Age Related Differences Of Neuronal Structures Within The Posterior Horn Of The Medial And Lateral Meniscus

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I have no financial conflicts to disclose.
Meniscus extrusion is age and load dependent \(^1,^2\)

Although nociceptive and proprioceptive neuronal structures within the meniscus are described, a topographic, age-related description of neuronal structures within the posterior horn of the lateral meniscus (PLM) and posterior horn of the medial meniscus (PMM) are lacking. \(^3,^4\)

**Purpose**
- Age related differences in neuronal structures in the PLM and PMM
- Comparison of the neuronal structures of the PLM and PMM

**Hypothesis:**
- With increasing age, less neuronal structure are found in the posterior horn of the human meniscus
- No difference between medial and lateral posterior meniscus horn
Material & Methods

- n = 10 ; 5 > 50 years, 5 < 50 years

- Posterior horns and the neighboring capsular tissue of the medial and lateral meniscus, near to the anchorage of the posterior root were collected

- All specimens were treated with 5% ethylene diamine tetra-acetate (EDTA) prior to an immersion in 10% sucrose overnight.
Cryosections with a thickness of 12 µm were obtained running perpendicular to the inner and outer rim of the menisci.

A panel of antibodies directed against various neuronal structures was used:
- Antibodies against S100- and GFAP-epitopes (Schwann cells)
- Antibodies against various neurofilaments (Clones: RT97 and SMI 32)
- Antibody against acid sensing channel 2 (ASIC 2) (Mechanosensory neurons)

Control sections were obtained omitting the primary antibody. All sections were counterstained with Meyer’s hematoxylin.
Most positive results were situated in the PLM and PMM at the upper part of the synovial fold and in the outer (so called “red-red”) zone of the meniscus. During dissection of the fresh tissue a tiny blood vessel running within the capsule towards the edge of the meniscus can be frequently detected in this region of the joint capsule and serves as a guide for the site from which the histological sections were obtained.
Results

- GFAP and ASIC positive neuronal structures were detected in nearly every PLM in the synovia and capsule next to the meniscus but also in the red-red zone.

- SMI 32 was only evident in the red-red zone of the PLM and PMM in close relation to accompanying blood vessels.

- Mechanoreceptors of different types were identified according to their morphological appearance and were more apparent in the PLM compared to PMM, but only in the less dense connective tissue of the synovial fold and infrequently in the outer red-red zone.
In contrast to recent literature neurons and mechanoreceptors were found predominantly within the upper part of the parameniscal synovia and red-red zone of the posterior horns of the medial and lateral meniscus.

No signs of neuronal structures were found within the dense, fibrous inner parts of the meniscus body.

The amount of neuronal structures was higher in the PLM compared to the PMM. However, the evaluated neuronal structures in both posterior horns were most likely sensory neuronal structures, which are involved in pain reception and transmission.
No age related differences between neuronal structures in the PLM or PMM were determined. Moreover, no age dependent difference with regard to bloody supply of the posterior horns was evident.

Age of the patient should not be a primary criteria for decision of meniscus repair


Vielen Dank!

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