## 고혈압 환자의 운동처방

## **Exercise Prescription for Hypertensive Patients**

가			
1			
Byung Sung Kim, M.D.			
Department of Family Medicine			
Kyung Hee University College of Medicine & Hospital			
E - mail : byungskim@naver.com			

## **Abstracts**

nehavioral modification is an essential component for the management of hypertension, and exercise is an important element to reduce blood pressure. For hypertensive patients, endurance exercise makes systolic blood pressure higher than in normal persons without a change in diastolic blood pressure. Exercise can reduce blood pressure by decreasing the norepinephrine level, increasing vasorelaxing materials, and improving hyperinsulinemia. Before prescribing exercise for patients with hypertension, exercise stress test should be done for men over 40, women over 50, and those who have 2 or more risk factors of coronary artery diseases (male, diabetes mellitus, hyperlcholesterolemia, family history of coronary artery disease, and smoking). There are 4 components in exercise prescription: aerobic; frequency 3~7 times/ week, duration 20~60 minutes; and intensity 50~85% of VO<sub>2max</sub>. After 3 or 4 months of well - controlled blood pressure with regular exercise, the antihypertensive drugs can be tapered gradually.

Keywords : Hypertension; Exercise prescription;
Endurance exercise; VO<sub>2max</sub>
: : : : :

가

가

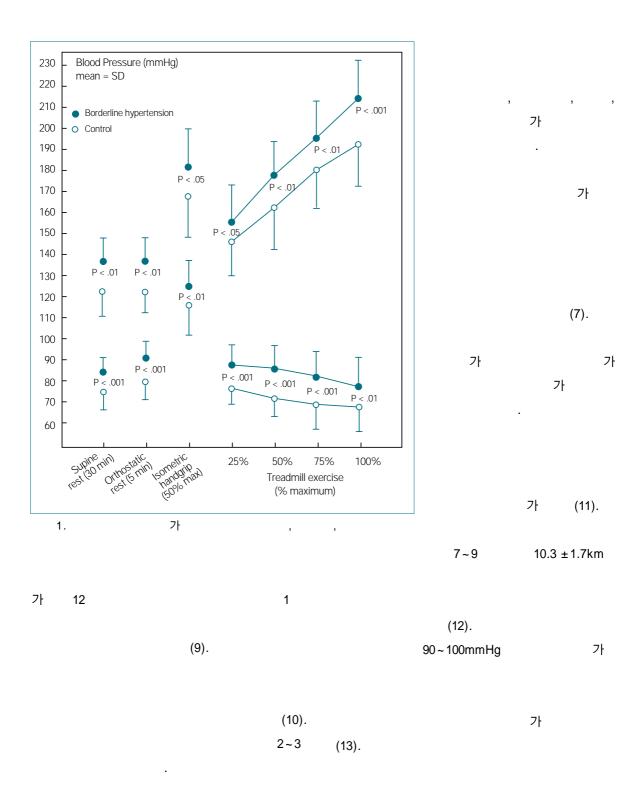
가

가 (1).

Special Issue •

1.		30 4	(3)	).
(	, ) ( )	1~3		10~20mmHg
~	~	,	가	(4).
0 ~	~ ~ 0 ~	,		(5). 가 가
	가 .			
가	(1).	11mmHg, (6).	8mi	mHg
			가	
	(aortic pulse wave velocity,	(7).		
PWV)가	가		85mmHg	
(carotid augmentation				, ,
,	가	,	,	2mmHg
	(2).	5 ~ 6mml	Hg .	2mmHg
		6%		
가			가 가	
	가 .			
( 1).		(8).		
				,

842



2. 가		. 260mmHg
• 2가		115mmHg .
•		
· 가		
		diltiazem, verapamil
• 40		<b>44</b>
• 50		dihydropyridine
		가 .
		71 .
71	•	
가	,	
(14).		가가
	가	
·		RPE(ratings of perceived exertion)
(atrial natriuretic factor)	가	
	(15).	
		. ACE 가
		. ACE
. 2		
		가
		180/110mmHg
		• • • • • • • • • • • • • • • • • • •
200mmHg	-	
115 mmHg가	가	· 가 , ,
115 mining/	<b>7</b> 1	γr , ,

3.

/

50~85% · VO<sub>2max</sub> 가 가 11~13 가 3~7 .4~6 가 30~60 700~2,000Cal 3 50~85% 가 (  $40 \sim 70\%$ ) 5 가 가 100 가 (220 -5 10 . @ 1 10~15 15 2 2~3 1. Parker FC, Croft JB, Cresanta JL, Freedman DS, Burke GL, Webber LS, Berenson GS. The association between cardiovascular response tasks and future blood pressure levels in child-12~16 가 ren: Bogalusa heart study. Am Heart J 1987; 113: 1174 - 9 2. Tanaka H, Safar ME. Influence of lifestyle modification on arte-2 rial stiffness and wave reflections. Am J Hyperten 2005; 18: 137 - 44 3. Gottdiener JS, Brown J, Zoltick J, Ross D. Left Ventricular Hypertrophy in Men with Normal Blood Pressure: Relation to Exaggerated Blood Pressure Response to Exercise. Ann Intern Med 1990; 112: 161 - 6

- Kaufman FL, Hughson OL, Schaman IP. Effect of exercise on recovery blood pressure in normotensive and hypertensive subjects. Med Sci Sports 1987; 19: 17 - 20
- Miller DD, Ruddy TD, Zusman RM, Okada RD, Strauss HW, Boucher CA, et al. Left ventricular ejection fraction response during exercise in asymptomatic systemic hypertension. Am J Cardiol 1987: 59: 409 - 13
- Hagberg JM, Seals DR. Exercise training and hypertension.
   Acta Med Scand 1986; 711(S): 131 6
- Hagberg JM. Exercise, fitness and hypertension. In Bouchard C, et al. eds. Exercise, fitness and health: A Consensus of Current Knowledge. Human Kinetics Books: Champaign, IL, 1990
- Cook NR, Cohen J, Hebert PR, Taylor JO, Hennekens CH.
   Implications of small reductions in diastolic blood pressure for primary prevention. Arch Intern Med 1995; 155: 701 - 9
- Himeno E, Nishino K, Okazaki T, Nanri H, Ikeda M. A weight reduction and weight maintenance program with long - lasting improvement in left ventricular mass and blood pressure. Am J Hyperten 1999; 12: 682 - 90
- 10. Kelemen MH, Effron MB, Valenti SA, Stewart KJ. Exercise

- training combined with antihypertensive drug therapy: Effects on lipids, blood pressure, and left ventricular mass. JAMA 1990; 263: 2766 71
- Winder WW, Hickson RC, Hagberg JM, Ehsani AA, McLane JA. Training - induced changes in hormonal and metabolic responses to submaximal exercise. J Appl Physiol 1979; 46: 766 - 71
- Overton JM, VanNess JM, Takata HJ. Effects of chronic exercise on blood pressure in Dahl salt sensitive rats. Am J Hyperten 1998; 11: 73 - 80
- 13. Duncan JJ, Farr JE, Upton SJ, Hagan RD, Oglesby ME, Blair SN. The effects of aerobic exercise on plasma catecholamines and blood pressure in patients with mild essential hypertension. JAMA 1985: 254: 2609 13
- 14. Ferrannini E, Buzzigoli G, Bonadonna R, Giorico MA, Oleggini M, Bevilacqua S, et al. Insulin resistance in essential hypertension. N Engl J Med 1987; 317: 350 7
- 15. Mannix ET, Palange P, Aronoff GR, Manfredi F, Farber MO. Atrial natriuretic peptide and the renin - aldosterone axis during exercise in man. Med Sci Sports Exerc 1990; 22: 785 - 9

