



Occupational Noise Exposure in the Pediatric Dental Setting

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BACKGROUND

- Dental professionals are exposed to potentially hazardous noise daily [1,2]
 - Ex: ultrasonic scalers, handpieces, suctions, and amalgamators [3, 4, 5]
- Pediatric practices have additional and unique noise sources, including screams and cries of non-cooperative and pre-cooperative children
- The U.S. Department of Labor and OSHA set acceptable workplace noise exposure guidelines
- Little evidence exists on pediatric specific dental practices

OBJECTIVES

- To evaluate noise levels recorded in a hospital based pediatric dental clinic
- To evaluate the occupational exposure personnel have to potentially hazardous levels of noise.

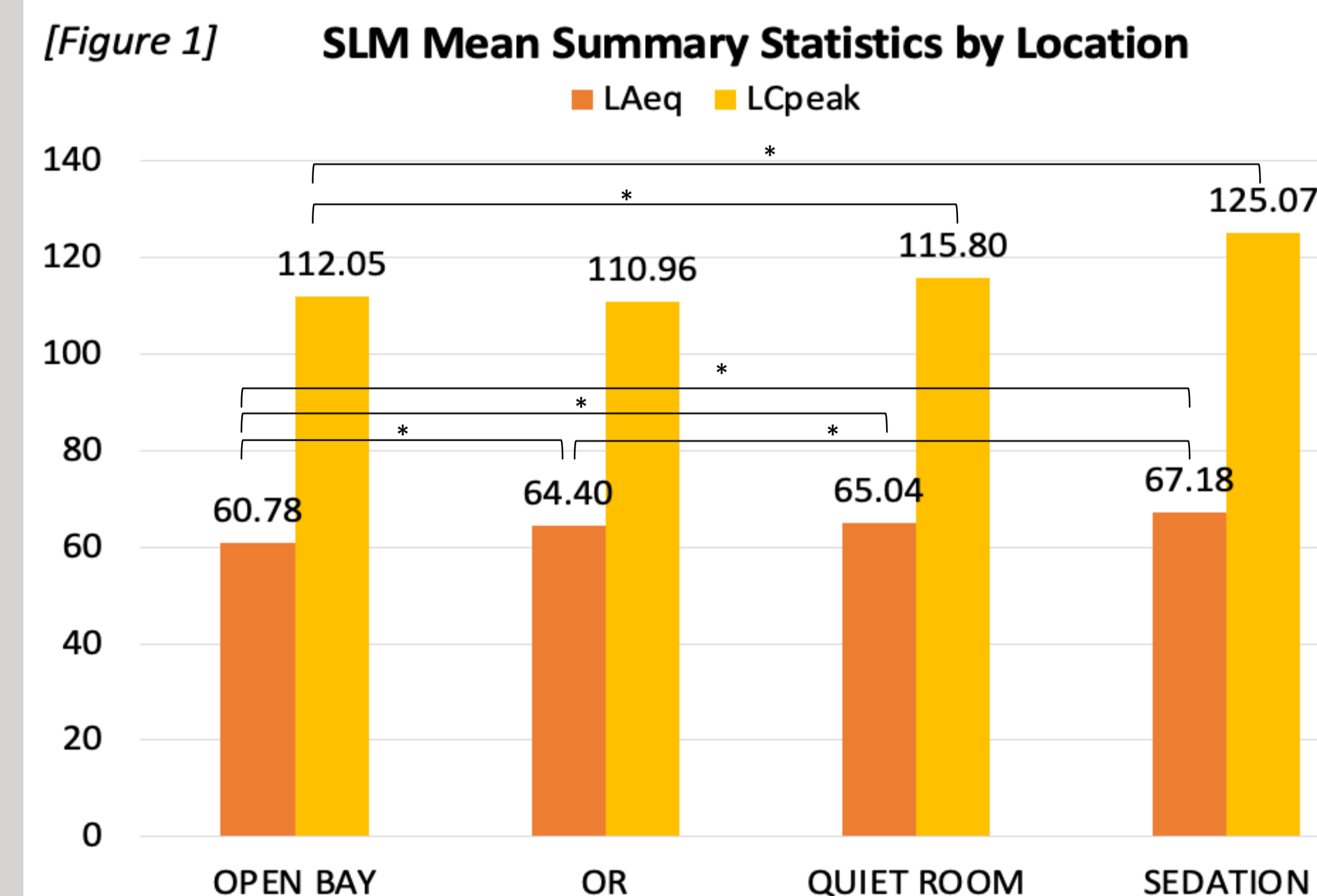
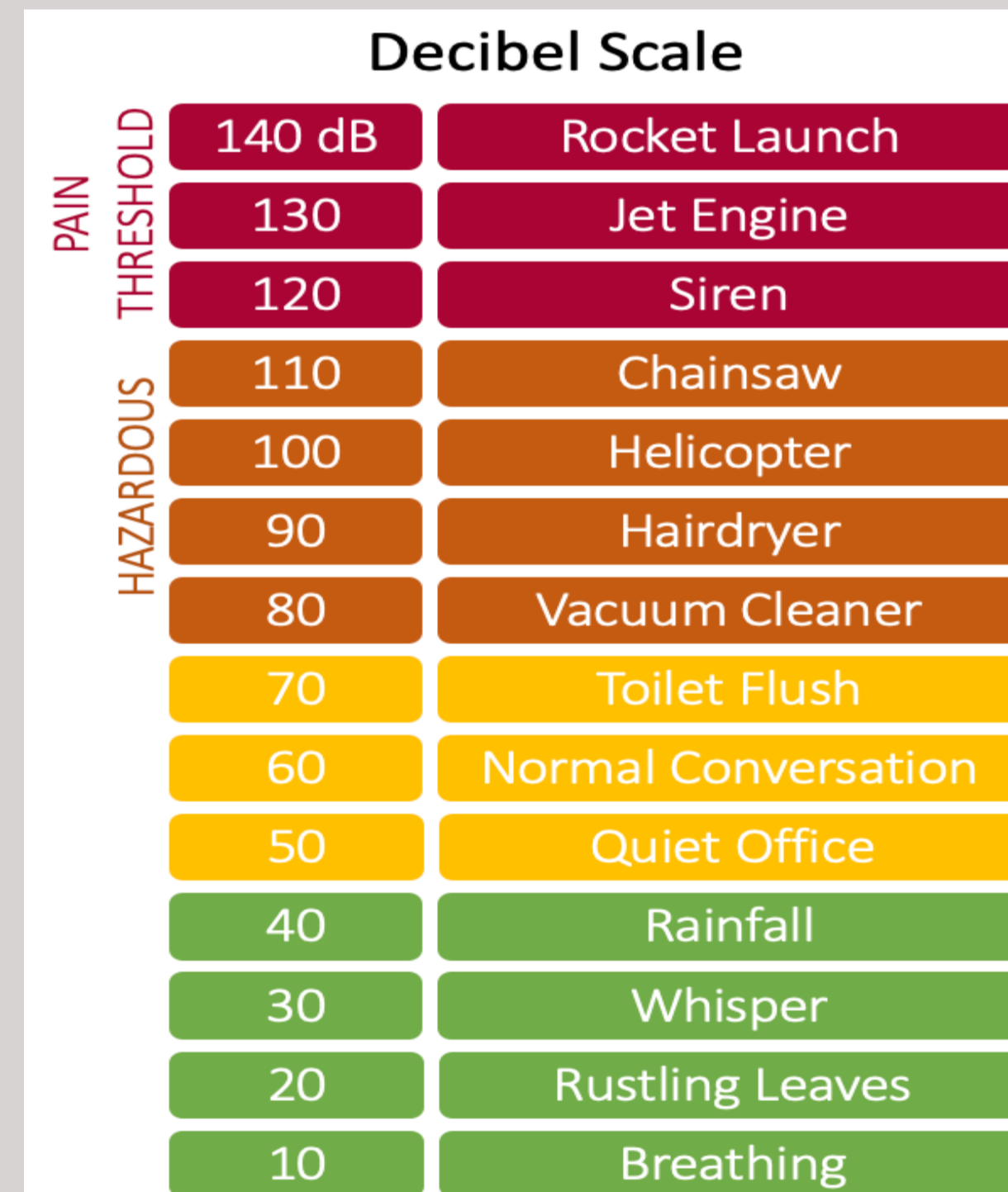
METHODS

- Background sound levels were analyzed in a quiet room (QR), open bay (OB), in-office moderate oral sedation suite (OS), and hospital outpatient operating room (OR) using a **Sound Level Meter (SLM)** [Larson Davis Model 831C]
- A **noise dosimeter** [Larson Davis Spartan 730] was worn clipped near the shoulder of a pediatric dental resident for 81 clinic sessions to monitor personal exposure
 - One session equal to morning or afternoon clinical session
- No changes made to the treatment rendered or instruments utilized
- Nonparametric ANOVAs used to compare the locations for differences in LAeq, LCpeak, and percentage of time above each OSHA threshold. A two-sided 5% significance level was used for all tests.
- The percentage of time above each OSHA threshold was calculated and converted to amount of time based on an 8-hour day.

RESULTS

SLM La_{eq}	OB < OR (p = 0.049), QR (p = 0.004), and OS (p = 0.001)	Figure 1
	OR < OS (p = 0.029)	Figure 1
SLM LC_{peak}	OB < QR (P = 0.010) and OS (P = 0.011)	
SLM % of Time Above 80 dB	OS > OB (p = 0.018), OR (p = 0.024), and QR (p = 0.039)	
Dosimeter La_{eq}	OB < QR (p = 0.007) and OS (p = 0.007)	
Dosimeter % of time above 80, 85, 90, and 92 dB	OB < QR and OS	Table 1

No personal exposure values approached or exceeded the OSHA time limits above thresholds



[Table 1] Dosimeter: Time Above Thresholds		
	Result	p-value
> 80 dB	OPEN BAY (5.05%) < QUIET ROOM (9.92%)	0.001*
	OPEN BAY (5.05%) < SEDATION (11.14%)	0.004*
	QUIET ROOM (9.92%) & SEDATION (11.14%) n.s.	0.421
> 85 dB	OPEN BAY (1.37%) < QUIET ROOM (3.65%)	0.001*
	OPEN BAY (1.37%) < SEDATION (4.07%)	0.002*
	QUIET ROOM (3.65%) & SEDATION (4.07%) n.s.	0.393
> 90 dB	OPEN BAY (0.36%) < QUIET ROOM (1.21%)	0.005*
	OPEN BAY (0.36%) < SEDATION (1.27%)	0.009*
	QUIET ROOM (1.21%) & SEDATION (1.27%) n.s.	0.340
> 92 dB	OPEN BAY (0.22%) < QUIET ROOM (0.77%)	0.020*
	OPEN BAY (0.22%) < SEDATION (0.76%)	0.033*
	QUIET ROOM (0.77%) & SEDATION (0.76%) n.s.	0.461

CONCLUSION and DISCUSSION

- Overall noise exposure of a pediatric dental professional in a hospital based pediatric dental clinic **does not exceed the threshold set forth by OSHA**
- Peak decibel values in the pediatric dental setting **reach that greater than emergency sirens**, and near that of a jet engine
- The **open bay treatment setting produced the least amount of noise**, when compared to a quiet room operatory, sedation suite, and operating room
 - Frankel 4 (++) Behavior children are more frequently treated in the open bay setting
- Quiet Room and Sedation settings produced the greatest personal exposure level** as measured via noise dosimeter
 - Children with poor behavior
 - Dental treatment including: restorative, extractions, emergency appointments, knee-to-knee, and use of protective stabilization

