

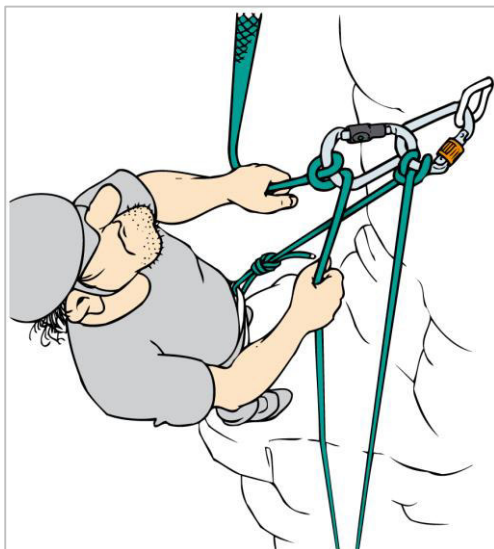
## Belaying in Multi-Pitch Routes – Comfortable or secure?

**Whether to belay the leader of a multi-pitch route with the belay device attached to the harness (body belay) or with the belay device directly attached to the anchor station (anchor belay) of a belay station has been discussed forever and vehemently among climbers and instructors. The Alpine Safety Research Group of the German Alpine Club gives an overview over advantages and disadvantages of both methods and possible fields of use.**

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There is general agreement in the alpine region on how to best belay the second up to the belay station: the belay device is attached to the central anchor station of the belay station and not to the harness of the belayer, as otherwise in case of a fall the complete weight would pull down the belayer (in the Anglo-Saxon region this is, in part, handled differently). A self-blocking belay device (plate) offers the advantage, that the second may be belayed whilst the belayer can relax and take photographs or check the topo at the belay station. It gets more exciting when the leader starts to ascend the next pitch. In general, two ways of belaying are possible: belaying with the belay device attached to the anchor station or to the harness. When belaying off the anchor station (Fig. 1), the belay device is attached to the anchor; the drag of a fall directly acts upon the anchor and not upon the body of the belayer. This is different when belaying off the harness (Fig. 2): Here, the belay device is attached to the harness of the belayer and the body of the belayer takes up part of the energy of the fall by being pulled upwards by the pull of the fall. Both methods have advantages and limits – only those who are familiar with them may take the better choice depending on the situation.



*Figure 1: When **belaying off the anchor** the belay device is attached to the belay station and the belayer is not affected by the force of the fall; belaying dynamically is more difficult.*



*Figure 2: **Belaying off the harness** is more comfortable – but only possible if the space above the belayer is free from obstacles and when a sufficiently long self-belaying sling and dummy runner or plus-clip is used.*

### **Belay device attached to the harness: better handling**

Today, many climbers get an approach to multi-pitch routes via sports climbing. No wonder, that body belay, which is common in sports climbing, becomes more and more popular also in multi-pitch routes. It even has certain advantages, in particular a better handling of the rope:

The belay device is always attached to the same familiar position in front of the body, which enables a fast and precise pulling in and paying out of the rope. This may reduce the potential height of a fall, as belaying with less slack rope is possible. „Soft“ or dynamic belaying, i.e. actively increasing the breaking length in order to reduce the impact force and the crash against the wall may be implemented using familiar movement patterns known from sports climbing. When being attached to the belay station, using „body dynamics“ by making an active approach or jump is not an option any more: this is virtually impossible from a hanging position. Experiments have shown that „dynamic belaying“ when hanging in the belay station is only possible by the device’s dynamics: by the belayer leading his hand towards the device together with the pull of the fall and thus feeding braking rope into the device. Intentionally feeding in rope, however, requires experience and constantly paying attention.

### **Attention: danger of injury!**

Those who want to decide in favor of body belay ought to realize that the direct exertion of force onto the belayer also poses certain dangers. The greater the drag of the fall, the greater the force exerted on the belayer and the further and more forceful is he dragged into the direction of the first intermediate fixing point. In particular light-weight belayers and far drops may cause interesting situations: if the belayer is pulled away from the belay station by a certain distance he may stumble and possibly let go of the brake rope, in particular if the first intermediate fixing point is located to the side of the belay station. Even a self-belaying or anchoring does not help here, to the contrary: if it is as short as required for the use at a belay station, the belayer is stopped abruptly when being dragged upwards and crashes against the wall. With belay stations in niches or cavities you risk hitting your head when being dragged up and consequently losing control over the brake rope (Fig. 3). At such belay stations belaying off the harness is dangerous.



*Figure 3: With **obstacles** above the belay station, belaying off the harness is unsuitable. Injuries due to impact and the danger of letting go of the brake rope are imminent.*

A further disadvantage of body belay: the belayer may not move around as freely at the belay station as in the case of belaying off the anchor. If the climber gets injured, the belayer has to think of a way to intervene.

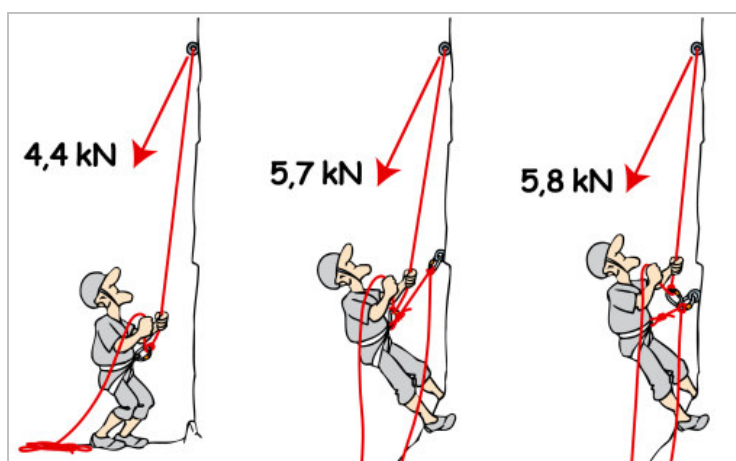
### **Belay device attached to the anchor station: the basic method**

In principle this is quite simple: When body belay is disadvantageous, anchor belay is advantageous – and vice versa! Handling the rope is often less comfortable when belaying off the anchor, as the belay device is not attached to the harness but to the anchor station – belaying fast and precisely is more difficult and in practice often more slack is given. If the climber wants to rest in an intermediate fixing point, the belayer cannot use his own body weight – as when belaying off the harness – in order to properly tighten the rope. The climber will have to take a rest somewhat further below in this case.

With anchor belay, a dynamic belay – whether the belayer is hanging in the anchor or standing on a landing – is only possible by means of the device's dynamic behavior, i.e. by the braking hand feeding rope into the belay device together with the pull of the fall. When belaying off the anchor, however, the braking hand has to give rope away from the body towards the belay device. This requires experience and full attention. But then, an experienced belayer may stop a fall virtually as softly as when belaying off the harness (Fig. 4).

The big advantage of anchor belay is that the belayer is not part of the belay chain. He is not in danger of being dragged from his position by the pull of the fall, of starting to stumble or getting injured and in the worst case losing control over the rope. This risk is in particular given when falls from great height are possible or the climber is clearly heavier than the belayer.

It must be pointed out that when belaying off the anchor station the force acting upon the braking hand and thus also the amount of rope passing through the belay device may be higher in case of a fall as compared to body belay. For ensuring a secure control of the brake rope, in particular for lighter belayers having little strength in their hands, wearing a glove is recommended.



*Figure 4: A comparison shows: **belaying dynamically** and sparing the safety chain is only possible using active body dynamics (I.). Belaying off the anchor station is only slightly more static than belaying from a hanging position off the harness.*

### **When is comfortable an option?**

To begin with: anchor belay is the basic method which may be used in all multi-pitch routes. The advantages of body belay are in particular relevant in ambitious climbing. The closer you get to your limit, the more important it gets that the rope does not stall when clipping but is not too slack either – and the more likely a fall will occur which ought to be stopped as dynamically as possible. The comfortable handling of the rope will tempt in particular the belayer to belay off the harness as often as possible.

The following preconditions have to be fulfilled for body belay:

- Experience in arresting a fall with the belay device attached to the harness: otherwise the risk of losing control over the rope is great when being dragged up.
- Weight difference not too great: the leader may not weigh more than 130% of the belayer!
- No falls from great heights are to be expected, so that no great fall energies may result. That means: the intermediate fixing points must not be too far apart and must be of high quality.
- Plus clip or dummy runner (see below) has to be possible, so that in case of a fall „into the belay station“ no downward pull into the harness may occur. Dummy runner is only possible, when there is a solid anchor station at the belay station, plus clip only when there is a reliable intermediate fixing point directly above the anchor station. In classic alpine routes without bolts (trad climbing; like it is frequently the case in the Dolomites, for example) both preconditions are usually not given!
- The first intermediate fixing point is not located beside the belay station but directly above it: The drag of the fall must not act sideways!
- A long self-belaying at the belay station is possible, otherwise there is a danger of the belayer crashing against the wall! The self-belaying has to be at least one or preferably even one and a half meters long; this often means that the belayer is hanging far below the belay station. Or he has to be able to belay “actively” from a standing position (with a slack self-belaying).
- There must be no obstacles above the belay station: Overhanging rocks or ledges above the belayer can pose a risk of injury!

Only if all preconditions are fulfilled may the body belay method be used, otherwise you ought to belay off the anchor. A decision in favor of the body belay method may thus never be taken before entering a route as you may only judge on site whether the preconditions are fulfilled. Consequently, you ought to be familiar with the anchor belay method which is the basic method for multi-pitch routes.

Generally speaking, the body belay method is an option in particular in pitches fully equipped with bolts and with smaller distances between the bolts. The anchor belay method, however, is the more recommendable belay method in routes with a more alpine character, i.e. with only few or questionable intermediate fixing points, traverses, confusing route courses or the possibility of far, uncontrolled falls.

### **Important facts on the setup**

When using the body belay method it is important to ensure that up to clipping the first solid intermediate fixing point the drag of the fall may not directly act downwards upon the climber. One possibility here is the „dummy runner“ in the upper anchor of the belay station (Fig. 2). As in this case the belay station (or at least one of its anchors) also serves as a top anchor, great forces act in case of a fall into the belay station. A method which is often better here is the so-called „plus clip“ (Fig. 5): when reaching the belay station the leader also clips into the first intermediate fixing point of the next pitch and uses the same first as a redirection point for belaying the second and then the lead climber. If this intermediate fixing point

is reliable, the plus clip is a clever option: for the belayer it offers sufficient space up to the first intermediate fixing point in case of a fall and reduces the danger of collision when a fall occurs only just above the belay station.

A second crucial point is the sufficiently long self-belaying sling of at least one meter. A self-belaying sling which is too short abruptly stops the belayer when arresting a fall and it may become difficult to keep control.

When belaying off the anchor station using an ATC it has to be ensured that in case of a fall into the belay station there is enough braking force. For this purpose, an additional carabiner may be used upstream of the ATC (Fig. 6) which may be removed again once a reliable intermediate fixing point has been clipped. Also a dummy runner provides the necessary redirection in order not to fall directly into the belay station, but it should only be used with reliable anchor stations – e.g. at a belay station in solid ice (Fig. 7). The munter hitch offers enough braking force, no matter whether the drag of a fall is directed upwards or downwards, i.e. no additional measures are required here. However, device-based dynamic belaying is somewhat more difficult using the munter hitch than using the ATC.

### Semi-automatic alpine belay devices

The semi-automatic belay devices Clickup and Smart are meanwhile also available as „alpine versions“ (AlpineUp and Smart Alpine), besides there are the MegaJul and MicroJul. All of those devices have a blocking support and are suitable for belaying double strand ropes. When belaying the second they work as a plate and thus enable belaying comfortably off the anchor station in the blocking mode.

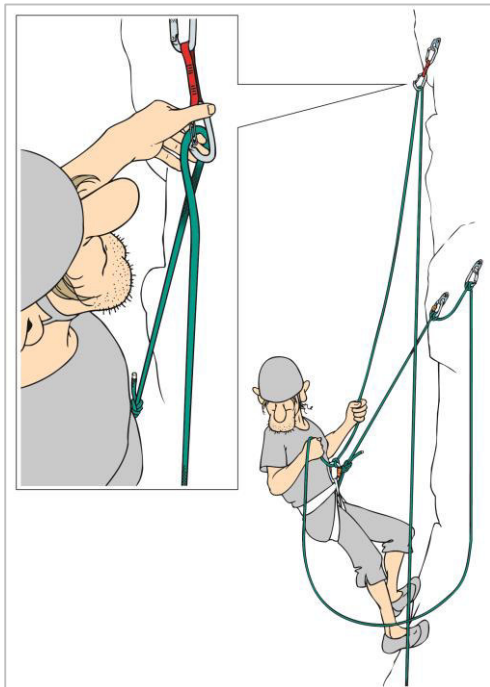


Figure 5: The **plus clip** is the best possibility for alert climbers to prevent a direct impact of the fall onto the belayer. It may further take the edge off the first few meters when climbing away from the belay station.

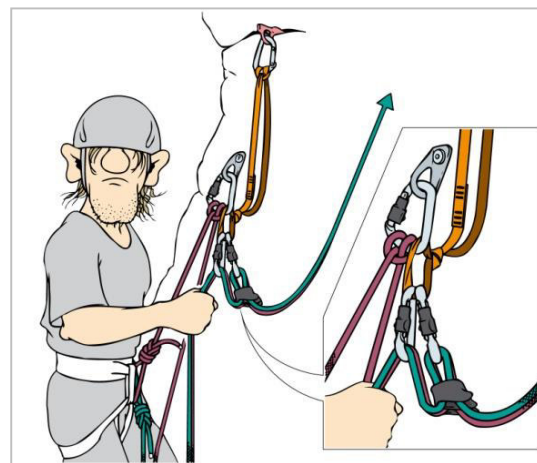


Figure 6: Using the direct belay method with ATC, before the first intermediate fixing point a redirection of the rope in the ATC has to be ensured; an **additional carabiner** may be connected directly upstream.

If you want to use the mode with blocking support of alpine semi-automatic devices for belaying the leader, you have to attach the belay device to the harness. Device-based dynamic soft belaying is not possible in this case, as no rope may pass through the device. The belayer is pulled upward even more vigorously – but when he gets injured at least the blocking support serves as a backup. A sufficiently long self-belaying sling to ensure a free flight route is even more important when using these devices. In addition to the blocking mechanism, the AlpineUp offers a dynamic mode and may thus also be used for belaying off the anchor station – but without the safety surplus of the blocking function then.

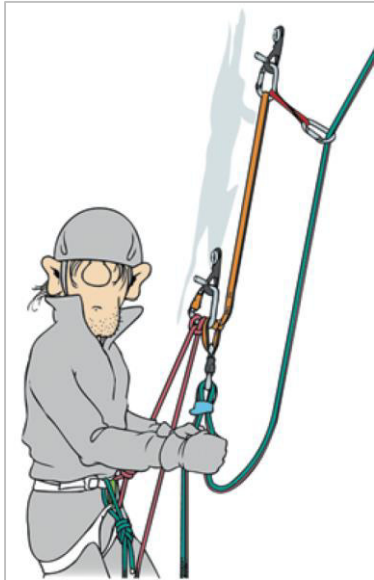


Figure 7: Alternatively, with solid anchor stations – bolts or in good ice – the **dummy runner** in the top anchor station may prevent the rope in the ATC being guided in parallel without the effect of braking force.

|                       | <b><i>Belay device attached to the harness</i></b>  | <b><i>Belay device attached to the anchor station</i></b>  |
|-----------------------|---|--|
| Prerequisites         | <ul style="list-style-type: none"> <li>▪ belayer is experienced in arresting a fall</li> <li>▪ weight difference is not too great</li> <li>▪ extreme falling distances are not to be expected</li> <li>▪ plus clip or dummy runner is possible (anchor stations are reliable)</li> <li>▪ first intermediate fixing point is not located at the side but directly above the belay station</li> <li>▪ space above the belay station is free from obstacles</li> <li>▪ long self-belaying is possible</li> </ul> | basic method without limitations   |
| Advantages            | <ul style="list-style-type: none"> <li>+ more precise rope handling and less slack</li> <li>+ movement pattern for belaying is the same as in sports climbing</li> <li>+ slightly less force acting upon intermediate fixing point</li> </ul>   | <ul style="list-style-type: none"> <li>+ belayer is not part of the belay chain</li> <li>+ control over brake rope not lost as easily</li> </ul>   |
| Disadvantages         | <ul style="list-style-type: none"> <li>– belayer is part of the belay chain</li> <li>– danger of losing control over the brake rope with great fall energies</li> <li>– danger of injury by impact</li> </ul>   | <ul style="list-style-type: none"> <li>– less precise rope handling</li> <li>– dynamic belaying requires more experience</li> </ul>  |
| Handling              | <ul style="list-style-type: none"> <li>▪ self-belay of at least 1m</li> <li>▪ dummy runner or plus clip ensures that drag of a fall is directed upwards</li> </ul>  | <ul style="list-style-type: none"> <li>▪ when belaying using ATC an additional carabiner is connected upstream or use dummy runner</li> <li>▪ gloves recommended for belayers having little hand strength</li> </ul> |
| Fields of application | high belaying precision desired and no extreme fall energies to be expected, e.g. alpine sports climbing  | partially questionable fixed points or high fall energies to be expected, e.g. trad climbing, ice climbing   |