

INDOOR CONDITIONING FOR MIDDLE DISTANCE

by **George Gandy, BAAB Senior Coach**

This article, in longer form, originally appeared in the December 1987 issue of the British Journal Athletics Coach. In it, British Senior Coach George Gandy discusses the circuit training program in use at Loughborough University. This program has contributed to the success of many British middle distance stars, among them Coe, Buckner, Sly, and Wade. Obviously, a circuit training program must be tailored to a particular situation, but the editor feels the concept is under-used in this country and that too little attention has been paid to overall strength and anaerobic conditioning by American middle distance runners.

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To compete at world level a middle distance runner needs more than just exceptional natural endowments and a general commitment to fitness. Such are today's standards that a large heart, powerful lungs and favorable balance of muscle fibers honed by plenty of mileage and high quality repetitions are unlikely to be enough.

For the vast majority to achieve full potential, carefully programmed work is necessary to develop strength for force in the propulsive muscles and for tolerance of stresses by equally attuned non-propulsive elements. Sufficient freedom of joint movements must also be ensured so as best to apply these forces, and enough specific endurance to allow the process to be repeated as often and as quickly as required.

It must be stressed at the outset that the Loughborough Circuit is no constant unchanging phenomenon, and this does impose some difficulty on adequate description. Certainly, it is now very different from when I first planned it, in 1974, to suit international 400 meter runners Gary Armstrong (46.2 secs) and Steve Scutt.

The filtering process whereby exercises have been replaced for reasons of value, safety, convenience or simply variety has continued through successive generations.

There is nothing new of course in the idea of circuit training itself. It was originally conceived in Britain in the 1950's as an all-round fitness training method in its own right, tailor-made for the standard school gymnasium. Considerable cardiorespiratory emphasis commended it as a potential substitute for outdoor running sessions in the worst winter weather. A standard session involved one or more laps (circuits) of exercise stations each requiring a prescribed number of repetitions. Usually each successive station imposed a contrasting demand (e.g., arm exercise following legwork) and individuals attempted to complete the total program inside given time limits before pro-

gressing to a more demanding requirement. Thus there was continuous loading on heart, lungs and circulatory system along with controlled intermittent stresses on selected muscle groups. With a little imagination the mix of the exercise can be varied and the "loadings" adjusted to satisfy more precise objectives.

The "Loughborough Circuit", as a term for the session now employed, is actually something of a misnomer. Certainly it is by no means the only example of such training on the Loughborough campus as several of the other University clubs use some form of circuit and even within our own club there is an excellent gym-based session for sprinters and jumpers operated by another of our club's coaches. Furthermore, for the technically minded, my session is really a form of "stage training"—a distinct derivation of circuit training aimed at greater local muscular stresses and thereby increases in specific strength endurance. The basic approach is initial all-round conditioning giving way gradually to a strong emphasis on legwork (specifically the propulsive muscles of the quadriceps and gluteals) and, to some extent, the stomach. Heart, lungs and other aspects of general circulatory fitness are not of particular concern here as they are well-catered for in the remainder of my training program.

From October to January a typical weekly Wednesday evening workout makes use of 13 exercise stations each coping with up to 9 people (in 3 groups of 3). Liberal use of preparatory static stretching is also a feature of most sessions. After a couple of low-key familiarization/pre-conditioning evenings the loading is systematically increased—usually to a maximum of 30 x 30 sec (1 minute)... surely a sound foundation for whatever is to follow.

In February and March various format modifications are introduced. There is a trend towards less volume all round and fewer exercise types, but with a higher quality

demand. This is associated with an increased degree of differentiation between event groups. Various maximum tests are included on an occasional basis frequently with impressive outcomes (e.g., Victoria Lee 500 consecutive bent-knee sit-ups, Calum Orr 2.2 secs for 4 meters rope climb, Steve Scutt 3 consecutive rebounds from floor to front support position on gymnasium beam set at maximum reach height). I have as yet no rigidly fixed formula, however, for best results in this phase.

Usually by April this form of training is terminated giving way to more event-specific requirements with the forthcoming season in mind.

None of the exercises included is any way revolutionary. However, the total is believed to be a purposeful mix of the useful with the directly beneficial. The order below does indicate direction of progression, although of course the starting point does differ for each of the 13 participating groups:

1. BOUNDING

The benefits in power and resilience of this form of activity are now well documented and commonly accepted. To begin with I seek simply a longer stride length and greater height than in normal training, with upright trunk and flat-footed landings for safety. As athletes improve, a horizontal limit to the movement of the leading thigh is sought, with range and drive of the arms exaggerated accordingly. Controlled movements are encouraged with development of height and distance until technical competence and fitness become adequate for bounding at greater speed.

2. PRESS-UPS

This standard exercise is included with the feet raised somewhat to increase the weight taken by the arms. Clapping between press-ups enhances difficulty and explosiveness when this is indicated.

3. **KNEE EXTENSIONS**, though the final 10-15 degrees of movement are included in order to work the vastus medialis muscle (just above the knee to the inside). Poor development and tone in this muscle tends to an imbalanced action of the quadriceps (the group on the front of the thigh) affecting control of the kneecap and is frequently associated with knee pain (joggers knee, housemaid's knee, chondromalacia patellae). This muscle is not worked adequately in easy to steady running as the knees tend not to be strongly extended through the final part of the range. Moreover, once sore knees are experienced, strong and complete extension is even less likely and so the muscle is likely to deteriorate further as a vicious cycle of decline ensues. Thus this exercise is seen as remedial for some, as preventative for others.

4. **SQUAT THRUSTS** are a very dynamic and demanding exercise involving gluteals, quadriceps and stomach muscles—groups centrally involved in all running, especially sprinting.

5. REBOUNDS

The athlete repeatedly drops from a front support position on a beam or bar (retaining hand contact) and rebounds two-footed from the floor to the original position. A minimal knee bend, briefest possible time of floor contact, and the least possible assistance from the arms should be the aims of this excellent routine for power and resilience.

6. **CHIN-NEES** is a modified form of sit-ups in which the knees are picked up alternately towards the upper body. The upper body rotates, alternately to right and left as the sitting up movements take place, developing the lateral components of abdominal activity.

7. BOX AND HURDLE JUMPING

Until recently the circuit included solely depth jumping—onto and off gymnasium boxes. The aim is to land and take off, with minimal knee bend, lightly and fast. Lately hurdle jumps have been inserted as these seem to encourage a more dynamic reaction on floor contact. Double-footed landings are preferred for reasons of safety.

8. **HIP THRUSTS** are only really demanding once they can be performed explosively by the practiced athlete. Then they are a strong gluteals exercise, otherwise just something of a "breather" on the way around the circuit.

9. **SKIPPING** has been added to the circuit recently in order to promote further fast, dynamic activity, not to mention coordination. Any technique is acceptable to start with as long as light and high foot contact with the floor is achieved, but gradually the athletes are asked to progress towards a high knee running action. The time allowance within the circuit may be insufficient for this exercise to be fully effective.

10. ROPE CLIMBS

This standard upper body exercise is tackled according to personal ability. At the highest level using arms only and two ropes, it contributes to development of biceps, deltoids, and the muscles of the upper back.

11. CONTINUOUS STEP-UPS

This is a development from the ordinary steps of the Harvard test in which the movement for one work period is continuously and repeatedly on a single leg. The height of the step is kept fairly low (no more

than 0.3m) in order to encourage strength of action in the outer 10-15° of movement, as with "Knee Extensions." Assistance of the activity by use of arms is not advised.

12. HORIZONTAL SPRINTING is another explosive exercise which develops gluteals, quadriceps and stomach. Good range of leg movement should be established prior to speed.

13. BENT-LEG SIT-UPS (abdominal curls) reflect the importance of tough, hard abdominal muscles as a platform against which powerful propulsive muscles can work. The importance of bent knees should be

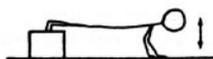
noted as an attempt to "isolate" the abdominals and avoid the tightening the psoas muscle (front and top of legs/front of lower pelvis) which can lead to postural problems.

The varied exercise demands of the circuit offer further advantage in highlighted individual qualities of movement—timing, balance, fluency and coordination, as well as strength/strength endurance aspects. Each session does therefore have its clinical/diagnostic aspect. In fact the sheer number (sometimes well over 100) and quality of the athletes who have used my circuit, over more than a decade, have provided invaluable insights into the physical machinery which forms the basis of outstanding performance.

1 Bounding
(lengths of gym)



2 Press-ups
(legs raised, clapping?)



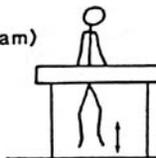
3 Knee Extensions
(final 10°- 15°)



4 Squat Thrusts



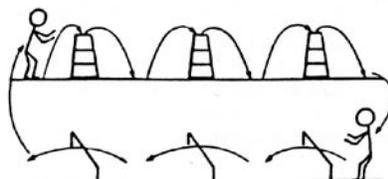
5 Rebounds
(from floor to bar/beam)



6 Chin-nees



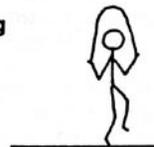
7 Box & Hurdle Jumping



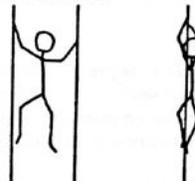
8 Hip Thrusts



9 Skipping



10 Rope Climbs



11 Continuous Step-ups



12 Horizontal Sprinting



13 Bent-leg Sit-ups

