

# A Noise-Reduction Program in a Pediatric Operation Theatre Is Associated With Surgeon's Benefits and a Reduced Rate of Complications: A Prospective Controlled Clinical Trial

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## Abstract In Brief Author Information

**Objective:** We assessed the impact of a noise-reduction program in a pediatric operating theatre.

**Background:** Adverse effects from noise pollution in theatres have been demonstrated.

**Methods:** In 156 operations spatially resolved, sound levels were measured before and after a noise-reduction program on the basis of education, rules, and technical devices (Sound Ear). Surgical complications were recorded. The surgeon's biometric (saliva cortisol, electrodermal activity) and behavioral stress responses (questionnaires) were measured and correlated with mission protocols and individual noise sensitivity.

**Results:** Median noise levels in the control group versus the interventional group were reduced by  $-3 \pm 3$  dB(A) (63 vs 59 dB(A),  $P < 0.001$ ) with a grossly decreased number of peaks greater than 70 dB(A) ( $\Delta n = -61/\text{hour}$ ,  $P < 0.01$ ). The intervention significantly reduced non-operation-related noise.

The incidence of postoperative complications was significantly lower in patients of the intervention group ( $n = 10/56$  vs  $20/58$  control;  $P < 0.05$ ).

“Responders,” surgeons with an above-average noise sensitivity (correlation  $r = -0.6$  for the work subscale of the NoiseQ questionnaire,  $P < 0.05$ ), experienced improved intrateam communication, a decrease in disturbing conversations and sudden noise peaks ( $P < 0.05$ ).

Biometrically, the intervention decreased both the surgeon's pre- to postoperative rise in cortisol by approximately 20% and the surgeon's electrodermal potentials of greater than 15  $\mu\text{S}$ , indicating severe stress by 60% ( $P > 0.05$ ).

**Conclusions:** Spontaneous noise during pediatric operations attains the magnitude of a lawn mower and peaks resemble a passing truck. The sound intensity could be reduced by 50% by specific measures. This reduction was associated with a significantly lowered number of postoperative complications. The surgeon's benefits are idiosyncratic with “responders” experiencing marked improvements.

Supplemental Digital Content is Available in the Text. A systematically enforced behavior modification program backed up by technical devices like optical sound warners decreased the resented intraoperative noisiness in a pediatric operating theatre by approximately 50%. This improved the well-being and biometric stress markers of the surgeons and was associated with a significant drop in patient complications.

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