Exercise and Hypertension

Blood pressure classification for adults aged ≥ 18

BP category	SBP (mmHg)		DBP (mmHg)
Optimal	< 120	and	< 80
Normal	120 – 129	and	80 - 84
High normal	130 – 139	or	85 - 89
Stage 1 hypertension	140 – 159	or	90 - 95
Stage 2 hypertension	160 – 179	or	100 – 109
Stage 3 hypertension	≥ 180	or	≥ 110

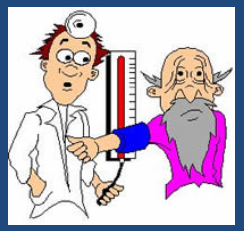
Risk stratification and treatment

Blood pressure stages (mmHg)	Group A(No RF, No TOD/CCD)	Group B(at least 1 RF, No DM, No TOD/CCD)	Group C (DM, TOD and/or CCD,± RF)
High normal (130-139/85-89)	Life style modification	Life style modification	Drug therapy
Stage 1 (140-159/90-99)	Life style modification (up to 12 months)	Life style modification (up to 6 months)	Drug therapy
Stage 2&3 (≥160/≥100)	Drug therapy	Drug therapy	Drug therapy

Lifestyle interventions

- Keep low dietary sodium intake
- ↓ excessive consumption of alcohol, coffee other caffeine-rich products
- Stop smoking
- Regular exercise

Exercise and blood pressure benefits



- **Dynamic aerobic training reduces resting BP in individuals with normal BP and in those with HT (A)**
- **↓ BP ≈ 5-7 mmHg after** isolated exercise (acute) or following exercise training (chronic)
- ↓ ambulatory BP, and BP at fixed submaximal work load (B)
- Decrease in BP appears **in HT > normal BP** subjects, response differences among indiviuals (B)
- Acute endurance effect (post exercise hypotension) **persist for up to 22 hr**

Resistance exercise

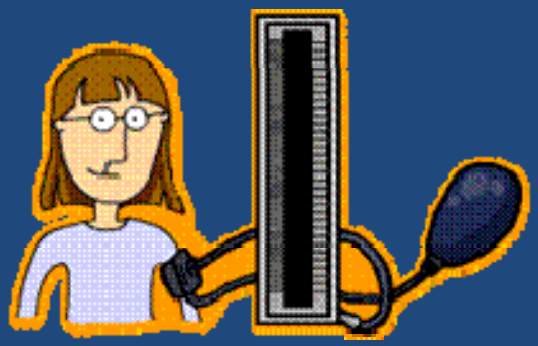
- Chronic **concentric and eccentric** effect

“ resistance training performed according to ACSM guidelines reduces BP in normotensive and hypertensive adults ” (B)

Exercise → primary prevention, treatment and control HT

Potential mechanism for reduction BP after exercise

- Neurohormonal, vascular, structural adaptation
- ↓ **TPR**, ↓ catecholamines, improve insulin sensitivity



Exercise recommendation

Evaluation

- History taking
- Physical examination
- Screening test

- Major risk factors
- Target organ damage
- CVD complications

Need exercise test

- Engage in hard or very hard exercise
- Stage 3 HT (Group C), no CVD : moderate intensity (40%-60% VO_2R)

No need for exercise test

- Stage 1 or 2, Group A or B : light to moderate exercise (< 60% VO_2R)
- Stage 3 (Group C) : light or very light intensity

  (< 40% VO_2R)

Exercise prescription

- **Type :** primarily **aerobic** activity supplemented by resistance exercise
- **Intensity :** **moderate** intensity (40%-60% VO_2R)
- **Duration :** 30 minutes or more continuous or intermittent exercise per day (minimum of 10 minutes intermittent bouts), **total 30-60 minutes**
- **Frequency** : on most, preferable all, days of the week

Safety and special considerations

- Strenuous physical activity(abrupt ↑ HR & BP) can trigger acute MI : latent or known case of heart disease, **sedentary**
- **Medication :**
- β blocker : abnormal HR response → **use RPE**
- Diuretics : abnormal regulation of temperature → dehydration, heat illness

} **hypoglycemia**

- Antihypertensive medication + PEH : hypotension → extend cool down
- Normal BP response : 8-12 mmHg / 1 METs, during exercise keep **BP ≤ 220/105 mmHg**
- HT with exercise test : intensity training set safety below ischemic ECG, angina threshold **≥ 10 bpm**