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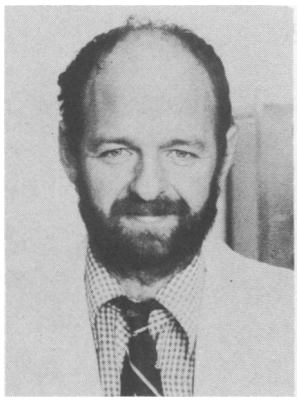

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EFFECTS OF POLLEN EXTRACT UPON ADOLESCENT SWIMMERS

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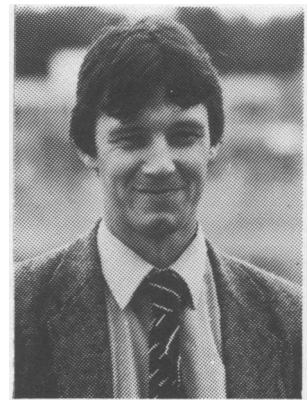

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ABSTRACT

Many competitive sportsmen in this country regularly use pollen extract as a dietary supplement in the belief that it can lead to an improvement in performance. We have investigated the effects of a six-week course of pollen extract administration on a variety of physiological parameters in a group (n = 20) of adolescent swimmers. At the time of the study, all subjects were training on a daily basis. During the course of the study, maximum oxygen uptake increased in both the treatment group and the placebo group, no difference between the response of the two groups being observed. Vital capacity showed a significant increase in the treatment group, but not in the placebo group. The results indicate that no positive benefit was obtained from the use of pollen supplementation. However, the number of training days missed due to upper respiratory tract infections was much less in the pollen treatment group (4 days) than in the placebo group (27 days). In a study of longer duration, this difference could lead to an improved performance by the pollen treatment group due to fewer interruptions to training.

Key words: Performance, Swimming, Pollen, Diet.

INTRODUCTION

The sporting situation is an intensely competitive one in which athletes will search for any improvement in performance, however small it may be. Accordingly, a wide range of ergogenic aids in the form of dietary supplements is extensively employed in this field. One of the more recent innovations is the use of a pollen extract which has been claimed to produce improvements in athletic performance. This product has been marketed by A. B. Cernelle as "Pollitabs",† containing pollen extract as well as vitamins B, C and E. The two main beneficial effects of this product have been claimed to be an increased resistance to respiratory tract infection (Lindahl, 1978; Mark-Vendel, 1978) and an effect on protein synthesis (Dubrisay, 1972). A large number of the studies carried out in this area have been rather poorly controlled, and it was the aim of the present study to determine whether or not administration of a pollen extract could influence performance.

METHODS

Twenty young competitive swimmers were used as subjects, comprising 16 males and 4 females. Mean age of the subjects was 15.7 years (range 11.5 to 20 years). All subjects were training on a daily basis, and all had been training for some months prior to the beginning of the test period. Subjects were divided into two groups, each containing 8 males and 2 females, the selection being random otherwise. A series of tests as detailed below, was then performed on each subject. These tests were repeated after a six-week period during which subjects ingested either Pollitabs or placebo (cod-liver oil capsules). Treatment administration was performed on a double-blind basis in order to minimise any subjective bias. Differences between groups were assessed

†Pollitabs capsules used in this study were supplied by the UK distributors, Health and Diet Food Co. Ltd., Godalming, Surrey. The same product is currently available as "Pollen Supertablets" at £2.20 for 30 tablets. The recommended daily dose for athletes is 2-4 tablets.

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by the Student's t-test, and differences within each group as a result of treatment were assessed by a paired t-test.

Height and weight were recorded, in addition to percentage body fat according to the method of Durnin and Rahaman (1967). Right and left hand grip strength measurements were made using a grip dynamometer (Takentiki Vogyo, Japan). Quadriceps isometric strength (MVC) and endurance time at 50% of MVC were measured using an isometric chair constructed after the manner of Thorstensson (1976).

Maximum oxygen uptake ($\dot{V}O_2$ max) was assessed by using stepwise increases in workload on a friction-braked Monark bicycle ergometer. The attainment of $\dot{V}O_2$ max was established according to the levelling off criterion of Åstrand and Saltin (1961). Respiratory variables were assessed on a P. K. Morgan automatic gas analysis system comprising a Fleisch pneumotachograph, paramagnetic O_2 analyser and infra-red CO_2 analyser.

Vital capacity (VC) and forced expiratory volume (FEV_1) was obtained using a Vitalograph spirometer.

Haemoglobin (Hb) concentration was estimated by conversion to cyanmethaemoglobin using Drabkin's reagent (BDH); haematocrit was obtained using a Hawksley micro-haematocrit system.

RESULTS

Results are presented in summary in Table I.

Anthropometric Measurements

Body weight and height increased in both groups during the test periods ($p < 0.01$). There were no differences between groups either before or after the test period. There were no differences in body fat content between the groups, and no change took place in either group.

Strength and Endurance Tests

No significant changes took place in right hand grip strength, isometric leg strength and isometric endurance time, with no differences between the groups. However left hand grip strength showed significant improvement in both groups ($p < 0.05$ in both groups). No differences, however, were found to exist between the groups.

Blood Measurements

A significant decrease ($p < 0.05$) in blood haemoglobin concentration took place during the trial period with mean (± SD) reductions of 1.05 ± 0.91 and 0.61 ± 0.67 g/100 mls for placebo group and Pollitabs group respectively.

The haematocrit (percentage) was found to decrease in the Pollitabs group significantly ($p < 0.05$); however there were no differences between the two groups.

Aerobic Capacity

The $\dot{V}O_2$ max, expressed in l/min, showed a significant improvement in both the Pollitabs and placebo group ($p < .05$), with mean (± SD) increases of 0.27 ± 0.09 and 0.24 ± 0.09 l/min respectively. If allowance is made for the increase in body weight which occurred during the test period, this increase in $\dot{V}O_2$ max, expressed in ml/kg/min does not assume statistical significance.

TABLE I

Comparison of Pollitabs and placebo groups. Values are means ± SEM. The right hand column shows the differences between the changes observed in the two groups. A full explanation of the tests employed is given in the text.

	Test Group			Control Group			
	Pre	Post	Difference	Pre	Post	Difference	Test v Control
Height (cm)	167.1 ± 2.2	167.8 ± 2.2	+0.7	165.2 ± 3.7	165.8 ± 3.7	+0.6	+0.1
Weight (kg)	56.2 ± 3.3	58.3 ± 3.3	+2.1	58.2 ± 3.1	60.0 ± 2.8	+1.8	+0.3
Body fat (%)	15.0 ± 1.2	15.4 ± 1.1	+0.4	18.0 ± 2.0	18.5 ± 2.0	+0.5	−0.1
Grip strength (R, kg)	38.8 ± 4.0	39.6 ± 4.0	+0.8	37.1 ± 2.4	36.7 ± 2.1	−0.4	+1.2
Grip strength (L, kg)	35.3 ± 3.6	36.6 ± 3.6	+1.3	34.1 ± 2.1	35.8 ± 2.2	+1.7	−0.4
Leg strength (kg)	40.7 ± 3.7	44.8 ± 3.4	+4.1	42.8 ± 2.3	47.0 ± 4.0	+4.2	−0.1
Endurance (sec)	81 ± 6	72 ± 6	−9	73 ± 7	72 ± 8	−1	−8
VC (ℓ)	4.83 ± 0.33	4.99 ± 0.30	+0.16	4.88 ± 0.38	4.96 ± 0.38	+0.08	+0.08
FEV (%)	86.8 ± 2.0	85.9 ± 1.6	−0.9	81.0 ± 1.0	82.0 ± 1.1	+1.0	−1.9
$\dot{V}O_2$ max (ℓ) min	3.05 ± 1.8	3.30 ± 2.0	+0.25	3.05 ± 0.25	3.32 ± 0.21	+0.27	−0.02
$\dot{V}O_2$ max (mls/kg/min)	54.4 ± 2.1	56.5 ± 1.4	+2.1	52.6 ± 2.2	55.1 ± 1.8	+2.5	−0.4
Hb (g%)	16.8 ± 0.3	16.0 ± 0.3	−0.8	16.7 ± 0.4	15.6 ± 0.5	−1.1	+0.3
Hct (%)	43.5 ± 0.9	42.3 ± 0.9	−1.2	42.0 ± 1.4	41.1 ± 1.3	−0.9	−0.3

Respiratory Parameters

Vital capacity increased considerably in the group taking Pollitabs ($p < 0.05$); a small increase was also observed in the control group, but this did not attain statistical significance. No significant difference was found between the groups.

Forced expiratory volume in 1 second was not found to change in either group nor was any significant difference found between the groups.

DISCUSSION

The subjects used for the present study were healthy adolescents differing from the normal population only in that they were all engaged on a strenuous programme of physical training. They may thus be considered to represent the group at which the beneficial effects of pollen supplementation are aimed.

If the body weight and height of these subjects are compared with non-athlethic children of comparable age, almost all were heavier and taller than average (Bayer and Bayler, 1976); this is in agreement with results obtained by Eriksson et al (1977) for a comparable population of swimmers. The results did not indicate that administration of Pollitabs had any effect on body weight, height or body fat content. It would not, however, be expected that any such effects would become apparent within the time scale of this experiment.

The normal training programme undertaken by the subjects included two weight training sessions weekly, with the aim of increasing muscular strength. In spite of this, there were no significant increases in either group recorded for right-hand grip strength or for quadriceps strength. In contrast to this finding the left-hand grip strength showed comparable increases in both groups. This may be explained by the fact that the left-hand strength is generally weaker than the right; any bilateral training carried out would thus represent a greater stimulus to the left side and consequently produce a greater improvement in performance.

The significance of the changes in vital capacity is not immediately clear. The results show an increase in VC in the Pollitabs group but not in the placebo group. This change, however, is not sufficiently large to cause a significant difference to exist between the two groups. The values obtained for all subjects in the present study are higher than those of normal adolescents (Engstrom et al, 1962). This finding is in agreement with other results obtained from swimmers (Andrews et al, 1972; Eriksson et al, 1977) and is also in agreement with the suggestion that a large VC is required for success in competitive swimming (Åstrand et al, 1963).

A high correlation has also been shown to exist between VO_2 max recorded during work on a bicycle ergometer and swimming performance (Åstrand et al, 1963). Although both groups recorded a higher value for VO_2 max following the test period there was no difference between the two groups, and the difference can therefore be ascribed to the effects of the training regimen.

The VO_2 max, when related to body weight, did not increase significantly; it seems probable, however, that the absolute aerobic power is of greater relevance to swimmers as the body weight is reduced to a large extent by submersion.

The changes in haematological variables (Hb and Hct) which were recorded would appear to be of little consequence, and probably reflect the haemodilution which normally accompanies a period of physical training.

The results would appear to indicate that there is no beneficial effect to be obtained by administration of pollen extract to swimmers. Before this conclusion can be stated with any certainty however, two points must be borne in mind. The first of these is that the present test lasted only six weeks; by comparison with the time scale which most training programmes are conducted, this is an extremely short space of time and may not be of sufficient duration to produce a measurable effect. Secondly, it was noted that the placebo group, during the 6-week experimental period, missed a total of 27 day's training through illness while the Pollitabs group missed 4 days in total. All days missed in both groups were the result of upper respiratory tract infections. Because of the small numbers involved, these data are not readily amenable to statistical evaluation. They do, however, suggest that the swimmers taking Pollitabs might expect to miss only 1 day in 105 due to upper respiratory tract infection; this compares extremely favourably with the placebo group who might expect to miss 1 day in 16. Such a difference might be expected to have important consequences for the athlete whose performance is dependent on the ability to engage in consistent physical training.

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OBITUARY

Dr. George Gregg, OBE, TD, MD, FRCPI, DPhysMed, DL

Dr. George Gregg, formerly Consultant Physician in charge of the Physical Medicine Department of the Royal Victoria Hospital, Belfast, died on February 13th. He graduated from the Queen's University, Belfast, in 1938, but soon after qualifying joined the RAMC, in which he served with distinction, attaining the rank of Major, and was awarded the Croix de Guerre with Palm of Belgium and Chevalier of the Order of Leopold II. After the war, he continued his interest in the Territorial Army, and commanded in turn both a Field Ambulance and the 204 General Hospital, TA, and being Honorary Colonel until the end of last year. He was a pioneer of physical medicine in Northern Ireland, being largely responsible for the formation of the department in Ulster's main teaching hospital. He retired about five years ago, but continued to take an interest in rehabilitation through his work at the Mater Infirmorum Hospital, Belfast for a further five years. His interest in rehabilitation was shown by his association with the Order of St. Lazarus, devoted to the alleviation of the ravages caused by leprosy. He was Vice-President of the St. John Ambulance Brigade and a Knight of the Order of St. John. He was a physician to HM the Queen, and one of her Deputy Lieutenants.

Besides his professional, Army and St. John commitments, George Gregg was a keen athlete, especially in field events. In his student days, he held the javelin record for the University for several years. He was one of the first doctors in Northern Ireland to join the British Association of Sport and Medicine, travelled to England on a few occasions to attend meetings, and he contributed an article to Brit. J. Sports Med. Vol. 8 1974 on injuries to the 3rd lumbar disc. We offer our deepest sympathy to his widow, and know that he will be missed throughout Northern Ireland.

H. E. Robson