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Original article

The role of an internal nasal dilator in athletes

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Summary. The nasal valve area has the minimal cross-sectional area of the upper airways. Nasal dilators have been found able to improve sport performance in athletes. The aim of this study was to investigate whether the use an internal nasal dilator may be able to affect respiratory pattern in a group of athletes. The use of internal nasal dilator induced a significant reduction of fatigue perception (p=0.000) and was optimally accepted. In conclusion, the present study demonstrates that Nas-air® is an internal nasal dilator able to reduce the fatigue perception and is preferred to external nasal dilator. (www.actabiomedica.it)

Key words: nasal valve, internal nasal dilator, athletes, sport performance, Nas-air®

Introduction

Nasal dilators were developed over a century ago and introduced successively in the nineties, they became very popular during the Olympic Games in Atlanta (GA, USA) in 1996 (1-3). A nasal dilator is considered efficient if is able to alleviate sleep disorders and snoring. The mechanism of action is based on reductions in nasal resistance.

Nasal dilators may be useful during physical exercise as reduced nasal resistance may induce a consequent reduction in the nasal breathing effort, increase in nasal ventilation, and delay in oral breathing onset during physical exercise (4, 5).

Many studies were conducted in athletes, mainly in adults, using nasal dilators as recently analysed by Dinardi and colleagues (3). However, the results of these studies are conflicting and no conclusive shared consent has been reached still now.

Nas-air® is a new internal nasal dilator that has been found able to significantly improve snoring (6). Therefore, the present study investigated the potential benefit of internal nasal dilator in a group of athletes.

Materials and Methods

The present open study included 19 athletes.

Inclusion criteria were: adult age. Exclusion criteria were: anatomical clinically relevant problems (e.g. very severe septal deviation and/or turbinate hypertrophy, such as grade IV), obstructive sleep apnea syndrome, disorders and current medications potentially able to interfere with findings.

The Nas-air® (E.P. Medica, Fusignano, Italy) and Rinazina Breathe Right® (GSK Consumer Healthcare, Milan, Italy) were given with appropriate instruction for their use. All patients signed an informed consent to participate in the study.

The athletes should run on a treadmill for 3 km in 23 minutes (angle of inclination 0°).

Briefly, the internal nasal dilator should be applied into the nose before the run, whereas the nasal strip should be applied on the bridge of the nose at the same time. Both devices should be worn during the whole exercise. The athletes were evaluated at baseline (without any dilator), after one week (with Nas-air®), and after another week (with Breathe Right®).

During the otorhinolaryngological visit, the following parameters were considered: age, gender, body mass index (BMI); a fibro-endoscopy was also performed.

Subjective parameters included perception of nasal obstruction, sleep quality, and olfaction. It was measured by a visual analogue scale (VAS). VAS score for nasal obstruction ranged from 0 (= completely blocked nose) to 10 (= completely patent nose). HR and SaO_2 were recorded at each visit. The perception of fatigue was scored as low, medium, and high. The device judgment was poor, good, or excellent

Clinical characteristics were reported as mean ± standard deviation (SD) for continuous variables and as percentage for categorial variables. The normal distribution of continuous variables was verified. Continuous parameters were analyzed by the ANOVA test, whereas non continuous variables were analyzed by the Pearson Chi-square test. The software SPSS23 was used.

Results

Globally, 19 athletes (16 males, mean age 22.9±4 years) were enrolled.

HR at rest was 70.6±8.8 bpm, SaO_2 at rest was 97.5±1%. BMI was 22.6±2.

The distribution of the nasal valve incontinence was: 5 subjects had normal valve, 10 had unilateral incontinence, and 4 had bilateral one. The VAS of nasal obstruction was 7±1.2.

The findings at baseline and after wearing every device are reported in Table 1. HR and SaO_2 data were similar in the three tests. Fatigue perception was significantly lower in subjects after Nas-air®. The device judgment was significant better for Nas-air®.

Discussion

The nasal dilators are a non-pharmacological treatment for nasal obstruction and may be also used by athletes as nasal dilators have been found able to improve respiration and consequently exercise capacity (7,8). In this regard, there is a body of experience on the use of nasal dilators in athletes, but the outcomes are conflicting. Therefore, we investigated the potential capability of a new internal nasal dilator (Nas-air®) to improve sport performance in a group of athletes.

The findings showed that Nas-air® significantly reduced the fatigue perception and was optimally accepted. Cardiorespiratory parameters were no affected by both devices.

The current outcomes are consistent with some recent reports. Dinardi and colleagues compared an external nasal dilator with a placebo nasal strip in 48 healthy adolescent athletes performing a 1000 m race (7). The results showed that the external nasal dilator was significantly superior to placebo and improved maximal oxygen uptake, nasal patency, and respiratory effort. Another study conducted by the same team investigated an internal nasal dilator compared to a placebo dilator (9). The study found that the internal nasal

Table 1. Clinical data at baseline, and after external or internal nasal dilator

	No device	External dilator	Nas-air®	p
HR mean±SD	152.5±21.1	144.2±22.1	142.9±24.9	0.430
SaO_2 mean±SD	96.2±1.4	96.5±1.2	96.5±0.8	0.625
Fatigue perception n (%)				0.000
low	2 (10.5)	4 (21.1)	16 (84.2)	
medium	14 (73.7)	10 (52.6)	3 (15.8)	
high	3 (15.8)	5 (26.3)	0 (0)	
Device judgment n (%)				0.007
Poor		6 (31.6)	0 (0)	
Good		10 (52.6)	9 (47.4)	
Excellent		3 (15.8)	10 (52.6)	

dilator was able to significantly improve nasal patency in adolescent athletes; however, there was no difference concerning cardiorespiratory parameters between nasal dilator and its placebo. A further study evaluated adolescent athletes with or without allergic rhinitis using an external nasal dilator and its placebo (10). The findings demonstrated that the external dilator significantly diminished nasal resistance, improved maximal oxygen uptake and rating of perceived exertion after a maximum cardio-respiratory test; the nasal device was effective on both healthy and rhinitic adolescents. A recent study enrolled 13 healthy triathletes without nasal symptoms and randomly tested 3 different conditions: no nasal dilator, wearing two different external dilators (11). These authors demonstrated that the two nasal dilators had similar effects, both improved the perception of nasal patency, the nasal respiration time and the nasal VO_2max.

Therefore, the current study is consistent with these reports and confirms the reliability of improving nasal patency and consequently the nasal respiration.

On the other hand, this study has some limitations, including the open design, the limited number of enrolled subjects, the lack of a follow-up, and the absence of validated objective parameters. Therefore, the current experience should be confirmed by further studies designed according to more robust methodology.

In conclusion, the present study demonstrates that Nas-air® is an internal nasal dilator able to significantly reduce the fatigue perception and is optimally accepted.

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Conflict of interest: None to declare

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