

1991

Athletic injury rehabilitation adherence

Sharon Ann Mullins
Ithaca College

Follow this and additional works at: http://digitalcommons.ithaca.edu/ic_theses



Part of the [Sports Sciences Commons](#)

Recommended Citation

Mullins, Sharon Ann, "Athletic injury rehabilitation adherence" (1991). *Ithaca College Theses*. Paper 188.

ATHLETIC INJURY REHABILITATION ADHERENCE

by

Sharon Ann Mullins

An Abstract

of a thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in the Division
of Health, Physical Education,
and Recreation at
Ithaca College

September 1991

Thesis Advisor: Dr. A. Craig Fisher

ITHACA COLLEGE LIBRARY

ABSTRACT

This study investigated gender and experience differences of sports medicine specialists' (SMSs') rehabilitation adherence attitudes and judgments and assessed the factors that influence injured athletes' adherence to athletic injury rehabilitation programs. Certified athletic trainers from District 2 of the NATA completed a questionnaire developed by the investigator that focused on the attitudes and judgments of SMSs concerning successful and unsuccessful adherence strategies they have used in their rehabilitation programs. The exercise rehabilitation questionnaire consisted of 60 statements deemed relevant to injury rehabilitation adherence. The statements were categorized into seven scales: trainers' influence, environmental influences, athletes' personality, pain tolerance, self-motivation, goals and incentives, and significant others. ANOVA revealed no significant difference for either gender or experience of subjects for any of the seven scales. An analysis of questionnaire item responses revealed the following as factors important to exercise rehabilitation: (a) good rapport and communication between the SMS and the injured athlete, (b) explanation of the injury and rehabilitation regimen, (c) convenience and accessibility of the rehabilitation facility,

(d) rehabilitation sessions planned around the athlete's busy schedule, (e) belief on the part of the injured athlete that the program is worth attending, (f) personal supervision and regular monitoring, (g) need for the injured athlete to see immediate results, and (h) support from significant others. SMSs reported education, goal setting, encouragement, monitoring progress, and support systems as successful adherence strategies. Threats and rehabilitation without monitoring were reported as unsuccessful strategies.

ATHLETIC INJURY REHABILITATION ADHERENCE

A Thesis Presented to the Faculty of
the Division of Health, Physical
Education, and Recreation
Ithaca College

In Partial Fulfillment of the
Requirements for the Degree
Master of Science

by
Sharon Ann Mullins
September 1991

Ithaca College
Division of Health, Physical Education, and Recreation
Ithaca, New York

CERTIFICATE OF APPROVAL

MASTER OF SCIENCE THESIS

This is to certify that the Master of Science Thesis for
Sharon Ann Mullins

submitted in partial fulfillment of the requirements for
the degree of Master of Science in the Division of
Health, Physical Education, and Recreation at Ithaca
College has been approved.

Thesis Advisor:

Committee Member:

Candidate:

Chairman, Graduate
Programs in Physical
Education:

Dean of Graduate
Studies:

Date:

Aug. 9, 1991

ACKNOWLEDGMENTS

The investigator would like to extend a sincere appreciation to everyone involved in the completion of this thesis.

1. To Dr. A. Craig Fisher, for his expertise, time, and encouragement provided throughout the completion of this study.
2. To Dr. Patricia A. Frye, for her guidance, advice, and support.
3. To Linda Weigand, for her typing expertise.
4. To all friends whose patience and support made it possible for me to complete this thesis.

DEDICATION

I dedicate my thesis to my mother and father, Jim, Karen, Bob, and Dan for their encouragement and support throughout my college career.

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	ii
DEDICATION.	iii
LIST OF TABLES	vii
Chapter	
1. INTRODUCTION.	1
Scope of Problem	4
Null Hypothesis.	5
Assumptions of Study	6
Definition of Terms.	6
Delimitations of Study	7
Limitations of Study	8
2. REVIEW OF LITERATURE.	9
Definitions of Adherence	10
Personal Variables	12
Situational Variables.	15
Prediction of Adherence Behaviors.	19
Barriers to Exercise Adherence	21
Strategies to Enhance Adherence.	23
Summary.	34
3. METHODS AND PROCEDURES.	35
Selection of Subjects.	35
Testing Instruments.	35
Method of Data Collection.	36
Scoring of Data.	36

Chapter	Page
Treatment of Data.	36
Summary.	37
4. ANALYSIS OF DATA.	38
Descriptive Statistics	38
Analysis of Questionnaire Item Responses.	39
Successful and Unsuccessful Adherence Strategies	46
Internal Consistency	48
Gender and Experience Differences. .	48
Summary.	48
5. DISCUSSION OF RESULTS	53
Trainers' Influence.	53
Environmental Influences	56
Athletes' Personality.	58
Pain Tolerance	59
Self-motivation.	60
Goals and Incentives	62
Significant Others	64
Summary.	65
6. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	68
Summary.	68
Conclusions.	69
Recommendations.	71

APPENDIXES

A.	INFORMED CONSENT FORM	72
B.	ATHLETIC INJURY REHABILITATION ADHERENCE QUESTIONNAIRE	73
	REFERENCES.	82

LIST OF TABLES

Table		Page
1.	Analysis of Questionnaire Item Responses	41
2.	Successful and Unsuccessful Rehabilitation Adherence Strategies.	47
3.	Internal Consistency of Adherence Scales	49
4.	Analysis of Variance for Gender and Experience	50

Chapter 1

INTRODUCTION

Exercise rehabilitation programs are designed to return athletes to their maximum potential after injuries have occurred. Sports medicine specialists (SMSs) are trained to evaluate and to assist athletes in the rehabilitation process. Success or failure of athletes to return to competition does not depend solely on the rehabilitation program. It depends primarily on athletes' commitment to their programs and the ability of the SMS to enhance athletes' commitment.

Factors that encourage athletes to stick to a rehabilitation program are of great concern to SMSs in making their rehabilitation programs effective. These factors help the SMS understand why some injured athletes adhere and others do not adhere and what those specialists can do to maximize commitment from athletes. What can the SMS do to enhance injured athletes' adherence? Why do some athletes opt to participate at a submaximal level of their potential when rehabilitation may allow them to perform at their maximal potential? There are many factors that may affect injured athletes' adherence to rehabilitation programs, but the major concern is what factors exert the primary influence on adherence and what can be done to increase injured

athletes' adherence, thereby returning them more quickly to competition and to their maximal potential.

Dishman (1984) divided the factors that influence adherence into two categories: the exerciser and situational factors. Psychological factors are grouped under the exerciser category and include pain tolerance and self-motivation. Pain tolerance refers to the ability to endure pain while performing rehabilitation. Quite often therapy is painful, and injured athletes with a low pain tolerance may significantly decrease their effort, leading to nonadherence. Self-motivated individuals are those who can reinforce themselves and are more apt to finish what they start. Self-motivated individuals do not have to be pushed by others to continue with their programs.

Situational factors include scheduling, support from significant others, the exercise treatment environment, and goal setting. Scheduling scholastic and collegiate athletes for rehabilitation involves working around classes, study schedules, work, and recreational activities. Athletes may not be able or willing to cut into other commitments to attend rehabilitation sessions. The ability to work around athletes' schedules becomes important in getting them to participate in rehabilitation (Dishman, 1984; Ice,

1985). Scheduling also involves how much time rehabilitation sessions will take. Athletes may not have much time to spare to attend a session; thus, sessions should be kept as short as possible.

Support from significant others is another situational factor. Significant others to athletes may include trainers, coaches, and teammates. If significant others are supportive of athletes' efforts, then the athletes are more apt to commit to the rehabilitation program, thus enhancing adherence (Friedman & Litt, 1987; Morisky, 1986; Sallis, 1986). If significant others are not supportive of injured athletes' endeavors, then they may be less motivated and, therefore, less likely to adhere to their rehabilitation.

The exercise setting can play a major role in helping athletes adhere to rehabilitation programs (Fisher, Domm, & Wuest, 1988). The setting should allow athletes to feel comfortable. If athletes are not comfortable with the exercise setting, then they may feel apprehensive about attending their sessions. If rehabilitation facilities are not convenient and accessible, injured athletes might be discouraged from attending exercise sessions and, thereby, decrease their chances for adequate rehabilitation.

Goal setting and commitment to the goal play an important part in adherence (Friedman & Litt, 1987; Wankel, 1985). Athletes need to know that their prescribed programs will benefit them. If athletes do not see any benefits from their programs, then they are more likely to drop out. It can be helpful if athletes have both short- and long-term goals. Short-term goals may involve increasing resistance or merely attending their sessions, whereas long-term goals may be to return to competition or to regain full range of motion.

Nonadherence to exercise rehabilitation programs is a great problem for the SMS and injured athletes. Once the significant factors have been identified, the SMS can use this knowledge to develop strategies for increasing adherence to exercise rehabilitation programs, thus, taking steps towards solving the adherence dilemma.

Scope of Problem

The purpose of this study was to assess the attitudes of athletic trainers concerning the rehabilitation of athletic injuries and their judgments concerning injured athletes' adherence to their rehabilitation. Exercise rehabilitation adherence can be an important step in returning athletes to competition. Athletes' degree of adherence to their

rehabilitation programs may determine how quickly athletes can return to competition or if they can return at all. It is important for SMSs to understand the reasons for adherence or nonadherence to increase the effectiveness of their programs.

The subjects included athletic trainers ($N = 505$) randomly selected from the mailing list of Division 2 of the National Athletic Trainers' Association (NATA). They received a questionnaire containing 60 statements concerning factors of exercise rehabilitation adherence. These factors included trainers' influence, environmental influences, athletes' personality, pain tolerance, self-motivation, goals and incentives, and significant others. The subjects were then asked to provide a short statement of the most successful strategy they have used and to list a strategy that simply has not worked for them.

An analysis of questionnaire item responses assessed the percentage of subjects' agreement and disagreement with each statement. Adherence scales were analyzed for gender and experience differences.

Null Hypothesis

There will be no significant gender or experience differences among SMSs on the exercise rehabilitation adherence factors.

Assumptions of Study

The following assumptions were made for the purpose of this study:

1. The SMSs were experienced enough in athletic injury rehabilitation to relate to the statements provided on the questionnaire.
2. The questionnaire statements were representative of significant factors of athletic injury rehabilitation adherence.
3. The questionnaire was answered truthfully by the SMSs.
4. The SMSs' specific areas of expertise would not affect their ability to respond to the statements presented in the questionnaire.
5. Administering the questionnaire through the mail did not affect the outcome of the study.

Definition of Terms

1. Adherence is the degree (both quantitative and qualitative) to which athletes work at their rehabilitation.
2. Environmental conditions are the conditions that surround injured athletes and the rehabilitation facilities that can affect the atmosphere.
3. Goals and incentives are what athletes and/or SMSs want to accomplish and how the injured athlete is

encouraged to achieve the particular goal.

4. Nonadherence is having little or no commitment to exercise rehabilitation programs.

5. Pain tolerance is the athletes' capacity to endure pain during their rehabilitation programs.

6. Rehabilitation is the program designed to return athletes to their maximal potential after injuries have occurred.

7. Self-motivation is the capacity of an individual to be able to motivate and reinforce oneself to perform a given task.

8. Sports medicine specialist (SMS) refers to a professional involved in the field of sports medicine. SMSs tested in this study were members of Division 2 of the NATA.

9. Support from significant others is the assistance provided to athletes from people closely associated with them (e.g., athletic trainers, athletes, and coaches) during rehabilitation.

Delimitations of Study

The following delimitations were made:

1. This study involved only members of Division 2 of the NATA.

2. Only selected dispositional and situational variables were considered as rehabilitation predictors.

Limitations of Study

The following limitations were made:

1. The results apply only to SMSs similar to those in the present study.

2. Results are limited by the degree to which the selected rehabilitation adherence questions addressed relevant aspects of injury rehabilitation.

Chapter 2

REVIEW OF LITERATURE

The review of literature will examine problems associated with adherence as well as strategies for the enhancement of exercise rehabilitation programs. Existing adherence literature deals primarily with rehabilitation outside the sport injury realm. The literature reveals that many of the same factors are antecedents of adherence or nonadherence in a variety of disease-related rehabilitation programs (e.g., diabetes, coronary heart disease, and hypertension). A number of strategies have been used to increase adherence levels to these programs and may also be effective in the sports medicine field.

SMSs spend a lot of time developing and implementing rehabilitation programs to return athletes to maximum potential; yet, athletes do not always make an adequate commitment to these rehabilitation programs. Dishman (1982) indicated a behavioral pattern in exercise programs in which approximately one-half of the people who begin a program drop out within the first 6 months. Why does this adherence problem exist, and what can be done to alleviate this dilemma? The following topics will be examined: (a) definitions of adherence, (b) personal variables, (c) situational variables,

(d) prediction of adherence behaviors, (e) barriers to exercise adherence, and (f) strategies to enhance exercise rehabilitation adherence.

Definitions of Adherence

Adherence has been defined and described in a variety of ways. The terms adherence and compliance have often been used interchangeably, generally referring to the degree a person's behavior coincides with the advice given (e.g., exercise, medication, diet, or other lifestyle changes) by a health care provider (HCP). However, some researchers have made distinctions between the two terms.

Dishman (1988) used the term compliance in reference to short-term health and medical advice and direct prescription to relieve symptomatology. Adherence is perhaps more appropriately used in reference to long-term behavior changes resulting from complying with health and medical advice. Compliance is necessary in each stage of behavior change. To Ice (1985), compliance reflects a present action that is chosen to benefit future outcomes. Again, short-term compliance affects long-term adherence.

Other researchers have distinguished between adherence and compliance more in terms of the interaction that takes place between the SMS and the

patient. Meichenbaum and Turk (1987) implied that, to be compliant, the patient must be obedient and follow the instructions of the SMS. The SMS says, and the patient does. Adherence implies a more active involvement of the patient, wherein SMS and patient mutually agree upon an acceptable course of behavior to produce the desired outcome. The patient plays an active role in the treatment planning.

Morisky (1986) claimed that the difference between compliance and adherence depends upon who is responsible for the conformance. The term compliance implies that the responsibility lies with the patient. Lack of compliance is blamed entirely on the patient. Adherence implies a partnership between the patient and the SMS. Both patient and SMS are mutually responsible for striving to ensure that the patient will become self-sufficient in managing his/her condition.

Although a few distinctions have been identified between the terms compliance and adherence, the terms generally have been used interchangeably. For the purpose of this study, the term adherence will be used and defined as the degree (both quantitative and qualitative) to which athletes work at their rehabilitation.

Personal Variables

Variables that differentiate rehabilitation program adherers from nonadherers are important to identify. These variables provide valuable information concerning the patient and can be used to help develop strategies for enhancing the patient's exercise rehabilitation adherence. Dishman (1984) divided the variables into two categories: exerciser (personal) variables and situational variables. Personal variables are patient-oriented and include self-motivation, pain tolerance, and other descriptions (e.g., age, sex, body fat percentage, etc.).

Self-motivation

Self-motivation has been defined as "a generalized, nonspecific tendency to persist in the absence of extrinsic reinforcement and is thus largely independent of situational influence" (Dishman & Gettman, 1980, p. 297). Self-motivated individuals are more apt to finish what they start regardless of the situation. They are better able to overcome situational barriers and work toward their goals. Patients who are self-motivated are reinforced by their own ideas and goals (Weiss & Troxel, 1986); thus, they are expected to persist in their rehabilitation programs longer than others who lack self-motivation. Unlike persons with high

self-motivation, individuals with low self-motivation need more external guidance and encouragement from those around them. Self-motivation has been found to be positively related to exercise adherence across a number of different situations (Dishman & Gettman, 1980).

Pain Tolerance

Pain is an individual process that varies from person to person (Hotchkiss, 1981). Individual psychological processes, such as remembering past experience, emotion, and attention, may influence the individual's perception of pain and how that individual reacts to pain. Pain tolerance is the capacity to endure the pain often associated with rehabilitation programs.

The athlete's level of pain tolerance can affect exercise rehabilitation adherence. For example, Fisher et al. (1988) found that adherers reported more tolerance of the pain associated with their sport injury rehabilitation program than nonadherers reported. Dolce, Crocker, Molatteire, and Doleys (1986) provided another possibility why pain affects adherence. They claimed that the anticipation of pain that occurs during rehabilitation often limits the individual's participation in the treatment program. Individuals who

expect pain during their rehabilitation program may work at a lower intensity or skip exercises completely to avoid the discomfort.

Pain tolerance can affect an individual's adherence level either by reducing the workload or by skipping prescribed exercises. Pain is an individual process, therefore injured athletes should be dealt with individually to teach them to cope with any pain that may be associated with rehabilitation.

Patient Factors

Patient factors include such variables as age, sex, body weight, body fat percentage, social class, marital status, and personality traits, none of which have been useful as predictors of adherence behavior (Friedman & Litt, 1987). Meichenbaum and Turk (1987) similarly concluded that a consistent relationship between patient factors and exercise adherence has not been established, with the exception of patient satisfaction and patient beliefs. Patients who are satisfied with their SMS and treatment regimen are more likely to adhere to their programs; dissatisfied patients are more likely to be nonadherent. A substantial relationship also exists between patients' beliefs in their treatment programs and exercise rehabilitation adherence. Davis and Eichen

(cited in Andrews et al., 1981) reported that patients who did not have strong beliefs in their exercise programs showed a high rate of dropout.

Situational Variables

Situational variables are the environmental conditions that surround and affect the individual in the rehabilitation process. The variables include the relationship between patient and the SMS, the influence of significant others, and the exercise setting.

Patient and HCP/SMS Relationship

A working relationship is essential between the patient and SMS to facilitate adherence. Attitudes that SMS display toward their clients through the communication process play an important role in establishing a workable relationship.

Stone (1979) revealed that only 25% of physicians they surveyed acknowledged that they may, in a way, contribute to their patients' medical prescription nonadherence. Others, however, argue that responsibility lies in the hands of both the HCP and the patient. Szasz and Hollander (cited in Meichenbaum & Turk, 1987) described the ideal relationship as an active partnership in which the HCP's function is to assist the patients to help themselves. This active involvement can play an important role in facilitating

adherence. Both the SMS and the patient play an important role in the rehabilitation program.

Attitudinally, the SMS needs to develop an environment that is conducive to a working relationship. If SMSs are open, honest, supportive, and respectful; praise the patient; and provide clear explanations, adherence will likely be increased (Meichenbaum & Turk 1987). SMSs need to make their patients feel comfortable and create the impression that as patients they also contribute to the rehabilitation process.

Quality of communication is another important aspect in developing a working relationship. Morisky (1986) claimed that a number of patients leave the doctor's office not sure of what they are supposed to do to follow their treatment regimen. As a caution then, SMSs need to be specific in their presentation of the exercise prescription. They should tell patients what exercises to do and how to do them (e.g., "Do 10 straight leg lifts by tightening the quadriceps and keeping the leg straight"); provide a demonstration of exercises, if necessary; and determine the intensity of the exercise, number of repetitions per set, how many sets to do, when to increase the intensity, and what days to work out. For example, "On Monday, Wednesday, and Friday, do three sets of 10 repetitions on the leg

extension machine. Start at 20 lb and increase the weight 5 lb when three full sets can be completed."

Any breakdown in the communication can be detrimental to adherence and affect the relationship between SMSs and patients. If patients do not understand the exercise prescription, they may become frustrated and stop adhering to the rehabilitation program. SMSs need to listen to their patients so patients can communicate any concerns, expectations, or problems they might be encountering.

Both the attitude of SMSs and communication are important to establish a working relationship. If SMSs develop this relationship, their influence may play a positive role in the facilitation of exercise rehabilitation adherence.

Significant Others

People who are significant to the patient can influence the patient's adherence level. Significant people may include a spouse, family members, friends, teammates, coaches, and SMSs.

Dishman (1984) found that people are more likely to keep a commitment to another person than they are to themselves, thus reinforcing that significant others are important to adherence. Heinzelman and Bangley (cited in Andrews et al., 1981) found fair or poor adherence

among exercising males whose wives' attitudes toward their husbands' participation were negative compared to those husbands whose wives' attitudes were positive.

Domm (1985) stated that social camaraderie can develop during the time of rehabilitation and can work to reinforce behavior for many people. The patient may develop a relationship with another person in the program, who then may provide support and encouragement. Support from significant others can help motivate the injured athlete; thus, the athlete is more likely to adhere to the rehabilitation program.

The Exercise Setting

The convenience and accessibility of the exercise setting are important factors of exercise rehabilitation adherence. Andrews et al. (1981) found greater dropout among patients who found it difficult to be on time, who perceived the exercise setting to be inconveniently located, and who encountered parking difficulties. They also stated that people are more likely to stay in a program if they feel their exercise program does not interfere with their job and their jobs do not interfere with their exercise program. People often have many commitments and responsibilities to tend to; thus, their rehabilitation session may not be a high priority for them at all times. SMSs need to be flexible in

scheduling patients to ensure that sessions are attended.

Student-athletes have a number of commitments to fit into their schedule, aside from an exercise rehabilitation program. Student-athletes have class, practice, and game schedules. Some may have jobs, need time to study, and need time for recreational activities. Scheduling is necessary to ensure that the athlete can attend rehabilitation sessions. It is necessary to fit the program to the athlete, not the athlete to the program (Dishman, 1984).

Many other factors that may affect adherence levels have been identified, but for the purpose of this study the focus has been on factors that appear to be more pertinent to exercise rehabilitation programs of injured athletes. No single factor is likely the sole reason for nonadherence to a program, but possibly a combination of personal and situational factors can be more effective in predicting nonadherence (Wankel, 1984).

Prediction of Adherence Behaviors

Prediction of adherence behavior can assist in differentiating adherers from nonadherers. If SMSs can identify potential nonadherers, they can utilize strategies to facilitate exercise adherence. A number

of models have been developed and tested for their ability to predict adherence behaviors.

Sonstroem (1980) used his psychological model for physical activity participation to predict athletic participation in middle school males. Estimation and attraction were the two variables measured with this model. Estimation is the attitude individuals have of themselves relative to possessing competencies in physical activity and sport settings. Attraction is the person's attitude toward vigorous physical activity and sport. The model was found to predict exercise recruitment significantly, but it was not as successful in predicting adherence to the sport program. This model may be beneficial in predicting initial recruitment of athletes, but it is not sufficient for predicting why athletes stay with the program.

Dishman (1981) used psychobiologic factors to predict adherence. Body fat percentage, self-motivation, and body weight were the three variables found to discriminate exercise adherers from nonadherers. This model accurately classified adherers and nonadherers in approximately 80% of all cases. The data resulting from the psychobiologic model led to the conclusion that the assessment of self-motivation and body composition may assist in predicting continuation

in exercise programs.

The descriptive screening model was developed by Oldridge (1984). A number of descriptive factors were identified, including smoking behavior, blue collar work status, excessive weight, low self-motivation, angina, and physical inactivity. Of the patients characterized by these variables, 80% eventually dropped out of their cardiac rehabilitation programs.

Theoreticians need to develop models to predict exercise rehabilitation adherence accurately because presently none exist. The information obtained from such models can help identify nonadherers and can be used by practitioners to incorporate strategies for facilitating adherence in exercise programs.

Barriers to Exercise Adherence

Barriers to exercise rehabilitation adherence need to be identified so they can be better understood and counteracted, thereby allowing for higher adherence levels. Barriers include the following: (a) patients' feelings and needs, (b) patient deficiencies, (c) lack of instruction or education, and (d) situational interruptions.

SMSs need to consider patients' feelings and needs when talking about possible barriers. Feelings of anger, anxiety, frustration, and depression can have a

negative effect on adherence levels (Weiss & Troxel, 1986). Patients may also be unable to cope with injury or be overwhelmed by the thought of long-term recovery. SMSs should take patients' feelings and needs into consideration. Wolken (1986) suggested that, if injured athletes' needs are not satisfied, they will likely lose motivation. Reduced motivation may decrease their levels of adherence to the rehabilitation program.

Nonadherence may arise simply from patient deficiencies (Meichenbaum & Turk, 1987), such as ignorance, laziness, forgetfulness, willful neglect, or lack of motivation, skill, resources, and social supports. All these deficiencies can negatively affect adherence levels.

Lack of instruction or education is another adherence barrier. Morisky (1986) suggested that patients often leave their doctors' offices not knowing what they are supposed to do to follow the prescribed treatment regimen. Meichenbaum and Turk (1987) suggested that the complexity of treatment regimens produces an information overload. People deal with the overload by omitting information, delaying the regimen, approximating the treatment, or avoiding the regimen altogether. If patients deal with the overload in any of these negative ways, they decrease the likelihood of

adherence to the treatment program.

Patients may face situational interruptions that prevent them from adhering to programs. Interruptions include jobs, family, medical problems, and travel. These situational interruptions can cause a relapse into inactivity (Sallis, 1986). Patients need to realize that setbacks do not imply failure, and they need to continue their program following any interruptions.

There are many barriers both SMSs and patients must overcome. Barriers can be detrimental to adherence levels if they are not understood and counteracted. Both SMSs and patients are responsible for this task.

Strategies to Enhance Adherence

It is evident that adherence to exercise rehabilitation programs is a problem that exists in sports medicine today. SMSs design rehabilitation programs for injured athletes, but participation is sometimes half-hearted or discontinued after a period of time. Why athletes choose to discontinue therapy is a real dilemma. Fisher (1990) identified self-confidence as the key to rehabilitation adherence. The athletes need to feel that the particular task can be accomplished successfully, that they are in control of the situation, and that they are committed to stick to the task. SMSs can play an important role in promoting

athletes' self-confidence, which in turn increases the likelihood of greater adherence.

SMS and Patient Interaction

Interaction between the patient and the SMS can be important to rehabilitation adherence. It is necessary to develop a relationship in which both the patient and the SMS feel comfortable. Relationship development involves compassion, communication, activation of the patient's self-motivation, and a shared responsibility between the SMS and the patient (Coleman, cited in Meichenbaum & Turk, 1987).

Patients want to feel comfortable and want the SMS to express genuine concern about their condition. In a sport injury setting, the SMS must be understanding and respect the athletes' feelings (Dunn, 1983). In an athletic training facility, injured athletes may come in contact with a number of trainers. All the trainers involved with a particular athlete should be informed about the athlete's condition and understand and respect the athlete's feelings so the athlete will feel confident with the prescribed rehabilitation program. Having a number of trainers can be beneficial to the athlete because more supervision can be provided. Friedman and Litt (1987) suggested that supervision provides social reinforcement and encouragement from

significant persons, both of which are important in motivating people to stick with their rehabilitation program.

Communication is important in promoting SMS-patient interaction. It involves two factors that can strengthen the relationship: attitudinal skills and communication skills (Meichenbaum & Turk, 1987). Attitudinally, a conducive environment needs to be established in which patients feel that their contribution to the rehabilitation program is appreciated. This may encourage patients to verbalize their concerns, needs, and expectations. Probably the most important communication skill is listening (to both what is said and what is not said). Listening is important to gain an understanding of patients' feelings, worries, concerns, and expectations about the SMS and the treatment. Friedman and Litt (1987) reported that patients were more satisfied with medical practitioners who listened, took time to explain the particular condition, were available by phone, and cared about them as patients. Likewise, Miller (1985) noted that empathy and listening skills increased patients' commitment and improved their clinical outcome.

The primary goal of adherence facilitation is to develop self-motivated behaviors that will be used even

when outside the rehabilitation setting or when supervision has been withdrawn (Dishman, 1982). Activating patients' self-motivation is an important task of the SMS because self-motivated people are reinforced by their own ideas and goals and more apt to finish what they start. Because self-motivated people do not need as much guidance as less motivated individuals, they are more likely to persist even if the SMS is not present.

Some researchers have discussed the importance of shared responsibility of rehabilitation between the patient and the SMS. Shared responsibility involves both parties (SMS and patient) playing a role in the rehabilitation process. Meichenbaum and Turk (1987) referred to this as a mutual participation role in which the SMS plays an active part by assisting patients to help themselves. Dishman (1984) discussed active participation in which the SMS provides encouragement and verbal reinforcement to increase adherence. Anderson and Kirk (1982) referred to this relationship as a therapeutic partnership. Again, both the SMS and the patient take responsibility in the rehabilitation process. Schulman (1979) stressed the importance of patients becoming actively involved in their rehabilitation. He found that patients who were

actively involved in their treatment regimen showed higher rates of adherence to their program and had more favorable clinical outcomes.

SMS and patient relationship is important to exercise rehabilitation adherence. Both the SMS and the patient are vital parts of the relationship if it is going to be effective. SMS understanding, communication, patient self-motivation, and shared responsibility are all factors of this relationship.

Patient Education

Patient education is critical in providing information to injured athletes about the condition. Weiss and Troxel (1986) suggested that the SMS fully explain the effects of the injury to the athlete. The athlete should understand the nature of the injury and what is to be expected in regard to pain, activity limitations, and length of the exercise rehabilitation program. A rationale for treatment should be provided, giving the athlete an understanding of why that treatment is important. This helps in reducing uncertainties and in enhancing the athlete's belief in the treatment program. Athletes/patients who do not believe that the treatment will be successful tend to be poor compliers with their programs (Geertsen, Gray, & Ward, 1973).

Education involves more than merely providing information; education should teach the patient how to implement treatment programs (Meichenbaum & Turk, 1987). The patient needs to learn what behaviors are required, how to perform the behaviors, when to perform them, and what to do if a problem arises. The SMS needs to educate the patient about the benefits and consequences and needs to make sure the patient understands the information provided.

Another component of patients' education is their ability to remember the information. If patients can recollect the necessary information, their chances of adhering increases (Stone, 1979). Stone identified several factors that play a role in the patients' ability to utilize the information provided. These factors include impediments of language, conceptual understanding of information given, differences of expectations regarding desirable outcomes of treatment, differences in role expectations regarding duties and responsibilities, and failure in patients' reception of information for emotional reasons (e.g., anxiety). Ice (1985) elaborated on the subject of recall, pointing out the importance of how the information is presented. He recommended that, in order to reduce forgetfulness, instruction and advice should be presented initially and

then their importance should be stressed.

Support from Significant Others

Literature reveals that adherence to treatment programs is enhanced by the effort and involvement of significant others (Friedman & Litt, 1987; Wankel, 1984; Wankel, Yardley, & Graham, 1985; Weiss & Troxel, 1986). Because significant others have a positive influence on injured athletes' adherence levels, it is important to establish support programs to enhance rehabilitation program adherence.

Coping with and recovering from an injury are difficult tasks that any injured athlete must face. Often injured athletes feel alienated from the team when in fact they need to feel as though they are still a part of the team (Weiss & Troxel, 1986). The coach and team members need to communicate that the primary concern is the injured athlete's health and that returning to competition is secondary. Teammates need to encourage and reinforce their injured teammates.

Weiss and Troxel (1986) suggested two other strategies for promoting adherence: peer modeling and injury support groups. Peer modeling involves the injured athlete talking to another athlete who has experienced the same problem. This strategy encourages the injured athlete by seeing and talking to a

successfully rehabilitated peer. The use of an injury support group enables injured athletes to voice their concerns with other injured athletes by sharing ideas about coping with their injuries.

Friedman and Litt (1987) suggested increasing supervision as a means to promote adherence. The SMS can increase supervision by watching the patient closely or by involving others in monitoring the rehabilitation regimen. Close supervision can provide social reinforcement and encouragement.

Wankel (1984) and Wankel et al. (1985) introduced a social support system to assist individuals in reaching their behavioral goals through encouragement and guidance. Support groups provide the patient with the opportunity to discuss problems. The support system includes the leader, a buddy from the class, and someone from the home. The leader is responsible for encouraging participants to establish and maintain their buddy and home support systems. The leader needs to facilitate a positive atmosphere and needs to monitor attendance and social support systems. The buddies are responsible for assisting each other by using phone reminders, by reinforcing desired behaviors, and by encouraging their buddy. Home supporters should provide an open environment for the participant to discuss

concerns and should decide what home routines would assist or detract from regular attendance. The home support can help make any of the necessary adjustments. All components of the support system provide reinforcement and encouragement.

Emotionally, injury rehabilitation can be difficult for injured athletes. The SMS is important in the establishment of support systems comprised of significant others. With support from significant others, injured athletes are provided with some motivation for adhering to their rehabilitation program and empathy with the difficulties encountered in adherence.

Tailoring Programs

Exercise rehabilitation programs should be flexible and tailored to match the individual characteristics of the injured athlete (Friedman & Litt, 1987; Ice, 1985; Meichenbaum & Turk, 1987). Programs are often designed for specific injuries without taking into account the injured athletes' specific characteristics or needs.

Ice (1985) suggested that each exercise program should be specifically designed for the individual. Programs should be flexible in regard to goals, choice of activities, and times that the program is offered. The time that the program is offered should be

coordinated with the patient's daily schedule. When dealing with student-athletes, the SMS must work rehabilitation time into a busy daily schedule of classes, practices, work, recreation, and study.

Meichenbaum and Turk (1987) similarly argued that treatment programs should be customized. When educating a patient, the SMS's message needs to be appropriate to the patient in terms of age, educational level, and cultural background. The program should fit the specific patient's characteristics, circumstances, personal habits, and routines. Each program developed should be customized to the specific individual.

Tailoring programs to the individual can help increase adherence. Treatment programs should be as convenient to the injured athlete as possible, so the athlete is able to attend on a regular basis.

Goal Setting

A goal-setting program can assist in getting injured athletes to adhere to their exercise rehabilitation regimen. It allows athletes to see progress on a regular basis, which in turn may work as a motivator for continued adherence to the program. It is essential for the SMS to have an understanding of goal-setting techniques and to assist injured athletes in the setting and attaining of goals.

Often injured athletes are overwhelmed by long-term goals (e.g., recovery from injury, return to competition). Weiss and Troxel (1986) suggested a goal-setting program that focuses on short-term goals in pursuit of a long-term goal. Included in such a program are specific guidelines to make these goals effective. It is important for goals to be realistic, attainable, and measurable. SMSs should see to it that goals are written, along with specific strategies for achieving them. Periodically, goals need to be evaluated so that necessary adjustments can be made.

Meichenbaum and Turk (1987) stressed the importance of the role of the SMS in goal setting. The SMS's knowledge is a necessity in helping the injured athlete set appropriate attainable goals. The SMS can provide the patient with feedback concerning progress and provide positive reinforcement. It is important not only to set goals but also to get the athlete to commit to the goals (Friedman & Litt, 1987). The SMS can play an important role in getting injured athletes to commit to their rehabilitation program.

Setting realistic short-term goals is important in order to accomplish the long-term goal. The SMS needs to assist the injured athlete in this process, and the athlete needs to be committed to the goals.

Effective goal setting can enhance exercise rehabilitation adherence.

Summary

Exercise rehabilitation adherence poses a real dilemma. SMSs spend time planning and implementing rehabilitation programs only to be faced with the reality that a substantial percentage of injured athletes drop out of their prescribed treatment programs.

Many variables (personal and situational) that lead to greater treatment adherence have been identified to assist SMSs in differentiating adherers from nonadherers. Barriers to adherence behaviors have also been identified and need to be understood and counteracted in order to promote adherence to treatment programs. Once these barriers are eliminated, the SMSs can take steps towards increasing adherence levels of injured athletes in their program.

Information obtained concerning adherence and the individual athlete can be used to develop and implement specific strategies for the enhancement of adherence to exercise programs. Effective strategies will increase adherence, thus returning injured athletes to their maximal potential.

Chapter 3

METHODS AND PROCEDURES

The following chapter deals with methods and procedures utilized in this investigation. Selection of subjects, testing instruments, methods of data collection, scoring of data, treatment of data, and summary are included.

Selection of Subjects

The subjects in this study were 505 male and female SMSs. They were randomly selected from the mailing list of District 2 of the NATA. SMSs were requested to provide demographic information, to respond to 60 statements, to provide judgment concerning the most successful adherence strategy they have used, and to list a strategy that has not worked for them. Informed consent forms were given to, signed by, and collected from participating subjects (see Appendix A).

Testing Instruments

The instrument used to assess SMSs' attitudes concerning the rehabilitation of athletic injuries and judgments concerning injured athletes' adherence to their rehabilitation was a questionnaire containing 60 statements plus two open-ended questions dealing with most successful and least successful rehabilitation adherence strategies (see Appendix B). Statements on

the questionnaire were developed by the investigator. The statements were categorized into seven factors deemed relevant to injury rehabilitation adherence based on a review of related literature. The seven factors included trainers' influence, environmental influences, athletes' personality, pain tolerance, self-motivation, goals and incentives, and significant others. SMSs read each statement and recorded their degree of agreement or disagreement on a 5-point Likert scale.

Method of Data Collection

Each SMS received a packet by mail comprised of an introductory letter explaining the purpose of the investigation, an informed consent form, the 60-statement questionnaire, an answer sheet, and a stamped return envelope. They were requested to return the completed questionnaire within 3 weeks.

Scoring of Data

SMSs' responses were recorded on computer answer sheets. Data files were created from computer scoring.

Treatment of Data

Descriptive statistics on demographics of subjects were assessed to provide information concerning gender, age, experience, and level of employment. An analysis of item responses was completed to assess what percentage of subjects agreed or disagreed with each

statement on the 5-point scale utilized. Most successful and least successful rehabilitation adherence strategies were tabulated. Internal consistency (coefficient alpha) was calculated for each of the seven scales. Questionnaire items correlating $\pm .10$ or less with the scale as a whole were deleted to maximize scale reliability. Scale differences by gender and experience were assessed by ANOVA.

Summary

Male and female SMSs ($N = 505$) from District 2 of the NATA were asked to provide demographic information and to respond to a questionnaire consisting of 60 statements. Subjects provided their degree of agreement or disagreement to each statement on a 5-point scale. They were also asked to provide judgment concerning the most successful adherence strategy they have used and to list a strategy that simply has not worked for them in their rehabilitation setting. Data were analyzed by assessing descriptive statistics, analyzing item responses, assessing internal consistency, using ANOVA to assess gender and experience differences, and tabulating most and least successful rehabilitation adherence strategies.

Chapter 4

ANALYSIS OF DATA

The overall purposes of this investigation were to assess gender and experience differences among SMSs and to assess the factors that influence injured athletes' adherence to sport injury rehabilitation programs. Attitudes and judgments of SMSs concerning rehabilitation was assessed to provide information pertaining to successful and unsuccessful adherence strategies SMSs have used in their rehabilitation programs. The results of the investigation are presented in this chapter. The chapter is divided into the following sections: (a) descriptive statistics, (b) analysis of questionnaire item responses, (c) successful and unsuccessful rehabilitation adherence strategies, (d) internal consistency, (e) gender and experience differences, and (f) summary.

Descriptive Statistics

The descriptive statistics were used to analyze demographic information. These included gender, age, years of experience, and level of employment. Subjects included certified athletic trainers from District 2 of the NATA. Of the 505 questionnaires mailed out, 186 were returned, yielding a return percentage of 37%. The participants were 53.5% males and 46.5% females.

Subjects were asked to provide their age in years. Age ranged from 22-63 years. The mean age was 30.17 years with a standard deviation of 7.39 years.

Years of experience as an athletic trainer (post-bachelor degree) was assessed. The majority (58%) had between 2 and 10 years of athletic training experience. Subjects with 0-2 years of experience comprised 19.4% of the sample, and those with more than 10 years experience comprised 22.6% of the sample.

Level of employment consisted of six categories. The percentage of the sample in each category was as follows: (a) not employed in the field, 2.7%, (b) high school, 29.9%, (c) college/university, 40.6%, (d) sports medicine clinic, 17.6%, (e) hospital, 0%, and (f) other, 9.6%. The largest percentage of subjects was employed at colleges and universities.

Analysis of Questionnaire Item Responses

An analysis of item responses was completed to assess the degree to which SMSs agreed or disagreed with each statement on the 5-point scale: strongly disagree, disagree, not sure, agree, and strongly agree. Response 3 (not sure) was to be used if the subject could not make a better assessment. This analysis of the questionnaire item responses provides information pertaining to which adherence items are viewed as more

and less important by SMSs. Subjects' responses are revealed in Table 1.

Under the heading of trainers' influence, subjects reported that good rapport and communication are important to exercise rehabilitation adherence. SMSs were in 100% agreement that rapport between athletic trainers and injured athletes is essential. Communication between athletic trainers and injured athletes is also essential. SMSs reported that explanation of injury (91% agreement) and explanation of the rehabilitation regimen (83% agreement) are important factors in getting athletes to stick to their prescribed rehabilitation programs. Convenience and accessibility of the rehabilitation facility were reported as important. SMSs were in 95% agreement that, if the training room is easily accessible, athletes' attendance at rehabilitation sessions will be greater and adherence will be enhanced. SMSs were also in 92% agreement that it is crucial to plan rehabilitation programs around the injured athlete's schedule to assure attendance. SMSs had mixed feelings about how the length of the rehabilitation session and crowdedness of training room affect adherence.

SMSs did not agree whether or not personality of

Table 1

Analysis of Questionnaire Item Responses

Scale/Item Number	<u>Response Percentage</u>				
	SD	D	NS	A	SA
Trainers' Influence					
1	6	36	7	42	9
2	1	6	3	58	33
3	1	13	4	56	27
4	0	0	0	28	72
5	20	58	17	4	1
6	1	27	12	56	4
7	1	9	13	65	13
8	2	37	17	38	6
9	1	17	12	58	13
Environmental Influences					
10	1	9	3	61	27
11	10	54	9	20	8
12	1	29	14	48	9
13	4	33	7	47	10
14	0	8	1	56	36
15	1	2	2	58	37
16	1	6	11	65	18

(table continues)

Scale/Item Number	<u>Response Percentage</u>				
	SD	D	NS	A	SA
17	3	39	16	34	9
Athletes' Personality					
18	5	56	23	15	1
19	4	36	12	41	8
20	1	9	4	71	16
21	1	6	16	66	11
22	5	62	9	21	3
23	8	64	13	13	2
24	10	51	14	23	2
25	4	32	9	44	11
Pain Tolerance					
26	2	39	8	49	3
27	4	55	3	36	2
28	2	35	8	51	5
29	2	38	16	41	4
30	0	1	2	60	37
31	2	40	13	41	5
Self-motivation					
32	1	10	4	69	17
33	0	3	1	57	39

(table continues)

Scale/Item Number	<u>Response Percentage</u>				
	SD	D	NS	A	SA
34	0	9	3	48	40
35	0	0	1	30	70
36	2	15	4	62	18
37	13	59	13	12	2
38	0	2	3	59	36
39	1	9	6	57	28
40	3	43	14	39	1
41	1	13	9	58	20
42	1	4	3	62	30
43	1	10	4	52	33
44	5	31	10	40	14
Goals and Incentives					
45	10	47	8	27	9
46	3	33	11	49	4
47	0	6	3	71	20
48	0	10	8	71	12
49	0	5	9	68	18
50	0	4	6	59	31
51	10	26	18	42	5
52	10	40	21	28	2

(table continues)

Scale/Item Number	<u>Response Percentage</u>				
	SD	D	NS	A	SA
53	12	67	9	12	0
54	2	25	19	48	11
55	5	66	14	13	2
Significant Others					
56	0	1	2	47	51
57	0	1	3	46	51
58	4	48	25	21	2
59	0	1	0	48	52
60	1	24	17	46	13

Note. Abbreviations used: SD = Strongly Disagree, D = Disagree, NS = Not Sure, A = Agree, SA = Strongly Agree.

the injured athlete is the most important factor in rehabilitation adherence; 55% of the subjects agreed that personality is important, and 36% disagreed. Most of the trainers did not have strong feelings either way.

The topic of pain tolerance reflected mixed responses concerning the role pain plays in influencing athletes' decisions to drop out of rehabilitation programs. Forty-six percent of the SMSs agreed that pain during athletes' initial rehabilitation session decreases their chance of sticking to their prescribed exercise program, and 42% of the SMSs disagreed. Also, 45% of the athletic trainers reported that the higher the athlete's expectancy of pain from the prescribed exercises, the less likely that athlete will adhere, yet 40% disagreed. Few subjects had strong feelings on either item. SMSs agreed unanimously that those athletes who understand the quantity and quality of pain expected during rehabilitation are more likely to adhere to their exercise rehabilitation programs.

SMSs were in 100% agreement that athletes will adhere to rehabilitation if they feel they will benefit from the program. Similarly, there was 96% agreement that athletes will not adhere if they feel it is not worth going through rehabilitation. SMSs also reported that personal supervision (92% agreement) and regular

monitoring of athletes (95% agreement) can promote adherence.

Results pertaining to goals and incentives revealed that 91% of the subjects agreed that athletes are more apt to adhere to rehabilitation programs when they see immediate results. Encouragement is an aspect of attaining goals that 90% of the subjects reported was necessary.

SMSs unanimously reported that injured athletes need to feel that they are still an integral part of the team. Subjects reported 100% agreement that coaches are important and 98% agreement that athletic trainers are essential, and also that their support is necessary to get injured athletes to adhere to their rehabilitation programs.

Successful and Unsuccessful Adherence Strategies

Successful and unsuccessful strategies SMSs have utilized or heard about are revealed in Table 2. The five most successful strategies are education, goal setting, encouragement, monitoring progress, and support systems. Fewer unsuccessful strategies were offered, but SMSs were clear that threats and rehabilitation without monitoring do not work.

Table 2

Successful and Unsuccessful Rehabilitation Adherence Strategies

Successful Strategies	<u>N</u> of Responses
Education	74
Goal Setting	59
Encouragement	47
Monitor Progress	39
Support System	34
Patient-SMS Rapport	21
Personalize Treatment	20
Withdraw Sport Participation	14
Variety of Treatment	10
Set Specific Schedules	9
Be Firm	6
Make Athletes Responsible	6
<u>Unsuccessful Strategies</u>	
Threats	52
Rehabilitate Alone	51
Offer No Explanation	6

Internal Consistency

Internal consistency was calculated for each of the seven scales using a coefficient alpha analysis. Items on the questionnaire that correlated $\pm .10$ or less with the scale as a whole were deleted to maximize scale reliability. Alpha reliabilities and deleted items for each scale are reported in Table 3. Reliability coefficients for each adherence scale ranged from a low of .30 (athletes' personality) to a high of .66 (pain tolerance).

Gender and Experience Differences

A univariate analysis of variance (ANOVA) was calculated to assess scale score differences by gender and experience. The results are presented in Table 4. There were no significant gender or experience differences for any of the seven scales. This led to a rejection of the research hypothesis.

Summary

Descriptive statistics provided demographic information about the subjects. An analysis of responses to the 60 questionnaire items assessed the percentage of agreement or disagreement for each item. Table 2 provides information concerning successful and unsuccessful strategies SMS have utilized or heard about. Internal consistency was calculated with

Table 3

Internal Consistency of Adherence Scales

Scale	<u>N</u> of Items	alpha
Trainers' Influence	8(5)	.44
Environmental Influences	6(11, 16)	.51
Athletes' Personality	6(22, 23)	.30
Pain Tolerance	6	.66
Self-motivation	10(37, 40, 41)	.62
Goals and Incentives	7(45, 48, 49, 54)	.53
Significant Others	3(58, 60)	.61

Note. Numbers in parentheses refer to item numbers deleted.

Table 4

Analysis of Variance for Gender and Experience

Scale	<u>df</u>	<u>F</u>
A. Trainers' Influence		
Gender (G)	1, 184	0.09
Experience (E)	2, 183	0.31
G x E	2, 183	0.06
B. Environmental Influences		
Gender (G)	1, 184	1.96
Experience (E)	2, 183	0.58
G x E	2, 183	1.62
C. Athletes' Personality		
Gender (G)	1, 184	0.18
Experience (E)	2, 183	1.56
G x E	2, 183	0.11
D. Pain Tolerance		
Gender (G)	1, 184	0.29
Experience (E)	2, 183	0.05
G x E	2, 183	1.23

(table continues)

Scale	<u>df</u>	<u>F</u>
<hr/>		
E. Self-motivation		
Gender (G)	1, 184	1.01
Experience (E)	2, 183	0.68
G x E	2, 183	0.10
F. Goals and Incentives		
Gender (G)	1, 184	0.10
Experience (E)	2, 183	0.64
G x E	2, 183	0.01
G. Significant Others		
Gender (G)	1, 184	0.01
Experience (E)	2, 183	0.99
G x E	2, 183	0.01

adjusted alpha reliabilities ranging from .30 (athletes' personality) to .66 (pain tolerance). ANOVA revealed that there were no significant differences between gender or among experience levels for any of the seven scales.

Chapter 5

DISCUSSION OF RESULTS

This investigation assessed attitudes and judgments of SMSs concerning factors that influence injured athletes' adherence to athletic injury rehabilitation programs. Successful and unsuccessful adherence strategies that SMSs have used in their rehabilitation programs were also revealed. The results presented in chapter 4 will be discussed in this chapter.

Although it had been speculated that less experienced SMSs might be more idealistic in their outlook to rehabilitation adherence, there was no significant experience difference in scale scores revealed. Also, because there were no significant gender differences, the questionnaire item responses are discussed without reference to either experience or gender. Discussion focuses on the following topics: (a) trainers' influence, (b) environmental influences, (c) athletes' personality, (d) pain tolerance, (e) self-motivation, (f) goals and incentives, and (g) significant others.

Trainers' Influence

Trainers' influence included three items found relevant to exercise rehabilitation adherence. These items included good rapport between the SMS and the

injured athlete, clear explanation of injury to the athlete, and the need for providing a detailed explanation of the injury to the athlete. On the other hand, it was not clear whether trainers need to be demanding to persuade athletes to stick to their exercise rehabilitation prescription.

SMSs reported 100% agreement that rapport between athletic trainers and injured athletes is essential in getting injured athletes to commit to their rehabilitation program. Meichenbaum and Turk (1987) emphasized the need for the SMS to be open, honest, supportive, and respectful, and Weiss and Troxel (1986) reported that SMSs need to consider the patients' feelings and needs. Patients may feel apprehensive about rehabilitation for various reasons (e.g., anticipation of pain, fear of reinjury, etc.). If trainers can develop a good rapport with their injured athletes, athletes may feel more comfortable in the rehabilitation setting and may be more apt to attend sessions on a regular basis.

As revealed in this study, explanation of the injury and detailed instruction of the exercise regimen are considered by SMSs to be imperative to the enhancement of adherence to exercise rehabilitation programs. Education was reported by trainers to be the

most successful rehabilitation adherence strategy. Weiss and Troxel (1986) agreed that education is important; injured athletes need to understand the effects of the injury, the nature of the injury, the likelihood of pain, the degree of activity limitations, and the length of the rehabilitation program. Morisky (1986) reported that many patients leave the doctor's office not sure of the regimen they are supposed to follow, and this results in decreased adherence behaviors. Possibly this lack of understanding can occur between the SMS and the injured athlete. Education also involves teaching patients how to implement their treatment programs (Meichenbaum & Turk, 1987). If injured athletes understand their programs and how to implement them, they are better able to initiate the program, perform the exercises properly, and continue their rehabilitation.

This study revealed that trainers believe their influence plays a role in the maintenance of adherence to rehabilitation programs. In an interesting juxtaposition, Stone (1979) surveyed physicians who reported that only 25% of them acknowledge that they, in any way, contribute to their patients' nonadherence. Possibly the difference in attitude exists because of the role that each specialist fulfills with his/her

patients. Trainers are involved in the actual implementation of the rehabilitation programs and personally involved with injured athletes on a regular basis. On the other hand, physicians are responsible for diagnosing the injuries or ailments and providing guidelines for rehabilitation. They occasionally see their patients, but not on as regular a basis as do trainers.

Good rapport between trainers and injured athletes, explanation of the injury, and detailed instruction are important factors of exercise rehabilitation adherence. There exists a need for proper education concerning the athlete's injury and rehabilitation regimen. Proper education can be the start of a successful strategy in promoting adherence, although by itself it is no guarantee of enhancing treatment adherence (Haynes, 1984).

Environmental Influences

As expected from the literature review, convenience of the program and accessibility of the exercise setting are important factors of exercise rehabilitation adherence. Athletic trainers reported a significant agreement that athletes' attendance will be enhanced if the training room is easily accessible. This finding is in agreement with that of Andrews et al. (1981), who

found greater dropout among those patients who find it difficult to be on time, who perceive the exercise setting to be inconveniently located, and who encounter parking difficulties. Often people do not want to be bothered with such inconveniences and find it easier to skip the rehabilitation session. On college or university campuses, injured athletes may be faced with a lack of transportation. If the injury is debilitating, the athlete may have difficulty getting to the rehabilitation setting. Possible transportation arrangements can alleviate this problem on campuses.

Athletic trainers also reported that it is crucial to plan rehabilitation programs around the injured athlete's schedule to assure attendance. Student-athletes have a number of commitments to fit into their busy schedules; thus, rehabilitation programs need to be flexible so sessions can be attended. Dishman (1984) stated that it is necessary to fit the program to the athlete, not the athlete to the program. Andrews et al. (1981) agreed that people have many commitments to attend to; thus, SMSs need to be flexible in scheduling patients in order to assure that sessions are attended.

SMSs revealed that the more accessible and convenient the rehabilitation facilities, the greater the likelihood that injured athletes will attend

rehabilitation sessions. Trainers need to fit programs to injured student-athletes to ensure regular attendance.

Athletes' Personality

In this study trainers did not reach agreement on whether personality of the injured athlete is the most important factor in injury rehabilitation adherence. In the literature, Friedman and Litt (1987) reported that patient factors (including demographic variables and personality traits) have not been useful as predictors of adherence behavior. Meichenbaum and Turk (1987) agreed that no consistent relationship between patient factors and exercise adherence has been established, with the exception of patient satisfaction and patient beliefs. Clearly, no default personality can be located (Sperry, 1985).

The fact that trainers could not agree about the subject of personality is not a surprise because personality is such a global topic. Personality is individualized and includes a wide range of personality traits. It would be difficult for anyone to agree as to which traits are relevant to adherence and which ones are not.

Pain Tolerance

Mixed responses were reported by athletic trainers

concerning the role pain plays in influencing injured athletes' decision to commit to their rehabilitation programs. Trainers did not agree on whether pain during initial rehabilitation sessions decreases injured athletes' likelihood of sticking to their exercise rehabilitation regimens. Possibly this lack of agreement exists because, as Hotchkiss (1981) pointed out, pain is an individualized process and individual psychological processes (e.g., memory, emotion, and attention) influence the individual's perception of pain. Thus, pain may hinder one individual's adherence level, but may play an insignificant role in the adherence level of another individual.

Dolce et al. (1986) claimed that the anticipation of pain that occurs during rehabilitation often limits the individual's participation in the rehabilitation program. If injured athletes anticipate pain or excessively accentuate pain cues, they may decrease the intensity of their workouts, skip certain exercises, or discontinue the rehabilitation program.

Athletic trainers did not agree on whether expectancy of pain during prescribed exercises affect adherence levels. However, trainers unanimously agreed that athletes who understand the quantity and quality of the pain expected during rehabilitation are more

likely to adhere to their prescribed programs. If athletes understand that different levels of pain are normally associated with rehabilitation and also that some pain (e.g., muscle soreness, joint stiffness) is inevitable, whereas other pain is a sign to discontinue exercise, they will accept some pain and continue their rehabilitation program. Perhaps trainers could not agree because, as previously mentioned, pain is individually perceived and affects each injured athlete differently.

Pain is an individual process that affects some injured athletes' adherence level, yet other injured athletes remain unaffected. Trainers can assist injured athletes by informing them about expected pain. By understanding the pain associated with rehabilitation, the injured athlete may cope with the pain better, increasing the likelihood of adhering to their exercise rehabilitation program.

Self-motivation

Self-motivation is the capacity to motivate and reinforce oneself to perform a given task. Self-motivated individuals are better able to work toward their goals without external guidance and encouragement (Weiss & Troxel, 1986). Athletic trainers identified some aspects of self-motivation as relevant to exercise

rehabilitation adherence.

Athletic trainers strongly believed that athletes are more likely to adhere to their rehabilitation programs if they feel it is worth going through the rehabilitation. This idea is supported by Geertsen et al. (1973), who found poor compliance among arthritic patients who did not believe their treatment program would be successful. Davis and Eichen (cited in Andrews et al., 1981) reported similar findings, with a high rate of patient dropout for patients who did not strongly believe in their exercise program.

Trainers also agreed that supervision and monitoring of injured athletes on a regular basis increase the likelihood that athletes will adhere to their rehabilitation regimens. Friedman and Litt (1987) suggested that supervision can provide reinforcement and encouragement to the injured athlete, thereby promoting adherence. It seems probable that injured athletes perform their exercise properly and with the necessary intensity when they are supervised. If they are not supervised, they may have a tendency to decrease their intensity.

Although only a few aspects of self-motivation have been discussed, other aspects may be important to rehabilitation adherence. SMSs need to motivate

athletes in hopes that motivated behaviors will eventually be self-sustaining (i.e., increase self-motivation).

Goals and Incentives

Athletic trainers ranked goal setting as the second most successful strategy that they have used to get athletes to adhere to their rehabilitation programs. Subjects revealed aspects of goal setting that they felt were important to exercise rehabilitation adherence.

As expected from the literature, most of the subjects disagreed that long-term goals are more important than short-term objectives. Athletic trainers also significantly agreed that injured athletes are more apt to adhere to their rehabilitation when they see immediate results. Weiss and Troxel (1986) suggested that athletes are often overwhelmed by the thought of long-term recovery; thus, short-term objectives should be set in pursuit of long-term goals. Perhaps by setting short-term objectives, injured athletes feel a sense of accomplishment, which in turn motivates them to continue with their programs. Short-term objectives provide injured athletes with a sense of progress on a regular basis.

SMSs reported encouragement to be an important incentive to exercise rehabilitation adherence.

Encouragement and feedback are important aspects of goal setting that the SMS can provide (Meichenbaum & Turk, 1987). Subjects listed encouragement as the third most successful strategy that they have used in their rehabilitation setting.

SMSs reported mixed feelings as to whether or not threats are a successful incentive to program adherence, yet they did rank threats as the most unsuccessful strategy. Possibly the dilemma lies in each subject's interpretation of types of threats. Some trainers may have associated threats with scare tactics. For example, "If you do not perform your therapy, you will not regain strength and will continue to limp." Other trainers may make a threat such as, "If you do not show up for your rehabilitation session, I will not tape your ankle for practices or games." The scare tactic mentioned is long-term, whereas the threat is short-term and may be more effective.

Goal setting can be important to exercise rehabilitation adherence. Trainers should learn goal-setting techniques and implement them in their program. Goal setting should include short-term objectives leading to the ultimate long-term goal of rehabilitation.

Significant Others

In this study, athletic trainers reported that support from significant others (teammates, coaches, and athletic trainers) is essential to get injured athletes to stick to their rehabilitation programs. Literature revealed that rehabilitation adherence is enhanced by the involvement of significant others (Friedman & Litt, 1987; Wankel, 1984; Wankel et al., 1985; Weiss & Troxel, 1986).

Athletic trainers unanimously agreed that injured athletes need to feel they are still an integral part of the team. Previously, Weiss and Troxel (1986) suggested that injured athletes often feel alienated from the team when in fact they need to feel they are still part of the team. It can be frustrating as an athlete to be injured and not able to play or have to play at a subpar level. The athlete may start to feel alienated from the team. Teammates and coaches can play an important role by encouraging and providing reinforcement to the injured player. Keeping the injured athlete involved in the team may encourage that athlete to adhere.

Athletic trainers ranked support systems as the fifth most successful strategy. Wankel (1984) and Wankel et al. (1985) introduced a support system for individuals involved in an exercise program. The

support system assisted individuals in reaching their goals through the encouragement and guidance of a support group. Support groups provide the individual with the opportunity to discuss problems and assist the individual throughout the rehabilitation process. SMSs could be important in the establishment and implementation of support systems.

Support is important to people regardless of what they are trying to accomplish. Injured athletes can use support from significant others to encourage them and to reinforce adherence behaviors. Coaches and teammates can be part of a support group for injured athletes. Visits by the coach or teammates to injured athletes can provide encouragement and make them feel as if they are still part of the team. Such support can encourage injured athletes to adhere to their prescribed rehabilitation programs.

Summary

The results of this study revealed factors that SMSs believe affect injured athletes' adherence to their exercise rehabilitation programs. SMSs play a primary role in the initial implementation and maintenance of rehabilitation programs. It is important that SMSs develop a good rapport with the injured athlete to allow for a better working partnership. Once good rapport is

established, the SMSs' influence can play an effective role in motivating injured athletes to develop self-sustaining adherence behaviors for their exercise rehabilitation program. The SMSs' role includes education of the patient, which was ranked as the most successful adherence strategy in this study. Education involves providing an explanation of the injury and providing detailed instructions of the prescribed exercise regimen.

Convenience of the program and easy accessibility to the facility were deemed as two important factors of adherence. Student-athletes often have busy schedules; thus, it is important for the SMS to be flexible and to plan rehabilitation sessions around the student-athlete's schedule.

It is also the role of the SMS to motivate injured athletes to reinforce themselves to perform their exercise rehabilitation program. In this study, SMSs reported that injured athletes need to feel that rehabilitation is worth the time and effort and that they will benefit from the program. Also, supervision and monitoring of the injured athlete can encourage the injured athlete to adhere. SMSs play a role in goal setting, which was ranked as the second most successful strategy in this study. SMSs stressed the importance

for the injured athlete to see immediate results and the important role SMSs can play in providing encouragement to injured athletes. The role of significant others was also addressed in this study. SMSs believe injured athletes need to feel that they are still an integral part of the team and that coaches and athletic trainers can play an important part in motivating their injured athletes to adhere to their rehabilitation programs.

Mixed responses were revealed for the topics of athletes' personality and pain tolerance. SMSs found it difficult to agree on these two issues. An athlete's personality involves so many traits that it would be difficult to determine which traits are significant to adherence behaviors. Pain tolerance is very individualized; thus, each injured athlete's response to pain may be different. SMSs did agree that injured athletes who understood the quantity and quality of pain are more likely to adhere.

Chapter 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study was undertaken to assess gender and experience differences of SMSs' rehabilitation adherence attitudes and judgments and to assess the factors that influence injured athletes' adherence to athletic injury rehabilitation programs. Attitudes and judgments of SMSs concerning rehabilitation were assessed to provide information pertaining to successful and unsuccessful adherence strategies they have used. Of the 505 certified athletic trainers from District 2 of the NATA, 186 participated in the study. SMSs were asked to respond to 60 statements concerning factors deemed relevant to rehabilitation adherence and to provide judgments concerning the most successful and least successful strategies they have used.

Internal consistency was calculated for each rehabilitation scale. Each item that correlated $\pm .10$ or less with the scale was deleted to maximize scale reliability. Reliability coefficients for each adherence scale ranged from a low of .30 (athletes' personality) to a high of .66 (pain tolerance).

ANOVA revealed no significant difference for either gender or experience of subjects for any of the seven

scales; therefore, these variables did not affect the results.

An analysis of questionnaire item responses was completed to assess the degree to which SMSs agreed or disagreed with each statement. This analysis revealed the following as factors important to exercise rehabilitation: (a) good rapport and communication between the SMS and the injured athlete, (b) explanation of the injury and rehabilitation regimen, (c) convenience and accessibility of the rehabilitation facility, (d) rehabilitation sessions planned around the athlete's busy schedule, (e) belief on the part of the injured athlete that the program is worth attending, (f) personal supervision and regular monitoring, (g) need for injured athletes to see immediate results, and (h) support from significant others.

Successful strategies reported by SMSs include education, goal setting, encouragement, monitoring progress, and support systems. Fewer unsuccessful strategies were offered, but threats and rehabilitation without monitoring were most often suggested.

Conclusions

The results of this study yielded the following conclusions regarding exercise rehabilitation adherence from SMSs' perspective:

1. Good rapport and communication between the athletic trainer and injured athlete are essential. These factors are important to a working partnership between the trainer and the athlete.

2. The injured athlete needs to understand the injury and the exercise regimen. If injured athletes do not gain an understanding, they may not perform the exercises properly.

3. The rehabilitation facility needs to be convenient and accessible.

4. The rehabilitation program needs to fit into the injured athlete's schedule to maximize attendance.

5. Athletes need to feel they will benefit from their rehabilitation and that rehabilitation is worth the time and effort. Athletes who feel rehabilitation is worthwhile will be more likely to put the time into their program than athletes who feel it is not worthwhile.

6. Exercise sessions need to be supervised and monitored to assure the athlete is performing the exercises with the correct technique, intensity, frequency, and duration.

7. Seeing immediate results can be motivating to the injured athlete. If athletes realize they are improving, they are more apt to adhere to their program.

8. Injured athletes need support from significant others. This support and encouragement may motivate the athlete to continue with the rehabilitation.

Recommendations

The following recommendations for further study were made upon completion of this investigation:

1. More research should be done in the area of athletic injury-related rehabilitation adherence.
2. A study involving other SMSs (e.g., physical therapists, exercise physiologists) should be conducted concerning exercise rehabilitation adherence.
3. A study of injury rehabilitation adherence strategies utilized should be conducted to further an understanding of why some strategies are more successful than others.
4. The interaction between SMSs and injured athletes should be observed to assess which behaviors are important to exercise rehabilitation adherence.

Appendix A

INFORMED CONSENT FORM

1. a) Purpose of the study: To determine factors that influence injured athletes' adherence to rehabilitation programs.
b) Benefits: To gain knowledge from the questionnaire concerning rehabilitation adherence. To gain insight and judgment from sports medicine specialists that may be used to get athletes to adhere to programs.
2. Method: Subjects will answer a questionnaire referring to factors involved in rehabilitation adherence. The questionnaire should take approximately 30 min to complete. Subjects will return the blue answer sheet and the informed consent form to Ithaca College in the stamped, self-addressed envelope provided.
3. Will this hurt? No physical or psychological risks are anticipated.
4. Need more information? Additional information concerning the investigation can be obtained from Sharon Mullins (607-272-2422) or Dr. Craig Fisher (607-274-3112). All questions are welcome and will be answered promptly.
5. Withdrawal from the study: Subjects' participation is voluntary, and they are free to withdraw from the study at any time.
6. Will the data be maintained in confidence? All collected data will be kept confidential. The answer sheets have been coded to track the returns and to maintain subjects' anonymity.
7. I have read the above and I understand its contents and I agree to participate in the study. I acknowledge that I am 18 years of age or older.

Signature

Date

Appendix B (continued)

3 - Sports medicine clinic

4 - Hospital

5 - Other

Age

Under Birth Date, mark age in years in Year column

Years of Experience as an Athletic Trainer (post-bachelor's degree)

Under Special Codes, in column K

0 - 0-2 years

1 - more than 2 years up to 10
years

2 - more than 10 years

II. Rehabilitation Adherence Statements

Please read the following statements and assess your agreement or disagreement with them, using the following 5-point scale as your guide:

1	2	3	4	5
Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree

If, for example, you feel strong agreement about the point made in a statement, then fill in 5. If, on the other hand, you disagree somewhat with a statement, then fill in 2. Use 3 only if you

really can't make a better assessment.

1	2	3	4	5
Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree

A. Trainers' Influence

1. The more experienced a trainer is, the more apt injured athletes are to adhere to their rehabilitation programs.
2. Athletes are likely to drop out of their rehabilitation programs if they are not given an explanation of their injuries.
3. It is necessary for trainers to provide detailed instructions of why certain rehabilitation exercises were chosen.
4. Good rapport between injured athletes and trainers is essential for rehabilitation adherence.
5. Injured athletes work harder on their rehabilitation with trainers of the same sex.
6. Athletes are more apt to adhere to their rehabilitation if the trainer is demanding.
7. Trainers who realistically apprise athletes of the likelihood of pain during rehabilitation sessions are more successful in getting athletes to adhere.
8. If the prescribed exercise program demands less than the athlete is willing to give, the athlete is less likely to adhere to the rehabilitation.
9. If trainers fail to make injured athletes aware of how hard they are working on their rehabilitation, then adherence will be lessened.

B. Environmental Influences

1	2	3	4	5
Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree

10. Unless the injured athlete feels comfortable with the training room environment, attendance at rehabilitation sessions will suffer.
11. A strictly business atmosphere in the training room is more conducive to exercise rehabilitation adherence than an environment that promotes socialization.
12. If the training room is crowded, athletes are less likely to attend their rehabilitation sessions.
13. Athletes are more likely to drop out of rehabilitation if their programs take more than 30 min daily.
14. It is crucial to plan rehabilitation sessions around the injured athlete's schedule to promote adherence.
15. If the training room is easily accessible, athletes' attendance at their rehabilitation sessions will be greater.
16. When needed transportation is available, attendance at rehabilitation sessions will be greater and adherence will be enhanced.
17. When the training room is crowded, injured athletes who show up for their rehabilitation tend not to work as hard on their prescribed exercises.

C. Athletes' Personality

18. Introverts are less likely to stick to their rehabilitation than are extroverts.
19. Athletes who initiate and pursue their rehabilitation with minimal directions adhere better to their rehabilitation.
20. Injured athletes who tend to display a general

1	2	3	4	5
Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree

pessimism (i.e., "nothing goes right for me")
are more apt to drop out of rehabilitation.

21. Athletes who don't fool themselves with how hard they are working adhere to their rehabilitation programs.
22. Only those injured athletes who give an "all out" commitment to their rehabilitation can be described as adherers.
23. Injured athletes who experience "depression" because of either their rate of rehabilitation progress or their present condition are likely to adhere to rehabilitation programs.
24. Athletes who fear reinjury are likely to drop out of their rehabilitation.
25. Personality of the injured athlete is the most important factor in rehabilitation adherence.

D. Pain Tolerance

26. If athletes hurt prior to starting their rehabilitation exercises, then adherence to these prescribed exercises will be reduced.
27. During rehabilitation, athletes generally stop their workout then they first experience the onset of pain.
28. If the rehabilitation exercises are painful, then athletes will lessen their commitment to their rehabilitation.
29. The higher the athlete's expectancy of pain from the rehabilitation exercises the less likely that athlete will adhere.
30. Athletes who understand the quantity and quality of pain expected during rehabilitation are more likely to adhere to their rehabilitation.

1	2	3	4	5
Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree

31. Pain during the athlete's initial rehabilitation session decreases the chances of adherence.

E. Self-motivation

32. Athletes who feel that they are not making progress in their rehabilitation will tend to drop out.

33. Unless athletes feel it is worth going through rehabilitation, they will not adhere to their rehabilitation.

34. Trainers who justify each particular exercise in a rehabilitation program have greater success with athlete adherence.

35. Athletes are more likely to adhere if they feel that they will benefit from their rehabilitation.

36. Although many athletes physically attend their rehabilitation sessions, they don't necessarily work hard at their programs.

37. If athletes can do their exercise programs alone, then they are more apt to adhere.

38. Athletes are more likely to work at their programs if trainers monitor them on a regular basis.

39. The mere presence of a trainer in the rehabilitation setting enhances the quality of the injured athlete's work.

40. Once rehabilitation exercises have been prescribed, athletes generally initiate and pursue their training room sessions even if the trainer is not necessarily present.

41. Adherence to exercise rehabilitation programs is directly related to the injured athlete's willpower.

1	2	3	4	5
Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree

42. When trainers personally supervise rehabilitation sessions, athletes work harder on their rehabilitation.
43. Athletes who succeed at their sport primarily through hard work are more likely to adhere to injury rehabilitation than athletes who succeed through their athletic talent.
44. Successful athletes (e.g., starters) are more likely to adhere to injury rehabilitation than unsuccessful athletes.

F. Goals and Incentives

45. Long-term benefits of rehabilitation are more important than short-term outcomes in getting athletes to adhere to their prescribed rehabilitation.
46. Athletes who cannot return to competition for the remainder of the season will be less faithful to their rehabilitation.
47. Athletes are more apt to adhere to rehabilitation programs when they see immediate results.
48. Knowledge of the long-term benefits of their rehabilitation programs tends to enhance athletes' adherence.
49. Adherence is enhanced when feedback to the injured athlete focuses on positive aspects of the rehabilitation, regardless of the actual progress.
50. Athletes need pep talks to encourage them to stick to their rehabilitation programs.
51. Threats (e.g., "If you miss rehab, you don't play!") are effective in getting athletes to adhere to their prescribed rehabilitation.
52. Scare tactics motivate injured athletes to

1	2	3	4	5
Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree

adhere to their rehabilitation programs.

53. Athletes will attend rehabilitation sessions only if nothing more pleasurable comes up during that time.
54. Rehabilitation programs are a high priority for injured athletes.
55. Injured athletes look for alternative activities as a means of missing their rehabilitation sessions.

G. Significant Others

56. Trainers' support of injured athletes' rehabilitation effort is essential for rehabilitation adherence.
57. Athletes who feel they're still an integral part of the team despite being injured are more likely to adhere to their rehabilitation programs.
58. When a number of trainers are involved in an athlete's rehabilitation, that athlete is less likely to adhere.
59. If coaches are supportive of their injured athletes' rehabilitation efforts, then athletes will more likely adhere to their programs.
60. If teammates are not supportive of injured athletes' rehabilitation efforts, then the athletes will tend to drop out of rehabilitation.

Thank you for completing these 60 questions. On the next page, there are two open-ended questions that we would like you to address.

Undoubtedly, all sports medicine specialists are interested in maximizing athletes' adherence to their injury rehabilitation programs.

.What's the most successful strategy or technique you have used or heard about to maximize rehabilitation adherence?

.What strategy or technique simply has not worked for you? List more than one if necessary.

(Detach this sheet from the questionnaire and return it with the blue answer sheet and the informed consent form.)

Again, thanks for your participation.

REFERENCES

- Anderson, R. J., & Kirk, L. M. (1982). Methods of improving patient compliance in chronic disease states. Archives of Internal Medicine, 142, 1673-1675.
- Andrews, G. M., Oldridge, N. B., Parker, J. O., Cunningham, D. A., Rechnitzer, P. A., Jones, N. L., Buck, C., Kavanagh, T., Shepard, R. J., Sulton, J. R., & McDonald, W. (1981). Reasons for dropout from exercise programs in post-coronary patients. Medicine and Science in Sports and Exercise, 13, 164-168.
- Dishman, R. K. (1981). Biologic influences on exercise adherence. Research Quarterly for Exercise and Sport, 52, 143-159.
- Dishman, R. K. (1982). Health psychology and exercise adherence. Quest, 33, 166-180.
- Dishman, R. K. (1984). Motivation and exercise adherence. In J. M. Silva, III & R. S. Weinberg (Eds.), Psychological foundations of sport, (pp. 420-434). Champaign, IL: Human Kinetics.
- Dishman, R. K. (Ed.). (1988). Exercise adherence: Its impact on public health. Champaign, IL: Human Kinetics.
- Dishman, R. K., & Gettman, L. R. (1980).

- Psychobiologic influences on exercise adherence.
Journal of Sport Psychology, 2, 295-310.
- Dolce, J. J., Crocker, M. F., Molatteire, C., & Doleys, D. M. (1986). Exercise quotas, anticipatory concern and self-efficacy expectancies in chronic pain: A preliminary report. Pain, 24, 365-372.
- Domm, M. A. (1985). Rehabilitation adherence.
Unpublished master's thesis, Ithaca College, Ithaca, NY.
- Dunn, R. (1983, Spring). Psychological factors in sports medicine. Athletic Training, pp. 34-35.
- Fisher, A. C. (1990). Adherence to sports injury rehabilitation programmes. Sports Medicine, 9, 151-158.
- Fisher, A. C., Domm, M. A., & Wuest, D. A. (1988, July). Athletic injury rehabilitation adherence. The Physician and Sportsmedicine, pp. 47-50, 52.
- Friedman, I. M., & Litt, I. F. (1987). Adolescents' compliance with therapeutic regimens. Journal of Adolescent Health Care, 8, 52-67.
- Geertsen, H. R., Gray, R. M., & Ward, J. R. (1973). Patient non-compliance within context of seeking care for arthritis. Journal of Chronic Diseases, 26, 689-698.
- Haynes, R. B. (1984). Compliance with health advice:

- An overview with special reference to exercise programs. Journal of Cardiac Rehabilitation, 4, 120-123.
- Hotchkiss, D. D. (1981). Cognitive strategies for athletic pain management. Unpublished master's project, Ithaca College, Ithaca, NY.
- Ice, R. (1985). Long-term compliance. Physical Therapy, 65, 1832-1839.
- Meichenbaum, D., & Turk, D. C. (1987). Facilitating treatment adherence. New York: Plenum.
- Miller, W. R. (1985). Motivation for treatment: A review with special emphasis on alcoholism. Psychological Bulletin, 98, 84-107.
- Morisky, D. E. (1986). Nonadherence to medical recommendations for hypertensive patients: Problems and potential solutions. The Journal of Compliance in Health Care, 1, 5-20.
- Oldridge, N. B. (1984). Compliance and dropout in cardiac exercise rehabilitation. Journal of Cardiac Rehabilitation, 4, 166-177.
- Sallis, J. F. (1986). Exercise adherence and motivation. Health Education Focal Points, 2, 1-3.
- Schulman, B. A. (1979). Active patient orientation and outcomes in hypertensive treatment. Medical Care, 17, 267-280.

- Sonstroem, R. J. (1980). Prediction of athletic participation in middle school males. Research Quarterly for Exercise and Sport, 51, 685-694.
- Sperry, L. (1985). Treatment noncompliance and cooperation: Implications for psychotherapeutic, medical, and lifestyle change approaches. Individual Psychology: Journal of Adlerian Theory, Research and Practice, 41, 228-236.
- Stone, G. C. (1979). Patient compliance and the role of the expert. Journal of Social Issues, 35(1), 34-59.
- Wankel, L. M. (1984). Decision-making and social support strategies for increasing exercise involvement. Journal of Cardiac Rehabilitation, 4, 124-135.
- Wankel, L. M. (1985, June). Program interventions to enhance exercise adherence. Paper presented at the VI World Congress of Sport Psychology, Copenhagen, Denmark.
- Wankel, L. M., Yardley, J. K., & Graham, J. (1985). The effects of motivational interventions upon the exercise adherence of high and low self-motivated adults. Canadian Journal of Applied Sport Sciences, 10, 147-156.
- Weiss, M. R., & Troxel, R. K. (1986, Summer).

Psychology of the injured athlete. Athletic Training, pp. 104-109, 154.

Wolken, G. H. (1986). Patient compliance in the medical health care continuum of care. The Journal of Compliance in Health Care, 1, 75-89.