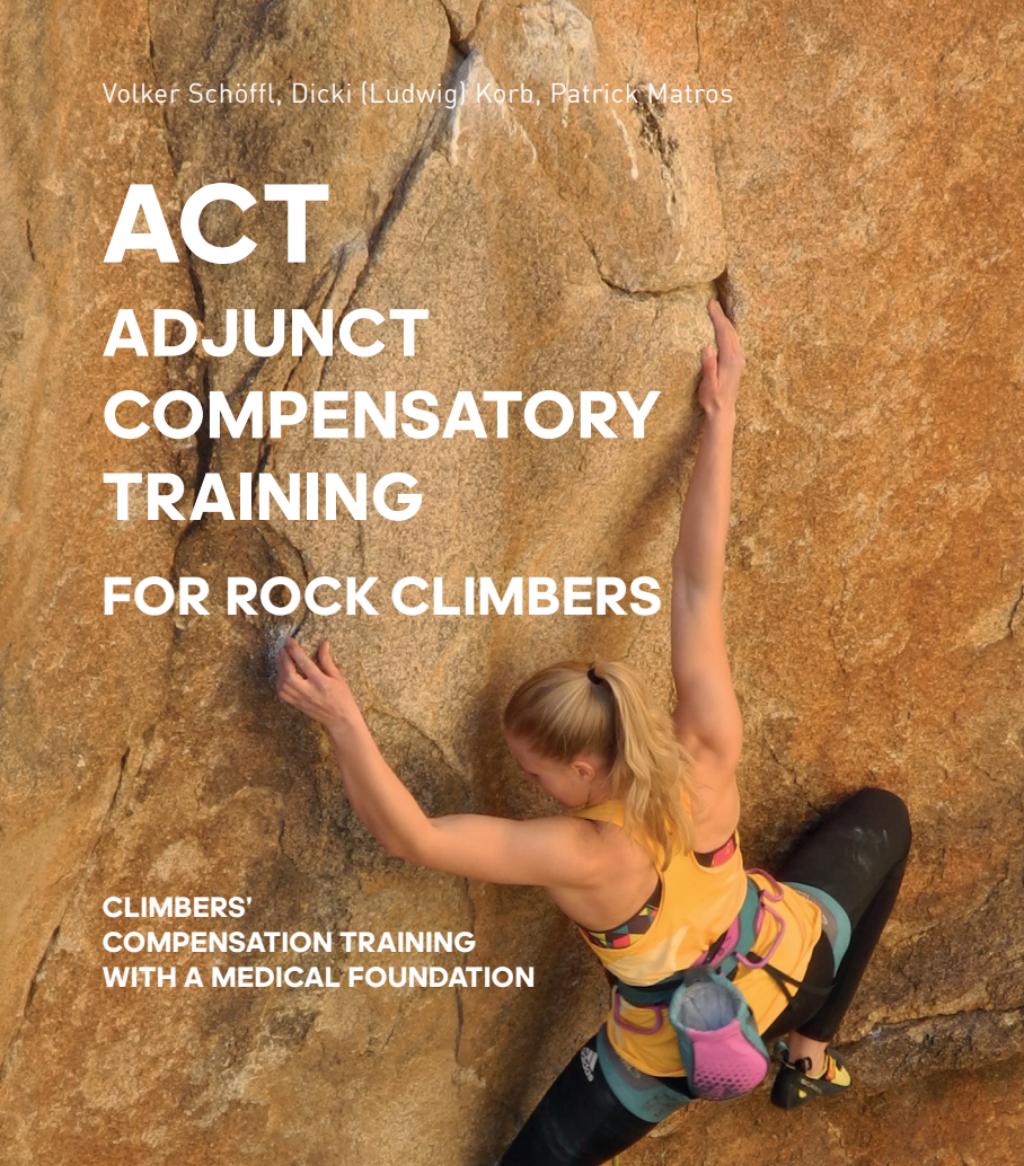


Volker Schöffl, Dicki (Ludwig) Korb, Patrick Matros

# ACT ADJUNCT COMPENSATORY TRAINING FOR ROCK CLIMBERS

CLIMBERS'  
COMPENSATION TRAINING  
WITH A MEDICAL FOUNDATION





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Volker Schöffl, Dicki (Ludwig) Korb, Patrick Matros

# THE AUTHORS

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**VOLKER**

Japanese translations currently in progress.

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He combines his enthusiasm for climbing and medicine with his medical aid project in Laos, where he and his wife work annually as volunteer doctors. ([www.sportsmedicine.rocks](http://www.sportsmedicine.rocks))

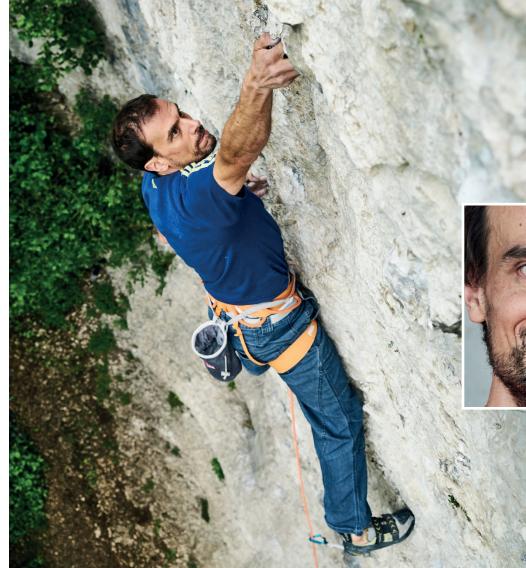
## DICKI

**Dicki (Ludwig) Korb** is a sport climbing and functional-fitness trainer, therapist and pedagogue. He has been climbing for 33 years and has gathered 18 years of expertise in climbing training with a variety of the best athletes in this sport. The world-renowned training book "Gimme Kraft" written together with Patrick Matros is a collection of climbing training expertise based on their various long-term activities as coaches. Dicki and Patrick both work providing training for all kinds of climbing-related athletes all over the world. Dicki is part of the education team in the German climbing federation and consulting coach for the German Climbing Team. Additionally, he has been part of the "Centre of Excellence" for the Adidas Terrex Global Team for four years, evaluating and supporting Adidas athletes together with Patrick and Volker. ([www.kraftfactory.de](http://www.kraftfactory.de))



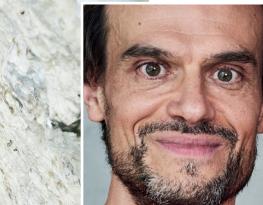
## PATRICK

**Patrick Matros** is a lecturer for sport and educational science as well as for various sports at the State Institute for Teachers Education in Bayreuth, Germany. He has a master's degree in sport and educational sciences and is a certified sports therapist, certified athletic trainer and member of the International Rock Climbing Research Association (IRCRA). Patrick is the author of several specialist sport and education books and articles, including the worldwide bestseller "Gimme Kraft!", co-authored with Dicki Korb. Together, they have trained athletes at the Federal Center of Sportclimbing in Nuremberg for several years and currently coach climbing team members of Adidas Terrex Outdoor. In cooperation with Adidas Terrex International Outdoor, they have developed a completely new concept for training and coaching outdoor elite climbers. Numerous Adidas Terrex Outdoor team members such as Barbara Zangerl, Mayan Smith Go-



bat, Bernd Zangerl, Melissa le Neve, Thomas Huber, Fabian Buhl, Kevin Jorgeson, Petra Klingler, as well as other top climbers and national teams of several countries trust their advice.

Patrick has 20 years of climbing experience with about 200 ascents of



routes between 8a and 8c. In 2011, he was able to make one of his biggest dreams come true with an all clean first ascent of Archon (8b) in his home area, the Frankenjura. At the time of publishing, Archon is the most difficult trad route in the region and has only been repeated by Alexander Megos. ([www.kraftfactory.de](http://www.kraftfactory.de))



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# INTRODUCTION

## ACT - ADJUNCT COMPENSATORY TRAINING FOR ROCK CLIMBERS: CLIMBERS' COMPENSATION TRAINING WITH A MEDICAL FOUNDATION

It is a well-known but often overlooked fact that climbing involves not only strong fingers but also a strong overall athletic build. Many climbers focus their training mainly on finger strength without paying attention to the fact that those fingers are attached to a body, and that body needs to be trained as well. Many injuries can be avoided by increasing overall strength, for example scapular stabilisers and core strength. Purely dead hanging on crimping fingers won't get you far! If we were to subdivide training for rock climbing into three categories, these would be specific finger-strength and climbing training, overall general strength training (including some cardio training) and a third, new component, defined as **Adjunct Compensatory Training, or ACT.**

Regarding climbing-specific and finger-strength training, we refer to various literature including "Gimme Kraft" by Dicki (Ludwig) Korb and Patrick Matros. This training can be performed either while climbing or separately (e.g. campus boarding, dead hangs etc.). Other muscles groups such as the biceps or the pecs can be trained with various general strength-training exercises like biceps curls. Don't forget that a high

cardiopulmonary capacity helps to endure the high specific training load in climbing, and thus should also be part of your training program. Both of these training styles focus on building up your strength to climb as hard as you want to, but there is a flaw in this! These methods of training are very climbing-specific and mostly focus on muscle slings and innervation patterns which operate during a climbing move. In order to withstand such trainings over a longer period of time and to prevent injuries, the antagonists and neglected muscle groups **MUST** be addressed. This is where **ACT** comes into play.

**Adjunct Compensatory Training** focuses on training the neglected muscle slings and innervation patterns within their specific range of motion, building up posture and core strength as well as balancing the athletic build of the body. The **ACT** concept was inspired by our long-time co-operation with high-level athletes. We combine our sports-medical and trainings-methodical knowledge to effectively prevent injuries and overstrain. Volker Schöffl, as the MD in the group, analyses the body from a sports-medical and biomechanical point of view. With his vast knowledge of climbing injuries (Volker Schöffl, Thomas Hochholzer, Sam Lightner Jr. "One Move Too Many") and as a highly active avid climber, he understands why certain conditions could and do lead to injuries in the long-term. Dicki and Patrick are



world-renowned climbing trainers and coaches. Coming from a top-level climbing background themselves, they focus on climbing-specific training ("Gimme Kraft", "Kraftfactory") and biomechanical analysis of climbing. Weaknesses in certain climbers which can be reduced through specific and adjunct training are frequently revealed by the biomechanical aspects. Combining our two fields of expertise, we have collaborated to create Adjunct Compensatory Training, which aims to rebuild neglected range of motion in muscle slings and to improve neuromuscular innervation patterns. Thus, it will help you to better withstand specific climbing training and reduce injury and the risk of overexertion. The **ACT** concept was born in 2015 and has been consistently developed further within our group since then. In our dai-

ly work with both elite athletes and "normal" climbers, we perpetually evaluated, restructured and remodelled our exercises, structuring and fine-tuning a program which we find most effective.

The **ACT** program consists of two sections. The general section focuses on preventative exercises especially for climbers and the specific section defines the adjunct and extra exercises which you can do as an injured climber, in addition to surgical or conservative medical therapy.

The exercises comprising the general section are based on our biomechanical analysis of climbing movements, as well as climbers' posture, build and the causes of chronic injuries over time. This collection should be an adjunct program, completed



in addition to your normal training at least twice per week. One session takes approximately 20 minutes and you should choose one or two exercises per focus from the collection. It's your decision whether you want to do this before or after a climbing session or separately on your well deserved "rest day". Alternatively, you can choose from the exemplary circuits of exercises and just follow these.

The exercises included in the specific section are designed to help your therapy in the case of an injury or overstrain. These exercises are not intended to substitute a doctor's evaluation but outline what you can do to help the healing process. It is important to remember in general and especially after surgery that you need to consult your responsible physician before proceeding; just

take this booklet along and speak with her or him. Thus, the second section of the **ACT** program has been developed for certain injuries and focuses on the specific aspects of **ACT** which are relevant to these injuries. It is possible to add some exercises from the general **ACT**, but again, especially after surgery, consult with your treating physician regarding which exercises are allowed at which stage in the rehabilitation process. The specific section helps to answer a question often asked by injured climbers: what can I do to recover? How can I supplement my rehab in addition to what the doctor or physiotherapist does? Here is the answer: **ACT**.

We want you to enjoy your climbing as much as we do ours. This should be injury-free and without negative

consequences in your future life. Of course we can't eliminate the sudden onset of a trauma, but we definitely think that we can decrease the likelihood of trauma and the onset of chronic conditions together through **ACT**. There's only one factor which we can't influence: you have to do your **ACT**, we can't do that for you!

For more comprehensive medical information on climbing-specific conditions, we refer to "One Move Too Many" (Volker Schöffl, Thomas Hochholzer, Sam Lightner Jr., Sharp End publishing, Boulder, CO, USA), the German edition "Soweit die Hände greifen" or the various other translations. For purely strength-related training, we refer to "Gimme Kraft" (Patrick Matros, [Dicki] Ludwig Korb, Café Kraft GmbH). This book here is intended as the bridge between those two ends of the spectrum of training for climbing.

Ok, let's go further into the theory behind **ACT**.

## CLIMBING AS A SPORT WITH A HIGH DIVERSITY OF SPECIFIC MOVEMENTS

Modern climbing and bouldering are disciplines which require a huge number of degrees of freedom in their movements. The central objective is always to solve new problems. Thus, we focus on the development of open movement and flexibility skills in sport climbing. The diversity of movements is related to the different types of rock in outdoor

climbing (e.g. granite, sandstone or limestone) which have specific textures for hand- and footholds, therefore requiring various techniques for climbing. On the other hand, in indoor climbing, which is becoming more and more popular, an endless number of different hand- and footholds in addition to the combination of walls in various angles of steepness guarantee that no two moves are identical. In this regard, modern indoor bouldering is renowned for continuing to raise the bar.

The diversity of movements including pulling, pushing, twisting and swinging makes it difficult to determine the weak points in the locomotive system of a climber which are the cause of overstress or injuries related to training for climbing.

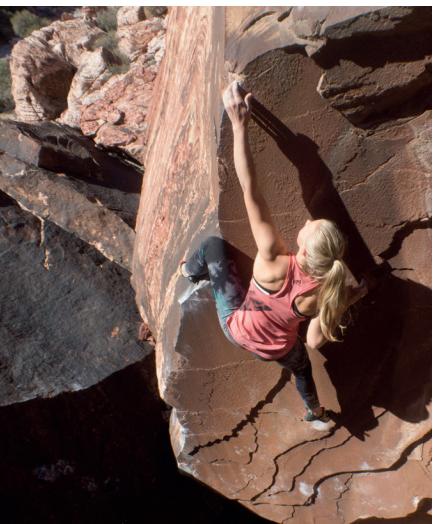
A first evidence-based step results from a targeted analysis of specialist diagnoses of climbing injuries, overstrain injuries, and their case history. The medical centre for sport climbing in Bamberg, Germany, under the direction of mastermind Volker Schöffl, is world-renowned for injuries of this variety (Sportsmedicine Bamberg – [www.sportsmedicine.rocks](http://www.sportsmedicine.rocks)).

The next step is based on the identification of problematic patterns of movement, understanding the functional anatomy behind these movements and analysing where limited range of motion or biased muscle innervation could have led to myofascial disharmony or imbalance. Patrick Matros and Dicki Korb are the founders of the "Kraftfactory",

one of the leading climbing training services. They are committed to achieving a deeper understanding of the connection between anatomy and injury; many top-level climbers seek their advice.

## THE MYTH OF ANTAGONIST TRAINING

So-called "antagonist training", as it has come to be known, seems to be undifferentiated and is generally ineffective in achieving the goal of injury prevention. The perspective that the movements of climbing have antagonist muscles which weaken over time due to poor innervation and, as such, need to be "built up", shows a rudimentary understanding of the functional anatomy of the human body.



## ADJUNCT COMPENSATORY TRAINING (ACT-TRAINING) - THE BETTER PREVENTATIVE ANSWER

The goal of our **ACT**-Training is to compensate biased movement patterns and strengthen the structures of the locomotive system which undergo high strain during climbing. Learning functional movement patterns and their transfer into climbing movement plays a crucial role in achieving this goal. Additionally, we try to integrate the neglected muscle groups with the primary goal of achieving maximum active control of the range of motion and innervation of muscle chains working together functionally. We cannot endorse and do not practice a simple hypertrophy strength training of the so-called "antagonist muscles".

To get to the point, this means:

- Try to maintain a high and functional range of motion in your joints which are often stressed by imbalanced movement in sport and activities of daily life
- Try to keep a highly active neuromuscular control of this range of motion by strengthening your muscles at the edges of mobility and by implementing functional movement patterns

We don't base our exercises on their visual attractiveness or coolness factor. Unfortunately, this kind of exercise which focuses on impressive body positions or unnecessarily in-

creased instability is often shown in the tutorials available on many video channels.

We believe in good sensory control of movement and, as such, focus on the smaller, subtler movements of the exercises. This often means that the athletes have to withstand some discomfort, but this is exactly the point at which the adaption process starts.

## ACT-TRAINING - WHAT IS IT?

Let's take a popular exercise to clarify: The I-Y-T Exercise, which is usually done using a sling trainer.

In this exercise, you pull your whole body out of a slightly backwards-tilted position into a vertical position. This exercise is performed with the arms in three positions: elevation with the arms in maximum overhead position (the "I"), elevation with the arms at approximately 130° abduction in the shoulder joint (the "Y"), and elevation with the arms at 90° abduction in the shoulder joint (the "T").

In our opinion, this exercise doesn't adequately target our goal of balanced compensation training; there are many more cons than pros. The goal of this exercise is to strengthen specific muscle groups of the shoulder girdle, which prevent or minimise a non-functional posture of the upper-body, while simultaneously training the core.

The idea can be traced back to Vladimir Janda, neurologist and well-



known pioneer of functional movement. He described the so-called "upper cross syndrome" as a functional imbalance induced by high tone and myofascial shortening of specific muscles of the shoulder girdle (e.g. Mm pectoralis major et minor) which can't be compensated sufficiently. In many cases, this can be observed as a prominent kyphosis of the climber's back. Clinical symptoms are well known and often provoked by frequent bad posture while sitting. The muscles known as prime movers during climbing movements (Mm. pectoralis major et minor or M. latissimus dorsi) can also intensify the problem. The I-Y-T exercise aims to strengthen the "neglected" muscles in a way of "anti-movement", which initially doesn't seem like a bad idea. However, this exercise doesn't consider the very specific neglected range of motion in climbing movement regarding the aforementioned muscles and muscle slings, for ex-

ample the lack of maximum flexing in the shoulder joint (maximum opening of the shoulder-torso-angle). The I-Y-T doesn't target this problem, as you can compensate much too early with your lumbar spine since it is executed in a plank position.

Therefore, the aforementioned core aspect of this exercise, which is often proclaimed as an advantage, is actually a disadvantage! Instead, we recommend exercises which enable much better control of active range of motion in the shoulder joint, such as lifting the arms while in a heel seat. The lumbar spine is locked in this exercise and the climber can focus much better on the intended target. Nevertheless, we still work in a functional way, not isolating single muscles, which can often lead to transfer problems.



We don't reject sling trainer exercises; on the contrary, we work a lot with this device! However, we analyse every popular exercise exactly, weighing up the pros and cons to make sure that it is suitable for our goals.

This collection of exercises cannot replace a personal trainer who, based on knowledge and long-term experience, would be able to identify and treat specific and individual dysfunctional patterns. We've tried our best to document the most frequent injuries and overstress syndromes known in sport climbing and to show you exercises which have proven themselves throughout years of our work and can make you a better climber!

Train smart! ☺

## THE STUFF YOU NEED

Although we have focused on exercises which do not require much equipment, you will need a few basic things.



Dumbbell



Kettlebell



Foam Mat



Stability Ball



Foam Roller

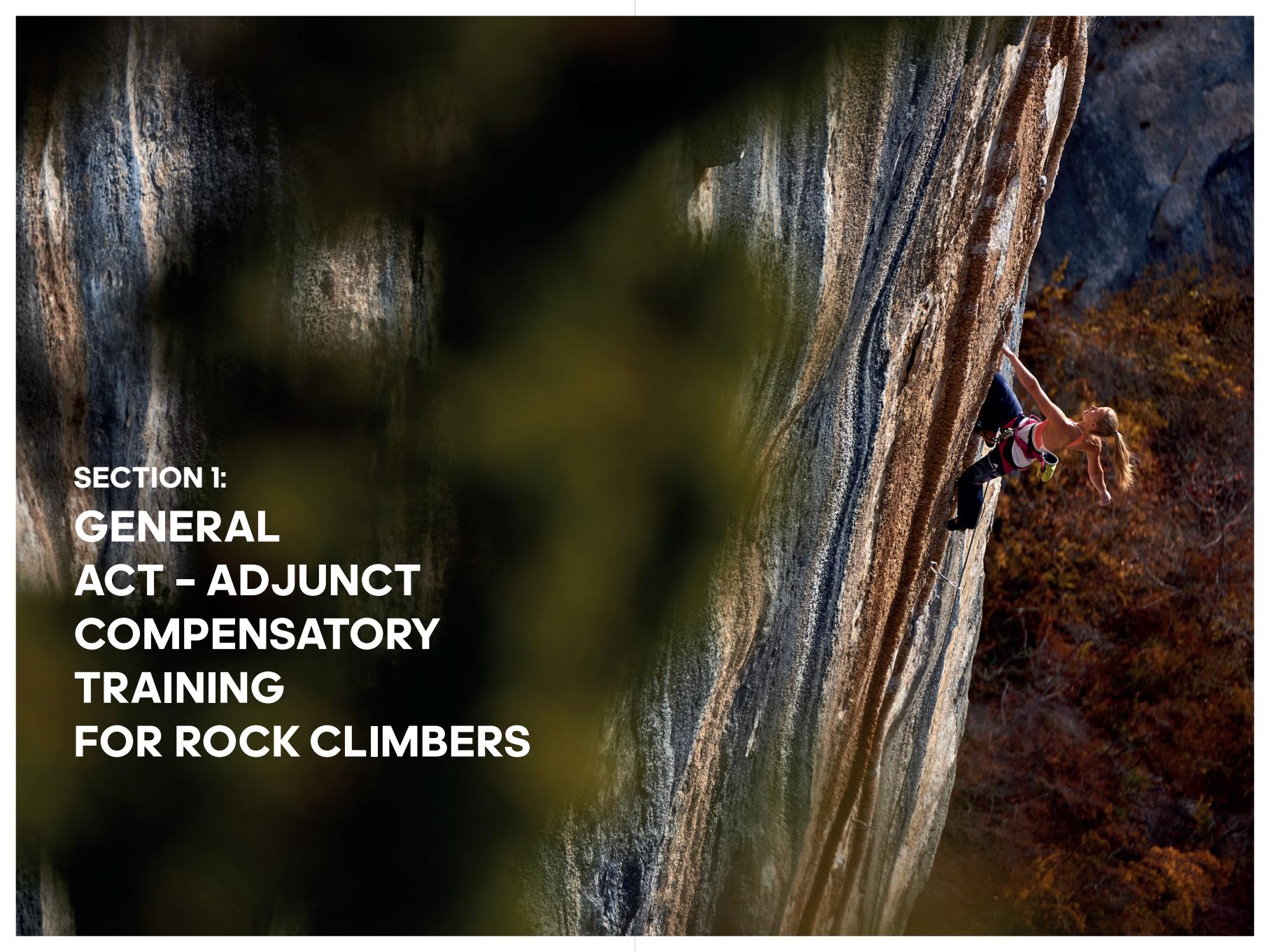


Long  
Resistance Band



Small  
Resistance Loop  
(ACT band)



A photograph of a female rock climber in mid-climb on a large, light-colored rock formation with distinct horizontal layers. She is wearing a pink tank top, dark pants, and a blue cap. Her body is angled upwards as she reaches for a hold. The background shows a dry, scrub-covered hillside under a clear sky.

# **SECTION 1:**

# **GENERAL**

# **ACT - ADJUNCT**

# **COMPENSATORY**

# **TRAINING**

# **FOR ROCK CLIMBERS**



The general part of the **ACT** exercise collection is based on our biomechanical analysis of climbing movements, as well as climbers' posture, build and the causes of chronic injuries over time. This collection should be an adjunct program, completed in addition to your normal training at least twice per week. One session takes approximately 20 minutes and you should choose one or two exercises per focus from the collection. We strongly recommend varying your choice of exercises to ensure the best training outcome. It's your decision whether you want to do this before or after your climbing session or separately on your well-deserved "rest day".

There are no strict instructions for repetitions and sets for the following exercises, since this doesn't fit

in with our concept of an individually tailored training program. Additionally, an exact number of repetitions or sets for specific purposes or goals is not scientifically verifiable in most cases (e.g. Friedmann, B. German Journal of Sportsmedicine 58, 1, 2007). It's only possible to define specific phases in which certain physiological chain reactions are more strongly trained, e.g. "time under tension" as a stimulator for muscular hypertrophy. Finer details are then set individually. In addition to suggesting an appropriate range of repetitions, we use the following parameters:

- speed of motion: static hold, dynamic (slow, medium, fast)
- intensity: low, medium, high, ARAP (as many reps as possible)

## ACT TRAINING GOALS AND CATEGORIES



### MOBILITY:

4-20 repetitions depending on flexibility; low to medium intensity (no pain); optional short static holding phase at limit of range of motion



### STRENGTH ENDURANCE:

12-25 repetitions; static or dynamic; ARAP



### MUSCLE/STRENGTH BUILDING:

6-12 repetitions; dynamic (slow, moderate); ARAP



### INTERMUSCULAR COORDINATION:

12-20 repetitions, dynamic (medium); medium intensity, not ARAP, since the movements become inaccurate at this point

## SETS

Generally, we recommend multiple sets (2-4) during the beginning or strengthening phase. During the maintenance phase (e.g. competition phase), fewer sets (1-2) can be completed.



# SHOULDERS

Strong shoulders help you to hold onto small holds. That strength doesn't come out of nowhere; the shoulders need to be trained. However, strong shoulders aren't the same as BIG shoulders. Looking at an athlete, the most visible muscle is the deltoid, the upper muscular layer. While the deltoid can be well-trained, for example in a bodybuilder, the underlying rotator cuff muscles, which

are far more important for stabilisation, may be weak. Additionally, joint capsular tension and the ligaments in between the humerus and the glenoid, the joint socket at the scapula, are crucial in preventing dislocations and subluxations. Consistent minor subluxations can lead to chronic injuries such as labral and biceps insertion injuries or rotator cuff tears.

## HANDSTAND WALKABOUTS

Start with your feet elevated to approximately hip height and your upper body in handstand position. Make sure your hips are angled to at least 35°. Walk your hands along the floor from one side to the other, keeping your neck straight. Push your head and chest actively between your shoulders. Alternatively, tap one hand onto the other.



### Shoulders

Elbows

Wrist & Fingers

Spine & Core

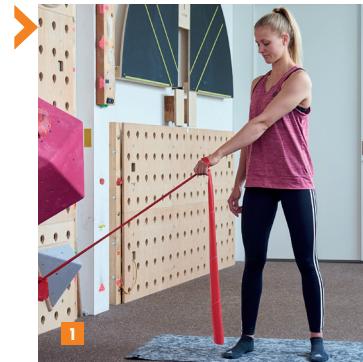
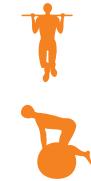
Hips

Legs & Knees

Ankles & Feet

## SWORD PULL

Fasten a resistance band at a height of about 15-20 cm above the floor to a suitable place, e.g. a radiator, wall bars or similar. Standing in an upright position with your side to the point of fixation and your feet shoulder-width apart, imagine that you are aiming to put your shoulder blades into your back pockets. Pull the resistance band, already under light tension, diagonally upwards, leading with your elbow as though you were drawing a sword. Make sure that your shoulders stay low and that the distance between shoulders and ears remains unchanged. When your elbow is so high that it can't be raised any further without lifting your shoulders, extend your forearm. This should all be done in one fluid motion.



### Shoulders

Elbows

Wrist & Fingers

Spine & Core

Hips

Legs & Knees

Ankles & Feet

## ROTATION CURLS

Hold a medicine ball with a handle or a dumbbell, no heavier than 4 kg. Extend your arm as far as possible upwards and backwards with maximum external rotation. Lower your arm and return to the starting position by following a "curl" motion.



## CHEST OPENER

Lie with your spine along the length of a foam roller which is long enough so that your lumbar spine and head can rest comfortably. Extend your arms to the side and let them hang downwards, stretching the front of the shoulder joint and relaxing the muscles of your chest.



### Shoulders

### Elbows

### Wrist & Fingers

### Spine & Core

### Hips

### Legs & Knees

### Ankles & Feet

## SCAPULAR STABILISATION

The stabilising scapular muscles are crucial for strong shoulders. These muscles work against an increased outward rotation of the scapula when hanging or pulling up, preventing "chicken wings". They work mainly between the inner rim of the scapula and the thoracic spine, e.g. the rhomboid muscles. They tend to become

overstrained and tightened, causing upper back pain, which occurs frequently in high-level climbers. The more stable the scapula, the less outward rotation can occur, meaning less "chicken winging". "Chicken wings" cause the forearm muscles to fail, leading to a fall, disaster, defeat, misery...

## ACT PULL-UPS

Loop the ACT band around your forearms just below your elbows (not around the joint). Hang on a pull-up bar with your hands shoulder-width apart so that the ACT band is under light to medium tension. Do a pull-up, rotating your elbows slightly inwards, so that they are close to your body when you pull yourself upwards. The ACT band supports the slight internal rotation of your elbows, ensuring that your shoulder blades remain in the desired position (down and back).



Shoulders
Elbows
Wrist & Fingers
Spine & Core
Hips
Legs & Knees
Ankles & Feet



## WALL SLIDES

Facing a wall, stand approximately 20 cm away from the wall and slide your forearms up and down the wall without letting your arms move away from each other. Make sure that your shoulder stay down and that your hands, elbows and shoulders are aligned.



### Shoulders

### Elbows

### Wrist & Fingers

### Spine & Core

### Hips

### Legs & Knees

### Ankles & Feet



## ELBOWS

Both the extensor and flexor muscle groups of the elbows and forearms are crucial to climbers. The main finger flexor and extensor muscles originate at the elbow and proximal forearm. The small muscles within the palm add to but are not responsible for the key point in climbing – finger strength. While the flexor muscles are obviously the functional

muscles for holding onto a hold, the extensors are required to stabilise the wrist in overextension to deliver strength to the finger tips. Therefore, both finger and wrist flexors and extensors need to be trained and must be in equilibrium. An imbalance in strength will lead to overstrain.

## FINGER EXTENSORS WITH ACT BAND

Lay a resistance band across the fingertips of one hand and pull on it with the other hand so that the fingers are half bent. Extend and spread your fingers, controlling the tension of the resistance band with the other hand.



### Shoulders

### Elbows

### Wrist & Fingers

### Spine & Core

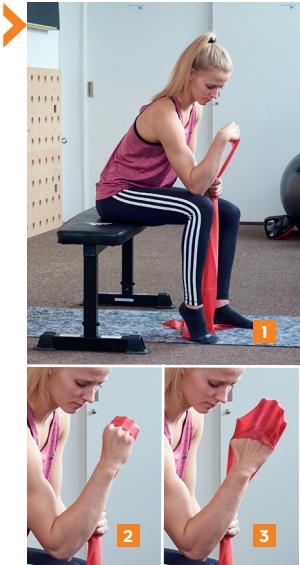
### Hips

### Legs & Knees

### Ankles & Feet

## FINGER EXTENSORS AND WRIST ROTATION WITH ACT BAND

Start seated with your forearm resting on your thigh. Lay a resistance band/ACT band across the fingertips of one hand, using the other hand to pull on the band so that your wrist is slightly bent. Open your hand with external rotation, simultaneously extending your fingers so that your wrist and fingers are extended.



Shoulders
<b>Elbows</b>
Wrist & Fingers
Spine & Core
Hips
Legs & Knees
Ankles & Feet

## WRIST

Many wrist conditions in climbers result from a lack of active stabilisation of the wrist joint. These injuries can be avoided. In side-pulls, underclings and pinches, active wrist stabilisation is the key to avoiding damage to the

soft tissue structures underneath the skin. Therefore, let's focus on the extensors and flexors. As for the elbow, both sides must be in equilibrium.

## UPSIDE-DOWN KETTLEBELLS

Choose a medium-weight kettlebell which you can hold with one hand with the ball facing upwards. Use your other hand to bring the kettlebell into this starting position, then remove the supporting hand. With your wrist in a neutral position and your shoulder blades down and back, try to push the kettlebell straight upwards until your arm is fully extended. Hold this position for 5 seconds and then slowly lower your arm. Use the other hand for support again to lower the kettlebell.



Shoulders
<b>Elbows</b>
Wrist & Fingers
Spine & Core
Hips
Legs & Knees
Ankles & Feet

# CORE: ABDOMINAL AND BACK MUSCLES

Every climbing move starts from the core. A strong core helps you to achieve the perfect position underneath the hold to effectively hold onto it. Staying close to the rock and not dangling away from it is one of the keys to doing hard moves. Both the back and the abdominal muscles are

crucial in stabilising the body's centre. No steep climbing without strong abs! No safe falling into the harness or onto the crash pad without a strong back! The abdominal and back muscles function as armour around your body's centre, the abdominal cavity and the spine.

## POWER PLANK

Fasten a resistance band at a height of about 15-20 cm above the floor to a suitable place, e.g. a radiator, wall bars or similar. Starting in a forearm plank facing the point of fixation with your feet shoulder-width apart, pull the resistance band with one arm. Choose the distance from the point of fixation such that the resistance band is under tension when your arm is fully extended. Make sure that your hips stay parallel to the floor when you pull.



Shoulders

Elbows

Wrist & Fingers

Spine & Core

Hips

Legs & Knees

Ankles & Feet

## TWISTED MOUNTAIN CLIMBERS ON STABILITY BALL

Start in plank position with your feet on a stability ball. Keep your body in one straight line with your neck as an extension of your spine. From this position, bring one knee to the opposite elbow, keeping the other foot stably on the ball. Return to plank position and repeat with the other leg.



Shoulders

Elbows

Wrist & Fingers

Spine & Core

Hips

Legs & Knees

Ankles & Feet

## CORE PENDULUMS

Lying on your back, place a foam roller, yoga block, or folded towel between your knees with your knees and hips bent at a 90° angle. Extend your arms towards the ceiling, loop the ACT Band around your wrists and pull your hands shoulder-width apart, making sure that your elbows don't jut out but are in line with your shoulders and wrists. Maintaining the starting position with your upper body and arms, tilt your legs to the side, reaching the point at which you can hardly hold your balance. Return to the starting position and tilt your legs to the other side.



# HIPS

Are hip muscles and pelvic stabilisation important for climbers? It may not seem like it at first, but they are! Hip conditions such as femoro-acetabular impingement have been increasing since crazy three-dimensional boulder moves have become

more popular. Hips tend become tight and weak pelvic stabilisers (e.g. the glutes) lead to a decreased range of motion and back pain, which certainly don't help in climbing. Paying attention to the hips certainly pays off.

## ONE-LEGGED ROMANIAN DEADLIFT VARIATION

Start standing, holding a medium-weight kettlebell. Lean your upper body forwards, lowering the arm with the kettlebell and extending the opposite leg backwards so that your torso and leg form a line parallel to the floor – the T-Stand. Come back to standing position.



Shoulders
Elbows
Wrist & Fingers
Spine & Core
<b>Hips</b>
Legs & Knees
Ankles & Feet

# LEGS

Don't think that legs aren't important in climbing! The sheer increase in hamstring and leg muscle injuries due to heel hooking are proof of the importance of these muscle groups. Strong hamstrings guard the knee joint and its inner ligaments and help

you to hook better. All those drop-knees are hard on your ligaments and other passive structures. Again, the better your muscular build, the more safe you can perform moves which seem nuts.

## ACTIVE HAMSTRING MOBILISERS

Fasten a medium-strength resistance band to a pull-up bar so that you can stand on one foot and hang the heel of the other in the band. Facing the band, pull the extended leg up and down, using some momentum.



Shoulders
Elbows
Wrist & Fingers
Spine & Core
<b>Hips</b>
<b>Legs &amp; Knees</b>
Ankles & Feet

# ONE-LEGGED CHAIR SQUATS ON FOAM MAT

For this exercise, you will need a chair or an object of similar height which is stable enough that you can stand on it. Lay a foam mat on the chair and place one foot on it. Without relying on momentum, try to stand up by pushing through the bent leg until you are standing on the chair. Do a one-legged squat, slowly lowering yourself to the starting position.



- Shoulders
- Elbows
- Wrist & Fingers
- Spine & Core
- Hips
- Legs & Knees**
- Ankles & Feet

# FEET

You use and abuse your feet all the time while climbing. You squeeze them into tiny shoes and as a reward, you jump up and down on them... ankle sprains, here we come. However, increasing proprioception and ankle stability can help to prevent twisting the ankles, which is a worthwhile investment to avoid a long-term absence from climbing. This may be an important prophylactic measure for boulderers to take!

## ANKLE SUPINATION ROLLS

In front of a wall or something you can hold for stability, stand along the length of a foam roller with your feet next to each other. Imagine that the soles of your feet have been glued to the foam roller. Holding onto the wall, roll to one side, cautiously testing the limit of your ankles to roll over your full range of motion. Maintain contact between the soles of your feet and the foam roller. Return to the starting position and switch sides. For more of a challenge, try this exercise without holding on to anything.

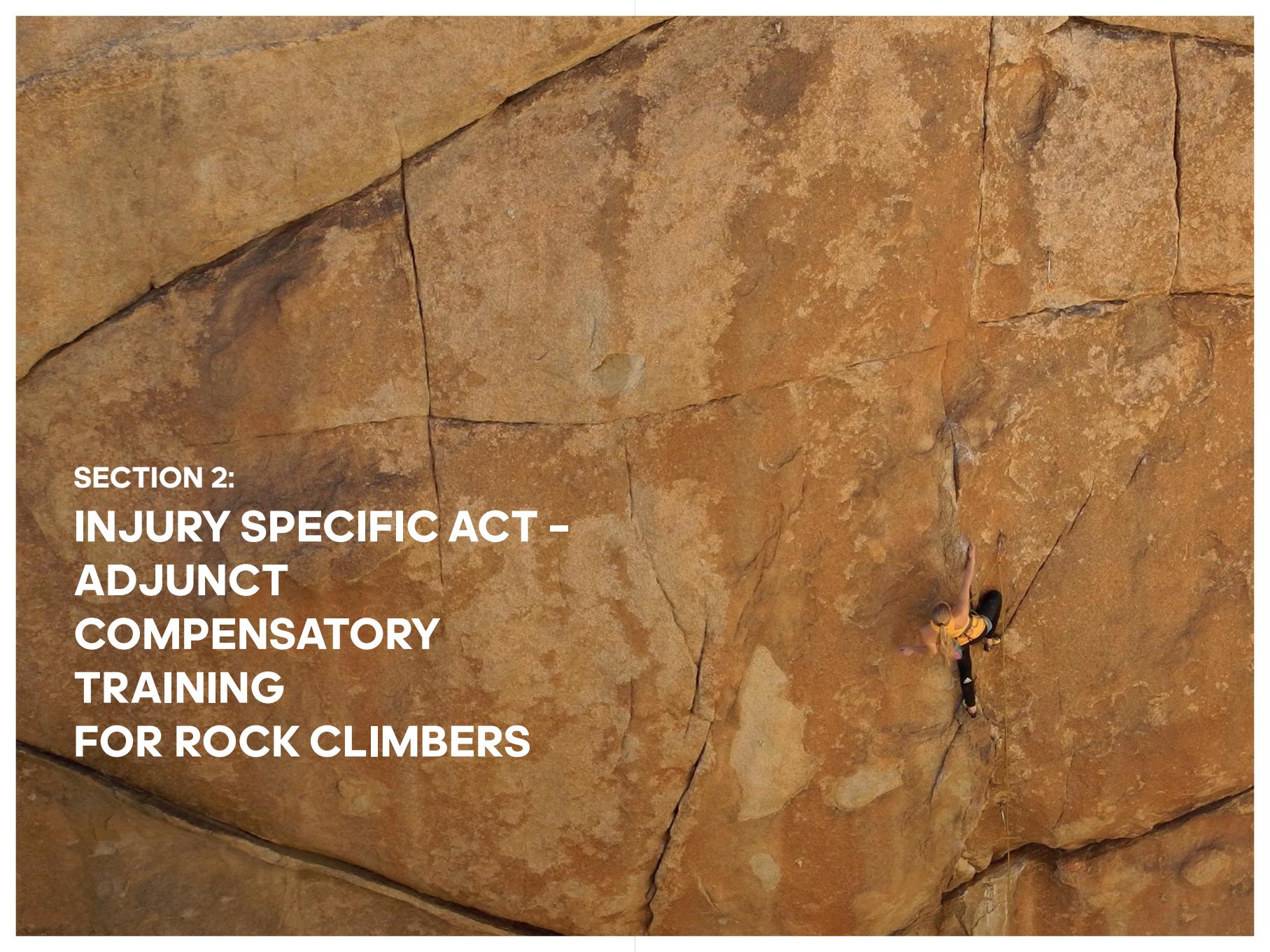


## COMPASS

Stand on a soft mat or other unstable surface. Shift your weight to one leg and slightly bend the knee of your standing leg. Move your free leg in all possible directions around your standing leg, making sure that your foot maintains contact with the floor at all times. Try to maximise the range of motion for all positions.



- Shoulders
- Elbows
- Wrist & Fingers
- Spine & Core
- Hips
- Legs & Knees
- Ankles & Feet**

The background of the image is a large, light brown rock wall with prominent vertical and horizontal cracks. In the bottom right corner, a female rock climber with blonde hair tied back is visible. She is wearing a yellow tank top, black leggings, and a pink harness. She is positioned on a vertical crack, with her left hand gripping a hold and her right hand reaching upwards. Her legs are bent at the knees, and she is looking upwards towards the top of the climb.

## **SECTION 2:**

# **INJURY SPECIFIC ACT - ADJUNCT COMPENSATORY TRAINING FOR ROCK CLIMBERS**



Now that we have explained some of the overall aspects of muscular stability and compensation training (**ACT**), we will describe the detailed exercises according to your medical condition. As previously mentioned, the intent of this book is not to substitute an exact medical diagnosis and workup but to show you how you can support your rehabilitation process on your own. You need to go and see a doctor for an exact clinical diagnosis. Once you've been diagnosed and cleared by your doctor to start self-exercising, you can come back here.

We also do not intend to go too far into the medical knowledge and anatomy but will briefly outline the various conditions before explaining

the **ACT** exercises. For more comprehensive medical information on climbing-specific conditions, we refer to "One Move Too Many" (Volker Schöffl, Thomas Hochholzer, Sam Lightner Jr., Sharp End publishing, Boulder, CO, USA), "Soweit die Hände greifen" or the various other translations. For purely strength-related training, we refer to "Gimme Kraft" (Patrick Matros, (Dicki) Ludwig Korb, Café Kraft GmbH). This book here is intended as the bridge between those two ends of the spectrum of training for climbing.

In order to choose the various exercises shown here, we focused on easy exercises which require little equipment, most of which can be performed with resistance bands,

slings, bars, towels or even without any aids. While the quantity of repetitions and of the sessions per day may vary, we recommend that you perform them at least once a day, but in the best case, twice a day. If your medical condition worsens during your rehabilitation process, you should stop and see your medical practitioner. Especially after surgery, it is important to consult with your treating physician regarding which ACT exercises are allowed at which stage in the rehabilitation process.

As we said before, there are no strict instructions for repetitions and sets for the following exercises, since this doesn't fit in with our concept of an individually tailored training



program. Additionally, an exact number of repetitions or sets for specific purposes or goals is not scientifically verifiable in most cases. It's only possible to define specific phases in which certain physiological chain reactions are more strongly trained, e.g. "time under tension" as a stimulator for muscular hypertrophy. Finer details are then set individually. In addition to suggesting an appropriate range of repetitions, we use the following parameters:

- speed of motion: static hold, dynamic (slow, medium, fast)
- intensity: low, medium, high, ARAP (as many reps as possible)



## ACT TRAINING GOALS AND CATEGORIES



### MOBILITY:

4-20 repetitions depending on flexibility;  
low to medium intensity (no pain)



### STRENGTH ENDURANCE:

12-25 repetitions; static or dynamic; ARAP



### MUSCLE/STRENGTH BUILDING:

6-12 repetitions; dynamic (slow, moderate); ARAP



### INTERMUSCULAR COORDINATION:

12-20 repetitions, dynamic (medium);  
medium intensity, not ARAP, since the  
movements become inaccurate at this point

## SETS

Generally, we recommend multiple sets (2-4) during the beginning or strengthening phase. During the maintenance phase (e.g. competition phase), fewer sets (1-2) can be completed.



# SHOULDERS

The shoulder is a ball-and-socket joint which is primarily stabilised by muscle tension, the joint capsule and a few ligaments. The surface area of the joint socket is much smaller than the humeral head, with a ratio of approximately 1:4. To make up for this difference in size, there is a cartilage ring, the labrum, around the joint socket (the glenoid). The labrum essentially creates a suction cup which helps to hold the ball in the socket. In addition to the passive components (bones and labrum), the shoulder is also stabilised by the muscles of the rotator cuff. The unique anatomical design of the shoulder gives it a very large range of motion but also allows for more dislocations than any other joint in the body. Another important component of the shoulder is the long biceps tendon and its

insertion onto the bone. The long biceps tendon actually runs through the shoulder joint, and, as such, is the only tendon in the human body to run inside a joint. The rotator cuff, the active stabiliser of the joint, is formed by the four tendons of the *M. supraspinatus*, *M. infraspinatus*, *M. subscapularis* and the *M. teres minor*. Its function is to centre the humerus head within the shoulder joint, thus allowing the deltoid muscles to move the shoulder. Each of these smaller muscles can also move the shoulder, but due to their small size, the larger deltoids tend to do the more powerful work. The rotator cuff encircles the humerus head anteriorly, superiorly and posteriorly. Its superior part, the supraspinatus tendon, runs through the acromion in what is called the "subacromial space".

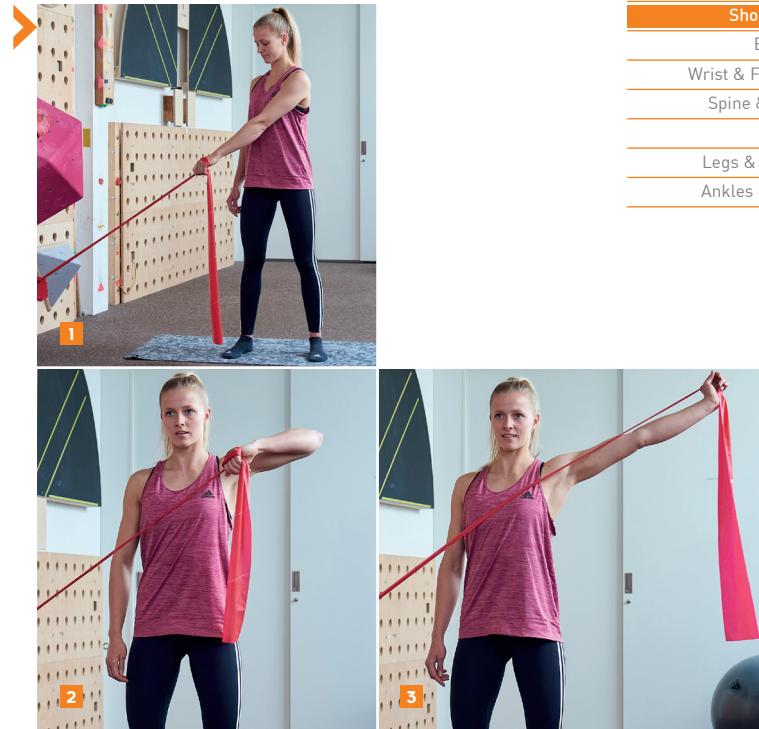
## IMPINGEMENT AND BURSITIS

There are several different forms of shoulder impingements, but distinguishing between internal and external impingements and their various sub-groups would be too medically technical for our purposes here. Generally speaking, if the muscles of the back, mainly the rhomboids and trapezius, do not stabilise the scapula, the space between the head of the humerus and the top of the socket (the scapula) is smaller than necessary. This squeezes the bursa, rotator cuff muscles and/or long biceps tendons insertion and labrum. The bursa becomes inflamed and the tendons of the rotator cuff, especially the supraspinatus, are

subject to minor tearing, inflammation and calcifications within the tendon. Other sources of impingement are the presence of bone spurs in the AC joint or the overdevelopment of the supraspinatus muscle, a common occurrence in bodybuilders. The aim of all exercises in impingement syndrome are to stabilise the scapula and to pull the humerus head further back as the impingement is mostly anterior, in between the shoulder roof, the acromion and the humerus head. As there are no muscles to directly pull the arm further downward, most exercises focus on external rotation of the joint.

## SWORD PULL

Fasten a resistance band at a height of about 15-20 cm above the floor to a suitable place, e.g. a radiator, wall bars or similar. Standing in an upright position with your side to the point of fixation and your feet shoulder-width apart, imagine that you are aiming to put your shoulder blades into your back pockets. Pull the resistance band, already under light tension, diagonally upwards, leading with your elbow as though you were drawing a sword. Make sure that your shoulders stay low and that the distance between shoulders and ears remains unchanged. When your elbow is so high that it can't be raised any further without lifting your shoulders, extend your forearm. This should all be done in one fluid motion.



- Shoulders
- Elbows
- Wrist & Fingers
- Spine & Core
- Hips
- Legs & Knees
- Ankles & Feet

## TABLETOP ARM EXTENSIONS

Starting in tabletop position, press one hand into the floor and extend the other arm to the side. Your palm is raised and the thumb is outwards. Follow the motion with your head, focusing on your palm. Hold this position for approximately 5 seconds before lowering the extended arm and returning to tabletop position. Repeat 5 times before changing sides.



Shoulders

Elbows

Wrist & Fingers

Spine & Core

Hips

Legs & Knees

Ankles & Feet



## RESISTANCE BAND BEHIND THE BACK

Hold the resistance band in such a way that you don't have to actively grasp it but can freely rotate your palms upwards during the exercise. The band should be stretched so that you can still comfortably move your arms over your head and behind your back. With the band behind your back, keep your arms straight but don't pull actively on the band, allowing it to contract and pull your shoulders backwards. Slowly move your arms up and down in order to stretch the front of the shoulder joint from all angles. Don't let your back hollow out. You can prevent this by tensing your gluteus maximus and pushing your hips slightly forwards.



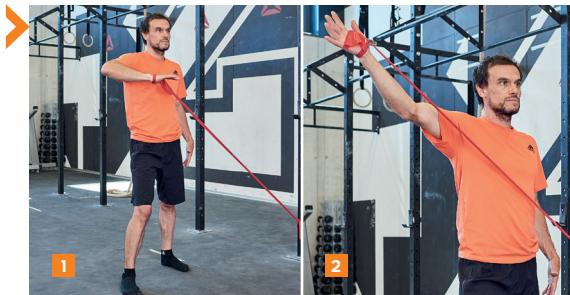
## ROTATION CURLS

Hold a medicine ball with a handle or a dumbbell, no heavier than 4 kg. Extend your arm as far as possible upwards and backwards with maximum external rotation. Lower your arm and return to the starting position by following a "curl" motion.



## EXTERNAL ROTATION WITH RESISTANCE BAND

Fasten a resistance band to the lowest rung of wall bars or another appropriate place, approximately 10-20 cm above the floor. Stand with your side to the wall and raise your bent arm to shoulder height. In this position, the resistance band should be under slight tension. Keeping your elbow bent and at shoulder height, raise your forearm as far upwards as possible, pulling against the resistance band.



Shoulders

Elbows

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# INSTABILITY

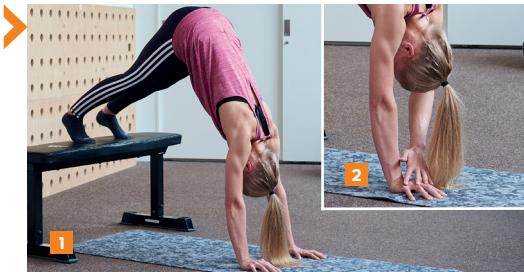
There are numerous forms and many classifications of shoulder instabilities. Focusing on the most frequent specific problems of climbers, we only need to distinguish between the two main forms: acute instabilities caused by trauma (dislocations) and chronic instabilities caused by a loose joint. Acute instabilities are either repetitive sub-dislocations with a consecutive loosening of the shoulder joint capsule and ligaments which lead to labral tears or acute dislocations. Most acute dislocations result in a labral injury and require surgical repair in climbers. Chronic instabilities result from underdeveloped shoulder stabilisers and are often provoked by hanging from a completely extended

arm. When a climber is resting on a completely relaxed shoulder, all of his/her weight is held by the connective tissues of the joint capsule. These passive structures are not meant to work without the flexion of the surrounding muscles. Over time, the constant stress tends to stretch these structures, loosening the shoulder joint.

The exercises described here are subject to both forms of instability, both chronic and acute. If you have had surgery after an acute dislocation, consult your surgeon and physiotherapist regarding which specific ACT exercises are allowed at which stage of the rehabilitation process.

## HANDSTAND WALKABOUTS

Start with your feet elevated to approximately hip height and your upper body in handstand position. Make sure your hips are angled to at least 35°. Walk your hands along the floor from one side to the other, keeping your neck straight. Push your head and chest actively between your shoulders. Alternatively, tap one hand onto the other.



### Shoulders

### Elbows

### Wrist & Fingers

### Spine & Core

### Hips

### Legs & Knees

### Ankles & Feet

## BEAR WALK WITH ARM RAISES AND OTHER VARIATIONS

Start in tabletop position and lift your knees a few centimetres from the floor. Crawl a few metres forwards in this position, focusing on keeping your knees low to the floor and your elbows straight and internally rotated, maintaining an external rotation in the shoulder.



## KNEELING NECK PULLS

Kneeling on one knee, fasten a resistance band in front of you at a height slightly above your head. Holding the resistance band under slight tension, lean your upper body forwards, making sure that your back stays flat and doesn't round. Alternating sides, pull your arms backwards, staying close to your sides. Pull your arm backwards until your hand reaches the level of your neck.



### Shoulders

### Elbows

### Wrist & Fingers

### Spine & Core

### Hips

### Legs & Knees

### Ankles & Feet

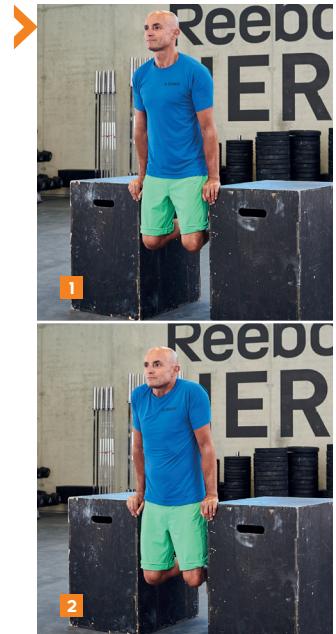
## RING PUSH-UPS

Start in plank position with your hands in the rings which are set a few centimetres above the floor, so that you can just brush the floor with your fingertips. If this is too challenging, modify by starting in half-plank with your knees on the floor. Do a push-up, turning the rings so that your arms stay close to your body.



## SCAPULAR DIPS

Start in dip position either on a dip bar or between two tables. From this position, do so-called scapular dips. In contrast to normal dips, don't bend your arms but rotate your elbows slightly inwards. Lower your head between your shoulders and use your shoulder blades to push your head back up. The focus of this exercise should be on the internal rotation of the elbows and on the position of the shoulder blades while pushing yourself up.



### Shoulders

Elbows

Wrist & Fingers

Spine & Core

Hips

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Ankles & Feet

## ACT ROWING

Place a box, chair, or similar about one body length away from the rings. Set the height of the rings so that your body is parallel to the floor when you hang in the rings with your arms outstretched your feet raised. Place a mini resistance band (ACT band) around your wrists and start in a horizontal position with your feet on the box, hanging in the rings with extended arms (body tension ☺). This exercise is called rowing because you pull yourself up as far as possible with both arms as though you were rowing. Make sure that your palms face each other and that your elbows stay close to your body. Pull the ACT band outwards with your wrists until your hands are about shoulder-width apart. Make sure that you keep your body aligned. It's easy to want to lift your head above the height of the rings, but that's not the aim of the exercise. It's much more important to keep your shoulder blades in a stable position throughout. This is aided by the use of the ACT band; by pulling the band apart with your wrists, your shoulder blades are automatically pulled together.



### Shoulders

Elbows

Wrist & Fingers

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Ankles & Feet

# SLAP INJURIES

SLAP tears, or tears of the superior labrum from anterior to posterior, are the most frequent shoulder condition on which we need to operate. The tendon of the long biceps head inserts into the upper part of the labrum of the shoulder. It undergoes stress once the arm is above the head and pulls inwardly, e.g. in a finger crack or gaston move. With the constant and recurring pull of the long biceps tendon on its insertion, it can partly or completely tear and, either

alone or together with the upper labrum of the glenoid, pull the biceps anchor, leading to a SLAP tear. Minor SLAP injuries benefit from shoulder stabilisation exercises, while complete tears require surgery. After surgery, these injuries will benefit from ACT exercises before you can resume climbing. Please speak with your treating surgeon regarding the best time to start these exercises during your rehabilitation process.

## ACT ROWING



Place a box, chair, or similar about one body length away from the rings. Set the height of the rings so that your body is parallel to the floor when you hang in the rings with your arms outstretched your feet raised. Place an ACT band around your wrists and start in a horizontal position with your feet on the box, hanging in the rings with extended arms (body tension). This exercise is called rowing because you pull yourself up as far as possible with both arms as though you were rowing. Make sure that your palms face each other and that your elbows stay close to your body. Pull the ACT band outwards with your wrists until your hands are about shoulder-width apart. Make sure that you keep your body aligned. It's easy to want to lift your head above the height of the rings, but that's not the aim of the exercise. It's much more important to keep your shoulder blades in a stable

position throughout. This is aided by the use of the ACT band; by pulling the band apart with your wrists, your shoulder blades are automatically pulled together.



### Shoulders

### Elbows

### Wrist & Fingers

### Spine & Core

### Hips

### Legs & Knees

### Ankles & Feet

# KNEELING NECK PULLS

Kneeling on one knee, fasten a resistance band in front of you at a height slightly above your head. Holding the resistance band under slight tension, lean your upper body forwards, making sure that your back stays flat and doesn't round. Alternating sides, pull your arms backwards, staying close to your sides. Pull your arm backwards until your hand reaches the level of your neck.

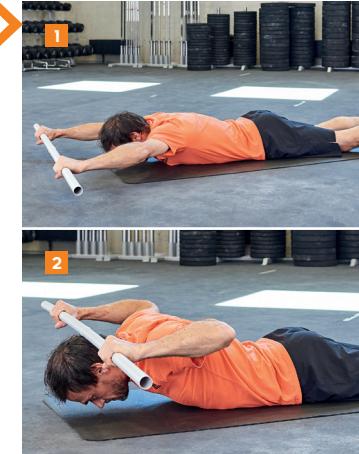


<b>Shoulders</b>
Elbows
Wrist & Fingers
Spine & Core
Hips
Legs & Knees
Ankles & Feet

## FAKE PULL-UPS



For this exercise, you will need a bar of about 120 cm in length (e.g. a broom handle) and ideally, a 5 cm thick mat. If you don't have a mat, this exercise can also be done without. Lie flat with your body on the mat and your head extending over the edge of the mat, or simply flat on the floor if you don't have a mat. Grasp the bar with both hands, hands shoulder width apart. Raise your head slightly and look at the floor – this is important to ensure that keep your neck straight. Pull the bar with both hands as far behind your head as possible. Repeat 5 times without lowering your head.



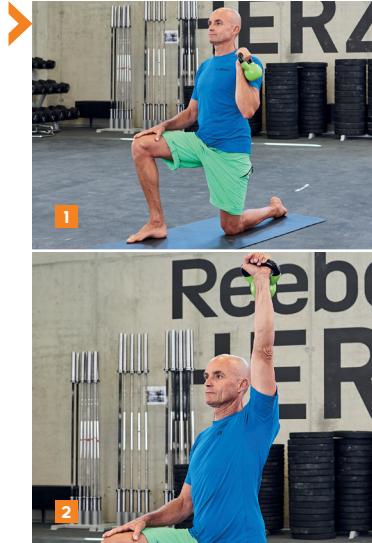
# ROTATOR CUFF

The rotator cuff encircles the humerus head anteriorly, superiorly and posteriorly. Its superior part, the supraspinatus tendon, runs underneath the acromion in the "subacromial space". The rotator cuff, mainly the supraspinatus tendon, undergoes stress in subacromial impingement, which may lead to partial tears. It also undergoes a lot of stress during shoulder-intensive moves while climbing, mostly through dynoing and jumps in "modern" gymnastics-like

bouldering. While complete tears require surgical repair, partial tears are mostly managed conservatively and benefit from exercise after the acute inflammatory phase. If you have had surgery for a rotator cuff injury, you will need to start ACT before resuming climbing. Consult your treating surgeon regarding what time in your rehabilitation process you should start these ACT exercises adjunct to your physiotherapy program.

## KETTLEBELL OVERHEAD PRESS

Choose a kettlebell of a weight which you can lift with one arm under medium effort when the ball of the kettlebell is hanging on the outside of your arm. On one knee, lift the kettlebell above your head with the opposite arm, rotating the elbow inwards when your arm is completely extended. Make sure that your shoulders remain in one horizontal line.



### Shoulders

### Elbows

### Wrist & Fingers

### Spine & Core

### Hips

### Legs & Knees

### Ankles & Feet

## CIRCULAR HANDSTAND PUSH-UPS

Start in plank position with your feet elevated – the higher the feet, the harder the exercise. Do a push-up, rotating your elbows in a circular motion, outwards on the way down and inwards on the way up.



<b>Shoulders</b>
Elbows
Wrist & Fingers
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## EXTERNAL ROTATION WITH RESISTANCE BAND

Fasten a resistance band to the lowest rung of wall bars or another appropriate place, approximately 10-20 cm above the floor. Stand with your side to the wall and raise your bent arm to shoulder height. In this position, the resistance band should be under slight tension. Keeping your elbow bent and at shoulder height, raise your forearm as far upwards as possible, pulling against the resistance band.



## ROTATION CURLS

This exercise is demanding for your coordination. Holding a 1-3 kg dumbbell, extend your arm backwards so that your arm is parallel to the floor. Push your elbow inwards, rotating the upper arm outwards, so that your fingers are pointing backwards and your thumb is facing down. Keeping your arm extended, bring the weight in and down to your side, keeping your elbow close to your body. Curl the weight and then return to the starting position. Try this first with one arm. Once you've mastered this, switch to alternating between the left and right arm.



### Shoulders

### Elbows

### Wrist & Fingers

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### Ankles & Feet

## WEIGHTED PRONE INTERNAL ROTATIONS

Lie in a prone position on a bench with your shoulders and elbows in a 90° angle with a 2-4 kg dumbbell in each hand. Starting with your hands towards the floor, raise the weights so that they are level with your shoulders. Your upper arms and shoulders are the axis of rotation. Be careful not to cheat! Make sure that you only rotate your shoulders and that your shoulder blades remain as stable as possible, even if this means not lifting your hands as high as you otherwise could.



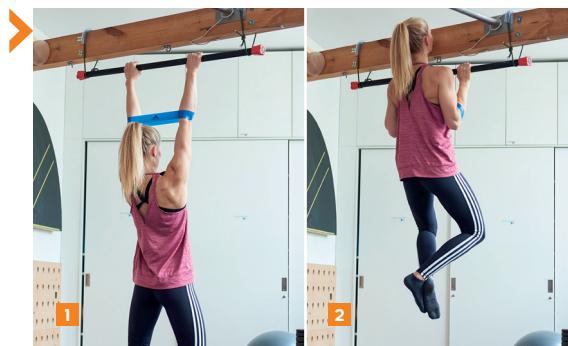
## SCAPULAR INSTABILITIES

Stable shoulders cannot exist without the strong muscles which stabilise the scapula itself. The scapula is largely supported by the rhomboid muscles, which run from the thoracic vertebrae to the medial margin of the scapula and the trapezius muscle. If these muscles are too weak or not utilised enough during the process of movement, this will lead to scapular winging ("chicken wings") and subsequently to further shoulder complaints. Additionally, the pectoralis,

chest and abdominal muscles, which are generally very tight in climbers, increase the tendency of scapular winging. A stable scapula is the key to a stable shoulder girdle.

## ACT PULL-UPS

Loop the ACT band around your forearms just below your elbows (not around the joint). Hang on a pull-up bar with your hands shoulder-width apart so that the ACT band is under light to medium tension. Do a pull-up, rotating your elbows slightly inwards, so that they are close to your body when you pull yourself upwards. The ACT band supports the slight internal rotation of your elbows, ensuring that your shoulder blades remain in the desired position (down and back).



Shoulders
Elbows
Wrist & Fingers
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Ankles & Feet



## WALL SLIDES

Facing a wall, stand approximately 20 cm away from the wall and slide your forearms up and down the wall without letting your arms move away from each other. Make sure that your shoulders stay down and that your hands, elbows and shoulders are aligned.



Shoulders
Elbows
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Ankles & Feet



## PRONE SCAPULAR STABILISERS

With a 2-3 kg weight or kettlebell in each hand, lie in a prone position on a bench or a similar elevation. With your elbows bent, lift both weights simultaneously so that your elbows are level with your shoulders. Extend both arms and pull your shoulder blades together, pushing the weights as far outwards you can.



Shoulders
Elbows
Wrist & Fingers
Spine & Core
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Ankles & Feet

## COMBINED SCAPULAR PUSH-UPS

Starting in plank position, lower your shoulders as far as you can without bending your arms and then push back up to plank. Repeat 5 times and then do a normal push-up. Make sure that your elbows are slightly internally rotated throughout the whole set.



# ELBOWS

The elbow undergoes high stress in climbing, as most of the finger/hand flexor and extensor muscles originate in this joint. These muscles need to be balanced in their strength, but that's usually not the case. The flexor muscles can only work efficiently when the extensors stabilise the wrist joint in a slightly overextended position. Therefore, the extensor muscles are also important in gripping a climbing hold. Just as there is an imbalance between the flexors and extensors in the elbow, there is also generally an imbalance between the pronators and supinators, which are the internal and external rotating muscles. For climbing, the biceps pivot point is in the wrong position as it forces your grip to be more pronated. When a climber pulls

on a horizontal edge, the smaller and inherently weaker pronating muscles are forced to work against the supinators. The pronators pull the hand around so that the palm faces the wall and does not simply spin around to a palms-up position and off the edge. Eccentric training has proven its high effectiveness in insertion tendinosis (e.g. medial or lateral epicondylitis) at the elbow joint. In training these muscles, it is also important to stretch them, as shortened muscles do not allow the antagonists to become stronger. Consider the extensor and flexor muscles as a scaffold around the forearm and elbow joint. If one part is too strong, the whole system falls out of balance.

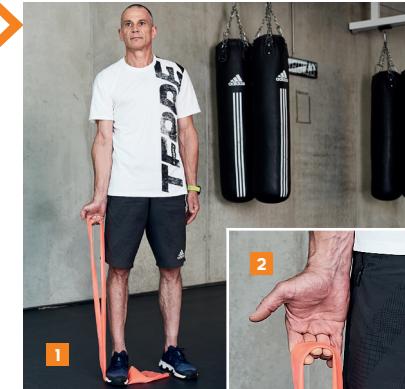
## MEDIAL EPICONDYLITIS - GOLFER'S ELBOW

The medial epicondyle represents the main insertion point of the finger flexors. As the hardest working muscles in climbers, these can cause chronic complaints. Commonly, these flexors are also shortened and are under high tension. To relieve this, intensive stretching is necessary. With chronic high stress on these muscles' insertion to the medial epicondyle, a chronic tendinosis with initial inflammation of its insertion and secondary chronic

degeneration can occur. This occurs most frequently in climbers over the age of 40 but can also affect young climbers. Together with your doctor's therapy (which may consist of injections, acupuncture, taping, braces, non-steroidal anti-inflammatories, radial shockwave or other treatments) and physiotherapy, ACT can not only help but also treat this condition.

## ECCENTRIC FINGER CURLS WITH RESISTANCE BAND

Start standing with a resistance band looped under one foot. With one arm straight down in front of your body, close the fingers so that you are almost making a fist. Pull the resistance band under tension across your fingertips. Open your fingers and slowly reduce the tension until the resistance band barely remains on your fingers.



## FLEXOR SLING STRETCH ON STABILITY BALL

Lie with your back on a stability ball and your legs at a slight angle with your feet on the floor. With a 2-3 kg weight in each hand, extend your arms. Hold the weights as far forwards with your fingers as you can so that the back of your hand faces down and the ball of your hand faces up. Don't try to work against the weights; allow them to pull your fingers and arms downwards, stretching the entire flexor system of your fingers and arms.



Shoulders

Elbows

Wrist & Fingers

Spine & Core

Hips

Legs & Knees

Ankles & Feet

# WRIST EXTENSOR TRAINING

Holding a 2-3 kg dumbbell, rest your forearm on your thigh or on the arm of a chair with your knuckles facing up. Raise your wrist as far as possible. Use only your wrist to lift the weight, making sure that you don't lift your forearm.



Shoulders

Elbows

Wrist & Fingers

Spine & Core

Hips

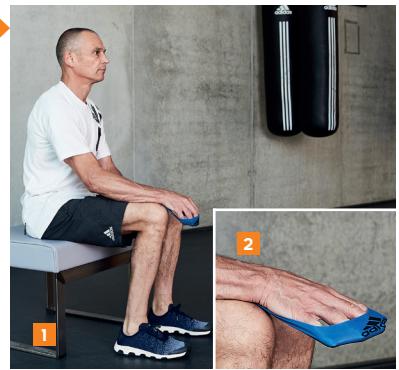
Legs & Knees

Ankles & Feet



# FINGER EXTENSOR TRAINING WITH ACT BAND

Lay an ACT band across the fingertips of one hand and pull it with the other hand so that the fingers are half bent. Extend and spread your fingers, controlling the tension of the resistance band with the other hand.



# ECCENTRIC VARIATION WITH HAMMER

This exercise is based on the effectiveness of leverage. Use a dumbbell with weights only on one side to achieve the shape of a hammer. Alternatively, use a clubbell or a real hammer. Whichever weight you choose, make sure that it doesn't exceed 2-3 kg. Sit on a chair and hold the non-weighted end of your weight of choice. The longer the lever is, the more intense the exercise will be. Rest your elbow on your thigh and, maintaining an internal rotation in your wrist (turn your thumb outwards), lower the weight until your arm is completely extended and the weight stretches your forearm muscles. Hold this position for 3 seconds and then use both hands to return the weight to the starting position.



# ECCENTRIC FINGER EXERCISE

Eccentric exercises are known to improve chronic insertion tendinosis. Originally, they became popular in the therapy of Achilles tendinopathy, but they also work well in elbow conditions. An eccentric movement means that a muscle is working against being pulled away from its centre. For the finger flexors, start in a finger flexion position and slowly pull the closed hand open using your other hand. With your flexors, try to work against the pull so that you can just get the hand to open. Alternatively, you can use a rubber band to passively extend your fingers. Aim for 3 sessions a day, which should be an easy task, considering that you can do this everywhere - sitting in a train, watching climbing movies etc.



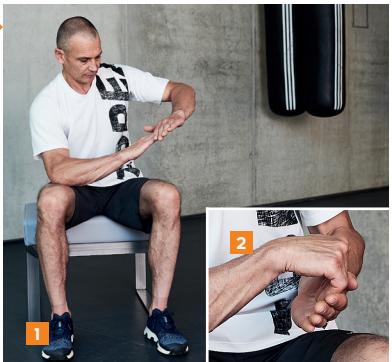
# LATERAL EPICONDYLITIS – TENNIS ELBOW

Almost all patients suffering from tennis elbow (*lateral epicondylitis*) have a short and less-developed extensor group. Thus, the weak muscle is constantly overused, leading to degenerative tendinosis after acute phases of inflammation. Similar to the finger

flexors in medial epicondylitis, ACT can help you to completely recover from this condition. These exercises may be a bit painful in the acute phase but we think that low-intensity training can be done in almost every stage of the condition.

## ECCENTRIC FINGER EXTENSOR EXERCISE

The same concept applies to the extensors as to the flexors. In fact, we almost always recommend doing exercises for both the extensor and the flexor muscles. For a negative load on the extensors, start in an almost extended finger position. With the other hand, push the fingers into a fist. Actively maintain enough resistance in your fingers so that your other hand can barely close them into a fist. Aim for 3 sessions a day, which should be an easy task, considering that you can do this everywhere - sitting in a train, watching climbing movies etc.



Shoulders

Elbows

Wrist & Fingers

Spine & Core

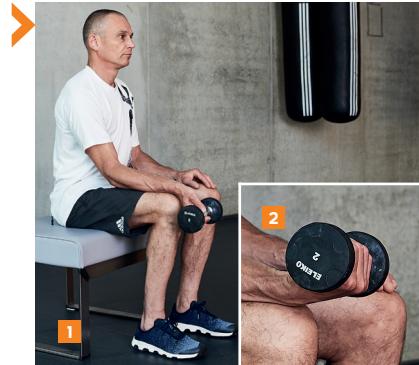
Hips

Legs & Knees

Ankles & Feet

## WRIST FLEXORS WITH A DUMBBELL

Rest your arm on a stable surface with your palm facing up and lay a 2-6 kg dumbbell across your palm. In the starting position, the weight should slightly overextend the wrist joint, passively stretching the forearm. Raise your forearm from the surface, rolling the weight up your arm. Execute this motion slowly and evenly.



Shoulders

Elbows

Wrist & Fingers

Spine & Core

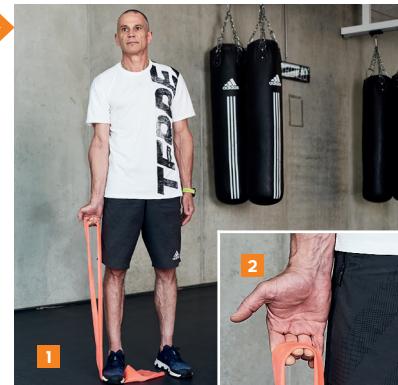
Hips

Legs & Knees

Ankles & Feet

## ECCENTRIC FINGER CURLS WITH RESISTANCE BAND

Start standing with a resistance band looped under one foot. With your hand straight down in front of your body, close the fingers on one hand so that you are almost making a fist. Pull the resistance band under tension across your fingertips. Open your fingers and slowly reduce the tension until the resistance band barely remains on your fingers.



## DUMBBELL CURLS

Rest your arm on a stable surface with your palm facing down and hold a 2-4 kg dumbbell. In the starting position, the weight should slightly bend the wrist joint. Raise your hand, lifting the weight. Execute this motion slowly and evenly.

Shoulders

Elbows

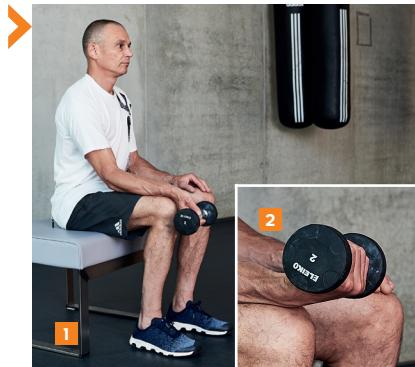
Wrist & Fingers

Spine & Core

Hips

Legs & Knees

Ankles & Feet



## ECCENTRIC VARIATION WITH HAMMER

For this exercise, use a hammer or a dumbbell with weights only on one side. The weight shouldn't be too heavy (1-3 kg). In a seated position, rest your elbow on your thigh, hold the dumbbell at the non-weighted end and bring your wrist into a neutral position with your elbow bent at 90°. The longer the lever is, the more intense the exercise will be. Allow the dumbbell to fall gently inwards until you feel slight tension in your forearm extensors, controlling the motion. Use both hands to return the weight to the starting position.



## BRACHIALIS TENDONITIS – CLIMBER'S ELBOW AND BICEPS TENDONITIS

Both the brachialis and the biceps insert into the anterior area of the elbow joint. Whereas the brachialis muscle is the strongest elbow flexor, the biceps is the main muscle required for

supination (outward rotation of the elbow joint). In case of inflammation (*brachialis tendonitis* = climber's elbow, or *biceps tendonitis*), they respond well to eccentric exercises.

## ECCENTRIC BRACHIALIS EXERCISE

Start standing holding weights in your hand while your elbow is flexed so that the brachialis is tensed. Remember, the brachialis is the strongest elbow flexor muscle. Slowly let the weight extend the arm while the brachialis works against this extension. Alternatively, you can start with your elbow flexed so that the brachialis is tensed. Maintaining resistance against the extension, slowly pull the injured arm straight using your other hand. Aim for 3 sessions a day, which should be an easy task, considering that you can do the second variation everywhere sitting in a train, watching climbing movies, etc.



## ECCENTRIC BICEPS EXERCISE

Although the biceps helps with elbow flexion, its main work is supination.

The principle of eccentric work as outlined above can also be applied to the biceps. Start with your elbow flexed and your hand open and rotated externally, so that you are looking at your palm. Withholding the eccentric load with your biceps, slowly rotate the injured arm using your other hand.



## SWORD PULL

Fasten a resistance band at a height of about 15-20 cm above the floor to a suitable place, e.g. a radiator, wall bars or similar. Standing in an upright position with your side to the point of fixation and your feet shoulder-width apart, imagine that you are aiming to put your shoulder blades into your back pockets. Pull the resistance band, already under light tension, diagonally upwards, leading with your elbow as though you were drawing a sword. Make sure that your shoulders stay low and that the distance between shoulders and ears remains unchanged. When your elbow is so high that it can't be raised any further without lifting your shoulders, extend your forearm. This should all be done in one fluid motion.



Shoulders

Elbows

Wrist & Fingers

Spine & Core

Hips

Legs & Knees

Ankles & Feet

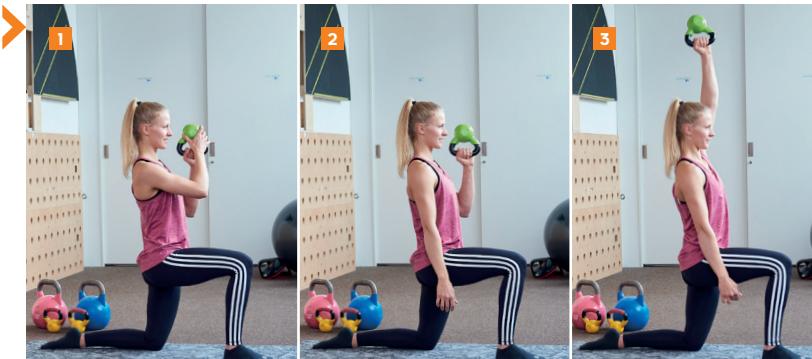
## WRIST

Many wrist conditions in climbers result from a lack of active stabilisation of the wrist joint. Strong forearm extensor and flexor muscles can prevent minor subluxations and ligamentous or joint capsular instabilities. As previously mentioned, an increase of external stabilisation, similar to a

scaffold, relieves stress on the internal joint structures. These exercises help in conditions such as extensor tendonitis, ulnocarpal synovitis, minor discus injuries, joint capsular inflammation or bone marrow oedema to the carpal bones.

## WRIST STABILISATION WITH KETTLEBELL

Choose a kettlebell of a weight which you can lift with one arm under medium effort when you hold the handle so that the ball faces up. On one knee, balance the kettlebell with the ball facing up while pushing it upwards. When your arm is fully extended, rotate your elbow inwards. Make sure that your shoulders remain in one horizontal line.



- Shoulders
- Elbows
- Wrist & Fingers
- Spine & Core
- Hips
- Legs & Knees
- Ankles & Feet

## WRIST AND FINGER EXTENSOR TRAINING

Lay an ACT band across the fingertips of one hand and pull on it with the other hand so that the fingers and wrist are bent. Extend your wrist and spread your fingers, controlling the tension of the band with the other hand.



Shoulders

Elbows

**Wrist & Fingers**

Spine & Core

Hips

Legs & Knees

Ankles & Feet

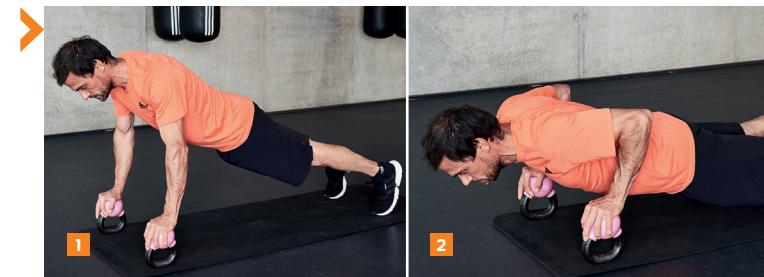
## ECCENTRIC VARIATION WITH HAMMER

For this exercise, use a 3-4 kg hammer or a dumbbell with weights only on one side. In a seated position, rest your elbow on your thigh, hold the dumbbell at the non-weighted end and bring your wrist into a neutral position with your elbow bent at 90°. The longer the lever is, the more intense the exercise will be. Allow the dumbbell to fall gently outwards until you feel slight tension, controlling the motion. Use both hands to return the weight to the starting position. You can vary this exercise also for inward rotation or, as shown in the pics extension.



## REVERSE KETTLEBELL PUSH-UPS

For this exercise, you need two small kettlebells and an optional soft mat for the more challenging variation. Flip the kettlebells so that the handles are on the floor, using the balls as the handles. From here, do normal push-ups. Exercise caution to avoid injury! Test your balance and get used to the instability of the flipped kettlebells. Doing a few modified push-ups with your knees on the floor can help you to get the feeling.



Once you've mastered this exercise, challenge yourself further by placing the mat under the kettlebells to increase instability.



Shoulders

Elbows

**Wrist & Fingers**

Spine & Core

Hips

Legs & Knees

Ankles & Feet

# FINGER INJURIES

This is a bit tricky as there are no actual muscles with the muscle body at the level of the fingers. The forearm muscle bodies on the extensor and flexor side are the most important for finger flexion and extension. Additional muscles which control the fingers, the interosseous and lumbrical muscles, are within the palm. While

climbing mostly focuses on the finger flexor muscle strength, the extensors are also important. These can prevent a dorsal shift of the finger phalanges in a crimp grip position, thus decreasing stress onto the interphalangeal finger joints. Concerning finger flexor strength training, we refer to the climbing specific training literature.

## FINGER EXTENSOR TRAINING WITH ACT BAND

Lay an ACT band across the fingertips of one hand and pull on it with the other hand so that the fingers are half bent. Extend and spread your fingers, controlling the tension of the band with the other hand.



Shoulders

Elbows

Wrist & Fingers

Spine & Core

Hips

Legs & Knees

Ankles & Feet

## FINGER EXTENSOR TRAINING

Extend and spread your fingers as far as you can. Hold briefly, then relax the fingers.



# SPINE AND CORE

Spinal injuries in climbers are not as frequent as other conditions but weakened paravertebral muscles increase the probability of a disc herniation or facet syndromes. Most importantly, core strength can relieve stress on the arms and shoulders while climbing, making it an important prophylactic factor in avoiding injuries. With a weak core, the whole weight of the

body hangs on the arms, resulting in a malpositioning of the shoulder girdle. This malposition subsequently leads to a lax shoulder capsule and repetitive or acute trauma. In addition, many climbers suffer from lower back pain, which can be effectively treated through muscular strength exercises of ACT.

## CORE PENDULUMS

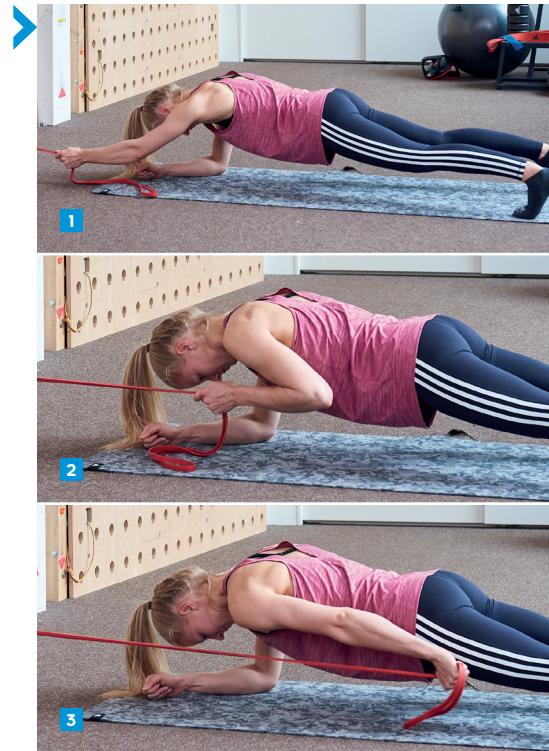
Lying on your back, place a foam roller, yoga block, or folded towel between your knees with your knees and hips bent at a 90° angle. Extend your arms towards the ceiling, loop the ACT Band around your wrists and pull your hands shoulder-width apart, making sure that your elbows don't jut out but are in line with your shoulders and wrists. Maintaining the starting position with your upper body and arms, tilt your legs to the side, reaching the point at which you can hardly hold your balance. Return to the starting position and tilt your legs to the other side.



Shoulders
Elbows
Wrist & Fingers
<b>Spine &amp; Core</b>
Hips
Legs & Knees
Ankles & Feet

## POWER PLANK

Fasten a resistance band at a height of about 15-20 cm above the floor to a suitable place, e.g. a radiator, wall bars or similar. Starting in a forearm plank facing the point of fixation with your feet shoulder-width apart, pull the resistance band with one arm. Choose the distance from the point of fixation such that the resistance band is under tension when your arm is fully extended. Make sure that your hips stay parallel to the floor when you pull.



Shoulders
Elbows
Wrist & Fingers
<b>Spine &amp; Core</b>
Hips
Legs & Knees
Ankles & Feet

# CLIMBER'S BACK - HUMP BACK

Overdevelopment of one muscle or muscle group while ignoring other muscles can actually change your posture. In climbers, this often happens by overdeveloping the subscapularis, thoracic spine muscles, lats (*latissimus dorsi* muscle), and under-

developing the pectoralis muscles. This shortens the pecs and causes the climber to bend forward with almost a humped back. Consistent stretching of these shortened muscles (e.g. *pectoralis major*) and posture training are both necessary.

## FOAM ROLLER WITH KETTLEBELL PUSH AND PULL

For this exercise, you will need a foam roller and a 1-2 kg kettlebell or dumbbell. Place the weight on the floor and the foam roller about 50 cm in front of it. Lie on your back with your upper thoracic spine on the foam roller. With your knees bent and your feet planted on the floor, extend your arms and grab the weight, making sure that your neck remains extended. Don't pull your chin to your chest but aim your gaze in the direction of the weight. By pushing and pulling with your legs, slide the weight back and forth along the floor, making sure that the foam roller remains under your upper spine – only about 20 cm back and forth. During the exercise, try to bring your hips as close to the floor as you can. Be careful! Listen to your body and don't push too far.

Shoulders
Elbows
Wrist & Fingers
Spine & Core
Hips
Legs & Knees
Ankles & Feet



## SHOULDER GIRDLE OPENERS ON STABILITY BALL

Lie with your back on a stability ball, legs bent and feet on the floor to stabilise your position. With a 2-3 kg weight in each hand, extend your arms out sideways and move them downwards to the point at which you would have to actively engage to move them further. Without actively pushing, let your hands sink towards the floor, pulled by the weights. Rest your head on the stability ball and relax the muscles of your neck. Hold this position for about 20 seconds. You can vary the position of your arms to target different zones of your shoulder and neck muscles.



## FLOOR ANGEL

Lie on the floor with your arms bent and to the side. Place a piece of a hose or a broomstick (2-3 cm diameter) under the natural curve of your lower back and slide your arms up and down along your sides. Make sure to keep your whole arm, especially your wrists, in contact with the floor and maintain contact between your lower back and the hose. Slide your arms as far up and down as possible over your full range of motion.

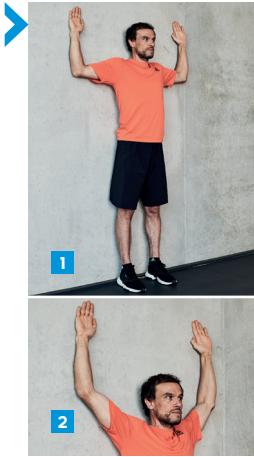


Shoulders
Elbows
Wrist & Fingers
Spine & Core
Hips
Legs & Knees
Ankles & Feet



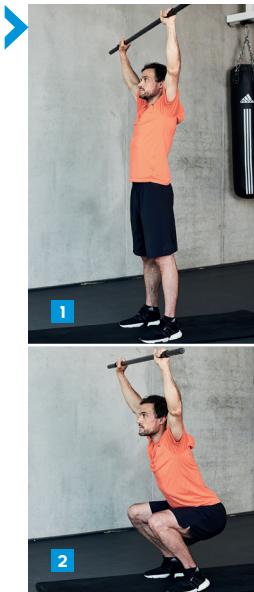
## WALL ANGEL

With your back to a wall, bring your arms up and out, keeping a bend in your elbow. Your head and your heels should be in contact with the wall. Place a piece of hose or a broomstick (2-3 cm diameter) between the wall and the natural curve of your lower back. Slide your arms up and down the wall along your sides, maintaining the contact between your arms, especially your wrists, and the wall. For the duration of the exercise, try to hold the hose in place with your lumbar spine by actively pressing your lower back into the wall. Slide your arms as far up and down as possible over your full range of motion.



## OVERHEAD SQUAT WITH BAR

Stand upright with your feet shoulder-width apart and parallel, toes pointing forward. Rest a broomstick on your head, holding it with both hands so that your elbows are bent at approximately 90°. Stand in front of a mirror so that you can check the position of your arms. Extend your arms straight up and squat, keeping your heels on the floor and moving your upper body as straight up and down as you can. Make sure that your knees point forwards for the duration of the exercise.



Shoulders

Elbows

Wrist & Fingers

Spine & Core

Hips

Legs & Knees

Ankles & Feet

## THORACIC SPINE SYNDROME - FACET JOINT SYNDROME

Although the vertebrae of the spine are separated from each other by intervertebral discs, they have direct articulation on both sides via the facet joints. These joints are surrounded by a very tight capsule. Minor shifts which happen in sudden movements cause the nerve endings within this joint capsule to fire. This is an alarm

to the body and it reacts through activation of the paravertebral muscles. These facet syndromes are a frequent nuisance in very active climbers and can become part of a vicious cycle which can be prevented by posture training, abdominal core strength and well-developed paraspinal musculature.

## ELBOW RAISERS

Lying flat in a prone position, place your fists and your shoulders on the floor so that your elbows are bent at approximately 90° and point directly upwards. With your gaze towards the floor, your neck should be straight. Lift your head up by about 5 cm, keeping your gaze towards the floor. Make sure that you don't compensate by hollowing your back. Lift both elbows so that your fists are 2-5 cm above the floor. Try to lift your elbows as directly vertically as you can. It's helpful to have someone to adjust your position at the beginning. Hold the position for about 10 seconds before lowering your fists and head to the floor.



Shoulders

Elbows

Wrist & Fingers

Spine & Core

Hips

Legs & Knees

Ankles & Feet

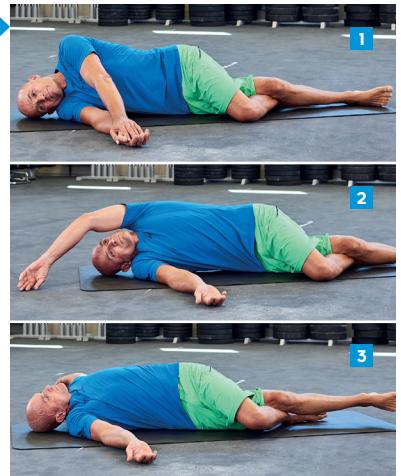
## STABILITY BALL PRETZEL

Kneeling in front of a stability ball, lean your upper body forwards and rest one elbow on the ball. Place your other hand behind your back, pressing the back of your hand against the middle of your back at the meeting point of the lumbar and thoracic spine. Lower your head as far as you can while pressing your hand into your spine and pulling your shoulders back. The front of your body pushes while the back of your body pulls. Hold this position for about 10 seconds and then change sides.



## PRETZEL

Lying flat on your back, extend one leg and cross the other over so that your foot is level with the knee of the extended leg. Roll onto the side of the extended leg and hook the foot of the bent leg around the calf of the straight leg. Lying on your side, extend both arms out in front of you, pushing the upper hand a bit further than the lower hand. Keep the lower hand where it is and draw a semicircle along the floor with the upper hand, bringing the hand over your head and to the other side of your body and back to the starting position. During this motion, try your best to maintain contact between your upper hand and the floor. If this isn't possible, lift your hand just enough so that you can continue the motion.



Shoulders  
Elbows  
Wrist & Fingers  
**Spine & Core**  
Hips  
Legs & Knees  
Ankles & Feet

## CERVICAL SPINE CONDITIONS - BELAYER'S NECK

Believe it or not, there are exercises to train your neck! Fighter-jet pilots regularly do these exercises to be able to bear the high stress loads caused by g-force during flights. The climber's neck is always under stress from various factors. First of all, while belaying or watching others, climbers need to look up. Although belay glasses help to reduce overextension in the neck while belaying, the neck is also under stress

while climbing and bouldering. The human head is quite heavy (roughly 5kg) and the dorsal muscles do most of the work to keep it steady and in place. If a climber's back condition causes an increased kyphosis of the thoracic spine, this can lead to a hyperlordosis of the neck, increasing the stress load onto the neck. Well-trained paravertebral muscles help to decrease the load onto the spine.

## LOOK AROUND

Grasp a light- to medium-strength resistance band in both hands and lay the band against the back of your head. Straighten your arms to bring a bit of tension into the band. Use your neck muscles to press your head against the resistance band. The preferred motions are straight backwards and diagonally backwards, but you can vary the movement to find the optimal position for yourself.



## NECK PRESS

This is essentially the same as the previous exercise, using your hand instead of resistance band. Press your hand against the back of your head and use your neck muscles to press against your hand. The advantage of this variation is that you can do it any time you like, for example while waiting at a red light or at your desk, without worrying about your colleagues thinking you're weird for wrapping yourself in a rubber band.



Shoulders  
Elbows  
Wrist & Fingers  
**Spine & Core**  
Hips  
Legs & Knees  
Ankles & Feet

# HIPS

## FEMOROACETABULAR IMPINGMENT

At first glance, hip conditions may not appear to occur that frequently in climbers. Nevertheless, the number of femoroacetabular impingements (FAI) and iliopsoas conditions in climbers has increased. In an FAI, the femoral neck has repetitive contact to the outer rim of the pelvic acetabular ring, which may lead to the build-up of osteophytes or osseous bumps (CAM)

at the femoral neck. This may be increased through intensive bouldering, dropknee positions or high stepping. In general, muscular stabilisation of the pelvis helps to decrease a pelvic tilt to the contralateral side, if standing on one leg. It also can decrease the impact to the pelvis from repetitive jumps down after a boulder.

### T-STAND HIP ROTATIONS

Standing upright in front of a chair or similar for stability, lean your upper body forwards and extend one leg backwards so that your torso and leg form a line parallel to the floor – the T-Stand. Support yourself with one hand on the chair so that you can stably hold this position. Turn your body and open your torso to the side, stacking your hips. Hold this position briefly before returning to the T-Stand.

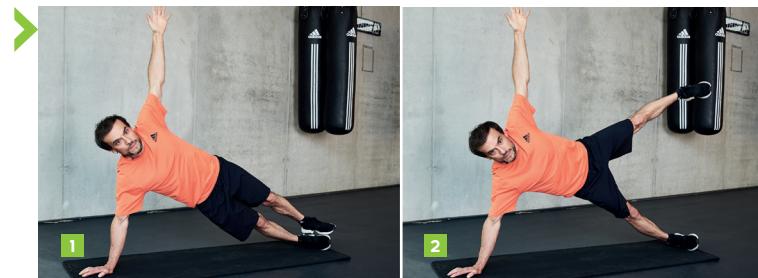


Shoulders
Elbows
Wrist & Fingers
Spine & Core
Hips
Legs & Knees
Ankles & Feet



### SIDEPLANK LEG LIFT

Start in sideplank position with one hand pressing into the floor and the other reaching straight up towards the ceiling. Maintain your body tension and keep your hips up. Lift your upper leg as high as you can. Hold briefly and then return to the starting position.



### ACT SQUAT

Loop an ACT band around your arms and start in a T-Stand with your arms extended forwards. Pull the band apart sideways and do a small squat. Make sure to maintain uniform tension in the ACT band and to keep your upper body parallel to the floor.



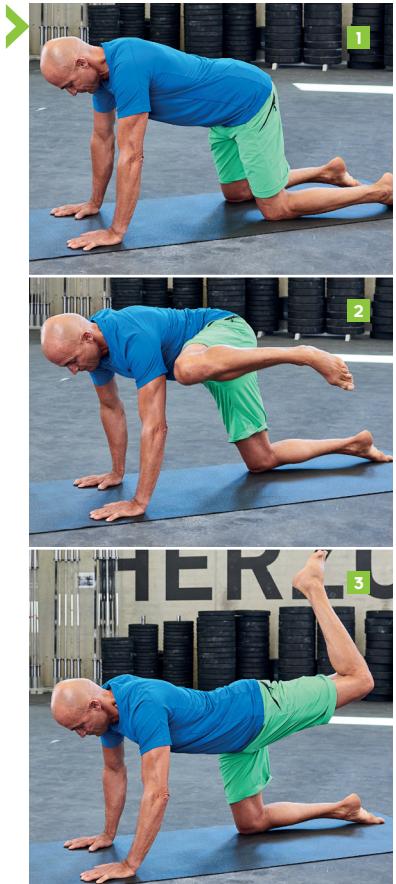
Shoulders
Elbows
Wrist & Fingers
Spine & Core
Hips
Legs & Knees
Ankles & Feet

## FIRE HYDRANTS

Starting in tabletop position, lift one leg as high as you can by opening the hip joint, keeping your knee bent at a 90° angle. Actively hold your leg at maximum height for 5-10 seconds. By rotating your hip, bring your leg behind you and upwards. Actively hold your leg at maximum height for 5-10 seconds. Return to the tabletop position and switch legs.



Shoulders
Elbows
Wrist & Fingers
Spine & Core
<b>Hips</b>
Legs & Knees
Ankles & Feet



## PELVIC HAMSTRING AND BICEPS INJURIES

The dorsal side of the pelvis, the insertion of the hamstrings and biceps femoris muscle are also exposed to a high stress load in climbing through heelhooks. Pulling on a heelhook leads to a high pull-out stress at the insertion of the rear upper muscles of the leg and they can either be strained or pulled out. This is more likely to

happen if these muscles, mainly the hamstrings, are weak and shortened. A strong muscular build can prevent this. If you restart training after a major hamstring tear or even surgery, consult with your surgeon regarding when you can start ACT.

## ACTIVE HAMSTRING MOBILISERS

Fasten a medium-strength resistance band to a pull-up bar so that you can stand on one foot and hang the heel of the other in the band. Facing the band, pull the extended leg up and down, using some momentum.



Shoulders
Elbows
Wrist & Fingers
Spine & Core
<b>Hips</b>
Legs & Knees
Ankles & Feet

## ROTATED HAMSTRING STRETCH

Kneeling on one knee, extend the other leg forwards and rest your heel on the floor. Flex the toes of the extended foot and turn your foot slightly inwards (supination) while pushing the leg downwards. At the same time, rotate your upper body outwards, towards your toes. You should feel a stretch in the hamstring and calf of the extended leg.



Shoulders
Elbows
Wrist & Fingers
Spine & Core
Hips
Legs & Knees
Ankles & Feet

## T-STAND SQUAT

Standing upright, enter the T-Stand with your arms extended forwards. In this position, maintain a slight bend in the standing leg. Make sure that your knee joint doesn't collapse inwardly – push it actively outwards. Activate the muscles in your buttocks and upper back so that your spine isn't rounded. Bend and then straighten the knee of your standing leg, doing a small squat. Return to standing and repeat. It's difficult to achieve a parallel line with your body if you're not flexible. Practice in front of a mirror to check your position. At the beginning, it's more important to pay attention to the tension in the correct muscles than to obtain the perfect position.



## KNEES

Knee injuries from heelhooks, frog or dropknee positions are frequent and lead to meniscal tears, cruciate ligament injuries or tendon strains and sprains. These can be prevented by well-trained muscles around the knee, mainly the quadriceps and the hamstrings. After an injury, before

you go back to play at the wall, you need to strengthen your legs again. When restarting after a major knee injury or even surgery, consult with your surgeon first regarding when you can start with ACT.

Shoulders
Elbows
Wrist & Fingers
Spine & Core
Hips
Legs & Knees
Ankles & Feet

## ONE-LEGGED ROMANIAN DEADLIFT VARIATION

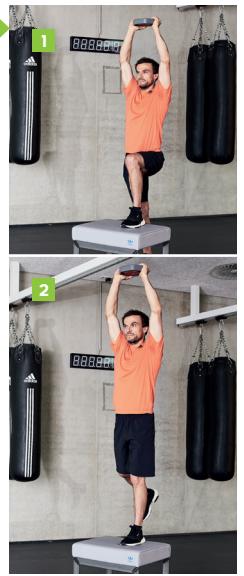
Starting in a T-Stand, hold an 8-10 kg kettlebell in your hand on the same side as the elevated leg. To modify this exercise, support yourself by holding onto a chair or a wall with your free hand. Extend the arm with the kettlebell towards the floor. Bend and then straighten the knee of your standing leg, doing a small squat. Make sure that your body stays parallel to the floor. While straightening your leg, bend the arm with the kettlebell, lifting the weight upwards. When you bend your knee to squat, allow your arm to extend downwards.



## ONE-LEGGED PUSH WITH BARBELL

Stand in front of a stool or a box – the higher it is, the more intense this exercise will be. Lift a 10-20 kg weight with both hands straight up above your head. Alternating sides, step up onto the stool with one foot and then return to the starting position. Make sure that your upper body remains upright.

Shoulders  
Elbows  
Wrist & Fingers  
Spine & Core  
Hips  
**Legs & Knees**  
Ankles & Feet



## ONE-LEGGED LUNGE VARIATION

Fasten a medium-strength powerband from a pull-up bar or similar. It should be high enough that you can hang your toes in the band when standing with your back to it. Hold a kettlebell no heavier than 12 kg in your hand on the same side as the foot in the powerband. Press the kettlebell directly upwards without pushing your shoulder upwards (centred shoulder) and then do a squat.



# ANKLES

Ankle sprains from falls are the most frequent acute trauma in climbing and bouldering. A twisted ankle can be a nuisance to your climbing for a while but these injuries can be prevented through stability training of the ankle joint, equilibrium exercises and fall training.

## ANKLE SUPINATION ROLLS

In front of a wall or something you can hold for stability, stand along the length of a foam roller with your feet next to each other. Imagine that the soles of your feet have been glued to the foam roller. Holding onto the wall, roll to one side, cautiously testing the limit of your ankles to roll over your full range of motion. Maintain contact between the soles of your feet and the foam roller. Return to the starting position and switch sides. For more of a challenge, try this exercise without holding on to anything.



## COMPASS

Stand on a soft mat or other unstable surface. Shift your weight to one leg and slightly bend the knee of your standing leg. Move your free leg in all possible directions around your standing leg, making sure that your foot maintains contact with the floor at all times. Try to maximise the range of motion for all positions.



# ACT EXAMPLE CIRCUITS



## ACT EXAMPLE CIRCUIT FOR MOBILITY



### RESISTANCE BAND BEHIND THE BACK

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### FINGER EXTENDORS WITH ACT BAND

see page 25



### ANKLE SUPINATION ROLLS

see pages 33, 85



## LOOK AROUND

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### PRETZEL

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### FOAM ROLLER WITH KETTLEBELL PUSH AND PULL

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### COMPASS

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## ACT EXAMPLE CIRCUIT FOR STRENGTH/ENDURANCE



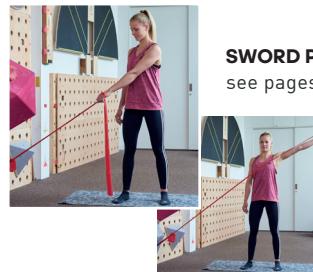
### EXTERNAL ROTATION WITH RESISTANCE BAND

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### ACT ROWING

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### SWORD PULL

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### WRIST STABILISATION WITH KETTLEBELL

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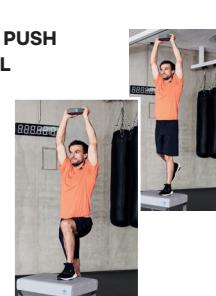
### CORE PENDULUMS

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### ONE-LEGGED PUSH WITH BARBELL

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## ROTATION CURLS

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## ACT EXAMPLE CIRCUIT FOR MUSCLE/STRENGTH-BUILDING



### RING PUSH-UPS

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### ECCENTRIC BRACHIALIS EXERCISE

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### POWER PLANK

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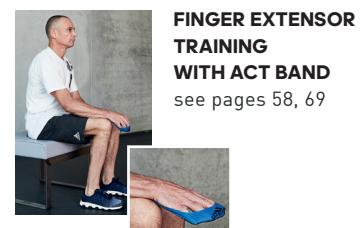
## HANDSTAND WALKABOUTS

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### ACT PULL-UPS

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### ACT SQUAT

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## ACT EXAMPLE CIRCUIT FOR INTERMUSCULAR COORDINATION



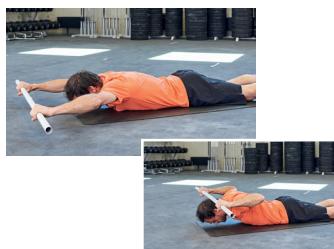
### BEAR WALK WITH ARM RAISES AND OTHER VARIATIONS

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### FAKE PULL-UPS

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### FLEXOR SLING STRETCH ON STABILITY BALL

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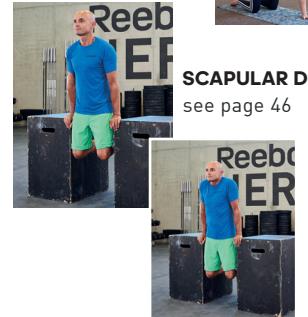
## TABLETOP ARM EXTENSIONS

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### SCAPULAR DIPS

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### T-STAND HIP ROTATIONS

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