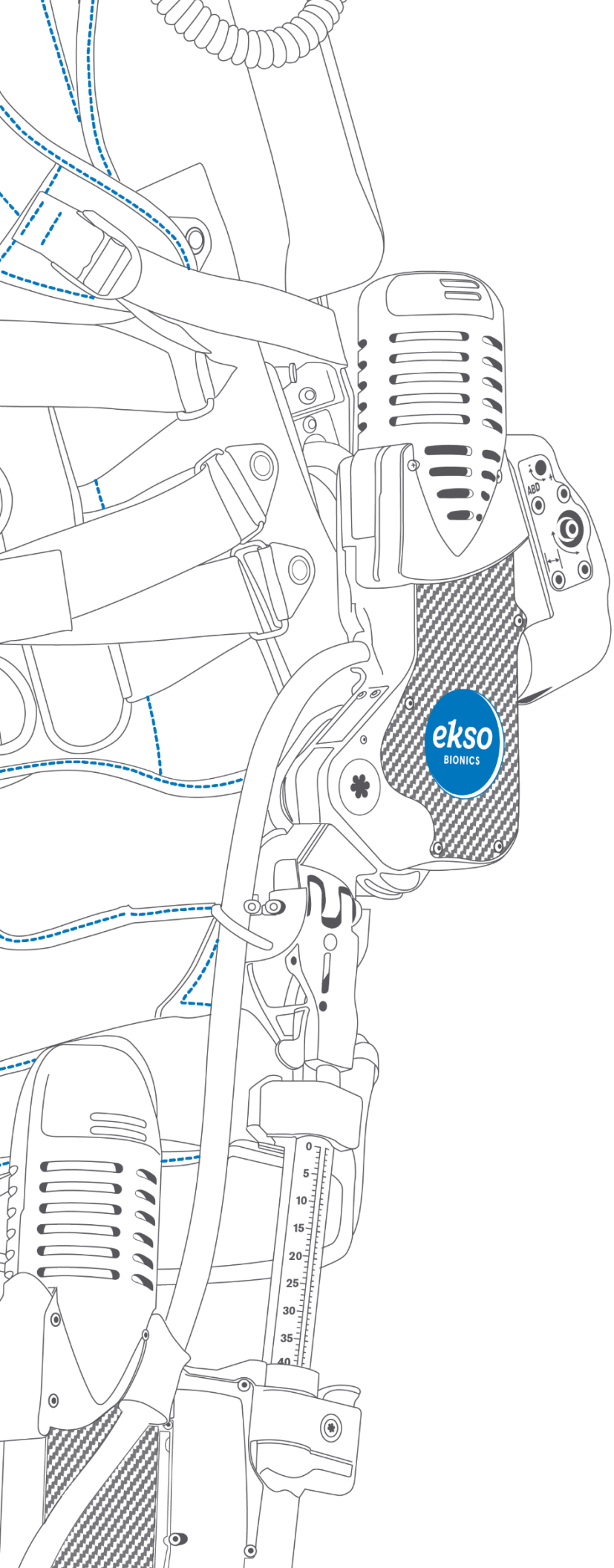

Learning Guide

EksoNR™ with GaitCoach Software

ekso BIONICS®

109489F

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EC REP

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Table of Contents

PREFACE

Training and Levels of Certification for EksoNR Use

The EksoNR is sent with the GaitCoach software.

GaitCoach Training

This is the training you will receive with the purchase of your EksoNR.

- Introduce the feature set of the EksoNR.
- Goal of training – Safe, effective, independent clinical use of the EksoNR
- Certification goal - Level 2 certification for physical therapist(s)
    - Can operate the EksoNR independently or with any support personnel when additional support is needed.
        - If the therapist is unsafe to utilize device independently they will be certified at Level 1, meaning that they can operate the EksoNR with anyone who has an equal or higher level of certification.
    - May delegate EksoNR treatment session to support personnel at their discretion.
        - When delegating tasks, the Level 2-trained physical therapist is still responsible for the patient, the EksoNR device, and for providing education to support personnel on device function and safety procedures.
- Physical therapist is able to provide training to other physical therapists on EksoNR with GaitCoach operation in preparation for EksoNR certification by Ekso Bionics

GaitCoach+ Training

This training is available for purchase and will provide access to additional software features that will allow further customization of EksoNR therapy sessions.

- Available at an additional cost
- Introduce additional features of the EksoNR.
- Goal of training – Enhance clinical use of the EksoNR

GAITCOACH TRAINING

EksoNR Device Description and Functions

EksoNR is a wearable, battery-operated bionic exoskeleton that enables individuals with lower extremity weakness or paralysis to stand and walk on level surfaces. Motors power the hip and knee joints and all motion is initiated either through specific patient actions or the use of an external controller.

The EksoNR provides assistance to the lower extremities. The EksoNR can be programmed to follow a specific stepping pattern with both legs, with adaptable assistance that results in changing motor output in response to patient performance. The stepping pattern can also be removed, which allows the patient to step in any way they desire and carry-over to be assessed. The EksoNR can be tuned and adjusted to fit a patient's precise needs.

Device functions: Sit-to-stand, walking, stand-to-sit, weight shift.

Patient requirements: Active participation, weight shifting, maintaining balance with assistance as needed

Environment for use

- Solid, dry, level ground with less than a 2% grade.
- Adequate supervision
- Use of an assistive device at all times

Therapeutic Benefits

- EksoNR is a clinical tool that can:
    - Address physical therapy goals related to standing tolerance, weight shifting, midline awareness, and balance.
    - Address physical therapy gait retraining goals through patterning and reciprocal stepping.
    - Enforce correct gait mechanics eliminating ability for patient to compensate.
    - Control the amount of robotic assistance to:
        - Provide assistance, as needed, to complete the swing phase of gait.
        - Provide support, as needed, during the stance phase of gait.
        - Provide non-ambulatory individuals with the ability to walk.

Patient Requirements

- Be screened and cleared by a physician prior to physical therapist evaluation for EksoNR use.
- Physical and cognitive ability to use an assistive device to participate in initiation and maintaining of weight shift. Use does not need to be independent of clinical support.
- Ability to communicate pain and need to cease session, verbally or nonverbally.
- Ability to acknowledge communication from the therapist, verbally or nonverbally.
- Healthy bone density.
- Skeleton does not suffer from any unhealed fractures.
- Able to stand using a device such as a standing frame.
- Hip width or leg segment lengths are within the range of adjustability.
- Weight does not exceed 220 lb (100 kg).
- Standing hip width of 18 in. (45,6 cm) or less.
- Must have functional use of at least 2 extremities.
- Must have near normal range of motion in hips, knees, and ankles.
    - Neutral ankle dorsiflexion.

NOTE: The knee may flex up to 12° to obtain a neutral ankle.

    - No more than 12° knee flexion contracture.
    - No more than 17° hip flexion contracture.
- Upper leg length discrepancy must be equal to or less than half an inch (≤ 0.5 in. or 1,3 cm) and lower leg discrepancy equal to or less than three-quarters of an inch (≤ 0.75 in. or 1,9 cm).

Contraindications

People with the following conditions should not use the device*:*

- Severe concurrent medical conditions: infections, circulatory, heart or lung, pressure sores.
- Severe spasticity (Modified Ashworth 4).
- Unstable spine or unhealed limbs or pelvic fractures.
- Active heterotopic ossification interfering with lower extremity range of motion.
- Significant contractures.
- Psychiatric or cognitive situations that may interfere with proper operation of the device.
- Cognitive impairments resulting in inability to express pain or need to stop session.
- Pregnancy.
- Poor skin integrity in areas in contact with the device.
- Decreased standing tolerance due to orthostatic hypotension.
- Range of motion restrictions that would prevent a patient from achieving a normal, reciprocal gait pattern, or would restrict a patient from completing normal sit-to-stand or stand-to-sit transitions.
- Unresolved deep vein thrombosis.
- Uncontrolled autonomic dysreflexia.
- Lower limb prosthesis.

Safety Reminders

- EksoNR should be donned/doffed on a solid chair without armrests or wheels.
- An EksoNR -trained physical therapist must remain—or delegate another person who must remain—within arm's reach of a patient at all times in case of a patient loss of balance or a device power loss.
    - EksoNR is NOT designed to prevent falling.
- Always use the EksoNR with sufficient supervision and physical assistance.
    - New patients, and those at higher risk of falling, may require more supervision and physical assistance.
- Always use the EksoNR with an assistive device.
- Give clear verbal instructions and physical cueing to patients and your colleagues.
    - Provide clear instructions to patients whenever beginning or changing an EksoNR action and when stopping, turning, or changing direction. (For example, "beginning stepping now.")
    - Provide clear instructions to your colleagues as you work in pairs. Verbalize that each partner is ready prior to initiating standing, walking, turning, or sitting during a patient session. Efficiently push the **Stop** button if your partner indicates a stop or pause is necessary.
- Assess skin integrity before and after every training session.
    - Special attention should be given to areas of EksoNR contact.
- Patients should perform adequate lower extremity stretching before and after EksoNR sessions, as indicated by their physical therapist.
- Discontinue use if the patient reports feeling discomfort or displays signs and symptoms of adverse reactions.

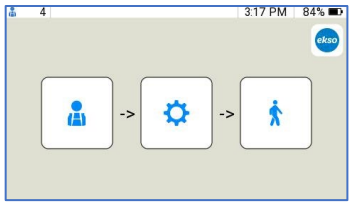
Device Specific Safety Considerations

- Do not use the EksoNR if the device is not operating properly.
- Discontinue use if the controller directs.
- Never use the EksoNR if the device has frayed or broken wires.
- Never use the battery charger if the charger cord is frayed or compromised in any way.
- Ensure the EksoNR batteries are fully charged or adequate for treatment session.

Adverse Events

Any adverse reactions noticed by a physical therapist or patient during or following the use of the EksoNR should be documented thoroughly and reported to **Ekso Bionics Customer Experience** immediately**.** This includes any undesired EksoNR mechanical behavior.

CONTROLLER PROGRAMMING OVERVIEW



Patient ID

It is important to assign a patient ID for the following reasons:

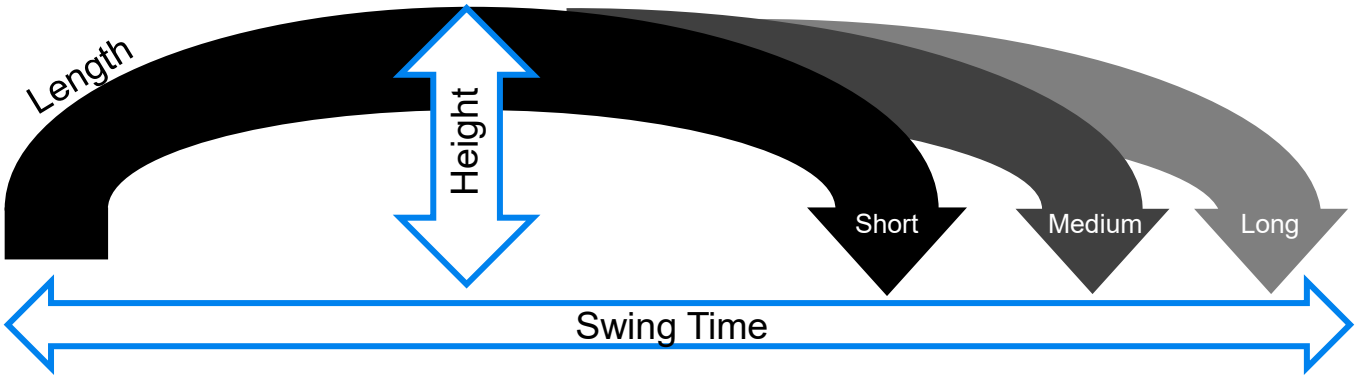
- EksoPulse tracks data for each session and requires a patient ID to identify which session belongs to which patient.
- Controller saves settings for each patient to save time when beginning a subsequent sessions.

Patient Settings – Pattern

Pattern may be turned on or off.

Pattern: On means the patient's leg must be at a specific position at a specific time during both swing and stance phase, and if it is not, the EksoNR will assist them to get there.

- The pattern, when turned on, is created by your settings: step length, step height, and swing time. Choose these based on your goal for the patient. Bold indicates default setting.
    - Step Length (short, **medium**, long)
    - Step Height (low, **medium**, high)
    - Swing Time (slow, **medium**, fast)



Pattern: Off means that there is no position or time requirement for the leg in swing or stance phase, meaning your patient can choose the step path they want to travel. While they also will have more freedom of their position on the stance leg, EksoNR will never fully remove power in stance.

Patient Settings ⚙ – Support

Support may be set to high or low. This support from the EksoNR will be present in **both** stance and swing phases of gait.

At no time does EksoNR fully release power from the legs.

- Pattern: On, Support: High
  - Stance: provides full support at the patient's fullest extension.
  - Swing: provides a constrained swing path that EksoNR will help keep the leg on.
- Pattern: On, Support: Low
  - Stance: allows 15 degrees of knee flexion to permit the patient to activate their own extensors.
  - Swing: provides a looser but still constrained path that EksoNR will keep them on.
    - If patient veers off of swing path, EksoNR will freeze patient's swing leg in place and allow them to use their own strength to get back to the path.
      - If they are unable, or they are in an unsafe position, EksoNR will kick in at full power to complete a step. You will hear a jingle that will indicate that this occurred.

- Pattern: Off, Support: High
  - Stance: strongly resists buckling with a hard stop at 45 degrees of knee flexion.
  - Swing: boosts the movement of the patient to assist with swing.
- Pattern: Off, Support: Low
  - Stance: moderately resists buckling, with a hard stop at 45 degrees of knee flexion.
  - Swing: provides enough assistance to offset the weight of the EksoNR leg.

COACHING METHOD

Overview of GaitCoach Software

The GaitCoach software will provide feedback on your patient's deviations. Once a suggestion has been made, you can accept or dismiss the suggestion to enter into focused walking to work on that deviation. If you accept, the GaitCoach will begin providing you feedback focused on that deviation. You can also choose a specific walking focus at any time from the score card.

There is a hierarchy in the GaitCoach. Each time the GaitCoach assesses your patient, it will go through this list in order. If your patient is doing the first component of gait well, then it moves on to examine the next component. If your patient is struggling with that component, it will suggest that you focus on that.

Hierarchy

1. Forward Lean
2. Lateral Shift
3. Step Height
4. Step Length
5. Step Length Symmetry
6. Swing Time Symmetry
7. Swing Time

The GaitCoach utilizes the settings you chose for step height, step length, and swing time to provide you feedback, regardless of whether you have the pattern turned on or off.

Hierarchy category	Deviation noted	On screen message
Forward Lean	Patient leaning forward	Too far forward Maintain upright posture
Lateral Shift	Patient over shifting laterally	Too much lateral shift Maintain midstance posture
	Patient under shifting laterally	Not enough lateral shift Shift over stance leg
Step Height	Patient not getting adequate push-off	Increase Knee Flexion Improve toe clearance
Step Length	Patient steps are too short	Step is too short Focus on improved heel strike
	Patient steps are too long	Step is too long Focus on controlled strides
Step Length Symmetry	Patient step lengths are unequal	Focus on Step Length Symmetry Step Lengths Uneven
Swing time Symmetry	Patient swing times are unequal	Focus on Swing Time Symmetry Swing Time Uneven
Swing Time	Patient swing times are too slow	Increase Speed Swing leg faster

Focused walking

As the GaitCoach identifies an issue with your patient's walking, it will suggest you continue to walk with a focus on that component of gait. The message may contain "left" or "right" if the deficit is specific to a side. If you accept and enter that focused walking, feedback will change to specifically provide feedback on that component.

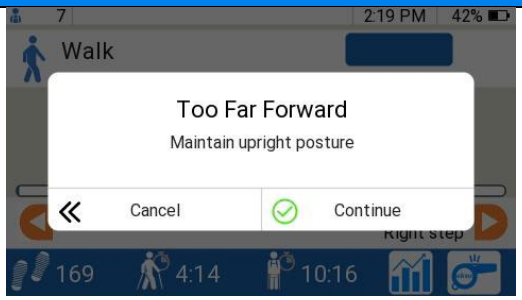
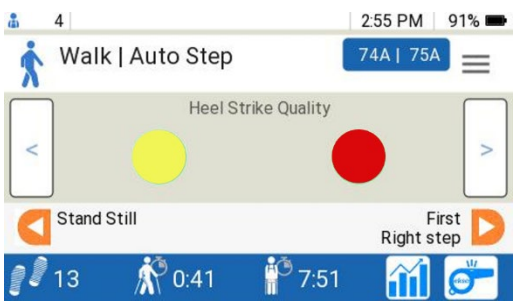
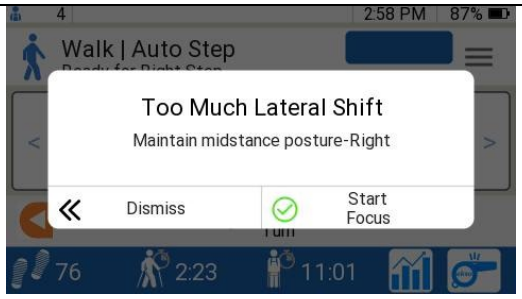
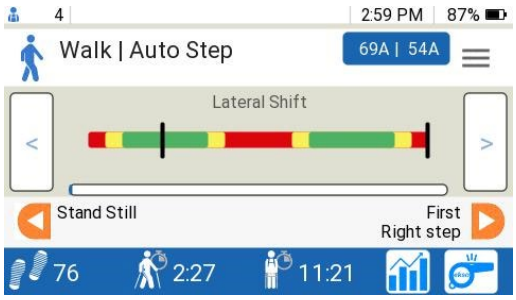
Feedback may be provided through:

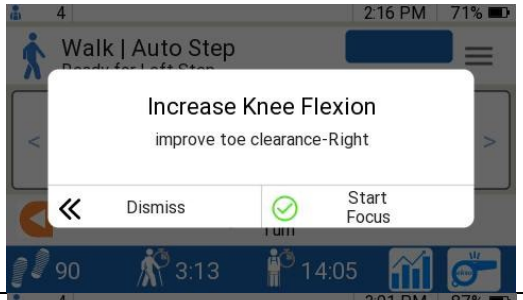
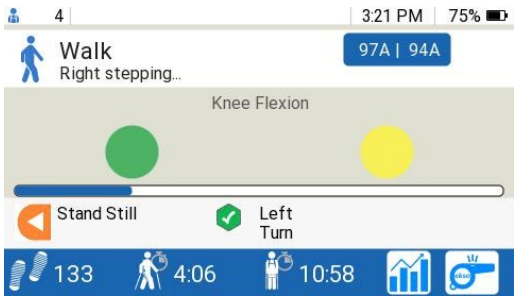
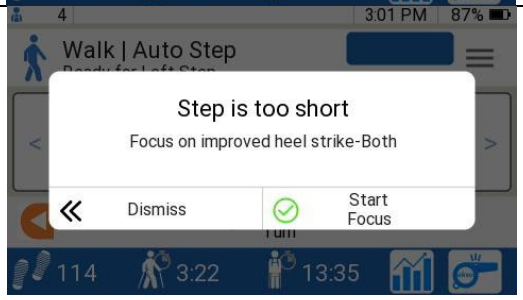
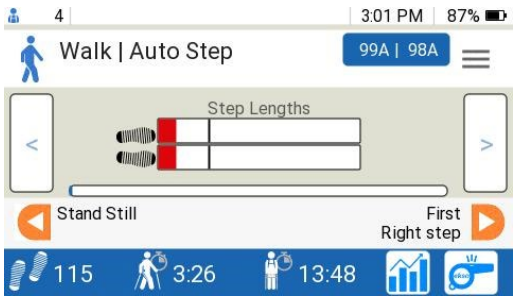
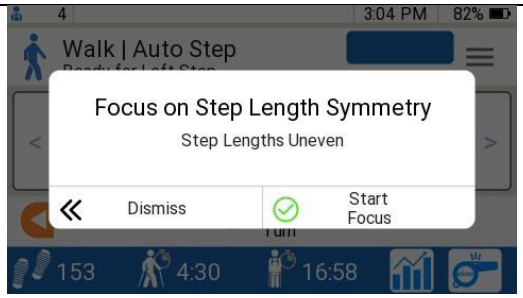
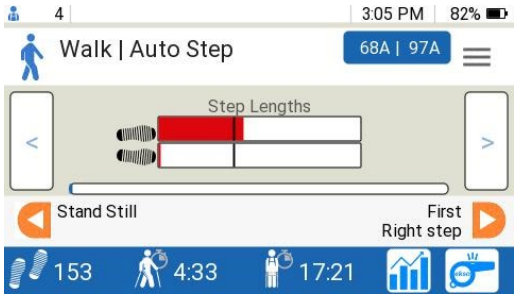
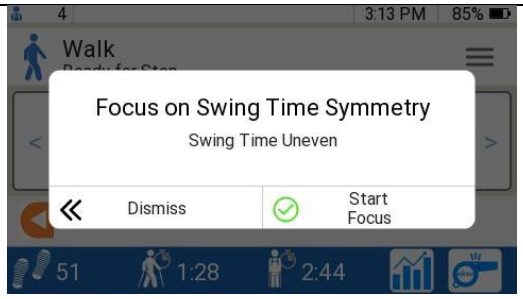
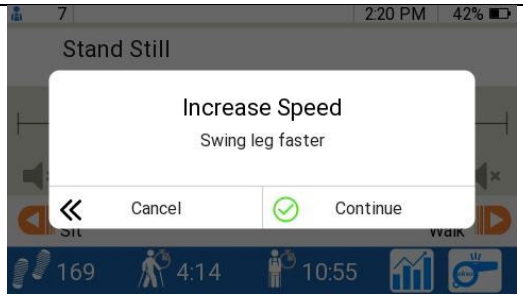
- Red/Yellow/Green indicators to inform if patient is within desired range.
- Graphs indicating patient positioning versus desired position.
- Graphs comparing the right and left leg.

You may choose to dismiss the focused walking. Once you dismiss the suggestion 5 times, the Coach will not suggest that area of focus again.

A popup message will dismiss automatically if neither **Accept** or **Dismiss** is selected. The last popup message can be accessed at any time from the  icon.

A focus can be selected from the scorecard menu at any time.

Hierarchy category	Popup message	Focus Feedback
Forward Lean		
Lateral Shift		

Step Height		
Step Length		
Step Length Symmetry		
Swing time Symmetry		
Swing Time		

BATTERIES

When a battery is plugged into the charger, the light on the charger should turn *red-orange*, indicating that the battery is seated correctly and charging.

When charging is complete, it will turn back to *green*.

It is important to take note of the *red-orange* light when initially plugged in because the charger's light will also be green when nothing is plugged into the charger or if the battery is plugged in incompletely.

Battery Alarms

- At 25% remaining battery level, the EksoNR alerts the therapist. The patient should walk to a chair and perform a powered sit.
- At 15% remaining battery level, the EksoNR allows *only* a powered sit.
- At 10% remaining battery level, the EksoNR will go into **Safe Mode** and a long-legged sit is required.
- A battery mismatch error will occur upon turning on the Ekso if there is >20% charge discrepancy between right and left batteries.

PATIENT EVALUATION

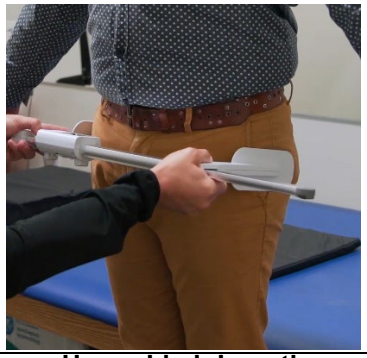
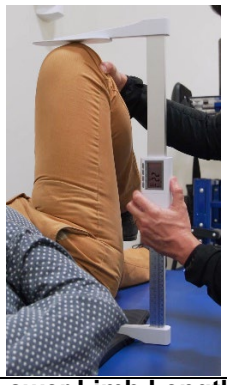
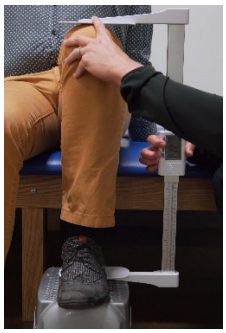
Range of motion

ROM measurements are all passive. Critical values include:

- Ankle dorsiflexion: Patient must achieve a neutral ankle.
    - If patient has ankle dorsiflexion limitations with knee in full extension, assess if patient can achieve 0° dorsiflexion by flexing knee.
        - Note what degree of knee flexion is required to achieve 0° dorsiflexion.
- Knee extension: Patient must have less than or equal to a 12° knee flexion contracture.
    - If knee flexion measurement is 12° or less, physical therapist can program this knee flexion angle into EksoNR .
- Hip extension: Patient must have less than or equal to 17° contracture.
- Hip flexion: Patient must have ability to flex to 100°.

Ekso measurements

Measurements are completed using calipers then converted to Ekso values using the conversion chart.

MEASUREMENT	POSITION	DESCRIPTION
Hip Width 	Standing (if able) or Supine	• Place measuring tool at greater trochanters, or widest measurement. • Apply pressure to compress adipose, if necessary. • Maintain vertical alignment of measurement arms by avoiding overpressure at upper attachment. • Read measurement tool on screen.
Upper Limb Length 	Supine	• Flex hip and have patient rotate away from side to be measured. • Place lower arm of measuring tool under patient leg in line with femur. • Patient returns to neutral pelvis posture. • Position hip in 90° of flexion with knee resting in maximum flexion. • Maintain vertical alignment of measurement arms by avoiding overpressure at upper attachment • Read measurement tool on screen.
Lower Limb Length 	Sitting	• Place foot on step stool; patient must wear the shoes to be used during EksoNR walking sessions. • Position leg with hip in >90° flexion so that knee joint is higher than hip joint. • Align tibia to vertical and place measuring tool under heel. • Maintain vertical alignment of measurement arms by avoiding overpressure at upper attachment. • Read measurement tool on screen.

Complete screening form, developing a plan for any “no” answers to determine if it is safe to proceed with EksoNR walking.

DONNING

Utilize black laminated Donning quick guide and safety checklist.

Fit Kit

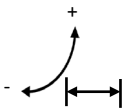
	**Description:** **Foot Binding Pad** **Purpose:** Provide additional padding for increased foot comfort. **Use:** Attach fastener pads on inside of binding.
	**Description:** **Foot Lift** **Purpose:** Provide additional height. Foot Lifts are available in sizes 0.125 in., 0.25 in., and 0.5 in. Metric units convert to 0,3 cm, 0,6 cm, and 1,3 cm. **Use:** Insert foot lift under shoe before securing binding.
	**Description:** **Tibial Spacer** **Purpose:** Used as a positional support for persons with thin lower extremities (anterior to posterior) to obtain better contact and postural support with EksoNR knee joint in standing. Can also be placed medially to the tibial space to help reduce knee valgus. Small (0.125 in./0,3 cm) and Medium (0.25 in./0,6 cm) sizes available. **Use:** Attach fastener spacer on inside of tibial pad.
	**Description:** **Thigh Strap Extender** **Purpose:** Provide additional length for the thigh support strap for individuals with greater thigh circumference. **Use:** Attach extender strap to thigh strap with minimum 3 in. (7,6 cm) fastener overlap on both ends.
	**Description:** **Hip Pad Spacer** **Purpose:** Provide additional contact for person with narrow hip width (less than 14 in. (35 cm)) to improve alignment within device. Adds an additional 0.5 in. (1,3 cm) per spacer bilaterally. **Use:** Attach fastener pads on inside of hips.

	**Description:** **Sacral Spacer** **Purpose:** Used as a positional support to obtain improved alignment of greater trochanter and EksoNR hip joint in standing for person with narrow pelvis (anterior/posterior). Medium and Large sizes available. **Use:** Attach fastener spacer between Rear Posterior Torso Brace and posterior carbon fiber plate. Secure in place with Posterior Torso Brace Bottom Closure.
	**Description:** **Inflatable Lumbar Pad** **Purpose:** Used to ensure optimal lordosis in spine. **Use:** With valve open, insert inflated pad into vertical pocket on front of Front Posterior Torso Brace. Adjust up or down to position, deflate as needed and close valve.
	**Description:** **Torso Spacer** **Purpose:** Used as a positional support for person with thin torso (anterior/posterior) to obtain better fit and contact within EksoNR torso padding and alignment in standing. Posterior Torso Spacers available in 0.25 in. (0,6 cm) and 0.5 in. (1,3 cm). **Use:** Insert torso spacer into pocket on posterior side of Front Posterior Torso Brace.
	**Description:** **Posterior Spinal Pads (Paraspinal Pads)** **Purpose:** Used to offload sacrum and/or spinous processes. **Use:** Place behind torso as needed.

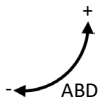
Small Anterior Torso Pad  Medium, Large, and Extra-Large Anterior Torso Pads (have similar look) 	**Description:** **Anterior Torso Pad** **Purpose:** Provide the abdominal support within device. Available in Small, Medium, Large, and Extra-Large. Lower Anterior Torso Pad attaches to the Anterior Torso Pads to increase length or improve abdominal girth capture. **Use:** Select the small, medium, large or extra-large torso pad, as appropriate for the patient. • The small pad is generally used for a patient with a small frame and/or good trunk strength • The medium pad is generally used for a patient with a higher level of injury and/or large torso length and width. • The large and extra-large pads are generally used for a patient with a larger abdominal girth.
	**Description:** **Arm Sling** **Purpose:** Provide upper extremity support when needed. Can be used for either right or left side. Plastic fasteners on sling straps integrate into EksoNR Shoulder Straps (torso backpack straps) for ease of use. Adjustable in length to support forearm appropriately. **Use:** Attach Arm Sling fasteners into clips located on EksoNR Shoulder Straps (torso backpack straps). Adjust strap length to support forearm appropriately. Use extra fastener strap to hold excess folded sling around elbow. Adjust positioning as needed.
	**Description:** **Posterior Sling** **Purpose:** Provide posterior support during sit-to-stand. Adjusts in length to support posterior appropriately. **Use:** Fits over hip motors. **IMPORTANT:** **The Posterior Sling must be used with every patient during a sit-to-stand transition. Once standing, the sling should be removed.**

Hip adjustments

Icon on device to unlock hip width



Icon on device to adjust hip width



Icon on device to adjust hip abduction

Ankle adjustments

There are two adjustments at the ankle: stiffness and angle.

Ankle Stiffness

- Four levels of adjustment with 1 being the least stiff, 4 being the most stiff.
- Aids in single limb stance stability and tibial progression.
- Sliding lever on front of ankle, can be aided by slight plantarflexion pressure on the footplate.
- Can be set asymmetrically.
- The two factors we utilize to choose this setting are patient weight and plantar flexion strength.
    - Spasticity in the gastrocnemius may be viewed as perceived strength when making this selection.

Stiffness	1	2	3	4
	Strong/Normal plantarflexion strength	**Fair/Good** plantarflexion strength and weight under 130 lb (60 kg)	**Fair** plantarflexion strength and weight 130-180 lb (60-80 kg)	**Poor/Fair** plantarflexion strength and weight 180-220 lb (80-100 kg)
			Absent plantarflexion strength and weight **under** 140 lb (64 kg)	**Absent** plantarflexion strength and weight **over** 140 lb (64 kg)
LEFT ANKLE STIFFNESS SETTING			**RIGHT ANKLE STIFFNESS SETTING**	

Ankle Resting Angle

- Adjustment achieves optimal standing balance.
- Must be set symmetrically.
- Controlled by 6-sided knob on the back of the ankle.
- EksoNR resting position is 0, which is slight relative dorsiflexion.
- Negative numbers result in more relative plantarflexion. Positive numbers result in more relative dorsiflexion.

To adjust:

- Use the chart to identify the correct value for the ankle angle setting based on the knee flexion setting that the patient requires.
- Can be adjusted before patient gets in the device.

Knee flexion angle	Ankle angle setting
0, 1, or 2 degrees	-3
3 or 4 degrees	-2
5 or 6 degrees	-1
7 or 8 degrees	0
9 or 10 degrees	1
11 or 12 degrees	2

- Once patient is in standing, if they appear to be unbalanced, help them find their balanced position. This should be where they are in good plumbline alignment when viewing from the side.
    - Then, disengage 6 sided dial to adjust. Dial is spring loaded and will turn in the direction of the balance point.

  NOTE: The dial cannot be turned from -3 directly to 2.

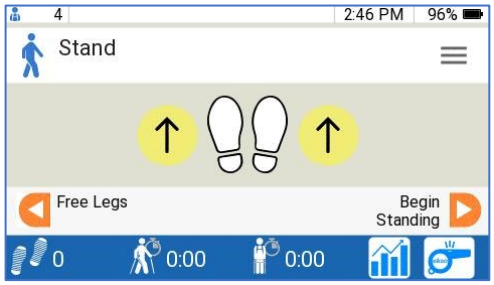
BEGINNING A SESSION

Identify patient impairments and goals

If your patient is able, completing a pre-walk before getting into the EksoNR is helpful for identifying gait deviations and determining goals for the session. These goals should drive your session.

Sit-to-Stand

- A single-phase stand transition in which the patient must be leaning forward prior to initiating.
    - Requires patient to already be leaned forward before physical therapist begins action with controller.
- First, patient's feet must be tucked back.



    - You will see colored dots next to two feet on the controller that indicate the foot position.
    - A red dot indicates that the foot is not in an appropriate spot to initiate a stand
        - Follow the arrows and move the foot in the direction of the arrow.
    - A yellow dot indicates that you can initiate a stand, but it may be less balanced.
    - A green dot indicates the ideal position of the foot.
        - Once both dots are green, or you are satisfied with the foot placement in yellow, you will be able to initiate a stand.

Pausing Sit-to-Stand or Stand-to-Sit

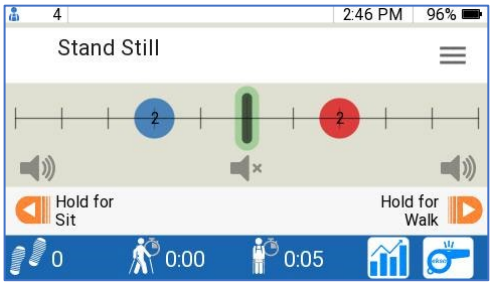
- Yellow button or same arrow that initiated the movement will pause the patient during transition.
- Follow commands on screen to continue patient towards sit or stand.
- ONLY select to free legs if patient is in contact with the chair.

Standing Visual Check

After stand transition, check for the following to ensure optimal set up:

- Confirm alignment of the hip and knee joints, including confirming the proper hip width setting.
- Confirm security of all straps, including pulling down torso pad, if necessary.
- Remove posterior sling.
- If it is patient's first time standing, confirm resting angle of ankle joint provides balance.

Weight Shift



When you initially stand up, you will be directed into a weight shift screen. You will also see this screen anytime you initiate a standstill.

The black line indicates your patient's position. The green line indicates midline.

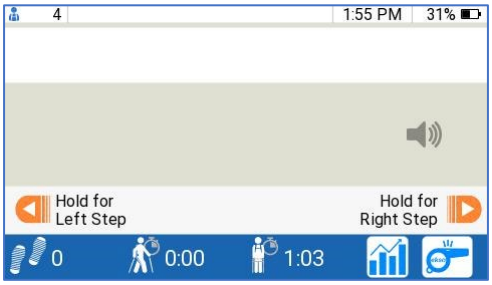
Move the red and blue dots to indicate your desired lateral weight shift.

Auditory cues can be turned on/off by pressing on the corresponding speaker icon.

If on, a chirp will sound when the patient is on the weight shift target. You will hear a negative tone if they shift past the desired target.

PreGait: Midstance

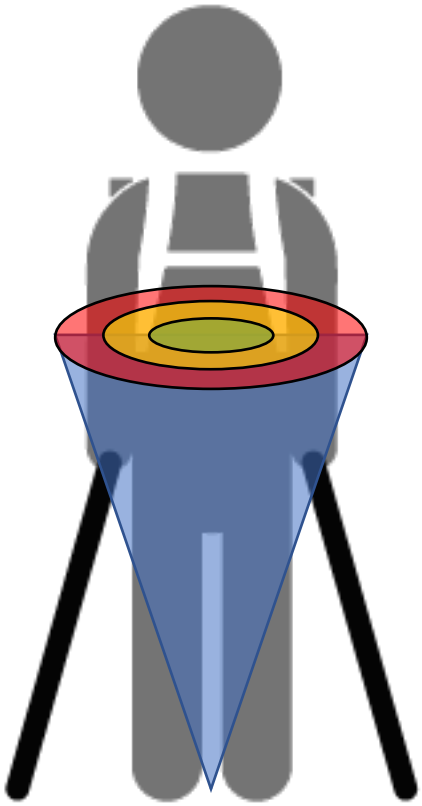
Found under the PreGait menu (☰) once standing, the Midstance program allows your patient to take one step forward into a stagger stance. This activity is designed to promote anterior-lateral weight shifts and ultimately assist the patient with achieving and maintaining their midstance.



- Select which leg to step forward with by holding the for a right step or the for a left step.
- Initiate that step by pressing the . This will get your patient into a stagger stance.
- Audio Cues
    - When the lateral component of the weight shift is achieved, a higher pitched “chirp” will sound.
    - When the forward component of the weight shift is achieved, a slightly lower pitched “beep” will be heard.
    - Shifting out of that anterior-lateral shift and back onto the trailing limb will trigger a dull “reset” audio tone.
- This can be completed as many times as desired by the therapist.
- Only one step is allowed in this activity. If the therapist desires practicing forward weight shifting on both sides, you must return to stand still, bring feet together, and initiate the activity again.
- Each step taken in Midstance will be added to the cumulative step count.

Handling Technique

Your goal is to keep your patient's center of mass over their base of support. Using the figure below, the goal is to keep patients in their green area – allowing them space to shift their weight between feet but not get outside of a safe base of support. As they enter the yellow and then the red areas, not only are their weight shifts inefficient, but they enter a position of imbalance. By preventing them from moving beyond the green zone, the therapist reinforces the correct balance point to the patient as well as keeps them safe throughout the EksoNR session.



Starting and stopping

If Pattern: On

- To begin walking, the first step will be triggered by pressing the right arrow. The right foot will step first.
- After the initial step, walking will occur automatically based on patient positioning.
    - Patient must hit lateral weight shift target, indicated by a chirp sound, if sounds are turned on. Patient must also unweight trailing limb to initiate subsequent step. If patient is unable to unweight limb, continued weight shift forward until a beep sound is heard will also initiate next step.
- To stop walking, pressing either the yellow button or left arrow will fully lock both legs into the patient's fullest extension.

If Pattern: Off

- To begin walking, press the right arrow to enable walking, then the patient can initiate their first step with either foot.
- Patient is in charge of initiating each step.
- To stop walking, pressing the left arrow will place both legs into a soft standstill, allowing some knee flexion.
    - The yellow button will fully lock both legs into the patient's fullest extension and should be utilized if there is any safety concern or significant fatigue.

Turning

If Pattern: On

- Pressing the green check enters Turn Mode.
    - **Turn Mode** allows the patient to take repeated steps with the same leg to complete a turn with a small radius.
- Turns are initiated in split stance, facilitating a turn towards the back leg.
    - Begin by turning the assistive device in the direction of the turn.
    - Cue patient to push down on assistive device while turning towards back leg, while still keeping weight through feet.
    - Patient should pivot on front of feet, slightly unweighting heels.
- Turn 90 degrees at a time.
    - If more than a 90-degree turn is required, initiate another step from **Turn Mode** screen to reenter split stance and repeat this process.

If Pattern: Off

- Press the left arrow to enter a soft standstill.
    - Patient can take a small step with either leg to put legs in split stance.
- Turns are initiated in split stance, facilitating a turn towards the back leg.
    - Begin by turning the assistive device in the direction of the turn.
    - Cue patient to push down on assistive device while turning towards back leg, while still keeping weight through feet.
    - Patient should pivot on front of feet, slightly unweighting heels.
- Turn 90 degrees at a time
    - If more than a 90-deree turn is required, cue patient to take a small step to reenter split stance and repeat this process

FEEDBACK SCORES

Feedback scores are provided when Pattern: On to help guide you in your session.

Scores are out of 100 and relate to the percentage of assistance that the EksoNR motors are providing to keep the patient on the swing path.

When Support: High -

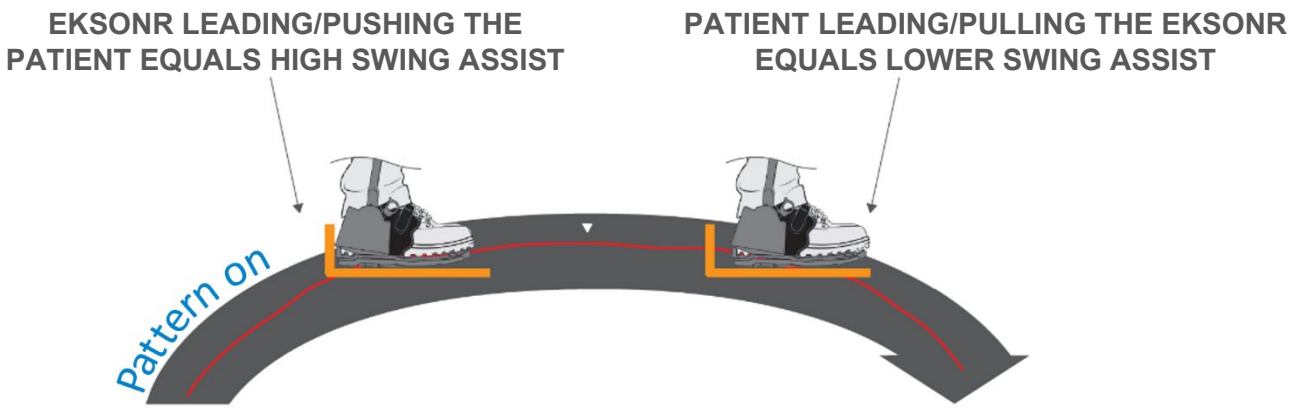
- **Swing Assist** - the real time amount of assistance the EksoNR is providing to complete the forward swing along the path
- **Min Assist** - the minimal amount of assistance the EksoNR estimates it would need to provide if your patient were to take their best step

When Support: Low -

- **Swing Assist** – will read 70, which is the set ceiling amount of assistance provided.
- **Min Assist** - the real time amount of assistance the EksoNR is providing to complete the forward swing along the path

The patient must sync with, and then lead, the EksoNR programmed gait path and use their power in that pattern before feedback scores will decrease. The patient must be following the guided path for the feedback scores to decrease.

Feedback scores can be utilized to assess whether a particular cue is helping the patient become more correctly engaged or to assess if a setting change was appropriate to make.



Locations of feedback scores

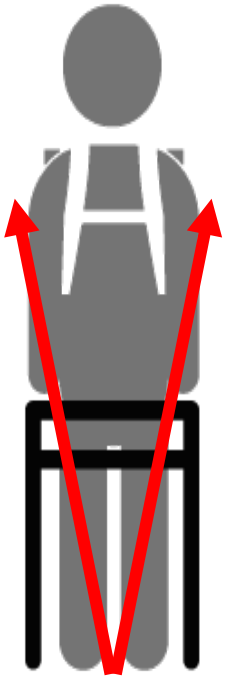
Feedback scores will only be shown when Pattern: On.

- Average of the last 5 steps on each leg will show on the walk screen as you are walking.
- Average of the last 60 steps on each leg will show in the statistics menu.
- Full session scores can be viewed on a graph via Ekso Pulse.

PROGRESSION

Begin with Pattern: On, Support: High. This will **teach** your patient a specific step.

1) Consider Base of Support



- Assure that the appropriate hip abduction setting is appropriate for the walking session.
- Ideal base of support is 1 inch (2,5 cm) between the patient's feet during mid-swing.

2) Teach appropriate weight shifting

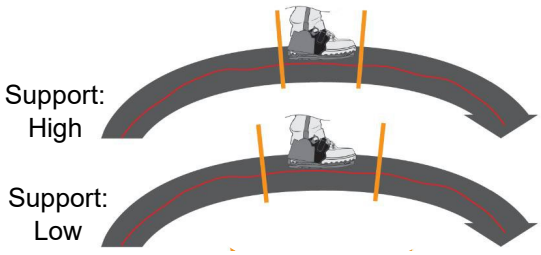
- The ability to maintain midstance is crucial to effective walking.
- Leaning too far forward results in landing on a flexed knee and shortened step length.
- Leaning too far laterally results in inefficient walking and could increase risk of falling.

3) Examine swing path

- Focus on creating the perfect swing for your patient.
- Begin with step height, then step length, then swing time.

4) Progress to Pattern: On, Support: Low, if appropriate

- Consider removing some support to further challenge patient.
- If the EksoNR detects that the patient is unable to complete the swing, it will increase power as needed to aid the patient after a short amount of time. This time is provided to allow the patient to attempt to self-correct and finish the swing with their own strength. At any time if EksoNR detects an unsafe position, it will complete the swing for the patient. If the EksoNR completes the swing due to either patient inability to get back on the path or unsafe position detected, a series of notes will sound to alert the spotter.



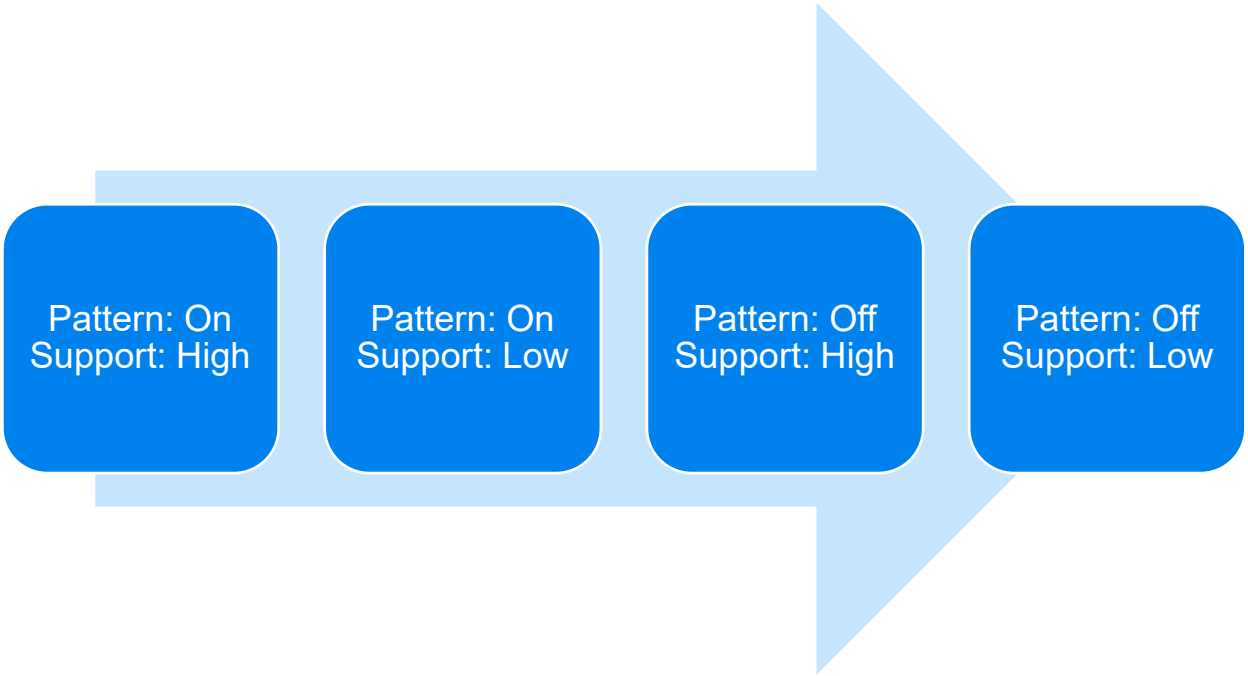
5) Progress to Pattern: Off, Support: High, if appropriate

- Once your patient has learned and is leading the step within the pattern, remove the pattern to assess their ability to carryover.

6) Progress to Pattern: Off, Support: Low, if appropriate

- Further challenge patient by decreasing support in both swing and stance.

Overall Progression Ideas



- If you are receiving a lot of coaching, consider returning to a higher level in the progression, either by providing more support, or turning the pattern back on.
- GaitCoach will give you some prompts to move through this progression, but you are not required to wait for that prompt. You can change pattern and support at anytime based on your clinical goals.

Assistive Device Progression

- Begin patients on walker.
- Using cane (not included) – utilize 3-point gait pattern.
- Using crutches – use 4-point gait pattern (crutch follows the step on the same side).
    - See *Operating Manual* for detailed instructions.

ERROR MESSAGES

Standing time out

A **Standing Timeout** error occurs when the EksoNR knee joints take longer than expected to—or never fully—reach the programmed **Knee Flex** angle during a sit-to-stand transition.

1. Press to acknowledge.
2. Hold to continue.
3. Gently press on the EksoNR knee joints to see if the brakes engage.
4. If an audible click is heard on both knees, the brakes have engaged. Press for **Stand Still** and proceed with session as normal.

5. If brakes do not engage, press to **Hold for Sit**. Sit down and begin an assessment of what prevented the knee joints from reaching the programmed **Knee Flex** angle during the sit-to-stand transition.

Likely causes of STO:

- Knee joint malalignment
- Knee ROM restriction/
- Ankle Clonus/Spasticity

Safe Mode

Safe Mode is a *safety feature* that occurs if a critical device error occurs. When the device enters **Safe Mode**, the EksoNR emits a distinct alarm cueing the physical therapists that immediate spotting is required for patient safety.

- Knees lock in whatever position they were in when the error occurs
- Hip motors go free with a damping component that slows the hip motion to assist the patient in staying upright, resisting the motion for hip flexion.
- Provide full extension moment through hips to provide mechanical stability (see photo).
- Lower patient to chair via long-sit with partner

Locked Knees Error

Locked Knees is a *safety feature* that occurs if a critical device error occurs in relation to the knee joint of the EksoNR.

- Hip motors engage/lock resisting the motion for hip flexion.
- Knee motors turn OFF and knee brakes engage, keeping EksoNR knees locked in current position
- React as if it is a Safe Mode, follow controller to free hips and long-sit patient

CLEANING

- Between patient sessions, all EksoNR components that make contact with a patient can be wiped down with a sanitizing wipe.
- Monthly – wipe down inner tubing of upper and lower legs to remove dust.
- Soiled soft goods (fit kit items) can be machine washed in cold water, then laid flat to air dry.
- See Operating Manual for full maintenance instructions.

GAITCOACH+ TRAINING

Introduction

GaitCoach+ Software is available for purchase and builds upon the features of GaitCoach.

GaitCoach+ introduces software to further customize and fine-tune the assistance provided to each leg when the pattern is on and off. This software addition provides the ability to:

- With Pattern: On, change step initiation mode.
- With Pattern: On, cap the assistance needed to keep the Ekso leg on the given path.
- With Pattern: Off, fine tune the swing assistance and stance support separately and individually between legs.
- Turn Pattern: On for one leg only.
- Change the speed of sit to stand.
- Complete PreGait exercises.

These programs allow EksoNR to be a stronger rehabilitation training tool used for gait, pregait, and standing balance/midline/weight shifting activities. EksoNR provides quantifiable feedback measures used for gait performance once a patient has been taught basic concepts for walking.

SETTINGS MENU

Stand Up Time

An additional setting choice allows you to stand at **normal** speed or **fast** speed. Foot position messages and requirements are the same. Speed chosen will also determine speed of stand to sit.

Step Initiation

Choose between manual and automatic step initiation. Step initiation program only applies when Pattern: On.

Manual: For every step, a button push is required to initiate that step

Automatic: A button push is required to initiate the first step, but each subsequent step occurs automatically based on patient positioning

Note: Automatic step initiation is the same as how GaitCoach software initiates steps.

ASSISTANCE MENU

The new assistance menu is where you can customize how the EksoNR will behave when walking.

Each leg can be set to have Pattern: On or Pattern: Off. It is possible to set the right and left legs differently, if that is appropriate for the patient.

From there, you will be provided with swing and stance options for each leg. Again, these can be set differently between right and left legs if that is appropriate for the patient.

Pattern: On

Options allow for assisting and supporting patient in swing and stance phases. All swing and stance options can be chosen independently for each leg.

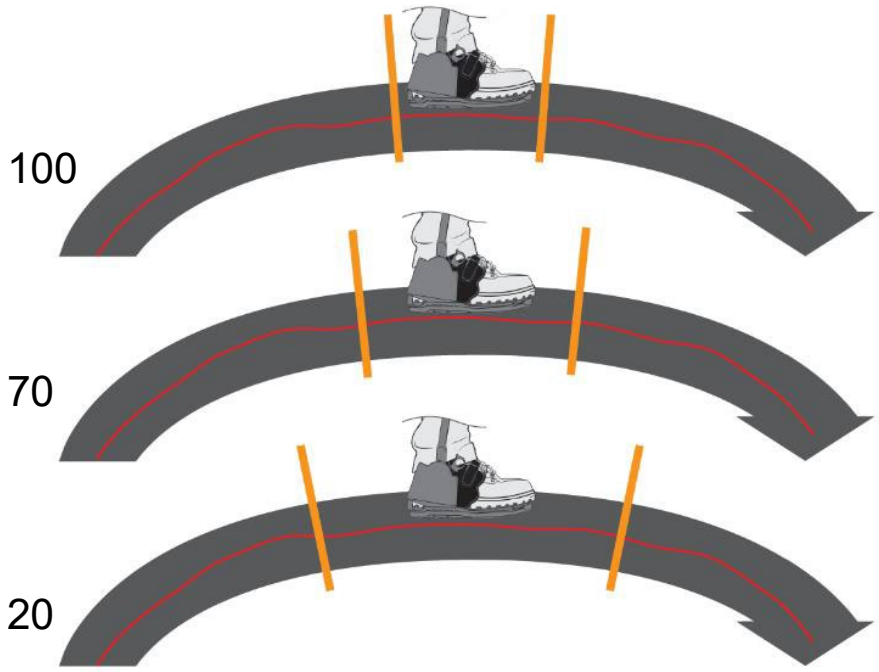
Swing support:

- **Max:** provides 100% motor assistance, 100% of the time to help break up spasticity
- **Adapt:** provides a constrained swing path that EksoNR will help keep the leg on while providing only as much assistance as needed for each step
- **100, 95, 90, 85…..10, 5, 0:** can be selected which will cap the amount of assist it will provide at that percent of motor power. For example, if you choose 60, this translates to the EksoNR motors providing at most 60% of the assistance that they are capable of providing. This will force your patient to be more active in their walking.

  It is important to understand that EksoNR is still adapting to the patient if they are walking at or below the selected value.

  If your patient veers off the desired path of swing in any way, EksoNR will freeze the swing leg in place and give them some time to get back on path. If it detects that your patient is approaching an unsafe position, or your patient is taking too long to find the path, EksoNR will complete the swing at 100% power.

As the Swing Assist value decreases, patient is less constrained along the swing pattern and has more “room” to succeed from an anterior/posterior perspective.



Stance support:

- Flex - Allows for flexibility through stance phase as patient aligns within requirements and can contribute to stance.
- Full - Not variable; ceiling at full power; less susceptible to patient interaction.

Pattern: Off

Customization of gravity offloading or added resistance for swing and support for stance. All swing and stance options can be chosen independently for each leg.

Swing

- Neutral: Provides assistance to support the weight of EksoNR only.
    - Begin each patient in Neutral to assess ability.
- Hi/Lo Assistance: Provides graded boost to amplify patient movement to aid in swing phase.
    - Appropriate for patients with low or emerging strength.
- Hi/Lo Resistance: Provides graded resistance for patients to push against with to complete swing.
    - Appropriate for patient with movement disorder, ataxia, or motor apraxia.

Stance

Ekso provides graded amounts of knee support to supplement patient's ability in stance.

Ekso provides knee flexion safety, block at 45 degrees.

To select stance support option, consider patients strength (glutes/quads) and weight. (Lower strength and higher weight; consider higher support. Higher strength and lower weight; consider lower support)

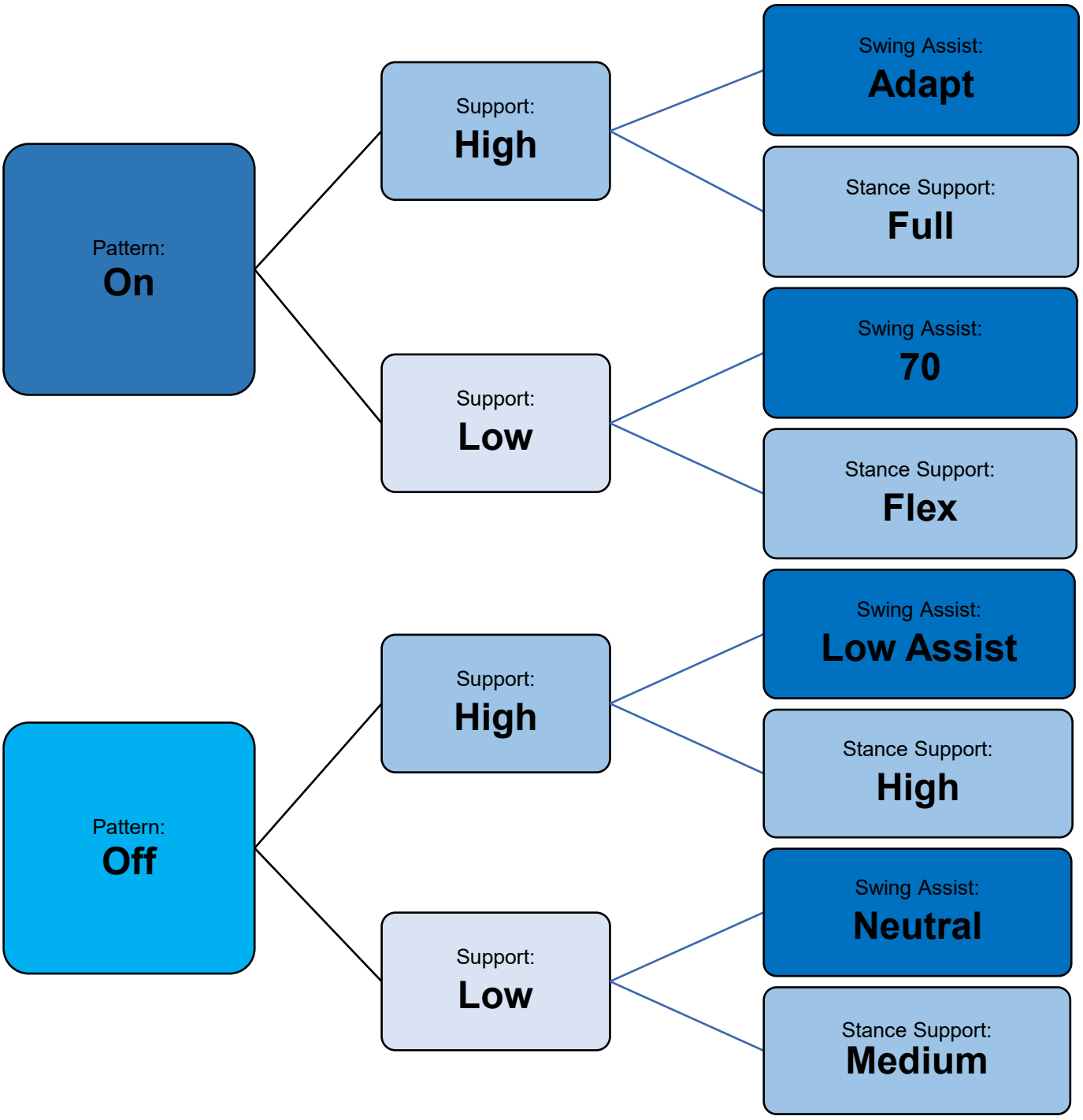
- Very High
- High
- Medium
- Low

UNILATERAL PATTERN: ON

EksoNR allows you to choose if the gait pattern is present or removed on both the right and left leg. By setting the right and left leg different, you will have only one leg required to follow the gait pattern.

- Allows for gait training with one leg following a specified path and one that is able to create its own step.
- Will need to program Swing Assistance and Stance Support on both legs.
- Step initiation mode only active for leg with Pattern: On.

GAITCOACH TO GAITCOACH+ EQUIVALENCY



SIT TO STAND

All Sit-to-Stand and Stand-to-Sit transitions are operated with bilateral leg power

- After Stand completed:
  - Controller prompts PT to “go to Pattern: Off” if both legs are set to Pattern: Off
  - Controller prompts patient to weight shift, then free offloaded limb if one leg is set to Pattern: Off
- Before beginning Sit action:
  - If Pattern: On for both legs
    - Controller prompts to press left arrow button to acknowledge and transition to sit with one additional left arrow push to “Begin Sit”.
  - If Pattern: Off for one or both legs
    - Two action screens now required to navigate, before beginning Sit.
      - First, must press left arrow button to “Go to Pattern: On”.
      - Second, transition to sit with one additional left arrow push to “Begin Sit”.

STOPPING

	Pressing Yellow Button at any time results in:	Pressing Left Arrow during Walking results in:	Actions same or different	Turning Options
Pattern On: Bilaterally	Full Stand Still: Both legs locked	Stand Still: Both legs locked	SAME	Green Checkmark enables turning program with controller initiated repetitive stepping. Green Checkmark returns to walk.
Pattern: Off Bilaterally	Full Stand Still	Stand Still: Both legs stay free, with the 35°-45° soft stops in place	DIFFERENT	No Turning program. Utilize Left arrow for stand still, if needed for patient safety. Instruct patient to turn with either leg.
Pattern: On Unilaterally	Full Stand Still	Stand Still: Pattern: On leg locked, Pattern: Off leg continues to allow patient initiated movement with selected Stance Support and Swing Assistance	DIFFERENT	No Turning program. Utilize Left arrow for stand still and step with Pattern: Off leg.

PREGAIT SUBMENU

A PreGait menu has been added to focus on mobilization tasks. This can be accessed before walking or interspersed throughout the session.

Weight Shift / Step in Place

- Combined weight shift and step in place modes allow for adjustment of weight shifting targets and level of trajectory free swing assist and stance support during any pre-gait stepping activities.
- PT begins in weight shift mode to set lateral targets but can transition to step in place by pressing and holding the right arrow to free the legs.
    - Alternating heel strikes, forward step weight shifts, marching in place, side-stepping.
        - Ekso offers range of motion values for the hip and knee angles.
    - Targets from Weight Shift screen will remain on in Step in Place mode for training carryover.
        - Both legs change to Pattern: Off.
            - Physical Therapist selects appropriate Swing Assistance for each leg.
            - Physical Therapist selects appropriate Stance Support for each leg.

Squats

- Allows squatting exercises from standing to three pre-determined limits for knee flexion motion.
    - 45 degrees, 65 degrees, 90 degrees
    - Follow instructions on controller to consider base of support, resting ankle settings, and ankle stiffness settings prior to squats.
        - Open base of support with driver or unlocking free hip abduction.
        - Set ankle stiffness to 1.
        - Set ankle angle to 2.
    - Real time hip and knee flexion ROM values will appear on the controller and blue numbers will record the knee and hip angles for the max squat achieved.
    - The controller also tallies the number of successfully completed squats.
- Both legs change to Pattern: Off stance mode.
    - PT selects appropriate setting for Stance Support.
- Yellow Button available to recover patient to standing if patient fatigues.

Midstance

Unchanged from GaitCoach software. Midstance allows your patient to take one step forward into a stagger stance. This activity is designed to promote anterior-lateral weight shifts and ultimately assist the patient with achieving and maintaining their midstance.

EKSONR WITH GAITCOACH+ PROGRAMMING DECISIONS