Welcome to **Fitness Frontiers**, a series that brings you the breaking news from the world of sports science and sports nutrition research. In each issue, **Andrew Hamilton** takes a look at some of the latest scientific research and what it means for you…

Pre-exercise stretching and running

Although it's still a very popular practice, recent research suggests that pre-exercise stretching not only fails to reduce injury risk, but may actually impair subsequent high-intensity exercise performance. This is because stretching muscle fibres appears to temporarily reduce the maximum force or torque they can produce, meaning they're not able to contract as powerfully. Some researchers have suggested that pre-exercise stretching may therefore also be detrimental to running economy, increasing the amount of energy required to maintain a given pace, because of reduced neural activation of muscle fibres leading to less efficient recruitment patterns.

Photo: Courtesy Polar

To test this theory, British scientists have compared the effects of three different pre-exercise stretching routines on running economy. Seven competitive male middle and long-distance runners participated in the study, completing four different pre-exercise conditions:

- Control condition (no stretching);
- Static stretching;
- Progressive static stretching;
- Dynamic stretching.

Each stretching routine consisted of two 30-second stretches for each of five exercises. The runners were tested on the 'sit and reach' test before and after each pre-exercise routine and running economy (oxygen consumption per kilometre covered) and steady-state oxygen uptake were measured during the final three minutes of a 10-minute run at moderate intensity.

The results showed that (as expected) all the stretching routines improved the runners' range of movement scores on the sit and reach test but none of them adversely affected running economy or impaired running performance. However, the researchers cautioned that this may have been because running economy was assessed after a period of sub-maximal running, which may have masked any effects from the stretching protocols and that more research is needed. The message seems to be that pre-exercise stretching for recreational runners is unlikely to impair performance. However, for competitive runners, although this study found no adverse effects, pre-exercise stretching may still be detrimental to performance and more research is needed.

J Strength Cond Res. 2007 Nov 1;21(4):1227-1232

The key to successful long-term weight loss

Most diets are doomed to failure; although almost any diet can produce weight loss, the difficult thing is keeping it off! Understanding successful behaviours that maintain weight loss in the longer-term is extremely important therefore.

To try and investigate this issue further, US scientists from the University of Kansas have attempted to compare behavioural strategies and perceived barriers between successful and unsuccessful 'weight loss maintainers' to see what works and what doesn't. In the study, 179 previous participants of a university-based behavioural weight management program completed postal surveys, which assessed their current weight, weight control behaviours and barriers they perceived to maintaining their weight loss.

The results were as follows:

- At 14 months following completion of the original weight management treatment, the respondents were on average 12.6kg or 11.3%, below their baseline weight (before they dieted);
- 76.5% of respondents had successfully maintained weight, defined as maintaining a weight loss of at least 5% below baseline;
- Compared to unsuccessful weight loss maintainers, the successful maintainers (ie those who had lost most weight and kept most off) engaged in much more frequent exercise and they also perceived the difficulty of weight management to be less problematical.

These findings are in agreement with previous research, which shows that physical activity is one of the strongest predictors of successful weight loss maintenance (something we've long been advocating in Ultra-Fit!). They also suggest that strategies that reduce the level of perceived effort required for long-term weight control may improve maintenance outcomes.

Int J Obes (Lond). 2007 Dec 4 [Epub ahead of print]

Sex – how good a workout is it really?

Most people would like to believe that a night of passion in the bedroom provides just as good conditioning as workout at the gym, or a 5-miler! But a new US study suggests that while sex does make some demands on the cardiovascular system, your sexual endurance is determined very much by your existing cardiovascular fitness.

In the study, nineteen men and 13 women (average age of 55 and 51 years respectively) underwent a maximal Bruce protocol treadmill stress test followed by home-monitored sexual activity using non-invasive HR and BP recording devices. The Bruce protocol treadmill stress test is a graded exercise test combining simultaneously increasing speed and gradient, which is designed to determine maximal oxygen uptake (see below):

As a rough idea, a typical sedentary male with a maximum oxygen uptake of around 30-35mls/kg/min might be expected to reach the end of stage 3 of the test (ie last around nine minutes) before exhaustion sets in; an endurance trained athlete would be expected to achieve easily double this or more.

The researchers discovered that in all cases, the mean treadmill times recorded were significantly shorter than the mean times of sexual activity for men and women – ie treadmill test was much more physically demanding than sex! For men, the average heart rate recorded during sex was only 72% of that recorded during the treadmill test and for women, this fell to 64% of the treadmill test value. Most tellingly of all though, the treadmill exercise duration was an excellent predictor of sexual activity duration; each extra minutes duration on the treadmill test predicted an extra 2.3 minutes of sexual activity in the bedroom – that's an extra 20-30 minutes for a physically fit couple compared to a sedentary couple!

The bottom line seems to be that while sexual activity does make some physical demands, if you really want to perform in the bedroom, developing some serious CV fitness is your best move by far!!

Am J Cardiol. 2007 Dec 15;100(12):1795-801

Bruce protocol treadmill stress test

Stage	Mins into test	Speed (km/h)	Speed (mph)	Gradient (%)
1	0-3	2.74	1.7	10
2	4-6	4.02	2.5	12
3	7-9	5.47	3.4	14
4	10-12	6.76	4.2	16
5	13-15	8.05	5.0	18
6	16-18	8.85	5.5	20
7	19-21	9.65	6.0	22
8	22-24	10.46	6.5	24
9	25-27	11.26	7.0	26
10	28-30	12.07	7.5	28