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رئيس القسم : دكتور/ عبد الله حبنى

العلاقة بين العمود الفقرى والحبل الشوكي في الحمير

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تم في هذا البحث دراسة كل من علاقة النتوء الشوكي للفقرات بفلقات الحبل الشوكي المقابلة وكذلك دراسة علاقة النتوء المستعرض لكل فقرة الى فلقات الحبل الشوكي المقابلة . كما تم تحديد نهاية الحبل الشوكي في العينات التي تم دراستها مع مقارنتها بنهايات الحبل الشوكي في الحيوانات المستأنسة الأخرى .

كما تم تعيين متوسط طول الحبل الشوكي في العينات التي تمت دراستها .

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**THE RELATION BETWEEN THE VERTEBRAL COLUMN
AND SPINAL GORD IN EQUUS ASINUS**

(With Two Figs.)

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SUMMARY

The topographic anatomical relationships between the spinal cord segments and the spinous and transverse processes of the Vertebrae were completely described. The total length, in addition to, the level of termination of the spinal cord were examined

INTRODUCTION

The early topographic study of the spinal cord was done by LINSERT (1935) and THIEL (1941) in dog, SEIFERLE (1939) in horse and cattle, SCHURMANN (1951) in cat and GOLLER (1957) in sheep. References about the relation between the spinous and transverse processes of the vertebrae and spinal cord segments are meagre.

MATERIAL and METHODS

This study was carried out on 16 adult clinically healthy donkeys (*Equus asinus africanus*) of both sexes and of different ages. The animals were bled and then injected with 10% formalin solution.

To study the relation between the spinous and transverse processes of the vertebrae to the spinal cord segments, the spinal cords were exposed from the dorsal side by laminectomy and from the lateral side by the paramedian section of the vertebrae.

RESULTS

A- Relation between the spinous processes and the spinal cord segments:

I- Cervical region:

The dorsal tubercle of atlas and the apex of the spinous process of axis lie vertical to the caudal third of the first and the caudal fifth of the second cervical segments respectively.

The summit of the spinous process of the 3rd cervical vertebra lies vertical to the cranial sixth of the 4th cervical segment, that of the 4th vertebra lies vertical to the junction between the 4th and 5th segments. The summits of the spinous processes of the 5th and 6th vertebrae are related vertically to the caudal fifth of the corresponding spinal cord segments. That of the last cervical vertebra lies vertical to the middle of the last cervical spinal cord segment.

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II- Thoracic region:

The summit of the spinous process of the 1st thoracic vertebra lies vertical to the caudal fourth of the 2nd thoracic segment. That of the 2nd vertebra lies vertical to the caudal fifth of the 4th thoracic segment i.e. two segments caudal to its corresponding one. The same relation is also established from the 3rd to the 6th thoracic vertebrae.

The spinous processes of the 4th and 5th thoracic vertebrae, which form the highest point of the animal and are clinically palpable, are vertically apposite to the 6th and 7th segment respectively.

The spinous processes of the 7th, 8th and 9th thoracic vertebrae are vertically related to the 8th, 9th and 10th thoracic segments i.e. one segment caudal to its corresponding one.

The spinous processes of the 10th to the 15th thoracic vertebrae are related to their corresponding segments

The summits of the spinous processes of the 16th and 17th thoracic vertebrae are vertical to the caudal limit of the 15th and 16th thoracic spinal cord segments, while that of the last thoracic vertebra lies vertical to the caudal third of the 17th thoracic segment, i.e. the spinous processes of the last three thoracic vertebrae are vertically related to a segment preceding to its corresponding one.

III- Lumbar region:

The spinous process of the 1st lumbar vertebra lies vertical to the caudal fifth of the last thoracic segment, while that of the 2nd lumbar vertebra lies vertical to the junction between the 1st and 2nd lumbar segments.

The spinous process of the 3rd lumbar vertebra lies opposite to its corresponding segment, that of the 4th lies vertical to the cranial third of the 5th segment, while that of the 5th lumbar vertebra is opposite to the junction between the 3rd and 4th sacral segments.

B- Relation between the transverse processes and the spinal cord segments:

I- Cervical region:

The palpable caudal end of the wing of atlas is related to the cranial third of the 2nd cervical segment, while the transverse process of axis is related to the middle of the 3rd segment.

The transverse processes of the 3rd, 4th and 5th cervical vertebrae are related to the cranial third of the 4th, 5th and 6th cervical segments, while that of the 6th cervical vertebra is related to the middle of the 7th segment. That of the last cervical vertebra is related to the caudal end of the last cervical segment.

II- Thoracic region:

The transverse processes of the first two thoracic vertebrae are opposite to the middle of the 2nd and 3rd thoracic segments, that of the 3rd and 4th vertebrae are related transversely to the cranial third of the 4th and 5th segments. Also that of the 5th and 6th thoracic vertebrae are related to the cranial limits of the 6th and 7th segments.

Transverse processes of the 7th till the last thoracic vertebrae are related to their corresponding thoracic segments.

THE RELATION OF VERTEBRAE TO THE SPINAL CORD

III- Lumbar region:

The transverse processes of the 1st to the 4th lumbar vertebrae are related to their own segments, while that of the 5th lumbar vertebra is related to the middle of the 2nd sacral segment.

C- Level of termination of the spinal cord:

The spinal cord terminates at the junction between the 1st and 2nd sacral vertebrae. However, it was found that the cord ended either cranial to the before mentioned level at the caudal third of the 1st sacral vertebra in two dissected cases, or caudal to it either at the middle of the 2nd sacral vertebra in three cases or at the junction between the 2nd and 3rd sacral vertebrae in only one case.

The total length of the spinal cord in *Equus asinus africanus* measured from the level of Foramen magnum till its termination, reaches about 133 cm (ranging between 121 to 144 cm).

DISCUSSION

The spinous process of the last cervical vertebra lies vertical to the middle of the last cervical segment in the donkey, similar observation was given by HABEL (1951) in cattle.

The beforementioned results found in the thoracic region reveal that the caudal inclination of the spinous processes is most pronounced from the 2nd to the 6th vertebrae. It is also slightly clear from the 7th to the 9th vertebrae, while from the 10th to the 15th vertebrae, the spinous processes are nearly vertical and those of the of the last three thoracic vertebrae are directed slightly cranial.

The level of termination of the spinal cord in donkey is similar to that found in horse and cattle as stated by HABEL (1951). However, the spinal cord in dog terminated between 6th and 7th lumbar vertebrae as stated by McCLURE (1964) and DELLMANN and McCLURE (1975) or at the seventh lumbar vertebra as described by BRADLEY (1959). Moreover, the spinal cord was also observed to terminate at the middle of sacrum as mentioned by BRADLEY (1923) and SISSON and GROSSMAN (1953) in horse, McCLEOD (1958) and RAGHAVAN (1964) in cattle, in addition to SHARMA and RAO (1971) in buffalo.

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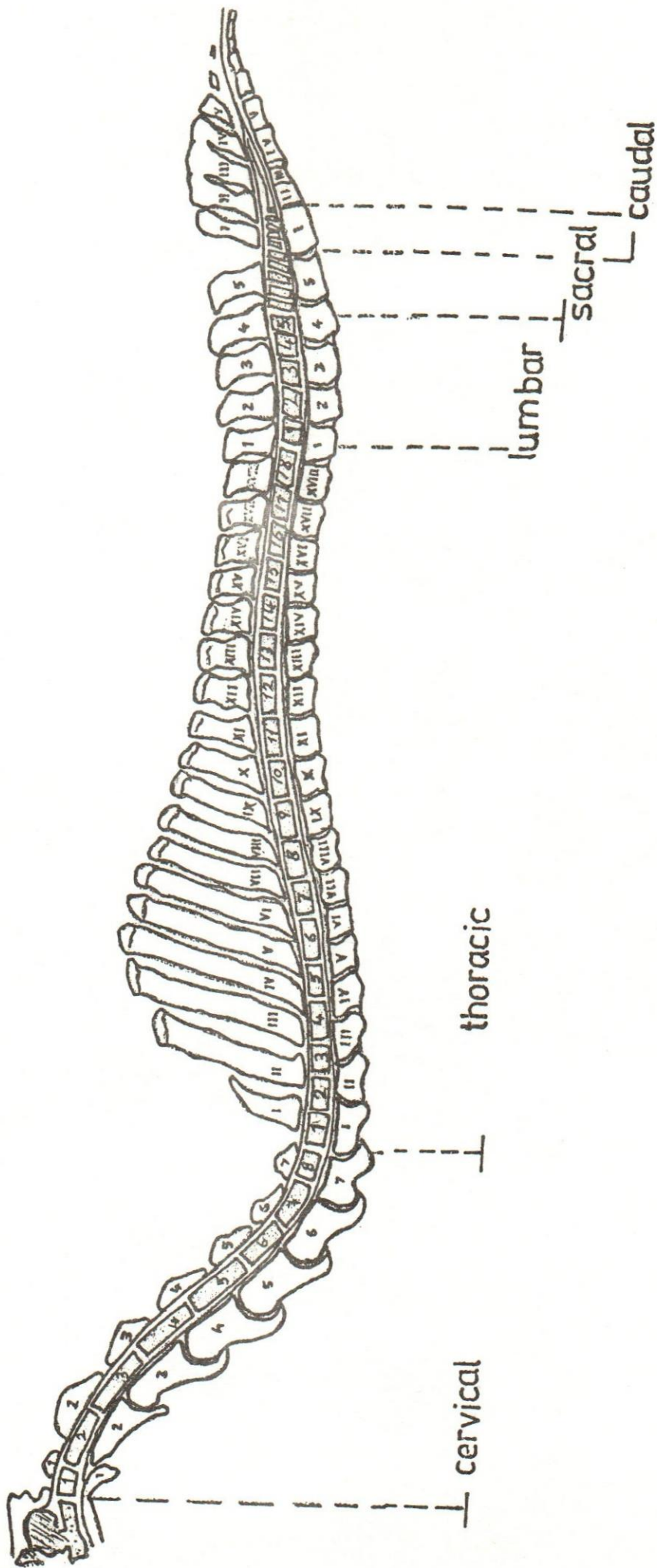


Fig. (1): Sagittal section of the vertebral column showing the relationship of the spinal cord segments to the vertebrae.

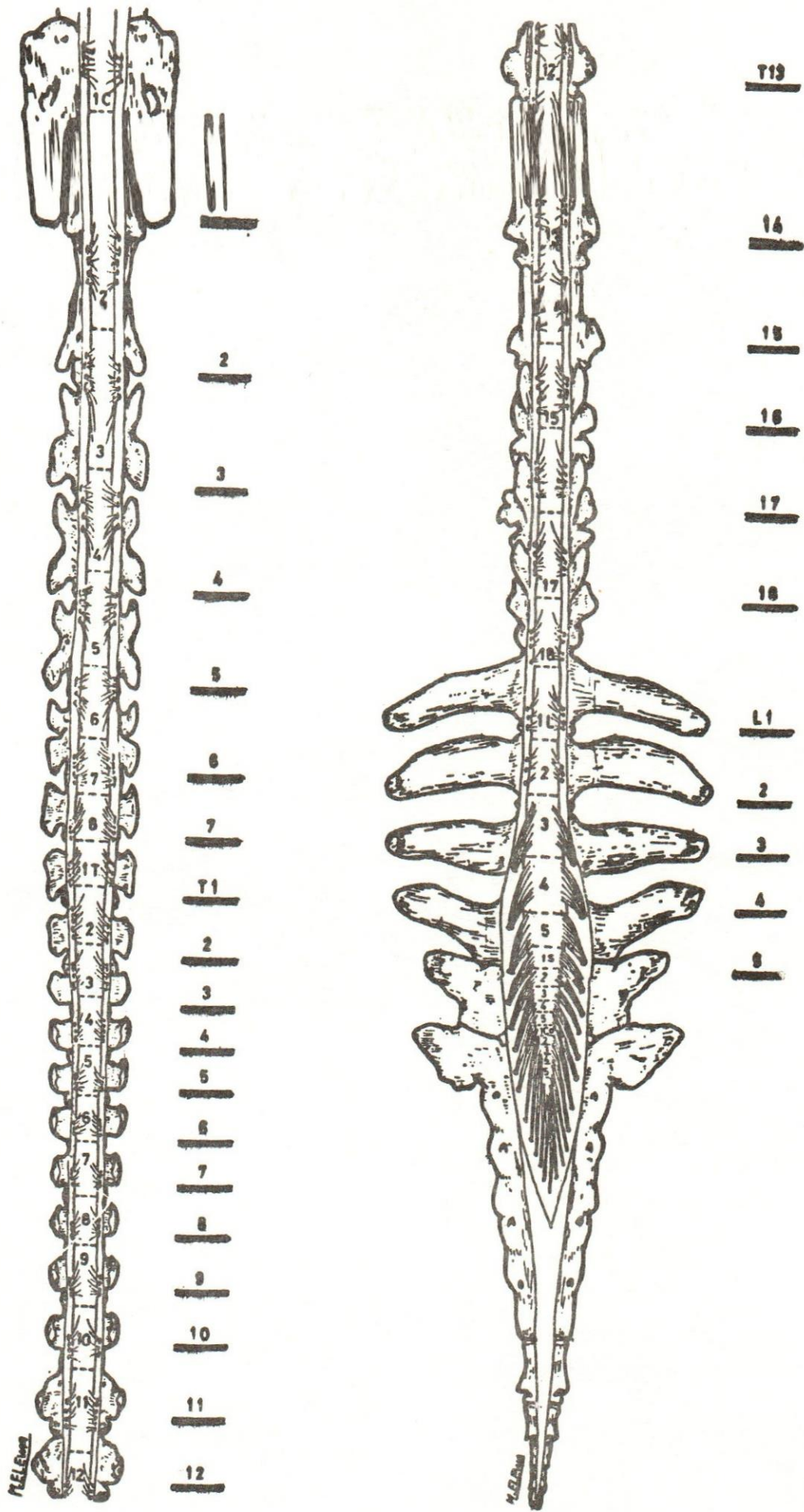


Fig. (2): Dorsal dissection of the vertebral column showing the relationship of the transverse Processes of vertebrae to the spinal cord segments (The figures on the right represent levels of the transverss processes).