

Fit to Play: The Fitness Effect on Physically Challenging Flute Repertoire

This case study was done to determine whether physical fitness plays a part in performing flute repertoire. Most repertoire allows performers the choice of where to breathe. However, there exists a “brute” repertoire where breathing is prescribed by the composer, which poses physical challenges for performers. The author contrasted pieces from traditional repertoire with Heinz Holliger’s (*tair(e)*), which requires passages of breath-holding and measured inhalations. The author was tested for cardiovascular fitness (VO_{2max}) and corresponded these levels to pulse rates while playing at baseline and 6 months after undertaking a physical fitness program. After the exercise program, expertise with standard repertoire combined with the unmeasured variables of resonance, openness of the chest and oral cavities, embouchure size, and air speed saw little improvement with increased fitness levels. However, when air regulation is out of the performer’s control, the effect of cardiovascular training brought the “brute” repertoire into the same range of difficulty as the standard repertoire. *Med Probl Perform Art* 2011;26(1):51–52.

To the Editor—Musician’s cardiovascular fitness rarely comes into question, as there are world-class performers of highly varied fitness levels. Although a flutist needs large amounts of air, regulating the air needed for any given phrase is learned through deeper breathing while refining the embouchure and opening the mouth and chest cavities. However, in the 1980s, a group of composers, including Helmut Lachenmann, Nikolaus Huber, and Heinz Holliger, began a new compositional trend that uses air itself as a compositional element. Pieces require breath-holding with both full and empty lungs and inhaling while playing. These stresses are beyond those of standard repertoire and lack a comprehensive pedagogy.^{1,2} The physical effects of breath-holding may include increased heart rate,³ raised blood pressure,⁴ lowered cognition,⁵ and exertional headache.⁶ This case study tested whether cardiovascular conditioning⁷ could offset these challenges.

To test the difficulty of breath-holding, a test area in Heinz Holliger’s (*tair(e)*) was assigned. After the strenuous section, recovery pulse rates were measured. This was done using a carotid pulse rate and a stopwatch for 15 seconds. As a contrast, three test pieces were assigned from traditional flute repertoire; in all of the excerpts, speed was controlled with a metronome and stopwatch. The test areas were as follows: from Debussy’s *Afternoon of a Faun*, the opening solo of four measures were played freely, until the performer ran out of

air on the last note; from Mendelssohn’s scherzo from *A Midsummer Night’s Dream*, the final solo, 2 before rehearsal P to the end, was played at metronome speed 84; and in J.S. Bach’s *Sonata in E♭ Major*, the first movement was played until measure 26 at metronome speed 60. In Holliger’s (*tair(e)*), the pulse rate was measured after the second fermata on page 1, line 8.

VO_{2max} was measured twice via the OWN index, once before an exercise regimen was in place and once 4 months after (see below, Table 1). The tests were done using a Polar Chest Strap heart rate monitor while performing a treadmill test. The initial level measured at baseline, 24 mL/kg/min, is very low, below the range of a nonathlete. The second level measured after exercise training, 39.7 mL/kg/min, shows improvements, bringing the 38-year-old female subject into the low end of the range for a runner.⁸ In order to control the validity of the fitness effect versus improvement resulting from specific practice, the pieces were not practiced in the interim.

The exercise regimen consisted of a 4-day/wk plan. It included mild weight training and three 60-min aerobics classes. The aerobics classes included cardiovascular and resistance training, while 1 day/wk the subject did a more intense Zumba class. This included larger, full-body movements, kicks, and jumping. The weight training involved lateral pull downs, chest presses, leg presses, and abdominal floor work. In addition, pilates was used 1 day/wk. The type of exercise was not closely controlled because this study was not meant to prescribe any particular exercise program. It was decided that, rather than measuring a target heart rate which would limit the exercise to those that could be highly controlled, the subject would be better suited committing to

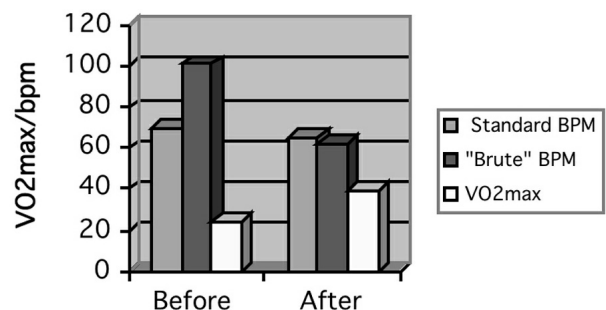


FIGURE 1. Corresponding heart rate levels to VO_{2max} levels during test phases of repertoire before and after fitness improvements.

TABLE 1. Recovery Heart Rates and Their Averages Following Flute Peices Before and After Exercise Regimen

	Standard Flute Repertoire			"Brute" Repertoire
	<i>Afternoon of a Faun</i> , Debussy	Scherzo from <i>A Midsummer Night's Dream</i> , Mendelssohn	<i>Sonata in Eb Major</i> , J.S. Bach	<i>(t)air(e)</i> , Holliger
Recovery pulse rate with VO_{2max} 24 mL/kg/min	70	70	68	100
	70	70	68	104
	70	70	70	100
	= 69.5 bpm			= 101.3 bpm
Recovery pulse rate with VO_{2max} 54 mL/kg/min	68	70	60	60
	68	68	62	68
	68	60	62	60
	= 65.1 bpm			= 62.6 bpm

$\Sigma \times f \div \Sigma f = X$, where f is frequency and X is bpm.

classes that she enjoyed. This ensured that the exercise was carried out and minimized the risk of discontinuing the exercise altogether.

CONCLUSIONS: The performer has had extensive professional experience with the standard repertoire. Regulating the air stream and energy levels is done automatically. Therefore, expertise with standard repertoire combined with the unmeasured variables of resonance, openness of the chest and oral cavities, embouchure size, and air speed saw little improvement after increased fitness levels. However, when air regulation is out of the performer's control, the effect of cardiovascular training brought the "brute" repertoire into the same range of difficulty as the standard repertoire (Fig. 1). Thus, the performer met the breathing challenges of Heinz Holliger's *(t)air(e)* without having practiced it in a practice room.

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