

## Engaging in Physical Activity at Home with a Focus on Promoting General Health

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### Abstract

The importance of physical activity in enhancing overall health at any age is well documented. Some conditions, such as avoiding going to the gym or facing urgent circumstances (e.g. the coronavirus pandemic), can lead to a more sedentary lifestyle and increase the risk of chronic diseases. Home-based training is an effective way to stay active at home. This review aims to offer various methods for alternative and practical home-based activity programs to enhance fitness levels. This is especially important when preventive measures, such as quarantine, are necessary to ensure isolation and minimize interpersonal contact. **During quarantine, it's iessentialfor adults, especially those with chronic diseases, to exercise regularly.T he method was library-based; new books and articles on physical activity at home were reviewed, and the scientific basis for performing physical activity at home was provided. Various physical activities using the devices at home and exercises without using the devices were examined. Practical suggestions for staying active at home, along with aerobic exercise, including walking, running on a treadmill, proper use of stationary bikes, and body weight resistance exercises, were provided. In Conclusion, this guidance provides valuable information on home-based physical activities for sedentary individuals to improve their health.**

**Keywords:** Endurance training; Resistance training; Home-based physical activity; Public Health

### Introduction



The positive impact of physical activity (PA) on overall health is well-documented regardless of age (1). Additionally, PA acts as a protective factor in managing and preventing noncommunicable diseases such as sarcopenia, type 2 diabetes, fractures, osteoarticular disorders, and lung disease (2). Despite its benefits, insufficient PA has been linked to 1.5–3% of direct healthcare costs (3). Inadequate PA is the fourth leading risk factor for global mortality, according to the World Health Organization (WHO). To promote PA in the general population, especially among healthy older individuals or those with certain chronic diseases, WHO has released new 2020 guidelines on PA and sedentary behavior (2). These guidelines recommend 150–300 minutes of moderate-intensity aerobic PA per week or 75–150 minutes of vigorous-intensity aerobic PA per week, combined with strength and balance exercises of moderate intensity or higher at least three days a week for elderly individuals.

It's important to note that just 10–15 minutes of light activity, like walking or stretching, can help relax muscles and improve blood circulation (4). Regular physical activity not only benefits our daily lives but also provides an opportunity to connect with family and promotes mental well-being, reducing the risk of depression, cognitive decline, and the onset of dementia while also improving overall mood (6, 5). Studies have demonstrated the specific advantages of physical activity, including improvements in physical and physiological health parameters and positive effects on mental health and well-being (8, 7).

Therefore, implementing a tailored physical activity program to be carried out at home when you cannot go to the gym and prefer to stay at home to do exercises can effectively reduce the adverse physiological and psychological effects of inactivity. This article focuses on practical programs and recommendations for physical activity at home for sedentary individuals throughout life, drawing on the guidelines of the American College of Sports Medicine (ACSM).

### Perceived exertion scales scale or Borg scale

The Borg scale, known as the perceived exertion scale (RPE), monitors exercise intensity during aerobic endurance workouts. The RPE can be influenced by age, sex, previous training, and fitness level. External environmental factors like ambient temperature, listening to music, watching television, altitude, nutrition, and external feedback can also affect the relationship between exercise intensity and RPE. Despite these potential influences, the RPE remains a valid monitoring tool (9).

Table 1. Perceived exertion scales scale or Borg scale

Rating	Perceived Exertion Level
0	No exertion at rest
1	Very light
3-Feb	Light
5-Apr	Moderate, somewhat hard
7-Jun	High, vigorous
9-Aug	Very hard
10	Maximum effort, highest possible

### Heart rate as a variable to control training intensity

Heart rate is the most common method to control the intensity of aerobic activity. The reason is the close relationship between heart rate and oxygen consumption, especially when its intensity is between 50 and 90% of functional capacity ( $VO_{2max}$ ). Heart rate reserve (HRR) ( $= HR_{max} - HR_{rest}$ ) is the difference between a person's maximum heart rate ( $HR_{max}$ ) ( $age - 220$ ) and resting heart rate ( $HR_{rest}$ ) (10). The most accurate way to adjust the intensity of aerobic activity using this method is to determine the specific heart rate along with the optimal percentage of  $VO_{2max}$  or the heart rate related to the lactate threshold. Laboratory conditions and specialized tools are necessary to estimate and identify intensities with the highest accuracy. If these facilities are unavailable, predicting the maximum heart rate using the person's age ( $age - 220$ ) can be used to determine exercise intensity. The relationship between  $VO_{2max}$ , HRR, and  $HR_{max}$  is shown in Table 2 (11). Also, the characteristics of the intensity of the aerobic training program at home for different target groups are presented in Table 3.

Table2. Relationship between percentages of  $VO_{2max}$ , HRR, and  $HR_{max}$



percentage of functional capacity VO2max%	Percentage of heart rate save HRR%	Percentage of maximum heart rate (Hrmax%)
50	50	66
55	55	70
60	60	74
64	65	77
70	70	81
75	75	85
80	80	88
85	85	92
90	90	90
95	95	98
100	100	100

Table 3. Characteristics of the intensity of aerobic exercise program at home for different target groups

High	Moderate	Low	Intensity	People
<b>50-70% of maximum heart rate</b>	<b>50-75% of maximum heart rate</b>	<b>50-70% of maximum heart rate</b>	<b>Percentage of maximum heart rate (% of HRmax)</b>	<b>Elder</b>
<b>1-3 on a scale of 0-10</b>	<b>1-3 on a scale of 0-10</b>	<b>1-3 on a scale of 0-10</b>	<b>Rate of Perceived Exertion RPE(0-10)</b>	
<b>70-90% of maximum heart rate</b>	<b>70-85% of maximum heart rate</b>	<b>65-80% of maximum heart rate</b>	<b>Percentage of maximum heart rate (% of HRmax)</b>	<b>Untrained</b>
<b>3-5 on a scale of 0-10</b>	<b>3-5 on a scale of 0-10</b>	<b>2-4 on a scale of 0-10</b>	<b>Rate of Perceived Exertion RPE(0-10)</b>	
<b>85-100% of maximum heart rate</b>	<b>80-95% of maximum heart rate</b>	<b>70-90% of maximum heart rate</b>	<b>Percentage of maximum heart rate (% of HRmax)</b>	<b>Trained</b>
<b>5-10 on a scale of 0-10</b>	<b>4-8 on a scale of 0-10</b>	<b>3-7 on a scale of 0-10</b>	<b>Rate of Perceived Exertion RPE(0-10)</b>	
<b>hefty workload, Deep and rapid breathing Only a few words can be said without pausing.</b>	<b>heavy workload, fast breathing Talking is possible, but singing is not possible.</b>	<b>easy workload, Breathing is easy and comfortable.</b>		<b>Description</b>

### Aerobic endurance training models

The following section provides primary technical considerations and general guidelines for standard cardiorespiratory exercise devices. This exercise guide is adapted from the book Essential Recipes in Strength and Conditioning (2015), published by the National Strength and Conditioning Association (NSCA) (12). Following are instructions for using a treadmill, stationary bike, rowing machine, stair machine, elliptical, walking, and running (Figure 1-6).

### Treadmill

#### starting position

- Begin by attaching a safety clip to clothing that does not interfere with upper or lower limb function.
- Put the belt between the two legs by placing the feet on the right and left surfaces.
- Read the instructions on the treadmill console to know how to adjust the speed and incline of your particular treadmill.
- Turn on the machine and adjust the belt speed to the desired heating speed.

#### **Movement stage**

- While holding the handle, allow one leg to swing freely, striking the treadmill with the outside of the midfoot using a sawing action.
- When you are comfortable with the speed of the belt, start walking/running on the treadmill.
- Run/walk and move to the front of the machine while still in the center of the treadmill deck.
- Take the hands off the handles and adjust the speed and incline until the desired level of exercise is achieved.
- Avoid holding the console or handles while walking or running.

#### **End the position**

- Slow down the treadmill's speed and cool down for 3 to 5 minutes to prevent blood pooling and improve venous return.
- Place the steps on the surfaces on both sides of the belt and turn off the device (12).



Figure 1. Proper position on the treadmill

### **Cycling**

#### **Starting Position:**

- Begin by adjusting the chair's height so that the knee of the leg on the outside of the bike is slightly bent (25-30 degrees).
  - Keep the foot flat and parallel to the soles of the feet on the pedal.
- Adjust the seat so that the knee on the outside leg is positioned slightly in front of the center of the pedal, and make sure the pelvis does not move forward and backward but moves along with the pedal.
- While maintaining a natural spine position, lean forward slightly from the pelvis.
  - Adjust the handlebars so that the arms form an angle, with slightly bent elbows. Ideally, the angle between the arm and hip should be about 90 degrees.

#### **Movement Stage:**

- When pedaling, keep the soles of the feet in contact with the pedals.
- Maintain a neutral posture and prevent shoulder movement.
- Different hand positions may be used by using the handlebars:
  - Keep a slight bend in the arms, palms down, and a more upright position.
  - Place the palms facing the sides of the handlebars, with a slightly forward bend.
  - Use a racing position, with forearms resting on the handlebars, creating maximum forward lean.

### End Position:

- Slow down until the pedal comes to a complete stop, and then step off the bike (12).

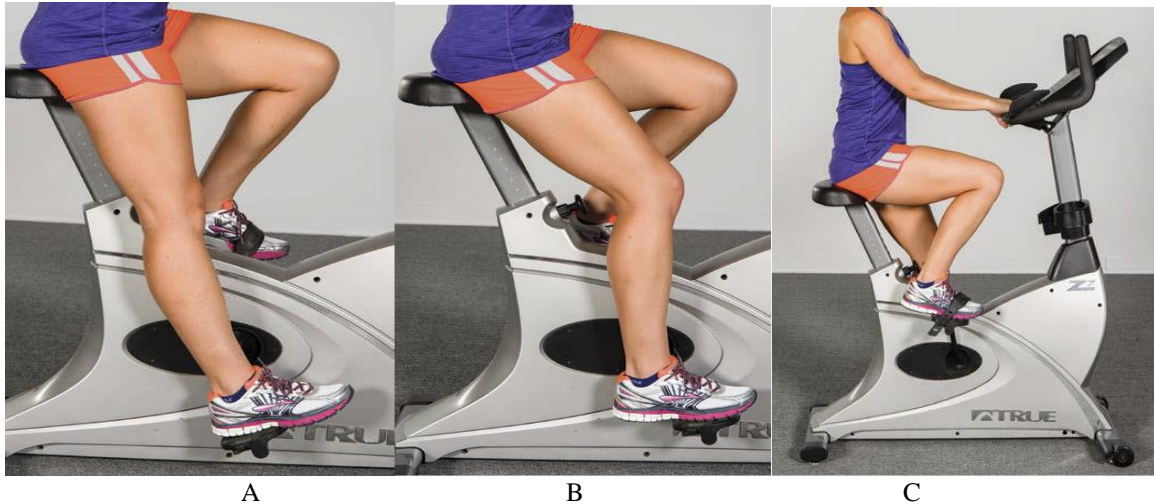


Figure 2. Proper seat height adjustment: (a) right leg with knee locked and heel on the pedal; (b) slightly bent knee with a toe on the pedal; (c) Pedal at noon position, knee parallel to hip and ground.

### Stair climbing device

#### starting position

- Hold the handles while moving the pedals forward.
- Put the whole foot in contact with each pedal.

#### Movement stage

- Start walking. Use the handles to hold on.
- Take deep steps (10 to 20 cm) while standing.
- Do not let the steps touch the floor or the top of the device.
- Continue gently holding the handles as you step forward, maintaining a straight posture with shoulders straight and relaxed, hips higher than hips, and knees in line with feet and toes. They move forward.
- While looking straight ahead, hold the handles lightly and maintain a standing position with relaxed shoulders, torso, knees, and legs in line and toes pointed forward. Keep.

#### End the position

- Hold the handles while pulling the pedals back (12).





Figure 3. Proper position in the stair-climbing device

### Elliptical machine:

#### Starting Position:

- Place one foot on each pedal of the elliptical machine.
- Stand straight, facing forward, and hold the handles with your right and left hands. Keep your head up, shoulders still, and arms balanced on your hips.

#### Movement Stage:

- Move the pedals forward by alternating the movement of your arms and legs.
- Keep your feet in complete contact with the pedals throughout the exercise unless the machine's design causes your heels to lift.
- Avoid letting your knees extend past the back of your toes when bent.
- Use the handles for balance. If you don't need to hold them, you can pump your arms as you would when walking or running.
- Adjust the incline of the elliptical to simulate running or walking motions more accurately.
- Moving forward emphasizes the quadriceps while moving backward increases stress on the hamstrings and glutes.

#### Ending Position:

- Gradually reduce the speed until the machine comes to a complete stop, then turn off the pedals (12).



Figure 4. Proper positioning on the elliptical machine

#### **Walking:**

##### **Walking technique:**

##### **Body Position:**

- Keep your head straight with your eyes looking forward.
- Keep your shoulders still and avoid slouching.
- Align your upper torso directly over your hips, with your ears, shoulders, and thighs in a straight line.

##### **Toe Contact with the Ground:**

- Initially, your heel should contact the ground and then smooth the weight to the toes.
- The weight should shift from the outside of the heel to the front and slightly to the inside and middle of the toe.

##### **Stepping:**

- Without rotating the pelvis (unless race walking), allow the pelvis to move freely to increase stride length.
- Engage your buttocks and gluteal muscles by raising your knees.

##### **Arm Movement:**

- Your arms should swing forward and backward in coordination with the opposite leg.
- Keep your shoulders relaxed to allow your arms to swing freely.
- At faster walking speeds, your arms should be bent at the elbows at 90 degrees, with movements originating from the shoulders.
- The hands should move back and forth without crossing the body's midline, creating a forward driving force.
- Keep your hands relaxed and claw-like, swinging forward towards the chest in line with the nipple line while the hip joint on the same side swings backward (12).

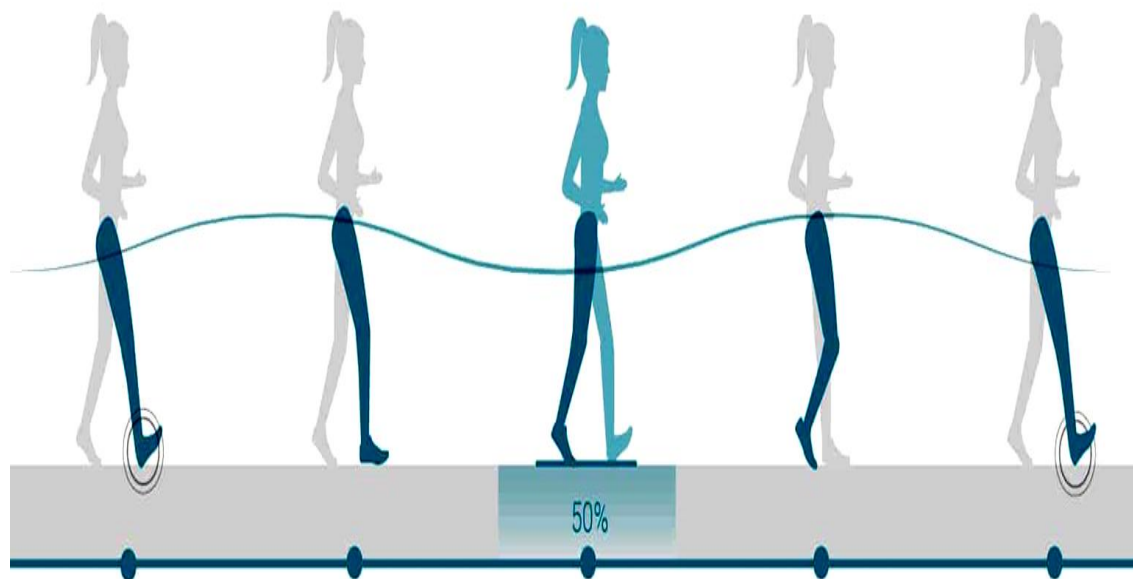


Figure 5. Correct position and shape of hands and feet while walking

## Running

### body position

- Keep the head straight with the eyes and move forward.
- Keep the shoulders still and do not allow them to bend.
- Place the upper torso directly over the hips while straightening the ears, shoulders, and thighs.

### Toe contact with the ground

- The heel should first strike the ground, followed by a gentle "rolling" action of the heel to the ball, allowing the weight to spread over the foot.
- Weight should be transferred from the outside of the heel and still moving forward and slightly inward through the middle of the ball of the foot at a push.

### Stepping:

- Without rolling the hips (unless race walking), allow the hips to move freely to increase stride length.
- Raise the knees and engage the hip and hip muscles in this movement.
- With each running step, the foot should be almost under the hips to avoid braking and spending too much time in the air.

### arm operation

- The arms should move forward and backward in conjunction with the lower body (e.g., when the left arm moves forward, the right leg is forward, and vice versa).
- Shoulders should be relaxed, allowing the arms to swing freely.
- Compared to walking, most arm movement comes from the lower arm, as excessive shoulder movement dissipates energy.
- The forearm movement should be done between the waist and the chest.
- Arms and hands should move back and forth, not crossing the body's midline, to generate forward thrust (12).



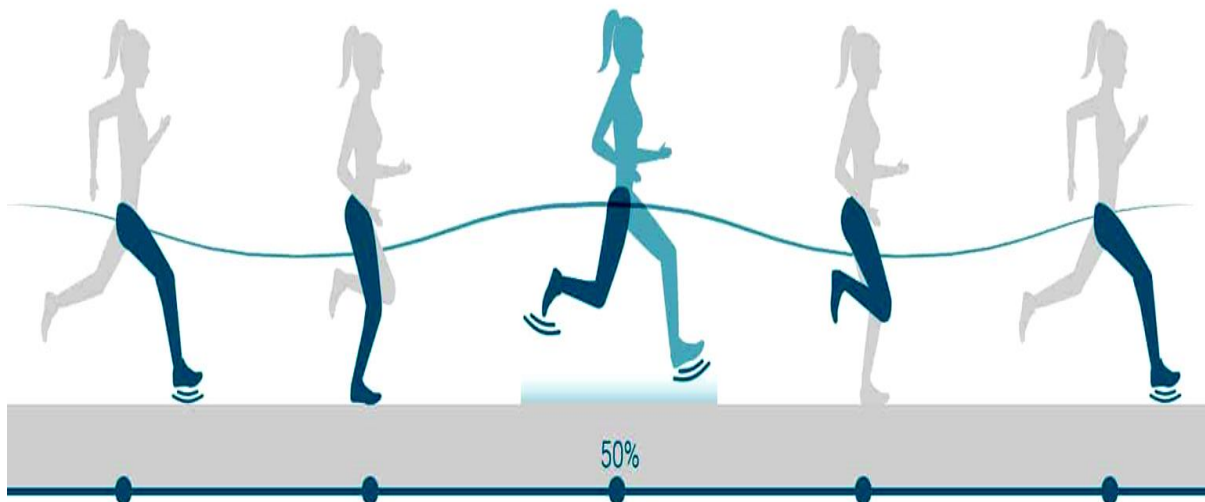


Figure 6. Correct position and shape of hands and feet while running

Table 4. Characteristics of the intensity of the resistance training program with body weight at home for different target groups

Benefits	Repetitions	Sets	The status of people	Exercise
<b>Warm-up:</b> High knee with the opposite hand and foot - squatting and jamming the leg from the back - bringing the thigh and leg straight up - jumping the rope (total movements 5 to 10 minutes)				
Enhancing the strength and performance of the lower body muscle	10 Repetitions	1-2 Sets	Untrained	Body weight squat
	20 Repetitions	2-3 Sets	Trained	
Improving the strength and performance of the upper body muscle	10 Repetitions	1-2 Sets	Untrained	push-ups
	20 Repetitions	2-3 Sets	Trained	
Improving the hamstring muscle strength and increasing running speed	5 Repetitions	1-2 Sets	Untrained	Lunge
	10 Repetitions	2-3 Sets	Trained	
Improving the strength and performance of central and trunk muscles	10 Seconds	1-2 Sets	Untrained	Alternative leg raises
	20 Seconds	2-4 Sets	Trained	
Improving the strength and endurance of core and gluteus muscles	10 Seconds	1-2 Sets	Untrained	Side plank
	20 Seconds	2-4 Sets	Trained	
Improving the strength and endurance of abdominal muscles	15 Repetitions	1-2 Sets	Untrained	Crunch
	20 Repetitions	2-4 Sets	Trained	
<b>Cool down:</b> Static stretching exercises in most large muscles (total movements 5 to 10 minutes)				

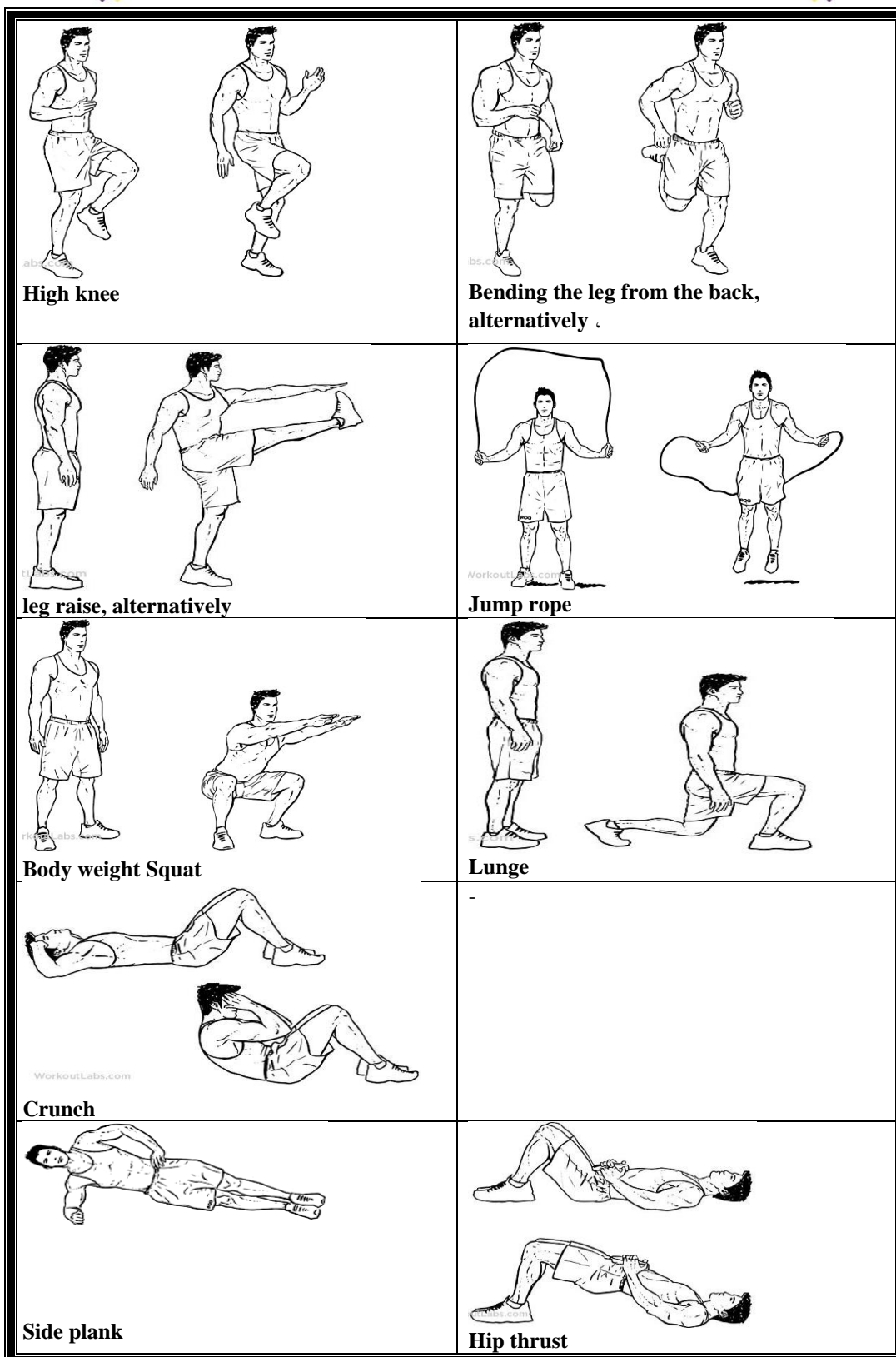


Figure 7. Correct position and form of resistance exercises with body weight

**Conclusion:**

One way to improve public health is to replace outdoor activities with home activities if it is not possible for you to do outdoor activities, such as resistance training using body weight and aerobic exercises. Aerobic exercises can be performed using a treadmill and stationary bike with basic protocols if possible. The importance of maintaining a healthy diet cannot be underestimated. Keeping up regular physical activity and daily exercise in the safe environment of your home is an essential strategy for healthy living. Home activities allow people to stay healthy by doing simple exercises at home. Additionally, it is necessary to note that due to the wide range and number of sources, the study tried to use reliable and up-to-date sources in sports sciences to minimize limitations.

#### Reference:

1. Garber CE, Blissmer B, Deschenes MR, Franklin BA, Lamonte MJ, Lee IM, et al. American College of Sports Medicine position stand. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med Sci Sports Exerc.* 2011;43(7):1334-59.
2. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G, et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *Br J Sports Med.* 2020;54(24):1451-62.
3. Oldridge NB. Economic burden of physical inactivity: healthcare costs associated with cardiovascular disease. *Eur J Cardiovasc Prev Rehabil.* 2008;15(2):130-9.
4. Ku PW, Hamer M, Liao Y, Hsueh MC, Chen LJ. Device-measured light-intensity physical activity and mortality: A meta-analysis. *Scandinavian journal of medicine & science in sports.* 2020;30(1):13-24.
5. Czosnek L, Lederman O, Cormie P, Zopf E, Stubbs B, Rosenbaum S. Health benefits, safety and cost of physical activity interventions for mental health conditions: a meta-review to inform translation efforts. *Mental Health and Physical Activity.* 2019;16:140-51.
6. saremi a, parastesh m. THE EFFECT OF WEIGHT-LOSS PROGRAM ON LUNG FUNCTION AND SYSTEMIC INFLAMMATION IN OBESE MEN. 2010.
7. Jeong T-W, Lee J-W, Kim O-J, Choi J-I, Kim H-W, Choi Y-D. The Effects of Intensity of Physical Activity on Mental Health. *Journal of Medical Imaging and Health Informatics.* 2020;10(6):1413-7.
8. Haible S, Volk C, Demetriou Y, Höner O, Thiel A, Sudeck G. Physical Activity-Related Health Competence, Physical Activity, and Physical Fitness: Analysis of Control Competence for the Self-Directed Exercise of Adolescents.

International Journal of Environmental Research and Public Health.  
2020;17(1):39.

9. Zinoubi B, Zbidi S, Vandewalle H, Chamari K, Driss T. Relationships between rating of perceived exertion, heart rate and blood lactate during continuous and alternated-intensity cycling exercises. *Biology of sport*. 2018;35(1):29.

10. Mirza KK, Cuomo K, Jung MH, Russell SD, Gustafsson F. Effect of heart rate reserve on exercise capacity in patients treated with a continuous left ventricular assist device. *Asaio Journal*. 2020;66(2):160-5.

11. Medicine ACoS. ACSM's guidelines for exercise testing and prescription: Lippincott Williams & Wilkins; 2013.

12. Haff GG, Triplett NT. Essentials of strength training and conditioning 4th edition: Human kinetics; 2015.

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- Conclusions
- Acknowledgments
- Nomenclature (Not-necessary for two-page summary paper)
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- Appendices

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Use single spacing with no space between the section headings and the paragraph following it. Put one space between the texts of main sections.

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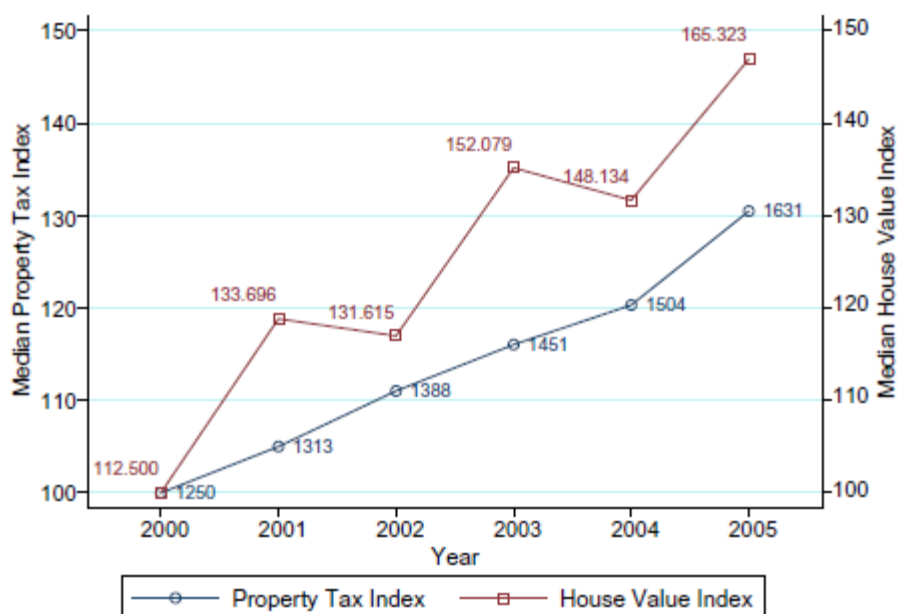
Leave one space between the Table/Figure and the text following it.





**Table 1-major cities on the 21 routes to london**

Route number	City 1	City 2	City 3	City 4	City 5	City 6
1	Halifax	Sheffield	Nottingham	Bedford		
2	Plymouth	Exeter	Salisbury			
3	Tiverton	Taunton	Frome			
4	Bristol	Bath	Reading			
5	Southampton	Winchester				
6	Portsmouth	Chichester				
7	Canterbury	Rochester				
8	Yarmouth	Ipswich	Colchester			
9	Norwich	Bury				
10	King's Lynn	Ely	Cambridge			
11	Berwick	Newcastle	South Shields	Sunderland	Durham	
12	Bradford	Leeds				
13	Whitby	Scarborough	York			
14	Manchester	Derby	Northampton	Leicester		
15	Hereford	Gloucester	Circenster			
16	Beverley	Hull	Lincoln	Boston		
17	Whitehaven	Liverpool	Macclesfield	Lancaster	Carlisle	Kendal
18	Shrewsbury	Birmingham	Wolverhampton	Coventry	Dudley	
19	Worcester	Oxford				
20	Kidderminster	Warwick	Banbury			
21	Chester	Lichfield	Coventry			



**Figure (1) median property taxes and house value in the united states, 2000-2005**

### Results Discussion

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- [3] Billings, Stephen, 2009. Do enterprise zones work? An analysis at the borders. *Public Finance Review* 37 (1), 68–93.