



Editorial



An Age-old Debate: Anterior Versus Posterior Surgery for Ossification of the Posterior Longitudinal Ligament

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See the article “The Clinical Implications and Complications of Anterior Versus Posterior Surgery for Multilevel Cervical Ossification of the Posterior Longitudinal Ligament; An Updated Systematic Review and Meta-Analysis” on page 530.



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Ossification of the posterior longitudinal ligament (OPLL) is a disease characterized by heterotopic bone formation classically occurring in the cervical spine. The compression from the ossified mass is one cause of cervical spondylotic myelopathy (CSM) and predisposes patients to spinal cord injury (SCI).^{1,2} This special issue of Neurospine focuses on the management of OPLL and CSM, addressing some controversies that surround the optimal surgical approach to OPLL.

OPLL is more common in East Asian populations with incidence rates from 1.9% to 4.3%³ compared to 0.1%–1.7% in the Caucasian population.⁴ The exact cause of OPLL remains to be determined. Given that there is a significant recurrence risk in parents (26.1%) and siblings (28.9%) of OPLL patients, a genetic link has been long postulated.⁵ Extensive linkage and genetic studies have identified rare variants of 11 genes associated with OPLL.⁶ Additional studies are needed to further establish the genetic role in the pathogenicity of OPLL.

The neurological dysfunction from the compressive effect of OPLL is often progressive and irreversible.⁷⁻⁹ Surgery is currently the only effective treatment option in patients with advanced CSM from OPLL.¹⁰ The role of surgery in the management of patients with minor symptoms or mild CSM from OPLL remains controversial and these patients are often managed conservatively.¹¹ In the most recent guidelines on the management of CSM, the expert opinion based on the current body of evidence advises against prophylactic surgery in asymptomatic patients with cervical cord compression.¹ We suspect that early surgery will have an expanded role in the management of OPLL as more is discovered about the natural history of OPLL and mild CSM and their association with subsequent SCI.

The optimal surgical approach in the treatment of OPLL has been a topic of great discussion amongst spinal surgeons for decades. Laminoplasty through a posterior approach has historically been the most common method since it was first described in 1973.¹² In recent years, the anterior approaches to OPLL are gaining momentum due to their improved safety profile.

The fundamental principles of surgical treatment for OPLL are to decompress the spinal cord from the ossified lesions, maintain or restore normal stability of the spine and release compressed nerve roots. In the posterior approach, the decompression is achieved indirectly by increasing the canal space whereas anterior surgery allows for direct decompression via the removal of the ossified mass. Furthermore, an anterior construct is optimal in re-

storing the physiological lordosis of the cervical spine.

Theoretically, the anterior approach should be superior in terms of neurological outcomes given that it achieves decompression directly. Furthermore, anterior surgery achieves superior post operative alignment of the spine when compared to posterior approaches.¹³ Despite these benefits, anterior decompression is less often utilized as it is technically demanding and associated with serious complications. Removing the ossified lesion in OPLL is challenging as it is frequently adhered to a calcified or thinned dura. As such, an anterior approach is susceptible to iatrogenic durotomies and intraoperative SCI.

The discussion around the optimal surgical approach is, hence, a balance of the risks of an anterior approach compared to its relative benefit over a posterior decompression. In this issue of Neurospine, a meta-analysis on anterior vs. posterior surgery for OPLL from the Seoul National University provides valuable data on this balance of risks and benefits for spinal surgeons.¹⁴ Based on our assessment, this meta-analysis is the most comprehensive when compared to other analyses,¹⁵⁻²⁰ with 21 studies including 2 recent large series from Morishita et al.²¹ and Hou et al.¹³ Furthermore, the authors have provided extensive analyses on the complications of the 2 surgical approaches that are crucial in clinical decision making.

In keeping with previous studies, the results of this meta-analysis revealed that surgery for OPLL had a significant improvement in the postoperative Japanese Orthopedic Association scores with the anterior approach having a greater impact (difference of 1.30) when compared to posterior decompression. On the contrary, anterior procedures had a higher rate of postoperative neurological deficits (2.17% vs. 1.11%) and iatrogenic durotomy (3.74% vs. 0.96%). The authors concluded that, in general, the small improvement in postoperative clinical outcomes do not justify the potentially serious complications that are associated with anterior approaches for OPLL.

The final decision on the approach needs to be individualized to patient-specific factors. There are some instances in which the advantages provided through the anterior approach justify the small increase in the probability of complication. A posterior approach allows for limited indirect decompression, which might not be sufficient in cases of severe OPLL. Anterior surgery is, hence, recommended in OPLL with canal occupancy ratios of greater than 50%.^{13,22,23} The curvature of the spine needs to be taken into consideration as there is evidence against posterior approaches in rigid kyphotic spines.²⁴ Key measures of alignment such as C2-7 Cobb angle, sagittal vertical axis and the modified K-line should be used in the decision making on

the approach.

The comfort level of the surgeon with the technique is critical on the choice of the approach. A surgeon experienced in anterior approaches in OPLL can further justify that approach given its superiority in outcomes. Laminoplasty is the most common posterior operation in OPLL partly because of its comfort amongst surgeons in East Asia where OPLL is common. Other techniques such as laminectomy and fusion can also be utilized. In a multicentre prospective AOSpine study, the major outcomes of laminectomy and fusion and laminoplasty were comparable in CSM.²⁴ However, laminectomy and fusion can provide superior deformity correction potentially avoiding the progressive kyphotic deformity which is a downfall of posterior laminoplasty as a treatment for OPLL.²⁵ Further data comparing the two posterior approaches in the context of OPLL are required to determine the superior posterior technique in long term outcomes.²⁶

The topic of anterior vs. posterior surgery for all causes of CSM has been studied separately. In a propensity-scored matched analysis using prospective multicentre data, the AOSpine group reported overall similar postoperative outcomes and complications between the two groups.²⁷ With the current body of evidence a guideline or algorithm on the optimal approach to CSM cannot be established and the final decision should be made on a case-by-case basis.²⁴ A randomized control trial to determine the optimal surgical approach to CSM is currently underway.²⁸ The results of this unique study in which experts vote for the eligibility of randomization would address the current lack of high-quality evidence.

Overall, the comprehensive meta-analysis on anterior vs. posterior approaches to OPLL in this issue of Neurospine provides surgeons essential information to aid in choosing the optimal surgical approach. The posterior approach is generally preferred due to its safety profile; however, in severe OPLL (occupancy ratio > 50%) and cases with kyphotic deformity the superior outcomes of the anterior approach may justify its use. The final decision on the approach will be dependent on patient specific factors as well as the experience of the surgeon on the different approaches. Further international multicentre studies are required to have enough evidence in supporting a unifying conclusion on the optimal approach.

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Title: The Accordionist
 Artist: Pablo Picasso
 Year: 1911

The Accordionist is a 1911 painting by Pablo Picasso. As stated by the title, the painting is meant to portray a man playing an accordion. The division of three-dimensional forms into a two-dimensional plane indicate that the painting is in the style of analytic cubism, which was developed by Picasso and Georges Braque between 1907 and 1914. The onset of cubism is possibly due to Picasso and Braque rebelling against centuries of traditional, realistic art that imitates the natural world.

More information: https://en.wikipedia.org/wiki/The_Accordionist

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