

Ken Ledward Equipment Testing Service

The Principle of the Trekking Pole

The Trekking Pole

The information contained here is the result of extensive personal experience, and by seeking the opinions of regular hillgoers, amateur and professional, and from those who have recommenced their activity in the hills after recovery from orthopedic surgery.

I am particularly pleased that Allen Fyffe U.I.A.G.M. - Director of Scottish Mountain Leader Training Board, prev senior staff instructor at Glenmore Lodge, the Scottish National Sports Centre, is able to support the following technical advice.

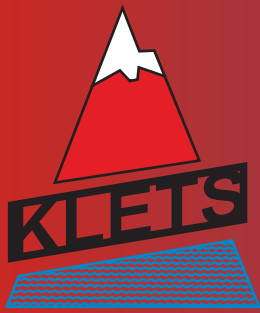


How Might You Benefit From Using A Trekking Pole

As an example, imagine ascending or descending a steep staircase. You reach for the banister rail on ascent and, as the body comes alongside the hand, you give a slight push to aid the upward movement.

When descending the hand holds the banister forward of the body and gives security and support.

The pole takes the place of the banister rail, and can be put in the most convenient position to suit the terrain and your pace. Up or downhill, on smooth grass or on rough ground, and even on moderately steep rocky sections it will give some propulsion and stability. This can be best obtained from using a pole in each hand.



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Pole Type

Poles suited to all types of outdoor use can be divided into four main groups.

1) The traditional wooden one-piece walking stick, or the longer thumb stick.

2a) The one-piece lightweight alpine (downhill) ski pole.

2b) The ultra-lightweight one-piece cross-country (Nordic) ski pole. Both 2a and 2b can be obtained in aluminium, fibreglass or carbon fibre, and they can be cut to length by removing the handle.

3a) The aluminium two-piece hospital-style orthopedic pole uses a push button adjuster with a leaf spring on the inside of the tubing. This can be supplied with a custom contoured handle. One U.S.A. firm also supply a this style of pole with a pliable sleeve covering all of the adjuster holes. In KLETS tests it was found that this U.S.A. pole did not work any better than the much less expensive U.K. variety, but it could be more easily fitted with a wrist loop.

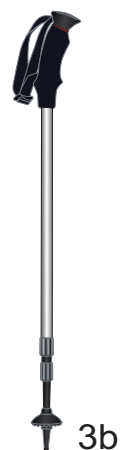
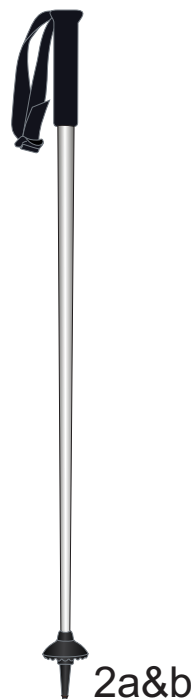
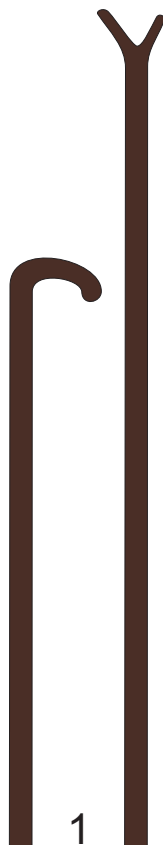
3b) The more recent two, three and even four piece aluminium pole with a twist grip tensioner on the inside of the tubing, which uses the universally accepted in-line ski pole handle with an integral wrist strap. See setting the length for advice on adjusting the pole to suit. The main advantage that the sectional pole has over the one-piece pole is that it can be telescoped short enough to be put in a case or rucksac. It also causes less hassle on public transport.

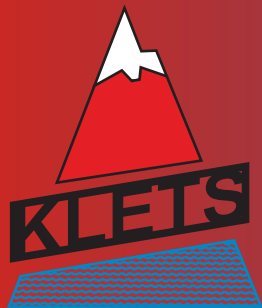
The use of the modern style sectional pole is not a panacea for all. I would recommend it only for use by those who are involved in regular outdoor activities, to save wear and tear on the lower limbs.

The twist tensioners fitted on the inside of the tubing of most modern sectional poles cannot be unconditionally recommended for those who have any serious limb disability, poor co-ordination or for those in the early stages of recovery after hospitalisation. For this group I would only recommend only those sticks or poles from groups 1, 2a, 2b and 3a above.

WHY ?

In a series of tests which simulated a falling stumble which required pole support, it was found that no matter how tightly the twist tensioner was thought secured, it could not be relied upon 100% to retain its set length, and for those without the swift reaction of the regularly active person such a stumble led to a total fall.





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How Much Weight Can Be Transferred from Lower to Upper Limbs and onto the Poles ?

I reckon that somewhere between 5% and 20% of bodyweight can be transferred, the higher figures when using a double-pole plant in difficult terrain.

KLETS has done a calculation with many people, mostly from the outdoor retail trade. Below is just one estimate from a KLETS tester.

Bathroom scale weight fully clothed, wearing boots and holding poles = 63.5kg/140lbs.

Lifting one leg and placing gentle weight on the pole = 51.5kg/113.5lbs

A weight transfer from lower to upper limbs = 12kg/26.5lbs

The subject had calculated to walk 152 paces to each 100m. In a 25K walk, approximately 15.5 miles over undulating terrain he will cover 38,000 paces, at a rate of 5 km per hour - just over 3 m.p.h. The walk will take 5 hours.

Bodyweight 63.5kg x 38,000 paces will produce a foot-to-foot weight loading of 2,413,000kg = 2,375 ton, equal to 475 ton per hour on the lower joints without the use of poles. 237.5 ton per hour per leg.

The weight transfer in the above exercise is a staggering 374.06 ton total which means 74.81 ton per hour is taken off the hips, knees and ankles, with hopefully no long term effect on the wrists, elbows and shoulders: I can report no joint problems resulting from my 4 years on this test programme and a most noticeable increase in my cardio-vascular efficiency.

It is impossible to correctly foretell the weight transfer to be had in rugged mountain country. The change of pace and the need to pause at obstacles means that a constant ground speed is difficult to maintain and, on really difficult ground, the poles might not be suited to use at all. However, every time you make an assisted stride you can be sure that you have made some weight transfer to relieve the lower limbs.

Listed below are some calculations based on the above formula. I think that most people will find their average weight transfer falls within this 5kg to 9kg region.

5kg weight transfer will produce a saving of 37.40 ton per hour.

6kg weight transfer will produce a saving of 44.80 ton per hour.

7kg weight transfer will produce a saving of 52.36 ton per hour.

8kg weight transfer will produce a saving of 59.85 ton per hour.

9kg weight transfer will produce a saving of 67.33 ton per hour.

Health Benefits

The use of trekking poles will, like swimming and cross country skiing, provide a near total body exercise. Those people who usually finish a long walk with an aching back will be surprised to discover that the ache will decrease or disappear if using poles. One of the test team always complained of difficulty in bending to unfasten boot laces after a long rugged walk and now when using poles has little or no problem in this respect.

The figures on the weight transfer page do not take into account the carriage of a rucksack load, nor do the figures give what I know will be vast load increases if running down very steep hillsides. If the body drops between 5 and 15cm as in fell running we can expect the weight loading to be considerably greater. One wonders just what will be the results for some people of subjecting the body to repeated participation in events like 2 day mountain marathons and the longer distance fell races, plus the many hours spent in training runs ?

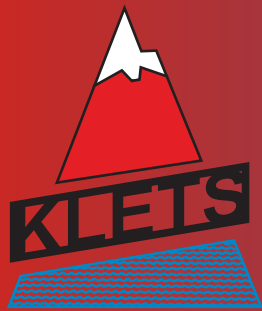
Even for fell running training the use of the ultra lightweight Nordic pole is known to give assistance.

Some who have spent many years in the hills without the aid of poles have become lame and for them the enjoyment now is lessened. Some have gone for replacement joints and discover the road back to full fitness is long and may not lead to pain free enjoyment even with slightly decreased mobility.

I urge everyone, particularly the young, to start using poles now, especially when travelling with more than normal bodyweight. Prevention of joint and muscular damage in the early years will extend your enjoyment in the hills and may avoid the trauma of surgery at a later time, when your accumulated experience should be permitting extended outdoor trips of superb quality.

KLETS has already started training courses for retail staff in specialist outdoor shops and believes that soon the technique of "walking with poles" will feature in outdoor training centre programmes and be seen as an important aspect of all hillwalking activity.





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The Multi Section Twist-Grip Adjustable Pole

I recommend for serious mountain activity only those poles which have a vertical handle, an extension of the actual pole. This is because the most vital assistance comes not from handle as a grip, but from the wrist strap which is attached to the top of the handle. This allows full rear arm extension as in Nordic two phase style. You may find it helpful in the early days of practice to wear a pair of thin gloves.

Poles with angled handgrips do not permit easy use of a wrist strap, and mostly are seen by me as more orthopaedic and therefore selectable for specific medical needs where they appear to work perfectly well.

It should be noted that we have received numerous reports of a flick/lock tensioning mechanism being released accidentally from impacts received during the traverse of boulder slopes.

Setting the Length

First extend the lowest section and tighten firmly at the STOP/SAFE mark. This section on most poles is tapered and to tighten at below the maximum circumference creates considerable movement as the end of the tube is not in contact with the anti-rattle collar which lies at the end of the upper pole sections. This is sometimes mistakenly used as a grip when adjusting the pole.

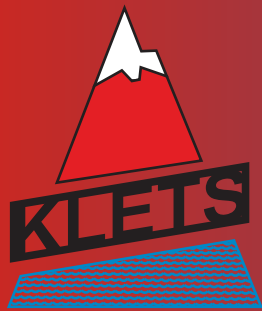
Extend the other section/s and slightly tighten, hold the pole with tip to the ground and press down gently until the top of the handle is just above your waistline. Tighten the remaining joints. There can be no hard and fast rule on pole length as walking styles differ greatly and your personal physique and "feel" for what is the most comfortable pole length will produce something that will not be miles away from a ground to waistline length anyway. This length is suited to any style of pole.

KLETS has been setting one pole at waist height and the other pole 10cm longer. The shorter pole is used on the uphill side when on a long traverse and, for the very steep descent or high step-up we will have one that is suited to the situation. At all other times the difference in height should not create any inconvenience.



The Wrist Strap

This must be adjustable and preferably approximately 15mm wide where it leaves the handle widening up to 30mm in width where it passes round the back of the hand. The buckle must be as central on the back of the hand as possible; too few suppliers are using the two-way adjuster buckle which provides the maximum comfort and convenience.

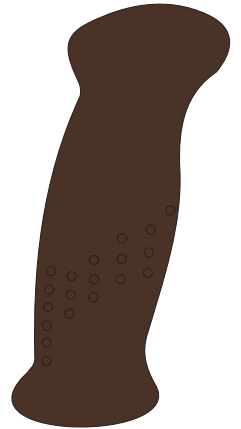


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Pole Handle

This should be vertical and slender without large sharp edges protruding and the top or bottom. A small finger shaping on the leading edge will provide better grip in wet weather and when wearing gloves no matter what the manufacturers say about their non-slip handle materials.



Tubing

Wall thickness with current technology is best at 1mm (orthopedic poles 2mm). For a well matched telescoping fit and minimal rattle, each of the smaller diameter sections outside surfaces must lie neatly up against the inside of its next larger partner, tapered sections excepted.

Poles marked as DIN standard 7884 are not necessarily better than other poles that have not met this standard; 7884 is an Alpine (downhill Ski) pole specification and your use in the U.K. will be mainly off snow and moving through the sort of terrain 7884 has not "officially" been tested in. Sufficient to say that most poles tested by KLETS do last the course, unless trapped between boulders and then levered hard, when they can bend and possibly fracture. Replacement parts are available for most of the poles currently on sale.

Baskets and Tip

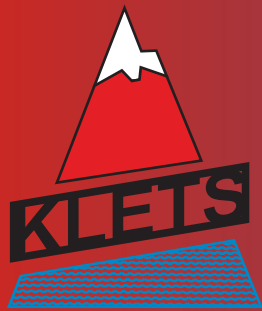
The basket near the bottom of the pole is mainly intended for snow usage. Some of the suppliers do offer alternative smaller sized baskets and all can be trimmed to suit the terrain. In any situation you can usually depend on at least one incident when the basket traps under a rock and wrenches your arm. A good compromise is the stubby ferrule on some poles which, for most non-snow situations, is an alternative that works very well indeed.

The lowest section of the pole will normally be a solid insert containing the ferrule. The best tips are Tungsten which will last longer and give better grip on slippery surfaces.

There is still no longer lasting ferrule cover for use on tarmac but the race is on, if only to quieten what can sound like a thousand newly shod ponies racing down the road. It is hoped that a solution can be found before the use of poles in the U.K. becomes commonplace otherwise we'll all be walking about with earplugs.

Cleanliness of gear is vital with all outdoor equipment and particularly so with safety equipment. Take apart the multi section pole after use and dry it out by normal ventilation and not direct heating. Clean off any aluminium dust with a cloth and use a soft brush on the threads and the tensioning pieces. Some manufacturers advise lubrication but experiences here show that this usually finishes up with a gooey mess when the dust mixes with the oil. Good clean dry components work best over the long term.





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Using the Pole

The need to readjust pole length during a walk should be kept to a minimum, it is much simpler to take a temporary hold below the handle than it is to stop and re-adjust a pole length, particularly when in rain or snow. A short section of tape wound round the tube below the handle makes a non-slip hold. A quick flick of the wrist-strap buckle to lengthen the loop, and a drop of the hand to the lower position give fast adjustment which is just as quick to return to the original position.



Secondary grip



Strap adjustment

The length of the wrist strap should give a good, comfortable, firm hold when the thumb and the forefinger is against the the handle and approximately 5mm of handle top is poking out between them. To test the correct loop length, the pole should fall back into the palm and between the thumb and the forefinger as the pole returns from its most rearward position and is made ready for the next placement. This takes a lot of practice and it is wise to check this movement out with your retail shop supplier.



Length checking



Follow through

You should aim to use just the thumb and forefinger to guide the pole tip to its next placement and then immediately transfer the weight onto the heel of the hand against the strap; you can test yourself on this action by opening the fingers out wide for the follow-through. This follow-through as the arm extends behind you is not a pull or jerk on the pole but is a gentle extension of the arm as the body walks past the pole placement. It is this subtle movement which can be an aid to propulsion. To grip the pole handle will keep the hand and limb muscles in tension which wastes energy, and in winter, some conductive heat loss.



Pole plant



Un-sprung and sprung pole sections

Some manufacturers are including in their range a pole incorporating a strong spring, the pole is of course slightly heavier and more costly.

In our test sessions we found no advantage over the non-sprung pole (**see update below**); there is little noticeable cushioning effect for the arm joints at initial pole impact against the ground, and there can be sufficient movement in the length to create a small problem if making a delicate balance push off the spring loaded pole.

My own opinion is that a slightly elasticated wrist-strap would do a better job at a fraction of the cost.

*** UPDATE - Recent very long descents experienced in the Grand Canyon USA and on the GR20 Corsica clearly indicated that releasing the handle at initial pole impact and allowing the strain to move to the heel of the hand against the strap gave a cushioning effect. The integral spring mechanism could not be felt. Our KLETS testers and other professional mountaineers that we have met can identify the integral spring operation infrequently and usually only as a sort of propulsion on high steps or on long strides. It has been reported that to weight the spring mechanism when making a delicate movement, as in boulder to boulder stream crossing, can interfere with the anticipated balance movement.**

