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Cover Picture:
Coronal T2-W MR image shows patchy high signal intensity in the neck of right femur, indicating bone oedema. Areas of patchy high signal intensity in the surrounding muscles represent muscle oedema.
(Refer to pages 95-99)

Exercise as Medicine

K C Teh

The review on the role of exercise in prevention and management of type 2 diabetes by Lim et al[1] emphasises the importance of and need for exercise for a common disorder in Singapore. This article does indeed confirm that exercise can and should be used in the prevention and treatment of type 2 diabetes. It also covers the possible mechanisms by which exercise helps in diabetes – increased insulin sensitivity and reduction in obesity, as well as the other health benefits of exercise (such as improvement in lipid profile, reduction of blood pressure, improved physical fitness and cardiovascular function). As one single bout of exercise has a limited duration of action on insulin sensitivity, regular exercise is required to be effective. Improved fitness with regular exercise also enhances the insulin-stimulated glucose uptake into muscle, further strengthening the case for regular physical activity.

While beneficial, it is important to minimise the risks associated with exercise in diabetes and the following are some important considerations:

a) Diabetes must be controlled before patients are allowed to start on an exercise programme.
b) Hypoglycaemia is a common problem during and after exercise. This can be avoided by:
   (i) consuming carbohydrates (15 to 30 g) for every 30 minutes of moderately-intense exercise (diabetics should always carry with them a carbohydrate source during exercise);
   (ii) decreasing insulin dose;
   (iii) avoiding exercising muscle underlying injection sites;
   (iv) avoiding late evening exercise;
   (v) consuming slowly-absorbed carbohydrate following prolonged exercise;

   Limiting exercise sessions to less than 30 minutes will also help to prevent hypoglycaemia, as well as avoiding intense muscular activities.
c) As diabetics may have associated circulatory disorders, it is advisable to avoid high-intensity exercises. Exercise testing may be necessary to identify those cases with cardiovascular problems.
d) Those with other complications e.g. retinopathy, and peripheral neuropathy should take necessary precautions (e.g. eye protection for racket sports).

The need to be physically active for health and fitness maintenance was never an important issue until recent times, when technological advances resulted in sedentary lifestyles for most of us. As far back as the 1950s, a study by Morris et al[2] noted a relationship between

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coronary heart disease and lack of physical activity at work. Other studies done later also related lack of physical activity (occupational and leisure-time physical activity) with coronary heart disease, overall mortality and higher risks of diseases like colon cancer, non-insulin-dependent diabetes mellitus, hypertension and obesity[3-9]. Exercise can and should therefore be vigorously promoted to prevent the common "lifestyle" diseases like coronary heart disease, diabetes mellitus, hypertension and obesity. The U.S.A. has, with the Surgeon-General's report in 1996, has rightly placed sufficient emphasis on physical activity for promotion of health[10].

To successfully implement exercise programmes, it is essential to consider factors like safety, effectiveness and adherence. Safety of exercise depends on a host of factors, which may be intrinsic (individual physical and psycho-social characteristics) or extrinsic (type of activity or sport, manner in which activity is practised, environmental conditions, equipment, attire). It is important to get fit for any activity. For the very unfit, relatively safe exercises should be encouraged and started at a low intensity, before progressing to higher intensity exercise and activities with higher risks of injuries. Medical clearance for more intense physical activity should be conducted for those at risk, especially those over 40 years of age. Precautions like adequate fluid intake, avoiding exercise when unwell (e.g. with 'flu'), and proper exercise attire further enhance safety of exercise.

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For those whose objectives are to exercise for health benefits, the US Surgeon-General's recommendations to accumulate 30 or more minutes of moderate physical activity (e.g. brisk walking) on most days of the week would suffice. Aerobic activities like brisk walking, jogging, cycling, and swimming would be more effective for both health and aerobic fitness. Exercising to promote aerobic fitness requires more continuous activity at higher intensity, as recommended by the American College of Sports Medicine[11] (three to five times a week for 20 to 60 minutes each time at an intensity equivalent to between 60 and 90 percent of maximum heart rate). For overall fitness, strength training and regular stretching (e.g. before and after physical activity) should also be incorporated into any exercise programmes.

It is not difficult to prescribe an exercise programme. But to do it well, considering safety, effectiveness, and short-and-long-term adherence can be quite a challenge. In a review by Shephard[12], who looked at factors influencing the exercise behaviours of patients, compliance rates with various exercise programmes varied between 13 and 89 percent, with most studies having compliance rates of about 50 percent.

The following are some factors to consider to motivate people to start exercising and to ensure better adherence to exercise programmes:

1) Convincing and educating on the need for regular physical activity.
2) Variety, challenge and fun in exercise programmes.
3) Need to consider individuals' differences, preferences and aptitudes
4) Provision of facilities and, where necessary, proper instruction and equipment.
5) Spouse and peer approval.
6) Group camaraderie.
7) Medical and physical fitness evaluations (e.g. the National Physical Fitness Award Scheme and the Singapore Armed Forces' Individual Physical Proficiency Test) to evaluate progress or results of any exercise programmes.

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8) Providing other incentives to keep physically fit. For example, if life insurance companies could be persuaded (as in the case of cigarette smoking), regular exercisers may benefit from lower insurance premiums.

For most people who exercise regularly, however, the motivation to do so often comes from the good feelings derived. Instead of fitting a person into an exercise programme, we should fit an exercise programme to a person's needs and requirements. This would also help to improve adherence to exercise programmes. SMJ

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