

# Introduction

How it all happened – started but never ends  
Back to the top with the 8 steps of rehabilitation  
*Doing the crucial right*



It can happen so quickly from one moment to the next and it's already happened. This one technical error and these external environmental influences with icy, uneven slope or a wrong movement on the soccer field and the fall with diagnosis cruciate ligament rupture and the end of the season follows. Now there is no way back only this one way forward, which on the one hand should be really well thought out and planned and on the other hand is always ongoing so that such injuries do not occur again.

But what is behind it all and what does the way back into sports look like? Why it is enormously important to do the right things during rehabilitation and afterwards as a preventive measure, we explain to you in the following.

In the rehabilitation of an injury it is basically irrelevant whether you are a competitive athlete or not, the phases are always divided from one stage to the next. Each stage is considered as an independent hurdle to be mastered and in no way two stages are taken at once, this only leads to stumbling and tumbling back down to the lower stage. Time and patience play a decisive factor, the more conscientiously and consistently the therapy and training as well as the associated regenerative measures are completed in the individual stages, the better the transition to the next rehabilitation phase.

This also includes that the requirements for each individual rehabilitation stage should be checked and tested in order to accompany you in the best possible way on your way, to drive you and to be able to lead you back to your top performance in sports and everyday life. Decisive is also a good joint leadership and communication on the part of doctors, physiotherapists and coaches team, which we would like to show you here.

There are exactly 8 rehabilitation stages to distinguish, exactly 8 as infinite, because even after successfully completed rehabilitation it always goes on and now the prevention as rehabilitation stage 8 moves into the spotlight, so that the risk of a subsequent injury can be reduced. It is particularly important in rehabilitation stage 1 to complete an initial test of the healthy side of the leg to lay a foundation, if followed in stage 3, 5 + 6 these measurement results can then already be compared with the injured side and put into relation. The better, more precise and, above all, more targeted one works on the deficits and potentials from the beginning of the therapy, the more successfully one can set the green ticks on the checklist in the individual rehabilitation phases and approach one's goal piece by piece. Nevertheless, one should be aware that this rehabilitation path accompanied by people who work together with the highest precision and competence is not an easy path with shortcuts, it can be very individual with uphill and downhill passages. Below are the detailed rehabilitation contents in the individual phases. We wish a successful rehabilitation and way back!

# Criterion based ACL-Rehabilitation

1

Phase 1: early post-operative phase

**MOTUM**  
HUMAN · PERFORMANCE · INSTITUTE



Phase 2: late post-operative phase (ca. 4 week after full load)



2

Phase 3: Strengthening and tendon orientation

**MOTUM**  
HUMAN · PERFORMANCE · INSTITUTE



Phase 4: Strengthening plyometry



3

Rehaphase 5: sportspecific run/jump training

**MOTUM**  
HUMAN · PERFORMANCE · INSTITUTE



4

Phase 6: Return to Sport

**MOTUM**  
HUMAN · PERFORMANCE · INSTITUTE



Phase 7: Return to Competition (soonest 9 month)



Phase 8: Secondary prevention



## Phase 1: early post-operative phase

| Aims   | Milestones   |
|--|--|
| <ul style="list-style-type: none"> <li>○ Total extension</li> <li>○ Swelling reduction</li> <li>○ Reduce muscle atrophy</li> </ul> | <ul style="list-style-type: none"> <li>○ Range of Motion ROM 0-90°</li> <li>○ Full load</li> </ul> |

### Content of therapy

|                                   |   |
|-----------------------------------|---|
| <b>Physiotherapy and training</b> | <ul style="list-style-type: none"> <li>○ E/F mobilisation in permitted range – <b>focus extension</b></li> <li>○ Check hip and ankle mobility</li> <li>○ Electromyography (EMG): control and activation Quadriceps with Biofeedbacktraining</li> <li>○ Swelling reducing measures</li> <li>○ Neuromuskuläre Electrostimulation (NMES):Kneepacemaker</li> <li>○ Blood Flow Restriction Training (BFRT)</li> <li>○ Gait training and analysis</li> <li>○ Water therapy</li> <li>○ Virtual reality (VR), Neuroathletic, Blaze Pods...</li> <li>○ Cooling: Game Ready, Kyrofluid</li> <li>○ Strengthening OP leg: coordination, Mobilisation, Stabilisation</li> <li>○ Training of healthy leg: in strength endurance method + upper body/core</li> </ul> |
|-----------------------------------|---|

### MOTUM Tests: Elevation of basic tests

## Phase 2: late post-operative phase (ca. 4 week after full load)

| Aims   | Milestones: 4 Weeks full load   |
|--|---|
| <ul style="list-style-type: none"> <li>○ Normal gait</li> <li>○ Reduce swelling despite progression of load</li> <li>○ Normal step up and down</li> <li>○ Possible activities of daily life ADL</li> </ul> | <ul style="list-style-type: none"> <li>○ Simple gait analysis Motum on treatmill</li> <li>○ Y-Balance test: single leg stability</li> <li>○ Isometry strength testing</li> <li>○</li> </ul> |

### Content of therapy

|                                   |   |
|-----------------------------------|---|
| <b>Physiotherapy and training</b> | <ul style="list-style-type: none"> <li>○ Strength endurance training</li> <li>○ Exercise examples: Squats, Good Mornings, Calf raises, Split Squats, Step up/down, Leg press (1bg), 1bg Squats/Deadlift</li> <li>○ Endurance: Hand/Ergometry or Crosstrainer</li> <li>○ Coordination training: balance training with instable surfaces</li> <li>○ BFR</li> <li>○ Biofeedbacktraining + EMG</li> </ul> |
|-----------------------------------|---|

### MOTUM tests: Gait analysis, Isokinetic

### Phase 3: Strengthening and tendon orientation

| Aims   | Milestones: 10-12 Weeks full load   |
|--|---|
| <ul style="list-style-type: none"> <li>○ Full ROM</li> <li>○ Muscle growth</li> <li>○ Tendon capacity and preparation for plyometric training</li> <li>○ Improve cardiac capacity</li> </ul> | <ul style="list-style-type: none"> <li>○ Isometric strength testing Squat</li> <li>○ Y-Balance</li> </ul> |

#### Content of therapy

|                                   |   |
|-----------------------------------|---|
| <b>Physiotherapy and training</b> | <ul style="list-style-type: none"> <li>○ Hypertrophy training</li> <li>○ Build up on tendon load</li> <li>○ Endurance basic 1 on ergometry</li> <li>○ Training of healthy leg: in hypertrophy method + upper body/core</li> </ul> |
|-----------------------------------|---|

**MOTUM tests: Isometric strength test, Y-Balance**

### Rehaphase 4: Strengthening plyometry

| Aims   | Milestones   |
|--|--|
| <ul style="list-style-type: none"> <li>○ Tolerance of load for developing run and jump movement pattern</li> </ul> | <ul style="list-style-type: none"> <li>○ Isokinetic strength testing</li> <li>○ Both legged/single leg „Counter Movement Jump“ on force plate</li> <li>○ Y-Balance Test</li> </ul> |

#### Content of therapy

|                                   |  |
|-----------------------------------|--|
| <b>Physiotherapy and training</b> | <ul style="list-style-type: none"> <li>○ Jump development</li> <li>○ Run ABC</li> <li>○ Continue on strength training: power/explosive strength</li> <li>○ Strengthening whole body</li> <li>○ Continue on endurance on ergometry: Basic 2 (extensive/intensive interval)</li> </ul> |
|-----------------------------------|--|

**MOTUM tests: Isokinetic, single leg jumps force plate**

## Phase 5: sport specific run/jump training (earliest after 6 month)

| Aims   | Milestones  |
|--|---|
| <ul style="list-style-type: none"> <li>○ Agility</li> <li>○ Run/jump development</li> <li>○ Sportartspezifische Drills</li> <li>○ Implementation of secondary injury prevention</li> </ul> | <ul style="list-style-type: none"> <li>○ Back in Action test 1</li> </ul> |

### Content of therapy

|                            |  |
|----------------------------|--|
| <b>Content of training</b> | <ul style="list-style-type: none"> <li>○ Sport specific training</li> <li>○ Progression of intensity and amount of running until jumping development</li> <li>○ Sport transfer of training: agility/speed/change of direction with external focus (Speedcourt/Virtual Reality MOTUM)</li> <li>○ Sportspezifische endurance training</li> </ul> |
|----------------------------|--|

### MOTUM tests: Back in Action Test 1

## Rehaphase 6: Phase Return to Sport

| Aims   | Milestones   |
|--|--|
| <ul style="list-style-type: none"> <li>○ Development of sportspezifische load p.e. back on snow, team training on court/field</li> <li>○ Rebuild fitness level before injury and better</li> </ul> | <ul style="list-style-type: none"> <li>○ Back in Action Re-Test</li> <li>○ Isokinetic testing</li> <li>○ Nominal value depending on sport</li> </ul> |

|                            |  |
|----------------------------|--|
| <b>Content of training</b> | <ul style="list-style-type: none"> <li>○ implementation of sport performance</li> <li>○ Regular implementation of secondary prevention measures</li> </ul> |
|----------------------------|--|

### MOTUM Testungen: Back in Action Re-Test + sportspezifische additional tests

## Phase 7: Return to Competition (soonest 9 month)

| Aims  | Milestones  |
|---|---|
| <ul style="list-style-type: none"> <li>○ Development of sportspezifische load and competition mode</li> </ul> | <ul style="list-style-type: none"> <li>○ Back in Action test)</li> <li>○ Retrieve performance at competition</li> </ul> |

|                            |  |
|----------------------------|--|
| <b>Content of training</b> | <ul style="list-style-type: none"> <li>○ Unlimited sport performance in daily competitive life</li> <li>○ Regular implementation of secondary prevention measures</li> </ul> |
|----------------------------|--|

## Phase 8: Secondary prevention

|                            |  |
|----------------------------|--|
| <b>Content of training</b> | <ul style="list-style-type: none"> <li>○ Diverse norm data</li> <li>○ Isokinet sportspezifische normdata:</li> </ul> |
|----------------------------|--|