

# Analysis of Relationship between Paraspinal Muscle Fatty Degeneration and Cervical Spine Motion Using Kinetic Magnetic Resonance Imaging

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## Abstract

The alignment and mobility of the cervical spine is influenced by factors related to the vertebral bodies, intervertebral discs, ligaments, facet joints, and muscles. Few reports have described the role played by the paraspinal muscles in cervical spine mobility. In this study, we investigate the relationship between fatty degeneration of the paraspinal muscles and cervical motion as assessed with kinetic magnetic resonance imaging (kMRI). One hundred eighty-eight symptomatic patients underwent cervical kMRI in neutral, flexion, and extension positions. We quantified cervical paraspinal muscle fatty infiltration and measured angular variation and translational motion at each cervical level, and the global Cobb angle. Cervical paraspinal muscle fatty degeneration demonstrated a pattern in which C3 and C7 had significantly more fatty infiltration than C4, C5, and C6. Additionally, when the normal group was compared with the fatty degeneration group with respect to angular variation, translational motion, and Cobb angle, no significant differences were found except in angular variation at the C3-C4 level. In conclusion, we found a significantly larger quantity of fatty degeneration in the paraspinal muscles at C3 and C7 than the middle cervical levels. Also, we demonstrate that fatty degeneration does not significantly affect cervical lordotic alignment or mobility characteristics.

## Keywords

kinematic magnetic resonance imaging - cervical spine - cervical paraspinal muscle - cervical lordosis - fatty degeneration - fatty infiltration - multifidus muscle

## 以運動磁共振影像分析椎旁肌肉脂肪變性和頸椎移動之間的關係

頸椎的排列和活動性受均椎體，椎間盤，韌帶，小關節和肌肉等相關因素影響。一些報告描述的頸椎椎旁肌對頸椎活動所起的作用。在這項研究中，我們評估以運動磁共振影像 (kMRI) 分析椎旁肌肉脂肪變性和頸椎移動之間的關係。188 有症狀的患者活動分別在中立，彎曲及仰頭位置接受頸椎 kMRI 活動。我們量化了頸椎椎旁肌的脂肪浸潤和量度了在每個頸椎節段的角度變化和平移活動，和整體的 Cobb's 角度。在頸椎椎旁肌脂肪變性顯示的模式中，C3 和 C7 比 C4，C5 和 C6 顯著地有更多的脂肪浸潤。此外，以角度變化，平移活動，Cobb's 角比較正常組別和的脂肪變性組相比，除了在 C3-C4 節段的的角度變化外，彼此並沒有顯著差異。相比頸椎中間的節段，我們發現了明顯較大數量的脂肪變性在 C3 和 C7 椎旁肌肉。此外，我們發現脂肪變性不會顯著地影響頸椎前凸的排列或活動性的特點。