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The Role of the Vertebral End Plate in Low Back Pain

End plates serve as the interface between rigid vertebral bodies and pliant intervertebral disks. Because the lumbar spine carries significant forces and disks don't have a dedicated blood supply, end plates must balance conflicting requirements of being strong to prevent vertebral fracture and porous to facilitate transport between disk cells and vertebral capillaries. Consequently, end plates are particularly susceptible to damage, which can increase communication between proinflammatory disk constituents and vascularized vertebral bone marrow. Damaged end plate regions can be sites of reactive bone marrow lesions that include proliferating nerves, which are susceptible to chemical sensitization and mechanical stimulation. Although several lines of evidence indicate that innervated end plate damage can be a source of chronic low back pain, its role in patients is likely underappreciated because innervated damage is poorly visualized with diagnostic imaging. This literature review summarizes end plate biophysical function and aspects of pathologic degeneration that can lead to vertebrogenic pain. Areas of future research are identified in the context of unmet clinical needs for patients with chronic low back pain.

椎體終板在下腰痛的角色

終板作為堅硬性的椎體與柔韌的椎間盤之間的接口。由於腰椎應承受顯著的力和椎間盤沒有一個專門的血液供應，終板必須平衡不一致的要求，一方面要保持結實以防止椎骨骨折，另一方面要提供多孔方便椎間盤細胞和毛細血管椎之間的運輸。因此，終板特別容易受到損害，令促使炎症的椎間盤成分和帶血管的椎體骨髓增加交流。損壞的終板區域可以是骨髓病變反應的部位，當中包括增殖的神經，這是受化學敏化作用和機械刺激的反應。雖然一些證據顯示神經支配的終板損傷可以是慢性下腰痛的來源，但是其作用在患者的診斷中很可能被低估了，因為在影像診斷中，神經支配損傷是難以顯現的。本文獻回顧綜述了終板的生物物理功能和導致脊椎所致的疼痛的病理退變。在未能達到慢性下腰痛患者的臨床需要的背景下，已確定了將來的研究領域。