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Appendix A-Questionnaire provided to spine surgeons

Please check (√) the metrics of performance you believe are important to measure to evaluate a surgeon performing a L3 hemilaminectomy with a burr and suction and could differentiate between a Senior surgeon (PGY-4 and above training level) and a Junior surgeon (PGY-3 and below training level).

METRIC OF PERFORMANCE		Yes
Example: Relevant metric to measure		√
Example: Irrelevant metric to measure		
SAFETY		
Mean force applied on ligamentum flavum		
Maximum force applied on ligamentum flavum		
Volume of ligamentum flavum removed		
Mean force applied on dura		
Maximum force applied on dura		
Volume of dura removed		
Number of times dura was touched with an active burr		
Minimum position of the burr in the cephalad-caudad axis while removing L3		
Maximum position of the burr in the cephalad-caudad axis while removing L3		
Minimum position of the burr in the medial-lateral axis while removing L3		
Maximum position of the burr in the medial-lateral axis while removing L3		
Maximum position of the burr in the anterior-posterior axis while removing dura		
Blood loss		
Other SAFETY metrics not mentioned above?		
EFFICIENCY		
Position of the burr when the first removal of L3 occurs		
Idle time (amount of time no force is applied by any tool on any structure)		
Total tip path length of the burr (sum of every change in position)		
Total tip path length of the suction (sum of every change in position)		
Time to completion		
Amount of time spent removing L3/ Time to completion		
Other EFFICIENCY metrics not mentioned above?		
COORDINATION		

Volume removed while simultaneously using the suction and the burr	
Mean velocity of the suction while simultaneously using the burr	
Number of times structures are touched with suction while using the burr	
Amount of time spent while simultaneously using the suction and the burr	
Mean distance between the tip of the burr and the tip of the suction	
Other COORDINATION metrics not mentioned above?	
MOTION	
Variance of angles of the burr when removing L3	
Distance between two acceleration peaks for both tools (consistency of movements) when removing L3	
Mean acceleration of the burr over the whole procedure	
Mean acceleration of the suction over the whole procedure	
Mean velocity of the burr when removing ligamentum flavum	
Maximum velocity of the burr when removing ligamentum flavum	
Mean velocity of the burr when removing dura	
Maximum velocity of the burr when removing dura	
Other MOTION metrics not mentioned above?	
Other metrics ideas not described in this list?	