Extraforaminal Lumbar Interbody Fusion-ELIF: Anatomic Basis and Technique
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Background and context: A variety of surgical exposures have been utilized for treatment of lumbar disc problems. However there is frequently a compromise between exposure of the disc space, root retraction, and ease of instrumentation. The usual posterior exposure techniques are known to cause substantial muscle damage.

Purpose: This study reports on the anatomic investigations, European surgical application and early North American experience with this muscle separating less invasive surgical exposure method-ELIF.

Study design/setting: Anatomic Dissection and Clinical Utilization, introduction of technique to other surgeons.

Patient sample: 512 clinical patients undergoing spinal fusion.

Outcome measures: Completion of the procedure through the anatomic exposure planned.

Methods: Beginning in 1985 RA described exposure for HNP separating the muscle bundles, this was followed by cadaver dissections in France and refinement of the exposure technique expanding on that described by Wiltse to allow separation rather than splitting of the Multifidus Longissimus interval of the Erector Spinae Complex. Adjustments of the Skin, Fascia, and Muscle incisions allowed direct access to the Transverse Process, Facet, Pedicle and Intervertebral disc space via a single posterior lateral incision without specialized retractor systems. Refinements since 2005 have permitted intervertebral fusion through this exposure.

Results: The anatomic interval and exposure has been reliably defined in cadaver dissection. Dr. RA has accomplished 500+ procedures utilizing this anatomic exposure method 170 were bilateral and 330 unilateral. In North America it has been used in 12 cases since adoption in 2007. The surgical time was 105 minutes for single level fusion, blood loss (less than 50cc reported by RA), and ease of instrumentation is comparable or better than for standard posterior exposures. The separation between muscle sections within the Erector Spinae can with study be reliably identified. No procedure required conversion to alternative technique.

Conclusions: Used either unilaterally or bilaterally this technique offers many of the advantages of that described by Wiltse, but expands the range of possible interventions considerably. Even when the intramuscular plain of dissection is difficult to define the procedure can be accomplished reliably. The advantage of less soft tissue injury with standard retractor systems and conventional lighting and magnification methods seems worthy of further study.

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