SPORT FOR YOUTH – THE ESKIMO APPROACH

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Recent reports have shown that the Canadian Eskimo has a high level of cardio-respiratory fitness (1, 2). This paper reviews information on arctic peoples in order (i) to assess how far urban children fall short of their potential development, and (ii) to examine those patterns of sport and other physical activity that are responsible for the greater realisation of potential in the Eskimo.

Information was obtained at Igloolik, a small and isolated village high in the Canadian Arctic, near the tip of the Melville peninsula. Until about ten years ago, there was little contact with the "white" man, and the majority of inhabitants followed a traditional nomadic life. Currently, there are some 20 "white" people in the village, but a substantial proportion of the men still make their living as hunters, and the impact of North American "culture" remains relatively small.

Physiological tests were completed on some 70% of the population of adults and children over the age of nine years. The aerobic power was predicted from the oxygen consumption and the pulse rate during performance of sub-maximal exercise. Direct measurements of maximum oxygen intake were also carried out on some 50 villagers, and it was shown that because of some reduction in maximum heart rate, prediction procedures over-estimated the true aerobic power of the population by 8%. Nevertheless, even after applying an 8% correction, values for the maximum oxygen intake were plainly much greater than those found in the urban-living inhabitants of metropolitan Toronto. Focussing specifically upon children aged 9 – 13 years, average values for Eskimo boys were 63 ml./kg. min, compared with 51 ml./kg. min in Toronto boys, while average values for the Eskimo girls were 53 ml./kg. min, compared with 41 ml./kg. min in Toronto girls.*

How far is this difference attributable to over-nutrition in Toronto? The Eskimo children were certainly quite thin. The three skinfolds recommended to the International Biological Programme (triceps, subscapular and suprailiac, ref. 3) were measured by standardized techniques, and the average values were 4.8 mm per fold in the boys and 6.4 mm in the girls, compared with the readings of 7.8 and 10.2 mm in the Toronto sample. Nevertheless, these differences in sub-cutaneous fat were insufficient to account for the larger relative aerobic power of the Eskimo children.

**Details of statistics are given in the references cited (1, 2). The discrepancy between the two populations was highly significant.*

When absolute values were calculated, they still had a substantial advantage, respective values being 2.21 and 1.78 l./min STPD for the Eskimo children, and 1.79 and 1.38 l./min STPD in the Toronto children.

The development of muscular force in the Eskimo child was less remarkable than the cardio-respiratory fitness. Cable tensiometric measures of knee extension force showed somewhat greater readings than in Toronto (43.6 kg and 41.7 kg for Eskimo boys and girls, compared with 37.7 and 34.9 kg in Toronto schoolchildren). On the other hand, possibly because the Eskimo children normally protected their hands by thick mittens, grip strength readings by a Smedley dynamometer were actually poorer than in Toronto, respective values being 18.0 and 16.9 kg for Eskimo boys and girls, but 21.2 and 18.4 kg for Toronto schoolchildren of the same age.

Our observations thus show the Eskimo child as having a large aerobic power, whether measured in absolute or in relative units. He also has a good development of his leg muscles, but carries less fat and arm musculature than Toronto children of the same age. It could be argued that the difference between the two populations has a genetic basis, but this is a rather unlikely possibility, since it is possible to distinguish two groups of young adults (2). One group participate regularly in traditional hunting activities, and these also have the high aerobic power typical of the adolescent. The second group has accepted employment with various government agencies in the village; in some cases, activity is moderately strenuous, but the peaks of intense work characteristic of hunting are avoided. This latter group has a 30% smaller aerobic power than the average adolescent boy. It is conceivable that the weaklings accept the "urban" life, but this is not our impression; we believe that the urban life-style has played a causal role.

If our hypothesis is correct, it then seems likely that environmental rather than genetic factors are responsible for the large aerobic power of the Eskimo child. In other words, the average Canadian schoolchild is operating with 20% less than his potential maximum oxygen intake, and – like the adult city dweller – is carrying a substantial unnecessary burden of fat.

Is it possible to chart the pattern of activities responsible for the more favourable development of the Eskimo child? The most obvious difference between

Igloolik and Toronto is in the degree of organisation of leisure time. In Igloolik, little is planned, whereas in Toronto many children operate to a tight schedule throughout their waking hours. There are relatively few opportunities for formal sport in the Arctic and little spare cash for the purchase of equipment and clothing. During the dark winter months, a table-tennis table is available at the parish hall, and there is a weekly "square dance". The latter was apparently imported from the Canadian west some twenty years ago, and has evolved to a complex sequence, with individual vigorous dances lasting half an hour or more. At Easter, there is some semblance of a "track and field" event; this involves most of the islanders, and requires running through deep snow while wearing heavy clothing. During the summer months, crude baseball games are arranged on the frozen sea surface, tobogganning is improvised on a nearby hillside, and excursions on snow shoes are popular. In some larger settlements (such as Inuvik), cross-country skiing is being introduced. There are also informal snowball fights, stone throwing contests, fishing, and practice in the use of dog whips. However, the main basis for the development of physical fitness is incidental rather than deliberate activity. All of the village children have frequent necessity to walk and to run over rough and sometimes deep snow while wearing heavy clothing. The boys spend their leisure hours in experimenting with small dog teams and carving pieces of soapstone, commonly dropping out of school for two or even three weeks to accompany their fathers on long and arduous hunting trips. Parental example is very important, and the active hunter is the prototype the boys wish to emulate. Families are quite large, and the older girls are often required to help their mothers, not only performing normal household chores but also carrying smaller children on their backs using the traditional "yappa".

The situation of the average Toronto schoolchild is very different. Opportunities for organized sport are numerous, each municipality offering leisure-time instruction in swimming, skating, ice hockey, and gymnastics, with numerous structured leagues for such games as baseball, Canadian football, ice hockey, soccer and lacrosse. Within the school system proper, the extent of physical activity varies with the personal initiative of the principal, but rarely amounts to less than two or three thirty minute sessions per week.

Superficially, much physical activity is in progress. However, because the system is so structured, with rigid 30 minute time allocations, each child spends much of his potential activity period at such diversions as the initial dressing and roll call, instruction in specific skills, announcements and "awards", and final undressing. The actual floor time is concentrated upon the development of skills, and although there may be opportunity for sprints at maximum speed, there is rarely possibility for the sustained activity needed to develop endurance. Incidental activity is negligible in Toronto, and the common parental example involves the use of the car and power equipment at every opportunity.

It is plainly impractical for the Toronto schoolchild to revert to the life of the aboriginal hunter, and he lacks an active father-figure. Nevertheless, certain lessons can be drawn from a comparison of life styles. The Toronto child plainly needs more opportunity and facilities to be himself — to engage in spontaneous walking, running, cycling and exploring. While a pedagogic function is sometimes claimed for the current over-organized pattern of urban child-rearing, the unorganized Eskimo child is manifestly happy and well-adapted to both the community and the environment. Organized activity is often by its very nature wasteful of time that could be devoted to the development of endurance fitness, and a game followed without technical interruptions is much more likely to produce the desired physiological gains. Finally, much training can be derived from purposeful informal activity. Parents commonly complain of the labour involved in driving their child one or two miles to a neighbourhood hockey rink. But if the child were persuaded to walk this same distance through heavy snow while wearing winter clothing, he might well develop cardio-respiratory fitness through the journey if not through his participation in the formal recreation period.

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