

A full-page background image showing two rock climbers on a steep, reddish-brown cliff face. The climber at the top is wearing a white helmet and a green tank top, while the climber at the bottom is wearing a red helmet and a black tank top. Both are secured by ropes. The background is a clear blue sky and a blue ocean.

Detlef Heise-Flecken/Gabi Flecken

# ROCK CLIMBING

TECHNIQUE  
EQUIPMENT  
SAFETY

WITH AN INTRODUCTION TO INDOOR CLIMBING

MEYER  
& MEYER  
SPORT



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## Rock Climbing

## **Disclaimer**

At the request of the publisher, to make reading easier this book has been written using exclusively the male form of the personal pronoun. This should be understood to include the female form as well.

Rock climbing is a dangerous sport. As a beginner you should always practice under the supervision of a climbing instructor or an experienced climber. The authors and the publisher cannot be held responsible for any shortcomings or injuries that might occur as a result of the content of this book.

Detlef Heise-Flecken & Gabi Flecken

# ROCK CLIMBING

TECHNIQUE | EQUIPMENT | SAFETY

WITH AN INTRODUCTION TO INDOOR CLIMBING



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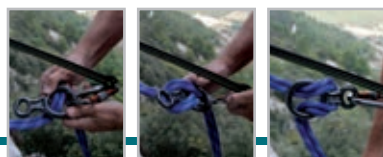
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# About This Book

The way of learning the sport of rock climbing has changed considerably in past decades. While 20 years ago the first steps toward climbing were taken almost exclusively on natural rock surfaces—on crags, also called climbing gardens—nowadays the beginner uses mainly an indoor-climbing gym: available at all times and in any weather, always safe but still exciting. Eventually, however, almost every one of those indoor climbers feels the urge to combine climbing fun with nature. They want to swap the plastic grips for the varied structures of real rock and not be limited by the ceiling, but rather view the unending sky above them and experience the impressive feeling of looking down from on high. Because there are many climbing gardens and well-established climbing crags about, the first step out of the climbing gym and onto the rocks—apart from the journey to get there—is nowadays easy.

Lead climbing—a distinct variation between indoor climbing with a top rope and Alpine rock climbing—promises more intense climbing while also challenging your ability and your psyche.

This book is devoted exclusively to the basics of rock climbing. So that lead climbing is made as safe as possible, the first section of the book covers the necessary basic knowledge required for climbing (e.g., protection and belay techniques, creating belay stands, and rappelling). We also cover climbing of multiple rope lengths (also called multi-pitch) and important subjects such as falling and bailing out from climbs. On purpose, we do not cover Alpine climbing and solo climbing. These subjects are too complicated for the beginner lead climber and would be too lengthy for a compact reference book.

Regardless of your reasons for taking up rock climbing, this book gives useful, valuable tips not only for climbing up but also for a safe descent. The experienced top-rope climber who has left the climbing gym behind and wants to take the first steps on the “sharp end” of the rope will also find comprehensive instructions. The “weekend-hobby climbers” (i.e., those who do not climb regularly) can use this book to review various tactics and bring their own knowledge up to speed.



## Rock Climbing

This book does not intend to replace an established climbing school. We strongly recommend that your first step is to attend a course on lead climbing. In Europe, these are run by various Alpine clubs and mountain schools; there are similar organizations elsewhere in the world. In our opinion, a lead-climbing course in the climbing gym is not sufficient to prepare you for your first outdoor climbing experience. The knowledge required for outdoor rocks is more complex than what the limited possibilities available in the gym can offer.

“The brain is the most important muscle for climbing” (Güllich, cited in Hepp, 2004). This statement by Wolfgang Güllich (1960-1992)—a famous German climber and one of the first who brought extreme solo climbing to the Alps—is as valid today as ever.

With this in mind, we wish you many successful, safe, relaxing, but nevertheless exciting rock climbing experiences.

Just as rock climbing is not possible without a reliable partner, this book would not have been possible without the commitment and help of family and friends. We extend our hearty thanks to them and in particular Andrea, Christiane, Lukas and Peppi. Also we greatly thank Norbert and Bengt Haunerland for their help with the translation of the German original into English.

Detlef Heise-Flecken and Gabi Flecken

# 1 Equipment and Safety Techniques

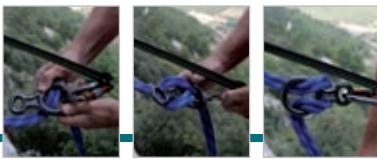
## 1.1 Equipment Indoor Climbing

For indoor climbing, you need to have the following equipment:

- Climbing harness
- Climbing shoes
- Belay device with a HMS carabiner
- Climbing rope
- Chalk bag

Beginners should not buy a complete set of equipment immediately. In most cases, when first attempting climbing under the guidance and support of an instructor, you can rent the necessary climbing equipment from the climbing gym. Often, this is included in the initial fee for a beginners course. With a little experience, novice climbers can better assess what equipment is appropriate and necessary for them. Advice from instructors and advanced climbers can also be useful, although their advice sometimes tends toward personal favorites or trendy brands that are often very expensive and not necessarily the best choice for beginners. Because of the large number of products available, climbing equipment is now much more affordable. Extra care is required when purchasing used equipment, especially for inexperienced climbers who may not be able to evaluate wear and tear of such equipment.

This is particularly important with equipment that is offered through the internet, since neither the condition or size and fit can be checked prior to purchase. All safety-relevant equipment is subject to special standards indicated by the standardization marks EN, CE, and UIAA, and one of these must be marked on the article. It cannot be overemphasized that all climbing equipment must be handled carefully – your life and safety depend on it.



## Rock Climbing

### Climbing Harness

Sport climbers, nowadays, generally use a seat harness (photo 1). Full-body harnesses are only used by Alpine climbing groups carrying large backpacks as well as children under 8 because of their body size (see photo 2); sometimes these harnesses are also used for obstacle climbing (like crate climbing). Seat harnesses come in many different designs and prices. Always ensure your harness fits correctly and comfortably.

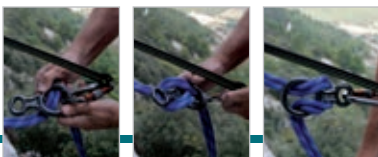


## Equipment and Safety Techniques

Adjustable leg straps, while not necessary, are practical if, for example, you plan to wear thick pants as well as shorts, or you gain or loose weight over time. If harnesses are obtained for use in schools or other educational establishments, variability, ease of handling, and similarity are key. Meanwhile, fast adjust buckle systems (photo 3) that make the often tedious looping back of the buckle strap unnecessary have become popular (see page 19).







## Rock Climbing

### Climbing Shoes

Footwear is a complex subject. Climbing shoes for beginners do not need any particular shape, but they must fit well. This means they should fit as tightly as possible, without pinching the toes and making you want to rip them off after each climb. Extremely tight-fitting shoes have a noticeable benefit only at more difficult climbs (see Table Page 200). Because slippers and many soft shoes with Velcro closures must be worn as a close fit, these are not suitable for beginners. With lace-up shoes, climbers can take small steps using less energy, and they fit the foot better (photo 4).

4



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**TIP:** The cheapest-fitting climbing shoe is usually the best for a beginner, because the first pair you use is quickly worn out from footwork mistakes.

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### Safety Equipment

The HMS carabiner (which comes from a German term meaning half clove hitch belay; photo 5) is and remains the best to use with a belay device (see pages 35-47). It differs from the other locking carabiners by its typical pear shape.

5

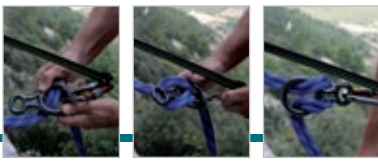


Screw-locking

HMS

Spring-lock





## Rock Climbing

6



The still widely-used belay with a fixed Figure Eight abseil device (photo 6) will sooner or later be superseded by the tuber device (or ATC; photo 7), because the tuber has a higher braking force and there is less chance of mishandling (Albert, 2007a).

7



Assisted braking devices, such as GriGri and Cinch, are not suitable for beginners. If the belayer instinctively reaches for the belay device when a partner falls, the automatic brake mechanism may be disabled. In addition, assisted braking devices are expensive and require some practice when lowering a partner.

## Equipment and Safety Techniques

### Chalk

Chalk (magnesium carbonate) binds the sweat on the hands and, thus, increases friction on steep slabs or rounded edges. For beginners, chalk is only recommended for those who tend to suffer from extremely sweaty hands. In quite a number of walls, only chalk balls are permitted since they release a smaller dose of powder and reduce the formation of dust. A completely dust-free alternative is liquid chalk (photo 8).



8



## Rock Climbing

### Climbing Ropes

Climbing ropes are already installed in the top roping sections of most indoor climbing walls. They are suspended from an anchor point and cover exactly the length of the route to be climbed. Both ends of the rope must reach to the floor, preferably with an excess of 1-2 m of rope at each end. Although, for the time being, the beginner does not need to worry about purchasing a rope, but he should nevertheless understand some of the characteristics about ropes. Climbing ropes are between 10 and 11 mm thick and have a breaking strain of at least 20 kN. More simply expressed, though not physically entirely correct, that means that the rope has a tensile strength of up to about 2,000 kg. The outer colored sheath of the rope is a protective mantle for the core but should still have no signs of damage. If the white core of the rope can be seen through the covering, the rope must not be used, and climbing wall management must be made immediately aware of it. Through frequent usage, the ropes become rough. Such ropes are still usable but are harder to handle. If this makes ensuring your partner's safety difficult, they should be replaced.

For setting up anchor points or more advanced climbing techniques in the sports wall, you need the following additional material.

### Carabiners

Carabiners come with screw fastening or spring-lock fastening gates (photo 5). The most common carabiners are locking carabiners, with a locking mechanism to prevent unintentional opening. These are used, for example, for holding additional weight or the construction of rope anchor points. Due to their shape, regular locking carabiners are unsuitable for HMS, but HMS carabiners can serve the same purpose as locking carabiners.

### Accessory/Prusik Cord

Accessory/Prusik cords are thin ropes with a diameter of 4-7 mm. Among other things, they are used for connecting additional weight. Their breaking strain—depending on the diameter—is between 3 and 10 kN. They are used mainly as knotted slings (photo 9).

### Tape Slings

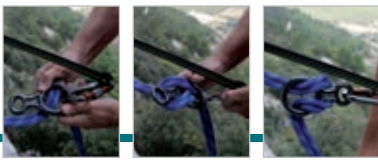
Tape slings are made of sewn webbing consisting of polyamide or Dyneema (photo 9). They come in different widths (10-30 mm) and lengths (30-240 cm). They have a breaking strain—like climbing ropes—of at least 20 kN. Slings are among the most relevant security-related equipment, and therefore must be inspected regularly for damage.

9



l = Tape slings

r = Belaying rope



### 1.2 Fixing the Climbing Harness

#### Putting on the Harness

Before putting on the harness, it must first be properly laid out. This is often a challenge for inexperienced users, especially when the belt is twisted and the leg straps and loops must be sorted out. The following five steps explain the structure of a belt and help later to put it on correctly.

The climber takes the wide, usually padded, waist belt in both hands so that

- both leg loops hang down next to each other without any twists,
- the elasticized part of the leg loop is inside (toward the climber),
- the belay loop (connection between leg loops and waist strap) is facing forward, and
- adjustable leg straps and the leg loop buckles, if present, point forward so that they are outside the lower rings.

If a harness appears to be completely twisted, it is helpful to lay it on the ground and rearrange it there. Once straightened out, the harness is pulled on like a pair of trousers and fixed above the pelvic bones by tightening the buckle on the waist belt.

## Equipment and Safety Techniques

**ATTENTION:** The tongue on classic types of buckles has to be threaded back through the buckle (photos 10-12); otherwise it may not close tightly and hold properly, and the belt buckle could open under strain.

10



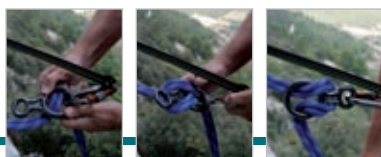
11



12







## Rock Climbing

Speed Adjust buckles (see photo 3, page 11) only need to be pulled tight. They tighten by themselves, and the strap is stitched thickly at the end so that it is almost impossible that it will slip out freely.

On harnesses with adjustable leg loops, the buckles are tightened so that there is still room to push three to four fingers in between the leg and the loop. Thus, the leg loops sit as tight as the waist belt. Non-adjustable leg loops should sit similarly.

As mentioned earlier, smaller children up to about 8 years should use a full-body harness (photo 2, page 11). Due to the proportion of their head to the body, the body's center of gravity is located higher up on the body (in the area of the rib cage). The probability of falling head first is greater than with older children, adolescents, and adults and the danger is lessened by having a higher placed belay loop on the full-body harness.

---

**ATTENTION:** *The term seat harness can possibly lead to a dangerous misunderstanding: It must not be worn too low on the hips, but rather you must—as described above—be buckled it up at the waist.*

---

### Tying the Knot for the Tie-In to the Harness

There are two types of knots generally used to attach the harness to the climbing rope: the rethreaded Figure Eight knot, and the double bowline knot. We recommend the rethreaded Figure Eight knot, sometimes called double. It is the most commonly used tie-in knot, because it is easy to learn. Tying the double bowline is more complicated than the Figure Eight and partner checks are harder to verify. This is why the Figure Eight has become popular for the tie-in to the harness for beginners. It can be practiced in advance at home, in the classroom, or at the climbing wall. In the following section, the two methods of tying the knot are illustrated, and the pictures make them easy to learn—for children and adults alike. The method of tying the knot is always described and illustrated for a right-handed person. The method for left-handed people is shown only in the photos and without a description.