frontiers FOR YOUNG MINDS

HUMAN HEALTH
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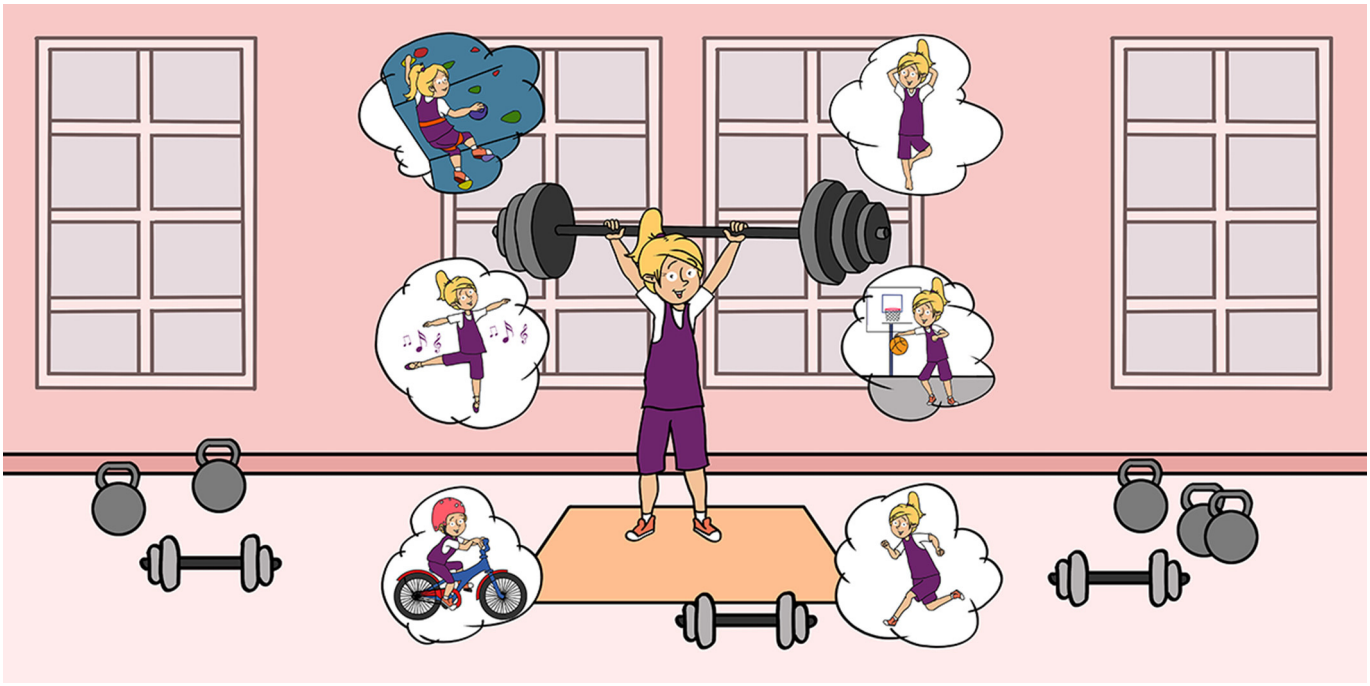

# PUMP IT UP!—STRONG MUSCLES CAN MAKE YOU HEALTHIER

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YOUNG REVIEWER:

LILY

AGE: 13

We imagine that you want to be healthy; nobody likes to be ill because that often prevents us from doing the things we like to do. However, we often do not do everything in our power to keep ourselves healthy because modern life is designed to be comfortable. Consequently, we are moving and exercising less than ever, and even young people are suffering the effects of physical inactivity. In this article, we will explain why it is essential for you to move your body, to do so correctly, and to be physically active throughout your life. We will also dispel some myths about children and adolescents lifting weights. There are many things you can do in your daily life to be more physically active!

## MODERN LIFE AND PHYSICAL INACTIVITY

Did you know that over 80% of adolescents worldwide are not active enough [1]? For example, the average 12- to 19-year-old American teenager sits for more than 8 h a day. This means some kids hardly move during a third of the day! This lack of physical activity can lead to many health problems, including obesity and diabetes. Being **sedentary** also can reduce the chances that you will discover the full potential of your body. Physical abilities like jumping, throwing, pulling, climbing, and crawling are necessary for playing sports, engaging in outdoor activities, and expressing yourself through movement. In children and adolescents, these physical abilities are declining because young people often do not play outside and exercise as much as they should. Think about it: our ancestors had to be physically active to hunt and eat. Yet today we spend too much time sitting in front of screens or commuting in cars, buses, and trains instead of playing outside or walking to our destinations. Many free-time activities have become more sedentary. For example, you may enjoy entertainment such as video games or social media. The problem is that these activities do not require much physical movement at all.

**SEDENTARY**

A person that spends much time sitting or does not move often. A sedentary lifestyle leads to many health problems.

## WHY SHOULD YOU MOVE?

Sports, exercise, and active play are considered a "medicine" that can prevent many diseases [2]. Moving your body throughout the day is an excellent way to reduce your risk of heart disease, improve your physical fitness, and maintain the proper levels of joint mobility. The good news is that, unlike some medicines, physical activity has no dangerous side effects when it is done the right way. Practicing sports and playing outside with friends will also help you socialize, feel more energetic, and concentrate better. Physical activity can help you to feel better, look better, and think better. Several studies affirm that practicing exercise and sports regularly when you are young helps you to continue exercising when you are an adult [3]. This concept is called **adherence**. During adulthood, exercising regularly is necessary for our physical health and the health of the brain, which naturally decline as we age. Unfortunately, when kids have poor muscle strength, they may be more likely to suffer injuries and less likely to participate in exercise and sports later in life [4].

**ADHERENCE**

Exercise is more effective if you keep practicing it in the long term. People showing exercise adherence are those who participate in physical activity regularly.

## PEOPLE WERE STRONGER IN THE PAST!

Although it may seem like a surprise, when they were your age, your mother and father, and possibly even your older brothers and sisters, were probably stronger than you are. Research studies have shown that boys and girls cannot perform as many sit-ups and pull-ups as previous generations could. Because we use technology for longer periods these days, a condition called **exercise-deficit disorder**

**EXERCISE-DEFICIT DISORDER**

A condition caused by physical inactivity, when people do not get the amount of moderate to vigorous physical activity recommended by current public health standards.

is appearing [5]. This disorder is caused by doing <60 min of moderate-to-vigorous physical activity daily. When your muscles are inactive, they get weaker and softer, and you can suffer from **pediatric dynapenia**, which is a low level of muscular fitness [6]. Children who do not exercise enough also cannot jump as far or run as fast as other children. Due to inactivity, the hearts, lungs, muscles, and bones of modern-day children may not be fully prepared to meet the demands of sports or other activities.

**PEDIATRIC DYNAPENIA**

A disorder of children and adolescents, characterized by low levels of muscular fitness and the physical limitations that it causes.

## NO WORRIES: EXERCISE TO THE RESCUE

Maybe, after reading this far, you are feeling a little discouraged. But the bright side of all this is that your physical fitness can improve! Scientific studies say that *any* age is the right time to start exercising. Try to accumulate at least an hour of daily physical activity, and you will quickly begin to see the benefits. Everything counts! You may think exercise is just traditional sports, like basketball or track and field. But riding your bike, walking your dog, dancing, or playing at the park also count as exercise. Playing hopscotch, carrying your friends around, or doing wheelbarrow races can also improve your strength, balance, and coordination.

## STRONGER MUSCLES, STRONGER HEALTH

Being stronger brings many health benefits (Figure 1). Try to perform some form of strength-building activities at least 2 or 3 times per week [7]. Strength-building exercises with weights, medicine balls, elastic bands, or even with just your own body weight have been shown to make muscles stronger and faster. If you do not have equipment at hand, that is no problem. During the COVID-19 lockdowns, many people found creative ways to do workouts at home. You can use household items, such as bottles of water or a backpack. Try to chest press a bag of pet food or a jug of laundry detergent. **Calisthenics** are also beneficial for improving your physical condition naturally and playfully. These exercises, which include push-ups, pull-ups, squats, or sit-ups, use your body weight and can be performed almost everywhere and adapted to your fitness level. Many studies say that using your own body weight can improve your strength, flexibility, agility, and endurance. Imitating animals, in activities like bear crawling or duck walks, can be fun and help you to get fit at the same time.

**CALISTHENICS**

Exercises performed using your own body weight. Most calisthenics can be easily done anywhere because no equipment is needed.

**RESISTANCE TRAINING**

Exercises that make muscles move against a weight, a barbell, or another piece of equipment. Also called strength training since the aim is to increase body strength.

## DISPELLING MYTHS ABOUT LIFTING WEIGHTS WHEN YOU ARE YOUNG

**Resistance training** (also called strength training), which involves lifting weights, has had a bad reputation when it comes to children. People previously believed that it could harm young kids. However,

**Figure 1**

There are many health benefits of strength training when you are young.

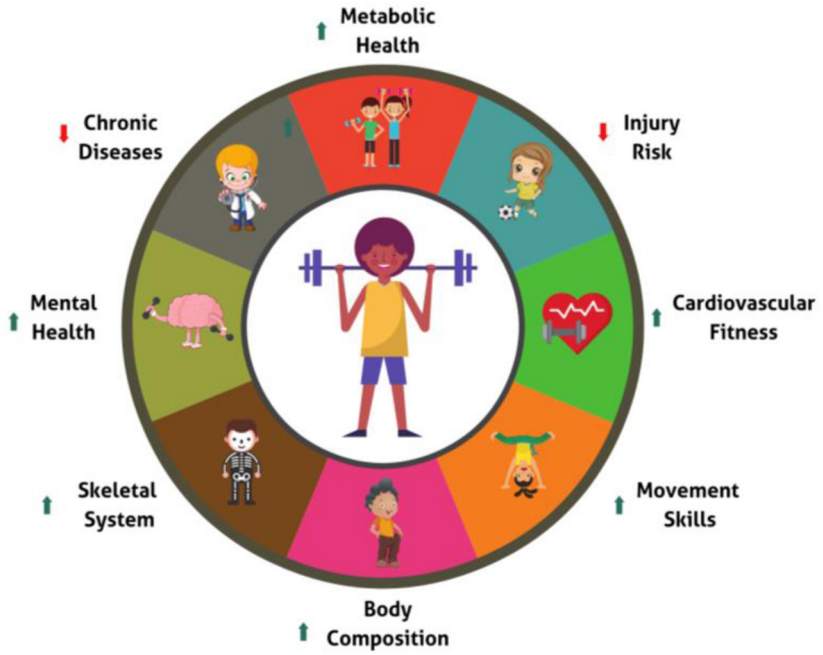


Figure 1

scientists have shown that performing strength-building exercises with good technique does not harm growing bones or make muscles bulky [8]. In fact, it is difficult for young children to increase their muscle size beyond that of normal growth, because children lack several hormones that only appear during puberty. This does not mean that strength training at an early age is not helpful. Strength training can help children to be more competent in sports such as gymnastics, climbing, or skating. These disciplines require high levels of skill and strength. Also, participating in strength-building activities when you are young increases your future strength. Children who exercise early in life have better muscle strength levels later in life than inactive children or those who only participate in traditional sports (Figure 2). Following instruction from qualified teachers and coaches is important to prevent injuries. Children who perform strength exercises at home without supervision suffer more injuries than those participating in well-designed programs at school or at fitness centers under the supervision of teachers or coaches.

## CONCLUSION

Moving and being active are necessary to help us maintain healthy bodies and minds. Daily physical activity has many benefits at any age, and childhood and adolescence are no exception. In fact, experts are warning about serious health consequences in kids who are not moving enough. Various types of exercises can be beneficial to your health, if practiced regularly. Strength training is an important form of physical activity, since improving muscular strength early

**Figure 2**

Effects of regular resistance training during childhood on adult strength. You can see that practicing resistance training when you are young is the best way to improve the muscular strength (or strength reserve) that you will show as an adult, also called strength potential (Figure adapted from Myer et al. [9]).

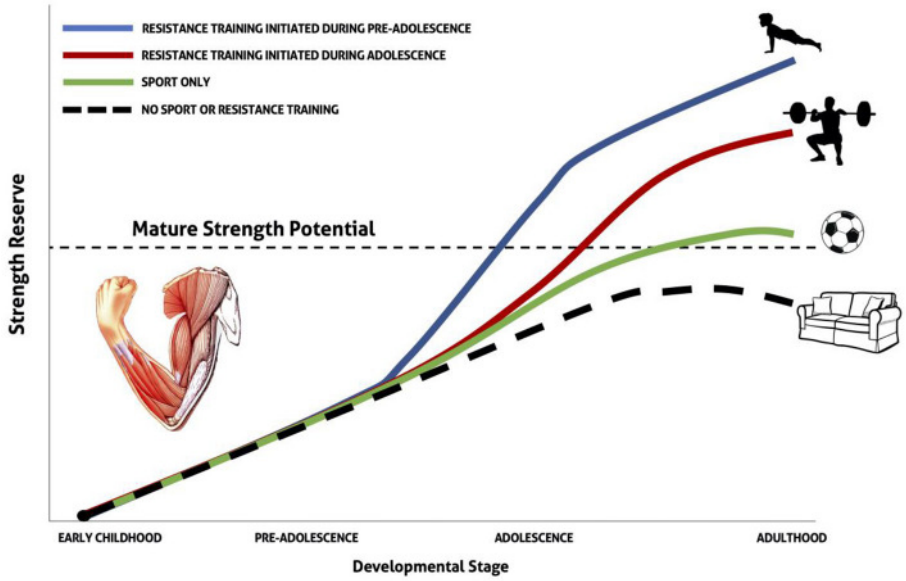


Figure 2

in life supports ongoing participation in exercise and sport activities *throughout* life. Strength training can be fun, and exercises for children and adolescents and can be practiced with very little equipment. So, now that you understand the benefits of being strong and physically active, we hope that you make some form of resistance training an important part of your daily life. Now is a good time to get up and move your muscles!

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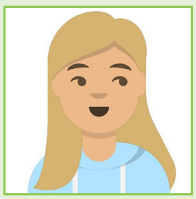
## YOUNG REVIEWER



**LILY, AGE: 13**
Hi, my name is Lily. I am 13 years old and I love to dance. I also like going to the beach, swimming, cooking and reading. My favorite subjects at school are dance, cooking, woodwork, and English.

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I am interested in everything related to sports and exercise and in ways to promote a healthy lifestyle. I am the director and a senior researcher at the Sport and Physical Activity Studies Center (CEEAF) at the University of Vic—Central University of Catalonia (Spain, Barcelona). I hold a Ph.D. in sport sciences. My current projects revolve around injury prevention in young athletes and the use of technology to preserve athletes' health. When I am not busy, I like playing with my kids,

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**ANNA M. SEÑÉ-MIR**

My passion is the promotion of physical activity and health through education. My objective every day is to explore, learn, and understand more about these complex and vast areas. Mainly, I am focused on research and teaching. Research stimulates my curiosity and develops my knowledge, and teaching helps me analyze what I have learned and share it with others. I hold two bachelor's degrees in physical education, a master's degree in health and community welfare, and a Ph.D. in psychology. My current projects integrate movement in primary education classrooms during academic lessons and assess its effects on physical activity levels, academic achievement, and brain functions.

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I hold a Ph.D. in sports science and nursing. I am focused on exercise in special populations. My research interests are the prescription of exercise for primary prevention and to maintain health. I am a former basketball player, and now I play as a hobby, which I combine with long walks with my wife and my dog.

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I am an exercise physiologist with interest in exercise prescription for special populations. My main research interests are exercise for improving the health of women and children. Outside of reading and writing, I enjoy hiking and practicing yoga with my dog.

**AVERY D. FAIGENBAUM**

I am a professor in the Department of Health and Exercise Science at The College of New Jersey. I teach courses related to health and fitness, and I have a special interest in youth resistance training and long-term athletic development. I have written scientific articles about pediatric exercise science and co-authored several books on youth fitness. I am currently working on research projects that prepare children and adolescents for a lifetime of physical activity.