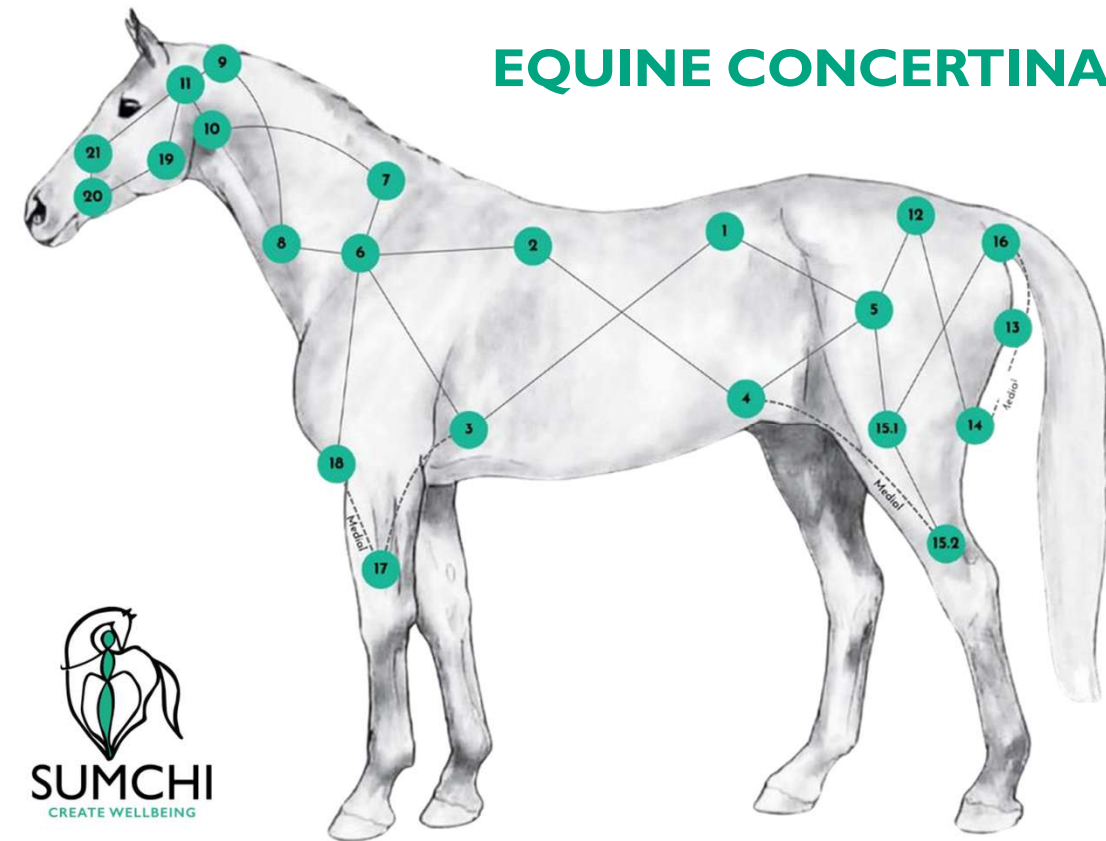
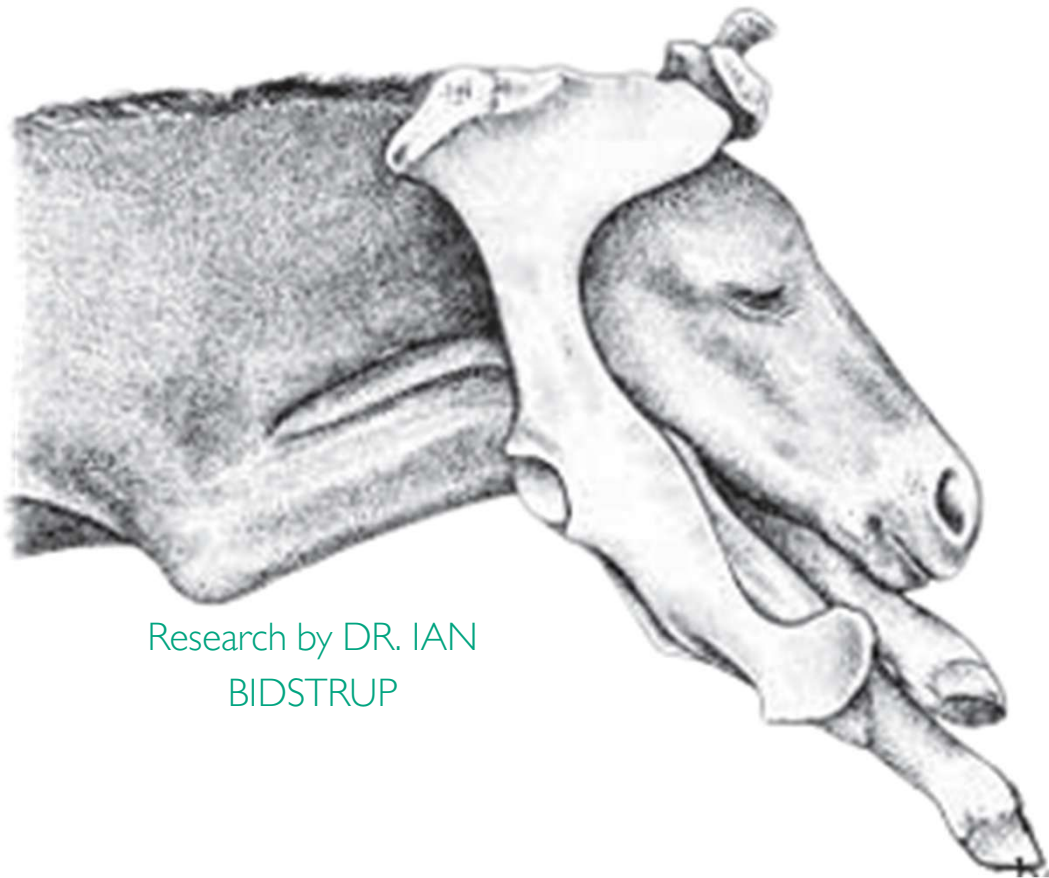


A Look into Dr. Ian Bidstrup's Research on Equine Birth Trauma and Linking into SUMCHI's New Insight on the Components of the Collagen Matrix

with Beth Shaw and Robyn Butterworth





Beth Shaw

Owner and Founder of BSET Academy
SAVC: CSR Veterinary Physiotherapist
- Reg no. CSVP24/17700



**ETT International Practices in
Hong Kong, China and
Karkloof, South Africa**



Robyn Butterworth

**Principal and Academic Facilitator of
BSET Academy**



**China -
Chenadu**



**Hong Kong Jockey Club
Happy Valley Race Course**



Madagascar



South Africa - Durban July



BSET ACADEMY

Training for Equine Careers since 2008

Karkloof Valley, KWAZULU-NATAL, South Africa



BSET Academy is a recognised training provider, which offers a full-time 2-year course Holistic Healing Equine Modalities. We produce certified ETT Practitioners, who currently work worldwide supporting all levels of equine athletes.

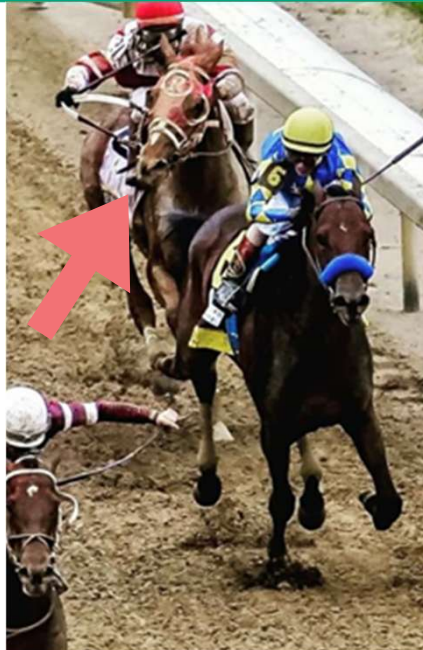
BETH SHAW'S EXPERIENCES

Many horses across disciplines exhibit neck issues, but increased awareness can improve the health and well-being of sport horses.

In 2016, I started collaborating with retired veterinarian and author Sara Wyche. Our observations of neck trauma have led us to develop and discover important muscle hubs and components within the collagen matrix named The Equine Concertina

The Key Question - Is neck trauma in modern sport horses due to training, birth trauma, breeding, or a combination?

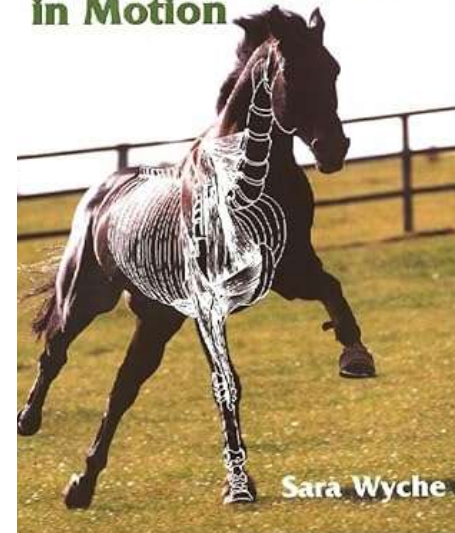
2022 Kentucky Derby Winner Rich Strike
An example of hyperextension in the moment, this horse never performed successfully again.



WEBINAR OVERVIEW

- Dr. Bidstrup's well-documented research.
- SUMCHI's Equine Concertina and the components of the collagen matrix.
- Hyperextension of the spine and the possible consequences for tissues and nerves.
- Observing foals and their dam's interactions that may reveal early weaknesses or disruptions.

The Horse's Muscles in Motion



Dr Bidstrup questions, if there is this much damage to the ribs then what other damage is occurring during Birth Trauma?

At birth, the sternum-to-withers region is soft and highly malleable, with the developing collagen matrix providing much of the structural support, these tissues are not yet fully stabilised. Compressive or abnormal forces during birth and early development may influence how tension patterns form through the thorax, neck, and forelimbs. This raises the question of how much early structural adaptation or distortion may predispose some horses to hyperextension patterns later in life?

BIRTH TRAUMA STUDIES

The 2003 post-mortem study by Schambourg et al. examined 760 neonatal foals (1990–2000) and found that:

- 9% (67 foals) had thoracic trauma at necropsy.
- Rib fractures were present in 19 foals as a direct cause of death
- **Ribs 3–8 were most commonly affected (≈86%)**
- 94% of lesions occurred at the costochondral junction

The high incidence of costochondral fractures (T3–T8) and thoracic asymmetry suggests that birth compression forces may establish long-term restrictions within the thoracic sling. These restrictions may later manifest as girth sensitivity, postural asymmetry, and compensatory spinal loading in the adult horse.

According to 2007 research paper, it was found that at least 80% of rib fractures picked up by ultrasound were missed by xray.

- Thus finding 5% with fractured ribs, as per the 1999 paper, translates to 20%, or 1 in 5 foals with major rib trauma, not just rib/sternal junction trauma.

D. JEAN, V. PICANDET, S. MACIEIRA, G. BEAUREGARD, M. A. D'ANJOU and G. BEAUCHAMP
EQUINE VETERINARY JOURNAL

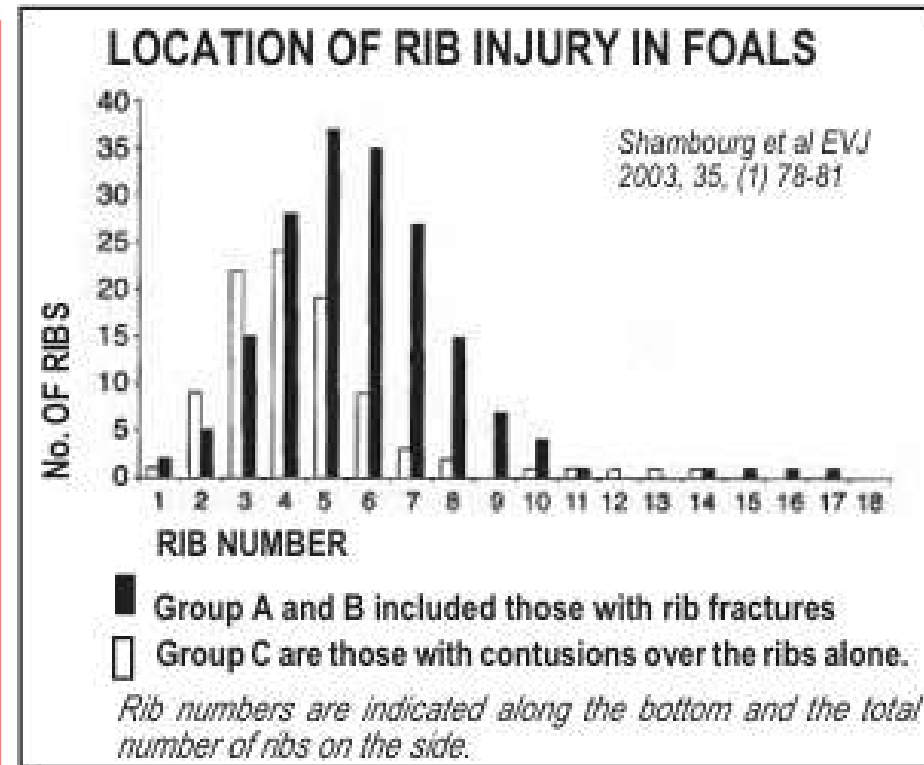
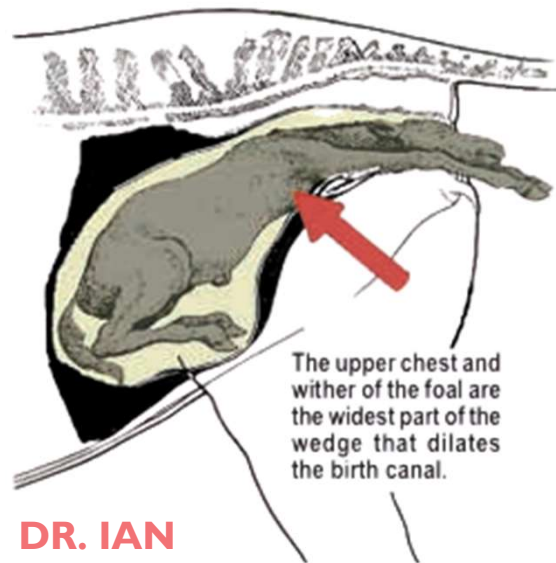


Image from Fox Run Equine Center, Apollo, Pennsylvania. Dr Bidstrup

During birth, the foal's ribcage, especially at the shoulder and wither, is subjected to significant forces and particularly prone to injury. Rib fractures are not always visible without specific examination, but their presence can significantly impact comfort and performance throughout the horse's life.

- A large study found that over 20% of foals had rib fractures or disrupted rib-to-breastbone junctions at birth (D. Jean et al., EVJ 1999).
- The 4th to 6th thoracic vertebrae most frequently affected. Post-mortem studies further support these findings (Shamborg et al., EVJ 2003).
- Right-side issues, such as right wither and pelvic damage, are most common. Leading to problems like difficulty with the right canter lead and a dropped right hip.

The research underscores the importance of careful assessment of neonatal foals and ongoing monitoring for subtle signs of birth-related trauma, as these may influence the horse's behaviour, comfort, and rideability for years to come.



**DR. IAN
DIDSTUB**

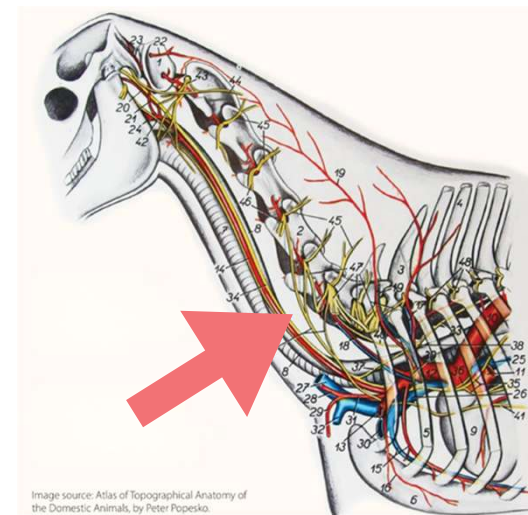


Image source: Atlas of Topographical Anatomy of the Domestic Animals, by Peter Popesko.

BRACHIAL PLEXUS

AN OVERVIEW OF DR BIDSTRUP'S RESEARCH BIRTH TRAUMA

- Birth trauma major factor in girth, wither, and flank sensitivity.
- Can cause issues which often manifest as fear and anxiety, one-sidedness, sacroiliac imbalance, and saddle fit problems.
- Can result in discomfort for the horse and dramatically affect rider balance and performance.
- Critically, injuries to the spinal column and ribcage at birth may have lasting effects on the nervous system.

Website: <https://www.spinalvet.com.au>

YouTube: [@spinalveteducation9151](https://www.youtube.com/@spinalveteducation9151)

<https://youtu.be/P8-cNGefLI?si=AdlQKoryEhKTKFN7>

“Identifying and treating any birth injuries at an early stage may assist breeders in decreasing potential performance disadvantages.”

Dr. Ian Bidstrup



BIRTH Trauma

by Wendy Elks with Dr. Ian Bidstrup
Photo by Carol Willocks

Equine research has allowed the development of new concepts in the link between chest and pelvic trauma at birth, and pain, behavioural and performance problems of horses.

For humans, giving birth is a momentous occasion; for horses, it's a process mostly performed alone and unassisted, in their natural environment. The 'expectant' horse breeder may await the imminent arrival of a four-legged 'baby' with foaling stall and intercom at the ready, only to find that the mare has given birth in the paddock during the night. In the morning the foal, with extraordinary capability, stands beside its mother, drinking and sturdy, ready to embrace life. The brief trauma of birth is over. Or is it?

A growing body of clinical experience and scientific research indicates that the physical trauma of birth can sometimes profoundly affect a foal's physiological development and consequently its future performance. Horses suffering from the unresolved effects of birth trauma may be those often referred to as 'saddle shy', 'girthy' or 'cold-backed'. A horse may be considered piggy, difficult or nasty, when in fact the animal is responding to chronic pain and discomfort, which goes back to the birthing process. Many years of observation and successful treatment of spinal conditions by Dr Bidstrup and his colleagues indicate links between trauma suffered at birth with a complex range of conditions such as girthiness and one-sidedness in riding horses.

Birth trauma, resulting in long term spinal dysfunction of humans, is well recognised by chiropractors, osteopaths, some medical practitioners and physiotherapists, and most of these practitioners advocate early intervention to rehabilitate babies from the damage birth can cause. Similar trauma can occur to equines during foaling. Most of the time, in humans and horses, the damage heals quickly. But reasonably frequent spinal dysfunction appears to remain, which if undetected and uncorrected can lead to chronic conditions that the body learns to accept as normal. Not life-threatening, they nevertheless set the horse up for problems and difficulty when it comes to being ridden.

Birth trauma occurs because of the enormous pressure exerted upon the foal as it passes through the birth canal. While the skeletal frame of an unborn foal is supple and designed to withstand the journey of birth, it is well-recognised that virtually all foals undergo some damage during transit through the birth canal. As protuberances such as the foal's rib-cage at the level of the shoulder and wither are subject to the greatest forces,

CAROL WILLOCKS

EQUINE CONCERTINA

The Equine Concertina highlights the key components of a bilateral diamond lattice that functions within the larger collagen matrix, providing an intricate architectural framework for force transmission throughout the body.

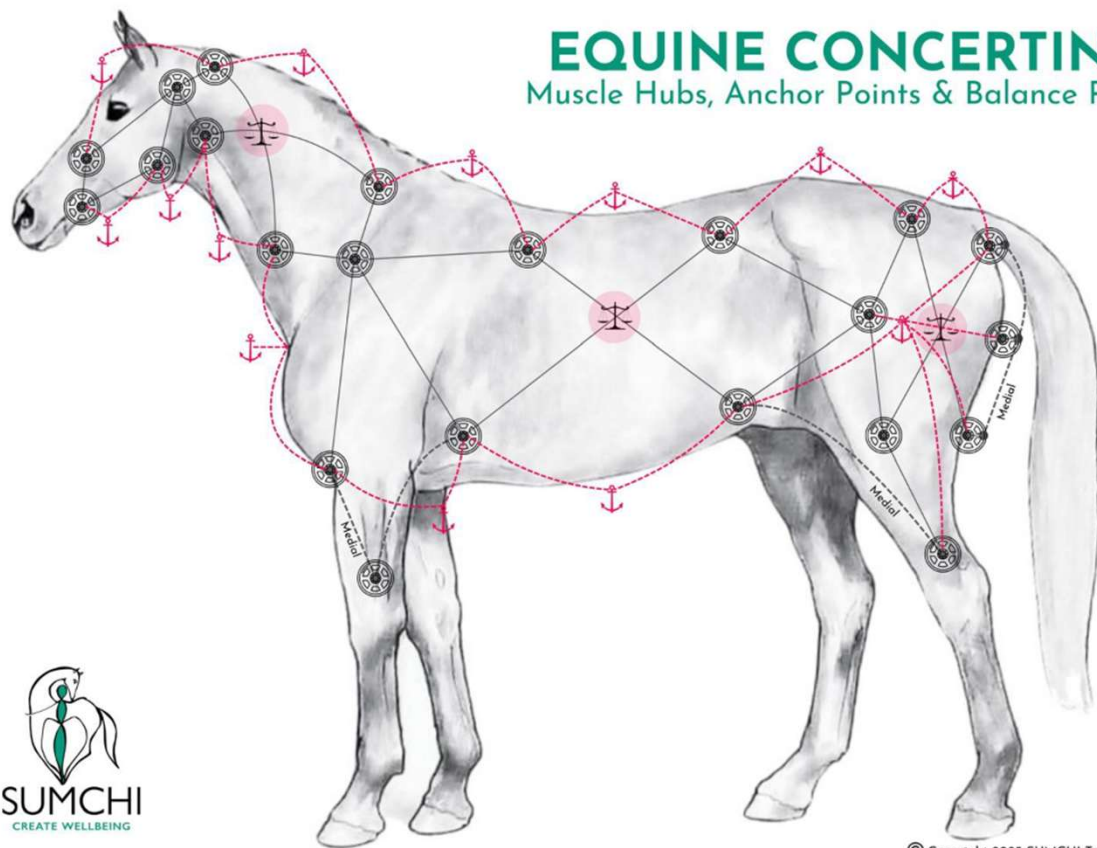
Components of The Equine Concertina:

- Muscle Hubs (MH)
- Interhub Tension Lines
- 3 Balance Points of Equilibrium (BP)
- Anchor Points (AP)



EQUINE CONCERTINA

Muscle Hubs, Anchor Points & Balance Points



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Muscle Hubs (MH)



Anchor Points (AP)



Balance Points of Equilibrium (BP)

The Equine Concertina framework illustrates how tension and force are distributed throughout the body in interconnected diamond patterns.

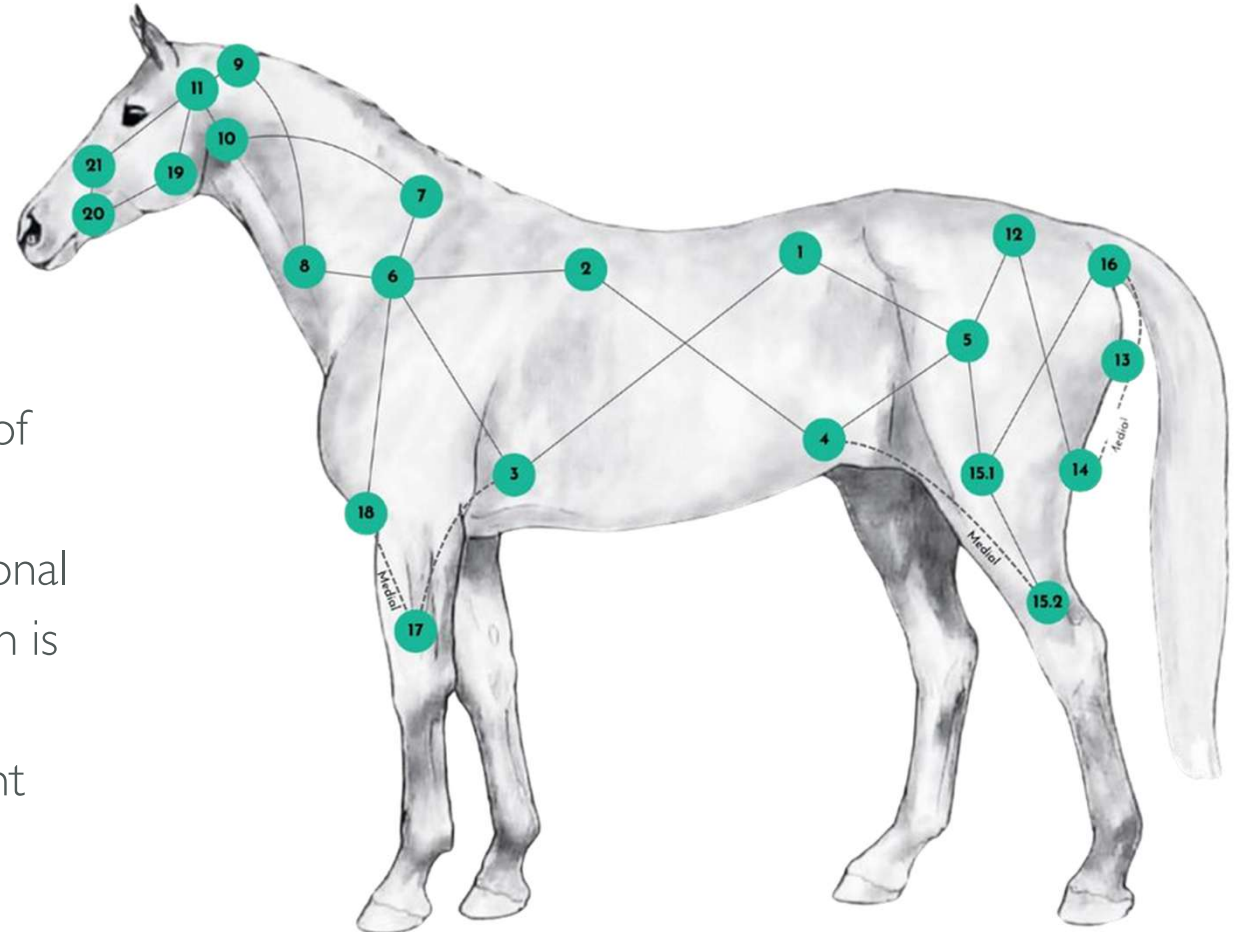
The Equine Concertina provides a way of viewing the horse as an integrated tensional system rather than isolated anatomical regions. Developing an understanding of this model may help in recognizing where a foal (or mature horse) is harboring trauma, restriction, or excess tension within its developing body.

EQUINE CONCERTINA

Muscle Hubs (MH)

Muscle Hubs are areas where two or more muscles overlap while acting in different directions.

- Convergence points of tension, capable of adjusting local and systemic tension
- Regions where tissues may recruit additional muscles to support locomotion; if tension is not properly managed through the hub, asymmetry and compensatory movement patterns can develop



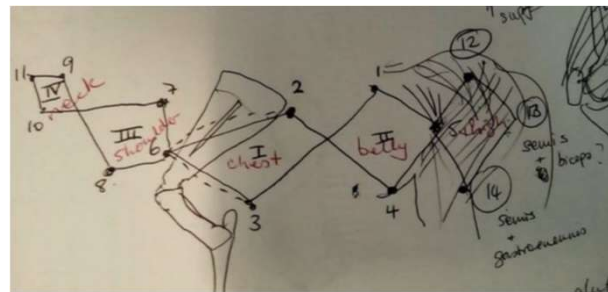
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INTERHUB

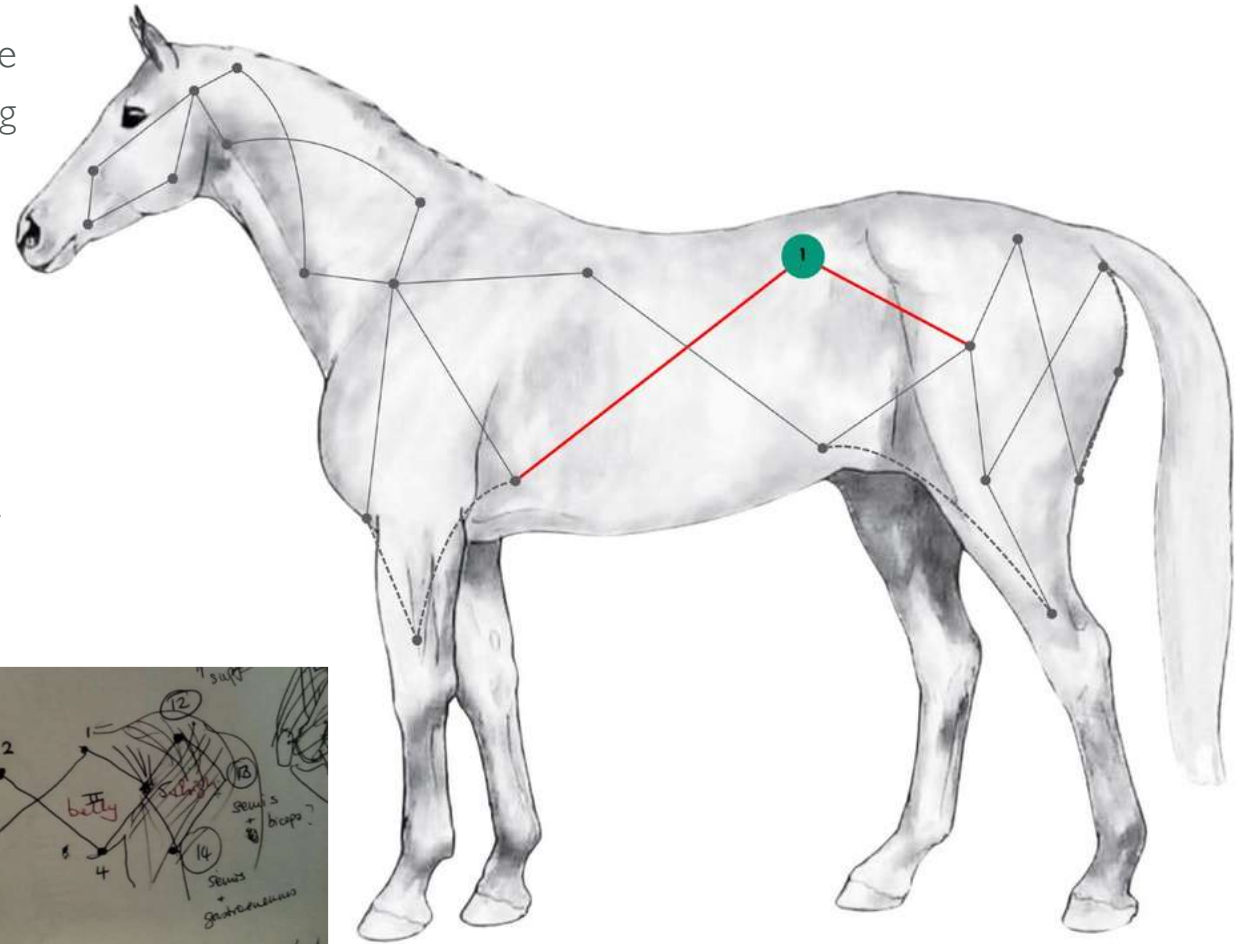
Tension Lines (IHTL)

Interhub Tension Lines (IHTL) are diagonal connective pathways that link one muscle hub to another, forming the concertina diamond patterns behind equine locomotion.

- IHTL are pathways for **transmitting mechanical tension between the main muscle hubs**, helping to coordinate movement across the body
- Structures that contribute to the overall integrity of the collagen matrix, with a speculative role in maintaining piezoelectric signaling
- If the integrity of the IHTLs is left unbalanced, it can contribute significantly to the development of asymmetry and locomotor restriction.



Sara Wyche-

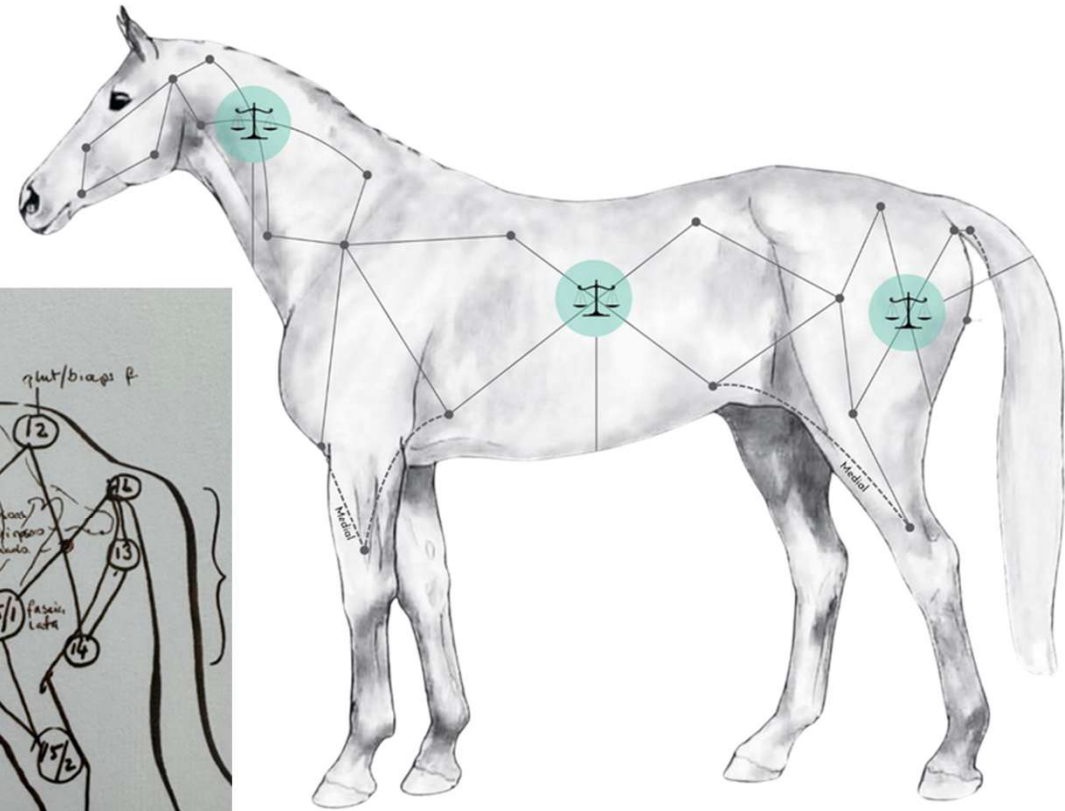
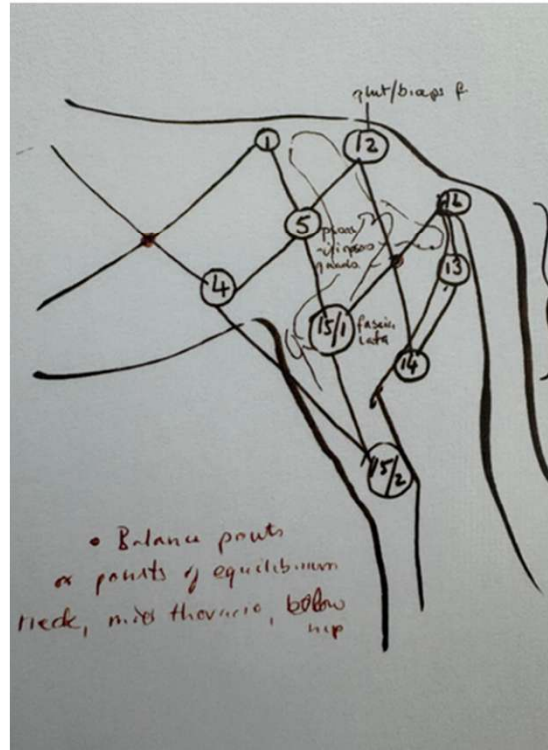


EQUINE CONCERTINA

Balance Points of Equilibrium (BP)

Balance Points (BP) of equine equilibrium are the crossover points of Interhub Tension Lines, creating the primary diamonds of the equine concertina.

- These points are tangible, visible to the trained eye, and are regions where opposing forces cross over in the horse's body, allowing connective tissues to efficiently transmit force and tension.
- When these points are in balance, they support stable posture, coordinated movement, and the rhythmic flow of essential life processes.
- However, when they shift in response to compensation, they can reduce equilibrium and negatively impact movement and well-being.



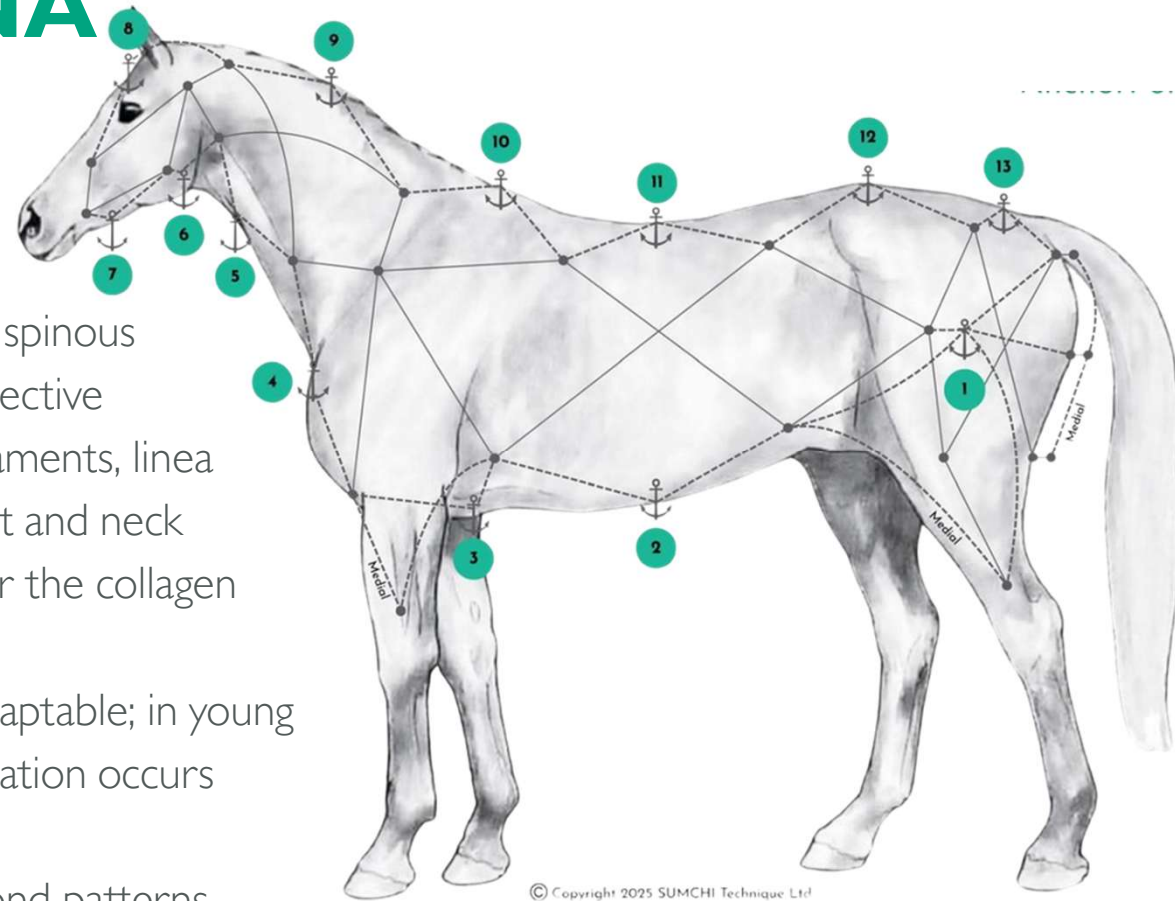
Sara Wyche-

2021

EQUINE CONCERTINA

Anchor Points (AP)

- Anchor points are fixed locations, both dorsal and ventral, within the collagen matrix
- They rest on skeletal foundations such as the dorsal spinous processes, pubic bone, and sternum, as well as connective structures including the nuchal and supraspinous ligaments, linea alba, and the converging muscles of the ventral chest and neck
- These structures act as essential reference points for the collagen matrix
- Although considered fixed, anchor points remain adaptable; in young horses, they are more fluid until growth plate ossification occurs
- Anchor points are proposed to function as:
 - Sites where tension from one side of the diamond patterns transmits across the body
 - Key locations for maintaining spinal compression and extension integrity



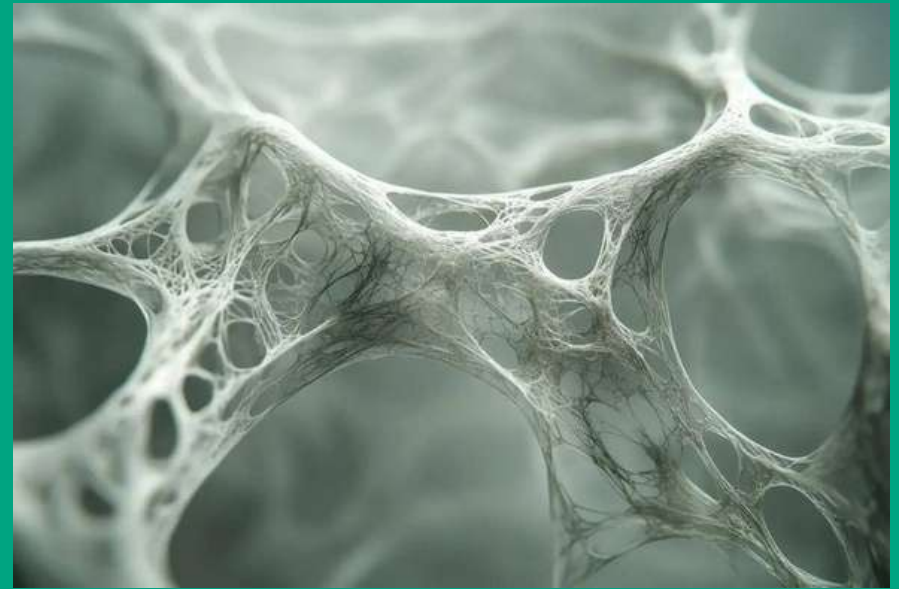


**THE EQUINE CONCERTINA IN
MOTION ON A SPORT HORSE**

COLLAGEN

Structure, Strength & Function

- Type I collagen = main structural backbone
- Forms:
 - Superficial fascia (broad supportive sheets)
 - Myofascia layers:
 - Endomysium (around fibers)
 - Perimysium (around bundles)
 - Epimysium (around whole muscle)
- Present in organs as connective tissue
- Makes up about $\frac{1}{3}$ of the horse's body
- Extremely strong (high tensile strength)
- Where the Collagen fibres gather the forces are transmitted through the horse's body, acting both as protective layers and supportive scaffolding



HYPEREXTENSION OF THE EQUINE SPINE

“The entire system of back muscles is divided into two major portions. One spans the lumbar and thoracic spine, the other spans the vertebrae of the neck. They all cross over in the region of the first rib. When maximum force is applied the back and neck muscles are capable of hyperextending the spine, usually with severe consequences for the structures at the base of the neck. These structures also include nerves.”

Sara Wyche, *The Horse's Muscles in Motion*.

- *Is caused by sudden, sharp, excessive movement*
- *Which leads to intense force transmission through the spine*
- *The nuchal ligament may yield at AP9*
- *Scalene muscles begin working in opposing directions*
- *Results in stress or displacement of the brachial plexus (nerves)*



**Drawing by Sara
Wyche**

AP9



MH8



A theory of Hyperextension of the spine in sport horses - it is caused by sudden, sharp, excessive movement- this leads to intense force transmission through the spine, thrusting through the T1 - C7 junction involving C6, through my work I have noticed this may cause the nuchal ligament to yield at AP9.

- How does this connect with Dr. Bidstrup's work? By sharing my own observations alongside Dr. Bidstrup's research, I hope to encourage breeders to view foals through the lens of the Equine Concertina.
- If you consider both his findings and my practical experience, and observe your foals with this perspective, together we may uncover new insights that will better support the development of sport horses.



MUSCULAR & STRUCTURAL IMPACT

- Tension has given way within the nuchal ligament. The muscle bodies of the scalene are pulled in opposing directions. The brachial plexus, which is imbedded within the scalene muscle, is then placed under neurological stress.
- Longus colli is also affected, especially around AP5.
- Damage at AP4 and AP3 disrupts normal tension patterns and may change how the horse loads the lower limb. Relating this to Ian Bidstrup's work, foals with sternal trauma often develop an asymmetrical pattern around the 4th–5th rib cartilage, which may lead to compensatory lower limb dysfunction.
- Involves key fascial structures, Fascia endothoracica, Sternopericardiacum and Diaphragm.

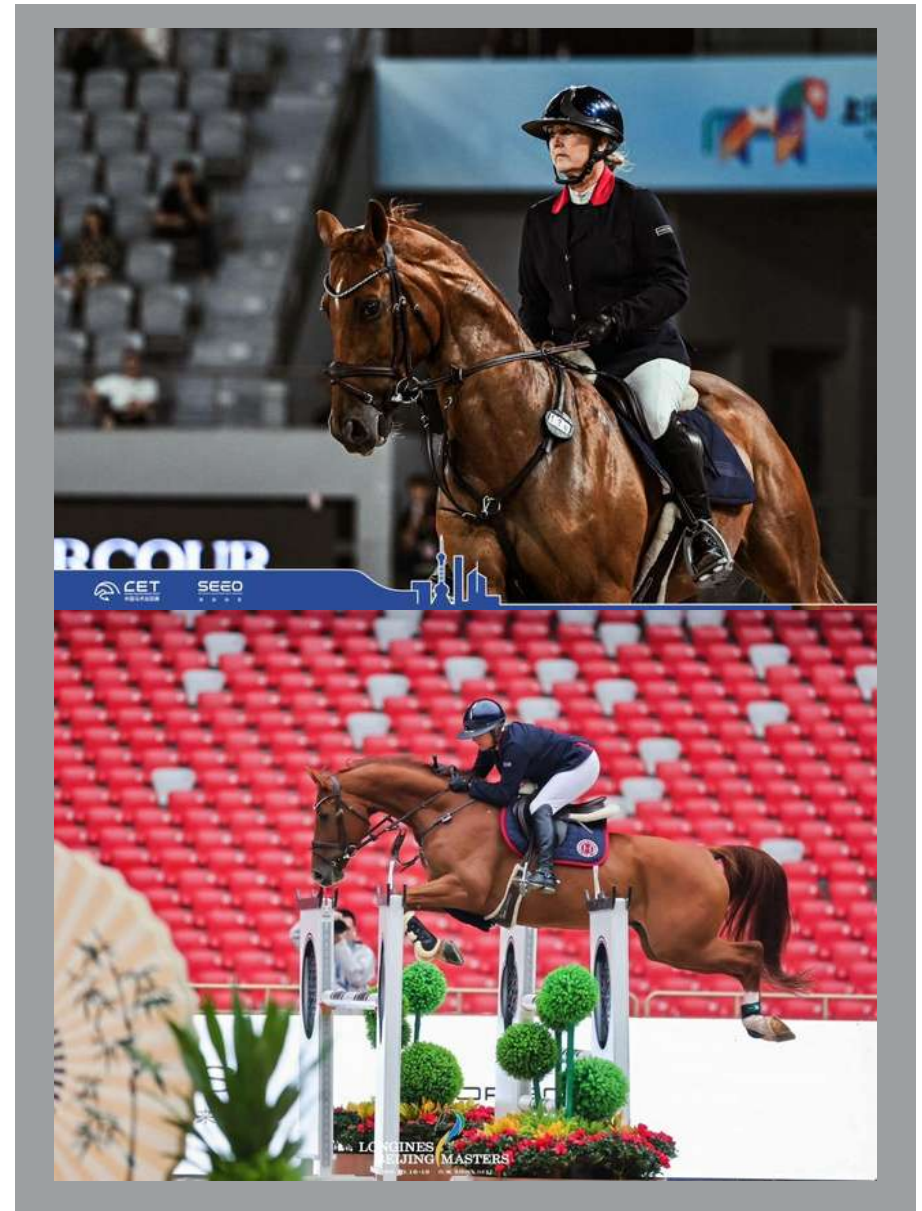
Clinical Implications

- Tension shifts at MH4 which involves the prepubic tendon
- MH4 links directly into AP1 at the base of the pelvis - Pre-pubic tendons and Symphyseal tendon
- Dysfunction can travel throughout the collagen matrix even causing disruption to the pericardium.

Evidence of active and past hyperextension(HE) of the spine has been presented to me through the racehorse, show jumper and dressage horse.

This explanation and pattern of HE can be linked and supported by Nerve Spots and Hock Scars - we discussed these topics at the WBFSH Assembly last year.

Example of Hyperextension of the Neck in a Show Jumper Treated by Beth Shaw



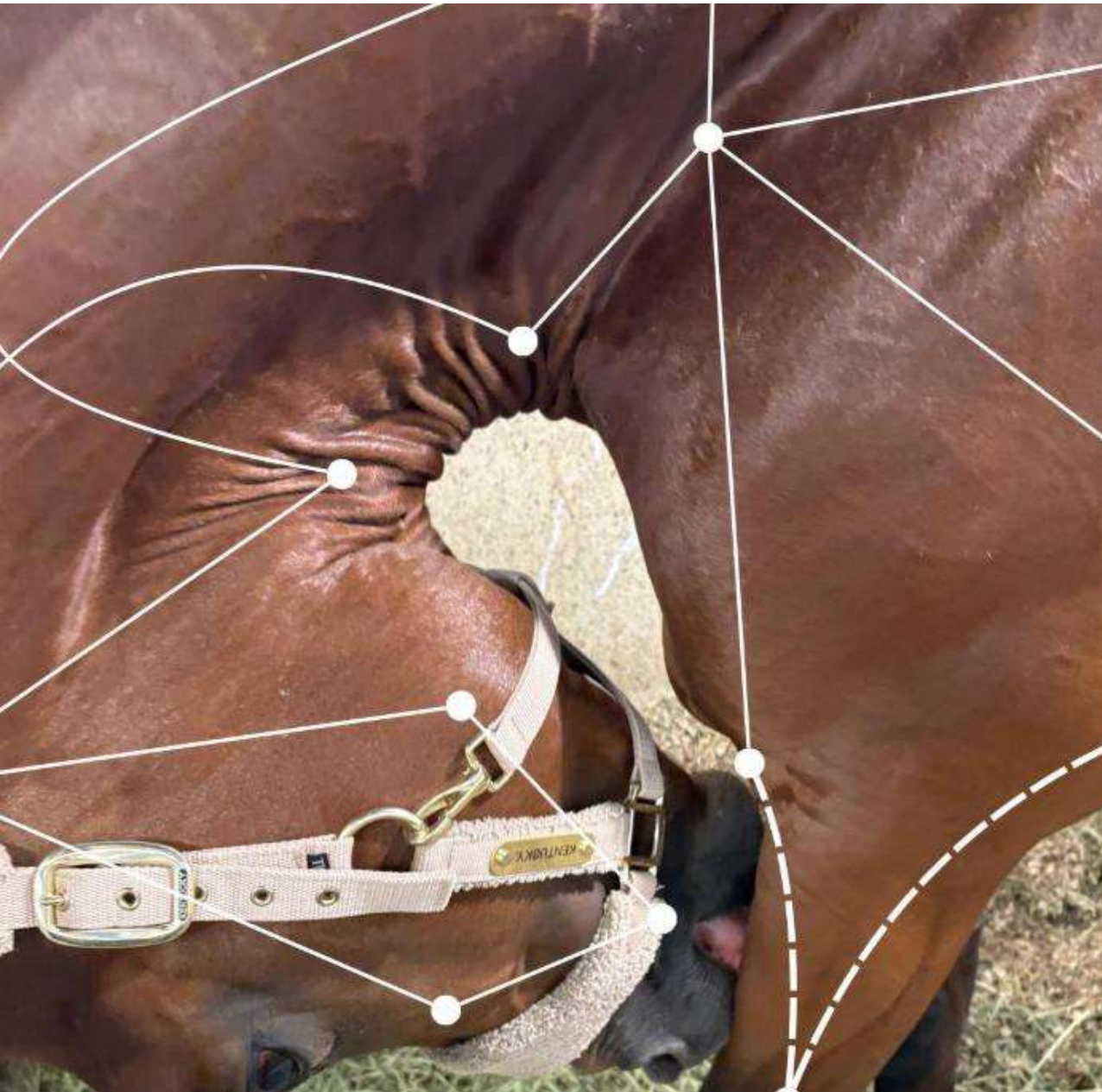
NATURAL HORSE WELLBEING

Behaviours such as self-grooming and mutual grooming may provide early indicators of asymmetry or restriction within the body. By recognising these patterns, we can begin assessing the integrity of the system from the very beginning.

This awareness may support the development of sounder performance horse with greater longevity of their career.



- *Self-Grooming*
- *Self Poultrice*
- *Mutual Grooming*



SELF-GROOMING

Self-grooming is when a horse uses its own body to maintain comfort, relieve tension, or stimulate sensation. It includes behaviours such as rolling, tail swishing, nibbling, rubbing, licking, chewing movements, yawning, stretching, stamping, pawing, and body shaking. Studying self-grooming through the lens of the Concertina indicates that these movements appear to target specific areas of muscular or fascial tension within the body.





MUTUAL GROOMING

Mutual grooming between horses is more than a social act; it activates the body's connective tissue at both structural and electrical levels. Through repeated pressure and contact, the horse's muzzle and teeth grasp, pull, and massage their partner's skin during mutual grooming. This action stimulates the skin and the tissues beneath it, enhancing physiological responses.

They usually focus on areas that are difficult to reach such as the neck, withers, shoulders, and back. It helps strengthen social bonds, reduce stress, and may also assist in relieving muscular tension in specific regions of the body. It is often observed after periods of stress or exercise, suggesting a role in helping the body return to a state of readiness. In herd dynamics, it is an important form of communication and connection between horses.



MUTUAL GROOMING BETWEEN MARE AND FOAL

Sharon L. Crowell-Davis conducted a **24-week study** titled “Self-grooming by mares and foals of the Welsh pony (*Equus caballus*)” (published 1985). Mutual-grooming behaviour of 15 mare–foal pairs was studied weekly for the first 24 weeks of the foal's life. Her work highlighted their preferred types of grooming and which mutual-grooming behaviours were engaged with for the longest. According to her findings, foals scratched their head and neck with a hind limb or self-groomed the trunk or hind limbs with their teeth for the largest portion of self-grooming activity. The mares spent the largest proportion of their self-grooming time rolling or rubbing their head or neck on an object, another pony, or their forelimb.

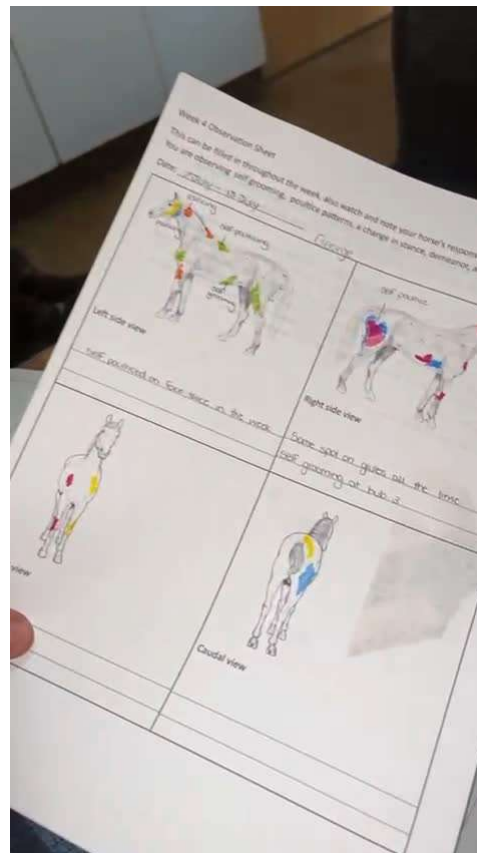


SELF- POULTICE

Self-poultice refers to a horse's instinctive use of external materials, most commonly manure or mud, to apply pressure, heat, or cooling to specific areas of discomfort in the body. Horses may deliberately press or position themselves against these materials to soothe tension or irritation. This behaviour often aligns with underlying areas of musculoskeletal restriction and is considered a natural self-regulation strategy.

EQUINE CONCERTINA

By identifying these issues early, can we strengthen the integrity of the system - especially through understanding the components of the collagen matrix - from the very start, potentially leading to sounder performance horses.



OBSERVATION SHEET

Pdf Observation Sheet - Self-grooming and self-poultice through the lens of the concertina is available upon request

We encourage you to engage with the equine concertina and map self-grooming and self-poultice to discover patterns in your horse.

Clinical developments in equine cervical surgery, such as those undertaken at Equitom, highlight the growing recognition of neck-related pathology in the sport horse.

Through my international travel and clinical work, I have observed a notable prevalence of cervical dysfunction across a wide range of horses. I found very beneficial to link into Dr. Ian Bidstrups work - for more information please visit his website <https://www.spinalvet.com.au/>

I am grateful for the opportunity to present and discuss this perspective with an influential group of professionals involved in sport horse welfare, as it may contribute to a broader understanding of cervical dysfunction and supports the continued advancement of equine care.

Additional Notes Follow On...

THANK YOU!

EMAIL:

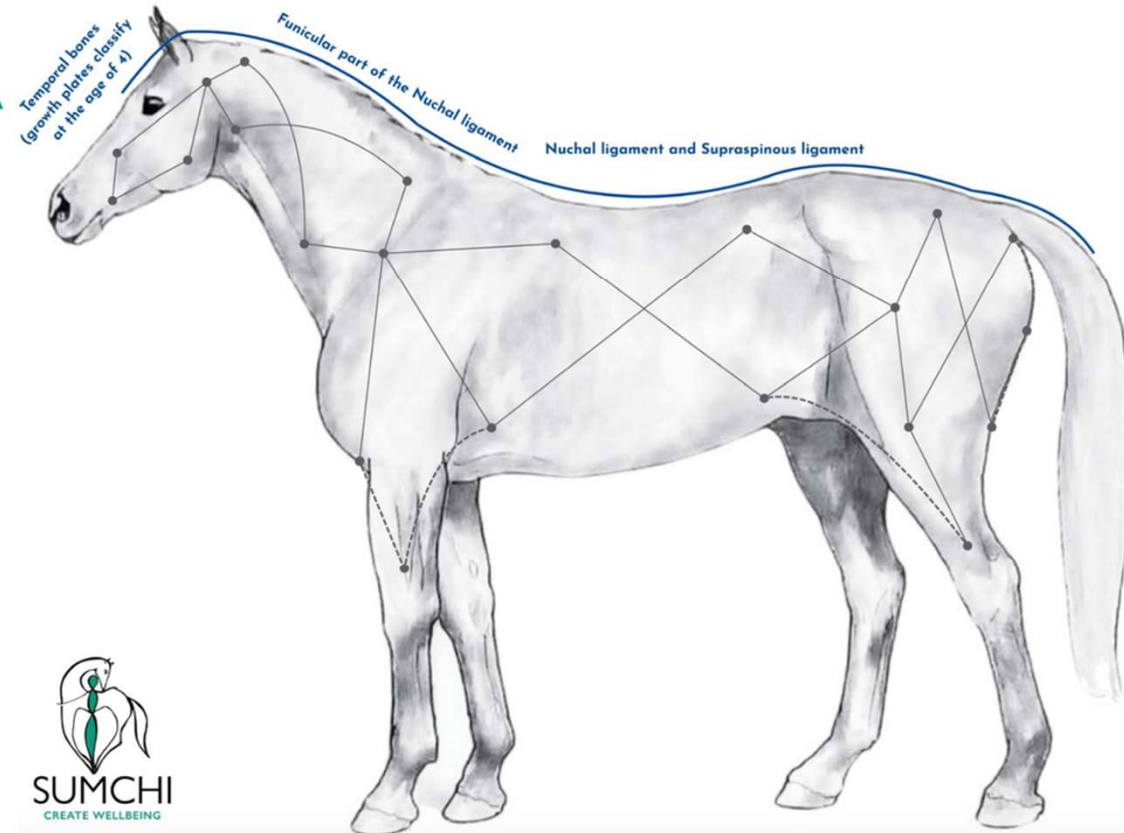
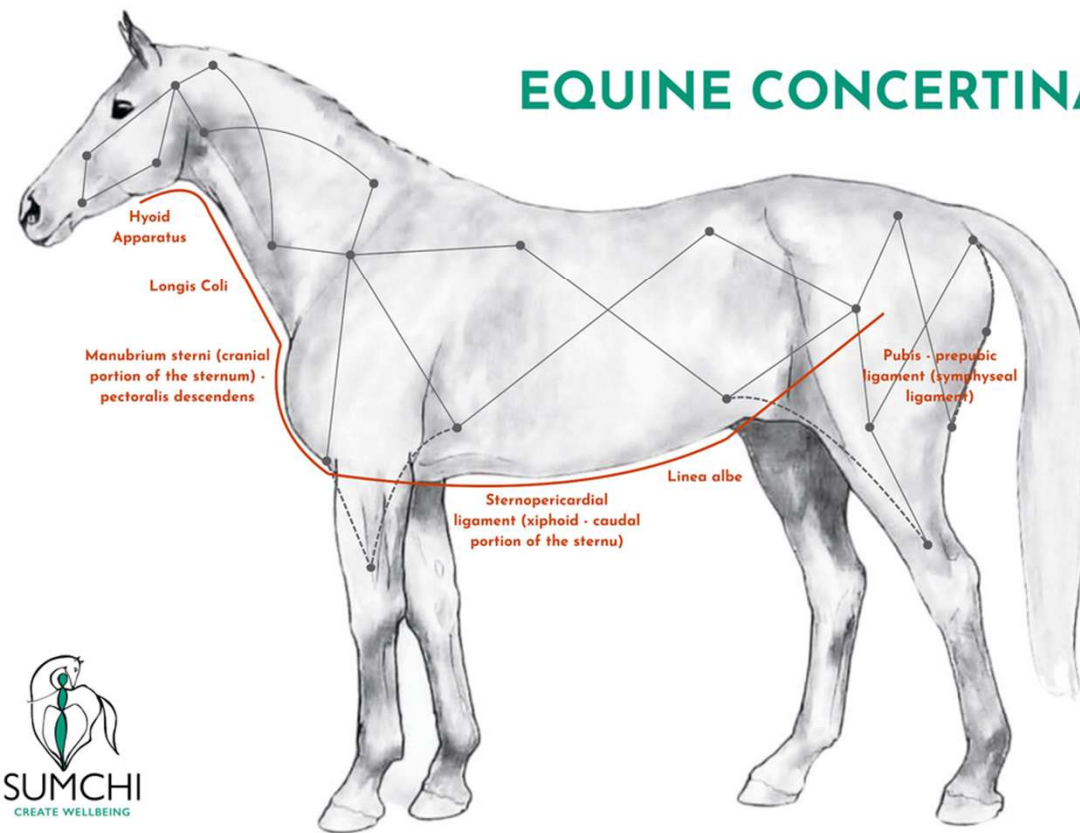
beth@sumchi.com



ANCHOR LINES

These diagrams give you a visual of dorsal and ventral connective tissues.

EQUINE CONCERTINA



CAN THE AWARENESS OF AP9 CHANGE THE FUTURE OF THE HORSE'S NECK CONDITIONS?

C6/C7, Cervical Development, and Sport Horse Breeding

It is important to consider whether greater awareness of cervical structure and the stresses experienced at birth, combined with appropriate management and training during early development, could improve tissue integration at the area C5,C6,C7. There is increasing recognition of an issue in Warmblood sport horses involving reduced connective tissue attachment from the lamellae of the nuchal ligament to the sixth and seventh cervical vertebrae. Understanding the collagen matrix and its components may help guide approaches to improving tissues supporting the cervical structure, optimising tension distribution, and encouraging connection through to the lower vertebrae.

A podcast on “The EquiScience” by Elisa Walfish” Episode 12 questions the sport’s growing preference for a more mobile and aesthetically flexible neck. While desirable, this may have unintentionally contributed to reduced structural strength in the cervical region. Recent veterinary discussions, including those presented at Boehringer Ingelheim First International Veterinary Exchange Conferences in Wuxi, China, highlighted the increasing prevalence of cervical-related issues in sport horses. Mathieu Foucaud, Head Surgeon at Equitom, Belgium, continues to develop advances in equine cervical surgery,

Brachiocephalicus

- Connects the skull of the horse to the forelimb
- Pulls the forelimb forward
- Assists in bringing the neck downwards and head back
- When a horse is poorly ridden, the muscle tends to fully support the forehead's weight leading the muscle to become inelastic and finally stop the animal from moving forward.

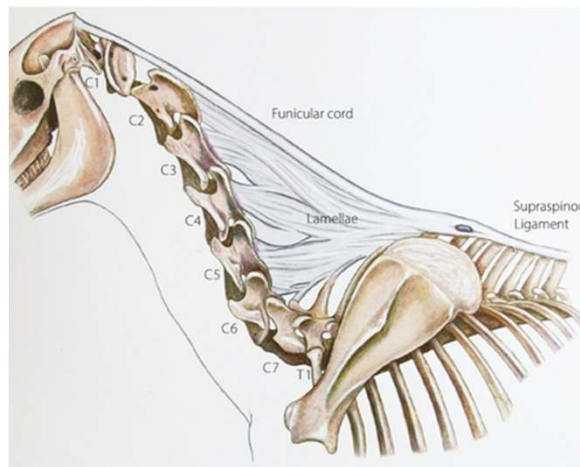
Omotransverse - closely connected to the brachiocephalicus

- Connects the wing of atlas (C1) inserts at the humerus
- Coordinates neck and shoulder movement
- Assists lateral neck flexion and forelimb protraction
- Restriction may reduce shoulder freedom and bending ability in the neck

Longus Colli

- Deep stabilising muscle beneath the cervical spine
- Supports neck posture and cervical stability
- Important for controlled, balanced movement and flexing the neck
- Weakness may contribute to neck bracing and instability

ANATOMY BREAKDOWN



Sharon May-Davis,

Janeen Kleine & Cristina Wilkins

<https://horsesandpeople.com.au/the-mystery-of-the-missing-lamellae/>

Scalene

- Deep muscles connecting the neck to the first ribs
- May assist inspiration by elevating the first rib
- Flexes neck, or bends it laterally
- Tension may affect breathing, posture, and forelimb loading

Nuchal Ligament + Laminae counterbalance the Brachiocephalicus

The Funiculus part of the Nuchal Ligament

- Strong, elastic structure that extends from the occipital bone to the third, fourth, or fifth thoracic vertebrae. This structure is followed by the less elastic supraspinous ligament, which reaches the sacrum
- Supports the weight of the head and neck
- Helps reduce muscular effort during movement
- Stores and releases elastic energy during locomotion

Laminae of Nuchal Ligament

- Sheet-like attachments extending from the nuchal ligament to the cervical vertebrae - which extend cranioventrally
- Help stabilise and support the neck
- Assist in maintaining alignment of the cervical spine
- Distribute tension throughout the neck during movement

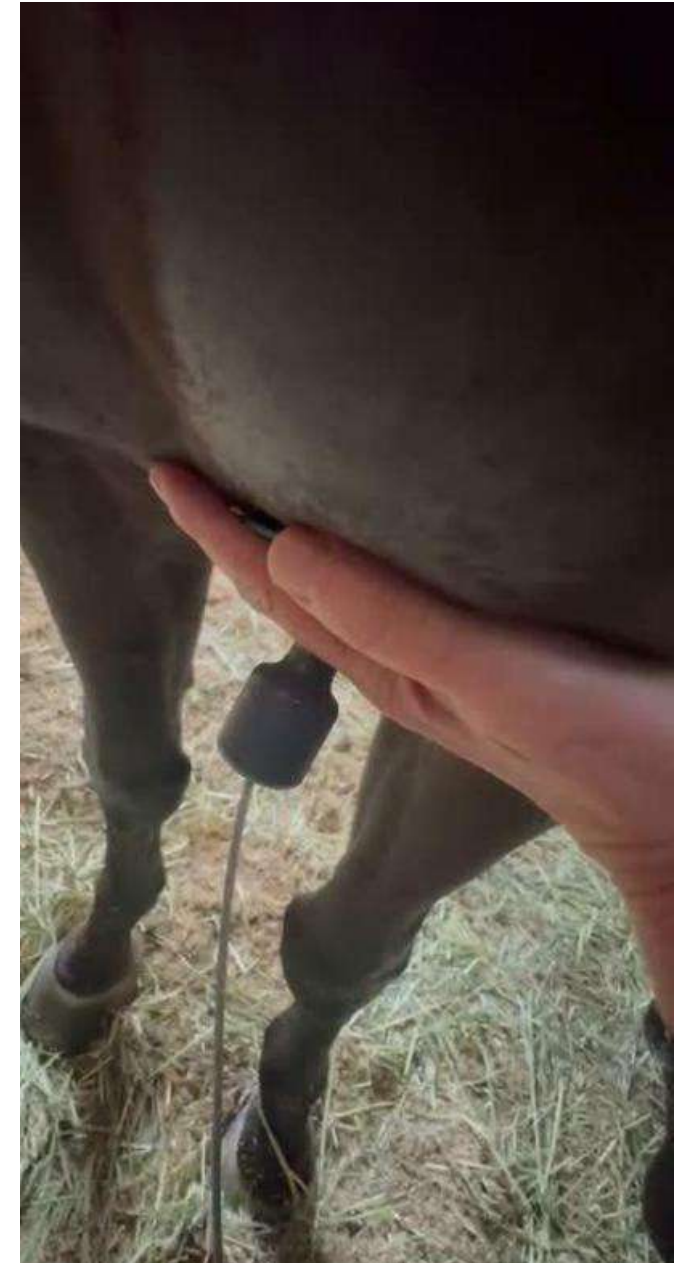


Association of Accredited Practitioners Pty (Ltd)

EQUINE TRANSEVA TECHNIQUE (ETT)

ETT is a technique that uses the Winks Greene Transeva- an apparatus originally designed by the late Sir Charles Strong. The technique is rich in history and has survived over time due to its unique pulse and mobile handpiece.

The Transeva's pulse creates rhythmic contractions, the ETT Practitioner assesses the state of muscle tone under contraction and adjusts the dynamic current accordingly to bring the muscle to optimum function





SUMCHI
CREATE WELLBEING

SUMCHI TECHNIQUE

SUMCHI Technique developed from our ETT work and the observation of Nerve Spots being present in areas of the skin lacking correct contractility, healthy myofascial tension and therefore, lacking optimal energy pathway transmission of and within the collagen matrix.





SUMCHI STROKES

and their influence on the Equine Concertina

SUMCHI Strokes are strategically designed movements over the horse's body to interact with Muscle Hubs and ITHL to improve the function and balance of the collagen matrix.

This allows for healthier function of the skin, circulation, nerves, fascia, muscles, myofascial kinetic lines and ultimately the channels of the life processes. These are all vital to ensuring well-being, smooth movement and optimal performance of the equine.