most medial of the four it lies in a similar position to its lateral counterpart and has a similar fiber direction.

### **GRACILIS**

**Function(s):** Adducting the hind limb

**Origin(s):** Pelvic symphysis, pubis and accessory ligament of the hip joint.

**Insertion(s):** Medial patellar ligament, tibia and crural fascia.

**Innervation:** Obturator

**Notes:** The most medial muscle in the horse's thigh. When viewed from the most posterior aspect of the horse this muscle appears to be large and fleshy.

### **SARTORIUS**

**Function(s):** Adducting the hind limb and flexing the hip joint

**Origin(s):** Iliac fascia and tendon of the *Psoas Minor*

**Insertion(s):** Tibia and medial patella ligament in common with the *Gracilis*.

**Innervation:** Saphenous

**Notes:** A long narrow and comparatively thin muscle that extends from the sub lumbar region that follows the cranial border of the *Gracilis*. Stifle issues can influence *Psoas Minor* and it has been seen that the horse's lumbar will roach in direct correlation. I believe the connection may be between the insertions of the *Sartorius* acting on its *Psoas Minor* origin creating a banded tension and it is this that leads to the roaching in affected horses.

### **ADDUCTOR**

**Function(s):** Adducting the limb, extending the hip joint and rotating the femur medially.

**Origin(s):** Pubis, Ischium and the tendinous origin of the *Gracilis*.

**Insertion(s):** Caudal aspect of the femur, medial epicondyle & medial collateral ligament of the stifle.

**Innervation:** Obturator

**Notes:** Totally covered by the *Gracilis*, the *Adductor* has a fleshy body that can be divided into two muscles; the *Adductor Brevis* and *Adductor Magnus*. Now if that isn't confusing enough, sometimes a third short muscle appears in the *Adductor* and is known as the *Adductor Longus*.

### **PECTINEUS**

**Function(s):** Adducting the hind limb and flexing the hip joint.

**Origin(s):** Cranial border of the Pubis, prepubic tendon and the accessory femoral ligament.

**Insertion(s):** Femur medial mid shaft.

**Innervation:** Obturator

**Notes:** The accessory femoral ligament splits the origin of this muscle and virtually divides it into two unequal parts. A difficult muscle to palpate, especially in techy horses.

### **GEMELLI**

**Function(s):** Rotating the femur laterally.

**Origin(s):** *Ischium* → lateral border near the Ischiatic caudal to the hip joint.

**Insertion(s):** *Femur* → trochanteric fossa and crest

**Innervation:** *Ischiatic*

**Notes:** The *Gemelli* has two divisions regarded as 1<sup>st</sup> and 2<sup>nd</sup> strata. Both insertions into the femur are in close proximity to the *Obturator* muscles.

### **QUADRATUS FEMORIS**

**Function(s):** Adducting the limb while extending the hip joint.

**Origin(s):** *Ischium* → ventral surface

**Insertion(s):** *Femur* → Posterior surface near the *Adductor*.

**Innervation:** *Ischiatic*

**Notes:** A narrow slender muscle, the *Quadratus femoris* appears triangular in shape along its body. The parallel bundles of fibers are directed ventrally, cranially and laterally as they pass obliquely beside the hip joint.

### **CAPSULARIS**

**Function(s):** Assisting in hip flexion

**Origin(s):** *Ilium* → close to the hip joint

**Insertion(s):** *Femur* → Cranial aspect

**Innervation:**

**Notes:** A reasonably short and innocuous muscle, the little known *Capsularis* has a round fleshy belly with flat tendons to both the origin and insertion.

### **POPLITEUS**

**Function(s):** Flexing the stifle and rotating the hind limb medially.

**Origin(s):** *Femur* → Lateral epicondyle

**Insertion(s):** *Tibia* → Medial and caudal aspect

**Innervation:** *Tibial*

**Notes:** The origin of this muscle lies beneath the lateral collateral ligament of the stifle joint and therefore, has to pass through the joint capsule before travelling obliquely to its insertion. Its thick triangular belly is made up of fibers that initially travel medially from the origin before changing direction and inclining towards its insertion.

### **ILIACUS**

**Function(s):** Flexing and rotating the hip joint.

**Origin(s):** Ventral surface of the ilium, ventral aspect of the sacroiliac ligament, wing of sacrum and the tendon of the psoas minor.

**Insertion(s):** Lesser trochanter of the femur in common with the tendon of the *Psoas Major*.

**Innervation:** *Lumbar and femoral.*

**Notes:** On the ventral aspect of the ilium, the Iliacus combines with Psoas major to form the *Iliopsoas* muscles. In fact, this intensifies the function of the Psoas muscles on the femur. It is a deep muscle being sub ilium and palpation is therefore indirect.

### **OBTURATOR EXTERNUS**

**Function(s):** Adducting the thigh and rotating it laterally.

**Origin(s):** *Pubis and Ischium.*

**Insertion(s):** *Femur* → Trochanteric fossa

**Innervation:** *Obturator*

**Notes:** Circulatory vessels and nerves perforate the origin, while the muscle belly displays coarse and loosely connected fibers.

### **OBTURATOR INTERNUS**

**Function(s):** Rotating the femur laterally

**Origin(s) :** Pubis and ischium  
Ilium and wing of sacrum

**Insertion(s):** *Femur* → trochanteric fossa

**Innervation:** *Ischiatic*

**Notes:** The iliac origin has been termed as a separate muscle known as the Piriformis. It contains a central tendon and has a pennate belly.

### **TIBIALIS CRANIALIS**

**Function(s):** Flexing the hock

**Origin(s):** *Tibia* → Lateral surface and adjoining fibula.

**Insertion(s):** 2<sup>nd</sup>-3<sup>rd</sup> metatarsal and 1<sup>st</sup>-2<sup>nd</sup> tarsal.

**Innervation:** *Peroneal*

**Notes:** The second tendon passing over the cranial aspect of the hock to the 1<sup>st</sup> and 2<sup>nd</sup> tarsal and 2<sup>nd</sup> metacarpal is known as the Cunean tendon. You see this term mostly referred to in surgical text, but it has found its way out and can now be seen elsewhere. The fibers of TC are intimately connected to Peroneus tertius close to mid shaft of the tibia and stay this way until they divide into 2 tendons just dorsal to the tarsals.

### **TIBIALIS CAUDALIS**

**Function(s):** Flexing the lower hind limb while extending the hock

**Origin(s):** Tibia and fibula head → Lateral condyle

**Insertion(s):** *Deep digital flexor* → close to the distal tibia.

**Innervation:** *Tibial*

**Notes:** Regarded as part of the Deep digital flexor it lays at the back of the gaskin with a fleshy belly that gives rise to a flattened tendon that joins the DDF shortly before the end of the tibia.

### **GASTROCNEMIUS**

**Function(s):** Flexing the stifle and extending the hock

**Origin(s):** *Distal femur* → medial and lateral aspects

*Supracondyloid fossa* → either side

**Insertion(s):** Hock → Calcaneus

**Innervation:** *Tibial*

**Notes:** The heads from the origin quickly unite to form a common fleshy belly before tapering into the Calcanean tendon. This is a common tendon for 4 major muscles; Biceps femoris, Semitendinosus, Superficial digital flexor and the Gastrocnemius. Originating between the 2 heads is the Superficial digital flexor (also known as Plantaris).

### **SOLEUS**

**Function(s):** Assisting the *Gastrocnemius*

**Origin(s):** Proximal Fibula

**Insertion(s):** Gastrocnemius tendon

**Innervation:** *Tibial*

**Notes:** A narrow thin muscle, the Soleus lies on the lateral border of the Gastrocnemius as it descends the Gaskin region of the horse. Its action is virtually non-existent in the horse and can be easily missed when dissecting the horse, even to the extent where one has to raise the question about its function, when in many cases it appears absent because visibility.

### **PERONEUS TERTIUS**

**Function(s):** Allowing hock flexion when the stifle is fixed  
Preventing overextension of the hock.

**Origin(s):** Lateral distal femur in common with the Long digital extensor.

**Insertion(s):** Calcaneus, 3<sup>rd</sup> and 4<sup>th</sup> tarsal, 2<sup>nd</sup> and 3<sup>rd</sup> Metatarsal

**Innervation:** *Peroneal*

**Notes:** This is an unusual muscle in that it is entirely tendinous in structure and as such, provides substantial support in protecting the hock from over extension.

### **LONG DIGITAL EXTENSOR**

**Function(s):** Extending the hind limb, flexing the hock and assisting in fixing the stifle.

**Origin(s):** Lateral distal femur in common with the *Peroneus Tertius*.

**Insertion(s):** 1<sup>st</sup>-3<sup>rd</sup> Phalanx

**Innervation:** *Peroneal*

**Notes:** The long distal tendon of this muscle flattens along the 3<sup>rd</sup> metatarsal before meeting with fibers from the Lateral digital extensor tendon. It also resembles its thoracic limb counterpart the Common digital extensor tendon as it travels along the dorsal aspect of the 3<sup>rd</sup> metatarsal. This tendon should also be checked for similar issues as those found in its thoracic counterpart.

### **LATERAL DIGITAL EXTENSOR**

**Function(s):** Assisting the *Long Digital Extensor*

**Origin(s):** Fibula and its ligamentous attachments to the tibia.

**Insertion(s):** Distal tendon of the Long extensor muscle.

**Innervation:** *Peroneal*

**Notes:** The muscle is pennate and fusiform with its tendon running the entire length of the muscle before passing laterally over the hock. Sometimes its insertion into the Long digital extensor does not occur and it inserts instead into the 1<sup>st</sup> phalanx like its corresponding forelimb counterpart.

### **DEEP DIGITAL FLEXOR**

**Function(s):** Flexing the lower hind limb while extending the hock

**Origin(s):** Tibialis caudalis → lateral aspect of the tibia and the fibula.  
Flexor hallucis longus → aspect of the tibia, caudal to the fibula.  
Flexor digitorum longus → and caudal aspect of the tibia.

**Insertion(s):** All three heads insert at the 3<sup>rd</sup> Phalanx → plantar surface

**Innervation:** *Tibial*

**Notes:** Regarded as the deep flexor of the lower leg, its 3 muscles unit close to the hock to form a powerful common tendon. This tendon then passes medial to the calcaneus. The characteristics of each of the 3 muscles range from fleshy to tendinous, which provides for strength and stability. It is a much larger muscle to its thoracic counterpart.

### **SUPERFICIAL DIGITAL FLEXOR**

**Function(s):** Extending the hock and flexing the lower hind limb. It also keeps the hock in extension whilst the hip and stifle are as well (reciprocal connection).

**Origin(s):** Caudal distal aspect of the femur in the Supracondyloid fossa.

**Insertion(s):** 1<sup>st</sup> (medial & lateral) distal phalanx; 2<sup>nd</sup> (medial & lateral) proximal phalanx after it unites with the Calcanean tendon proximal to the calcaneus and inserts via medial & lateral slippers.

**Innervation:** *Tibial*

**Notes:** The muscle is extremely tendinous in structure and chiefly relies upon other muscle groups to act upon the limb. This gives it incredible tensile strength as its distal tendon spirals around the Gastrocnemius tendon from a medial to dorsal aspect creating more of a mechanical effect in its action. As it passes over the Calcaneus, a medial and lateral attachment known as “slippers” insert before the tendon progresses distally. It is a much smaller muscle to its thoracic counterpart.

### **TENSOR FASCIAE LATAE**

**Function(s):** Flexing the hip joint and extending the stifle whilst tensing the fascia latae.

**Origin(s):** Tubercosae in partial partnership with the *Superficial Gluteal*.

**Insertion(s):** Fascia latae, Crural fascia of the leg, patella, lateral patellar ligament and the tibia crest.

**Innervation:** Cranial gluteal

**Notes:** The insertions into the patella, lateral patellar ligament and the tibia crest are

regarded as indirect due to respective fascial tissue connections. The TFL has 2 muscle bellies close the Tubercosxae with the longer belly closer to the flank.