Tendons, Ligaments, Joints

TENDONS AND LIGAMENTS OF THE EQUINE DISTAL LIMB

*Tendons, or sinews, connect muscle to bone.* The bones in a skeleton enable an animal to walk, run, jump, roll, and do other important physical activities. Without the ability of tendons to connect the muscles and bones that are responsible for controlling these actions, it would be impossible for the body to move in the way it does. Since tendons are important for the body to move, it is important to keep them strong, healthy, and free from harm.

The composition of tendons is much like gelatin, but harder and not as elastic. They are made of special cells called tenocytes, water, and fibrous collagen proteins. Millions of these collagen proteins weave together to form the strong strand of flexible tissue called a tendon. Tendons grow into the bone and form a tough mineralized connection. This connection creates a permanent bond that is extremely tough to break.

Despite their incredible strength, tendons can be damaged if overstrained or improperly cared for. Overuse can cause the collagen fibers in the tendon to form small tears, a condition called tendonitis.

*Ligaments connect bone to bone.* Ligaments are the fibrous, slightly stretchy connective tissues that hold one bone to another in the body, forming a joint. Ligaments control the range of motion of a joint, preventing it from bending backwards, for example, and stabilizing the joint so that the bones move in the proper alignment.

Ligaments are composed of strands of collagen fibers. While ligaments are slightly stretchy, that they are arranged in crossing patterns prevents the joint from becoming loose.

Stretching exercises increase the length and flexibility of the muscles, allowing the joint to move farther than before. The ligaments themselves are not stretched, as they provide the support for the joint. If ligaments are stretched, either by injury, excess strain on a joint, or by improper stretching techniques, the joint will become weaker, as the elongated ligaments are unable to properly support it.

Because ligaments are so important in the stabilization of joints, they are also highly susceptible to injury.

Because connective tissue such as ligaments must withstand a great deal of stress in day to day activities and have a relatively low blood supply, injuries can take a very long time to heal, and sometimes require surgery.
JOINTS AND ASSOCIATED LIGAMENTS

With the exception of the connection of the forelimb to the trunk, all the joints of the limbs are synovial. Further, in the majority of the joints the action is restricted to flexion and extension: this may be by one or more of several arrangements, for example the shape of the articular surfaces, the presence of ligaments on medial and lateral aspects (when paired these are called collateral ligaments), the action of restraining muscles.

Distal Interphalangeal Joint
The joint capsule has a pouch extending up the palmar aspect. During flexion the capsule forms a small pouch on either side against each ungual (alar) cartilage.

**Ligaments:**
Collateral ligaments of the joint itself; collateral ligaments of the distal sesamoid; distal ligament of the distal sesamoid

Proximal Interphalangeal Joint
Pouches of the joint capsule are very small (movement of joint is slight).

**Ligaments:**
Collateral palmar (these merge with the fibrocartilage of PII, thereby increasing articular surface of this bone. These palmar ligaments are reinforced by insertion of superficial flexor

Metacarpophalangeal Joint
The articular surface area of the seamoids is increased by the fibrocartilage uniting them, known as the intersesamoidian ligament. The joint capsule is fairly roomy as is to be expected from the amount of flexion permitted by this joint. See extent of capsule on either side of extensor tendons and, especially, the pouch extending up as far as bifurcation of the interosseus. Bulging of this pouch can be diagnostic if the distension is situated between the bone and the interosseus.

**Ligaments:**
Collateral ligaments (deep fibers of which are also attached to sesamoids). Other ligaments include the sesamoidean ligaments and the interosseus. In addition to collateral sesamoidean and intersesamoidean ligaments, there are short and cruciate sesamoidean which are deeply situated, then another layer of oblique sesamoidean ligament, then, most superficially situated, a straight sesamoidean ligament, this last being the only one which goes to PII the others going to PI.
**Carpal Joint** (commonly called "knee")
There are three articulations: - radiocarpal, intercarpal, and carpometacarpal. The greatest amount of movement takes place at the radiocarpal articulation note large gap on dorsal (cranial) aspect formed during flexion; greatest point of vulnerability is here (although protected to some extent by extensor tendons and strong fibrous tissue), but on the other hand easy access is allowed for arthrocentesis. Much less movement occurs at intercarpal articulation, therefore less vulnerability here. The movement that takes place at carpometacarpal articulation is merely gliding. The joint capsule, although roomy dorsally to allow free flexion, does not normally form any appreciable pouches. The palmar part of the joint capsule is greatly reinforced by fibrous tissue so that it is called **palmar carpal ligament**. This is smooth on its palmar aspect and forms the dorsal wall of the carpal groove already mentioned. Also, it is prolonged down as the **carpal check ligament**.

**Ligaments**:
Apart from the numerous small ligaments attaching the individual bones to each other, the main ligaments of this joint are: collaterals and palmar carpal ligament

**TENDONS WITHIN THE FOOT**

The tendon of the **common digital extensor muscle** is a process of the **3rd phalanx** and on the anterior (front) surfaces of the **2nd and 1st phalanges**. Its action is to extend the entire digit.

The **deep flexor tendon** is an extension of the muscle lying on the back part of the leg and inserting on the posterior aspect of the **3rd phalanx**.

The **superficial flexor tendon** runs parallel to the **deep flexor tendon** and divides below the fetlock and inserts on both the **1st and 2nd phalanges**.