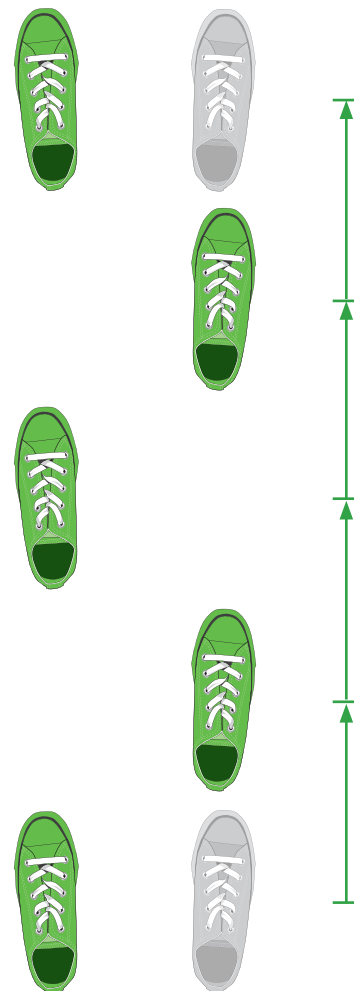


Symmetrical Step Length

All of us strive to maintain uniform step lengths because doing so saves energy. However, for orthosis users, achieving this uniformity depends on the precise adjustment of their orthosis. The ideal step length varies for each individual, influenced by factors such as leg length, muscle strength, existing health conditions, misalignments, and the type of orthosis worn. Constantly switching between short and long steps causes biomechanical inconsistencies that force the body to continuously adapt to changing step lengths. This repeated alternation results in increased energy expenditure required to start, slow down, and pick up speed again.



Uniform Step Lengths



Differing Step Lengths



3. Deceleration Phase

Forces act against direction of movement.



2. Maintenance of Motion

During walking, the body expends energy to maintain forward motion.



1. Acceleration Phase

Forces act in the direction of movement.

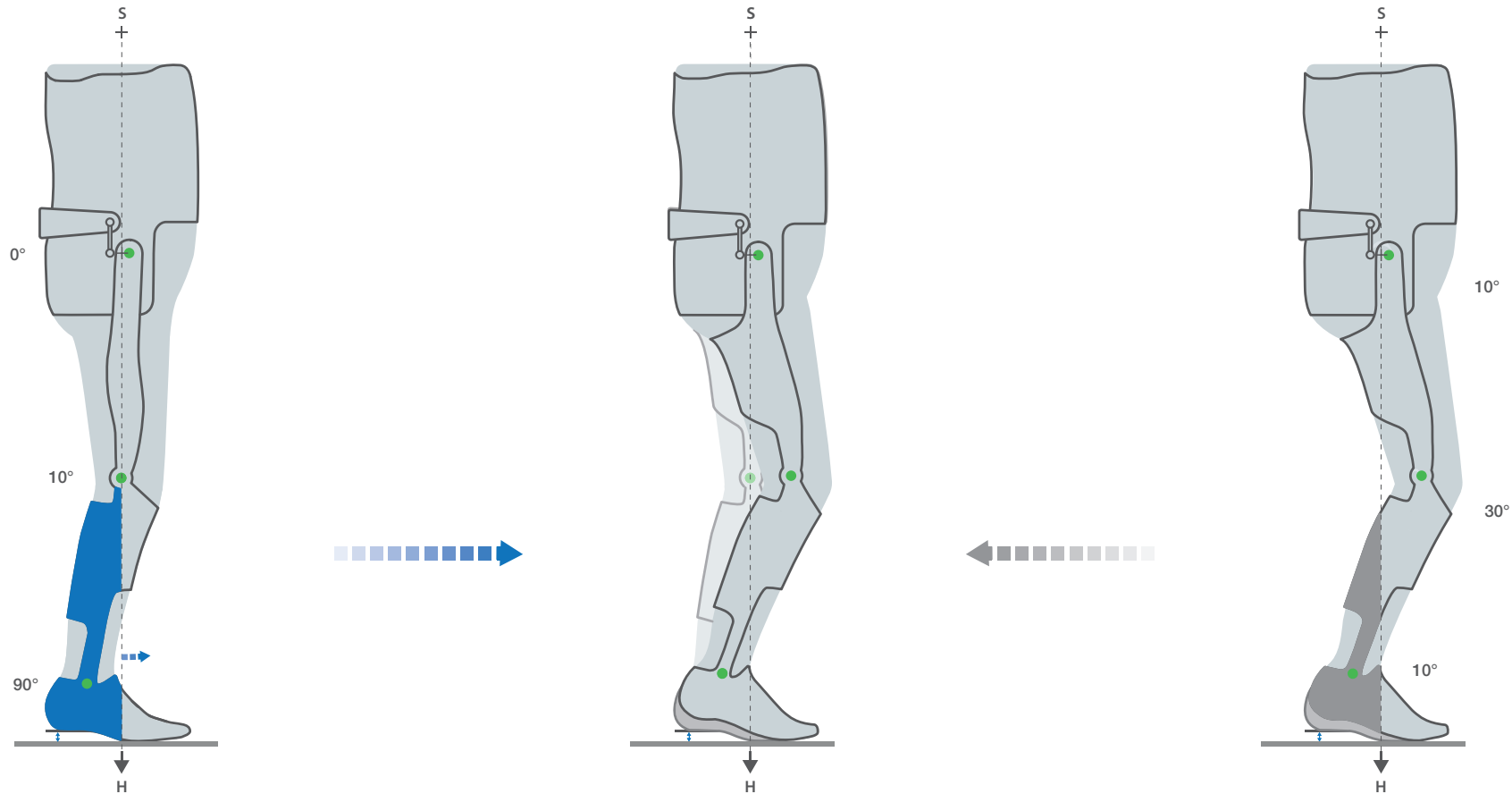
Interruption of Movement:
Forward motion is shortened with additional energy expenditure.

Interruption of Movement:
Forward motion is lengthened with additional energy expenditure

HKAFO / RGO Gait Initiation



Example RGO: For individuals using orthoses that extend above the hip, the first forward movement following a lateral tilt is crucial for initiating swing phase. The positioning of the legs plays a key role in how this movement begins. It is important that the manner of gait initiation remains consistent and does not cause variations in subsequent steps.



Standard

Tilting to one side initiates swing phase. The additional weight of the lower leg situated behind the vertical axis allows the leg to fall forward like a pendulum. This process is actively prolonged through shifting of the body's center of gravity.

Mixed

The different weight distributions located behind the vertical axis hinder uniform step initiation and make it difficult to achieve a consistent, symmetrical step length. This results in an unnecessary increase in energy expenditure during walking.

Contracture

After the lateral tilt, both the initiation and prolongation of swing phase occur exclusively by actively shifting the body's center of gravity. This requires precise adjustment of the vertical alignment, taking into account the ankle, knee, and hip joints.

To ensure a uniform step length and symmetrical, energy-efficient gait, further adjustments are essential. These include adjusting the sole length and position, assuring effective toe-off, optimizing the heel rocker, and compensating for any leg length discrepancies to ensure the pelvis is in a horizontal position.