The influence of disorders of the temporomandibular joint on equine gait

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As a prey species, the present day horse has evolved as a herbivore that is characterised by its flight/fight survival reaction, and which has adapted to swift recovery from exertion. The horse is single toed, and being quadrupedal, he has a balanced athletic action, which is well-suited to local terrain and rapid changes in gait, despite the potentially unbalancing effect of the long neck and heavy head required for grazing eighteen hours per day.

Anatomy and dynamics
The relatively elongated limbs of the equine herbivore require a neck, which allows the head to be lowered for grazing, or elevated and rotated for reception of environmental sensory information.

As a herbivore, the essential requirement of the horse, is the dental equipment to masticate fibrous vegetation reducing it to the necessary particle size required for almost continuous swallowing and, ultimate bacterial digestion in the capacious colon and caecum.

The required movements of the molar arcades originate from the bilateral temporomandibular joints (TMJs), which are situated at the dorsal end of the vertical ramus of the mandible (lower jaw), directly below the ear, and close to the point at which several cranial nerves exit the skull.

Temporomandibular joints
Each articular surface of the TMJs is unevenly divided and, separated horizontally by a fibro cartilage meniscus (a washer like insert, similar to that seen in the stifle). This permits a three dimensional freedom of movement during mastication, activated by the powerful masseter (cheek) muscles.

Over time the TMJs are subject to progressive wear against the resistance of foodstuffs and, the friction of dental enamel. Some of this is obviated by salivary flow during mastication. The hord apparatus and trachea are engaged during swallowing, and also, directly and indirectly with some aspects of locomotion.

There is an intimate relationship between the temporomandibular joint capsule and the external ear and middle ear via two ligaments, which form a potential open connection either way between them.

Effective locomotion is dependent upon the co-ordination of all parts of the skeleton being linked through the joints, stabilised by ligaments, and activated by agonist and antagonist muscle action.

The relationship between the axial skeleton (spinal vertebrae), the appendicular skeleton (limbs) and the TMJs is key. The horse in motion prefers to maintain closure of the mouth, and as a rule there is no oral breathing. The TMJs are ‘quiet’ and therefore, have no direct or indirect effect.

The head and neck play an important balancing role in maximising action and maintaining the essential balance of the moving horse. To this end, there is marked flexion and extension between C7 and T1 (the cranial (top) and caudal (bottom) extremities of the neck), and between the occiput and C1/2 (the head on the atlas). In practical terms the TMJs are not involved.

Disorders of the TMJ
Painful conditions occurring peripherally, within the joint, or both, may be due to external trauma, which is usually clinically obvious, or internal trauma, which often is not.