

PHOTOGRAPHY: LOUISE ALLEN

Centaur Biomechanics' Russell Guire and Judy Harvey discuss the art of Freestyles during the dressage to music presentation



# Preparing for success

**JANE CARLEY** reports from Centaur Biomechanics' annual Improve Your Riding and Confidence Conference, where experts shared the latest research and developments in rider and equine performance

Delegates to Centaur Biomechanics' Improve your Riding annual conference held at Moulton College, Northamptonshire, saw presentations on the latest research on equine sports performance and took part in interactive sessions to help them get the best out of themselves and their horses.

The experts included Olympic eventing gold medallist Andrew Hoy, international dressage rider, trainer and judge Judy Harvey, Centaur Biomechanics' Russell Guire, master saddler Mark Fisher, leading sport horse vet Dr Rachel Murray, performance horse farrier Ben Benson and Team GBR World Class Programme para-equestrian dressage equine physiotherapist

Helen Mathie. The team discussed a variety of topics, from correct warm-up techniques, surfaces and preventing injury to dentistry, saddlery and Pilates.

## WARMING UP AND COOLING DOWN

Rachel spoke of the importance of warming up the horse correctly before competition or training, and cooling down afterwards.

"Correct warm-up optimises performance and reduces the risk of injury," she explained.

Warming up offers physiological and psychological benefits and, in competition, the warm-up period may also offer the opportunity for some training.

When training, riders should always make time for warm-up,

training and cool-down periods for their horses.

Rachel explained: "Warming up and stretching are two different things. Stretching the horse before warming it up can actually increase the risk of injury, whereas stretching after warm-up can improve performance and have an effect of reducing injury."

She added: "When stretching the horse after a workout, the muscles are warm and pliable. This is when you have the maximum flexibility, and stretching can assist with the removal of waste products. You may find that this is the best time to ask the horse to work long and low."

Rachel detailed the physiological changes that take place during warm-up, such as increases in body, muscle and blood temperature,

## WARM-UP TIMES

Rachel's study of dressage riders found that, when training, they warm up on average for 16 minutes, train for 36 minutes and cool down for 11 minutes.

At competitions, the average warm-up time was 25 minutes 23 seconds for Novice level, 31 minutes 32 seconds for Medium, 32 minutes 53 seconds for PSG and 34 minutes 34 seconds for Grand Prix.

Of this, 39.3% was spent in walk, 40.3% in trot and 20.4% in canter at Novice level, while at Grand Prix the proportions changed to 38.8% in walk, 33.3% in trot and 28.0% in canter.

**Reference:** Murray R, Mann S and Parkin T. Warm-up in dressage competitions: association with level, competition type and final score. *Equine and Comparative Exercise Physiology* (2007) 3 (4) 185-189.

## WARM-UP ROUTINES

The following is a summary from Rachel's presentation

### Passive warm-up

Increases body temperature.

Solarium, exercise rug, massage rug.

### General warm-up

Non-specific exercise to increase body temperature.

5-10 minutes' general exercise.

Gradual increase in intensity.

Takes the horse to 50% of VO<sub>2</sub> MAX.

<100bpm heart rate (not always a good indicator of effort – may be affected by the environment, eg spooky horse in spooky arena!).

Energetic walk, gentle trot, slow canter.

### Specific warm-up

Uses similar parts of the body to be used in subsequent strenuous exercise.

Practise specific movements with a gradual increase in intensity.

Duration depends on whether the warm-up is for training or competition, and on the type of competition.

blood flow and flexibility, and explained how these help the horse perform better.

"Improving muscle metabolism and increasing the amount of aerobic rather than anaerobic performance delays fatigue and generates fuel for the central

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energy stores,” she explained. “It can take 72 hours to replenish muscle stores if overused during exercise, but if the horse is warmed up correctly, it can use more from the central stores.

“Tendons and ligaments also benefit from stronger structure. Initial cyclical loading changes their structure and makes them more elastic, reducing the likelihood of injury.”

However, Rachel emphasised that however correct the horse’s warm-up is, it must also be complemented by a well warmed-up rider.

“This could include proprioceptive warm-ups, which are commonly used by elite riders, including one-leg balances, wobbleboards, toe/heel skipping or ‘blind’ balancing.”

When considering what to include in the horse’s warm-up, Rachel explained that practising specific movements (see panel on page 36) offers proprioceptive conditioning, muscle and tendon conditioning, and increases joint and ligament flexibility.

## “Core stability can help prevent back pain – the small muscles need to help support and control the body”

“This could include shallow shoulder-in or small cross poles. Another useful exercise is flexing the neck away from the direction of travel.

“You are aiming for correct work, with transitions, increasing engagement and required movements, but not a large volume of anything.”

She emphasised that this should not be continued to the level of fatigue.

“Excessive repetition carries the risk of muscle glycogen depletion and of injury, along with reduced performance.”

The duration of a warm-up varies with the individual horse’s capability, both physical and mental.

“Bear in mind that a young horse could be excitable, but then get tired, while an older horse might be stiff and need longer. Also take into account the



Stretching after warm-up can improve performance and have an effect of reducing injury

### WORKING ON SURFACES

#### Rachel’s tips on avoiding injuries

- Horses become adapted to a single surface, so if they then go to a competition with a different one, this can increase injury risk. Ideally, horses need to train on different surfaces.
- Fatigue can exacerbate damage.
- Foot interaction with surface – a little slide is good.
- Extreme traction – where the foot gets ‘stuck’ – the strain goes up the leg to the sacroiliac.
- Firm surfaces – increased concussion, but decreased muscular effort.
- Bone injuries could potentially be increased by harder surfaces.
- Deeper surfaces can be useful for strength training, but don’t overtrain.
- Changes to surfaces – wetter or drier can increase the risk of injury.

- Uneven surfaces increase the risk of injury x1.4. Sudden changes in the surface cause a loss of balance and strain.
- Tripping, associated with sand or sand and rubber chip/strip surfaces, a surface with no base or a crushed concrete surface – all increase the risk of injury.
- Slipping risk is increased x17 on woodchip.
- Smaller arenas also increase risk.
- Ownership and maintenance are also factors – livery yards maintained less often, greater risk.
- Aim to practise on the surface you are competing on if possible.

#### References:

Murray R, Walters J, Snart H, Dyson S and Parkin T. Identification of risk factors for lameness in dressage horses. *The Veterinary Journal* (2010) 184 (1) 27-36.

Murray R, Walters J, Snart S, Dyson S and Parkin T. How do features of dressage arenas influence training surface properties which are potentially associated with lameness? *The Veterinary Journal* (2010) 186 (2) 172-179.

environment – ground conditions distractions and temperature.”

In extreme cold, muscles are weaker and tire earlier, so a longer warm-up at a low intensity is needed, whereas in hot weather less warm-up time is indicated, with periods for cooling and drinking.

“Also take ground conditions into consideration – on a hard surface the horse uses its muscles to reduce jarring, while in deep going it has to use more energy to push out of it. Ideally, you should warm up on the same surface as you are competing on, but if this is not possible, get into the arena as early as you can before the test starts, to get the horse used to it.”

#### INJURY FACTORS

A recent study of dressage horses showed that 24% had been lame in a two-year period, and dressage is the highest-risk sport for hind suspensory ligament damage.

“Generally, muscles, tendons and ligaments are working hard and the horse is at a low heart rate. At lower

levels of training, the horse may be working with the head and neck out and more load on forelimbs, but at higher levels there is more pressure on the joints and increased weight on the hindlimbs,” said Rachel.

She pointed out that stability and strength have an influence, and explained that hyperextension of the forelimb is often seen in young horses with extravagant movement but insufficient muscle to support that movement.

In the hindlimbs themselves, the fetlock is extended and the hock flexed, placing strain on the suspensory ligament, not just down the back of the leg, but also where it joins the hock at the top of the cannon bone.

Lack of strength can potentially increase risk of hock pain or sacroiliac pain, which can be exacerbated by asymmetry, general weakness, saddle fit and rider issues.

Back pain is related to limb pain, with the thoracolumbar region the most commonly affected.





Providing they are used correctly or under expert guidance, training aids can be useful as they provide resistance for the horse to work against and can help improve symmetry

### IMPROVING THE HORSE'S CORE

Experts agree that polework strengthens the back, abdominals and iliopsoas, and also increases proprioception.

Physiotherapist Helen Mathie explained: "Performing polework exercises in walk is best, as it is a gait in which it is easier to retrain correct muscle memory and rewire aberrant movement patterns, without stressing the joints and involving the big gymnastic muscles of the limbs, which may take over in trot and canter. Also, the longissimus dorsi muscle fires twice a stride in walk and trot, but only once in canter, so it's very effective."

She added: "You can long rein or work the horse on a long lead if it needs reassurance.

"Training aids can be useful while the horse is doing polework. Therabands, for example, provide resistance for the horse to work against and can help improve symmetry. The system comprises one flexible band under the belly and a second around the quarters, both attached to a saddle cloth. The bellyband encourages the horse to use his abdominals.

"A Pessoa is another option – it can shorten the horse's stride, but improves balance and rhythm, especially if used for long reining rather than lungeing. You could start the horse off in the Pessoa and then work without it to see the difference.

"An EquiAmi has a similar action to a Pessoa, but is slightly less fixed; the running rein also allows the trainer to choose different positions.

“Choose equipment that the horse goes best in, but offers sufficient control for safety – this might be a rope halter, cavesson or bridle. Loose side reins can also be used”

“Core stability can help prevent back pain – the small muscles need to help support and control the body,” said Rachel.

Risk is increased by factors including conformation, collagen quality, muscular strength, foot balance and, significantly, movement.

“The requirement for ‘uphill movement’ loads the suspensory ligament when only one hind is on the ground, as the hind lands before the front (diagonal advanced placement). This is seen in collected work, but extended work also drops the fetlock more and increases hock flexion. It can be an issue when showing horses at extended paces at too young an age.”

Rachel emphasised that a lack of training, strength or fitness can predispose any horse to injury.

“Cross training strengthens the whole body and thus decreases the risk of injury, while increased muscle development means that the horse is more stable with a rider.

“For a dressage horse, lungeing, hacking and even jumping can be protective – and aim to ride on

different surfaces. Regular turnout has also been found to protect against lameness.”

Respiratory problems are also a consideration, and research has shown that risk increased x4.32 if the horse had respiratory issues, due to fatigue and incoordination.

### POLEWORK EXERCISES

- A set of four poles in a straight line at 2ft 8in gaps followed by a 20ft gap and then four more poles at 2ft 8in. This encourages the horse to use its quarters, and improves proprioception.
- A serpentine of poles develops rhythm and encourages the horse to use his obliques, which are important muscles as they support the weight of the visceral material (intestines). Poles can be raised at one end – this is a good exercise

for a young horse as it is not too daunting.

- A cross made from eight poles, again 2ft 8in apart, can be used for several exercises – working on a circle over the pairs of poles, or simply to work the horse between the poles, making halt transitions or rein back.
- A square made from four 12ft poles with gaps at the corners – step in and back out. The poles can also be raised.

- Work over poles on a circle can be useful for a horse that finds it easier to stretch longitudinally than laterally. Notice that the horse can come onto its shoulder more on its tighter side and needs encouraging to stay straight. Take it steady with this exercise, as the fan of poles is hard work for the horse; as training advances, the poles can also be raised.

When training over poles, you can long rein or work the horse on a long lead if he needs more reassurance



“Choose equipment that the horse goes best in, but offers sufficient control for safety, such as a rope halter, cavesson or bridle. Loose side reins can also be used.

“Allow the horse to use his head and neck and think about what he is doing.

“Let him make mistakes and don’t micromanage. Remember to work equally on both reins.”

### DRESSAGE TO MUSIC

An interactive session saw delegates judge a variety of tests, including Freestyles, and then compare their scores, via a video playback, with those of list 1 judge Judy Harvey, who also gave useful tips on planning and riding music tests.

Using a Medium Freestyle as an example, Judy explained: “One of the attractions of Freestyle is that it enables a rider with an average horse to show it off to the best of its ability and to highlight correct training.”

Choosing the music is a fun, but taxing element, and Judy

“Cross training strengthens the whole body and thus decreases the risk of injury”

commented that, while many judges do not like clear vocals, music that uses the voice as an ‘instrument’ can work well.

“Music with a clear beat must match the footfalls, but more neutral tracks can give you a bit more flexibility. Remember that there is a mark for how well you have used the music, which is not just the accuracy of transitions to match changes in the music, but also taking advantage of any crescendos for dramatic movements or changes of pace.”

In creating the floor plan, she suggested that riders consider where the judge will view each movement from.



“In the Advanced Medium test that we viewed, the half pass is ridden away from the judge – it looks much more attractive viewed from the front. It can be useful to include mirror images, judges like them as it makes the test easier to assess.”

Level of difficulty is taken into consideration at higher levels, but Judy cautioned that non-compulsory movements must be

performed well to gain marks for this, rather than sacrifice them.

“At Advanced Medium you could make the half passes steeper or repeat them. There is more scope as you go up the levels – it can be hard to make a Novice test look interesting and original.”

Placing of trot and canter in the test can also help gain marks: “If your horse’s trot improves after the canter, do your canter work first. »



Russell Guire rides through a Freestyle test on Rosie Bush's 18.1hh Knabstrupper/Oldenburger gelding, Tresaison Roulette



“Try to ride a straight line with your eyes closed – the horse may drift one way or the other. Think about the weight in your seatbones, which can help the horse remain straight if it is equal”

“Many riders collapse forward in canter, which can be due to a weak core and a lack of suppleness through the pelvis, and this can unbalance the horse. Similarly, leaning back is a fault, which can create tension in the horse’s back.”

Russell advised riders to stretch their horses at the end of a work session. “This helps the horse develop strength through his back. The rider needs to create the energy to lift the horse and allow him to swing forward while stretching.”

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“Also, choreograph your final centre line to give a bit of impact – could you use a medium trot? But remember, this needs careful planning so that you don’t run out of centre line before the music finishes!”

When riding the test, be ready for anything, including music that might not start when expected, she advised.

“Try to halt and wait for your music to start when you put your hand up – if it is late and you are already moving, it is easy to get ahead of it. Bear in mind that in most arenas, you will be starting from outside the boards, so it will take a couple of seconds longer to come up the centre line.

“Be aware that every arena rides differently, depending on the going, the placing of the fence or boards etc, and can affect whether you get ahead of or behind your music.”

### HORSE AND RIDER INTERACTION

Centaur Biomechanics’ Russell Guire presented some of the latest research on horse and rider interaction.

“Make sure the rider warms up – drop the stirrups for the early work in walk to allow the hips to loosen up. Riding a serpentine as part of the warm-up engages the horse’s core and checks that he is listening to your leg. Can you make the turns without pulling the inside rein?”

“Try to ride a straight line with your eyes closed – the horse may drift one way or the other. Think about the weight in your seatbones, which can help the horse remain straight if it is equal.

“Research found riders tend to put more pressure on the left seatbone than the right,” he explained. “The effect of this is significant – the seat is pushed to

the right, the left knee becomes tight and the left leg comes up. If you are collapsing to the left, put your left hand up in the air to lift the left-hand side of the body; you can also try riding one-handed and pushing the free hand forward.



Leading sports horse vet Dr Rachel Murray discusses the importance of correct warm-up and cool-down periods