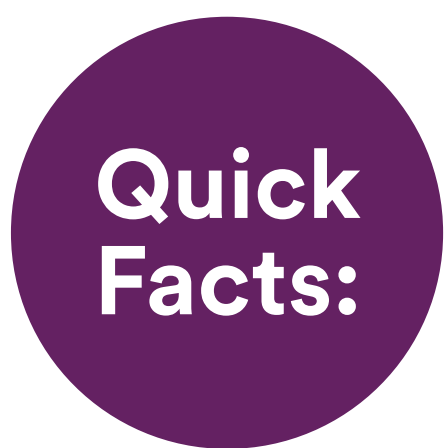


# North Star Ambulatory Assessment

The North Star Ambulatory Assessment (NSAA) is a validated rating scale used to measure the impact of Duchenne muscular dystrophy on ambulatory performance. Duchenne is a degenerative neuromuscular disorder that causes severe progressive muscle loss and premature death. People with Duchenne experience muscle weakness in the lower limbs that spreads to the arms, neck and other areas of the body, causing decreased motor functionality.<sup>1</sup>



- The NSAA is only given to patients who are ambulant, or able to walk on their own.<sup>2</sup>
- The NSAA contains universally used methods to practically and reliably measure motor function.<sup>2</sup> In clinical trials, the NSAA can be used as an endpoint to measure a person’s functional abilities before and after receiving an investigational therapy.<sup>1</sup>
- NSAA results, viewed over time and in connection with other timed functional tests and biological assessments, provide a picture of disease progression in patients.<sup>2</sup>

## Assessments Included in the NSAA

The NSAA requires patients to perform 17 assessments which test the speed and functionality of their motor skills.<sup>3</sup> For patients younger than five years old, the NSAA reorders the skills to better represent age-appropriate tasks and scoring. This demonstrates how skills are gained or lost in younger patients over time, while taking into account the average general development of motor skills that occurs in children.<sup>4</sup>

- Adjusted for age, the first eight items are in the achievable range for patients at three years old.<sup>4</sup>
- Once three and a half years old, the patient can be additionally assessed on the next five items.<sup>4</sup>
- At four years old, the patient is capable of being assessed on all tasks.<sup>4</sup>

## Scoring and Results

Scores of 0, 1, or 2 are given depending on activity performance, based on length of time taken to complete and whether assistance was needed.<sup>4</sup>

- A higher total score represents better functional performance. Natural history studies show a precipitous decline in the NSAA score for boys with Duchenne after they peak around the age of six.<sup>1</sup>
- A person's NSAA results can be compared with their previous scores to track the improvement, maintenance, or decline of their motor abilities over time.<sup>1</sup>
- The highest possible score varies, as a patient’s age determines the level of development that can be assessed.<sup>1</sup>

<b>0</b> Unable to perform the task. <sup>1</sup>	<b>1</b> Able to perform the task, but needed assistance—or completed the task independently, but struggled. <sup>1</sup>	<b>2</b> Can perform the task independently, without difficulty. <sup>1</sup>
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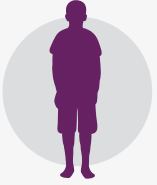
















AGE	HIGHEST POSSIBLE SCORE <sup>4</sup>
<b>3</b>	At three years old the highest possible score is 16 for eight items.
<b>3 1/2</b>	At three and a half years old, the highest possible score is 26 for 13 items.
<b>4-5</b>	At ages four to five, the highest possible score is 34.

# NSAA Assessed Skills<sup>3</sup>

## SAMPLE PATIENT SCORES

Patient A (Age 6)

Patient B (Age 5)

	<b>Stand</b>	Stand barefoot for as long and still as possible without external support.	<b>2</b>	<b>2</b>
	<b>Walk</b>	Walk forward for at least 10 steps (about 8-10 feet) with a consistent heel-to-toe gait.	<b>2</b>	<b>2</b>
	<b>Rise from chair</b>	Begin seated with arms crossed over chest, then stand up from the chair without uncrossing arms.	<b>2</b>	<b>2</b>
	<b>Climb step (right leg)</b>	Step onto a box step at least 15cm high with right (or dominant) foot.	<b>1</b>	<b>2</b>
	<b>Climb step (left leg)</b>	Step onto a box step at least 15cm high with left (or non-dominant) foot, joining the other.	<b>1</b>	<b>2</b>
	<b>Gets to sitting</b>	Lay flat on the floor with arms by side and move to a sitting position without turning towards the floor or using both hands to get up. Using one hand is permissible to achieve the top score.	<b>2</b>	<b>2</b>
	<b>Jump</b>	Stand on the floor with both feet together and jump as high as possible with minimal forward movement.	<b>1</b>	<b>1</b>
	<b>Run</b>	Run as fast as possible for about 32 feet. To achieve the highest score, both feet must clear the ground when running.	<b>0</b>	<b>1</b>
	<b>Stand on right leg</b>	Stand on right leg, with arms down, for as long as possible.	<b>1</b>	<b>2</b>
	<b>Stand on left leg</b>	Stand on left leg, with arms down, for as long as possible.	<b>1</b>	<b>2</b>
	<b>Descend box step (right leg)</b>	Facing forward, step down from the box with right (or dominant) foot.	<b>1</b>	<b>2</b>
	<b>Descend box step (left leg)</b>	Facing forward, step down from the box with left (or non-dominant) foot, joining the other.	<b>1</b>	<b>2</b>
	<b>Stand on heels</b>	Lean back onto heels for three counts while barefoot. To achieve a top score, both feet must be lifted at the same time using clear dorsiflexion (raising the foot towards the shin).	<b>1</b>	<b>1</b>
	<b>Rise from floor</b>	Lay flat on back and stand up as quickly as possible without rolling into a four-point kneeling or prone position (Gower's maneuver).	<b>1</b>	<b>1</b>
	<b>Lift head</b>	Lay flat on the floor with arms crossed across the chest and hands resting below the shoulder. Then, lift head, touching chin to chest, while keeping arms folded.	<b>2</b>	<b>1</b>
	<b>Hop on right leg</b>	Stand on right leg and hop one-legged without landing on both feet.	<b>0</b>	<b>1</b>
	<b>Hop on left leg</b>	Stand on left leg and hop one-legged without landing on both feet.	<b>0</b>	<b>1</b>

## NSAA TOTAL SCORE

**19**

**26**

### References

<sup>1</sup>Muntoni F. et al. (2019). Categorising trajectories and individual item changes of the North Star Ambulatory Assessment in patients with Duchenne muscular dystrophy. PLOS ONE, 14(9), e0221097.

<sup>2</sup>Scott, E. et al. (2011). Development of a Functional Assessment Scale for Ambulatory Boys with Duchenne Muscular Dystrophy. Physiother. Res. Int., 17(2), 101-109.

<sup>3</sup>Muscular Dystrophy UK. (2017, May). North Star Ambulatory Assessment. Retrieved from [https://www.muscular dystrophyuk.org/wp-content/uploads/2017/06/NSAA\\_Only\\_ManualVersion-2.0\\_May-2017.pdf](https://www.muscular dystrophyuk.org/wp-content/uploads/2017/06/NSAA_Only_ManualVersion-2.0_May-2017.pdf)

<sup>4</sup>Mercuri E. et al. (2016). Revised North Star Ambulatory Assessment for Young Boys with Duchenne Muscular Dystrophy. PLOS ONE, 11(8), e0160195.