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ANATOMIC PARTICULARITIES OF PELVIN MUSCULARITY – AFRICAN OSTRICH (*STRUTHIO CAMELUS*)

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Abstract

Even though specialty literature includes a series of publications regarding the muscles of pelvic limb of the African ostrich, there are still a couple of aspects that aren't entirely understood. Therefore, a series of differences in regards to the insertions of the pectineus muscle and ambiens muscle can be described, as well as the usage of different terminology for the identification of the cranial muscles of the thigh. This study, conducted on 10 african ostriches of different ages and sexes, realized through classic methods and macroscopic investigations, aims to conduct a detailed anatomization of pelvic muscles, more precisely of the muscles whose topography is adjacent to the pelvic region. The nomenclature used was in concordance with the Nomina Anatomica Avium 1993, although this study also suggests other naming options, which from our point of view better reflect the morphological and topographical realities.

Key words: *ostrich, pelvine, muscles.*

INTRODUCTION

The ostrich is the tallest and the heaviest of all birds. While the huge ostrich is a bird, it does not fly. Instead it runs. One stride can cover up to 4.9 meters. The bird is also very fast, as it can reach speeds of up to 64 kilometers per hour on short distances, and can keep up a speed of more than 48 kilometers per hour over longer distances.

The ostrich uses its short wings for balance, holding them outstretched when it runs. Its strong legs can also be used for self-defense (7). Muscles from the lumbar and sacral regions, but most importantly from the femural and calf regions are generally regarded as high quality meat. In order to improve the quality of the meat, many scientists study the different chemical components found in the biochemical structure of the muscles, which influence taste, texture, tenderness and many other attributes that improve organoleptic features.

In already published specialty literature, the data about the musculature of the ostrich is lacklustre and sometimes disregards the notions present in the Nomica Anatomica Avium. Based on this fact, the reason for establishing this study was the desire to complete the already existing data about this species anatomy.

MATERIALS AND METHODS

The study material is represented by samples originating from 10 adult ostriches of different sexes, with a weight range between 20 – 50 kg. Several bodies originating from zoos or private breeders were brought to the Veterinary Medicine College for necropsy. Other samples were procured from butcheries. Following their dissection the samples were also used for bone preparation. The samples underwent measurements, as well as descriptions of the anatomical particularities, and werre then photographed. The identification and description of the strucutres was done according to the Nomina Anatomica Avium – 1993.

RESULTS AND DISCUSSIONS

Caudal ilio trochanteric muscle *(M. iliotrochantericus caudalis)* (Fig.1) is a small narrow muscle, flattened latero-medially. Its insertion is found on the lateral side of the ilium, dorsal from the acetabular cavity. On this level,

the muscle is marked cranially by the proximal insertion of external iliofemural muscle, and distally by the proximal insertion of the iliotibial lateral muscle. Distally, the muscle's tendon inserts on the femur at the limit between its lateral and caudal part, at the base of big trochanter.

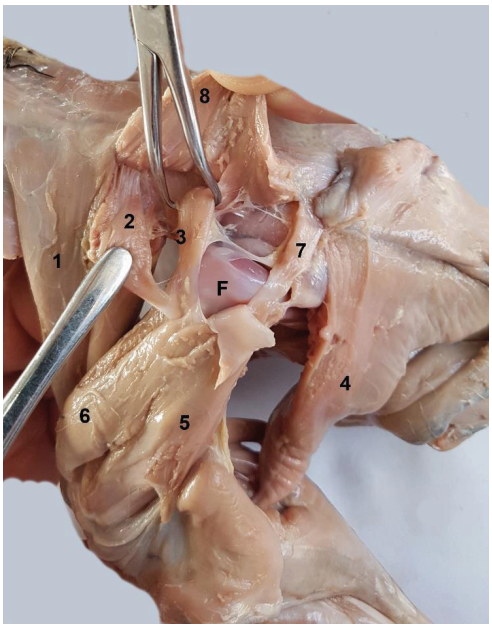

Fig. 1 Pelvis and hip muscles (lateral view) (original)
1 – iliotibial cranial muscle; 2 – iliotrochanteric cranial muscle; 3 – iliofemural intern muscle; 4 – iliofibular muscle; 5 – extern fibitibular muscle; 6 – medium femurotibial muscle; 7 – caudal iliotrochanteric muscle; 8 – extern iliofemural muscle; F- femur

The cranial iliotrochanteric muscle *(M. iliotrochantericus cranialis)* (Fig.1) is located cranio-dorsally to the coxal-femural joint, and it has rapports with the caudal-proximal edge of the cranial iliotibial muscle and the anterior edge of the medial iliofemural muscle. Its profound face provides contact with the lateral face of the proximal extremity of the ambiens muscle, while on the exterior the muscle is covered by the external iliofemural muscle. Its fixed insertion is on the lateral surface of the preacetabular part of the ilium, next to its cranial extremity. The distal tendon of this muscle inserts on the lateral surface of the femur, distally from the trochanter in the same place as the tendon of the intern iliofemural muscle.

The external iliofemural muscle *(M. iliofemoralis externus)* (Fig.1) is a muscle with a triangular shape. It is disposed in superficial plane and it fills the area between the cranial and the lateral iliotibial muscles. This muscle's proximal insertion is on the lateral surface of the preacetabular part of the ilium, near its dorsal edge, covering at this point the fixed insertion of the cranial iliotrochanteric muscle, the intern iliofemural and the medial iliofemural muscle. Distally, the flattened tendon of this muscle inserts on the lateral surface of the femur, ventrally from the trochanter.

The intern iliofemural muscle *(M. iliofemoralis internus)* (Fig.2) is totally coverd by the precedent muscle. It appears as a vertical, narrowed band which emerges to the lateral surface of the trochanter. Its proximal insertion is found on external suface of the preacetabular part of the ilium, cranio-dorsally from the acetabular cavity. The distal tendon inserts on the femur in the same place as the tendon of the cranial iliotrochanteric muscle.

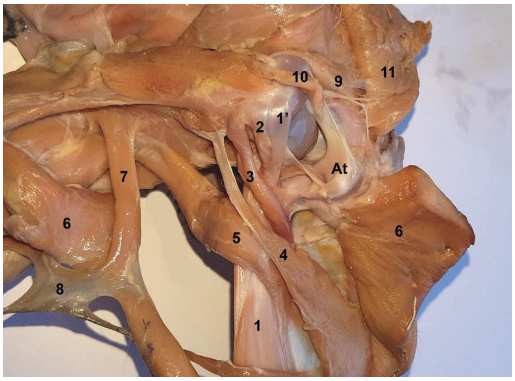

Fig 2. Profound muscles of pelvis (lateral view) (original)
1 – intern obturator muscle; 1'- intern obturator ligmanet; 2 – obturator extern muscle; 3 – ischiofemural muscle; 4 – caudofemural muscle; 5- puboischiofemural muscle; 6 – iliofibular muscle (sectioned) 7- orizontal part of crural lateral flexor muscle; 8 – quadrilater fasces; 9 – intern iliofemural muscle; 10 – caudal iliotrochanteric muscle; At-antitrochanter.

The medial iliofemural muscle *(M. iliofemoralis medius)* is placed on the profound surface of the external iliofemural muscle, in the area between the cranial iliotrochanteric muscle and the internal iliofemural muscle. This muscle has a triangular shape, with the apex oriented distally and it cranially intersects with the view the capsule of the coxal-femural joint. Its proximal

insertion is found on the external surface of the preacetabular part of the ilium in the free space between the insertion of the cranial iliotrochanteric muscle and the intern iliofemural muscle. The distal tendon of this muscle inserts on the medial surface of the femur on the line which delimits the superior and the middle third.

The caudofemural muscle *(M. caudofemuralis)* (Fig.2) is placed on the profound surface of the iliofibular muscle, being totally covered by this muscle and the iliotibial lateral muscle. Viewed fully, this muscle is oriented obliquely in a cranio-distal way, and it has a caudal muscular part and a cranially disposed, well developed tendon. The tendon inserts on the caudal surface of the femur at the delimitation between the proximal and distal third of the bone, dorsally from the insertion of the medial part of internal femuro-tibial muscle. The origin of the muscular part is found on the ventral border of caudal half from the postacetabular area of the ilium, on the first 4 coccygian vertebrae and on the superior border of the ilio-ischiatic membrane.

The ischiofemural muscle *(M. ischiofemuralis)* (Fig.2) is a relatively reduced muscle placed medio-cranio-dorsally to the caudofemural muscle, which it covers in the caudal third. Viewed as a whole, the muscle is oriented craniodistally and it can be evidenced on the profound surface of the iliofibular muscle, caudo-ventrally to the coxofemural joint. The fixed insertion of this muscle is on the lateral surface of the ischium in its cranial third, but also on the external ilio-ischiatic membrane in its cranioventral third. Cranially, the muscle has a short tendon thaat inserts on the latero-caudal surface of the trochanter, ventrally from the insertion of the tendon of the external obturator muscle.

The lateral obturator muscle (external) (Fig.2) *(M.obturatorius lateralis)* is a relatively small muscle, placed caudo-ventrally from the coxo-femural joint. The muscle presents two parts (dorsal & ventral) which are approximately merged together, which explains the difficulty met in individualizing them. The dorsal part is aligned with the tendon of the intern obturator muscle, starting from the obturator hole, and until its insertion on the femur. The origin of the lateeral obturator muscle is on the contour of he obturator hole, and its mobile insertion is found on the latero-proximal surface of the trochanter, in the same place as the tendon of the medial obturator muscle (for the dorsal surface) and on the caudal surface of the base of the trochanter, proximolaterally from the pneumatic hole (for the ventral part).

The medial obturator muscle (intern) (Fig.2) *(M. obturatorius medialis)* is placed near the ischio-pubic hole, and its appearance is flattened in a latero-medial way. Viewed laterally, the muscle presents its fibers placed horizontally in the superior half and oblique cranio-dorsally in the ventral half. The muscle's origin is on the ventral edge of the ischium, on the dorsal border and the lateral surface of the pubis as well as the lateral surface of the ischio-pubic symphysis. The muscular part continues with the tendon from the medial face of the obturator hole. It makes its way through the obturator hole medio-laterally, coming in contact with the caudal edge of it, then it goes on the superior border of the dorsal part of the lateral obturator muscle, fin order to insert on the latero-proximal surface of the trochanter.

The pubioischiofemural muscle *(M. pubi-ischio-femuralis)* (Fig.2 & Fig.3) is placed ventrally from the caudofemural muscle, craniodorsally from the crural flexor muscle, laterally and profoundly from the iliofibular muscle. From all points of view, it seems flattened latero-medially and oriented diagonally in a cranio-ventral way. The muscle is made up of two parts, and their fibers merge so the individualization between the parts is not perfect. The lateral part is placed dorsally from the medial one and it has its origins on the lateral surface of the pubis. The medial part is also divided in a dorsal part, inserted on the external surface of the ischium and on the ilio-ischiatic membrane & a ventral part, with an aponevrotic origin on the ventral edge of the ischium. Cranially, the pubio-ischio-femural muscle inserts through a tendon on the caudal surface of the femur in its distal third, proximally from the medial insertion of the gastrocnemius muscle and medially from the horizontal part of the lateral crural flexor muscle.

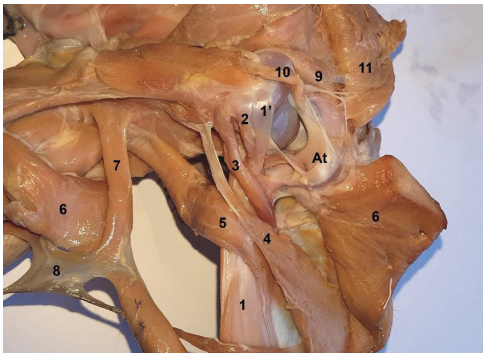

Fig. 3 Medial muscles of pelvis and hips (original)
1-Iliotibial cranial muscle; 2- ambiens muscle; 3- femurotibial accessories; 4- pectineus muscle; 5- puboischiofemural muscle; 6- obturator medial muscle; 7- crural medial flexor muscle; 8- crural lateral flexor muscle; 9- ligament of medial obturator muscle; 10- iliofibular muscle; 11- accessories part of crural lateral flexor muscle; 12- quadrilateral fascia; 13- distal bridle of medial crural flexor & distal bridle of *crus caudale* iliofibular muscle; 14- intermediary part of gastrocnemius muscle ; P- pubis; S- sinsacrum

CONCLUSIONS

Excepting the external iliofemural muscle, disposed superficially, the iliotrocantheric muscles and the other iliofemural muscles are grouped around the coxofemural joint which they help strengthen, similarly to the profound muscles of the basin in mammals.
Both obturator muscles are present; the lateral one made of two parts and reduced, while its medial counterpart is well represented.

The pubioischiofemural, ischiofemural and caudofemural muscles have their origin on the coxal bone but judging by the topography of their muscular parts they might be considered medial muscles of the pelvis.

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