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Background and development of a new physical educational infrastructure in the Irish Defence Forces

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1. Introduction

Physical fitness has traditionally influenced soldiers' mental and physical readiness for duty in peacetime as ell during wartime (Vogel et al,1978). In spite of improved military technology and more sophisticated weaponry, physical fitness remains an integral part of modern warfare, as reported in the Falklands (Mc Caig and Gooderson, 1986) and Grenada (Dubik and Fullerton, 1987). Physical training (PT) plays a key role in developing discipline and morale, particularly during recruit training. While military PT was traditionally had a narrow focus, evidence of a shift towards a more 'holistic' physical education (PE) approach has gained widespread support in recent years. It is against this background, and the absence of a clearly defined and comprehensive policy on PE in the Irish Defence Forces (DF), that prompted the carrying out of the Irish Defence Forces Health and Fitness Survey (DFHFS). This paper will briefly review the aim, methodology and principle results of the DFHFS, and report on the subsequent steps which have been taken to establish a new and more broad-ranging PE infrastructure within the DF, in response to the survey.

2. Aim of DFHFS

To establish a database on the health, physical activity and physical fitness levels of a representative sample of DF personnel.

3. Sampling procedure

A stratified random sample of 1070 personnel (approximately 10% of DF) was selected on the basis of rank and geographical location (Table 1).

4. Testing methods

The survey instruments comprised a battery of 9 fields tests of physical fitness selected from the Eurofit test battery (Council of Europe, 1988), and also including tests for leg power and upper body strength/endurance. The other survey instruments included a physical activity and lifestyle questionnaire, and a medical examination.

The principle areas of investigation are described in Table 2.

Table 2 Principle areas of investigation

Anthropometry and Fitness

Height
Weight
Body composition (skinfolds)
Flexibility
Handgrip strength
Leg power
Local muscle endurance
Cardiorespiratory endurance (VO2 max)
Leg

Lifestyle Factors

Level of education
Physical activity
Leisure activities
Work activity
Self-perceptions
Attitude to fitness

Medical Factors

Blood pressure
Cholesterol (HDL, LDL)
Triglycerides

From this data, threshold for coronary risk factors were compiled (Table 3).
A physical activity score was extracted from the questionnaire used in the survey, with a PAS < 10 deemed to be 'inactive'. A cardiorespiratory endurance risk threshold was calculated on the basis of the lowest 1/3 percentile for each age group.

Table 3 Thresholds for coronary risk factors

	CORONARY RISK FACTORS		RISK THRESHOLD
1	Blood pressure (mm/hg)	Systolic and/or Diastolic	140 90
2	Cholesterol (mmol)	Total Cholesterol and/or Total Cholesterol	5,2 0,25
3	Smoking (Cigs par day)		10
4	Physical Inactivity (PAS)		10
5	Body composition	% Body Fat and/or BMI	20% 25
6	Cardiorespiratory Endurance.		
	Estimated VO2 Max ($ml.^{-1}kg.^{-1}min$)	Age Group 1: 20 - 29 Age Group 2: 30 - 37 Age Group 3: 38 - 45 Age Group 4: > 45	< 35.5 < 30.7 <28.7 <25.3
	and/or		
	PWC 85%	Age Group 1: 20 - 29 Age Group 2: 30 - 37 Age Group 3: 38 - 45 Age Group 4: > 45	< 2.13 < 2.05 < 2.04 < 1.97

5. Summary of results

The key findings of the DFHFS can be summarised as follows:

5.1. Physical activity

Figure 1 illustrates duration of exercises in hours per week by age, and Figure 2 represents categories of physical activity during leisure time in recent months.

Figure 1 Duration of exercise per week by age

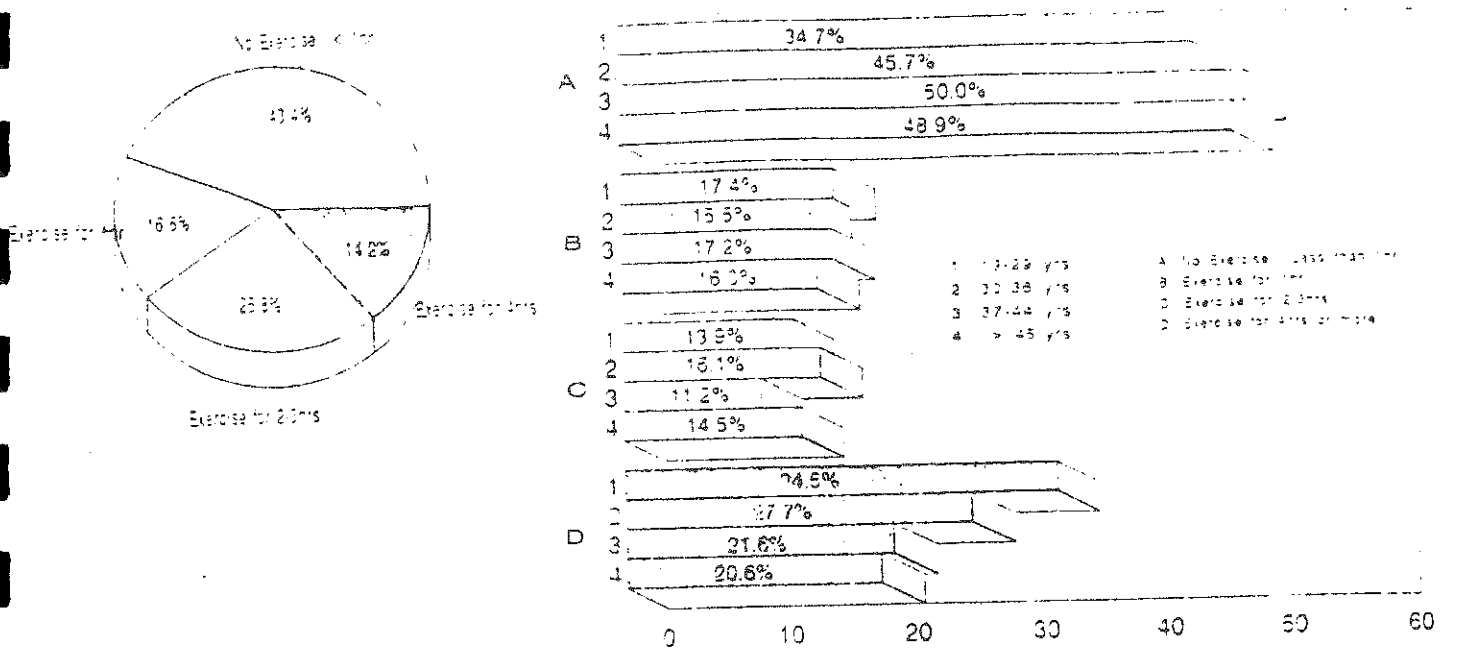
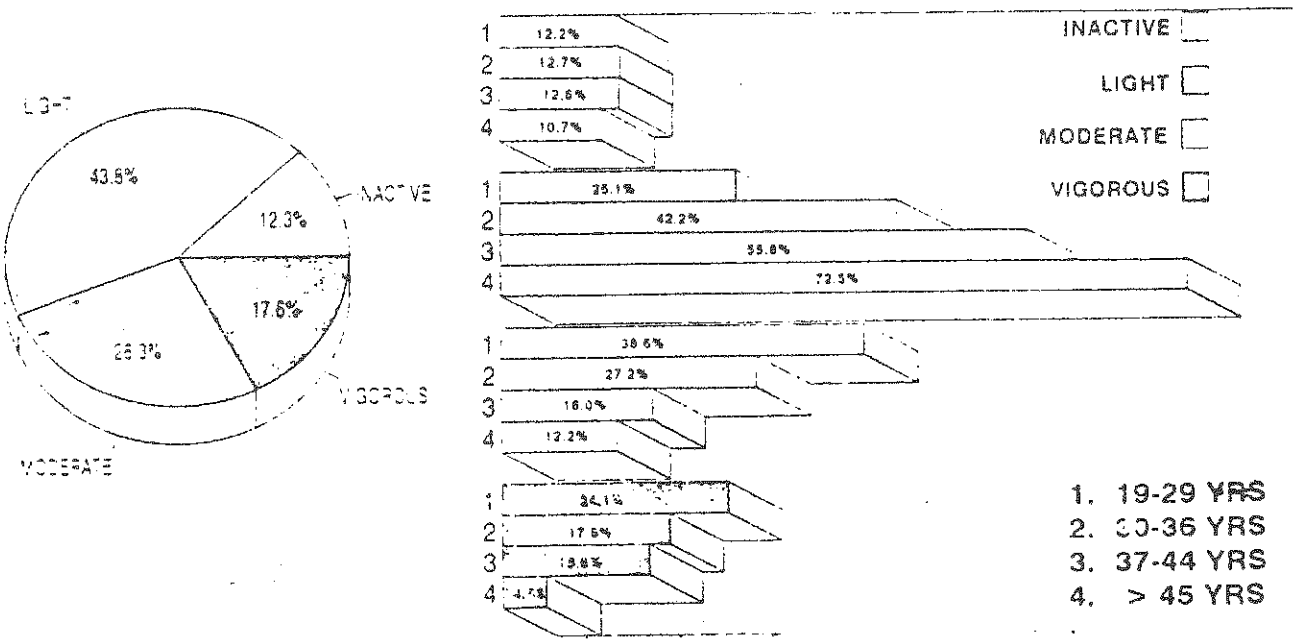


Figure 2 **Categories of physical activity during leisure time by age**



A large percentage of personnel engage in little or no meaningful activity during their leisure time. 60% reported exercising for one hour or less per week, while 55% categorised themselves as 'inactive' or engaging in 'light' (ie walking) physical activity during leisure time. Levels of physical activity also declined with age.

5.2. Physical fitness

Anthropometric and cardiorespiratory endurance scores only are considered within the confines of this paper. Figure 3 illustrates body mass index (BMI) and estimated percentage body fat scores. Based on BMI scores, 60% of personnel were found to be overweight, of which 13% were classified as obese. Similarly, 50% were classified as overweight according to estimated percentage body fat scores, of which 12% were classified as obese.

Figure 3 Anthropometry

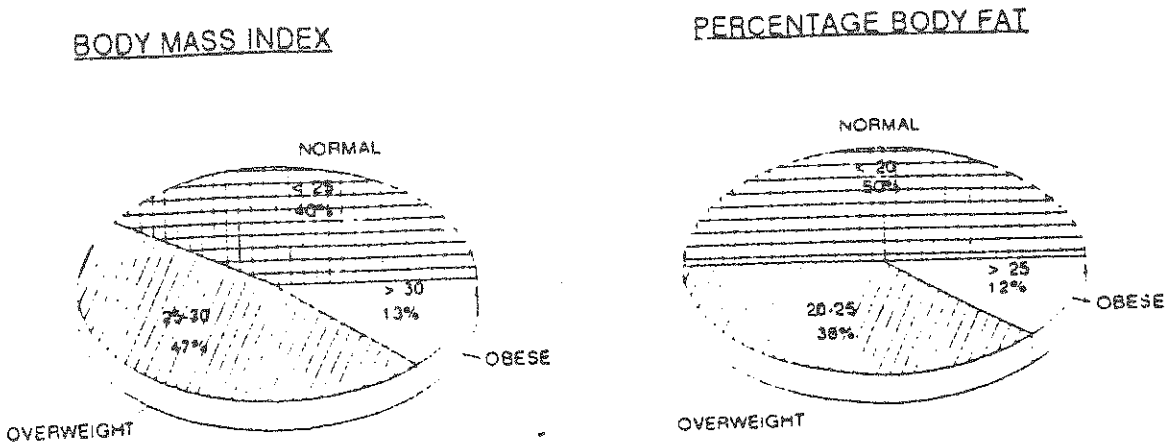


Table 4 shows predicted VO2 Max scores, as measured by a sub-maximal bicycle ergometer test (85%); These scores compare unfavourably with other military populations.

Table 4 Predicted VO2 max

AGE GROUP	19 - 29	30 - 36	37 - 44	< 45
ESTIMATED VO2 (ml kg min)	39.9	35.6	32.3	29.6

5.3. Coronary risk factors

The percentage of personnel exceeding risk threshold for coronary disease is shown in Table 5.

Table 5 Percentage exceeding risk for coronary heart disease

	CORONARY RISK FACTORS		% AT RISK
1	Blood pressure (mm/hg) (n=596)	Systolic: 16.3% and/or Diastolic: 16.3%	22.3%
2	Cholesterol (mmol) (n=597)	Total Cholesterol: 63.3% and/or HDL Total cholesterol: 58.1%	73.2%
3	Smoking (Cigs per day) (n=1072)		45.5%
4	Physical inactivity (PAS) (N=1052)		38.5%
5	Body composition (n=1070)	% Body fat: 50.2% and/or BMI : 60.5%	66.4%
6	Cardiorespiratory endurance (n=986)	Estimated VO2 Max: 33.3% and/or PWC 85% : 33.3%	36.8%

Overall there is a high prevalence of coronary risk factors within the DF Cholesterol (73.2%) and body composition (66.4%) are particularly prevalent, and a high incidence of smoking was also reported (45.5%). 70% of personnel were at risk with at least two risk factors, while 18% were at risk with four of more risk factors.

6. Design of a PE infrastructure

The DFHFS raised a number of concerns in relation to the health, physical activity and physical fitness levels of DF personnel. Most importantly, it highlighted the need for a more definite and broadly defined policy on PE within the organisation. Since completion of the survey in 1992, a number of positive outcomes have arisen in response to the survey.

* The appointment of full-time officers in each of the four Commands (geographical regions), Air Corps and Naval Service. The responsibilities of the PE officers include the development of PE programmes in each Barracks, the supervision of fitness assessments, and the promotion of maximum participation in DF sporting activities.

* The implementation of a new and more broadly defined physical fitness assessment procedure ('LIFE: Lifestyle Improvement and Fitness Evaluation). an outline summary of this is shown in Appendix 1. Test 1 is designed to establish an age-appropriate baseline level of fitness for all personnel. The key components of fitness identified in this regard are body composition, local muscle endurance and cardiorespiratory endurance. Test 2 is designed to test 'military fitness' and must be successfully completed by personnel engaged in operational duties, overseas service, and a selection requirement for career courses. Test 3 offers a health related fitness assessment for those failing to meet the minimum standards set in Test 1, followed by advice on a remedial exercise programme.

* The certification of physical training instructors (PTI), to the level of a civilian nationally recognised certificate, the National Certificate in Exercise and Fitness (NCEF). By embracing the NCEF, the DF is seeking to improve the variety and quality of instruction in exercise and fitness throughout the DF.

* The introduction of a new 'ratio scale' (bill of fare) in catering centres throughout the DF, based on healthier and more nutritional menus.

* The inclusion of a physical fitness assessment in the future screening and selection of military personnel.

* The inclusion of a PE module on all course syllabi. All officer and non-commissioned officer courses now include a minimum of two-week PE module, thereby equipping those leadership positions with some basic knowledge and skills to assist the PE officer and NCEF instructors.

7. Recommendations for the future

* The responsibility for maintaining high standards of fitness must be shared between Commanding officers and the individual. Commanding officers must be encouraged to support and facilitate PE programmes, and to prioritise fitness in his/her unit. However, it must be the responsibility of each individual to maintain a lifestyle which is conducive to a satisfactory level of fitness for continued service.

* In order to evaluate the effectiveness of the DFHFS and the outcomes emanating from the study, it is recommended that a follow-up study be conducted in the future.

* Increased expenditure on facilities and equipment is necessary to strengthen resources in the area of PE and fitness.

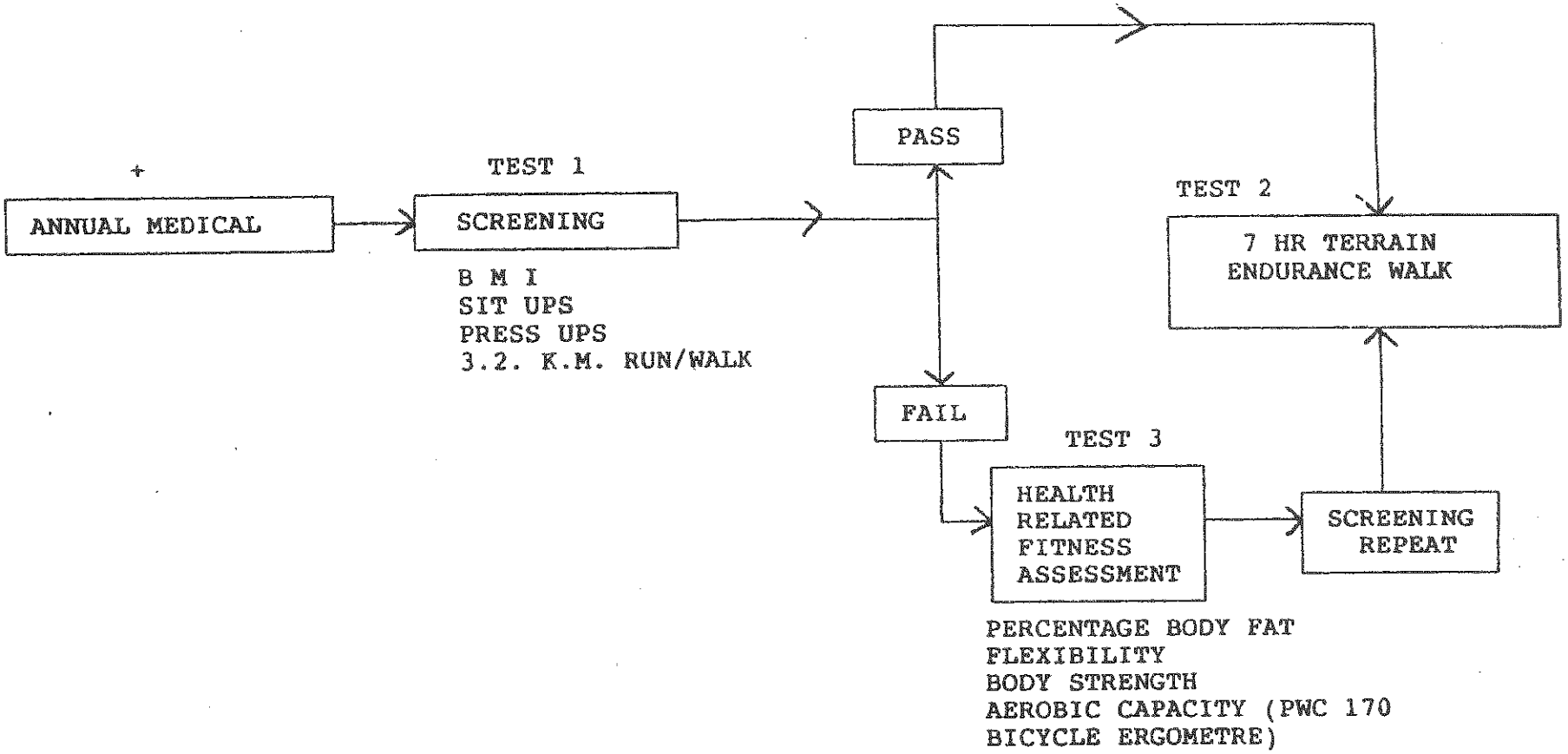
* Improved liaison between medical, physical educational and catering personnel, in order to facilitate a more integrated approach, particularly in dealing with the problems of ill-health and obesity.

* The provision of a broader range of physical activities within recreation programmes, to encourage those personnel not involved in competitive sport to become active.

* The introduction of smoking cessation programmes and 'smoke free' areas within the workplace.

APPENDIX 1

SEQUENCE OF FITNESS TESTS



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