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## Investigation of a Novel Cranial Ligament Between the Occiput and Cervical Spinal Dura

Edwin Glueck  
*Kansas City University*

Charles Coker  
*Kansas City University*

Rory Li  
*Kansas City University*

Robert Steele  
*Kansas City University*

Philip Brauer  
*Kansas City University*

*See next page for additional authors*

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**Authors**

Edwin Glueck, Charles Coker, Rory Li, Robert Steele, Philip Brauer, Brandalynn Holland, and Micaela Motzko

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### Abstract

### Introduction

The brain and spinal cord are covered by dura mater which attaches to bones and muscles in the cervical region. Dural connective structures have been described as the Ligamentum Craniale Durae Matrice Spinalis (LCDMS) (Von Lanz, 1929). The myodural bridge complex (MBC) is a component of the LCDMS linking suboccipital musculature to the cervical spinal dura. While performing en bloc dissections of the central nervous system, we found a novel connection between the occiput and the cervical spinal dura that has not been previously described that we have termed, the ligamentum kryptos craniale (LKC). In this study, we provide evidence that the LKC is a previously unrecognized component of the LCDMS.

### Methods

A total of 13 cadavers were dissected. Total spinal laminectomy and en bloc dissection was performed on two cadavers, and the occiput was removed via a coronal cut with inferior borders meeting the lateral most aspect of the foramen magnum. Eleven different cadaver skulls were cut at the euryon in transverse section. Five of the 11 cadavers were hemisected to the level of C5. LKC Length from origin to opisthion, thicknesses at opisthion, length from opisthion to cervical dura, and width at opisthion were measured. All measurements were taken with Mitutoyo Absolute IP-67 digital calipers except for LKC width, in which a flexible ruler was used. Photograph evidence was also obtained, and statistical analysis was conducted using Microsoft Excel.

### Results

The LKC was found in all bodies (13 specimens). Its shape was triangular as it exited the foramen magnum and inserted onto the cervical spinal dura (Fig. 1). Its origin spanned across the internal occipital crest, the inferior ridge of the cerebellar fossa, and the opisthion (Fig. 2). Various measurements of the LKCs were made (expressed as means  $\pm$  SD) including the length from origin to opisthion ( $1.94 \pm 0.3$  cm, N = 10),

thickness at opisthion ( $0.58 \pm 0.05$  mm, N = 6), length from opisthion to cervical dura ( $10.51 \pm 2.59$  mm, N = 5) and width at opisthion ( $5.05 \pm 0.44$  cm, N = 10).

## Conclusion

Based on the findings of this study, we believe the LKC is a novel component of the LCDMS. Data suggests the MBC attaches to the LKC rather than directly to the cervical spinal dura mater. In the clinical setting, the LKC may be relevant to unknown causes of head and neck pain. Future histological studies and microscopic analysis will be necessary to further categorize this structure.

## References

von Lanz, T. (Jun 1929). Über die Rückenmarkshäute : I. Die Konstruktive Form der harten Haut des menschlichen Rückenmarkes und ihrer Bänder. 118, 252-307.



**Figure 1**

The occiput is attached to the cervical spinal dura mater via the LKC. The LKC attaches to the occiput at the internal occipital crest (\*), the inferior ridge of the cerebellar fossa (^), and the opisthion (+).



**Figure 2**

Shows a sagittal view of the suboccipital region. The cranial dura mater (\*) is seen as a continuous structure with the cervical dura mater (D). The LKC is grasped with the forceps and its attachment to the internal occipital ridge (o) and opisthion (i) is seen. The LKC is attached directly to the cervical dura mater in the transverse plane of C1 (1) with the MBC (^) being attached to the LKC.