

# 심장재활

홍 경 표 · 추 진 아

## Cardiac Rehabilitation

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### 서 론

가  
가

### 2. 운동요법의 효과

가

Redwood <sup>4)</sup> Hartung <sup>5)</sup>  
(VO<sub>2</sub>max) 10~

30% 가  
(Fig. 1). <sup>6)</sup>

8

가 (18.3% - 0.8%,  
p<0.01)(Table 1). 가 ,

가 가 ,

7).

(rate pressure product : RPP)

### 본 론

#### 1. 심장재활팀의 구성

, ( ), ,  
, , , , ,  
, 가, ,

(Table 2)(Fig. 2). ,

inen<sup>9)</sup>

가 . Hamala -

### 3. 운동요법의 적응증 및 금기증

10

(Fig. 3).

10-12),  
13),

HDL -

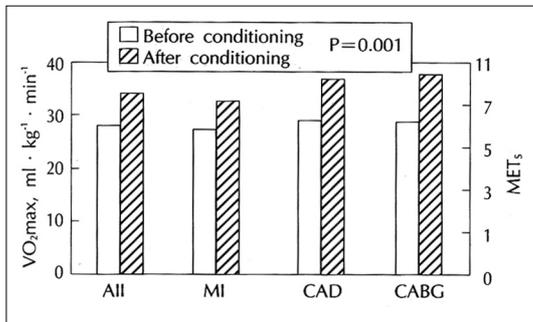
, LDL -

14)(Table 3).

(heart rate variability)

### 4. 운동요법의 위험도 평가

가 가



(Table 4).

가

(Table 5),

(Table 6).

(1~3 )

가

Fig. 1. 심근경색증, 관동맥우회로술, 관상동맥조영술로 관상동맥질환이 확인된 환자에서 운동요법으로 최대 산소섭취량(VO2max)이 의미있게 향상하였다<sup>5)</sup>.

8METs

2 가

Table 1. 심근경색증 환자에서 재활요법 전후 최대부하시 변수의 변화

					p
(ml/kg/min)	29.6 ± 6.1	35.2 ± 8.4	31.8 ± 7.9	31.4 ± 7.7	p = 0.0062
(L/min)	1.3 ± 0.5	1.5 ± 0.6	1.3 ± 0.5	1.2 ± 0.4	p = 0.0274
(ml/bpm)	15.3 ± 3.6	17.0 ± 4.3	14.8 ± 3.4	16.1 ± 3.3	p = 0.5403, NS
( )	825.0 ± 98.6	964.6 ± 176.1	875.7 ± 116.8	860.2 ± 133.4	p = 0.002
(maximal oxygen uptake, VO <sub>2</sub> max = cardiac output × arteriovenous oxygen difference)					
(metabolic equivalent, MET ; 1MET = 3.5ml/kg/min)					
(anaerobic threshold)					
(maximal O <sub>2</sub> pulse = VO <sub>2</sub> /heart rate)					

Table 2. 심근경색증 환자에서 재활요법 전후 최대하부하시 변수의 변화<sup>6)</sup>

					p
(mmHg · bpm)	160.8 ± 32.5	132.8 ± 27.0	145.2 ± 45.4	136.4 ± 35.2	p = 0.0305
(L/min)	33.9 ± 10.0	28.4 ± 6.7	31.2 ± 5.0	31.5 ± 4.7	p = 0.037
( )	12.1 ± 1.2	9.6 ± 1.5	11.9 ± 1.1	12.5 ± 1.6	p = 0.0007
(rate-pressure product, RPP = heart rate × systolic blood pressure/100)					
(minute ventilation, VE)					
(rate of perceived exertion ; 6 - 20 scale)					

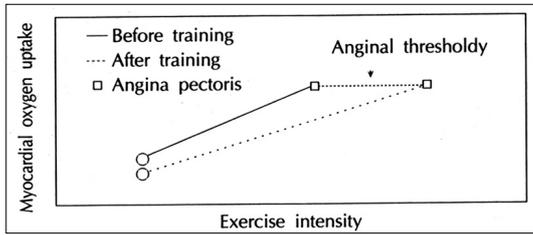


Fig. 2. 노력성 협심증에서 운동요법의 효과<sup>8)</sup>.

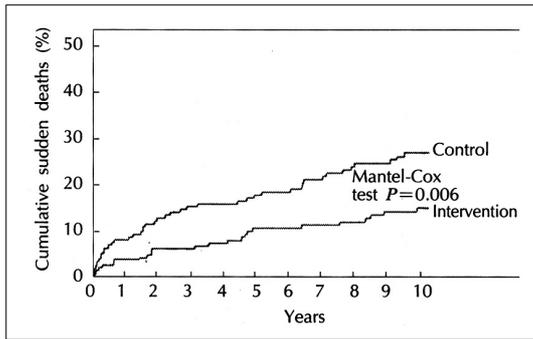


Fig. 3. 심장재활군과 대조군을 10년간 추적 관찰하였을 때 심장 돌연사의 빈도.

Table 3. 관상동맥질환에서 운동요법의 절대적 금기증

> 200/110mmHg	( > 20mmHg)
(> 120 / )	( < 40%)
(> 38 )	3
< 0.75cm <sup>2</sup> )	( > 50mmHg, (< 4METs) , 가 120 /
( > 400mg%)	ST > 2mm / 가

Table 4. 운동요법을 시행하기 전에 진찰 및 운동부하검사가 필요한 경우

	( > 40 , > 50 )		( E 2)	
			( - )	( + )
(40% < VO <sub>2</sub> max < 60%)	-	-	-	+
(VO <sub>2</sub> max > 60%)	+	+	+	+

가 . 가가 가

(Table 7).

1 : 80000 - 160000人.

5. 운동처방

1) 운동처방의 원리

, 1)  
가 (heart rate :  
HR) 20 /  
, 2) 5~10  
, 3) (rate of perceived  
exertion : RPE) , 4)  
40~60%  
가 5  
/週

Table 5. 운동중 심장사의 위험이 높은 환자



**Table 8. 운동요법의 각 단계**

Length of stay	Setting	Phase	GXT
5 - 14days	CCU/ward	(inpatient)	Low intensity
1 - 3mons	Hospital/clinic	(outpatient)	SL maximum
6 - 12mons	Local community center	(supervised, medical)	SL maximum
Indefinitely	Local community center/home	(unsupervised, maintenance)	SL maximum

CCU = cardiac care unit, GXT = graded exercise test, SL = symptom limited

20/ ) , 3 - 5 . 40%, 2METs,  
 1~2 1 RPE 8~9 5~10 , ,  
 20 , 3~4 / , 가 weight ,  
 가 2 / . 가 가  
 가 가 2 5METs

2) 2단계(Phase II)  
 1 , , ,  
 2~3 6~12 , , ,  
 , ,  
 7~15 . 2  
 40~50% , HRrest( ) + 10~12 3  
 / 20 / (Phase III)/가 가  
 . (stretch)

3) 3단계(Phase III)  
 50~70%, HRrest( 2 3~6 ,  
 ) + 20~30 / ( 10~12 가 90 / , 가 4METs  
 / ), RPE 11~15 15~20 / , 5METs 가  
 2~3 가 . 30~45 , 8METs  
 , treadmill, , 50~85%가 , 8METs  
 airdyne, weight . 5METs , , weight, ,  
 1) 40~60% , , weight, .  
 , 2~3METs 5~10 3 , ,  
 20~30 가 , 2) , 1) 8METs , 2)  
 3~5METs, HRrest + 10~20 / , RPE 11~13 ,  
 , 3) 5METs , 3)  
 , ST 1mm , 4)  
 5METs 1) 10~15 , 5) 가  
 30~60 가 , 2) , 6)  
 0.5MET/ 가 , 3) 가 ,

RPE

7. 각 심장질환에 따른 고찰

1) 노인

가 , , , ,  
가 가  
HRmax HR  
reserve 50~70%

5) 판막치환술

4~6

가 , 가

, airdyne 4

6) 심부전증

가 가

2) 인공심박동기/자동 제세동기

60~70%  
METs  
RPE, 가  
12 /  
60~80%

. 1) 3METs

20% , 2)

가 30 , 3)

1/2 , 4)

가 120 / , 5) 1.8L/min/m<sup>2</sup> ,

, 6) 12mmHg

Table 9

3) 협심증

가 4METs 가  
70~85% 가

4) 관동맥우회로술

가 4~6

Table 9. 심부전증에서 운동요법을 중단하거나 조정하여야 할 경우

---

	> 40 /
P2	가
	< 10mmHg
	가 10 /
	10mmHg
	가
	10mmHg
	가
	6mmHg

---

가  
1~2  
가 , 2~6  
가  
1~2  
가  
3~5  
30~60  
가  
40~60% , RPE 12~14  
가 . 5METs  
40~50%, RPE 11~12가 , 5METs  
50~70%, RPE 12~14  
가  
가<sup>15)</sup>  
가  
10 /  
 treadmill  
가  
가  
가<sup>16)</sup>

7) 심장이식

가  
가  
가  
가  
RPE  
60~70%, RPE 12~14  
가

8) 당뇨병

가  
1~2  
가  
가  
가  
가  
20  
가  
15~

8. 정서사회적인 중재

10~20% , 5~10%  
25%  
50%  
가

결 론

가가

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