Vocal Dose for Rhythm-Based Indoor Cycling Instructors: With and Without Amplification

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This study quantified the vocal dose, the distance vocal folds travel during phonation, and perceived vocal effort of 8 rhythm-based indoor cycling (RBIC) instructors. Such research is relevant because fitness instructors are at high risk for occupational-based voice disorders and vocal trauma.[1,2] To date, vocal usage data exist among other aerobic instructors but there is limited research focusing on the voice requirements required for cycling instructors.[3] The purpose of this study was to collect vocal dose of cycling instructors with and without amplification to explore voice usage and related effects. It was hypothesized that vocal dose would be lower in amplified voice versus unamplified voice and perceived phonatory effort (PPE) would be lower in the amplified condition.

In this study, the RBIC instructor's vocal function was quantified by identifying the vocal fold distance dose required while coaching a realistic cycling class under two different conditions: with and without voice amplification. Each instructor completed one trial of both conditions within a two-week window. Related data are shown in Table 1. Data collection occurred in the same local indoor cycling studio, with an average of 17 cycling volunteers participating in each class, exercising to the same cycling routine to maintain ecological validity.

Vocal dose was collected through an accelerometer that was attached just above the sternal notch and quantified using the Ambulatory Phonation Monitor (APM; Model 3200, PENTAX Medical, New Jersey) data logger. Results indicated that vocal dose was similar in both conditions. PPE was lower following the trial with the microphone.

Table 1. Participant Ambulatory Phonation Monitor (APM) data

	Participant	Distance Dose (m)	F0 Ave	PPE (%)	SPL (dB)
		Mic (No Mic)	Mic (No Mic)	Mic (No Mic)	Mic (No Mic)
Female Only	F1	2,514 (2,492)	281 (254)	59 (73)	100 (97)
	F2	2,540 (3,040)	263 (319)	25 (84)	107 (107)
	F3	3,480 (2,190)	252 (263)	51 (81)	108 (91)
	F4	2,390 (1,440)	262 (292)	62 (89)	96 (102)
	F5	2,120 (1,990)	290 (312)	61 (81)	87 (87)
	F6	(2,620)	(324)	(82)	(95)
	F7	(2,490)	(287)	(74)	(94)
	M1	2,170 (1,830)	212 (228)	18 (57)	94 (94)
	Range	1,360(1,600)	69(91)	37(16)	21(20)
	Median	3,480(1,440)	252(292)	25(81)	100(95)
	Average	2,608(2,323)	269.6(293)	51.6(80.5)	99.6(96.1)

Note: F0= Fundamental Frequency; PPE=Perceived phonatory effort; SPL= Sound Pressure Level; F=female, M=male

The findings from study support the hypothesis that PPE would be lower with amplification; however, the hypothesis for vocal dose was not supported. This introduces discussion concerning effort load of voice, required effort, and the impact on the RBIC instructors. The broad impact of this research is to more effectively educate and care for the vocal health of all RBIC instructors. Further studies targeted at RBIC could be completed. In addition, exploring other fitness instructors could allow a general understanding of fitness and voice.

Statement of Research Advisor

This project builds logically on my body of research that merges voice science and exercise science into a more holistic study of voice physiology in the occupational voice user. Improving our current voice habilitation and rehabilitation programs for those professionals using their voices in challenging environments requires quantification of the extent and quality of voice, which is accomplished for cycling fitness instructors in this investigation.

– *Mary Savage, Communication Disorders*

References

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