C-Leg 4.
Activity Chart Guide.

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ottobock.

Comparing a New *C-Leg* to Patient's Current Device.

The purpose of this guide is to strengthen your Activity Chart. First, we will go over the features and benefits and identify how a new microprocessor knee (MPK) can help your patient. Then there are some examples of how to complete the Activity Chart using this information.

Falls and stumbles

Swing Flexion Resistance: If medical records state that there are documented falls, your records will be stronger if you include additional detail about the number of falls and the respective injuries and costs incurred as a result (if available). The insurance payer likely paid for those injuries, but may not take the time to look back when deciding whether to cover the MPK or not.

After compiling a history of falls and injuries, state that "the enhanced stumble recovery feature on the *C-Leg* 4 takes stability to a new level by actively controlling and adjusting swing flexion resistance while the knee is swinging forward. This ensures that the proper amount of resistance is in place to enable recovery in the event of a stumble."

Unable to change walking speed
Compensatory movements
Energy expenditure issues

Microprocessor Swing and Stance Phase Control: Discuss activities that require changes in walking speed (e.g. walking in crowds or crossing a busy street). Your patient might also have difficulty with activities that require deceleration or transition to another type of surface. Follow with "the *C-Leg*'s main microprocessor gathers information from the various data sources and processes this information to adjust the knee joint´s functionality in real time, allowing the patient to walk more naturally and vary cadence with the knee adapting more accurately and more quickly than without a microprocessor." This would also apply if patient is compensating with the sound side (e.g. hip hike, circumduction, or vault), or requiring excess energy to ambulate.

Need to stand securely on level ground or on slopes

Inertial Motion Unit (IMU): Describe activities that require secure standing on a level surface or on an incline. Follow with "the patented inertial motion unit (IMU) on the *C-Leg* allows the patient to intuitively stand on a flexed and stable knee on level, uneven, or inclined surfaces (ramps or hills). With traditional prosthetic knees people with limb loss must use hip extension to stabilize the knee or deliberately bend the trunk forward to ensure that their center of mass stays ahead of their knee axis to prevent unexpected flexing of the prosthetic knee."

Unable to walk up/down slopes or ramps
Unable to descend stairs (step-over-step)
Unable to negotiate uneven/challenging terrain
Requires support for sitting

Stance Flexion: Describe activities that include hills, ramps or stairs and then state that "*C-Leg* provides hydraulic resistance against knee flexion (bending) mimicking the eccentric action of the quadriceps muscle. This controlled knee flexion occurs in early stance phase during weight bearing, and also provides shock absorption and reduced impact, thus allowing the patient to securely walk up and down slopes and ramps, negotiate uneven/challenging terrain, and to descend slopes and stairs step over step."

If the patient also requires support when sitting down, follow with "this feature also provides controlled support when sitting down."

Prolonged standing, locked or flexed knee

My Modes: Describe activities requiring a flexed knee for prolonged standing activities (e.g. cooking, stand on a slope, work at a tall desk or bench), locked knee (e.g. walking down steep hills, ladders, working on a roof, or exercise) or flexed knee (e.g. Horseback riding, motorcycle, roller skates and driving a car).

Need to take steps backward

Inertial Motion Unit (IMU): If the patient has a need to back-up, step away, or literally take steps backward during an activity, follow up with "the patented inertial motion unit (IMU) on the *C-Leg* provides stability when taking steps backwards/backing-up. Contrast this to traditional microprocessor knees which do not accommodate backward walking, causing the knee to collapse when stepping backward."

Snap back or knee jerk

Hydraulic Stance Extension Damping: If patient is experiencing snap back or knee jerk state that "*C-Leg* provides microprocessor-controlled progressive resistance during stance extension resulting in a more natural gait. Without this increased resistance the patient would feel a pronounced "snap back" or "jerk" at the knee, and would also present with an unnatural looking gait pattern.

Requires weatherproof componentry

IP 67 Rating: If patient has a need for weatherproof componentry state that "the *C-Leg* 4 IP 67 rating protects it from damage due to incidental contact with or temporary submersion in fresh water; however, it is not designed to be routinely submersed or used while showering or swimming. Because the *C-Leg* 4 is considered weatherproof, the patient does not have to worry while walking in the rain or using it around water.

Ottobock MPK Comparison (for Activity Charts).

	Kenevo	C-Leg 3 Discontinued	C-Leg 4	Genium	Genium X3
Sensors					
− Knee Angle	x	x	x	x	x
− Ankle Moment	x	x		x	x
− Inertial Motion Unit (IMU)	x		x	x	x
− Knee Moment				x	x
− Knee Extension Moment			x		
− Axial Load	x			x	x
Extension					
− Stance-none, Swing-fixed					
− Swing & Stance: Programmable		x			
− Swing & Stance: Real-time	x		x	x	x
Stance Flexion					
− Programmable		x	x		
− Selectable modes	x				
− Real-time				x	x
Swing Flexion					
− None (fully open valve)	x				
− Fixed (adjustable)					
− Programmable		x			
− Autoadapts			x	x	x
Maximum Weight	330#	300#	300#	330#	330#

Continued:	Kenevo	C-Leg 3 Discontinued	C-Leg 4	Genium	Genium X3
Features					
– Stumble Recovery	x	x	x	x	x
– Intuitive Stance	x (Mode C only)		x	x	x
– Walking Backward Support	x		x	x	x
– Sitting Support	x		x	x	x
– Reliable Stance Release	x		x	x	x
– Reliable Stance Release for short steps	x	x	x	x	x
– Walk Down Stairs Step-over-Step	x (Mode C only)	x	x	x	x
– Walk Up Stairs Step-over-Step				x	x
– Walk Up Slopes Step-over-Step	x (Mode C only)	x	x	x	x
– Step over Large Obstacles				x	x
– Walk to Run Feature				x	x
– Optimized Physiological Gait				x	x
– Programmable Modes		2	2	5	5
– Dedicated Running Mode					x
– Mute Mode					x
– Rugged Protector					x
Water Protection Ratings					
– IP 22 Fresh Dripping Water	x				
– IP 66 Water Jets					x
– IP 67 Weatherproof			x	x	
– IP 68 Submersible					x

C-Leg Daily Activity Chart Example.

Daily Activities	Distance Traveled	Can patient do this activity with current prosthesis?	How will patient be able to do it better with the new prosthesis?
Prior to the amputation, patient walked his two dogs 2 times daily for ½ mile. On his route there are cracks in the sidewalk and slope up to ten degrees.	Goal: Realistic 3.5 miles per week	Patient currently uses a mechanical knee. It is very difficult to do concurrent activities, such as managing the dogs with mechanical knee prosthesis. As a result he falls several times per year and recently injured his back, incurring $9500 of related medical expenses. He stumbles frequently and feels unsafe. He cannot carry objects at work, because it puts him off balance and at risk of falling.	He will be able to walk the dogs more safely with the C-Leg as it has been proven to increase multitasking capacities and cognitive burden while walking with the prosthesis The enhanced stumble recovery feature on the C-Leg 4 takes stability to a new level by actively controlling and adjusting swing flexion resistance while the knee is swinging forward. This ensures that the proper amount of resistance is in place to enable recovery in the event of a stumble, which will help when walking on uneven sidewalks and should increase his overall confidence when walking the dogs.
Prior to the amputation, patient went to the gym 3X per week and walked 2 miles on the tread mill. Realistically, he would like to get back up to 1 mile	Goal: 1 mile @ 3X/wk.	He attempted to walk on the treadmill with his current knee. He had to walk at a very slow rate completely supporting himself with the bars. He was afraid of falling and this hurt his shoulders.	The C-Leg will give him the necessary stability to walk on the treadmill using the bars similar to an able-bodied person, without fear of falling.
Prior to the amputation, patient went hiking in the mountains on steep and uneven terrain at least 12 times per year. Generally, these would be 5-10 mile hikes. He would like to start slowly doing this again.	Goal: 1-2 miles per month	He has not attempted any hiking other than on level terrain with his current knee.	The C-Leg provides hydraulic resistance against knee flexion (bending) mimicking the eccentric action of the quadriceps muscle. This controlled knee flexion occurs in early stance phase during weight bearing, and provides shock absorption and reduced impact, thus allowing the patient to securely walk up and down slopes and ramps and negotiate uneven/challenging terrain. This feature will allow him to safely navigate uneven terrain and slopes and will provide smooth deceleration when coming down off the mountain

Prior to the amputation patient mowed and raked the lawn weekly during the summer.	Goal 12 x per year, 1 hour	Patient's yard has too many uneven spots and some steep areas. He attempted to mow it and fell twice and has since had to hire help.	The C-Leg has been shown to have superior safety and allows for faster walking on uneven terrain and obstacle courses, with and without concurrent activities. C-Leg will allow him to maintain his yard again.
Daily Activities	**Distance Traveled**	**Can patient do this activity with current prosthesis?**	**How will patient be able to do it better with the new prosthesis?**
Prior to the amputation patient rode his bicycle 2x per week	Goal 2x/wk.	Patient's current knee does not allow him to ride a bicycle.	The C-Leg has a "my mode" feature which allows him to switch to bicycle mode using the remote control.
Prior to the amputation patient shopped at busy stores and malls and walked in crowds.	Goal 1X per week	Patient's current knee allows him to carefully vary his gait, but not intuitively and he always has to concentrate on every single step.	The C-Leg will allow him to focus on his shopping and not worry about changing speed or moving out of the way. The C-Leg's main microprocessor gathers information from the various data sources and processes this information to adjust the knee joint´s functionality in real time, allowing the patient to walk more naturally and vary cadence with the knee adapting more accurately and more quickly than without a microprocessor.