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Injuries Arising From Aerobic Fitness Classes

SUMMARY

Aerobic fitness classes are a popular form of exercise for many people. A questionnaire survey of 410 participants and a clinical review of 100 patients presenting for treatment, showed that 67.3% of respondents had significant pain resulting from the classes, but only 21% stopped exercising because of it. The majority of injuries are to the lower extremities, including tibial stress syndrome and patellofemoral pain. This study suggests that most of these injuries are preventable, especially by advice on proper footwear, pace of activity, how many classes to attend and how frequently to increase activity. (Can Fam Physician 1985; 31:1517-1520.)

SOMMAIRE

Pour bien des gens, les cours d'exercices aérobiques constituent une forme populaire de maintien de la forme physique. Un questionnaire distribué à 410 participants et une revue clinique de 100 patients se présentant pour traitement a révélé que 67.3% des répondants ont éprouvé des douleurs significatives à la suite de tels cours, mais que seulement 21% ont cessé les exercices à cause de ces douleurs. La majorité des blessures se situent aux membres inférieurs et incluent le syndrome tibial d'effort et la douleur fémoro-patellaire. Cette étude suggère qu'il est possible de prévenir la plupart de ces blessures, particulièrement par des conseils sur les chaussures appropriées, le rythme de l'activité, le nombre de cours auxquels participer et comment augmenter la fréquence de l'activité.

Key words: Aerobics, injury, prevention

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AEROBIC FITNESS classes have rapidly become one of the most popular exercise activities in North America. Classes are organized under a variety of names—Jazzercise, Enerfit, Dyna-fit, S.W.E.A.T. Fitness, Aerobic Dance, etc. They are held at local schools, halls and fitness centres. Most health spas, community parks and recreation departments and YMCA-YWCAs have a regular schedule of classes. In addition, there is a large variety of television programs, records and videotapes allowing a 20-50 minute workout in the comfort

of your living room. Officials at the British Columbia Recreation Association (BCRA) estimate that approximately 200,000 people in the Greater Vancouver area (population 1.3 million) participate in at least one exercise class per week. The BCRA is involved in organizing, training or licensing the majority of fitness programs in this city; however, the large number of private and home programs make it impossible to determine an exact number of participants.

Aerobic fitness classes last 45-60 minutes and consist of rhythmic movements of large muscle groups following the lead of a class instructor in time to recorded dance music. There is generally a 10-12 minute period of warm-up exercise followed by 15-20 minutes of sustained high intensity aerobic activity, finishing with two or three min-

utes of cool-down exercises. The second half of the class is done on floor mats from the sitting, supine or kneeling positions. There are 18-20 minutes of medium intensity exercises, finishing with 10-12 minutes of stretching and flexibility exercises. The purpose of these classes, from the instructors' viewpoint, is to improve cardiovascular (aerobic) fitness and general flexibility by exercising each muscle group.

With this rise in participation in aerobic fitness classes, physicians are seeing more patients with injuries sustained as a direct result of classes.

Method

From November 1983 to October 1984 I reviewed charts of 100 patients presenting to my office with injuries

resulting from aerobics classes. The results of this review are shown in Table 1. For each of these patients, the history included details of the injury as well as of the aerobics program involved—(number of classes per week, recent change in frequency, type of shoes worn, other forms of exercise and presence of any pre-existing injury). The physical exam included not only the injured part, but also examination of leg and foot alignment, stance, gait pattern and shoe wear.

Following this clinical review, I became interested in knowing how many participants had some pain or injury but did not feel they needed medical attention. A one page questionnaire asking information about the participant, the type of aerobic program attended and any physical problems arising as a result of class participation was distributed among the classes of five local fitness instructors. Surveys were given out at random to people as they came to class; each person completed and returned the form within

one week. Approximately 800 surveys were distributed; 410 were completed and returned. Results are summarized in Tables 2-4.

Results

Although more and more men are starting to participate in aerobics classes, the average participant, according to the survey (Table 2) is a woman in her mid-twenties who attends three or four classes per week. The main reason for attending is "to get in shape"; the second most common reason was "because it's fun" (Table 3).

Of respondents to the questionnaire, 53% stated that aerobics classes are their *only* form of exercise. Of the remaining 47%, almost half admitted they do no other *aerobic* activity. These people included such activities as bowling, horseback riding and dancing as their "other forms of exercise". Thus only 25% of the respondents included aerobics classes as part of an overall fitness program in addition to running, cycling, swimming and other regular exercise.

A total of 276 respondents (67.3%) admitted to having significant pain in some parts of their body due to class participation (Table 4), yet only 86 (21%) had to stop going to classes because of the pain. Of the injuries, 80.5% occurred to the back or lower extremities; the shin was the most commonly affected site (40%).

The results of the questionnaire correlated very closely with the results of the clinical review (Table 1). The average patient presenting in the office during the time of this review was a woman in her late twenties who attended four to five classes per week; 70% said aerobics classes were their only form of exercise. Almost half (44%) of these patients had increased their exercise frequency six weeks before the onset of symptoms. The type of pain and injury experienced were very similar to the survey respondents; the shin was again the most frequent injury site.

Discussion

Only a very few aerobics class participants regularly engage in any other forms of exercise; the majority of aerobics participants can therefore be classed as relatively unconditioned recreational athletes. Aerobics are viewed as a good way to get into shape and to have fun doing it. Whether aerobic classes achieve this goal has been the subject of some debate.^{1, 2} There seems little doubt now that these classes *can* improve general fitness level both subjectively (Table 3) and objectively.³

That only 86 of 276 aerobics participants stopped exercising due to pain suggests that most people put up with the pain and did not think the injury re-

TABLE 1
Aerobics Participants Seeking Medical Advice

	No. of Patients	
	M	F
	100	1
		99
No. of injuries	107	
Age—Average	29	
—Range	24-34	
No. of classes per week	4.25	
No. who do no other regular exercise	70	
Recent increase in workouts	44	
Aerobic Fitness Injuries		
(n=107)		
Tibial stress syndrome	42	
Patellofemoral pain	19	
Back pain	8	
Anterior and/or posterior compartment strain	5	
Hip pain	5	
Arch strain or plantar fasciitis	4	
Achilles tendonitis	3	
Other (each <2%) (includes hamstring strain, gluteal strain, shoulder pain, wrist sprain, tachycardia)	21	
Common Causes		
Overuse syndrome	48	
Biomechanics		
—Hyperpronation	32	
—Arch abnormality	19	
Poor footwear	27	

TABLE 2
Characteristics of Questionnaire Respondents

	No. of respondents	
	M	F
	410	34
		376
Age—Average	27.2	
—Range	14-67	
No. of classes per week—Average	3.3	
—Range	1-14	
Type of shoes worn		
Jogging	217(53%)	
Aerobic	70(17%)	
Inadequate	119(29%)	
Don't know	4(1%)	
No. who do no other exercise	207(50.5%)	

TABLE 3
Reasons for Attending Aerobics Classes (n=410)

To get in shape/stay in shape	236(57.6%)
Because it's fun/social activity	97(23.7%)
To lose weight	64(15.6%)
To feel better about myself	46(11.2%)
To increase cardiorespiratory reserve and improve flexibility	33(8.0%)
To relieve stress and tension	27(6.6%)

TABLE 4
Injuries Occurring Among Survey Respondents (n=410)

No. with painful injury	276(67.2%)
No. with recent increase in workouts	131 (31.9%)
No. who stopped due to pain	86 (20.1%)
Type of injury	
Shin splints (pain in one or both shins)	164 (40%)
Back pain	96 (23.4%)
Knee pain	93 (22.7%)
Leg muscle cramps	85 (20.7%)
Upper extremity pain	80 (19.5%)
Arch or instep pain	48 (11.7%)
Other foot pain	49 (11.7%)

PARAFON FORTE C8

chlorzoxazone, acetaminophen and codeine



PRESCRIBING INFORMATION

THERAPEUTIC CLASSIFICATION: Analgesic Muscle Relaxant.

INDICATIONS: PARAFON FORTE C8 tablets with codeine are indicated as an adjunct to rest and physical therapy for the symptomatic relief of mild to moderate pain, associated with acute painful musculoskeletal disorders and cervical and disc syndromes.

CONTRAINDICATIONS: Hypersensitivity to any of the three components (chlorzoxazone, acetaminophen, codeine).

WARNINGS: Drowsiness can occur with the use of PARAFON FORTE C8 tablets with codeine and may be additive to drowsiness from the concomitant use of alcohol or other central nervous system depressants. Patients should be cautioned about driving a car or operating potentially hazardous machinery if they become drowsy or show impaired mental or physical abilities while taking this medication.

This product contains codeine which can produce drug dependence of the morphine type and, therefore, has the potential for being abused.

PARAFON FORTE C8 tablets with codeine are not recommended during pregnancy or lactation, since safety in pregnant women or nursing mothers has not been established.

Because safety and effectiveness of PARAFON FORTE C8 tablets with codeine in children have not been established, such use is not recommended.

PRECAUTIONS: Use with caution in patients with known allergies or with a history of allergic reactions to drugs. PARAFON FORTE C8 tablets with codeine should be discontinued if a sensitivity reaction occurs such as urticaria, redness or itching of the skin.

PARAFON FORTE C8 tablets with codeine are not recommended for patients with liver disease, and should be discontinued if any signs or symptoms suggestive of liver dysfunction occur.

ADVERSE EFFECTS: Most frequently observed are central nervous system effects such as dizziness, lightheadedness, drowsiness, overstimulation, or malaise. These may be alleviated if the patient lies down.

Occasionally, gastro-intestinal effects such as nausea and vomiting. Constipation may develop after long-term use.

Rarely discoloration of the urine may be observed, resulting from a phenolic metabolite of chlorzoxazone. This is of no known clinical significance.

Rarely allergic type skin rashes, petechia, ecchymoses. Angioneurotic edema or anaphylactic reactions are extremely rare.

DRUG INTERACTIONS: None of great clinical significance.

OVERDOSE SYMPTOMS: The manifestation of an overdose of PARAFON FORTE C8 tablets with codeine are those of chlorzoxazone and acetaminophen overdose, combined with an exaggeration of the adverse effects of codeine.

Chlorzoxazone: Initially, gastro-intestinal disturbances, nausea, vomiting, or diarrhea together with drowsiness, dizziness, lightheadedness or headache.

Then malaise or sluggishness which may be followed by loss of muscle tone and voluntary movement.

Acetaminophen: Early symptoms of acetaminophen overdose overlap the symptoms of codeine overdose and include gastro-intestinal irritability, nausea, vomiting, anorexia, diaphoresis and general malaise. Symptoms of hepatic necrosis may become evident from three to five days following ingestion.

Codeine: In sufficient overdose, codeine can cause euphoria, dysphoria, miosis, a decrease in respiratory rate, cyanosis and hypotension. Death due to respiratory failure may result.

TREATMENT: The stomach should be emptied promptly by lavage or induction of emesis with syrup of ipecac, followed by administration of activated charcoal.

The hepatotoxic effect of acetaminophen overdose can be countered with the antidote N-acetylcysteine. Further information on the clinical course of acetaminophen overdose and its treatment with N-acetylcysteine is available from McNeil Pharmaceutical (Canada) Ltd. The respiratory depressant effect of codeine overdose can be countered with a specific narcotic antagonist such as naloxone. In the presence of hypoventilation or apnea, oxygen should be administered and respiration assisted or controlled. A patent airway must be maintained.

Hypotension may be counteracted by administration of norepinephrine.

Cholinergic drugs or analeptic drugs should not be used.

ADULT DOSAGE:

PARAFON FORTE C8 tablets with codeine: 1 or 2 tablets 4 times a day, not to exceed 8 tablets in a 24-hour period.

DOSAGE FORM:

PARAFON FORTE C8 tablets with codeine: Each tablet imprinted PARAFON FORTE C8 one side and "M" on the reverse, contains: chlorzoxazone 250 mg, acetaminophen 300 mg, and codeine phosphate 8 mg.

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quired professional help. The 100 patients seen in the office therefore seem to represent the most severe aerobic fitness injuries. This group of participants tended to be slightly older, attended more classes per week, had a higher rate of recent training increase, and more frequently cited aerobics classes as their only form of exercise when compared with the average aerobics participant in the larger survey.

An overuse syndrome was suggested if the patient had recently started a regular aerobics program or had recently increased the number of workouts per week. Overuse is obviously a major cause of aerobic fitness injury. As in most weightbearing activities, biomechanical abnormalities contribute to the injury in a significant number of cases. Aerobics classes contain many different exercise moves, including much on-the-spot running and jumping. All of the force and shock of repeated landings must be absorbed vertically between the floor, the shoe, the foot and the lower leg. It is not surprising, then, that poor footwear contributed to injury in one of four cases. Sneakers, simple court shoes or other shoes with poor support and cushioning were considered inadequate for aerobics participation.

Clearly, physicians and fitness instructors can do much to prevent the majority of serious aerobic fitness injuries. We should advise our patients/participants of several important points:

1. Start with only two or three classes per week. Using the 10% per week rule for increasing exercise level, they should add one class per week every three to four weeks.
2. Choose a good pair of exercise shoes. I recommend a good jogging shoe, a high quality court shoe (although some lack adequate lateral support) or one of the newer aerobics shoes. Athletic shoe researchers would do well to continue research and development of a good aerobics shoe—one that ideally will incorporate good shock absorption throughout the sole while keeping firm heel and lateral support, light weight and flexibility.
3. Exercise at your own pace: do not try to duplicate the moves of the instructor, who likely does one or two classes per day.
4. Choose a good aerobics program. Many groups exist with instructors who have little or no training in fitness methods. Several groups, including

the BCRA and the International Dance-Exercise Association (in conjunction with the American College of Sports Medicine⁴) have recently introduced fitness instructor certification programs to ensure an adequate level of training. A good aerobics program should have:

—instructors trained and qualified in fitness and safety.

—an adequate number of classes per week with the possibility of varying the intensity of the workout.

—periodic safety monitoring and pulse checks during the workout.

—adequate warm-up and cool-down periods.

—ideally have a medical consultant to advise instructors and participants of potential dangers and problems.

5. Report to a physician with any pain lasting longer than 24 hours or recurring with each workout.

Conclusion

Aerobic fitness classes are a very popular and beneficial form of exercise; they are also fun, which keeps people coming out to participate. More and more physical complaints are being seen from these classes, tibial stress syndrome ("shin splints") being the most common. The majority of these injuries are overuse injuries and can therefore be prevented; we need only advise participants in a few key areas. Armed with this information, we should be able to keep more of these participants going to classes, and therefore help turn them into conditioned recreational athletes.

Acknowledgements

I wish to thank Maggie Brinton, Paula Stockdale, Leslie Tuft, Melanie Leah and Wendy Carr for their assistance with this study. ●

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