CompassSport Series - Fitness for Orienteering

Core Training: Does it Work?

This series of articles is covering a range of topics within the field of strength and conditioning, with the aim of helping to develop the orienteer's physical conditioning, irrespective of age or ability. In this issue, we focus on a deeper look at core training…..

The use of core training for orienteering fitness development has increased markedly over the past few years, with many club nights now regularly incorporating such exercises into their programmes. British Orienteering, in their Strength & Conditioning DVD released a couple of years ago, state that such exercises 'help to improve posture and increase strength in the muscles deep within the abdomen which connect to the spine, pelvis and shoulders.' In addition, many advocates of core work have theorised that it helps to improve sport performance and prevent and treat injuries (Cissik, 2011).

However, statements such as those above are actually founded upon very little scientific research. What evidence does exist is often contradictory, limited or taken out of context and clarification is needed here. This article will look at some of the recent studies in this area and attempt, where possible, to draw out conclusions for the orienteer.

Performance Improvement

Theoretically, there are three main areas in which the core musculature could be involved in orienteering performance. Firstly, these muscles help to stabilize the trunk and pelvis, which could assist in helping the orienteer to maintain running form, particularly in the uneven terrain often encountered in orienteering races. Secondly, it is the kinetic link by which force is transferred from the lower to the upper body and finally, the core's muscles may be actively recruited to perform an athletic movement, such as in twisting and flexing the trunk as obstacles in terrain are negotiated at speed.

The research supporting the claims of performance enhancement is sparse. In one of the most relevant studies, and one which supports the use of core work for orienteers, Sato and Mokha (2009) found that a six week core training programme for recreational runners improved 5k time trial performance by an average of 47 seconds, but no significant effects on lower extremity stability were discovered. In contrast, Stanton et al. (2004) found that six weeks of stability ball training improved high school athletes core stability measures, but no significant changes in running economy were observed. Finally, Tse et al. (2005) examined the effect of an eight week core training regime on the performance of college-aged rowers and found no significant improvements in any of the performance measures (vertical jump, broad jump, shuttle run, 40m sprint, medicine ball throw or 2000m rowing test).

Certainly, based on very limited evidence, the picture is a confusing one and much more work is required in this area before we can state with any confidence whether core work is of benefit to athletic performance and, if so, what should be the correct method of training to optimise the potential effects.

Injury Prevention
The primary area focussed on by authors who support the use of core work for injury prevention is that of lower back injuries. However, once again, the limited research available here is conflicting. Nadler et al. (2002) applied a 2-5 times per week, 30-45 minutes per session, core strengthening programme in club athletes and found no significant changes in the incidence of lower back pain (LBP). In contrast, Durrall et al. (2009) found no new episodes of LBP reported during the season, when investigating the relationship between a ten week, 2 times per week core training programme and LBP in female club gymnasts. Caution must be taken with these findings, as other factors could have contributed to the lack of LBP and it is thus impossible to prove a definite cause and effect link existed here. Again, more research is required in this area to clarify the situation.

Injury Treatment
Some studies conducted around core training for rehabilitation from LBP have shown positive results. Goldby et al (2006) showed that core work once a week for ten weeks reduced disability from LBP, Hides et al. (2001) found that isometric holding exercises twice a week for four weeks prevented recurrences of LBP and, finally, Kumar et al. (2009) discovered improvements in daily life performance measures resulting from a five week, alternate day, core training programme. Unfortunately the details given in the methodology of these research studies is insufficient to make definitive recommendations for the structure of a core training programme. Also, criticism has been levelled at this work on the basis that the sample sizes tend to be small, there is little long-term follow-up work applied and other studies have shown placebos to be as effective as treatment.

Overall, then, the literature is hardly definitive about the benefits of core training. However, until more detailed research has been conducted in this growing area of scientific interest, there will be many who continue to advocate the use of core work for performance enhancement, injury prevention and rehabilitation. Certainly, it is the author's view that there is a good deal of anecdotal and experiential evidence to continue to encourage orienteers to include core exercises in their strength and conditioning programmes and, until the science unequivocally rejects the notion of core work, we should continue to use it to supplement our other strength and conditioning work. It is with this view in mind, that we now switch our focus to outline a potential range of core work specific to the orienteer.

Core Exercises
When designing a programme to focus on core development, the orienteer should consider a number of factors. Firstly, there should be a mix of static and dynamic exercises which will work on both isometric and isotonic strength development. Isometric exercises can include holds such as the plank, 'supermans', 'bird dog' and single leg balance, all of which have the potential to help improve poise and stability. They also have the advantage of requiring minimal equipment, are generally easy to perform from a technical viewpoint and they can be conducted in any setting. Progressions can be applied through use of Swiss balls and balance discs, once the technique has been mastered and the orienteer is requiring a more demanding workout. Dynamic exercises also assist in the development of balance and agility, but will generally recreate this in a more challenging, sport-specific fashion through the orienteer having to control the movements, as they would when running through

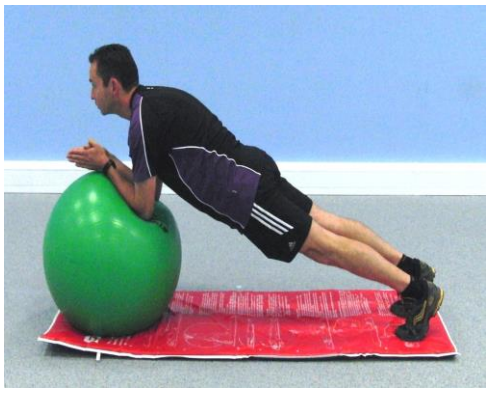
terrain in a competition. Higher forces can be applied and movements through a range of axes used to develop all-round strength. Again an assortment of equipment can be employed here, dependent upon availability, and various stages of progression can be undertaken, once the orienteer is ready to begin taxing the musculature further.

Secondly, the orienteer should select a range of exercises to stress the three main regions of the core: upper (principally the upper torso, including muscle groups such as the pectoralis major and latissimus dorsi); middle (central torso muscle groups, eg. rectus abdominus, external obliques) and lower (hip girdle musculature, eg. gluteus maximus, psoas major). This will ensure all links in the central kinetic chain are strong and imbalances are avoided. The exercises demonstrated below have been selected to cover this range of core musculature.

Finally, these exercises can be integrated into general resistance training sessions, as a part of the warm-up, for instance, or can be applied as dedicated circuits, where the focus is solely on core exercises. The orienteer should look to perform these exercises at least a couple of times a week in order for significant strength gains to be made and can either choose to perform them for a number of repetitions or for a specific length of time, with total exercise time being in the region of twenty to thirty minutes per session.

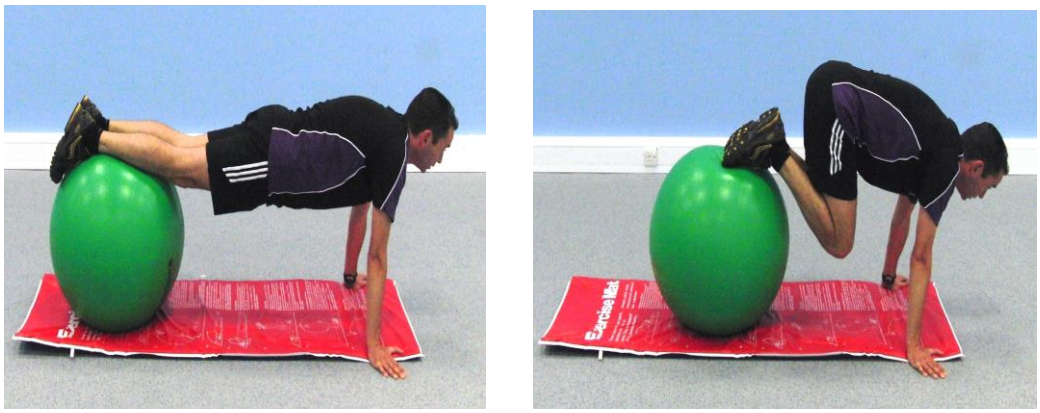
The figures that follow demonstrate a range of suitable exercises forming a twelve station circuit, focussing on exercising the different regions of the core, but these are by no means exhaustive. A variety of books and web resources exist, which show many more examples of appropriate exercises that can be utilised, and anyone looking to develop their sessions once they have mastered the fundamental techniques should seek these out to expand their knowledge of this area. The easier exercises are shown first, and suggested progressions are given to the drills, but again many variations exist to continue to make these more difficult as the orienteer becomes stronger in the core.

Figure 1. Plank on Swiss ball



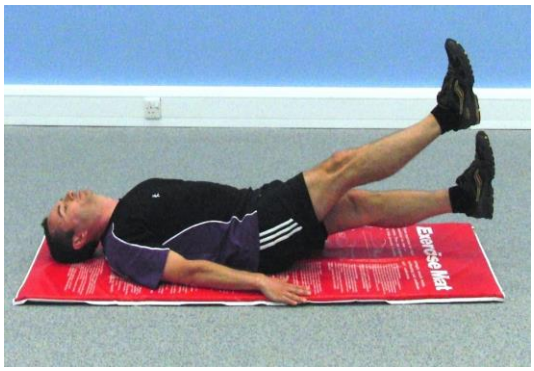
Suggested progression – Raise and lower supporting legs alternately during static hold. Remove swiss ball and perform with supporting arms on mat if too difficult.

Figure 2. Hip flexion with Swiss ball



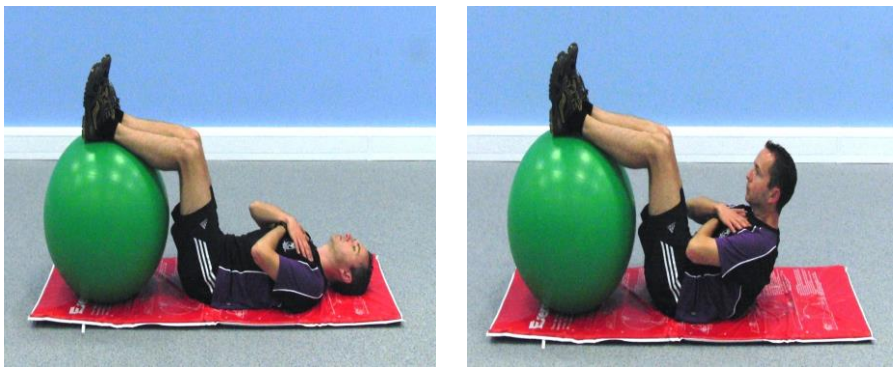
Suggested progression – Move to one legged curls, alternating with right and then left leg

Figure 3. Scissor kicks (move legs alternately up and down)



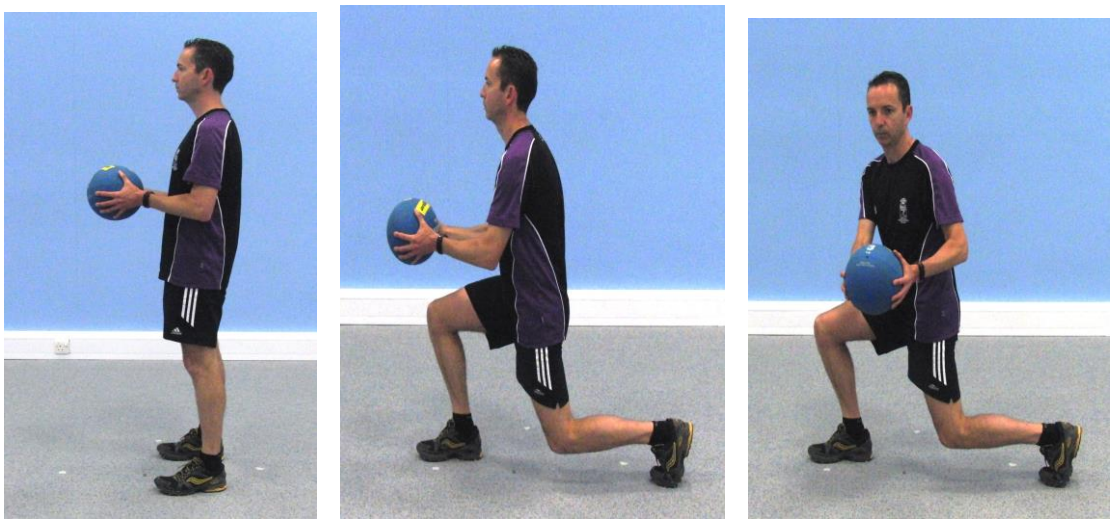
Suggested progression – use ankle weights

Figure 4. Abdominal crunch with Swiss ball support



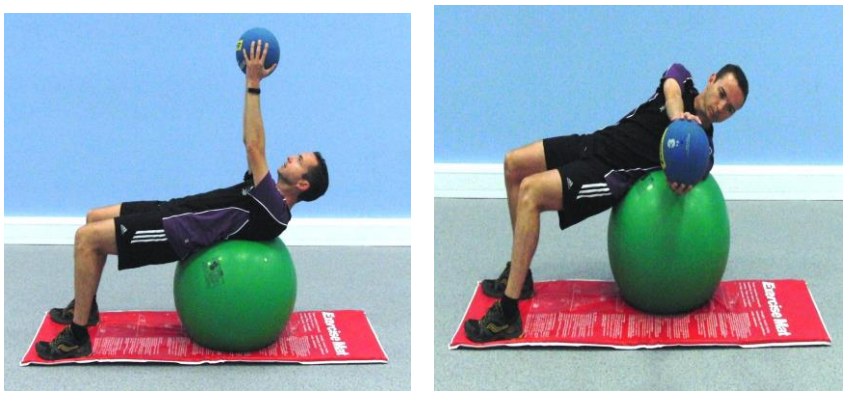
Suggested progression – use a weight/medicine ball held across the chest

Figure 5. Lunge with twist (sweep to both left and right at the end of the lunge stride)



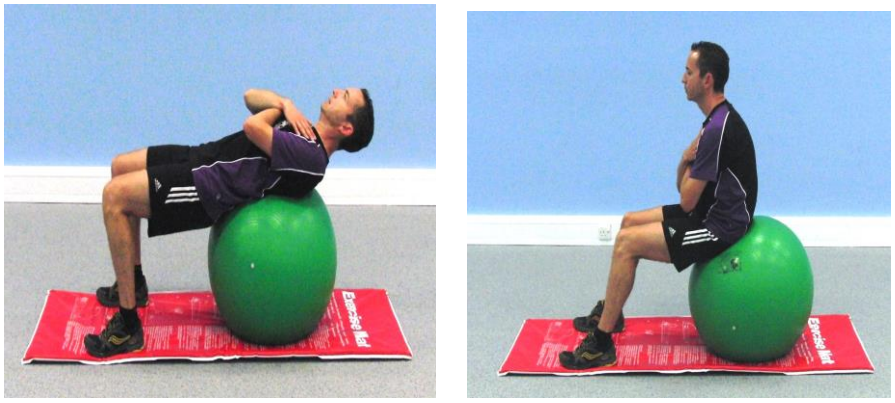
Suggested progression – use a heavier medicine ball and lower/raise this at the end of the twist

Figure 6. Laying twist on Swiss ball (sweep alternately to left and right sides)



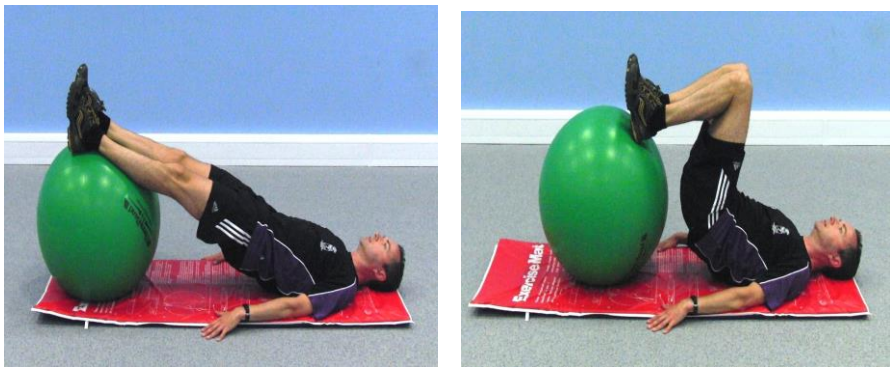
Suggested progression – use a heavier medicine ball/weight

Figure 7. Sit-ups on Swiss ball



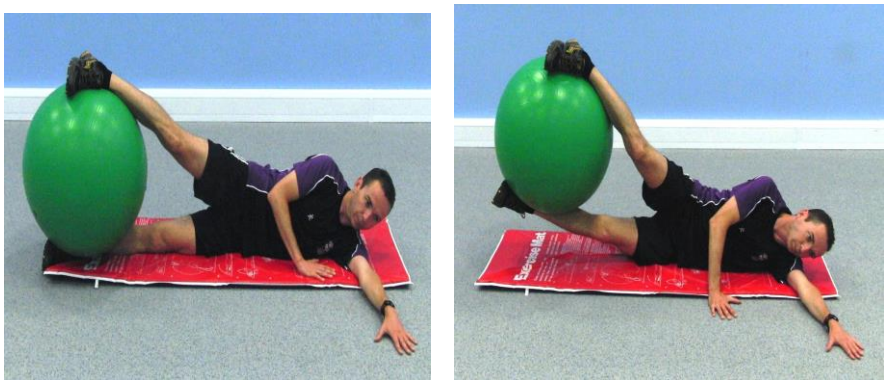
Suggested progression – use a weight/medicine ball held across the chest

Figure 8. Hamstring curls on Swiss ball



Suggested progression – move to one legged curls

Figure 9. Side leg raises with Swiss ball (perform on left and then right side)

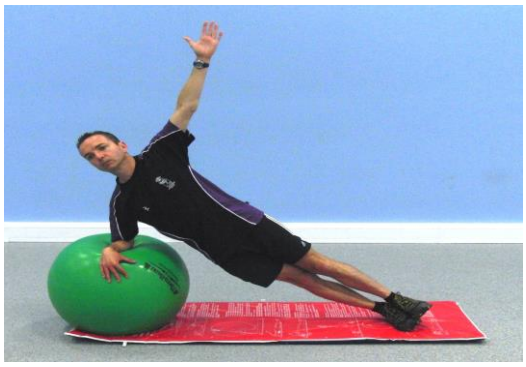


Suggested progression – hold at top for 5 seconds each time

Figure 10. One legged squat with Swiss ball support (can be done as static hold)

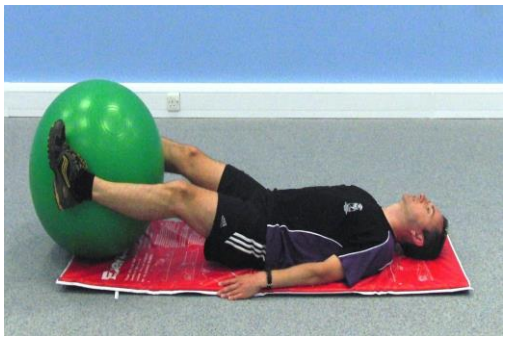
Suggested progression – increase weight of medicine ball and rate of squatting

Figure 11. Side plank on Swiss ball



Suggested progression – Start with wide supporting base (feet apart) and then gradually narrow this. Remove Swiss ball and perform with supporting arm on mat if too difficult.

Figure 12. Leg raise with Swiss ball



Suggested progression – Bring in a rotation left and right of the ball at the top of the raise.

Conclusion

Whilst the science remains unclear in support of core training, experience and anecdotal evidence continues to advocate the use of such exercises as part of an orienteer's all-round fitness programme. Hopefully ideas for suitable exercises have been presented here that many will find of benefit to them and orienteers will feel confident in putting together a suitable core session to supplement their existing fitness regime.

Next issue we will explore the post-exercise recovery process.

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