

“Senobi” Stretch Ameliorates Asthma Symptoms by Restoring Autonomic Nervous System Balance

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Abstract: The number of asthmatic patients is increasing in Japan. It is conceivable that changes in lifestyle (eg, lack of exercise and high-energy diet) may be associated with this phenomenon. The resulting factor seems to be altered activity of autonomic nervous system of these patients. When this activity was estimated by the measurement of heart rate variability, asthmatic patients ($n = 11$) showed a tendency for parasympathetic nerve dominance in comparison with healthy controls ($n = 10$). We recommend the patients engage in the “Senobi” stretch exercise, which involves stretching the arms and body upward while standing. After 1 month of regularly performing this exercise, most patients showed a decrease in the frequency of asthma rescue medication use. They also showed a recovery of forced expiratory volume in 1 second. These results suggest that the Senobi stretch is a useful exercise for asthmatic patients to perform to achieve a desirable improvement in symptoms.

Key Words: asthma, autonomic nervous system, exercise, heart rate variability

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Patients with bronchial asthma often experience sporadic breathing difficulties. Many clinicians prescribe β -adrenergic stimulants, methylxanthines, anticholinergics, and steroids to eliminate bronchial obstruction.^{1–4} However, these medications do not provide a complete solution. The health lifestyle in Japanese society has changed, and lifestyle-related diseases have been increasing.⁵ In many developed countries including Japan, the number of allergic patients is increasing prominently.⁶ In other words, lifestyle factors that stimulate parasympathetic nerves (eg, lack of exercise and high-energy diet) might be related to the onset of allergies and asthma.^{7–11}

In light of these findings, we recommend the practice of the “Senobi” stretch, as it is called in Japan, to a group of asthmatic patients. It was hypothesized that this gentle stretch would not be an asthma aggravator. We did in fact find that the patients’ autonomic nervous systems were stimulated, which results in reduced asthma symptoms. That is, after performing the Senobi exercise, the patients showed recovery from parasympathetic nerve strain as estimated by heart rate variability (HRV) measurements. Meanwhile, they also had a reduction in the frequency of asthma

attacks and use of rescue medication while showing reference levels of forced expiratory volume in 1 second (FEV₁).

METHODS

Subjects

The subjects in this study were 21 asthmatic patients (age, 44.8 ± 10.3 years; male-to-female ratio, 10:11; body mass index [BMI], 22.9 ± 1.7 kg/m²). The patients were diagnosed with mild persistent asthma according to the Global Initiative for Asthma guidelines.¹² All asthmatic subjects were atopic as shown by at least 1 positive allergy skin-prick test. All asthmatic subjects presented asthma symptoms that required treatment with only an inhaled short-acting β -agonist on demand. As controls, 10 healthy age-, sex- and BMI-matched volunteers (age, 45.1 ± 11.9 years; male-to-female ratio, 5:5; BMI, 22.5 ± 1.8 kg/m²) were selected for the study. The asthmatic patients had a baseline FEV₁ that was between 50% and 75% predicted, and they demonstrated a reversibility of FEV₁ of more than 15% after nebulizing albuterol. Airway hyperresponsiveness was measured by methacholine challenge and expressed as the concentration required to provoke a decrease in FEV₁ of 20% (PC₂₀). The PC₂₀ value in asthmatic subjects was less than 10 mg/mL. The exclusion criteria included exacerbation of asthma within the previous 8 weeks, respiratory infections, a history of smoking, renal disease, pregnancy, diabetes mellitus, cardiovascular disease, and obesity. Informed consent was obtained from the patients.

Senobi Stretch

To stimulate the activity of the sympathetic nerves, the Senobi stretch was practiced by the 11 asthmatic patients. This exercise was selected as an appropriately mild exercise for asthmatic patients; it does not cause enough exertion as to be a stressor or stimulus for asthma attack, but it is sufficient to stimulate the sympathetic nerves. In this stretch, the back is arched, the hands reach up in the air, and this posture is held (Fig. 1A, right). The patients performed this stretch for 1 minute, 3 times a day, every day for 1 month. As a control exercise, we selected a standing forward bend, which is a similar degree of exercise stimulation to the Senobi stretch, and this was performed for the same duration and frequency as the Senobi stretch. Thus, 11 patients performed the Senobi stretch and 10 control patients performed the standing forward bend.

Measurement of Parameters

The activity of the autonomic nervous system was examined by using the Body Checker (Sato Shouji, Inc., Yokohama, Japan), which estimates HRV. Heart rate variability spectral analysis allows the identification of noninvasively perturbations of the autonomic nervous system.¹³ The data of HRV were then converted to the level of the autonomic nervous system.¹⁴ The FEV₁ value was measured by using respiration flow meters. Heart rate variability and FEV₁ were again measured 1 month after performing the exercises.

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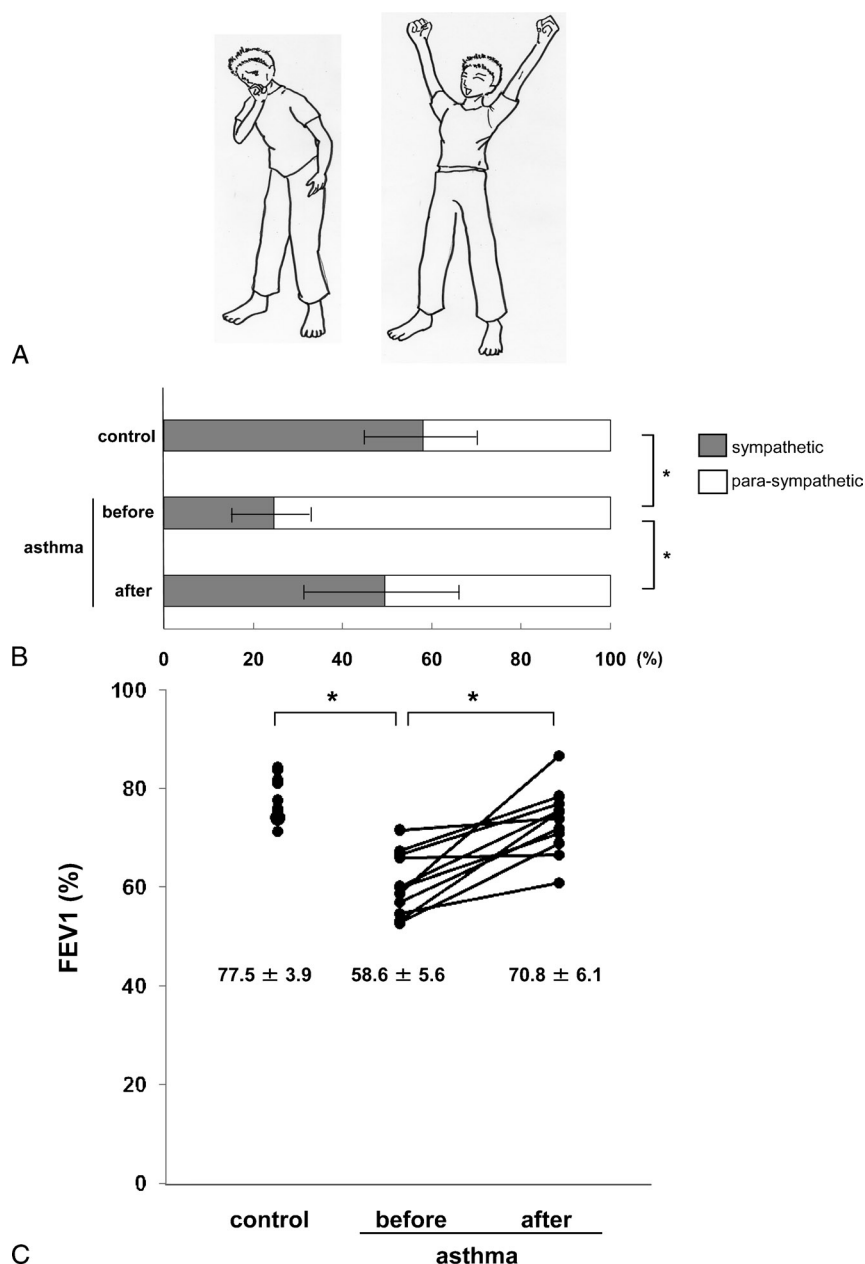


FIGURE 1. The effect of the Senobi stretch. A, (left) Common posture seen in asthmatic patients during breathing difficulties. (right) The Senobi stretch. B, The balance of the autonomic nervous system in the asthmatic patients before and after the Senobi stretch, as estimated by HRV. C, Percent baseline FEV₁ in asthmatic patients before and after the Senobi stretch. **P* < 0.05.

Statistical Analysis

Difference of the data was estimated by unpaired or paired *t* test. The threshold of significance was 0.05 for all tests.

RESULTS

Exercise

Many asthmatic patients tend to exhibit a certain curved-in body posture when experiencing breathing difficulties (Fig. 1A, left). It was hypothesized that an opposing posture, such as that in the Senobi, can help reverse these asthmatic symptoms. The patients performed this exercise for 1 month. After 1 month, a significant reduction was observed in the frequency of using res-

cue medication in patients who had performed the Senobi stretch but not in those who had done the control exercise (Table 1).

Parameters Changes

It was found that asthmatic patients had an altered level of parasympathetic nerve dominance, as estimated by HRV (Fig. 1B). After 1 month of exercise, the level of parasympathetic nerve dominance primarily seen in the asthmatic patients (*n* = 11) had recovered to almost the same level as in the healthy controls (*n* = 10).

To confirm the improvement of clinical symptoms in asthmatic patients, the level of FEV₁ was then examined. Before performing the exercise, the asthmatic patients had a decreased

TABLE 1. Frequency of Rescue Medication Use in Asthmatic Patients Before and After the Exercise

Exercise	Frequency of Rescue Medication Use/wk	
	Before	After
Senobi stretch (n = 11)	3.5 ± 0.3	1.8 ± 0.6*
Standing forward bend (n = 10)	3.4 ± 0.3	3.0 ± 0.2

Asthmatic patients performed the Senobi stretch or standing forward bend for 1 minute, 3 times a day, for 1 month. The frequency of rescue medication use in a week was calculated before and after the month of exercises.

* $P < 0.05$.

level of FEV₁, and this level was found to be improved after the month of exercise (Fig. 1C).

DISCUSSION

It is known that regular exercise can reduce airway reactivity and medication use in asthmatic patients.¹⁵ However, intensive exercise sometimes acts as a stressor and induces a short-term attack of asthma.^{16–20} In light of these findings, we selected a particularly mild exercise, the Senobi stretch, because this exercise is easy to perform and does not act as a stressor. The results of this study demonstrated that the Senobi stretch was effective for asthmatic patients, resulting in an improvement of FEV₁. In addition to this functional improvement, the exercise reduced the potential for a short-term attack of bronchial obstruction. After 1 month of performing the exercise, most patients had a decrease in the frequency of rescue medication use. Furthermore, after the exercise, the patients showed recovery from parasympathetic nerve strain.

The recent increase in the number of allergic patients in Japan and other developed countries suggests that a change in health lifestyle may be related to this phenomenon.⁶ In Japan, air pollution is no longer as serious as in the past, but children's lifestyles have changed, with less exercise and a high-energy diet. It has been speculated that the predominance of parasympathetic nerves in asthmatic patients increases the onset of bronchial asthma.^{7–11}

In the present study, we assessed the balance of the autonomic nervous system in asthmatic patients by HRV analysis. Spectral analysis of HRV allows the identification of noninvasively perturbations of the autonomic system. The dysfunction of autonomic nervous system is suggested to contribute to the pathogenesis of airway diseases.^{13,14} If asthma attacks are associated with the predominance of parasympathetic nerves in the patients, we considered that gentle exercise might result in a good outcome. However, strenuous exercise may trigger asthma attacks. Many asthmatic patients with a predominance of the parasympathetic nerve activity dislike engaging in exercise. The Senobi stretch is an easy exercise that can be maintained by asthmatic patients without the concern for exercise-induced asthma attacks. Although this stretch was found to be effective in this study, we cannot exclude the possibility that these effects could have resulted from a placebo effect.²¹

In many countries, the number of allergic patients has been gradually increasing. However, it is difficult to attain a complete cure with treatment composed only of commonly used asthma medications. In considering the status of autonomic nervous system in asthmatic patients (eg, the dominance of parasympathetic nerves as estimated by HRV), a mild stimulus such as the Senobi stretch as well as other efforts toward a healthy lifestyle might be a useful treatment to approach a cure for the disease.

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