# Rope Climbing and the Military

**Boot Camp & Military Fitness Institute 18/02/2022**

ROPE CLIMBING AND THE MILITARY

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# Part One: Background

## 1.0 Introduction

*"Competitive rope climbing is truly an art and a skill by itself. It does not involve all the intricacies or maneuvers of apparatus work yet the art of climbing can be detailed and exacting in nature. A great deal of practice is involved to produce a champion rope climber."* (Loken & Willoughby, 1959).

Rope work is a full body workout that is a great test of strength and not for the feint of heart! This exercise is excellent for developing the upper body, as well as building an iron grip and improving agility and coordination skills.

With this in mind, many militaries utilise rope work as part of their training regimes, both for recruits and trained soldiers. And, for good reason. It is an excellent method for developing strength and endurance across the entire body that can aid the soldier in a variety of military manoeuvres/operations.

Although the general principle of rope work across militaries is the same - to climb up and down a rope (vertical rope work) and traverse across a rope (horizontal rope work) - the reasoning behind its use varies (slightly) between them (discussed later).

The bane of physical education classes everywhere, the rope climb was actually an official event in the earliest modern Olympics (Athens, Greece in 1896). While competitors were originally judged on both speed and style, Olympian rope climbers competing in the 20th century merely had to race to the top. Arguably the most impressive win in the history of the event - which was taken off the programme after the Los Angeles Olympics of 1932 - took place in St. Louis 1904, when US gymnast George Eyser won gold despite having a wooden leg.

## 1.1 Brief History

- Claudius Galen (129-216 AD) makes reference to gymnastic climbing activities, specifically rope climbing.
- Both the Greeks and Romans had used ropes as exercise apparatus.
- "The ancients were not unaware of such gymnastic arts. They called it 'scrambling up the rope' (Greek) or 'ascend by means of rope' (Latin)." (GutsMuth, 1793).
- For the first time, rope climbing was introduced in 1544 by a German primer on gymnastic events who recommended rope climbing for children and adults as a part of exercise.
- Johann F. GutsMuth - considered the grandfather of gymnastics - formalised the concept of rope climbing as a part of physical education in the 1793 classic manual Gymnastik fur die Jugend.
- During the late 1700s, outdoor apparatus - climbing frames - were designed, from which ropes and ladders could be hung.
- During the early 1800s, Friedrich Jahn - considered the father of gymnastics - designed huge scaffolds, suporting very long climbing ropes, for erection in exercise parks that he termed "Turnplatz".
- In 1816, Jahn published Die Deutsche Turnkunst in which he stated that the most difficult type of cable or rope climbing is "with both feet and only one hand." ...and... "Also, it is not easy to climb upside down."
- For the first time, rope climbing was included in the Hellenic Games in 1859.
- Turnplatz also made an appearance in Canada, introduced by German immigrants during the late 1850s/early 1860s - with one in Hamilton in 1863 holding possibly "the first gymnastic competition to be held in Canada." (Nurmberg, 1970, p.6).

- In 1896, the Olympic Games included rope climbing in its gymnastic events.
    - During the first Olympic event, the rope was almost 14 metres long, and the competitors could only climb holding the rope with their legs in either straight or horizontal position while ascending with the hands.
    - The event was held outdoors.
    - There were five participants, Nikolaos Andriakopoulos won gold in 23.40 seconds and Launceston Elliot, a Briton, came fifth (IOC, 2022).
- During the 1900s, as artistic gymnastics separated from the general calisthenics associated with Jahn's system, climbing activites gradually disappeared - with the one exception being rope climbing.
- Rope climbing was a part of the gymnastic events in the Olympics until 1932.
- In ancient times, the events were held outdoors. The climbers had to ascend while being in an L-shaped position (see Competition Technique below). In 1904, the rules changed, and the rope length was reduced to 25 feet (7.62 metres).
- In 1904, George Eyser won the climbing match by ascending to the finish point in 7 seconds, despite having a wooden leg.
- By now, the winning criteria included the speed by which any climber ascended, the lesser time they take, the more points they earn. The rope climbing event had essentially evolved into a speed contest (form and technique were no longer judging criteria), climbing a large diameter rope using the hands only.
- In the 1906 Interim Games, the rules were again changed, and the length of the rope was reduced to 10 metres. G. Alimbrantis was the winner of this event who completed his rope climbing in just 11.4 seconds.
- In 1924, in the Olympic Games which was held in Paris, the length of the rope was reduced to 8 metres.
- In 1936, Thomas Gucker III set a record of climbing a 20-foot rope under 3.8 seconds.
- In 1938, Bob Sears, "Army West Point" - a US Military Academy - won the first National Collegiate Athletic Association (NCAA) rope climbing competition (NCAA, 2017, 11).
- In 1947, a famous climber, Garvin Smith, set a record of climbing a 25-foot rope in 4.7 seconds.
- By 1948, Garvin had an unofficial US record of 4.2 seconds for a 25-foot rope and had been "clocked under 5 seconds in 17 consecutive gymnastic meets." (Time Magazine, 1948, p.167).
- In 1948, Olympic officials decided not to include rope climbing as an Olympic event due to the fact that "Other countries had too few climbers to make the event worth while." (Time Magazine, 1948, p.167).
- In 1954, the first ever world record of climbing a 20-foot rope in a mere 2.8 seconds was first recorded by Donald Perry of the US during the NCAA Championships.
- Competitive rope climbing would last until "1962" (NCAA, 2017, p.11) in the US under the watch of the Amateur Athletic Union (AAU) and the NCAA.
    - Military competitors won 5 of the 20 competitions, Army 2 and Navy 3.
    - Championships not held between 1943 and 1947.
- Richard Montpetit, a member of the Canadian Pan-American Games Gymnastic Team in 1959 "won one of the few medals earned by the men's team, and this was in rope climbing." (Nurmberg, 1970, p.94) - he placed second.
    - Rope climbing and Indian clubs were "special events" (p.356) for the "Olympics of the Western Hemisphere" (p.354) as the Pan-American Games are known and occur 1 year prior to the Olympics.
- The sport of competitive rope climbing was revived in the Czech Republic in 1993, with competitions conducted at regional and national level.
- The current world record holder for the 8 metre climb could be Martin Masár, who recorded a time of 5.58 seconds in a national competition in 1997.
- On 14 December 2010, Sergeant Sam Sheriff in the gymnasium of 45 Commando Royal Marines in Arbroath, Scotland, completed 100 climbs of a 30 foot rope in 10 hours 56 minutes.

## 1.2 Competition Technique

Climbers ascended a 1.5 inch diameter natural fiber rope, starting in an L-shaped position (seated position on the floor with legs outstretched) with the rope lying on the floor between their legs.

The length of the rope varied. In Olympic competition it was originally 14 metres but by 1924 had reduced to 8 metres long, except when the Games were held in the US when a 25 foot rope was used. Also in the US the AAU and the NCAA apparently sanctioned competition on both a 20 foot and a 25 foot rope.

Technique during competition included:

- The climber leaning back and executing an explosive pull and surge upward, kicking the legs as they ascended the rope, using hands only.
- Climbers were allowed to kick their legs but could not use legs or feet on the rope or to push off the floor.
- The first move gave the momentum for the rest of the climb. Climbers would typically lean back with an open body as they started to climb from the seat position, and the strength necessary to do this effectively is similar to the strength required to perform a front lever on the still rings.
- There was a flat plate (or tambourine) coated with lamp-black at the top of the rope that the climber was required to reach up and touch.
- Coming down - not part of the contest - was hand-overhand.
- When the climber got back to the floor, they showed the smudge on their fingers to the timers.
- Climbers were timed by manual stopwatch. This was a major problem, for it took several timers to time the event - and their times were averaged in some fashion. Lots of opportunity for human error!
- At no point during the ascent or descent could the climber use their feet or legs on the rope.

# Part Two: Military Perspectives

## 2.0 The Royal Marines (RM) Commandos

The RM utilise rope work on the 30-foot Rope Climb, Tarzan Aerial Course, Bottom Field Assault Course, and for the regain.

For the RM, rope work is designed to test the courage, agility and determination of trainees (RM Recruits, RM Young Officers, and All Arms Commando Course (AACC) Trainees).

On day one of the AACC, candidates must demonstrate their ability to climb a 30-foot rope with 25 lb of equipment and rifle. However, one does not simply climb up the rope! It is a formalised/structured process.

- The trainee must wait to be called forward to stand next to a rope.
- Permission is then given by a Physical Training Instructor (PTI) to climb the rope.
- Climb the rope in the prescribed manner.
- Once the trainee reaches the top they must:
    - Call out their number, rank, name, and request permission to descend the rope.
    - Wait for the PTI to acknowledge and give permission.
- Descend the rope in the prescribed manner.

Failure to follow instructions or complete the task in the prescribed manner can lead to a second attempt or [even] removal from the course.

Strength and skill (i.e. technique) are equally important to complete this task. Strength with poor skill can be mean the individual unduly fatigues themselves performing the task, which is important given there are other fitness tasks to subsequently complete.

There was a direct operational reason for the inclusion of rope work in the original Army Commando course. On operations in the Second World War, commandos carried with them a six foot rope with a toggle and loop on it. These toggle ropes could be strung together and used to scale cliffs or cross rivers and they were in fact used for these purposes in the course of campaigns in the Second World War.

It was essential that prospective RM Commandos be adept at their use and training incorporated rope work to achieve this.

Rope work also assists the RM operationally other ways and is intellectually important. This is because it opens up the potential for different kinds of movement over and across spaces which are initially deemed impassable.

As such, for the RM, rope work serves a three-fold purpose:

1. To act as a criteria of fitness for personnel during training;
2. To test a trainees courage, agility, and determination; and
3. To enhance or open up strategic/tactical options for commanders during operations.

## 2.1 British Army Military Fitness Instructors

Although all fitness instructors across Defence (i.e. RAF, Royal Navy, RM, and British Army) conduct rope work during their training to become qualified Physical Training Instructor (PTIs), my background is the Army so I will discuss from that perspective.

As part of the training to be a British Army PTI, all candidates must complete what are known as gymnastic performance tests, commonly known as 'P Tests'.

The purpose of the P Tests is to show off the different facets of fitness (i.e. strength, endurance, skill, speed, and flexibility - which is dependent on the test performed). They also build courage - breaking your legs because you fell from the top of the 20-foot rope is not fun!

One of these P Tests is climbing a rope and comes in three levels: basic, intermediate, and advanced. The basic test is a 'simple' climb up a 20-foot (6-metre) rope using hands and feet whilst the advanced test is hands only.

Like the RM test, the process is formalised/structured:

- The trainee must catch the attention of the instructor (by standing to attention and raising their right arm) and request permission to conduct a test.
- Once the instructor gives permission and comes over to the trainee, the trainee must state their name and test to perform.
- The instructor will then say 'Carry On'.
- The trainee then ascends the rope in the prescribed manner.
- On reaching the top, touch the metal cover of the rope.

- Descend the rope in the prescribed manner.
- Come off the rope and stand to attention.
- The instructor will then announce pass or fail.

The rope climb is designed to demonstrate strength and technique. Movement up and down the rope should be smooth (i.e. arms not shaking and deliberate movements, not rushed). It also develops discipline. Purposely moving slowly/deliberately on a rope knowing your arms are tiring requires discipline.

As such, for the PTI, rope work serves a three-fold purpose:

1. To act as a criteria of fitness for personnel during training;
2. To test a trainees courage and discipline; and
3. To 'show off' their fitness.

### 2.2 French Foreign Legion Paratroopers

Those in the French Foreign Legion (FFL) who apsire to be paratroopers must undergo rope climbing as part of their notoriously arduous training.

Aspirants will be told to climb a rope with a 30-50 lb pack until the instructors tell them they can stop.

This may be as part of their training or utilised as a means of punishment.

As such, for the FFL, rope work serves a two-fold purpose:

1. Strength training/technique development; and
2. As a disciplinary tool.

### 2.3 World Police and Fire Games

The World Police and Fire Games (WPFG), held biennially, is an international sporting event for police, fire, customs and corrections services personnel. From 22 to 31 July 2022, the WPFG was held in the port city of Rotterdam, Netherlands. More than 10,000 competitors from 70 different countires participated in 63 sports including CrossFit, athletics, water polo, kite surfing, and the ultimate firefighter.

The WPFG also has the toughest competitor alive (TCA) competition which consists of eight different disciplines including a 5 km run, shot-put, 100 metre sprint, 100 metre swim, 6.1 metre rope climb, bench press, pull-ups (heaves), and an obstacle course.

## Part Three: The Benefits of Rope Climbing

There are a number of benefits to rope climbing, as noted below.

### 3.0 Grip Strength

- Grip is a limiting factor, which means lifts involving grip can only be done to the point of your max grip strength.
- For example, your back may be strong, but without a great grip, your deadlift will be limited.

- Rope climbing is fantastic for building grip strength.
- First, you have to hold your own weight, potentially for an extended amount of time.
- Second, you have to progressively resist gravity with each hand as you climb higher, which forces your grip to work unilaterally and stabilise the body.

### 3.1 Arm Strength

- As you climb a rope your arms are forced to extend and then pull the weight of the body higher.
- This creates a different dynamic on your arms you may not achieve as effectively from your regular pull-up/heave.
- Every time you pull yourself up you are forcing one or both arms to work in unison.

### 3.2 Back Strength

- Rope climbing also strengthens the upper back musculature and lats.
- As you climb you are forced to pull yourself close to the rope, which is going to force the lats to work, much like they do in a pull-up/heave.
- The key difference between rope climbing and pull-ups is the amount of stabilisation required on a rope.

### 3.3 An Indicator of Strength (Power)

- The ability to climb a rope fast and well has a correlation with upper body power.
- A study published in 2015 by Dhahbi and colleagues compared power output of the timed 5-metre rope climb with other upper body power tests such as the pull-up test, 1-RM bench press, and medicine ball throw.
- Dhahbi and colleagues suggested the rope climb was a valid and reliable test for assessing upper body power.
- This adds another method for assessing and testing your ability to produce upper body power.

### 3.4 Fun and Challenging

- When you are hanging 20-feet above the floor and the chance of falling could leave you with serious injury, there becomes an added level of excitement and challenge.
- Obviously you are not going to let yourself fall, which can help push you past limits you may not have reached otherwise.

### 3.5 Confidence

- Rope climbing is different than most exercises: there is a clear cut finish line, and that (of course) is the top of the rope.
- Every time you make it to the top of a rope with your own strength, you build confidence in yourself.
- When you begin to add progressions such as removing your feet, it is a clear indicator of strength improvement, aka, a natural confidence boost.

## Part Four: Methods and Techniques for Climbing a Rope

There are a number of methods used for climbing a rope, all of which will have pros and cons, or "…unique benefits and drawbacks." (Spence & Kay, 2016, p.92).

Having taught rope climbing to various populations (e.g. civilians, trained soldiers, and trainee fitness instructors), I have made the following generalisations from my observations:

- Nearly everyone finds the 'footwork' of rope climbing tricky to learn;
- Nearly everyone jumps into the rope climb (unless prewarned not to);
- Nearly everyone takes 3-5 'arm reaches' to get to the top (some take more, especially novices);
- Almost all proficient rope climbers effectively and efficiently utilise their legs to support and 'push' themselves up the rope; and
- Once proficient, nearly everyone raises their knees to chest level 3-5 times in order to establish a good 'push' position for their legs on the rope.

## 4.0 Strength and Technique

Strength and skill (i.e. technique) are equally important in rope work.

Poor skill can mean prematurely fatiguing your muscles - which can impact on later military tasks - because you have to work harder to achieve the same output (e.g. climbing to the top of a 30-foot rope).

Poor strength can mean you do not even get off the ground and, therefore, are unable to complete the military task associated with the climb. Simply put, strength limitations will be a cause of movement/technical errors.

Although climbing a rope can be a daunting and arduous task for most - especially with 25 lbs of equipment and a rifle on your back - the aim is to complete the task without being unduely fatigued once completed, and this can only be achieved through training.

Adam Spence and Andy Kay published a very good paper in 2016 regarding the scissor method, including its three phases, common technical errors, anatomical and biomechanical factors to consider, and progression (refer to References for the paper).

## 4.1 Your Feet and Rope Climbing

If you are strong enough, now or in the future, you may may be able to rope climb without using your feet, but it is far from easy and not what a novice should begin with. Regardless of which method is used, all novices should be taught how to rope climb using their feet to assist them and how to 'brake' on the rope so they do not slide down and lose ground (plus sliding down opens the potential of ropes burns which are not pleasant).

Using the feet can aid in conserving upper body strength, especially when one is starting out and/or you plan on more than a single climb.

There are two basic methods for climbing a rope using the feet: the Stirrup Method (aka Wrap and Lock) and the Scissors Method and refers to how your feet grip the rope. However, whichever method is used the climbing technique is the same.

## 4.2 Methods of Ascending (Climbing) a Rope

There are several methods of climbing a rope:

1. Climbing rope with hands and feet.

2. Climbing rope with hands only (legs in Pike position or 'free' position).
3. Climbing two ropes simultaneously (one hand per rope).
4. Climbing upside down!

In formal UK military training, only methods one and two are utilised (the others may be used in challenges!).

When it comes to using the feet in rope climbing, the UK military does not advocate the methods that involve 'locking' the rope around the feet. This idea of locking the rope around feet is so you can stop on the rope without incurring undue fatigue (i.e. it can give your arms a temporary reprieve). The US military advocate locking, with different methods between the Services. Whilst climbing a rope, a soldier is extremely vulnerable to attack and, therefore, the less time spent climbing the better! As Spence and Kay (2016, p.92) state, the scissor "...method allows for an efficient and safe ascent because the legs remain in contact with the rope as the athlete completes each "shift," minimizing the reliance on upper-body strength alone."

In general, the UK military will teach the scissor method, which "is a closed kinetic chain whole-body exericse." (Spence and Key, 2016, p.92). For individual's the method they use will be based on a number of factors such as personal preference, competition criteria, and organisational norms (e.g. UK vs US military).

Table 1 outlines methods of rope climbing using both hands and feet.

| Method | Description |
|---|---|
| **Gym Class Lock** | 1. A favourite method of children climbing ropes in school and in the playground.<br>2. It is the most basic way to grip the rope with your feet.<br>3. However, it is also the least efficient and helpful, requiring you to use the most upper body strength because your feet can not effectively brake and lock.<br>4. To perform, reach your arms up overhead to grab the rope with both hands.<br>5. Now jump your feet up and grip the rope between the soles of your feet, squeezing the rope between them.<br>6. Push off with your feet and reach higher up with the hands.<br>7. Holding tight to the rope, tuck your knees up again and squeeze the rope between your feet.<br>8. Continue this way up the rope, squeezing the rope between your feet and then using your legs to push you up as you then pull yourself up to reset your feet. |
| **Wrap and Lock (Basic) (aka Stirrup Method)** | 1. This method enables you to brake and use your legs to climb the rope.<br>2. To perform, reach your hands up overhead and let the rope fall down the centre of your body.<br>3. Tuck your knees up, and with your dominant foot, step down on the rope as you press up on the loose end with your other foot.<br>4. Your feet must be close together and squeezed together, as one presses up and the other presses down - This will 'lock' the rope in place.<br>5. From this position, push up and straighten your legs as you reach up overhead - The more you tuck your knees up and then lock, the more you can push off your legs to help you climb.<br>6. Push off the rope lock and reach up overhead.<br>7. Now tuck your knees back up and again lock the rope in place. |

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|---|---|
| | 8. You can also perform this basic wrap and lock with the rope outside your dominant leg instead of between your legs if that is more comfortable. The point is to clamp down on the rope with one foot as you press up and together on the rope with the other foot. |
| **Wrap and Lock (Stomp and Stand)** | 1. This technique uses less upper body strength than the Basic Wrap and Lock, as long as you do not lose the rope.<br>2. If the rope becomes unwrapped, you will have to use more upper body strength to re-wrap mid-climb, whereas it is easier to 'grab' the rope with the Basic Wrap.<br>3. To perform, place the rope between the legs (front to rear) and around the dominant leg (behind the thigh and in front of the shin), placing the rope on top of the same foot.<br>4. Reach your hands up overhead and grab the rope.<br>5. Pull up as you tuck your knees up with the rope wrapped around your leg.<br>6. Now clamp down on top of the rope with your free foot, pressing the rope down into your bottom foot.<br>7. Clamp and then straighten your legs and stand up so you can grab up higher on the rope.<br>8. Keeping the rope wrapped around your leg, release the top foot and again tuck your knees up.<br>9. Clamp down with your other foot to stand back up and reach up higher on the rope.<br>10. Because this wrap can rub your leg more, you may want to wear pants or even switch to the Basic Wrap and Lock to come descend the rope. |
| **Wrap and Lock (Spanish Style)** | 1. This technique is a really secure one that enables you to use your hips as you climb; however, if you lose the rope around your leg and it comes unwrapped, it is not as easy to get the wrap back and will require you to hold and use some upper body strength.<br>2. This technique has the same lock as the Stomp and Stand except, you will not squat to push up instead lowering your leg down in front.<br>3. To perform, place the rope between the legs (front to rear) and around the dominant leg (behind the thigh and in front of the shin), placing the rope on top of the same foot.<br>4. Reach your hands up overhead and pull up and tuck the knee of the leg with the rope up.<br>5. Let the rope slid down your leg and then straighten that leg out, with the rope wrapped around.<br>6. Press your other foot down on top of the rope with your legs out in front of you, almost as if you are sitting in the air.<br>7. Now, with the rope secure between your feet, straighten your leg down toward the ground.<br>8. Once standing tall, reach your hands up and again tuck your knee up with the rope around your leg.<br>9. Straighten your leg back out in front, lock down the rope with your other foot and then straighten your leg back down to the ground to come back up to standing.<br>10. Do not worry if you lose the wrap, just try to give yourself time to reset. If you really struggle with losing the rope, try the Basic Wrap and Lock. |
| **Scissor Method** | Phase 1: Set-Up: |

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|---|---|
| **(Spence & Kay, 2016, p.93-95)** | • Stand behind the rope with feet side by side. Extend the arms and reach up overhead to grip the rope firmly with one hand above the other.<br>• Maintaining a firm grip, position the rope so that it hangs on the medial aspect of the right knee and over to the lateral border of the right foot.<br>• Bring the left leg over the front of the rope, so that the rope is gripped firmly between the knees, and the left foot sits to the lateral border of the right foot.<br>• The knees and lateral borders of the feet have now created a "lock." The feet keep the rope in the correct position and provide an additional anchor as the athlete "shifts" up the rope.<br>Phase 2: The Shift:<br>• Loosen the lock to allow the rope to slide through the knees and feet. Flex at the hip and knees while aggressively leaning back.<br>• Reapply the lock by squeezing the rope firmly at the knees and feet and forcefully extending the knees and hips forward. The rope should be pulled close to the body at all times. This will allow the body to rotate around the fixed point at the hands.<br>• Toward the end of knee and hip extension, move the hands up the rope to reach a full overhead position.<br>• The athlete has now completed one shift. The athlete then repeats the previous three steps until reaching the top of the rope, or reaching a level of fatigue, which makes further ascent hazardous.<br>Phase 3: Controlled Descent:<br>• From the top of the rope, descend under control by reducing the tension of the legs, while bringing the hands off the rope, one at a time, in a hand under hand fashion. |

The above methods can be known by a variety of names, including: scissor method, stirrup method, J wrap, J hook, J hook (CrossFit variation), wrap and lock, brake and squat, and S wrap.

## 4.3 Methods of Descending (Climbing Down) a Rope

The following methods can be used for descending (climbing down) a rope:

- Hand over hand.
- Hand under hand:
    1. Slide upper hand down to lower hand.
    2. Lower body so arms are straight.
    3. Repeat 1 and 2 until you reach the floor.
- Sliding down: Only advised if wearing gloves.

## 4.4 Progression

During your rope climbing training it is important to place gym mats under the rope for safety and instilling confidence.

Your starting point for rope climbing will depend on your current individual circumstances. For example, you may never have climbed a rope (nor engaged in exercise) and feel like you have absolutely no upper body strength. The below is a brief example for illustration purposes only.

- Footwork.
    - Sit on a chair or plyometric box and practice the footwork required for the method you are going to use.
    - The rope should feel tight between the feet and not slip - if it is slipping, then you are not putting (or applying enough) pressure in the right spot.
- Push-ups (press-ups).
    - A good all-over exercise, but particularly useful for the upper body.
- Assisted pull-ups (heaves)/chin-ups.
    - Can be performed using a partner, machine, or resistance band.
- Chin-ups/pull-ups/jumps on the rope.
    - Pull-ups: A movement performed with a pronated (overhand, palms facing away) grasp.
    - Chin-ups: A movement performed with a supinated (underhand, palms facing towards) grasp.
    - Both of these will work the lats, traps, core, and arms.
- Rope climbing using hands and feet.
    - Start with one full ascent and descent, then rest.
    - Progress to two full ascents and descents without putting your feet on the floor between the first descent and second ascent.
    - Continue this progression until you can complete ten ascents and descents without touching the floor.
    - Can include weight.
- Rope climbing using hands only.
    - Same as using hands and feet.
    - Can include weight.

For those looking for speed on their rope climb rather than form, muscle-ups aid in cultivating the surge of power required on the start of the climb. Speed climbers also need to consider endurance/explosive power training such as climbing stairs (at speed), burpees and upper body plyometrics.

It is also important to practice your technique, whichever method you use. For example, some can find it difficult to place the rope between the legs and squeeze the thighs and 'capture' the rope between the feet as taught in the scissor method. As a PTI, I had many hours of teaching civilians, soldiers, and trainee PTIs how to develop rope climbing skills.

Table 2 outlines methods for developing grip, upper body, and core strength.

| Method | Description |
|---|---|
| **Row and Switch** | 1. This is a horizontal rope climb to build your back, bicep and grip strength.<br>2. It is an Inverted Row Variation using a climbing rope.<br>3. You can make this move harder or easier by holding the rope up higher or lower and by how close to parallel to the ground you get when you perform the Row and Switch.<br>4. To perform, grab the rope with one hand above the other and walk your feet forward to an appropriate incline.<br>5. Let your arms hang straight and engage your core to keep your body in a nice straight line.<br>6. Press your chest out and engage your back.<br>7. Now, drive your elbows down and back to row yourself up to the rope.<br>8. At the top, release the rope and switch your other hand on top. |

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|---|---|
| | 9. Lower yourself back down and repeat, driving your elbows down and back to row back up and switch your grip.<br>10. Do not let your hips sag or your back round.<br>11. Keep your core engaged throughout the entire movement. |
| **Bent-Knee Horizontal Climb** | 1. This method is a great way to work on your upper body and core strength when climbing without having to pull up all your weight or even know how to perform a foot wrap.<br>2. This method is a great beginner rope climb and easier than the Straight-Leg Variation because you have to pull up less of your weight.<br>3. To perform, start standing holding the rope in both hands at about head or shoulder height.<br>4. Engage your core and press your chest out.<br>5. Lean back and begin to lower yourself down hand over hand.<br>6. Bend your knees as you lower yourself down and keep your core and glutes engaged.<br>7. Touch your back down to the ground if possible and then begin to climb back up hand over hand.<br>8. Do not let your hips drop down to the ground.<br>9. Your bum can touch down but you do not want your hips to sag as you climb.<br>10. Climb back up hand over hand, keeping your core engaged and your chest pressed out. |
| **Straight-Leg Horizontal Climb** | 1. To advance the Bent-Knee Horizontal Climb, you can straighten your legs. This will allow you to take on more of your bodyweight without having to wrap your feet to climb vertically.<br>2. To perform, start standing holding the rope in both hands at about head or shoulder height.<br>3. Engage your core and press your chest out.<br>4. Lean back and begin to lower yourself down hand over hand.<br>5. Keep your legs straight as you lower yourself down.<br>6. Make sure you engage your glutes and core to keep your body in a nice straight line so your hips don't sag and your low back does not arch.<br>7. Lower yourself as close to the ground as you can. The lower you go, the harder the move will be.<br>8. Then climb back up hand over hand, keeping the core engaged and your legs straight. |
| **Pull-Up/Jumping Pull-Ups** | 1. Pull-Ups are a great way to build your lats, core and grip strength with a vertical pull exercise so you can work up to the full rope climb.<br>2. To perform Pull-Ups, reach your hands up to grab the rope one hand above the other. Then hang down.<br>3. Depending on how high up you reach, you may need to bend your knees so your feet do not touch down.<br>4. Press your chest out and, using your back and arms, pull your chin up over your hands.<br>5. Now lower back down and repeat.<br>6. Beginners who are unable to perform a full Pull-Up can start with jumping Pull-Ups.<br>7. To perform Jumping Pull-Ups, reach your hands up to grab the rope at about the height of your head.<br>8. Now bend your knees slightly to hang down. |

| | |
|---|---|
| | 9. Using your legs as much as needed, jump up and pull down on the rope to pull yourself up.<br>10. Only jump as much as is needed to pull your chin up over your hands.<br>11. Slowly lower yourself down and then repeat, jumping up.<br>12. The less you use your feet, the harder the move will be. |

Finally, it is important to note the impact that rope diameter can have on your ability to climb the rope. Generally, ropes are approximately 1.5 inch in diameter with (to a point) larger diameter ropes being easier to grip and smaller diameter being harder.

## 4.5 What If I Don't Have a Rope Available?

Military personnel on operations may not have access to a rope, but may still wish to train as if using a rope (either for personal training or for an upcoming course).

A good subsitute for rope climbs is towel pull-ups/heaves. This is because they mimic the movement and 'thick' grip demanded from the rope.

How to perform:

- Throw a towel over a pull-up bar (or a substitute) and grip either side of the towel with each hand.
- Alternate one hand high on the towel, the other low for increased realism.
- You should aim for 15 towel pull-ups to replicate the standard 15-foot rope climb of most (commercial) gyms.

## 4.6 Weight and Rope Climbing

In most militaries, webbing and a rifle or backpack is utilised, as this is the equipment the soldier will use in the field.

For civilians, they are more likely to utilise an off the shelf weighted vest (which come in various weights).

# Part Five: The (Anatomical) Science of Rope Climbing

## 5.0 Muscles Used for Climbing a Rope

Although climbing a rope requires strong hands and forearms, the muscles required for climbing a rope include:

- Biceps;
- Shoulders;
- Forearms;
- Back;
- Abdominals/core; and
- Of course, we cannot forget the contribution of our leg muscles.

## 5.1 Lower Arms and Hands

The flexor carpi ulnaris, flexor digitorum superficialis, flexor carpi radialis, flexor pollicis longus and flexor digitorum profundus all work together to keep your fingers closed firmly around the rope. Although your fingers may strain as you grip the rope, your arms will be engaged and receive a challenging workout because the muscles used to grip the rope originate in your forearms.

## 5.2 Upper Arms

The muscles in your arms are essential for rope climbing and work in synergy to forcefully bend your elbow and help you climb. The biggest and strongest muscle is your biceps brachii, located at the front of your upper arm. In addition, the brachialis muscle beneath your biceps also exerts force on your elbow joint, as does the brachioradicalis muscle of the upper forearm. Rope climbing provides an effective workout for all of the muscles on the front of your upper arms.

## 5.3 Shoulders

The latissimus dorsi, lats for short, is the main muscle involved in pulling your body up the rope. Located on the sides of your back and attached to your humerus, these powerful muscles provide most of the shoulder movement responsible for heaving you up the rope. Although your lats are the primary muscles used to extend your shoulders, numerous other upper body muscles are also called upon to assist. For example, your lower trapezius muscles contract to hold your shoulders down as you pull yourself up the rope. your serratus anterior holds your scapula flat to your rib cage, whilst coracobrachialis and anterior deltoid stabilise the shoulder and aid with shoulder flexion during the pulling action.

## 5.4 What about the Muscles of the Lower Body?

Although rope climbing is primarily an upper body activity, your legs are also used to help propel you up the rope. Proficient rope climbers will use their legs as much as possible to reduce the load on their weaker upper body muscles. This is especially important if you are climbing a rope while carrying heavy equipment - a common situation for military personnel.

The muscles of your inner thighs, adductor magnus, brevis and longus squeeze your legs together to stop you from sliding down the rope as you move your hands up for the next pull.

In conjunction with the pulling action of your arms, your gluteus maximus and hamstring muscles work to extend your hips to push you up the rope.

# Part Six: Miscellaneous

## 6.0 Summary

Although I have focused on the British Military, the topics outlined in this article can be applied across both military and civilian populations.

Because of my background, to me rope climbing is about demonstrating flair and panache, i.e. ascending and descinding a rope without your arms and legs shaking, using control and discipline to make it 'look easy' and/or perhaps show off. Training can help make this happen, but one needs a combination of strength and technique to achieve it. Of course some wish to show off in a

differrent way and ascend a rope as fast as possible, which takes a different kind of strength and technique. Ultimately, it depends on your personal preference and what you what to achieve or aim for.

Rope climbing is a great exercise but requires both strength and technique, especially if you want to make it look graceful and easy. Although, rope climbing is predominantly an upper body activity, your core and lower body also play a part. Mastering footwork on the rope can aid you to ascend the rope with less effort and should be practiced by all, but especially novices.

## 6.1 Further Reading

- World Records for Rope Climbing @ www.recordholders.org/en/list/rope-climbing.html.
- World Police and Fire Games (WPFG) @ https://wpfgrotterdam2022.com/.

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