CLINICAL ANATOMY OF THE PREPUBIC TENDON IN THE DOG AND A COMPARISON WITH THE CAT

**INTRODUCTION**

- The objectives of this paper are to show in the most detailed manner the composition of the prepubic tendon in the dog, its relationships with the neighboring structures and clinical correlations for diagnosis and surgical treatment of any pathological condition.
- This is not a comprehensive review. The paper focused on clinically important details not mentioned before. A review based on selected references is suggested prior to surgery.
- The prepubic tendon is a dense mass of collagenous tissue which serves as the attachment for the ventral abdominal muscles on the cranial border of pubis (the pecten of pubis).
- The prepubic tendon is a complex of tendons, mainly of musculi pectinei and musculi recti abdominis attached to rami craniales ossium pubis

**SUMMARY:**
Several authors were interested in the structure of the prepubic tendon in the dog in the last century. No similar structure was found in the cat. The descriptive anatomy of the prepubic tendon was either superficially or not correlated at all of to the clinical aspects of the veterinary medical profession. The implication of this structure in the pathology of the area is of high importance, considering that the physical examination and the surgical techniques should be correctly applied not only on to the prepubic tendon, but also to the neighboring structures, such as the superficial inguinal ring and the inguinal canal with its content.

**Key Words:** prepubic tendon, superficial inguinal ring, dog, cat
The prepubic tendon, which has also been called "cranial pubic ligament" similar to the "superior pubic ligament" in humans serves as a point of attachment for the ventral abdominal musculature onto the pelvis. In this capacity the prepubic tendon aids in the action of the abdominal press which makes possible the acts of expiration, urination, defecation, and parturition.

This structure has been described numerous times in the dog, but a homologous structure is not present in the cat.

It is imperative to have a thorough knowledge of the prepubic tendon and the neighboring structures to diagnose correctly any pathological condition and to use the appropriate surgical technique for repair.

MATERIAL AND METHODS

Two fresh and eight embalmed dogs, three fresh and seven embalmed cats were used in this study. The fresh specimens were provided from a Humane Society, whereas the embalmed specimens were first used by the students in the dissection room, and were provided either by different companies or embalmed in our Anatomy Laboratory. In this case the embalming fluid had the following formula:

1200 ml Formaldehyde
400 ml Propylene or Ethylene glycol
1000 ml Phenol
add water to 20 liters

RESULTS

According to our findings, Fig. 1 shows the superficial level of structures beneath the skin and the subcutaneous connective tissue. The right external and internal abdominal oblique muscles were reflected from the linea alba to expose the rectus abdominis muscle. The superficial inguinal ring, the femoral lamina, the femoral triangle and the corresponding vessels are shown. We should first mention that at the very cranial border of the pubic bones a poorly developed cranial pubic ligament connects the symmetrical pecten of pubic bones; in some cases this ligament was not present.

According to our findings, the transversus abdominis muscle did not attach to the prepubic tendon. Its caudal border, called "Linea arcuata" ended cranial to the pecten of pubis. The point of attachment of the prepubic tendon and of the aforementioned muscles on the pubis was not the median ventral pubic tubercle. Only the medial part of muscular fibers of the rectus abdominis muscle attached to the ventral pubic tubercle (Fig. 2). The largest lateral part of the rectus abdominis muscle, and the aponeuroses of the two abdominal oblique muscles attached to the pecten of pubis (see Fig. 2). The lateral part of the rectus abdominis muscle was provided with an elliptically shaped aponeurosis overlapping muscle fibers (see Fig. 2). The aponeurosis sent fibers that passed over and under the prepubic tendon (see Fig. 2).

The two crura of the superficial inguinal ring (from the
external abdominal oblique muscle) were strong and attached to the prepubic tendon and the pectineus muscle (the medial crus to the tendon, while the lateral crus to the muscle fibers of the pectineus) (see Fig. 2).

The prepubic tendon has been shown to extend from the pecten to the iliopubic eminence on either side, but little cross-over of fibers was noted in dogs. The structure of the prepubic tendon in the dog is most similar to that seen in ungulates; however, one significant difference noted in the dog is the incorporation of the iliopubic cartilage which was found to be intercalated in the pectineus tendon.

In the cat, the abdominal and pectineus muscles had separate attachments to the pubis and thus, a prepubic tendon does not exist. However, based on our findings the two crura of the superficial inguinal ring were as strong as to firmly attach on the cranial border of pubis on both sides of the insertion of the pectineus muscle on the iliopubic eminence (Fig. 3). We noticed three-four strong attachments of the aponeurosis of the external

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**Fig. 2** Prepubic tendon in the dog and surrounding structures

**Fig. 3** Surrounding structures of pubic area in the cat
abdominal oblique muscle on the medial aspect of the
thigh: the most lateral attachment is the continuation of
the lateral crus of the superficial inguinal ring, whereas
the other attachments originate from the medial crus of
the ring and the aponeurosis of the muscle itself (Fig. 3).

The aponeurosis of the external abdominal oblique
muscle sent in addition a strong attachment to the tendon
of the pectineus muscle (Fig. 4).

**COMMENTS AND CLINICAL CORRELATES**

Developmentally, the prepubic tendon is stronger in
species with a heavy abdominal mass and proportional
with the volume of the abdominal viscera, such as the
ruminants and the horses. In carnivores this structure is
less developed. The aponeurotic attachments of the
ventral abdominal muscles pull the prepubic tendon
ventro-cranially, in an angle that varies with the species
and the weight of the abdominal mass. In humans,
vertical posture changed the angle and the relationship of
the attachment of the ventral abdominal muscles. Thus,
there is no prepubic tendon in humans, but a superior
pubic ligament. The latter is attached to the superior
border of the pubic bones and joins the symmetrical
pecten of public bones overlapping the interpubic disc. In
addition, in humans the pubic attachment of the rectus
abdominis muscles is doubled ventrally by a dependence
of the aponeuroses of the external abdominal oblique
muscles, and dorsally by an enlargement of linea alba
called "adminiculum lineae albae". If we eliminate "important in
ungulates" and "gracilis", the definition may be applied to
the dog.

Specifically for the dog the prepubic tendon is defined
by another author as "a strong collagenous mass
composed primarily of the tendons of the paired rectus
abdominis muscles and the tendons of origin of the paired
pectineus muscles. It is firmly attached to the median
ventral pubic tubercle".

Our dissections showed that only the medial part of
muscular fibers of the rectus abdominis muscle attaches
to the ventral pubic tubercle and the largest lateral part of
the rectus abdominis muscle, and the aponeuroses of the
two abdominal oblique muscles attach to the pecten of
pubis.

"An iliopubic cartilage is intercalated in the prepubic
tendon at the junction between the symmetrical
pectineus tendon and the external abdominal oblique tendons at the caudal angle of the superficial inguinal ring. Our dissections showed that the iliopubic cartilage is located between the caudal commissure of the superficial inguinal ring and the muscular, not the tendinous part of the pectineus muscle, which should be given a different consideration in surgery.

In the cat the strong attachments of the two crura of the superficial inguinal ring on the cranial border of the pubis on each side and together with the tendon of the pectineus muscle seems to be as strong as the prepubic tendon of the dog.

A prepubic tendon is considered not to be present in any species in which the pectineus and adductor longus muscles are separate including humans, primates, rabbits and some rodents. This is not true, because in some dogs the adductor longus is a muscle totally separated from the pectineus.

Based on our anatomical findings and the nature of the prepubic hernia in dogs and cats precise reconstruction of this anatomy after traumatic injury is unlikely. However, reattachment of the anatomical musculature with suture, usually through holes drilled into the pubis, results in repair of the hernia with high success. Apparently, healing with scar tissue is sufficient to mimic the function of the prepubic tendon and related anatomy.

REFERENCES