Ligamental compartments

and their relation to the passing spinal nerves

are detectable with MRI inside the lumbar neural foramina

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Background

- **Lumbar spinal stenosis** is found in ~20% of patients with **low back pain** having an increasing prevalence.¹

- 5% of patients with **neurogenic claudication** lack a morphological correlate in **clinical imaging** – the “**occult stenosis**”.²

- Any changing of **intraforaminal ligaments** should likewise explain “occult” stenosis.³

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³ YU QIAN, AN QIN, MING H ZHENG. TRANSFORAMINAL LIGAMENT MAY PLAY A ROLE IN LUMBAR NERVE ROOT COMPRESSION OF FORAMINAL STENOSIS 2011.
Hypotheses

1. The intraforaminal ligaments are anatomical structures which can be found regularly.

2. Stained and plastinated body slices show the intraforaminal ligaments.

3. The body slices help to identify the intraforaminal ligaments in correlating MRI.
Material and Methods

• 15 lumbar spines including the 1\textsuperscript{st} – 5\textsuperscript{th} lumbar vertebrae have been dissected from fresh human bodies (83.9 y. average).

• \textit{Giemsa- and PAS-stained plastinated body slices} have been made.

• These plastinates have been compared to \textit{correlating MRI and CT} data.

• We have dissected one fixed lumbar spine for comparison with previous literature.
Giemsa, sagittal spinal nerve → IFL
Giems, horizontal

PAS, horizontal
Results

• **3 compartments** of intraforaminal ligaments (IFL): -thin medial IFL attached to the spinal nerves
  -intermedial vertical IFL without direct contact to the spinal nerves
  -thick lateral horizontal IFL without spinal nerve connection

• If IFL have no direct contact to the SN as seen in the slices, a connection has been noticed after dissection.

• IFL of all 3 compartments can be found in clinical imaging (CT/MRI).
3D-reconstruction (Mimics)
T2-weighted MRI
Discussion/Conclusion

• Manual dissection seems to be inappropriate for a detailed study of the IFL.

• Intraforaminal ligaments (IFL) are regular anatomical structures, which may play a role in power transmission and in protecting the spinal nerves.

• “Occult” stenosis seems to be related to changing of IFL.

• Diagnosis of IFL seems to be possible using MRI.
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