Human Performance Laboratory
UCC Office of Sport & Recreation

Fitness Test Results

Name: Feliks Komicz **Date of Test: 02/07/2012**

Blood Pressure: 130/85 (normal)

Introduction

Physiological testing helps to establish your current state of fitness. The testing can identify your strengths, but more importantly your weaknesses which you should work on in training. Repeated testing enables the charting of progress over a period of time, and thus shows exactly how effective a particular training programme is. Your results are displayed below, and are compared to ideal results for a sportsperson of your age and gender.

Anthropometry

	Your Score	*Recommended*
Weight:	**86.2 kg**	
Height:	**178.0 cm**	
Sum of 7 skin-folds:	**96.9 mm**	**< 85 mm**
Body fat (7 folds):	**17.0 %**	**< 15 %**
Fat Free Mass:	**71.5 kg**	
Waist Girth:	**91.0 cm**	**< 89.0 cm**

Body composition plays an important role in maintaining good health and in performance in almost every sport. Your body weight may be largely divided into muscle, bone and fat. To optimise your health and sporting performance it is essential that the amount of fat you carry falls within a recommended range. For optimal health and to attain a desirable fitness level a person of your age should ideally have a percentage body fat level of less than 15%. As body fat is dead weight the more a person exceeds this recommended range the more of a hindrance it is to performance, and the more of a negative effect this will have on your health. It is important to remember that some fat (5-6%) is essential for normal functioning.

Your body fat level is at a level which is slightly higher than what is ideal for fitness and good health. I would suggest that you target a score of 15% but ideally closer to 10-12% which equates to approx 4-5kg of fat loss.

Weight control is all about balancing your calorie intake with what you are expending. A separate hand-out is available on nutrition which details all aspects of your diet. You should aim to consume adequate slow-

releasing carbohydrate foods (eg. wholegrain rice/pasta and other grains such as lentils, barley, spelt, baked/jacket potatoes, wholemeal/wheaten breads, varied salads, wholegrain /oat-based cereals, beans, lentils, fresh fruit and vegetables, dried fruit, etc), minimise junk food (eg. confectionary, added sugar, deep-fat fried foods, cakes and biscuits, pizzas, burgers, fast / take-away food, alcohol, etc), eat moderate amounts of quality protein such as chicken, turkey, fish, yoghurt, nuts/seeds, lean meat, and include healthy fats (eg. extra-virgin olive oil, fatty fish such as salmon/mackeral/sardines, avocado). High saturated fat / high sugar foods are not only very high in calories but also relatively low in nutrients so these should be reduced. Secondly, as regards training ensure there is adequate long duration, low-moderate intensity training within your weekly training program as this helps to develop good fat burning ability, however, the key to keeping body fat under control is regular, consistent training of whatever intensity coupled with healthy eating. Another crucial aspect of training is to undertake resistance training ie. weights or circuits to build/maintain lean muscle mass.

Blood Cholesterol / Glucose

	Your Score	*Normal Score*
Blood Cholesterol (mmol/l)	3.64	3.00 - 5.20
Blood Glucose (mmol/l)	4.31	3.60 – 5.80

Cholesterol is a substance made naturally by the body, and it is essential for the formation of many hormones, vitamin D, and is found in the cell membranes, the brain and the nerve tissue. However, too much cholesterol in the blood is harmful because it accumulates on the arterial walls and can cause atherosclerosis (furring up of the arteries) and sometimes heart-attack. We get cholesterol from food, especially from meats and dairy products. Some people seem to be able to maintain normal blood levels of cholesterol even though their dietary intake of cholesterol (eg. egg yolk, cream, prawns, full-fat milk/cheese, etc) is high, whereas others, with a different type of metabolism, have problems with high blood cholesterol. Your total cholesterol level as shown on the first page is actually comprised of two main types of cholesterol ie. HDL and LDL/VLDL, the former is considered the good cholesterol because it helps remove other cholesterol from the artery walls and transports it to the liver to be processed and later excreted.

Your total cholesterol level is within the recommended range of 3.0 - 5.2 mmol.l^{-1}. Ideally it should be kept below 5.2 mmol/l.

To lower your level of cholesterol (or to keep it down) but more importantly to increase your HDL cholesterol you should try to make sure you trim off all the visible fat from meat, avoid deep fat fried food where possible, limit egg yolks, prawns, limit full fat dairy products and sauces, eat foods rich in fibre (wholemeal bread, wholemeal pasta/rice, bran-based breakfast cereals, etc), eat more fresh fruit and vegetables (at least 5 servings per day), include healthy fats in your daily foods (eg. olive oil, oily fish, unsalted nuts/seeds) and most importantly take **regular** daily exercise.

The blood sugar concentration or blood glucose level is the amount of glucose (sugar) present in the blood. Normal blood glucose levels are 3.6 and 5.8 mM (mmol/L, i.e., millimole/liter). The human body naturally tightly regulates blood glucose levels as a part of metabolic homeostasis.
The mean normal blood glucose level in humans is about 4 mM (4 mmol/L or 72 mg/dL, i.e. milligrams/deciliter), however, this level fluctuates throughout the day. Glucose levels are usually lowest in the morning, before the first meal of the day (termed "the fasting level"), and rise after meals for an hour or two by a few millimolar.

Leg Strength

	Your Score	*Recommended*
Standing Broad Jump:	**2.31**	**2:20 – 2:80+**

There are various methods of training which serve to enhance strength and power as listed below. In short, strength training serves as a prelude to power/explosive strength work which typically follows after. The key to deriving benefits from strength training is that the exercises closely mimic what your sport involves. The most common strength training methods are:

- Weight training – useful 'whole body' strength exercises include squats (single or double leg), squat toss (raise weighted ball from floor to over-head), wood-chops with band or dumbbell, power cleans (add shoulder press as an alternative), dead-lifts, alternate lunges (add lateral raise or shoulder press), bench step ups (add shoulder press). Other useful exercises include hamstring curl or Nordic dips, calf raises, bench press, lateral raises, leg press, dips, pull-ups. Light weights can be safely used by those under 18 yrs old presuming good technique is developed first.
- Hill-running - usually done in the form of hill-reps (e.g. 10 x 45-120 sec hill-efforts with walk/jog back recovery) where the focus is on striding out, good knee lift and pushing well of the toes. Use a hill which has approx 5-10% gradient. This is **not** flat-out sprinting, it's controlled fast running.
- Circuit training - using body weight exercises (e.g. press-ups, sit-ups, lunges, vertical jumps, squats, crunches, etc) and/or light dumbbells, and/or medicine ball exercises. Contact myself if you need guidance here.

When starting out on a weight training program your technique is a priority, you must seek professional instruction. A general toning program of 1-3 sets of 12-20 reps should be followed for the first 4-6 weeks to allow your body to adapt to the training and to learn the correct lifting techniques. Use a relatively light weight that you feel comfortable with and gradually increase this every few weeks. Depending on the sport you want to engage in you could then either continue with a general toning regime, a bulking up regime or building strength. To effectively build muscle mass you need to work in the 8-15 repetition range using a weight which elicits fatigue for that number of reps and going for minimum 4 sets and up to 8 sets per body part. Strength work typically involves a lower number of reps using a heavier weight (eg. 3-5 sets of 4-8 reps) again concentrating

on the muscle groups most used in your sport. Ideally weight training should be done at least twice per week for the general toning and up to a maximum of 4 or 5 times each week for building strength or mass (30-60 min per session). Progress slowly, and always warm-up and stretch prior to the session. If your goal is to reduce body fat then weight training will play a vital role in this. Weight training itself not only burns a lot of calories (comparable to a running session) but more importantly by increasing slightly your lean muscle mass you will have a much higher resting metabolic rate which means you will burn more fat at rest. The most successful weight loss programs have involved a combination of both aerobic training and weight training. Even for those who don't need to reduce their % body fat, this type of regime will ensure it doesn't start to creep up as you get older.

Strong abdominal muscles are a prerequisite for any sporting activity as the trunk is the base from which all limb movement occurs. Strong abdominal muscles are also important in helping to maintain proper posture and thus in the prevention of low back pain. Abdominal strength (and strength endurance) can easily be improved by doing a range of different 'core' exercises. A simple routine would be the following exercises performed after a session or on it's own (eg. 3-4 times weekly):

- Front bridge (3 x 30 sec, alternating right foot/left foot off 15 sec each)
- Side bridge (3 x 30 sec)
- Full sit-ups (2 x 20)
- Reverse curls (2 x 20)
- Ab crunches (2 x 25+) and/or crunches using gym ball (2 x 25)

If you are not sure how to do these exercises please contact myself or any qualified gym instructor for assistance.

The main points to remember regarding strength training are:

- Always warm-up and stretch out before a strength training session (eg. 10 min jog/cycle followed by 5 min stretching) and cool-down/stretch after your session, stretching is crucial here if you don't want to lose flexibility.
- If you want to combine aerobic training and strength training into one session it's best to do the aerobic work first.
- Aim for 2–3 sets of 12 – 15 repetitions with 1-2 min recovery unless you specifically want to bulk up or enhance strength / power in which case refer to above information
- Do a balanced weights program (ie. work opposing muscle groups) so that your injury risk is reduced. For eg. work both the chest and upper back muscle groups, quads and hamstrings, etc
- If you are new to a weights/circuit training program, consult a gym instructor to get help with learning correct technique
- With those under 18 years old it is recommended that only light weights be used and that technique development be a priority
- Always emphasise speed of movement on the lifting/ pushing/ pulling phase of the move

- Circuit training is a great way to combine both strength training and aerobic training. You have the option of combining one circuit training session and one weight training session per week. The circuits generally consist of 1-2 sets of 15-40+ reps or 15-30 sec per exercise (with 10-15 sec recovery) in such exercises as push-ups, lunges, sit-ups, dips, burpees, shuttle sprints, pull-ups, etc (see me at the lab if you require more detail on these).
- To develop speed and power ultimately there are a variety of methods that can be adopted here such as plyometrics, SAQ methods, etc. Professional instruction is recommended here before you start such training.

For any sport it is important to realise that general strength training doesn't automatically make you better in your chosen activity, training must be specific to your sport; strength gains in the weights room need to be transferred to gains on the playing field / sports hall / swimming pool by including specific power exercises. Remember to always progress slowly, in other words don't increase the weight you lift or the number of reps/sets you do too quickly. A lot of sports with the exception of the more endurance sports such as running, cycling and swimming require an ability to accelerate, sprint, stop, change direction quickly and accelerate again, hit balls or shuttles, kick, jump or punch. Such activities are generally performed at a higher intensity than can be sustained using aerobic energy pathways; training of the anaerobic (without oxygen) system is therefore critical. There are three areas of anaerobic fitness:

a) Maximal sprinting ability - short, maximal effort sprints/bouts
b) Anaerobic capacity – more sustained, maximal efforts
c) Speed endurance - your ability to reproduce short, fast sprints/bouts with short period of recovery

Depending on your exact sport and the level of performance you aspire to, your training regime may need to address these areas.

- Sprinting ability - improved through doing short, maximal sprints/bouts with adequate recovery eg. 2 sets of 10 x 20-60 meter sprints (or any distance up to 10 sec), 1-2 min recovery
- Anaerobic capacity - enhanced via sustained efforts eg. 10-12 reps of 15-30 sec full-out, 45-90 sec recovery
- Speed endurance is trained by doing short sprints with limited recovery eg. 2 sets of 10-20 x 25m sprints, 30 sec recovery (2 min between sets). Improvements in your speed endurance will come about through improvements in both aerobic and anaerobic fitness.

All these sessions are of a high intensity and so should be kept well away from competitions and should only be done after a thorough warm-up procedure. Space the sessions out so that you allow 36-48 hrs of predominantly recovery training in between. Any technique work/drills should be carried out before rather than after such sessions.

Endurance Capacity (VO_2max)

	Your Score	***Recommended***
VO_2max ($ml.kg^{-1}.min^{-1}$)	**38.8**	**48.0 - 60.0+**
($l.min^{-1}$)	**3.34**	**3.50 – 5.00+**

Maximum Heart Rate (beats.min^{-1})	**213**	**--------**
Aerobic Heart Rate Training Zone (beats.min^{-1})	**------**	**152 - 188**
Anaerobic Interval Training Zone (beats.min^{-1})	**------**	**189 - 203+**

VO_2max is a measure of your body's ability to take oxygen into the lungs, pump the oxygen around the body (heart and blood vessels), and have it used up by the muscles to produce energy. VO_2max is basically a measure of your endurance or stamina and is one major determinant of your health-related fitness and your performance in endurance sports. A good endurance capacity allows you to perform at a higher intensity by enabling you to produce more energy over a longer duration. As VO_2max can only be improved to a genetically pre-determined level the purpose of training is to increase the percentage of this that you can sustain for a period of time during a race for instance. Long distance (20-60 min or more), low-moderate intensity swimming, running, cycling, rowing, **brisk** walking, etc are crucial in the early stages of a training program in order to build your endurance capacity (ie. your VO_2max), this serves to form a base for later more intense training. A minimum of 6-8 weeks are initially required where the focus should be on gradually building up the duration of the exercise sessions (eg. **3 aerobic sessions of 15-20 min building up to 3-5 sessions of 20-60 min** over 6-8 weeks depending on the level of performance you aspire to). This type of training is ideal in achieving and/or maintaining desirable levels of body fat. As your fitness improves you can then add some variety to your weekly program by including some higher intensity, shorter duration exercise. Below are just some examples of sessions that you can use to maintain or improve aerobic fitness (if you would like more specific ideas then please get back to me). To maintain it, 1-3 sessions would suffice whereas to improve upon it 3-4 sessions are required:

- **Even paced/steady running** - or brisk walking, cycling, stepping, ski-machine or cross-trainer, swimming or rowing, 20-40+ min in duration (keep hr in aerobic zone)
- **Rebound run** – jog/run out from starting point for 15 min at a good pace (mid-upper aerobic zone), jog easy for 5 min, turn around and try to get back to the start *within* 20 min
- **Fartlek run** - involves a variety of paces eg. walk, jog, stride out, sprint, fast steady running, etc. An example would be jog 10 min, fast run 2 min, walk 1 min, sprint 20 sec, jog 3 min, fast run 4 min, walk 30 sec, sprint 10 sec, jog 2 min, fast run 6 min, 10 min easy jog to cool down (total time 30-40 min) - an ideal work-out for all round fitness (the fast run efforts will be upper aerobic and into anaerobic zone)
- **Interval running/cycling/swimming** - 10 min warm-up, 3-5 min fast running/cycling/ swimming, 2-3 min easy recovery, repeat 3-5 times, 5 min easy jog/cycle/swim to cool down, aim to gradually decrease recovery time but maintain similar speed during the interval (heart rate - anaerobic zone)

During the steady running and rebound run you should aim to get your heart rate into the **aerobic heart rate training zone** as shown above (you can easily check this now and again by exercising for at least 5 min, stop and immediately count your pulse for 15 sec and multiply this figure by 4 which will give you your current exercise heart rate; if it too low you should pick up the intensity a little, if it's too high then slow down the pace), this will ensure that you get optimal training effects. For the faster, more intense runs (eg. the fartlek, interval) you can go slightly above your aerobic training zone into your **anaerobic interval zone**, this is normal

and will help to further boost your aerobic fitness. This intensity of exercise is relatively difficult therefore don't work at this level for too long ie. over 10-15 min or too frequently (ie. more than twice each week). Examples of anaerobic interval training would be 6-8 x 300-500 m on the track with 90 sec jog recovery, 3 sets of 8 x 50m sprints with jog back recovery, or pyramid sprints of 5 metres, 10, 15, 20, 15, 10 & 5 (ie. sprint to a 5 metre line, turn and sprint back, turn and sprint to 10 m line , etc), rest 5 min and repeat 3-4 times. If your current club training (disregard this if you don't train with a club) includes a session which is similar to one of the above work-outs then count that as one session. Always warm-up (5-10 min) and stretch adequately before starting a training session; spend a similar amount of time on a cool-down period.

To summarise, on a weekly basis you should aim to:

- *Eat a healthy diet including a good breakfast, lunch and dinner with a focus on slow releasing carbohydrates/quality protein foods/low fat foods*
- *Drink water (or diluted juice) often, take a water bottle to each training session*
- *Do plenty of regular stretching particularly after most training sessions*
- *After you've got well into your new training program aim for up to 4 or 5 aerobic based sessions per week*
- *Introduce 1- 2 faster sessions (after about 8 weeks into your new program)*
- *Complete at least 1 and up to 3 muscle-toning/strength sessions*
- *Keep a training diary detailing all training undertaken*
- *Train, don't strain, if you are unusually tired then have a day off or a few days of easy training*

I hope the above information will be of some value to you. Hold on to your results so that you can compare them if you decide to have another test. Your next test will quantify any improvements and thus to see how effective your training program has been. If there is any of the above which you are not sure about please do not hesitate to contact me at the Human Performance Laboratory in the P.E. Dept. (Tel. 021-4904769 or t.woods@ucc.ie). Good luck with your training!

Trevor Woods
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