

# Spontaneous stabilisation of postlaminectomy cervical kyphosis by anterior longitudinal ligament ossification

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## ABSTRACT

Cervical laminectomy has been known to cause postlaminectomy kyphosis and instability, often necessitating extensive anterior and posterior procedures with instrumentation for the stabilisation and correction of the deformity. We report a case of spontaneous stabilisation of postlaminectomy cervical kyphosis by anterior longitudinal ossification in the absence of an ossified posterior longitudinal ligament, thus circumventing the need for surgical intervention.

**Keywords:** cervical laminectomy, ossified anterior longitudinal ligament, ossified posterior longitudinal ligament, postlaminectomy kyphosis

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## INTRODUCTION

Cervical laminectomy has been performed for compressive myelopathy secondary to multiple level disc herniations, congenital stenosis and ossification of the posterior longitudinal ligament.<sup>(1)</sup> The progression of ossification of the posterior longitudinal ligament (OPLL) following posterior cervical decompressive procedures has been well documented.<sup>(2)</sup> However, ossification of the anterior longitudinal ligament (OALL) in the absence of OPLL following cervical laminectomy has not been described in the literature thus far.

## CASE REPORT

A 30-year-old Indian man presented with progressive difficulty in walking for six months, with a recent onset of numbness in all four limbs and a loss of manual dexterity in both hands. Neurologically, the patient had features of cervical compressive myelopathy (Nurick Grade 4) with a mild weakness of the wrist extensors and elbow flexors (Medical Research Council, Grade 4 power). Magnetic resonance (MR) imaging (Fig. 1) revealed multiple level



**Fig. 1** Preoperative radiographs of the cervical spine show the absence of ossification of the posterior longitudinal ligament, ossification of the anterior longitudinal ligament and instability, with a good range of movement.

disc herniations with maximal compression at the C3–C4 disc level. There was no evidence of OPLL or OALL. As the radiographs showed a normal cervical alignment

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**Fig. 2** Postoperative radiographs show (a) cervical kyphosis (straight lines) and spontaneous stabilisation by ossification of the anterior longitudinal ligament from C3–C7 (arrows) (b) without ossification of the posterior longitudinal ligament.

with no instability on dynamic views (Fig. 1), cervical laminectomy from C3–C6 was performed. Radiographs at the six-month follow-up pointed to cervical kyphosis with OALL. At the 18-month follow-up, there was progression of the OALL with a significant decrease in the range of motion of the cervical spine (Figs. 2a & b), although the patient had improved to Nurick Grade 1 and had no gait disturbance.

## DISCUSSION

The first descriptions of ossification of the anterior



**Fig. 3** Postoperative MR images show adequate decompression of the cervical cord following C3–C6 laminectomy.

longitudinal ligament were made by Forestier and Lagier<sup>(3)</sup> and Forestier and Rotes-Querol.<sup>(4)</sup> They named the condition ankylosing hyperostosis of the spine, in order to differentiate it from cervical degenerative disease and ankylosing spondylosis. Later, specific radiological criteria for its diagnosis were established by Resnick and Niwayama, and termed diffuse idiopathic skeletal hyperostosis.<sup>(5)</sup>

Although OPLL has been well investigated due to its associated neurological symptoms, OALL has not received a similar amount of attention due to its incidental occurrence in patients with cervical spondylosis or OPLL, and also because it is rarely symptomatic.<sup>(6,7)</sup> However, there have been anecdotal reports of dysphagia caused by OALL,<sup>(8,9)</sup> with occasional reports of resultant aspiration pneumonia.<sup>(8,10)</sup>

Based on its morphology as seen on sagittal computed tomographic imaging, OALL has been classified into three types: segmental, continuous and mixed.<sup>(7)</sup> This is similar to the classification of OPLL.<sup>(11)</sup> The segmental type involves partial or entire elongation of the vertebral body without disc space involvement, while the continuous type is defined as OALL flowing over multiple level disc spaces. The mixed type has the attributes of both the segmental and continuous types.<sup>(7)</sup>

Several authors have documented the potential occurrence of kyphosis after laminectomy in patients with OPLL.<sup>(12,13)</sup> In addition, decompressive surgery may result in the progression of OPLL.<sup>(2)</sup> Although the coexistence of OPLL and OALL has also been reported,<sup>(14)</sup> the occurrence of OALL in the absence of OPLL following cervical laminectomy has not yet been described in the literature.

Our patient had no evidence of OPLL or OALL prior to surgery. The compressive myelopathy was secondary to multiple disc herniations for which he underwent C3–C6 en bloc laminectomy as there was no preoperative evidence of cervical kyphosis. Postoperatively, cervical kyphosis of 28° was observed, which stabilised at the one-year follow-up, with a significant decrease in the cervical range of movement from 38° to 7° post laminectomy (Figs. 1 & 2). However, the patient had no axial neck pain or radicular pain. There was significant neurological recovery (Nurick Grade 4 to Grade 1), and the MR image showed adequate decompression of the cord (Fig. 3).

Chacko et al have described an OALL preserving oblique corpectomy in patients with cervical myelopathy due to OPLL with associated OALL, as it provides inherent stability to the cervical spine.<sup>(15)</sup> An increase in the range of motion of the cervical spine has also been observed following the simple excision of OALL.<sup>(8)</sup> This suggests that OALL following laminectomy may occur in an attempt to stabilise the kyphotic cervical spine. Excision of an asymptomatic OALL in such a clinical scenario may lead to instability, and hence, no further surgical intervention was undertaken despite radiographic evidence of a kyphotic cervical spine.

In conclusion, OALL has received much attention in the past due to the fact that it has been an occasional cause

of dysphagia, while no importance has been attributed to its role in stabilising the spine. Isolated OALL in a post cervical laminectomy patient is a rare condition that provides inherent stability to the cervical spine and can be observed without urgent operative intervention to correct the postlaminectomy kyphotic deformity in an asymptomatic individual.

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