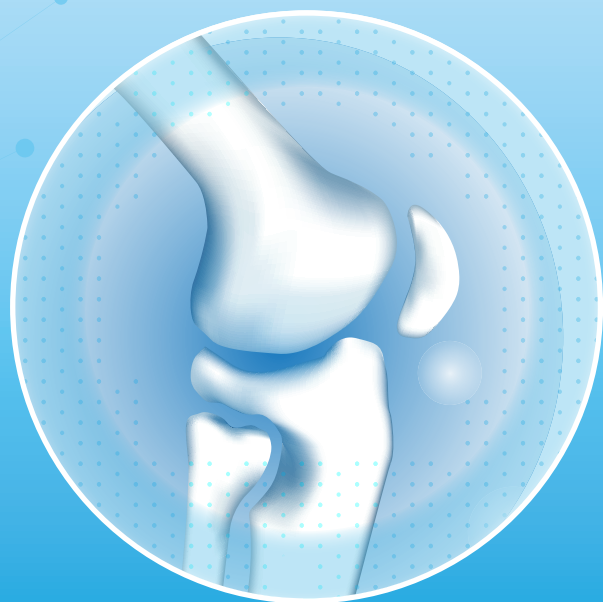


knee index





THE INDEX

The knee index is an evaluation developed to assess patients with a knee pathology or who have had surgery.

Using the knee index, therapists are able to plan a personalized rehabilitation program to meet a patient's specific and individual needs.

The knee index is a solution created to combine evaluation and rehabilitation in a simple and automatic way for the therapist, while providing the ability to modify individual rehabilitation parameters unique to each patient.

The knee index allows for an evaluation of the patient through tests that determine:

- Proprioceptive deficits in the operated limb
- Load distribution
- Motor Control
- Posture
- The patient's progress during the rehabilitation process
- Return to full function by comparing the test indicators of the operated limb with those of the healthy limb



THE PATH

The knee index is the first functional evaluation that is included in the clinical examination carried out by the orthopedic surgeon, that allows to obtain a complete evaluation of the knee.

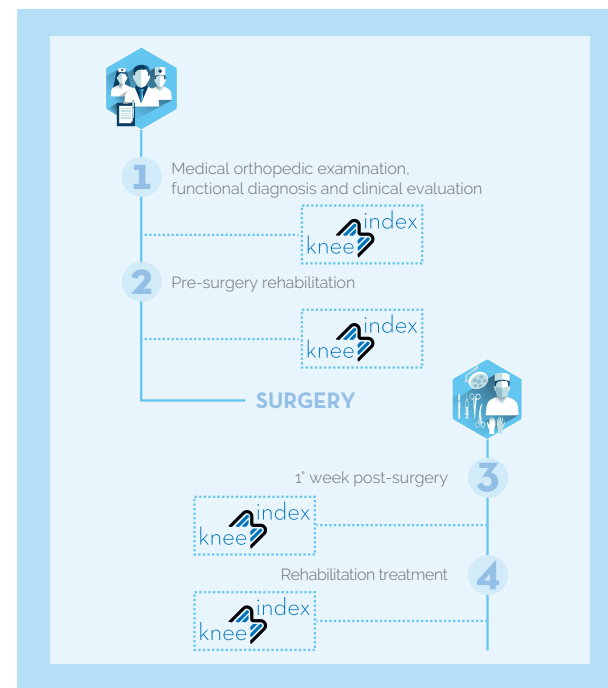
The knee index provides objective data to help the orthopedic surgeon provide support in monitoring the patient's progress through the evaluation and rehabilitation process, and a communication tool with the team of physical therapists and physiatrists.

This path, determined by a facility's workflow and the patient's need, may consist of an initial assessment (1), followed by a pre-surgery rehabilitation phase (2) and its evaluation, joint replacement and post-surgery phase (3) with further treatment and final evaluation (4). This path is completely modular. The phases may be planned independently of one another depending on the specific needs of the patient and the organization of the facility.

The knee index may also be used within the rehabilitation center for the evaluation and treatment of non-surgical conditions to support the physical therapist throughout the patient's clinical course of rehabilitation.

BENEFITS FOR THE PATIENT

- Faster recovery times
- Improving everyday life activities, such as ascending and descending stairs
- Ad hoc training for better crutch control
- Data is automatically organized into objective reports
- Treatment efficiency: more engaging exercises for the patient, less downtime
- Therapy is highly customizable through varying levels of exercise difficulty
- Better postural alignment



BENEFITS FOR THE ORTHOPEDIC SURGEON

- More objective monitoring of patient progression
- Provides objective and reliability reports of collected data
- Personalized treatment suggestions based on the specific deficits of the patient
- Progressive load control over time
- Easy management of post-surgery rehabilitation
- **Ability to set-up up a tailored rehabilitation service with specific pathways to support orthopedic surgery**

KNEE INDEX FOR KNEE SURGERY

The goal of knee surgery is to optimize the biomechanics of the knee, improve function and remove pain. Rehabilitation following knee surgery is an essential and fundamental part of its success.^{1,2/3,4}

Rehabilitation programs focus on range of motion (ROM) recovery and improving stability.⁵

Some of the most common problems faced by patients following knee replacement is poor motion control, reduced proprioception and balance^{6,7}, conditions also common to other knee disorders.

These deficits affect patients' ability to perform activities such as twisting, swinging, walking on irregular surfaces and changing direction. Various studies have shown that balance training can be helpful in post-surgery functional recovery and rehabilitation.^{7,8}

These improvements are due to the recovery of joint proprioception and postural control.

1. Cioppa-Mosca J, Cahill JB, Cavanaugh JT, Rudnick H, Wolff A. Postsurgical Rehabilitation Guidelines for the Orthopedic Clinician. Mosby Elsevier, St Louis, 2006.

2. Bade MJ1, Stevens-Lapsley JE. Early high-intensity rehabilitation following total knee arthroplasty improves outcomes. J Orthop Sports Phys Ther. 2011 Dec;41(12):932-41

3. Cioppa-Mosca J, Cahill JB, Cavanaugh JT, Rudnick H, Wolff A. Postsurgical Rehabilitation Guidelines for the Orthopedic Clinician. Mosby Elsevier, St Louis, 2006.

4. Bade MJ1, Stevens-Lapsley JE. Early high-intensity rehabilitation following total knee arthroplasty improves outcomes. J Orthop Sports Phys Ther. 2011 Dec;41(12):932-

5. <http://www.moveforwardpt.com/SymptomsConditionsDetail.aspx?cid=aba13452-8eec-4fcb-adb8-53e3a5456e3f>

Our "Multi-sensors" solution, to be used exclusively with hunova and huno devices, extends the normal use of a single position sensor to three multi-function sensors. This allows the knee index application to have more evaluations and an improved digital recording of R.O.M., all within dedicated and integrated reports.



6. Attfield SF, Wilton TJ, Pratt DJ, Sambatakakis A. Soft-tissue balance and recovery of proprioception after total knee replacement. J Bone Joint Surg Br 1996;78:540-545 [PubMed: 8682816]

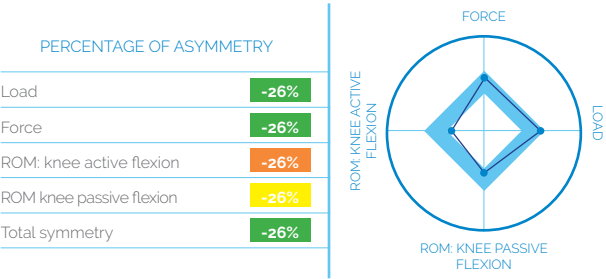
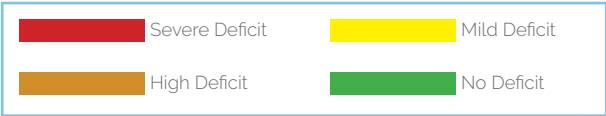
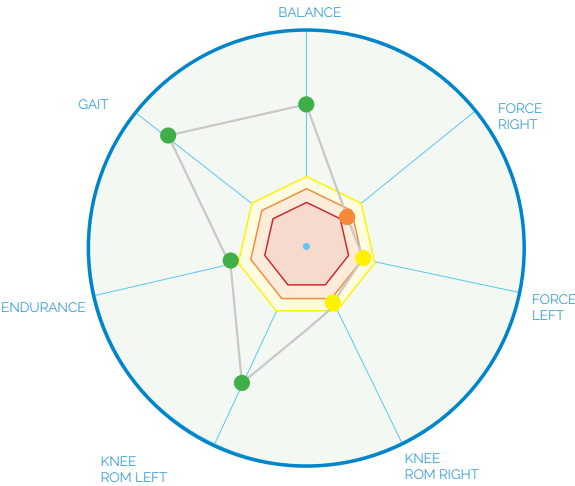
7. Liao CD, Lin LF, Huang YC, Huang SW, Chou LC, Liou TH. Functional outcomes of outpatient balance training following total knee replacement in patients with knee osteoarthritis: a randomized controlled trial. Clin Rehabil. 2015 29(9):855-67.

8. Minns Lowe CJ, Barker KL, Dewey M, Sackley CM. Effectiveness of physiotherapy exercise after knee arthroplasty for osteoarthritis: systematic review and meta-analysis of randomised controlled trials. BMJ. 2007;335:812.

INDEX AND RESULTS

The knee index provides a percentage score that reflects the functional performance of the knee at a specific time.

The knee index is calculated by combining the results of robotic evaluations grouped into 7 areas. Once deficits are identified in one or more functional area, the knee index suggests specific treatment to address the areas of dysfunction.



A percentage of symmetry between -20% and +20% can be considered normal.
If % > +20% -> asymmetric: performance is better on the right side.
If % < -20% -> asymmetric: performance is better on the left side.

	Reference	Knee RH	Knee LH
ROM Knee Extension	0-5°	1.0°	2.0°
ROM Knee Passive Flexion	160°	100.0°	135.0°
ROM Knee Active Flexion	140°	90.0°	130.0°

Parameters measured through the knee index compared to the reference values.

Training SUGGESTIONS

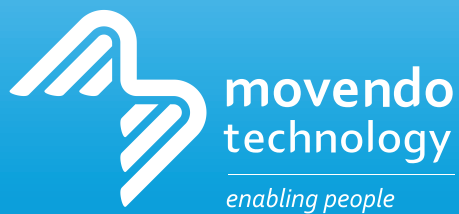
The knee index addresses several functional areas, identifying areas with functional limitations, categorizing the patient's level of deficit by severity (red, orange, yellow, green).

Based on the evaluation, the algorithm suggests a targeted rehabilitation program with personalized exercises.

functional area	level	suggested macroarea	starting difficulty
Knee ROM Right	Suggested	Knee ROM	Difficult
Strength Right	Recommended	Strength Right	Medium
Strength Left	Suggested	Strength Left	Medium
Maintenance		Maintenance	Easy

"The knee index may only be used in association with hunova/huno/huno s devices."





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