Fundamentals of Technique

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In climbing, achieving perfect economy of movement is the Holy Grail that few individuals ever realize. You can become the exception, however, by means of a constant focus on climbing in accordance to the fundamentals of this sport. Please recognize that becoming a well-skilled climber is a conscious decision that takes a plan and disciplined long-term follow-through.

Let's consider the two basic modi operandi of climbers at a gym. Most individuals tie into the rope and just climb. They move in ways that feel easiest based on their experience. However, beginners' lack of experience will often lead them down a road of clumsy movement and poor technique that can solidify into bad habits.

The more effective, but less common second mode is to climb with the intention of doing each move and every route in accordance with the fundamentals. It's this attention to detail that imparts technically sound skills and leads to rapid gains in ability. These results are indeed remarkable, and they are achieved only by an individual who is uncommonly effective in his practice and training.

Precise Foot Placements That Carry Your Weight

Given that your legs are stronger than your arms, the first fundamental of climbing is that the legs should do the majority of the work. The exceptions to this rule are overhanging routes, which demand greater use of the arms and advanced techniques--you will learn six additional fundamentals for climbing difficult overhanging routes in future articles.

The process of effectively using your feet begins with spotting the footholds and positioning your feet on the best part of each hold. Directing your foot placement demands attention to detail beyond that given to hand placements. Whereas handholds are easy to inspect, the greater eye-to-foot distance commonly leads to less-than-ideal foot placements. Furthermore, your feet don't provide the same degree of feel as the hands, making the quality of each foot placement more difficult to assess. For these reasons, developing good footwork isn't something that just happens-it's an attribute you make happen via constant foot focus and practice.

Upon spotting a foothold and positioning your foot for optimal purchase, you want to shift some body weight over the hold before standing up on it. It's this downward pressure that helps the shoe rubber stick to it, so not properly weighting a hold often leads to the foot slipping off the hold. Of course, the location of your other three points of contact will dictate a unique balance point and weighting for every new foothold. In many cases you will be able to advance both feet so they can push in unison. However, it's more intuitive to climb with one foot pushing at a time (as in climbing a ladder), so you'll need to make a conscious effort to develop this important foot skill.

The final aspect of fundamentally sound footwork is proper alignment of your center of gravity directly over a foothold. Balance, stability, and application of force are optimized when your center of gravity is positioned directly over your feet, forming a line perpendicular to level ground. On a less-than-vertical wall or slab, this requires a hip position out from the wall and over the foothold. On a near-vertical climbing surface, you simply need to keep your body position straight and over the feet as much as possible. When the climbing wall overhangs, it becomes impossible to position your weight over your feet, so new fundamentals take over.

Grip Handholds "Lightly" and Let Arms Play a Secondary Role

In a sport where anxiety and fear often rule, it's understandable that many climbers hang on for dear life with their hands. This tendency manifests itself with overgripping of the handholds and unnecessary muscling of moves with the arms. The end result is rapid fatigue, pumped forearms, and an eventual need to hang on the rope in order to rest and recover. You will no doubt experience this scenario during your initial days learning to climb.

You can avoid this outcome by practicing-and making habit-the fundamentals of proper hand and arm use. These critical skills include gripping each handhold with the minimum force required, using the arms mainly for balance and not as a primary source of locomotion, and pushing with the feet in unison with a pulling arm.

Begin by making each hand contact a conscious process. Whereas many climbers just grab a hold with little thought and continue with the process of climbing, you must make each hand placement a thoughtful act. First, consider where's the best place to grab the hold? It's not always on the top of the hold, and it often relates to the location of your last foot placement. Now as you grab the hold, focus on using a "light touch" that yields "soft forearms." Sure, certain holds will demand that you bear down hard on them, but most do not. Your goal must be to try to use each hold with a light touch, and then increase the gripping force only as much as is required for the move at hand. This process of best gripping each handhold only takes a split second, but it's a master skill the separates the best from the rest. Commit to making this skill habit through targeted practice with the drills detailed later in the chapter.

Beyond gripping the rock, you need to decide just how much you need to pull down on a given handhold. As discussed earlier, it is imperative that you push with your feet and let the leg muscles carry the load. Think of your arms as points of contact that simply prevent you from falling backwards off the wall. For example, in climbing a ladder your feet do all the work while the arms mainly provide balance. While rock climbing is far more complex than climbing a ladder, hold this model in your mind as the ultimate goal-the arms maintain balance while the legs provide thrust.

The "Left-Right" Rule for Stable Movement

The magic of efficient climbing movement comes from the synergistic interaction of the arms and legs and a constant transfer of force and torque through your body. To this end, the Left-Right Rule states that maximum stability and ease of movement comes from the pairing of a left hand and right foot (or a left foot and right hand) into harmonious action.

Let's again use climbing a ladder as our model. Ascending a ladder with opposing hand-foot combinations (e.g. a left hand pulling and right foot pushing at the same time) is so intuitive that it's almost impossible to climb a ladder any other way. Supposed you tried to climb a ladder with non-opposing hand-foot combinations, such as a right hand and right foot working together; you'd immediately begin to barndoor or rotate sideways off the ladder. Thus, the Left-Right Rule is a fundamental for balanced, stable movement.

While you don't need to even consider the Left-Right Rule in ascending a ladder, formulating movement up a climbing wall is much more complex since the position and shape of the hand and foot holds wreak havoc with your intuitive sense of movement. Thus, in seeking to reposition your hands and feet on the wall, it's helpful to ponder which holds will provide the best opportunity for a left-right combination. Easy climbs will often provide a pulling right hand that can combine with a pushing left foot (or vice versa). More difficult climbs tend to be more devious as the holds are smaller, farther

apart, or displaced off to the side of the route line. Later in the chapter you will find several toprope drills to develop skill in using left-right combinations.

Move with Perfect Economy

The technical paramount is to climb with perfect economy. Make these two words - perfect economy - your mantra every time you touch the rock.

Perfect economy means discovering the way to do each move, and an entire route for that matter, with minimal energy expenditure. If you have a cat, you can observe economic movement firsthand. Most of the time a cat moves in a slow, quiet, deliberate way; however, sometimes a situation demands a powerful, dynamic leap to maintain perfect economy. This cat-like movement should be your technical model for efficient climbing: Smooth, quiet, leg-driven movements, but with an unhesitating shift to an arm-pulling, dynamic movement when it is required to maintain perfect economy. Here are some attributes of economic movement that you should aspire to acquire.

Quiet Feet

Quiet foot movements are one of the hallmarks of a climber with great technique. Conversely, feet that regularly pop off of footholds or skid on the wall surface are typical of an individual possessing lackluster footwork and poor economy.

For many climbers, noisy footwork is just the way they climb - it's a habit that developed over a long period of time, and it is a flaw in their technique that will prevent them from ever reaching their true potential. Your goal, of course, is to learn to climb with good foot technique from the start. This means concentrating on each foot placement, holding the foot steady and firm to the hold, and standing up on the foot with confidence as you proceed smoothly to the next hand or foot hold.

Rhythm and Momentum

Like any dance, climbing should have a natural rhythm that utilizes momentum and inertia. Climbing in a ladder-like motion yields the rhythm "step, reach, step, reach." However, a better rhythm for effective movement is often "step, step, reach, reach" since it allow the legs to direct and drive the movement. There are obviously many other rhythms such as "step, reach, step, step, reach, reach" and "step, step, reach, step, reach, reach." Consider that every unique sequence possesses a best rhythm of movement, and you'll eventually learn to intuit this on the fly. As a beginner climber, however, it takes a conscious effort to avoid leading with the hands in a strenuous and inefficient "reach, reach, step, step" rhythm. Strive to tap into the rhythm of each route, and climb accordingly.

Similarly, you want to utilize momentum in a way that helps propel successive moves. This is especially important on difficult climbs with large spacing between holds. Think of how you would move hand-over-hand across monkey bars at a playground-each movement blends with the next in a perfect continuity of motion. This style of smooth, continuous motion is critical when climbing through crux sequences. Interestingly, many folks do just the opposite as they engage the crux sequence with measure and caution. In doing so, they not only lose upward movement, but they also have the inertia of stillness to overcome. Hopefully you can avoid this tendency by consciously directing a steady rhythm that maintains forward momentum through the most difficult parts of a climb.

Pace

Pace is another aspect of climbing economy that becomes increasingly important as a route gains in steepness and difficulty. While an easy climb with large holds allows you to ascend at a leisurely pace, a crux sequence or overhanging terrain will demand that you kick into high gear and surmount the difficulty in short order. When climbing near your limit, it must be your intention to move as briskly as possible without any drop-off in technique (skidding feet, botching sequences, and such). Reduce the pace at the first sign that your technique is suffering. It helps to identify obvious rest positions ahead of time, and then make it a goal to move from one to the next as fast as possible. Ultimately, knowing just the right pace on a given route is a sense you will develop with experience. Practice climbing at different speeds and on different types of routes, and you'll quickly foster the subtle skill of proper pace.

Optimize Use of Rest Positions

Finding efficient rest positions is as important as finding the best way to do a crux sequence. If you miss a good rest stance, you miss an opportunity to physically recovery as well as mentally "read" and prepare for the next section of the climb. Consequently, locating rest positions on a climb should be viewed with the same sense of importance as in locating all the key holds.

This process begins with on-ground visualization of the route in an attempt to estimate the location and body position of rest stops. Upon reaching a rest step, assume a body position that will allow the most fatigued muscles to rest (usually the forearms, biceps, and calves). An optimal rest position would consist of your feet in the rest step position, legs straight, and hips over the legs or in a position midway between the feet (should they be on holds more than shoulder-width apart). If the climb is less than vertical, your upper body can relax completely and in some cases you might even be able to assume a no-hands rest position. Such a casual rest position places no time limits on how long you can remain parked there--although this luxury is rare on more difficult routes.

Rest positions on vertical to overhanging climbs make complete weighting of the feet more difficult and often impossible. While you still want to place as much weight as possible on the footholds, a significant amount of weight will remain on your arms. In this case it's absolutely vital that you hang with straight arms, so that the bones are providing the support, not the muscles of the upper arm. Still, your forearm muscles will need to contract in order to maintain a grip on the handhold. The best strategy then, is to attain a stable stance and alternate shaking out your arms every ten to twenty seconds. This way, both arms take turns resting. At some point, however, hanging out at the rest begins to cost more energy than you can recover--it's at this time that you need to begin climbing toward the next rest spot.

Fortunately, there's a recovery technique that I developed called the G-Tox which can markedly accelerate recovery of finger strength while at a margin rest position. Instead of simply hanging the resting arm by your side, alternate the arm position every five seconds between the normal "dangling" position and an above your head "raised-hand" position. This simple technique has been shown by a British researcher to increase recovery by 50 percent or more over the standard dangling-arm shakeout. This should be evidence enough to make the G-Tox a regular part of your climbing stratagem.

A big part of becoming a fundamentally sound climber is learning to gain brief rests in the midst of even the most difficult routes. Practice and unbridled creativity are the only two requisites for solving difficult sequences and finding vital rest positions. Remember that the best climbers are not always the strongest; their prowess instead comes from uncommon mastery of climbing economy and effective resting.

Use Flagging to Enhance Stability

Flagging is the alternative technique for maintaining stability when a left-right hand-foot combination is not possible. Suppose you are attempting to use a right hand and right foot combination to propel upward movement. Upon releasing your left hand to make a reach upward, you will immediately begin to barndoor. This sideways rotation is hard to fight, and often results in a fall. However, a simple flagging of the free leg (in this case the left) significantly improves stability and balance by shifting your center of gravity more directly over the supporting (right) foot and under the supporting (right) hand.

Exploit Mantling and Hand-Foot Matches

Another important technique for ascending difficult "big-move" climbs is the hand-foot match. Let's consider the most common scenario of needing to mantle with one hand while the other hand is pulling. The pulling hand will usually be positioned above your head while the mantling hand will contact a hold somewhere near your torso. Depending on the size of the hold to be mantled, you may be able to press your entire palm onto the hold or, possibly, just your fingertips. The left-right combination of pushing and pulling hands provides great stability, so you will be able to upgrade one or, possibly, both feet. Quite often you'll need to match a foot to the handhold on which you are mantling. Regardless, the mantle is complete when you are able to weight your feet, gain balance, and upgrade your hand from the mantle.

Clever Use of Opposing Forces

You have already learned the importance of the Left-Right Rule for enabling stable movement. On easy climbs this left-right combination is usually a pulling right hand along with a pushing left foot (or vice versa). More difficult climbs tend to be more devious, however, so you'll need to consider all the other possible arm positions—side pull, undercling, and Gaston—and figure out how to match one of these with an opposing foot placement.

Detailed below are a few of the most common left-right combinations called into use on difficult climbs. You should practice each of these on the bouldering wall in order to develop its unique motor skills. Vary your hand and foot placements as much as possible to acquire a broad range of use for each hand-foot combination.

Side-Pull Arm and Outside Edge of Opposite Foot

Side-pulling hands are a staple move on almost every moderate to advanced climb. While this move is a bit less intuitive than down pulling, you will quickly gain comfort in its use. Most important is the foot position you select to oppose the side-pulling hand. In most cases it's best to use the outside edge of the opposing foot, not the inside edge. Doing this may feel awkward at first, but you'll find a natural sense of stability once you learn to appropriately set your hips over the outside-edging foot. The key is to concentrate on rotating your hips so that the hip opposite the pulling hand is turned into the wall—that is, your face and chest will rotate toward the side pulling hand. This very stable position will allow you to step up your free (nonopposing) leg and quite possibly your free (nonopposing) hand as well.

Occasionally a move will dictate that a sidepulling hand must be combined with use of the inside edge of the opposing foot. While this, too, is a fairly stable body position, it provides less reach upward with the free hand. Therefore, anytime you are struggling to reach a handhold, try using the outside edge of your shoe to maximize reach.

Gaston and Inside Edge of Opposite Foot

The Gaston (aka reverse side pull) is the most unnatural and weak arm position for beginners, yet it's a fairly common move needed to unlock many crux sequences. Use of the Gaston is best opposed by the inside edge of the opposite foot. Combining a Gaston with an outside-edging foot is strenuous but doable if absolutely needed. Practice this move in a variety of ways to gain comfort and strength in its use. As with all these advanced moves, the bouldering area is the ideal proving ground to experiment with and learn the skills.

Undercling and Inside or Outside Edge of Opposite Foot

Often overlooked by beginner-level climbers, undercling hand positions are actually quite easy to perform. What's more, an underclinging hand helps maximize your reach with the free hand, and it positions your arm and body in a naturally strong position. Therefore, the undercling is a move you want to practice and put to frequent use.

Typically you will undercling a hold somewhere near your torso while you press with an opposing foot. This foot can edge with either the inside, outside, or toe portion of the shoe, although use of the outside edge is best for maximizing your reach (see above photo). Remember that in edging with the outside of your foot, it's best to turn the hip opposite the pulling hand to the wall. In extreme situations you may even need to use a foot smear to oppose the underclinging hand. This is a very powerful but important move that you can practice on the bouldering wall.

Side-Pulling Left and Right Hands

Use of opposing handholds is a key move for unlocking a sequence that lacks any usable down-pull or undercling handholds. Most common are two opposing side pulls that you'll draw inward to create tension through your arms, shoulders, and upper body. While you will be unable to create much upward movement, this opposition will allow you to upgrade one or both feet. Ideally, you'll want to upgrade the foot that opposes the better of the two side pulls, so that it sets up a stable left-right combination. This will enable you to release the other side-pulling hand so as to upgrade it to the next hold.

Another possibility is opposing Gaston holds. Though strenuous, you may occasionally need to grab two Gastons at or just above head-height and pull outward in order to support your weight while upgrading a foot position. This is a most advanced move that requires a high level of base strength. A word of caution, however: Using a Gaston hold on an overhanging wall places great force on the shoulder joint and in rare cases can cause injury. Proceed carefully.

Twist Lock and Backstep on Steep Terrain

The twist lock and backstep are the bread-and-butter moves of a steep-wall connoisseur. As a climbing wall tilts back past vertical, it becomes increasingly difficult to place a high percentage of weight on your legs. Consequently, a greater portion of body weight must be supported by the arms—which, of course, possess less absolute strength than the legs. Use of the twist lock and backstep together helps draw your body in toward the surface of the overhanging wall. This changes the force vector on the handholds, making them feel more positive and secure. More important, this drawing-in of the body places more weight onto the footholds. However, proper execution of these moves requires practice and a significant amount of strength through the core muscles of the torso.

The twist lock is typically used to ease the upgrading of a hand on an overhanging section of wall. For example, consider the situation in which your right hand is on a good hold and you'd like to reach up high with the left hand. While you could attempt this move straight-on—chest facing toward the wall in a neutral position—it's far less strenuous to turn your left hip to the wall before making the reach upward (see photo). Proper positioning of the feet is critical for making this move work. Since the left hip is turning to the wall, you'll need to use the outside edge of your left foot on a hold somewhere below or in back of your body (hence the term "backstep"). Usually you'll find a complementary right foothold to help maintain the twist-lock body position. The feet then press in unison while the right arm pulls down and in toward your torso, creating the twist lock. Finding just the right body position is the key to providing a secure twist lock; when you do you'll notice that a surprising lack of effort is needed to reach up and acquire the next left handhold. This amazingly efficient locomotion over steep terrain is the magic of the twist-lock technique.
Granted, superlative use of the twist lock and backstep is something that will take many hours of practice. In fact, during your initial attempts at using these moves you might swear that they require more energy than basic straight-on moves. Trust that with practice, you will develop the necessary motor skills to make these moves feel quite easy. Initially limit your practice of the twist lock and backstep to boulder problems that overhangs about 20 degrees past vertical. As you acquire skill, expand use onto even steeper boulder problems as well as onto overhanging toprope climbs.

Creative Use of the Feet

What do you do when you start pumping out or lacking reach on steep terrain? Consider using one of your feet as a hand! Heel hooks, toe hooks, and knee locks are real difference-makers when it comes to surmounting roofs and surviving on overhanging rock. Given the strength of the leg muscles, a good heel hook, knee bar, or toe hook is often more effective and efficient than the available handholds in surmounting a bulging crux or roof. Let's kick into the details of these critical moves.

Heel Hooking

Your primary use of heel hooks will come when turning the lip of a roof, topping out on a boulder problem, or copping a quick shakeout while on steep stone. In these cases, you'll likely have your hands on holds at or above head level and intend to place one of your heels on a hold off to the side near shoulder level. Which heel you choose to hook with depends on two factors: the availability of a decent-sized hold on which to place your heel, and the location of the next handhold that you hope to acquire. This next reach up is best made with the hand on the same side as the heel hook. So if it looks like the next attainable hold is set up for the right hand, it would be best to use a right heel hook. Once set, pull with the heel hook as if it were an extra arm. Often it helps to think about *pulling your heel toward your rear end*; this will maximize use of the leg muscles and help shift your center of gravity toward the heel hook. Meanwhile, the other foot should inside-edge or smear on the wall to help contribute to the upward motion. As you gain elevation, make a quick reach to the next handhold and then switch your heel hook into a standard step-down foot placement.

Toe Hooking

Toe hooking is a foot move used mostly in pulling overhangs or in navigating roofs. This technique involves simply hooking as much of the toe and top (laces) portion of your shoe as possible on a large protruding hold. Sometimes you will toe hook onto a hold with a bent leg, and then straighten that leg as your hands move out the roof. Ideally you'll have one foot toe hooking while the other foot pushes off a nearby hold. This opposing push-pull combination enhances the foot purchase on the holds and lowers the chance your feet will come swinging off the roof (a common problem). Strive to keep your

arms and legs in the straight position as much as possible so that your body weight is being supported more by bone than by muscles. Done properly, you can navigate a surprisingly large roof with the limiting factor being forearm endurance. Experiment with this foot technique in the bouldering area and you'll gradually gain skill and confidence in climbing with your back to the ground!

Knee Locks

Knee locks are a boon on overhanging walls and roofs with large protruding holds—that is, if you know the technique and can find a position to exploit this "thank-god" move. Consider a severely overhanging indoor climb with no obvious rest positions. Chances are the forerunner has positioned two holds in just the right way so that you can place your toe on one hold and then lock your knee against a larger opposing hold. Such a knee lock can provide surprising purchase and it will often allow you to drop one hand at a time to shake out and chalk up. When climbing outdoors you will occasionally come upon a knee lock that's so solid you'll be able to cop a rare, no-hands inverted rest! Keep your eyes open for a downward-facing block (with an opposing toe hold) or a knee-width crack or oblong pocket - miss such a knee-lock and you've missed perhaps the most important hold of the climb!