A COMPUTER SYSTEM TO QUANTIFY EXERCISE ON A MASS BASIS*

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Abstract

An important criteria for investigations involving physical activity is an accurate measurement of the energy cost of the exercise performed. When the sample size is less than 50, a simple data recording form and hand calculations are satisfactory. However, when the sample size is greater than 500, it is difficult to quantify the physical activity on a longitudinal basis. A more rigorously defined form and an automated data processing system must be utilized in such cases. A computer program called ELOG has been developed to quantify energy cost of physical activity. Presently, the subject name, sex, ID number, date, type of physical activity, quantity of the activity, and duration are entered on a recording form. At the end of each month, the forms are keypunched. Using the log data, the ELOG program generates a report that describes the activity performed, calculates the individual session energy cost, and generates a summary showing total and average energy cost for the month. The data are then stored in a central database for subsequent longitudinal analysis, e.g. comparison with cardiovascular function measurements in the laboratory. The ELOG program currently processes the physical activity of over 700 subjects on a monthly basis. A conversion to source data automation is currently being investigated so that the subject would be able to enter the information concerning his exercise into a terminal connected directly with a computer for processing. ELOG has shown to be an accurate, cost effective system to quantify physical activity on a mass basis.

Introduction

Recently, substantial interest in exercise, both by researchers as well as the general public,has developed. General health benefits resulting from a regular exercise program have been expounded by many. Much of the current popularity in cardiovascular fitness is due to Cooper's aerobics program (1,2,3).

The word "aerobics" was adapted from the term "aerobic" and is used for the metabolism which utilizes oxygen in the production of energy for the body. Aerobics is a system of endurance exercises which require sustained effort, e.g. running, cycling, swimming, and fast walking. This type of exercise is designed to improve the efficiency of the cardiovascular system (heart, lungs, and blood vessels) by increasing the body's ability to transport and utilize oxygen.

Based on the aerobic concept, Cooper developed the aerobics system of endurance training and has described the system in his popular books Aerobics (1), The New Aerobics (3), and with his wife, Aerobics for Women (4). To make this program of training adaptable for use by the general public, a point system was devised that awards points for various amounts of physical activity. The point system is based on the energy cost of the activity, i.e., the amount of oxygen utilized. Thus, the number of points achieved (energy cost) is dependent on the intensity of the activity and its duration. Cooper suggests that a minimum of 30 points per week is necessary for men to maintain satisfactory cardiovascular condition (2). The system is unique in that numerous activities can be combined or interchanged to meet the 30 points per week recommendation.

Aerobic points represent only one form of energy cost. There are other units of measure for total energy cost, including kilocalories (kcal), leters of oxygen, kilopondmeters, watts, etc. These units for energy cost can, of course, be expressed in the form of rate of expenditure by expressing the energy cost per unit of time and/or per unit of body weight.

Pollock has reviewed a number of studies concerning the quantification of endurance exercise (5) and has shown that the four contributing factors to energy cost during exercise are intensity, duration, frequency, and mode. Energy cost is a function of intensity times duration, frequency simply provides a multiple of the basic energy cost unit, and finally mode is the actual function relating energy cost with intensity and duration. As a general model, we can see that:

Energy Cost = f(intensity, duration) x frequency

For a given time period for which n exercise sessions are to be quantified, the total energy cost is:

$$\text{Total Energy Cost} = \sum_{i=i}^{n} (\text{Energy Cost})_i$$

The above equations represent a formulation for the quantification (energy cost) for many types of exercise. The energy cost itself is a function of the mode of exercise, i.e., intensity and duration. Thus, given the intensity and duration values for any particular exercise session and the functional relationship for the exercise to calculate the individual session energy cost, the total energy cost can be evaluated. Finally, the energy cost can be represented in any one of the standard units of measure, e.g., aerobic points, kcal, etc.

An accurate quantification of the total energy cost of exercise is important for a number of reasons. First, when research studies are performed which involve physical activity, an accurate quantification of the energy cost must be made. For example, if an investigation is being made into

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the effect of training a particular way, an evaluation of the energy cost for each exercise session over the training period will have to be made.

Second, quantification of exercise is desirable for any personal exercise program. Historical information can be kept if each exercise session can be quantified, and this may be related to an individual's associated health as measured periodically in laboratory. Third, medically supervised cardiovascular fitness health centers, such as YMCA's and the Aerobics Activities Center in Dallas, desire to evaluate the energy cost for the exercise performed by the individual so that feedback information can be provided and his exercise information can be subsequently correlated with periodic health examinations which include a maximal performance exercise stress test using multi-lead EKG monitoring (6).

The problem arises as to the most appropriate way to quantify the exercise for such cases. When the sample size is relatively small (less than 50-100), a simple data recording form and hand calculations may be satisfactory. In such cases, a tabular format is provided, the exercise is written down (usually at the time it is performed), and using the necessary function for the mode of exercise to evaluate the energy cost from intensity and duration, calculations are performed by hand or using a calculator to evaluate energy cost.

However, when the sample size is quite large (in the order of 500-1000), it becomes difficult and unwieldy to quantify the physical activity. It takes too many people to record the exercise sessions. Also, performing the calculations for the energy cost could be very time consuming.

Given the desirability to quantify exercise for large populations on a longitudinal basis at the Aerobics Activity Center in Dallas, the purpose of this project was to develop a rigorously defined recording form and an automated data processing system so that an accurate quantification of the total energy cost for physical activity of the members of the Aerobics Activity Center could be accomplished.

Methods

The Aerobics Activity Center in Dallas is a medically supervised cardiovascular conditioning center. The physical plant includes two indoor hand ball courts, a basketball court, 22 lap per mile banked indoor track, four outdoor tennis courts, a 25-yard swimming pool, and a quarter mile/half mile Tartan jogging trail. Presently, there are approximately 900 members who exercise on a regular basis. All members must have been previously screened via a maximal performance treadmill stress test using multilead EKG monitoring and must be cleared for unrestricted exercise or restricted exercise under medical supervision.

Because a requirement for membership is a maximal performance treadmill stress test and a follow-up stress test at least at 3-year intervals, it became desirable to quantify the exercise for the membership for two primary reasons: 1) the energy cost could be correlated with the exercise tolerance values recorded during the stress test, and 2) frequent periodic feedback of information providing a summary of the member's exercise during the previous month would instill positive reinforcement to his exercise program.

A recording form was designed in early 1973. This recording form was utilized for the entire Aerobics Activity Center membership beginning in August, 1973. After one year, this form was revised to help reduce the number of errors in the recording process by the membership; no new information was added at that time. The recording forms are kept in an alphabetical file on the locker room counter so that each member may complete the log while he is cooling off after his exercise session. At the end of each month, the forms are collected for processing and a new set of forms are made available. The forms are printed using two different colors of stock so that the membership will be aware that a new recording form is being employed.

The first step in the processing involves a hand check of each card to catch obvious errors in recording by the AAC members. The forms are then key punched over a 24-hour period using an outside local keypunch service. The punched cards (usually about 3000) are then run through a computer program called ELOG (for Exercise LOG program) which verifies the input data, calculates the energy cost (expressed as Cooper aerobics points), stores the exercise data in a central data base according to the member identification number, and then produces a report for each member. The generated reports are checked by hand to catch any obvious remaining errors, and finally, the reports are mailed to the members. The processing flow is shown graphically in Figure 1.

The ELOG program was originally written to process each recording form in a sequential basis and produce a corresponding report on a standard computer printer. No data was saved from one month to the next. By the end of 1974, it became desirable to have the generated report also include the member's name and address to facilitate the mailing of the report via an envelope with a see-through window. In addition, it became desirable to place all of the information into a central data base so that subsequent longitudinal analysis could be made. To accomplish this, a unique member identification was created so that there would be no ambiguity in storing the information. The new member ID includes a check digit to reduce errors in the recording process. These changes were implemented during early 1975 and the revised recording form and computer generated report have become operational.

The ELOG program was coded using the FORTRAN language and, with some modification, it can be converted to operate on almost any computer with FORTRAN capability. Presently, the program operates on a Xerox* Sigma-7 computer at Wadley Institutes for Molecular Medicine in Dallas. ELOG utilizes the Xerox Extended Database Management System (7) to maintain a central integrated database of exercise and cardiovascular examination data. The reports are prepared by a Xerox 1200 printing system.

The ELOG program presently calculates energy cost according to Cooper aerobic points (1, 2, 3). In the first version of the program (August, 1973 - August, 1974), the calculation of energy cost (aerobic points) was accomplished totally by table look-up. The Appendices from The New Aerobics (3) which contain the aerobic point values for many modes of exercise were placed in a computer file. Linear interpolation between both intensity and duration were utilized to give an evaluation for the aerobic point score or energy cost.

In the current version of the ELOG program, two linear modeling equations have been utilized to give a

*Xerox no longer manufactures mainframe computers; service and possible future engineering will be performed by Honeywell, Inc.

more consistent evaluation of the energy cost for the running exercises. The models were developed by graphical analysis of the point score vs. velocity and time. The other events still employ table look-up techniques.

Results

A copy of the exercise log recording form currently in use at the Aerobics Activity Center is shown in Figure 2. The member supplies his name in free-text format, sex, and unique ID number in the form of ACxxxxx. This number provides the primary key to the database, and the inclusion of a check digit greatly reduces the chance of identifying someone in the database incorrectly. The exercise log allows one or more bouts of exercise to be recorded per day with one entry made per bout of exercise, e.g., notice the "interval" type of workout where many short running segments were performed during one day in Figure 4. The reverse side of the form contains an additional 64 possible entries.

To aid the individual in completing his exercise form, a detailed set of instructions (Figure 3) was composed. Each new member receives a copy of the instruction sheet, is taught by one of the Assistant Directors in the AAC how to complete the log, and a large bulletin board display is used to remind the user to fill out the form every time he exercises. On occasion, a special set of blank exercise logs are prepared for those members who did not complete an exercise log during the previous month. An appropriate message to encourage the member to complete his form is enclosed.

A sample of the first version of the computer generated aerobics exercise log report is shown in Figure 4. Aerobic points are calculated for the individual exercise as well as a summary giving total aerobic points and average aerobic points per week. Year-to-date totals are also provided for quantity of exercise for each mode performed.

A sample of the current version of the exercise log report is shown in Figure 5. This report is prepared utilizing the Xerox 1200 printing system. An overlay provides the logo, titles, column headings, row shading, and horizontal-vertical lines. The ELOG program generates the individual entries, including any error codes, and the summary report at the bottom of the page. The report was designed so that it could be folded in half lengthwise and inserted into an envelope with a see-through window.

Discussion

The exercise log processing system has been shown to be a cost effective and accurate way to quantify physical activity on a longitudinal basis for a large number of subjects. Studies utilizing this information and correlating it with exercise treadmill stress test information are currently underway. It should be pointed out that there are some inconsistencies in the aerobic point assignments for different modes of exercise (8). These inconsistencies are primarily due to the original table evaluations published by Cooper being determined by empiricle methods. Many of the inconsistencies in the point score evaluation for the running exercises have been eliminated as a result of using the linear models. Further research, of course, into more exact evaluations of energy cost will be necessary.

Now that the system is operational, the monthly cost for verifying the exercise log forms, keypunching the information, running the ELOG program, examining the preliminary results, making hand corrections, and finally producing the final report is less than $1.00 per exercise log per month.

It should be pointed out that there could be substantial problems in quantifying exercise from many thousands of individuals. Requiring the individual to record his exercise on the exercise form results in errors in five to ten percent of the cases. Most of these errors are caught during the scan made before the data is keypunched. However, the hand scanning, along with the keypunch process, are the most time consuming portions of the entire process. If a very large number of forms, say in the tens of thousands, were to be processed, this method might not be as effective or economical. The numeric information could possibly be processed by OCR techniques which would reduce the bottleneck of converting the exercise data into a machine readable format.

Many of the errors which are typically made could be caught if an intelligent data entry system were utilized. With such a system, the user would enter his information into a computer terminal which would have logic, either locally or remote, to verify his data as being valid and reasonable. Intelligent data entry results in a number of improvements: 1) a large number of the typical errors are caught at the time the exercise is recorded, 2) the data is captured directly in machine readable form and does not have to be keypunched (this is usually referred to as source data automation), and 3) the calculation logic for the energy cost can be done at the same time the individual enters his data. Thus, feedback information can be provided which explains to the individual exactly how much exercise, in terms of energy cost, he has done. The novelty of using a computer terminal encourages individuals to record their exercise. Such a system is currently going under feasibility analysis using a Datapoint mini-computer system.

This study has investigated the quantification of exercise by automated means for a large number of individuals. It has proven to be cost effective and very well accepted by those who complete their forms. It is hoped that this information will help quantify the relation between exercise levels and associated health information obtained in the laboratory. Such longitudinal analysis could, for example, begin to establish what relation, if any, exists between levels of fitness and subsequent incidence of cardiovascular disease (9).

References

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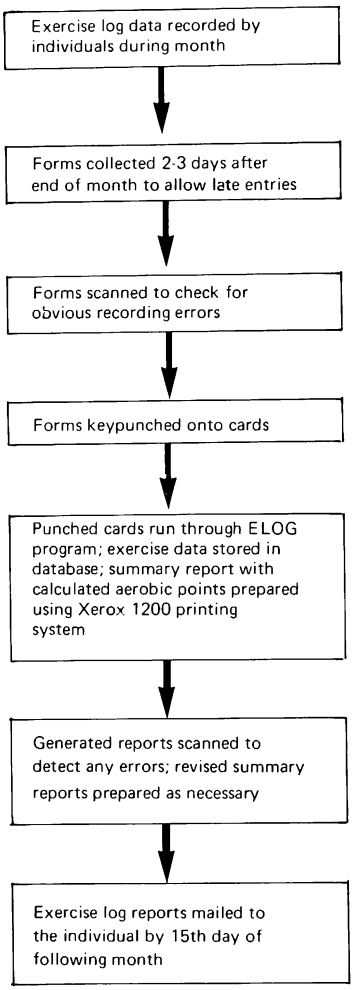

Figure 1. Processing Flow for the Computerized Exercise Log

AEROBICS EXERCISE LOG

The Aerobics Center / 12100 Preston Rd. / Dallas, Tx. 75230

NAME. (LAST NAME, FIRST NAME) ____________________ SEX Male [ ] Female [ ] Identification Number ________

ACTIVITY CODES:	ALLOWABLE UNITS	CODES	UNITS:	CODES
01 = JOGGING/RUNNING	MI, YD	11 = BADMINTON (SINGLES)	SE, GM	21 = LACROSSE
02 = WALKING	MI, YD	12 = BADMINTON (DOUBLES)	SE, GM	22 = FOOTBALL
03 = STATIONERY RUNNING	SM (STEPS PER MIN)	13 = STAIR CLIMBING	RT (ROUND TRIPS)	23 = SKIING
04 = CYCLING	MI	14 = WALK/JOG	MI, YD	24 = VOLLEYBALL
05 = STATIONERY CYCLING	(ENTER BODY WT IN DISTANCE, LOAD IN UNITS)	15 = TREADMILL	(ENTER MPH IN DISTANCE & ELEVATION IN UNITS)	25 = HANDBALL
06 = SWIMMING	MI, YD	16 = GOLF	HO	26 = BASKETBALL
07 = TENNIS (SINGLES)	SE, GM	17 = CALISTHENICS		27 = SQUASH
08 = TENNIS (DOUBLES)	SE, GM	18 = ROPE SKIPPING		28 = WRESTLING
09 = AERIAL TENNIS (SINGLES)	SE, GM	19 = HOCKEY		
10 = AERIAL TENNIS (DOUBLES)	SE, GM	20 = SOCCER		

ACTIVITY CODES 17 - 28 REQUIRE DURATION ONLY

** CURRENT MONTH: (JAN. = 01 . . . DEC. = 12) [ ] CURRENT YEAR: 19[ ] CURRENT WEIGHT [ ] **

Month	Day	Activity	Distance	Units	Duration (HRS : MINS : SECS)	Month	Day	Activity	Distance	Units	Duration (HRS : MINS : SECS)
			.		: :				.		: :
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(CONTINUE ON REVERSE SIDE)

Figure 2. Sample Aerobics Exercise Log Recording Form

Institute for Aerobics Research
11811 Preston Road
Dallas, Texas 75230
(214) 661-3374

INSTRUCTIONS FOR USING THE MONTHLY EXERCISE LOG

Introduction

Please use the exercise log to record your aerobics workout. The information you provide will be given to a computer for processing. We will calculate your aerobic points and will give you a computer generated summary of your month's activities. This information will allow us to correlate your daily exercise with your treadmill stress test performance, and it will also help us carry out The Dallas Study which we hope will determine the relation between exercise and the possible prevention of heart disease.

Instructions

Please **print**, using all capital letters, with one letter or number to a box.

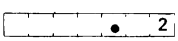
Place the mileage you have logged previously in the "starting value" column.

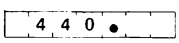
Please use decimals instead of fractions if your total-to-date includes parts of miles.

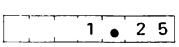
Day. Place date (day of the month) in the first column. Use 2 digits for all dates, i.e., 1....9 are written as 01....09. If you have no activity to record for a given day, just number the next line with the next date you do record exercise. Do not skip lines for skipped days.

Activity. Write the code of your exercise activity as found in the list at the top of the exercise log. If an exercise activity is not listed, the aerobic point values for it have not been determined. You may keep a record of that activity by using any 2-digit code from 21 to 99, but aerobic points will not be calculated for that activity.

Distance. Write the distance or amount in the third column. Please adjust this number around the decimal point, e.g., if you covered 2 miles, place the "2" like this:

not like this:  or 

Similarly 440 yards would be placed: 

and 1 1/4 miles would be placed: 

For **stationary running**, put the number of steps per minute as the distance. For a workout on the **treadmill**, put the speed (in mph) in this space.

Units. Place the unit of measurement in column 4. For games like **tennis or aerial tennis** the unit will be SE (set) or GM (game). For **stair climbing**, use ST (stair); for **golf**, use HO (holes). For **stationary running**, the unit will be SM (steps/minute). If you use the **treadmill**, this column is where you record the percent elevation from 00 to 25. For stationary cycling, use this column to record the tension. Use 10 for a tension of 1, 15 for 1½, 20 for 2 and so on.

Duration. Place the duration of time you spent on your exercise activity here.

For some sports such as tennis and golf, the distance and units columns will be used to record the number of sets or holes played and the duration column will be left blank. For other sports like soccer, the duration only will be recorded, and the distance and units left blank. Refer to the back of **The New Aerobics** for clarification on what to record.

Figure 3. Instructions for Using the Aerobics Exercise Log

AEROBICS EXERCISE LOG

PURDY, J GERRY BODY WT. 156 LBS. MALE DEC, 1973

DAY	ACTIVITY	DISTANCE/QTY	DURATION	AEROBIC POINTS
02	JOGGING/RUNNING	9.00 MI	1:03:19	58.77
03	JOGGING/RUNNING	.50 MI	4:00	2.50
03	JOGGING/RUNNING	440.00 YD	1:28	1.69
03	JOGGING/RUNNING	110.00 YD	0:45	.19
03	JOGGING/RUNNING	440.00 YD	1:28	1.69
03	JOGGING/RUNNING	110.00 YD	0:45	.19
03	JOGGING/RUNNING	440.00 YD	1:28	1.69
03	JOGGING/RUNNING	110.00 YD	0:45	.19
03	JOGGING/RUNNING	440.00 YD	1:28	1.69
03	JOGGING/RUNNING	110.00 YD	0:45	.19
03	JOGGING/RUNNING	1.00 MI	6:45	5.83
03	JOGGING/RUNNING	2.25 MI	16:19	13.74
04	JOGGING/RUNNING	3.00 MI	22:00	18.32
04	JOGGING/RUNNING	2.00 MI	14:45	11.82
05	JOGGING/RUNNING	5.00 MI	32:45	33.81
06	JOGGING/RUNNING	5.00 MI	34:45	32.48
08	JOGGING/RUNNING	7.00 MI	50:03	44.94
09	JOGGING/RUNNING	5.00 MI	33:19	33.43
10	JOGGING/RUNNING	3.00 MI	23:00	17.66
10	JOGGING/RUNNING	.50 MI	2:38	3.80
10	JOGGING/RUNNING	.50 MI	5:00	2.00
10	JOGGING/RUNNING	.50 MI	2:36	3.84
10	JOGGING/RUNNING	.50 MI	5:00	2.00
10	JOGGING/RUNNING	440.00 YD	1:10	2.00
10	JOGGING/RUNNING	440.00 YD	2:30	1.00
10	JOGGING/RUNNING	440.00 YD	1:17	1.93
10	JOGGING/RUNNING	440.00 YD	2:30	1.00
11	JOGGING/RUNNING	5.00 MI	33:39	33.21
12	JOGGING/RUNNING	.50 MI	4:00	2.50
12	JOGGING/RUNNING	1.00 MI	5:37	7.16
12	JOGGING/RUNNING	.50 MI	5:00	2.00
12	JOGGING/RUNNING	.50 MI	2:46	3.62
12	JOGGING/RUNNING	.50 MI	5:00	2.00
12	JOGGING/RUNNING	440.00 YD	1:23	1.80
12	JOGGING/RUNNING	440.00 YD	2:30	1.00
13	JOGGING/RUNNING	5.00 MI	35:39	31.88
14	JOGGING/RUNNING	.50 MI	5:00	2.00
14	JOGGING/RUNNING	440.00 YD	1:25	1.76
14	JOGGING/RUNNING	440.00 YD	2:34	.96
14	JOGGING/RUNNING	440.00 YD	1:23	1.80
14	JOGGING/RUNNING	440.00 YD	2:34	.96
14	JOGGING/RUNNING	440.00 YD	1:20	1.87
14	JOGGING/RUNNING	440.00 YD	2:34	.96
14	JOGGING/RUNNING	440.00 YD	1:18	1.91
14	JOGGING/RUNNING	440.00 YD	2:34	.96
14	JOGGING/RUNNING	440.00 YD	1:21	1.84
14	JOGGING/RUNNING	440.00 YD	2:34	.96
14	JOGGING/RUNNING	440.00 YD	1:20	1.87
14	JOGGING/RUNNING	440.00 YD	2:34	.96

AEROBICS EXERCISE LOG

PURDY, J GERRY BODY WT. 156 LBS. MALE DEC, 1973

DAY	ACTIVITY	DISTANCE/QTY	DURATION	AEROBIC POINTS
14	JOGGING/RUNNING	440.00 YD	1:19	1.89
14	JOGGING/RUNNING	440.00 YD	2:34	.96
14	JOGGING/RUNNING	440.00 YD	1:13	2.00
14	JOGGING/RUNNING	.75 MI	7:30	2.99
15	JOGGING/RUNNING	3.00 MI	21:15	18.82
17	JOGGING/RUNNING	8.00 MI	55:00	52.99
18	JOGGING/RUNNING	4.00 MI	32:26	22.77
19	JOGGING/RUNNING	5.00 MI	36:05	31.59
20	JOGGING/RUNNING	5.00 MI	34:45	32.49
21	JOGGING/RUNNING	3.00 MI	24:39	16.66
22	JOGGING/RUNNING	7.00 MI	49:00	45.66
24	JOGGING/RUNNING	9.00 MI	1:07:30	55.99
26	JOGGING/RUNNING	4.00 MI	28:19	25.43
27	JOGGING/RUNNING	6.00 MI	40:11	40.19
28	JOGGING/RUNNING	5.00 MI	35:34	31.93
29	JOGGING/RUNNING	7.00 MI	49:54	45.04
30	JOGGING/RUNNING	5.00 MI	33:45	33.16

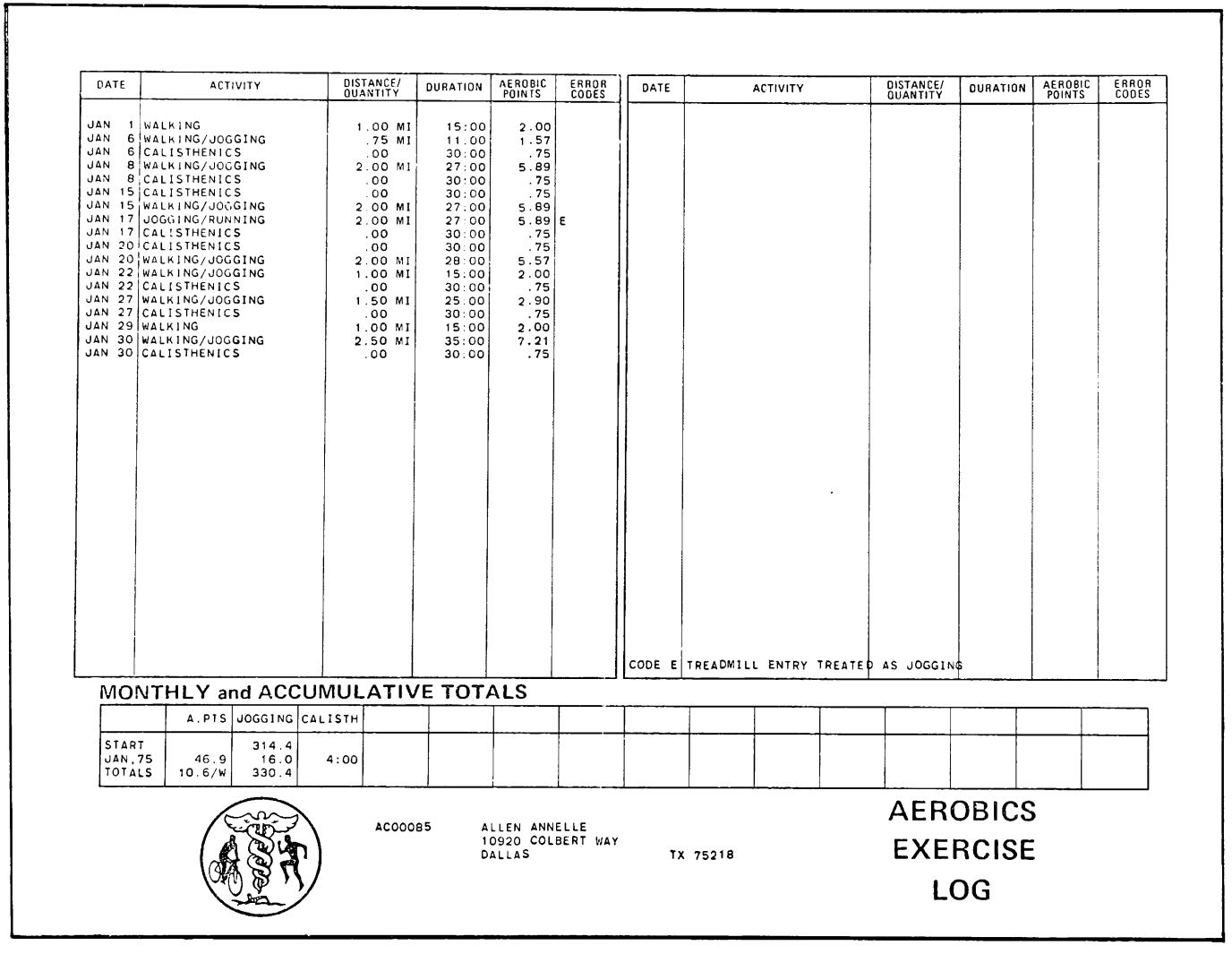
SUMMARY STATISTICS FOR DEC, 1973

ACTIVITY	MONTH	TOTAL
JOGGING/RUNNING	136.50 MI	15742.50 MI
TOTAL MILEAGE	136.50 MI	15742.50 MI

AEROBIC POINTS FOR THIS MONTH = 862.8

AVERAGE AEROBIC POINTS PER WEEK = 194.8

Figure 4. Sample Aerobics Exercise Log Computer Generated Report (First Version)



DATE	ACTIVITY	DISTANCE/ QUANTITY	DURATION	AEROBIC POINTS	ERROR CODES
JAN 1	WALKING	1.00 MI	15:00	2.00	
JAN 6	WALKING/JOGGING	.75 MI	11.00	1.57	
JAN 6	CALISTHENICS	.00	30:00	.75	
JAN 8	WALKING/JOGGING	2.00 MI	27:00	5.89	
JAN 8	CALISTHENICS	.00	30:00	.75	
JAN 15	CALISTHENICS	.00	30:00	.75	
JAN 15	WALKING/JOGGING	2.00 MI	27:00	5.89	
JAN 17	JOGGING/RUNNING	2.00 MI	27:00	5.89	E
JAN 17	CALISTHENICS	.00	30:00	.75	
JAN 20	CALISTHENICS	.00	30:00	.75	
JAN 20	WALKING/JOGGING	2.00 MI	28:00	5.57	
JAN 22	WALKING/JOGGING	1.00 MI	15:00	2.00	
JAN 22	CALISTHENICS	.00	30:00	.75	
JAN 27	WALKING/JOGGING	1.50 MI	25:00	2.90	
JAN 27	CALISTHENICS	.00	30:00	.75	
JAN 29	WALKING	1.00 MI	15:00	2.00	
JAN 30	WALKING/JOGGING	2.50 MI	35:00	7.21	
JAN 30	CALISTHENICS	.00	30.00	.75	

DATE	ACTIVITY	DISTANCE/ QUANTITY	DURATION	AEROBIC POINTS	ERROR CODES

CODE E TREADMILL ENTRY TREATED AS JOGGING

MONTHLY and ACCUMULATIVE TOTALS

	A.PTS	JOGGING	CALISTH
START		314.4	
JAN.75	46.9	16.0	4:00
TOTALS	10.6/W	330.4	

AC00085 ALLEN ANNELLE
10920 COLBERT WAY
DALLAS TX 75218

AEROBICS
EXERCISE
LOG

Figure 5. Sample Aerobics Exercise Log Computer Generated Report (Current Version Using a Xerox 1200 Printing System)