

# Noise Production From Common Weightlifting Activities

Carter M. Denne MS, DO and Jack B. Anon MD

## Introduction:

Noise exposure is a known cause of hearing loss and regulations have been set forth to protect the hearing of workers exposed to loud noise. Not only are individuals exposed to sound during work but also during recreational activity. There is limited research pertaining to the noise exposure experienced when performing weightlifting.

## Methods:

Two common weight room scenarios were sought to be replicated. These included dropping a barbell from the deadlift and clean positions. Total amount of weight dropped and type of weights (rubber vs. metal plates) were recorded. Hi-Temp® Standard bumper plates (BP) and Intek® Cast Steel metal plates (MP) were added symmetrically to a 45lbs Rogue® barbell. Noise measurements were taken using the CEL633C1 noise dosimeter from a standard distance. Noise variables recorded included LAeq, LAFmax, LCpeak, and Lex8hr(projected).

## Results:

The maximum LCpeak for the deadlift and clean were 128.2 and 118.2 dB, respectively. All deadlift drop noise was weakly correlated ( $r=.18$ ) with weight on the bar. At the clean position, peak noise was strongly correlated ( $r=.99$ ) with the amount of weight on the bar.

A combination of (45MP+25MP+10MP) had the loudest deadlift and overall noise (LCpeak = 128.2 dB). At equivocal weight, metal plates were found to create significantly higher LCpeak values compared to bumper plates from the deadlift position. In the clean position, a weight combination of (45BP+25MP+10MP) had the highest decibel reading at Lpeak 118.3 dB. Weight dropped from the clean position was found to be significantly louder than the deadlift position only with 45BP.

## Discussion:

Weightlifting and associated activities can create a high level of noise. LCpeak, LAeq, LAFmax, and Lex8hr were not found to violate the standard safety guidelines. However, these levels are of possible concern when multiple repetitions and prolonged exposure are considered. Further research is needed to determine the risk of hearing damage associated with weightlifting.



Image 1: Demonstration of the drop height from the clean position



Image 2: Demonstration of the drop height from the clean position

Exposure level, L (dBA)	Duration, T			Exposure level, L (dBA)	Duration, T		
	Hours	Minutes	Seconds		Hours	Minutes	Seconds
80	25	24	-	106	-	3	45
81	20	10	-	107	-	2	59
82	16	-	-	108	-	2	22
83	12	42	-	109	-	1	53
84	10	5	-	110	-	1	29
85	8	-	-	111	-	1	11
86	6	21	-	112	-	-	56
87	5	2	-	113	-	-	45
88	4	-	-	114	-	-	35
89	3	10	-	115	-	-	28
90	2	31	-	116	-	-	22
91	2	-	-	117	-	-	18
92	1	35	-	118	-	-	14
93	1	16	-	119	-	-	11
94	1	-	-	120	-	-	9
95	-	47	37	121	-	-	7
96	-	37	48	122	-	-	6
97	-	30	-	123	-	-	4
98	-	23	49	124	-	-	3
99	-	18	59	125	-	-	3
100	-	15	-	126	-	-	2
101	-	11	54	127	-	-	1
102	-	9	27	128	-	-	1
103	-	7	30	129	-	-	1
104	-	5	57	130-140	-	-	<1
105	-	4	43	-	-	-	-

Table 1: OSHA Noise Exposure Recommendations Based on Exposure Time

Trial #	Weight on Barbell	LCpeak (dB)
1	45BP+25MP+10MP	118.2
2	45BP+25MP+5MP	116.7
3	45BP+25MP	113.1
4	45BP+5MP	111.6
5	45BP	110.2

MP= Metal Plate, BP= Bumper Plate

Table 3: Clean Position- 5 loudest trials

Trial #	Weight on Barbell	LCpeak (dB)
1	45MP + 25MP+10MP	128.2
2	45MP+25MP	127.1
3	45MP	125.6
4	45BP+45MP+25MP	121.8
5	45BM+45MP	120.0

MP= Metal Plate, BP= Bumper plate

Table 2: Deadlift Position- 5 loudest trials

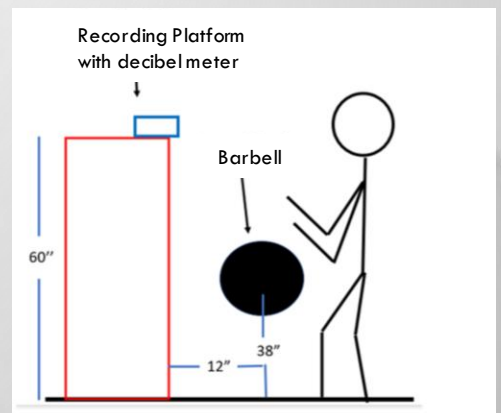


Image 3: Recording platform with decibel meter used to measure noise exposure