

The Solution



Why go treeless?

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Why do trees cause problems?

“Saddles are sold with little consideration of fit and even less knowledge about the consequences of poor fit.”
(Harman 1999)

I’m not a saddler, but from a rider and trainer’s point of view, I have known for years that saddles cause problems.

“Back problems have been recognized as an important clinical performance-impairing problem in the equine athlete.”
(Jeffcott 1979)

I used to keep a wide range of expensive saddles in different fittings to try to provide an optimum fit for any of the horses that I currently had in training. I even had air panels put into some of them, which undoubtedly helped, but I knew it was only alleviating the problem, not solving it. I have since carried out a significant amount of study and research into the issues of saddle fitting and now believe that it is the single biggest issue of equine welfare that I will see in my lifetime.

Most people experience problems with saddles and it is common to hear of frustrated riders spending large sums on saddle after saddle that for one reason or another just don’t work.

“73% of a group of horses showed uneven saddle panels causing significant pressure on the back, with 57% showing back pain and muscle atrophy from saddles with serious multiple fitting problems.”
(Harman 1997)

It is also common to hear of made to measure saddles failing, although this is not as surprising as it sounds as the saddle may well fit in theory on a static horse, but becomes a problem as soon as the horse actually moves.

“Velocity increases the force onto the back”
(canter = 2.5 x the weight of the rider)
(Clayton et al 1999)

And, as we are all aware, horses change shape constantly throughout their lives. For example, in just a week, a fluctuation of 3 kilos in weight is perfectly normal. The horse carries most of his stored fat deposits over his top line, so even small variations in weight will immediately affect saddle fit.

“Poor saddle fit is among the major causes of back pain among horses.”
(Jeffcott et al 1999)

What causes the problems?

a) *The tree points.*

Most people have seen a saddle stripped down to the tree, and understand that in order to protect the spine from the tree, the gullet has to be wide enough to allow movement and high enough to give wither and spinal clearance.

But fewer people have perhaps fully understood the design and function of the tree points. The front arch that forms the pommel extends down either side into points, just like a clothes peg. It is made of a broad band of steel over the arch, tapering into points that are shaped like table knives. The tips of these are supported by the trapezius muscle, which lies behind the shoulder blade on either side of the withers.



The stripped down tree shows the tree points with stirrup bar attached

“Movement of the back at the wither is significantly reduced in the ridden horse.”
(Townsend et al, 1983)

“The movements of the back directly influence the head and neck position.

With a high head and neck position, the stride length and extension of the back are significantly reduced. The neck can be a useful measure of stretch through the back as well as stride length.”

(Rhodin et al, 2005)

Even with careful fitting, a roomy gullet and a well-flocked panel, the pressure caused by the tree points can cause nerve damage and atrophy of the muscles, the long-term effect of which often goes unnoticed.

“Muscle damage and ligamentous strain are seen in about 25% of horses with back pain.”

(De Cocq et al, 2004)



Atrophied dorsal musculature showing typically prominent wither and spine.

Narrower horses are particularly susceptible to this clothes peg effect which will also cause lateral pinching as soon as the horse tries to turn or bend. Over time, these horses show the tell tale hollows either side of the withers.

“Tree pressure points can cause pain, muscle wastage, problems related to the willingness of the horse to be ridden, moving the back away from the underneath of the saddle, stiffness in lateroflexion, dorsoflexion, and ventroflexion, and difficulties in transitions as well as in collection.”
(Nyikos *et al*, 2005.)

Because the saddle stays relatively still on narrow horses, it can easily give the impression of fitting well, but the pressure tends to be concentrated into the same place, which can cause galling and ulceration.

“Skin necrosis begins close to the bone, long before visible signs such as reddening of the skin and ulcerations occur.”
(Todd and Thacker 1994)

b) The stirrup bars.

The only part of the structure of the tree that is strong enough to support the stirrup bar is the front arch. This means that all the weight that is loaded onto the stirrup by the rider is taken directly into the tree points, adding to the pressure into the muscle. Bigger horses tend to have heavier riders, so we tend to see greater depletion of the muscle and increased hollows.

c) Scapula push.

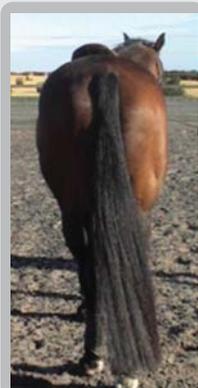
i) Causing torque

As the horse moves his forelimbs, the scapula (shoulder blade) swings forwards and backwards like a pendulum. At the point where it is furthest back, the forelimb generates maximum thrust.

At this moment, the scapula pushes against the tree point on that side, causing the whole tree to pivot and the back of the saddle to rotate across the back. This effect is accentuated when the horse turns because the dorsal muscles contract and lift the saddle across the back.

Commonly, the torque point that is consequently created in the waist of the saddle causes pressure to the supraspinous ligament, leading to inflammation and in severe cases, a bowed appearance.

The scapula can become restricted or even bruised, with the possibility of permanent nerve damage. The stride pattern will alter, causing shortening, choppiness or even unlevelness.



“The range of motion of the ridden horse is significantly lower than that of the unriden horse. If a saddle provokes localized pressure concentrations, the horse terminates the forward swing of the leg and stride length decreases.”
(Peham *et al* 2004)

A tree saddle moves across the back as the horse turns

The rider can feel the concussive effect of this in his or her own back and joints.

ii) Causing rolling

Where there is a lot of bulk around the back of the shoulder due to conformation (e.g. loaded or wide shoulders) or excessive fat deposits, this will push against the tree points even more and the clothes peg effect will cause rolling; the whole saddle may even slip out of position.

The rolling effect causes twisting to the rider's lower back and strain to the lumbosacral joint.

iii) Causing sliding

The saddle can also be pushed forward, over the shoulders and in extreme cases up the neck. This is caused by the tree being pushed forward into the back of the scapula by the croup, particularly in canter when more thrust is created by the hindlimbs. The scapula blocks the forward push of the points, instead lifting them upwards, where they slide unhindered over the top of the scapula instead.

Because of this, riders are usually more aware of a poor fit, but often remain frustrated because wide horses offer more of a challenge to saddle-fitters.

A large number of riders suffer chronic lower back problems with associated arthritic and sciatic pain.

Friction to the horse's back associated with this tree movement can also cause disruption and breakage to the hair or even bald areas at the back of the saddle. Skin integrity can also be damaged, leading to inflammation, infection or lumps.

d) One-sidedness

No horse or rider is completely straight in their posture and movement – we all have a slight degree of curvature of the spine (scoliosis) that makes us contract one side of the body and extend the other.

In both horses and humans, this is usually shown as right-handedness. (Even if a person writes with their left hand, they are usually right handed in their posture.)

The horse, by contracting the right side of his body, carries the hind legs to the right, prefers to flex the neck and poll to the right and pushes his weight more onto the left forelimb.

In this position, the right scapula moves against the tree point more, and the contracted right dorsal muscles push up against the lateral branches of the tree. This has the effect of pushing the tree onto the left side of the back.

The rider tends to collapse the right hip, which also has the effect of pushing the weight to the left.

*“Measured pressure loading on the left fore quarter ...(of the saddle area) was repeatedly larger... (than in other areas under the saddle).”
(Peham et al 2004)*

The fact that the tree is consistently carried to one side of the back causes several other issues:

- The right tree point can consequently cause increased lateral pressure against the wither, with the left side of the back muscles receiving increased vertical pressure.
- It is often possible to observe thickening of the tissues on the right side with a corresponding atrophy on the left.

This effect will be increased if trauma to the back causes muscle spasm or ligament strain. Malalignment of the back can be caused by alterations in postural tone between the left and right sides of the back musculature.



The lateral branches of the tree can cause damage to the stabilizing structures of the back.

“In a survey of horses referred with a history of thoracolumbar (back) complaint, 38.8% were diagnosed with soft tissue injury, the most frequent site being the longissimus dorsi muscles and / or the supraspinous ligament in the caudal (rear) withers and cranial (forward) lumbar regions.”
(Jeffcott 1980)

“The increased tone or spasm caused by local muscle injury of the longissimus dorsi could produce a slight curvature of the horse’s spine (i.e. spastic scoliosis). This situation would lead to abnormal biomechanical stress on the thoracolumbar spine and so affect normal locomotor pattern and performance.”

(Jeffcott and Dalin 1980)

“A dynamic dysfunction of the stabilizing system of the spine results in the static appearance of scoliosis. Even small compensatory differences between the right and the left sides cause permanent, asymmetric dynamic overloadings on the soft tissues.

These loadings are cumulative and after some time result in the partial loss of elasticity in the soft tissues of the spine.”

(Ober 1974)

e) Girthing

Because horses usually carry treed saddles more on the left shoulder, this causes increasing one-sidedness, with the right side of the horse becoming more constricted. This effect can become more pronounced with a girth that has an elastic insert on one side only.

The effect of this can cause the girth to be pulled more tightly against the tissue around the lower part of the rib cage and sternum, restricting the movement and causing tears to the myofascia underneath.

Wide horses are often over girthed to help hold the saddle in place, particularly with leather girths which are usually quite slippery, and it is common to see tree point girth straps used in an attempt to provide stability.

Conversely, it is not uncommon to see narrow horses being ridden with a very loose girth.

In either type of conformation, there is a torque point from the lateral branches of the tree, usually where it either starts to narrow at the gullet waist, or at the point where it is at its narrowest. The tissue can become pinched between the tree and top of the spinal processes; it is common to see muscle or ligament inflammation at this point.

Because it is extremely difficult to check the fit in this area, this problem often goes unobserved.

Jumping is worse!

“The greatest amount of movement that occurs within the vertebral column is probably produced during the act of jumping.”

(Jeffcott 1979)

At the moment of landing, as the horse's front feet touch the ground, the scapula is extended forward and the muscles behind it are stretched and vulnerable. The rider's weight is concentrated onto the tree points as horse and rider's full force touches down. If you add the extra concussive effect from hard ground or a drop landing, this impact onto the points is enormous.



The scapula is extended forward in jumping

Anticipation of the landing may lead to:

- Rushing, or excitability
- Backing off or refusing
- Poor technique or bascule
- Faulty parabola
- Pecking, stumbling or grunting on landing
- Bucking on landing
- Rushing away from the fence
- Carelessness, unexpected lack of scope
- Cat jumping or dropping the hind legs early

“Force plate studies have shown that the forelimb ground reaction forces during the landing are twice as high as the bodyweight (measured over a simple 1.10m vertical fence)”

(Schamhardt et al. 1993)

The list is endless! In fact, we get so used to dealing with any of these symptoms on a daily basis, that we think of them as perfectly normal.

...But what if they were NOT normal?

Often, blame for poor performance is apportioned to the rider's poor skill, or the horse's bad temperament:

“ • The clinical manifestations of chronic back pain can be very variable and it is widely recognized that many complaints from owners are in fact associated with problems of schooling and equitation.

- One fairly consistent feature is a history of some alteration of temperament.
- A kind horse may become awkward and rather fractious. This may be seen as a loss of enthusiasm for work. There may be a disinclination to jump, particularly the combination-type fences...or a horse may lose its fluidity and timing and tend to rush his fences.
- In some cases, no significant damage was found which would account for the clinical signs of back trouble. These may have been attributable simply to temperament or equitation problems.”

(Jeffcott 1975)

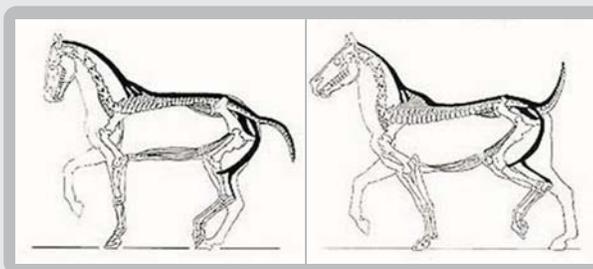
Sometimes, it becomes obvious to the rider that there is a saddle-fitting problem, which could be causing some of the symptoms described.

Until recently, saddle fitting has been a rather exclusive domain of experienced saddlers. Even though they often choose a suitable saddle, vets or owners cannot reproduce such subjective evaluations reliably. Only “rules of thumb” exist and saddle fitting is almost exclusively performed on the standing horse alone.

“Methods for objective evaluation of saddle fit and investigations of the influences of ill-fitting saddles upon the equine back are lacking.”
(Peham et al 2004)

The effects of saddle and weight on the back movement of the horse had never been studied until as recently as 2004.

These skeletal views make it clear why collection is defined as "a particular posture that makes weight-bearing easiest for the horse."



Horse A

Horse B

In collection, three key points along the vertebral column arch upward:

- The loins coil
- The part of the back that would be under the saddle arches upward
- The base of the neck is raised relative to the loins.

Horse A produces an ideal piaffe, a highly collected trot-in-place

Horse B trots forward completely "upside-down" - an example of anti-collection. (This posture is typical of a horse with back pain or saddle-related issues.)

Both images are taken directly from photos of real horses.

-Notice how different the placement, weighting, strike down, and swinging of the legs is in A vs. B.

This illustrates a law: vertebral dynamics govern limb dynamics, or put more simply, whatever the back, neck, and loins are doing governs what the limbs can do.

“A saddle with weight causes an increase in the retraction angle of the forelimb.

The horse tries to compensate for the extending effect of the saddle by increasing the retraction of the forelimbs.

Tightening a girth around the horse’s chest, thereby exerting pressure on the sternum and the withers, does not measurably influence back movement.

The influence of a saddle with weight can best be described as an overall extension or hollowing of the back. This may contribute to soft tissue injuries and Kissing Spines Syndrome.”

(De Cocq et al., 2004)

So why do we use trees?

Asked this question, the majority of people will say that the tree protects the horse's back and makes him more comfortable by distributing the weight.

...But the real answer lies in military evolution:

Early Chinese warriors used to mount by pole-vaulting on with their spears, then holding onto the mane to stay there.

This progressed to a simple single loop on a leather pad to aid mounting, but would still have required a degree of skill and athleticism.

It was the advent of two metal stirrups in around 300AD that had a massive impact (and shifted the balance of power to warlords such as Genghis Khan and Attila the Hun):

- They assisted less skilled riders
- It became more difficult to pull the rider off in combat
- They allowed the seat to be raised, turning the rider's legs into shock absorbers and giving further stability for the development of accuracy (e.g. for archers)
- They gave a secure platform from which to fight
- They provided a firm base from which to swing a sword – more power in the stroke
- By 700AD, the pommel and cantle had grown huge enough to hold in place the massive impact of a knight in full armour carrying a couched lance and striking his opponent at a gallop.

These facts draw the conclusion that:

- *Trees were first developed from the need to hold the stirrups in place and provide lateral stability – this remains the case today in a traditional craft handed down through generations.*
- *Trees were never developed for the comfort of the horse – padding is necessary to help protect the horse from the tree.*
- *Trees do not evenly distribute weight – this is physically impossible if you put a rigid structure between two live, moving beings.*

All of this raises more questions:

i) Can the pressure of a saddle converging on the bone below or the poor posture resulting from it cause problems such as kissing spines and lordosis (swayback)? Kissing Spine Syndrome (KSS) or Impinging Dorsal Spinal Processes (IDSP) is crowding or overriding of the spinous summits and occurs commonly in the saddle area of the back, with the highest occurrence amongst jumping horses. When the back hollows, the space between the processes narrows and the spines touch or even override.

The onset is usually insidious with gradual loss of performance associated with stiffness of the back. One of the first signs is often a change in temperament.

“Pressure on the outside of muscles converges on bone below, reaching significantly higher values than at skin surface. This may not only affect muscle function but also induce damage to skeletal structures of the spine.”

(Le et al 1984)

“One of the causes of KSS is thought to be weight bearing and other stresses inflicted by the rider.

(De Cocq et al. 2004)

“KSS lesions are detected most frequently in the saddle bearing area, between the 12th and 18th vertebrae Crowding and overriding of the dorsal spinal processes was most often diagnosed in competitive jumping horses...resulting in lowered performance and bouts of back pain..”

(Jeffcott 1980)

“Evidence of impingement was detected in 86% of spines (in post mortem examinations) and the lesions occurred most frequently between T13 and T18. (the saddle area).”

(Townsend et al., 1986)

ii) If you clamp one of the most flexible parts of the spine behind the shoulder, this must cause a “derailing” effect - disruption of the coordinated movement of the back. *Can this contribute to sacroiliac and hind limb problems?*

iii) In restricting the forelimb movement, the stride becomes more concussive – *could this contribute to the high incidence of foot and distal limb problems?*

iv) If the saddle is always carried unevenly and the spinal flexion is restricted, could this cause uneven wear and tear, scoliosis (lateral curvature of the spine) or arthritic problems in the back and limbs? *Could this effect also contribute to soft tissue injury, particularly in the distal forelimb?*

So why does treeless work?

I have been training and competing in *The Solution* treeless saddles since 2000 and in that time have observed that problems that I had previously considered “normal” began to disappear.

- *Without the clothes peg effect of the tree points restricting the shoulder and surrounding musculature, the forehand suddenly frees up and horses can more readily find their natural balance, moving more uphill and straighter.*
- *Young horses improve confidence and older horse become happier.*
- *All the horses that I have tried in treeless saddles have changed - some more dramatically than others, but without exception, all have improved.*
- *Mentally, I would say that their tendency is to be more forward thinking, confident, calm, willing, able to concentrate, and less spooky, resistant, defensive, evasive, naughty etc.*
- *The physical changes are a result of this - improved musculature and more power, elasticity and expression.*

Observations that I made when studying a direct comparison with a range of horse and rider combinations working in a traditional treed saddle and a *Solution* treeless saddle showed the treeless saddle to be consistently improving performance:



Freedom in the shoulder produces more expression in the movement

- Less lateral deviation in the hind limbs - indicating straighter posture and improved engagement.
- A smaller range of vertical movement between the hock and point of buttock indicating improved engagement.
- The neck was longer in all paces and a lower head carriage was seen in walk, indicating improved back action, stride length and posture.
- Both saddles and riders sat straighter on the horses' backs, with a marked decrease in lateral deviation to the left.
- All horses improved their overall way of going, becoming happier and more willing.

The *Solution* jumping saddle has produced similarly dramatic results:

- Calmer, cleaner jumping, with improved technique.
- Horses are able to use their shoulders better.
- They are also less worried about the tree points slamming in to the back of the scapula on landing.
- They don't tire as quickly and can concentrate longer.
- In fast work, horses that had previously been thought to have a poor natural gallop learned to lower and flatten the frame and significantly developed the stride length.



*Confident jumping in **The Solution** Jumper*

The British made *Solution* saddle

- *Is the first treeless saddle to be designed specifically as a professional rider's tool.*
- *Is allowed for use in all disciplines under FEI and national governing body rules. (Caution is recommended when looking at other "treeless" designs – although its increasing popularity has made treeless now allowed in competition, discipline rules state that the saddle must be of English style, which most makes are not.)*
- *Probably remains the only truly treeless saddle - it has absolutely no rigid parts to cause injury and is completely flexible.*

There are other designs on the market, but although they describe themselves as treeless, they usually have some form of rigid frame, usually a pommel arch, which I would only describe as part-treed, at best.

However, the good thing about all of these saddles is that it finally gives riders a choice. The result is a growing awareness of saddle issues and a long-term benefit to the horse.

There are significant welfare implications in the development and use of the treeless concept.

The Solution treeless saddle design:

- *Having been established since 1999, is now thoroughly tested and proven*
- *Does not set out to provide even distribution of weight, but to protect the back from pressure and trauma by using a unique layering system*
- *Flexes with the movement of the horse's back thus reducing peak pressure*
- *Places the stirrup attachment across the broadest part of the back to further disperse pressure, instead of localising it*
- *Can be used with balancers to ensure optimum fit and even contact without spinal pressure*
- *Is available in gulletted and gullet free models for all disciplines*



The Solution moulds to the shape of the horse's back



*A well developed back – an 8-year-old eventer that has only ever worn a **Solution** saddle*

Training advantages:

- Backing young horses is much easier as they don't seem to mind the girth. Even if they do tighten against it initially, there are no tree points to tighten back into them, which is what frightens them and can lead to freezing or bucking.
- The treeless can be fitted to any horse, regardless of conformation problems.
- Horses tire less quickly, both physically and mentally.
- The stride is freer therefore longer - this has wide ranging implications across all equestrian disciplines.
- Problem horses can benefit - those with cold-backed syndrome, kissing spines and other back conditions.
- Many so-called behavioral problems resolve.
- Even where tree point damage has caused muscle atrophy, when tree use is discontinued, there can be considerable regeneration, particularly in younger horses.
- In remedial and rehabilitation work, it is possible for the trainer to feel subtle gait irregularities; this is also extremely useful in the early diagnosis of lameness.

Veterinary use

In the clinical evaluation of back-related problems, *The Solution* is useful as a diagnostic tool and can be usefully employed to eliminate the saddle as a possible source of pain. Previously, there have been a large number of referred cases of back problems that have been impossible to diagnose.

“In nearly 12% of cases in a survey of horses referred with a history of thoracolumbar (back) complaint, no definitive diagnosis could be established at all. These horses usually exhibited some loss of performance with discomfort in the back. No specific clinical or radiological abnormality could be found for the presenting clinical signs.”
 (Jeffcott 1980)

Dr. Sue Dyson MA, VetMB, PhD, DEO, FRCVS, Head of Clinical Orthopaedic Studies at the Animal Health Trust in Newmarket, and one of the world’s leading orthopaedic clinicians specialising in the diagnosis and treatment of lameness in the horse, now regularly uses the Solution in assessing horses with back pain and recommends its use to clients:

“It has been my experience that some horses with back pain benefit tremendously by the use of *The Solution* saddle. Clinical assessment of a horse with a performance related problem working in a Solution treeless saddle helps me to determine if such a saddle might benefit the horse in the long term, although this may take several days assessment to determine”
 (Dr. SJ Dyson 2006)



A referral case from the AHT shows the typical signs of back damage: dipped spine, hollowed musculature, weak top line and hindquarters.

The Equine Clinic at the AHT specialises in lameness and poor performance in horses from all disciplines, taking an integrated approach to diagnosis and management.

In one AHT case study, a horse that had appeared lame in front when ridden in its own saddle moved markedly better when *The Solution* was used and it was then possible to observe subtle hindlimb lameness.

Several case studies undertaken at the AHT have involved kissing spines syndrome and all have shown marked improvement with the use of *The Solution* saddle.

Important safety considerations

- *The Solution* is easy to fit, making it straightforward for anyone to use without fear of causing damage to the horse.
- If the horse should roll or fall on the saddle, he will not injure himself with it.
- Should the horse fall and trap the rider underneath, the saddle will not cause injury to the rider.



*Safety considerations for riders, horses and saddles – the flexible **Solution** caused no damage*

The rider benefits:

- A particular bonus is the positioning of the stirrup bars which are not restricted to being placed on the tree points, but are positioned for optimum rider balance, making a tremendous difference to comfort and security. Riders are able to adopt a correct position more easily, and also to self-correct.
- There is no concussion or push from a rigid frame, making it exceptionally good for riders' backs too.
- Because the horse can more clearly feel the rider and his slightest position changes, he is able to respond more easily to subtle aids.
- Similarly, the rider can feel every movement in the horse's back, helping in the precision of those aids.
- The soft, flexible seat allows the rider to spend extended periods in the saddle without seat bone ache.

Teachers and trainers benefit:

- Instead of spending valuable time working through tension, the trainer can focus on the positive progression of the quality of the work.
- The rider becomes easier to teach as he can now concentrate more easily on the harmony of the work, becoming more able to respond to the trainer.
- Without many of the issues of rider position and balance, the rider can be taught effective use of the aids.

Efficient and cost-effective:

- The rider only needs one saddle for life, because it can be fitted to any horse.
- No re-flocking, expensive tree repairs or rigid parts to cause wear.
- Being extremely lightweight makes it easy to carry and to lift, especially onto big horses.
- It can be rolled up and transported in a sports bag, or even a flight bag.

Research, development and results:

Case study research projects run with vets, physios, colleges and equine welfare organisations such as the International League for the Protection of Horses (ILPH) and the Thoroughbred Rehabilitation Centre (TRC) are providing a wealth of valuable information on the benefits of long-term use of *The Solution*.

Important feedback, not just from professional trainers and top competition riders, but also from a huge range of owner riders, amateurs, and hobby riders ensures that we are able to constantly upgrade, improve and develop our range of designs to further enhance the performance benefits for both horse and rider.

A selection of all these articles and stories can be found on our website.