

Vital Sign Considerations for Physical Therapy Practice During the COVID-19 Pandemic

The following information is intended for physical therapists and physical therapist assistants.

Vitals are Vital

Although to date, COVID-19 appears to be largely affecting the adult population, there is evidence that children of all ages can become ill with COVID-19. Common signs and symptoms in children include cough, pneumonia, and elevated heart and breathing rates. Due to the impact of COVID-19 on the heart and lungs, monitoring the child's heart and lung function during physical therapy examination and intervention is critical. The physical therapist should consider the child's vital signs at rest, with position changes, and with physical activity as the child's cardiopulmonary efficiency, and ability to adapt to position change and exercise is critical to therapy interventions and outcomes.

Normal Resting Vitals by Age¹

Infant

Age	Heart Rate	Respiratory Rate	Blood Pressure	SpO2
Premature	100-180 beats per minute	>40 breaths per minute	55-75/35-45 mmHg	>90%
0-3 Months	100-150 beats per minute	25-35 breaths per minute	65-85/45-55 mmHg	>90%
3-6 Months	80-150 beats per minute	25-35 breaths per minute	70-90/50-60 mmHg	>90%
6-12 Months	70-150 beats per minute	20-30 breaths per minute	80-100/55/65 mmHg	>90%

Toddler & Child

Age	Heart Rate	Respiratory Rate	Blood Pressure	SpO2
2-3 years old	70-120 beats per minute	20-30 breaths per minute	90-100/55-70 mmHg	>90%
4-5 years old	70-110 beats per minute	20-30 breaths per minute	90-100/60-70 mmHg	>90%
6-8 years old	60-110 beats per minute	12-25 breaths per minute	100-110/65-75 mmHg	>90%
10-12 years old	60-90 beats per minute	12-25 breaths per minute	110-120/70-80 mmHg	>90%

Adolescent

Age	Heart Rate	Respiratory Rate	Blood Pressure	SpO2
>12 years old	60-100 beats per minute	12-25 breaths per minute	110-120/75-80 mmHg	>90%

Rate of Perceived Exertion (RPE)²

If a child is taking prescription Beta Blockers, they will have a blunted heart rate response to exercise and will require use of an RPE scale when monitoring this patient population. For example, if a child is rating themselves at a 5 on an 11-point scale (0-10), it indicates that the child is exercising at approximately 60% of their maximal heart rate.

Borg Rating Scale of Perceived Exertion (RPE)²⁻⁴

- Borg RPE Scale numerical rating scale (15-point or 11-point for Modified Borg RPE Scale) indicates level of exertion perceived from a given activity or exercise
- Age 3-12 years: variable correlation with heart rate, but considered clinically useful for children as young as 9 years with respiratory conditions such as Cystic Fibrosis
- Age 13+ years: good to excellent correlation with heart rate
 - ⇒ Very light work = **1** on an 11-point scale
 - ⇒ Light work = **9** on a 15-point scale (6-20 scale)
 - ⇒ Very hard work = **7** on an 11-point scale
- Administration: At beginning and end of the activity, show the scale to the child. Ask the child to measure his/her perception of the intensity of the exercise or activity.

0-10 Modified Borg RPE Scale		
0	No Breathlessness	Rest
1	Very Slight	Really Easy
2	Slight Breathlessness	Easy
3	Moderate	Moderate
4	Somewhat Severe	Sort of Hard
5	Severe Breathlessness	Hard
6		
7	Very Severe Breathlessness	Really Hard
8		
9	Very, Very Severe	Really, Really Hard
10	Maximal	Maximal, just like my hardest race
Source	Homerding et al. 2010 ²	Parish 2020 ³

OMNI Scale of Perceived Exertion for Walking and Running^{5,6}

- The OMNI Scale is a perceived exertion scale that includes numbers 0 to 10 accompanied by a visual aide to indicate level of exertion perceived from a given activity or exercise.
- Age 6-18 years: valid in children with cerebral palsy; GMFCS Levels I-III
- Age 8-18 years: valid in typically developing children
- Administration: Read the following directions to the child: “We are going to ask you about how tired you feel when you are doing each of the activities. Please use the numbers on the picture to tell us how your body feels when you are doing the activity. Look at the person at the bottom of the hill. If you feel like this person, you will be not tired at all, so you should point to number 10. If you feel somewhere in between, then point to a number between 0 and 10. We want you to tell us how your whole body feels, and remember that there are no right or wrong answers. Use both the pictures and the words to help you choose.”

Sources:

1. Hillegass, E. *Essentials of Cardiopulmonary Physical Therapy*. 4th ed. Saunders, St. Louis MO, 2016.
2. Hommerding PX, Donadio MV, Paim TF, Marostica PJ. The Borg scale is accurate in children and adolescents older than 9 years with cystic fibrosis. *Respir Care*. 2010;55(6):729-733.
3. Parish A. Pediatric considerations for post-acute COVID-19 management. *Post-Acute COVID-19 Exercise & Rehabilitation (PACER) Project*. Video. 11 Apr, 2020. Accessed: June 4, 2020. <https://www.cardiopt.org/resources-covid-19.php>
4. Gros Lambert A, Mahon AD. Perceived exertion: influence of age and cognitive development. *Sports Med*. 2006;36(11):911-928. doi:10.2165/00007256-200636110-00001
5. Fragala-Pinkham M, O'Neil ME, Lennon N, Forman JL, Trost SG. Validity of the OMNI rating of perceived exertion scale for children and adolescents with cerebral palsy. *Dev Med Child Neurol*. 2015;57(8):748-753. doi:10.1111/dmcn.12703
6. Robertson RJ, Goss FL, Boer NF, et al. Children's OMNI scale of perceived exertion: mixed gender and race validation. *Med Sci Sports Exerc*. 2000;32(2):452-458. doi:10.1097/00005768-200002000-00029

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