Title	Rethinking Trim and Fit (TAF) programme strategies . . . weighing the scientific evidence
Author(s)	Michael Chia
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RETHINKING TRIM AND FIT (TAF) PROGRAMME STRATEGIES . . . WEIGHING THE SCIENTIFIC EVIDENCE

Review by Michael Chia

INTRODUCTION

The association between over-fatness during the school-going years with over-fatness in adulthood cannot be disputed (Knittle, 1972; Rimm and Rimm, 1976). Evidence shows that more than 80% of overweight children become overweight adults (Abraham, Collins and Nordsieck, 1971). Current evidence shows that the younger and less over-fat the child is at the onset of the overweight treatment programme, the more marked and longer lasting are the results of the intervention (Parizkova, 1982). Therefore, the on-going emphasis of identifying and combating over-fatness among Singaporeans, especially at an early age in primary school, must remain and is a sagacious health and educational policy. This paper highlights and puts into perspective some of the scientific evidence regarding the aerobic fitness and physical activity habits of over-fat and over-weight young people and suggests some guidelines for schools' Trim & Fit (TAF) programmes.

ASSESSING AEROBIC FITNESS OF OVER-FAT AND OVERWEIGHT YOUNG PEOPLE

Cursory observation tells us that over-fat and overweight young people do not do as well as their normal weight counterparts in performance, such as the 2.4 km run test. Is the inferior performance of these individuals the result of a deterioration of their aerobic fitness brought about by their excess weight or fat or is it due to the imperfections of statistical techniques used to interpret the data?

The gold standard measure of aerobic fitness is peak oxygen uptake (peak VO_2). This is simply the highest rate of oxygen use by the body while performing maximal exercise (e.g. running on the treadmill to volitional exhaustion). In absolute terms ($L\ min^{-1}$), the peak VO_2 of overweight young people is similar to, or higher than normal weight subjects (Armstrong and Welsman, 1997; Nair and Schmidt, 1996), but when divided by body mass using simple ratio standards (i.e. in $mL\ kg^{-1}\ min^{-1}$), the aerobic fitness of over-fat and overweight young people is inferior to those of normal weight young people (Armstrong, Williams, Balding, Gentle and Kirby, 1991; Nair and Schmidt, 1996).

The use of simple ratio standards to normalise performance between individuals of different sizes, though widely used, is controversial. Heavier individuals are disadvantaged while lighter individuals are advantaged using the ratio model. This is because overweight and over-fat individuals have a greater proportion of their weight in the form of fat which itself contributes little

to the overall value of peak VO_2. The use of a log-linear model to compare aerobic fitness data between overweight and normal young people shows that the difference in aerobic fitness between normal and overweight young people is reduced markedly but is still less than that of normal weight young people (Armstrong and Welsman, 1997). Two studies have shown no difference in aerobic fitness between obese and normal weight young people when the test values were expressed in relation to lean body mass (Elliot, Goldberg, Kuehl, and Hanna, 1989; Maffeis, Schena, Zaffanello, Zoccante, Schutz, and Pinnelli, 1994). Cooper, Weiler-Ravell, Whipp, and Wasserman (1990) reported that when body mass was supported such as during cycling exercise, the aerobic fitness of obese young people is comparable to those of normal weight young people.

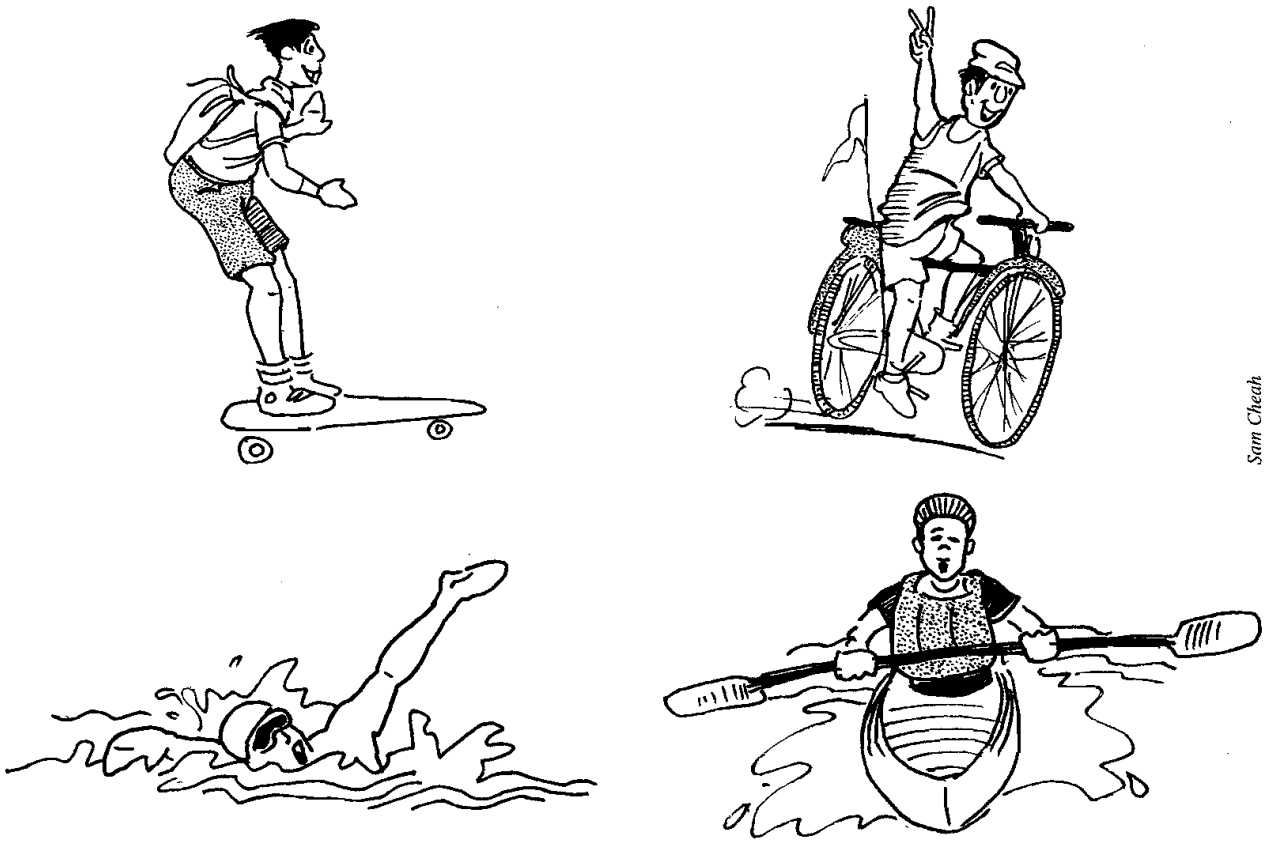
HEALTH BENEFITS OF SUSTAINED PHYSICAL ACTIVITY OR TRAINING FOR YOUNG OVERWEIGHT AND OVER-FAT YOUNG PEOPLE

Apart from the direct effects upon increased caloric expenditure and body fat reduction, a physical activity programme that is sustained over a period of time confers other health and metabolic benefits on the overweight young person. Improvements in blood fat profile, glucose metabolism and overall coronary risk profile can be expected (Sasaki, Shino, Tanaka, Ando and Arakawa, 1987). Despite no alteration in body composition profile, a 20-week intervention programme of dietary restriction and exercise markedly decreased resting and sub-maximal exercise blood pressure (Rocchini, Katch, Andersen, Hinderliter, Becque, and Martin, 1988). The same beneficial pattern of change was also noted for insulin sensitivity. Exercise was shown to control insulin resistance and reduce insulin levels in obese young people, particularly if combined with a low-fat, high carbohydrate diet (Barnard and Wen, 1994).

PHYSICAL ACTIVITY OF OVERWEIGHT AND OVER-FAT YOUNG PEOPLE

A review of the extant literature suggests that obese young people tend to be less physically active than those who are of normal weight (Bar-Or and Baranowski, 1994). The results from these studies have shown that:

- overweight and over-fat children are disadvantaged in activities that require them to support their body mass such as walking, running and jumping. However, in activities where their body mass is supported, they may be as able, if not more able, than their normal weight peers;
- children are more likely to see themselves as capable of being successful and manageable (and therefore more likely to adhere to the activity) in physical activities where they are not penalised because of their size;
- obese young people tend to be less physically active than those who are



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More appropriate modes of exercise for overweight children.

of normal weight. However, because of their greater body mass, obese or overweight young people may expend more energy than those of normal weight despite their lower levels of physical activity;

- exercise sessions for children need to be discontinuous, with short rest periods between activity bouts. As the pupils become more able, the duration of the exercise periods can be gradually increased;

- when children are given their choice of physical activity and they enjoy the experience, it is more likely that positive behaviour change will occur that could carry over into adulthood;

- apart from the direct effects upon increased caloric expenditure and body fat reduction, a physical activity programme that is sustained over a period of time confers other health and metabolic benefits to the overweight young person.

CONCLUSION

TAF programme administrators should note that orchestrating enjoyable and successful physical activity experiences for TAF members must be a prime objective. It ensures their future life-long participation in physical activity. Safeguarding the good health of our young people is investing in our nation's future. The way forward is to have young people gainfully engaged in daily physical activity. Daily physical activity is quality life insurance for our young people. Are your pupils adequately covered?

IMPLICATIONS

1. ***Emphasise large muscle groups with the body weight preferably supported.***
   As a TAF strategy, it may be more appropriate to use cycling, canoeing, rowing or swimming as a mode of exercise, and a fitness assessment tool, when such activities are available, rather than a run or walk test.

2. ***Include daily physical activity to raise estimated daily energy expenditure.***
   A TAF strategy worth emphasising is that every little bit of daily physical activity counts and results in 'extra' caloric expenditure. For example, doing household chores, taking the stairs, having more active play during recess, doing simple errands for the class like collecting and sending books to the staff room, all add up to additional daily caloric expenditure.

3. ***Emphasise activity duration rather than intensity.***
   Physical education sessions should be structured to emphasise lower-intensity activity for TAF members. The discerning PE teacher can positively highlight what TAF members do well rather than focus on what they are awkward at. No one in class should be excluded from any physical activity because of a lack of skill. The PE teacher must modify the activity to meet the demands of different ability groups. The task set by the teacher must be fun, challenging and achievable. Good effort must be commended and encouraged. The positive longer-term impact of good effort noticed and affirmed by the teacher cannot be over-rated.

4. ***Incorporate the child's preferred activities.***
   TAF programme administrators should not only be concerned with short-term results. They must temper their intervention programme with strategies for instilling a love for a more active lifestyle, by incorporating activities enjoyable to the participants. Favourable lifestyle habits take time to inculcate. When good habits are formed over a period of time, then there is a higher chance that lifestyle change is longer lasting than if the change is coerced or is too drastic.

5. ***Persevere with the TAF programme, even when body mass and body mass index do not change.***
The TAF programme will accrue other health benefits to over-fat young people even when in the short term, BMI and body composition profile do not alter very much. The acid test of a successful TAF programme is not only the excess fat loss whilst the participants are in the programme, but whether the positive lifestyle changes take root after the cessation of the intervention programme.

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