Optimizing Positioning for In Office Otology Procedures

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Abstract

Objective: Surgeons often report musculoskeletal discomfort in relation to their practice, but few understand optimal ergonomic positioning. This study aims to determine which patient position, sitting versus supine, is ergonomically optimal for performing otologic procedures.

Subjects and methods: This was an observational study in which three neurotologists were observed performing a standardized stimulated cerumen debridement procedure on volunteers in two positions: sitting and supine. The Rapid Upper Limb Assessment (RULA), a validated tool that calculates stress placed on the upper limb during a task, was used to evaluate ergonomic positioning, Scores on this instrument range from 1-7, with a score of 1-2 indicating negligible risk of developing posture-related injury. The risk of musculoskeletal disorders (MSDs) increases as the RULA score increases.

Results: In nearly every trial, RULA scores were lower when the simulated patient was placed in the supine position. When examined as a group, with the patient sitting, the median RULA score was 5 and with the patient in the supine position, the median RULA score was 3 (p < 0.0001). When the RULA scores of the three neurotologists were examined individually, each had a statistically significant decrease in RULA scores with the patient in the supine position.

Conclusion: This study indicates that patient position may contribute to ergonomic stress placed on the otolaryngologist's upper limb during in-office otologic procedures. Otolaryngologists should consider performing otologic procedures with the patient in the supine position to decrease their risk of developing upper-limb MSDs.

Introduction

Physicians and surgeons often explore the hazards that their patients face at work, but little attention is given to the dangers they face in carrying out their practice[1]. It has previously been observed that dentists[2], nurses[3], and surgeons[1,4] report a significant level (>75%) of musculoskeletal discomfort in relation to their practice. In the case of cerumen removal, otolaryngologists must place themselves in a position to both visualize and manipulate the cerumen within a patient's ear canal. This often results in positions that are less than ideal. **In this study we assessed the positioning of neurotologists while simulating cerumen removal to determine whether patient position affects physician ergonomics.**

Methods

-Neurotology fellowship trained attendings were observed simulated cerumen removal on mock patients, which were composed of volunteer clinical staff
-The Rapid Upper Limb Assessment (RULA) tool[5] was used to calculate ergonomic positioning **(Figure 1**- see blue table for scoring).
-Physician posture was examined with patients in two positions: seated upright at 90 degrees and supine.
-To observe the effect of physician and patient height on positioning, combinations of neurotologists and patients of varying heights were observed.
-Measurements were limited to the right ear of each subject and to the neurotologist's dominant hand and arm (right side in all cases).
-Muscle use score was always scored as +0 since the action was not held for >10 minutes and was not repeated 4 times per minute. Force/Load score was always +0 since the load was always less than 4.4 lbs.

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Figure 1: Sample RULA worksheet

Results

-3 physicians were observed simulating cerumen removal on 7 volunteer mock patients.
-Physicians ranged from 64 inches to 77 inches in height. Volunteer mock patients ranged from 59 inches to 72 inches in height.
-Median total and subcategory RULA scores are summarized in **Table 1**.
-The paired difference in RULA scores for all simulations was statistically significant (p < 0.0001).
-When examined by individual physician, all three physicians had statistically significant reductions in paired RULA scores between sitting to supine patient positions (all three p values < 0.05).
-Physicians 1 and 3 had significant reductions in their neck scores (p=0.0313 and 0.0156 respectively), while physician 2 had a significant decrease in their upper arm score (p=0.0313) between trials.
-No difference in RULA scores by height difference were detected across the three conditions (p > 0.05, Spearman correlation).

Table 1: Median RULA Score by Position+ and Physician+

	Total Sit	Total Sup	*p-value	P1 Sit	P1 Sup	*p-value	P2 Sit	P2 Sup	*p-value	P3 Sit	P3 Sup	*p-value
Total Score	5	3	**<.0001**	5	3	**0.0156**	4	3	**0.0313**	5	3	**0.0313**
Upper arm	3	2	**0.0003**	3	2	0.1563	4	2	**0.0313**	3	2	0.1250
Lower arm	2	1	**0.0005**	2	1	0.1250	2	1	0.1250	2	1	0.1250
Wrist	3	3	**0.0020**	3	3	0.2500	3	3	0.1250	3	3	0.2500
Neck	4	2	**<.0001**	4	2	**0.0313**	3	2	0.3438	4	1	0.0156
Torso	2	1	0.1460	2	1	0.2500	2	1	0.1250	2	2	> 0.99
Leg	1	1	0.0625	1	1	-	2	1	0.1250	1	1	-

*p-value as calculated by Wilcoxon test, bolded values are statistically significant with p<0.05
+Physician= P, Sitting= Sit, Supine= Sup

Discussion

The main finding of this study is that the act of placing a patient in the supine position (as opposed to upright) results in a profound improvement in the ergonomic positioning of the physician as measured by RULA score. Overall median RULA scores changed from a value indicating possible risk of MSD with the patient in the sitting position, to a score indicating an acceptable posture when the patient was in the supine position.

Our study had several limitations, including a small study population, and risk of observational bias. However, it carries important implications. Many otolaryngologists perform otologic procedures several times per day in their clinic; over the course of a practice lifetime, improper ergonomic positioning puts them at risk of developing MSD. Physicians could significantly reduce their propensity for development of MSD by simply placing the patient supine in the examination chair while executing common otologic procedures.

References

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