The Lokomat® starts with a default speed of 1.5 km/h. However, in order to challenge patients during Lokomat therapy, the optimal speed value will vary for each patient depending on health, experience with the Lokomat, and individual training goals. Here we provide recommendations on how to find the optimal speed for each patient.

**How do I define the optimal speed for each patient?**

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**How do I choose the appropriate speed value during a training session?**

For the first training session the default speed of 1.5 km/h will be given. From there you must increase or decrease the value. How? It is too fast if the patient cannot follow the gait pattern; it is too slow if the movement is not smooth. According to feedback from experienced Lokomat users, generally for adults an initial training session speed between 1.5 and 2.0 km/h is selected in most cases. Note: children using the pediatric orthosis need a lower initial speed, ranging from 1.0 to 1.5 km/h, because of their shorter average leg length.

As soon as a safe and physiological walking pattern has been established and the patient has grown accustomed to walking in the orthosis, we recommend increasing the speed to challenge the patient during the entire training session. We therefore recommend selecting the highest speed value at which the patient is still able to maintain a nice walking pattern.

**When does it make sense to select higher or lower speed values?**

**Recommendations for increasing speed values:**

- If the gait pattern does not appear physiological due to a low speed; increasing the speed might help the walking pattern to look “smoother” (Reisman et al., 2009; Tyrell et al., 2011).

- Higher speeds equal more repetitions and increase the challenge for the patient. A challenge point optimization is required to provide sufficient afferent feedback and positively influence neuroplasticity, particularly early after injury (Pohl et al., 2002; Lamontagne & Fung, 2004; Miller et al., 2008; Outermans et al., 2010; Wada et al., 2010; Kuys et al, 2011).

- Make sure that the speed is continually increased as training progresses to ensure challenging walking sessions and that the speed supports each patient’s potential for functional recovery (Andriacchi et al., 1977; Wagenaar & Beek, 1992; Wagenaar & van Emmenik, 1995).

- When the training goal is to enhance an “automatized” gait pattern during over-ground walking, a high speed value during the training session is required (Hesse et al., 2001; Kwakkel & Wagenaar, 2002).

- If patients are already able to walk but the training goal is to also further increase their walking speed over ground, an increased speed value during Lokomat-assisted training is required.

Despite the fact that a high speed value is required in order to sufficiently challenge patients during their walking session, lower speed values are suitable on specific situations.

**Recommendations for decreasing speed values:**

- During the first training session a lower speed is recommend to allow the patient to get used to the orthosis and the walking pattern.

- Use a lower speed when focusing on a specific movement; for example, consciously extending the knee during stance phase (Nogueira et al., 2013).
• Decrease speed for patients with spasticity when starting the training session until the muscle tone regulates and adapts to the movement. Higher speeds can provoke a spastic reaction which may cause the orthosis to stop for safety reasons (Bohannon & Andrews, 1990).

What do I need to consider when changing the speed value?

• The step length should be adapted to the speed.
• The synchronization value should be adjusted (you can also use the automatic setting).
• The Hip Offset may require adjusting (towards extension).
• Quality of movement may be affected, e.g. heel strike at initial contact.
• The patient’s joints need to be able to support the increasing impact force.