

## Squad Screening – Physiological Measurements

We now know that climbing is to be featured as a showcase in 2020 at the Tokyo Olympics. The athletes representing us there are probably around 12-15 years old right now. Some may not have even thought about competitive climbing. Identifying talent and then nurturing that talent is an important skill of a coach. There is a significant risk that talented young climbers do not turn into talented adults because of injury or other factors; perhaps they were pushed too hard by their parents, perhaps a coach didn't identify any risk factors or perhaps they just burned themselves out. We can't mitigate against every circumstance but we can avoid injuring the children under our care.

Last issue began the process of outlining a series of tests that will help you ensure that you can identify any issues that can be addressed by looking at general strength and stability. This issue avoids the more specific, climbing related strength tests that allow you to make an assessment on someone's all-round climbing strengths and weaknesses. These tests should be decided by you and there are many to choose from. Investigate Functional Movement Screening (FMS) for example but basically; push-ups, sit-ups, pull-ups – that sort of thing are all fairly standard. The MTUK & BMC are developing some excellent performance profiling tools which will help us all which will be available soon.

Because of this the article focuses on measurable elements of a climber's physiology that can assist you in determining their physical well-being in relation to their performance. These are not 'screening' tools i.e. intended to weed out the weak but standard measurements to help you inform your practice as a coach. Any specific findings (such as pain or significant weakness) should be referred to a specialist physiotherapist.

This phase is for establishing some simple values from which comparisons can be made, evidence collected for possible research purposes and which can be compared directly with statistical norms. This is not to say that all children should fit a specific 'type' merely that only by measuring is it possible to spot outliers i.e. someone who is radically different and may need further investigation or more importantly, the creation of a more athlete focussed coaching regimen.

As an example someone might not know that they are hypermobile (test 2) but this wouldn't necessarily affect their climbing and apart from acknowledging it no further action need be taken apart from suitable strengthening exercises. However, if they are hypermobile and have knee and elbow pain then there might be an issue – send to a physiotherapist.

### Grip Strength

This seemingly innocuous test has recently been linked to intelligence and longevity (in adults) and as well as this it is always fun (think *chrush*). However it doesn't correlate strongly with climbing ability i.e. some climbers who can climb above 8a have relatively weak grip and some who have strong grips do not necessarily climb hard. There is a direct correlation with size and grip strength so you can see that a big, 20 stone, non-climber could have (and probably does) a stronger grip than a 10 stone individual who climbs.

However, that said climbers *do* have, on average a 12% stronger grip compared with their demographic equals who do not climb.

Climbers also have a more equal grip between left and right and a stronger 'inner range' grip i.e. the ability to hold onto something overhanging (the easiest description I could think of).

In kids none of this is adequately measured or analysed to be able to draw conclusions however it is still a valid test. Why? If you have two climbers, ostensibly climbing the same the same grade and one has a stronger grip than the other then this would be a significant factor informing your coaching.

For this test you need a dynamometer – approximately £20 for a ‘non-scientific’ one from Amazon. £300 for a proper one.

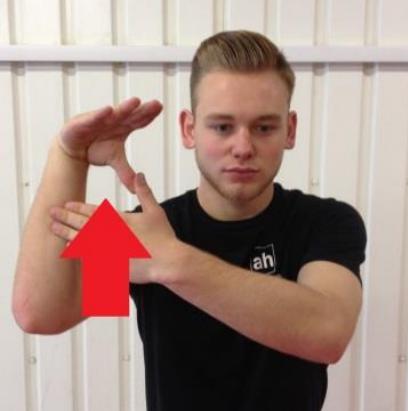
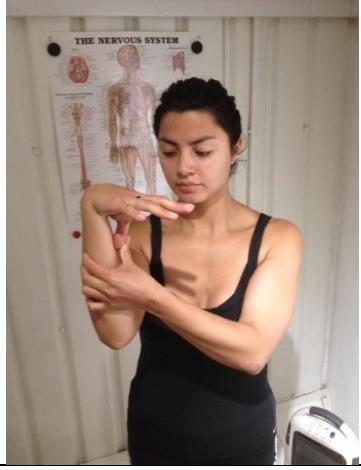
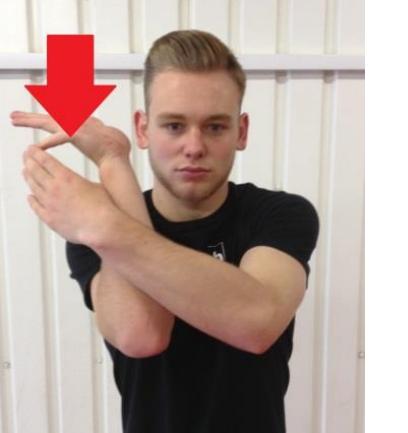
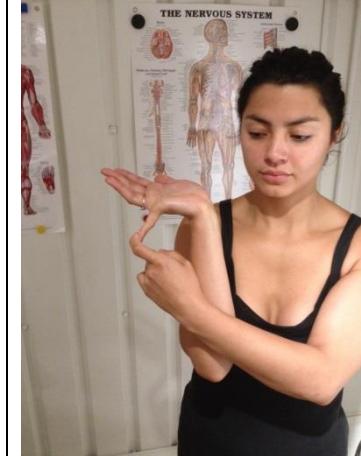
## Method

Hold the device by the side, squeeze hard for 1 second and repeat for 3 times and take an average.

### Beighton Score (Fig 1)

The Beighton score is a test for hypermobility and uses 9 signs, 4 which are repeated left to right and the 5<sup>th</sup> is bilateral. Only a score of 9/9 is considered hypermobility syndrome – lower but significant findings should be referred to the physiotherapist.

**Fig 1: Beighton Score**

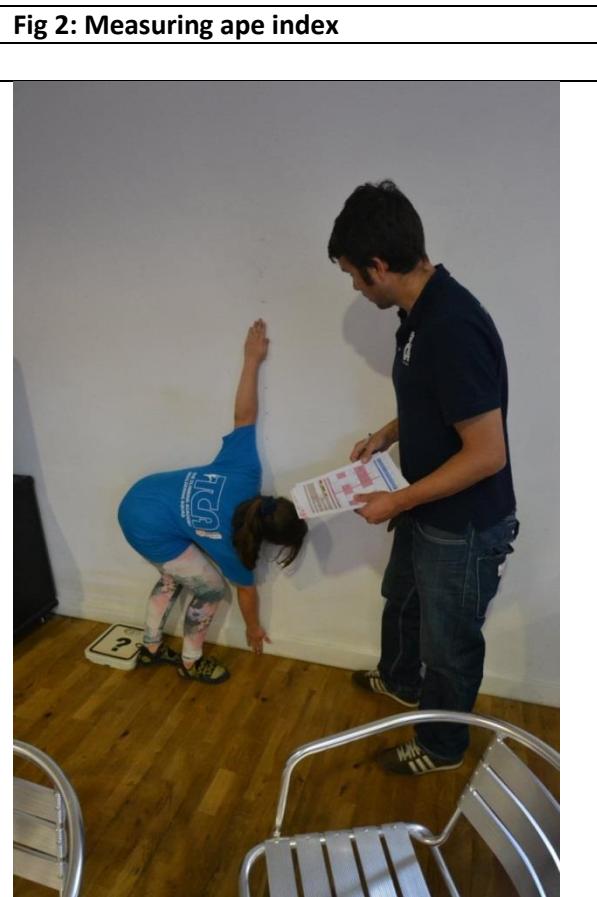
	<p><b>Score 1 point for each thumb that touches the wrist easily in this position.</b></p> <p>◀Harrison scores zero</p> <p>Natali scores 2→</p>	
	<p><b>1 more point for each pinky that can be bent to 90 degrees easily</b></p> <p>◀Harrison zero</p> <p>Natali also zero, but close→</p>	

	<p>Do the elbows hyperextend?      ↙ Harrison 0      Christina 2 →</p>	
	<p>1 point for each knee that hyperextends      ↙ 0 for Harrison      To the left we can clearly see the angle of a 'normally' hypermobile knee →</p>	

## **Ape Index (Fig 2)**

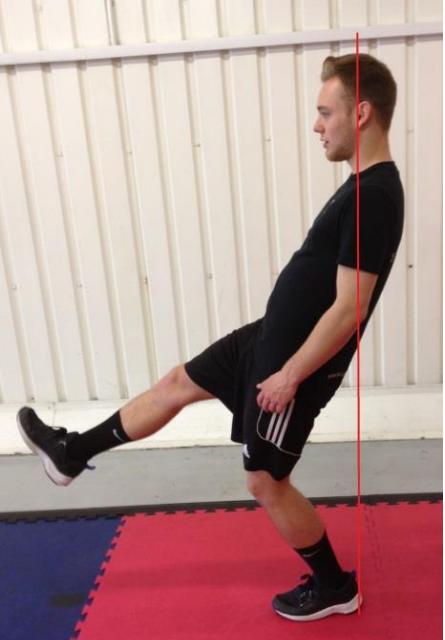
The ape index is well known to all climbers; the difference between height and span. Here we measure in Cms. The easiest way is for a climber to stand against the wall and put their hand against the wall at the crown of their head and then turn around, reach the ground and see how far over or under they are.

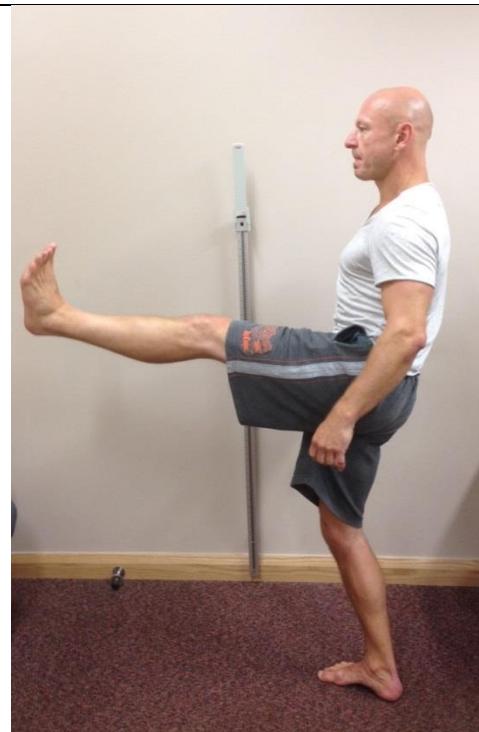
A more accurate way it to work in pairs and use a measure of some descripton.



### Standing Straight Leg Raise (SSLR)

This is an excellent test of strength, control, core strength, stability, hamstring length and balance. The simple outcome is to measure how far an individual can lift their leg with both knees remaining straight (a slight 'softening' is acceptable) – measure this by eye, in degrees. However further analysis is possible and this test can give an real clue as to quad strength, hamstring tightness, hip flexor strength, core strength and overall spinal and hip stability.

<b>Fig 3: Standing Straight Leg Raise.</b>	
<b>Normal upright posture – approx 70 degrees but it is possible to see that Harrison is finding this difficult</b>	<b>Tight hamstrings force Harrison backwards when asked to lift higher with no discernable improvement in the lift</b>
 A photograph of a man in a black t-shirt and shorts performing a standing straight leg raise. He is standing on a red mat with his left leg straight and lifted, reaching his foot towards his left hip. A vertical red line is drawn through his body to indicate the midline. He is looking down at his lifted leg. The background is a white wall.	 A photograph of the same man performing a standing straight leg raise. He has shifted his weight and is leaning significantly to his right, with his torso leaning back. His right leg is straight and lifted. A vertical red line is drawn through his body, showing that his trunk is rotated and shifted to the right. He is looking down at his lifted leg. The background is a white wall.
<b>Mark has excellent control, stability and strength as well as flexibility – a martial artist and 58 years old.</b>	<b>Here we can see Steven has poor core strength causing his trunk to collapse</b>



It is important to measure and record these tests and then after adapting the climber's training for 2-3 months you must then reassess. Without recording and comparing these tests are pointless. As the coaching team produce more information it is then possible to track significant changes and correlate this with performance and injury rehabilitation.

It is important not to get too bogged down with information as it then becomes difficult to analyse. There are a multitude of specific tests that a physiotherapist(for example) might perform and many of the results are subjective – the ones listed above are easy to measure, record and analyse. Ensure that a sensitive and caring approach is taken and that your climbers do not feel as though they are being 'monitored' and that they understand the benefit of having an awareness of their own physical limitations.

An electronic copy of the full screening protocol, including an Excel analysis package is now available for a limited time to all coaches if you contact Danny directly.

#### **Next issue – Special Tests**

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