Rehabilitation Adherence in Sport Injury: Sport Physiotherapists’ Perceptions

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Context: Athlete’s adherence behavior can influence the outcome of a rehabilitation program. Objective: To draw on sport physiotherapists’ expert knowledge to increase understanding of adherence issues in practice and identify factors that influence adherence and strategies that can be used to enhance adherence. Design: An interview design with inductive content analysis. Participants: Nine (6 women and 3 men) experienced sports physiotherapists. Results: Under-adherence and over-adherence were issues in practice for some practitioners, and adherence was viewed as important for successful recovery from injury. Three higher order themes emerged relating to the influence of athlete characteristics, situational characteristics, and characteristics of the injury and rehabilitation on both facilitating and preventing rehabilitation adherence. Strategies to improve adherence in practice emerged from the data and broadly addressed the key determinants of adherence. Conclusion: Adherence to rehabilitation is influenced by a number of factors and strategies to enhance adherence are identified. Key Words: rehabilitation, psychology, health behavior

Adherence to sport injury rehabilitation has received limited attention within sport psychology, and there is a need to further our understanding of this issue. Adherence has been defined as “an active, voluntary collaborative involvement of the patient in a mutually acceptable course of behavior to produce a desired preventative or therapeutic effect.” Adherence behavior in sport injury rehabilitation may include clinic-based activities, modifying sport activity (e.g., resting), taking medication, and completing home-based activities (e.g., icing). A number of sources, including research studies and surveys with sports medicine personnel, suggest that low and nonadherence can be an issue in practice. Brewer summarized a number of studies and reported that adherence to sport injury rehabilitation rates could be as low as 40%. The findings are not clear cut, however, as Brewer reported that some studies found adherence rates as high as 91%. Others have suggested adherence may diminish further during a lengthy rehabilitation period or when rehabilitation is home-based. It has been assumed that recovery from injury and decreasing the risk of re-injury is largely contingent upon an athlete’s adherence with a prescribed rehabilitation program. However, the relationship is not straightforward and outcome studies have been inconsistent in documenting the link between adherence and injury recovery.
To date, research investigating sport injury rehabilitation adherence has focused primarily on identifying predictors of adherence behavior. Brewer\textsuperscript{3,6} outlined a number of personal (eg, self-motivation) and situational (eg, injury duration) factors that have been associated with adherence behavior. Further, theoretically based research has also identified key factors influential in explaining adherence behavior. However, much of this research has employed a deductive framework whereby researchers have identified the variables that were examined a priori. For example, Taylor and May\textsuperscript{5} conducted a study with injured student athletes and examined the value of the Protection Motivation Theory in predicting rehabilitation compliance. Theoretically based research, of course, has considerable merit but in a relatively new area of research adopting a more inductive approach can be beneficial and complementary in order to allow pertinent variables to emerge from the phenomenon being studied.\textsuperscript{8} Recently, Brewer\textsuperscript{9} argued further research is required to be able to draw conclusions about the most critical factors affecting adherence to rehabilitation. Qualitative studies offer a complementary approach to quantitative studies in understanding rehabilitation adherence and may identify new factors for consideration and provide further support for previous findings.

In sports medicine, sport physiotherapists are typically the primary health care professional for injured athletes. As such, these professionals develop expert knowledge and experience of working with athletes recovering from injury; however, little research has been conducted with this group to draw from this invaluable practical knowledge. Exceptions include survey research, which has demonstrated that physiotherapists recognize the psychological aspect of injury and the role of psychological strategies in enhancing recovery and coping with injury.\textsuperscript{4,10} Indeed, Hemmings and Povey\textsuperscript{4} highlighted that adherence problems are an issue that physiotherapists encounter in practice, and that adherence behavior was viewed as a distinguishing characteristic of athletes who do or do not cope well with injury; however, limited research has focused specifically on rehabilitation adherence and has drawn on the expert practical knowledge physiotherapists have regarding the factors that they perceive to influence adherence behavior and what strategies they use to deal with adherence.

The aim of this study was to increase understanding of the issue of adherence to sport injury rehabilitation by interviewing physiotherapists to gain insight into their perceptions and experiences of athletes' adherence to sport injury rehabilitation behavior. The findings of this qualitative study may be used to support or extend previous research, to inform practice, and ultimately increase athlete adherence to sport injury rehabilitation.

**Method**

**Participants**

Participants (M age = 35.1, SD = 5.6 years) were White UK-based physiotherapists and six women and three men who had an average of 11.75 (SD = 4.1) years experience as a qualified physiotherapist. At the time of the interview the participants spent an average of 75% (range = 20% to 100%; SD = 29.5%) of their working time
in a sports medicine setting dealing with injured athletes from a range of sports, spanning from recreational to elite level. The individual working with athletes for only 20% of his time had previously worked with athletes to a greater extent.

Measures

A semi-structured interview was used to gain insight into the participants’ perceptions of adherence in sport injury rehabilitation. The interview guide was developed over several phases.\textsuperscript{11,12} Initially, a series of questions was developed to address the following: (1) What is the incidence of adherence in practice? (2) What is the importance of adherence in practice? (3) From their interactions with athletes, what do the physiotherapists perceive are the factors that influence good adherence to rehabilitation in the clinic, at home, and in a sport setting? (4) What factors influence poor adherence to rehabilitation in the clinic, at home, and in a sport setting? Questions developed were concise and nonleading and a number of possible probing questions were created to stimulate responses and ensure the smooth running of the interview. An introductory statement was developed to explain the purpose of the interview, confidentiality and withdrawal procedures, and to provide definitions of key terms used in the interview. For example, adherence was defined as “the extent to which athletes stick to and follow their recommended rehabilitation program.” Nevertheless, it should be noted that some participants used the terms \textit{compliance} and \textit{adherence} interchangeably. A pilot interview was conducted with a physiotherapist representative of the target population. The physiotherapist provided feedback on the interview technique and questions, and the interview transcript was examined for problematic questions. Subsequently, minor amendments were made to the interview questions in order to increase clarity and understanding.

In qualitative inquiry, the researcher is also viewed as an instrument of the research\textsuperscript{13} and it is therefore appropriate to provide details of the primary researcher’s background and perspective so that the reader can interpret the researcher’s understanding of the data.\textsuperscript{14} At the commencement of the interviews the researcher had been a practicing sport psychologist for seven years and had experience of undertaking qualitative research. The researcher had also recently experienced an injury that required physiotherapy. The research investigation was primarily stimulated by the researcher’s experiences of working as a sport psychologist with injured athletes and discussions with physiotherapists.

Procedure

Institutional ethical approval for the study was granted and all participants completed informed consent forms. The participants were purposively identified through local sport medicine clinics as physiotherapists working predominantly in sport and contacted via letter to be invited to participate in the study. All participants agreed to take part and approximately one week prior to the interview they received a copy of the interview questions. The interviews took place in a mutually convenient location and lasted around 60 min. The interviews were taped and subsequently transcribed verbatim. The interviews took place over a period of 12 months and the sample size was restricted when it appeared that a level of saturation had been reached as limited new information was emerging from the interviews.\textsuperscript{15}
Data Analysis

First, the interview transcripts were scrutinized so that the primary researcher could familiarize herself with the responses and start to identify relevant content. Interpretive summaries of each interview were written in order to summarize the main content, make sense of the interview data, and provide a framework within which quotes from each participant could be contextualized. Subsequently, an interpretive inductive content analysis was undertaken to organize the data into common themes. Meaning units (n = 461) were extracted from the interview transcripts following Tesch’s definition of a meaning unit (i.e., “a segment of text that is comprehensible by itself and contains one idea, episode or piece of information”). The meaning units were organized into the four broad categories of interest: (1) incidence and importance of adherence in practice, (2) factors that influence good adherence to rehabilitation, (3) factors that influence poor adherence to rehabilitation, and (4) strategies used to improve adherence. Each meaning unit was “tagged” with an appropriate label and these represented raw data themes. Raw data themes with similar meanings were clustered together to form first order themes, and a hierarchical structure was developed by identifying relationships between first order themes to establish second order themes. The inductive process was ongoing until no further groupings could be made and the highest order themes in each category were labeled General Dimensions, and this could represent a first, second, or third order theme.

A number of procedures were incorporated into the analysis to increase its credibility following established guidelines. As discussed above, details of the researcher’s background were provided. Member checking was undertaken by returning the interpretive summaries to the participants who agreed to read them in order to ensure the researcher’s interpretation of the interviews accurately reflected the participant’s interpretation. Following feedback, minor amendments were made to two summaries to more fully reflect the participant’s views. Two additional analysts with postgraduate experience in qualitative research audited the analysis. Each theme was discussed and the auditors questioned the primary researcher who was required to justify the content of each theme. Discussion continued until agreement was reached on the analysis. Finally, numerous example quotes from the interviews are included in the results section to allow readers to appraise the fit between the data and the interpretation of the data and so that the “voices” of the interviewees are heard and can resonate with the reader.

Results

The results from each of the four broad categories are presented in turn: (1) incidence and importance of adherence in practice, (2) factors that influence good adherence to rehabilitation, (3) factors that influence poor adherence to rehabilitation, and (4) strategies used to improve adherence.

Incidence and Importance of Adherence in Practice

The general dimension Incidence of Adherence in Practice included 13 comments made by the physiotherapists that over-adherence, under-adherence, and adherence were all issues evident in practice. For example, one physiotherapist noted,
I can say that the number of people who will do everything I’ve asked them to do are very few and far between. I can probably name the people, the individuals, count them on the fingers who did everything I’ve asked them to do. It is very difficult to find anyone. (Interviewee 3)

However, there was not complete consensus between the physiotherapists that adherence was a problem in practice as four comments were made suggesting adherence is not an issue. For example, one physiotherapist reported “probably most comply.”

The physiotherapists proposed a number of reasons why it was important for athletes to adhere to rehabilitation that were clustered in the general dimension Importance of Adherence. These reasons included that adherence will help the athlete recover, it will prevent the injury worsening so that the physiotherapist will know whether the prescribed exercises are effective, and the physiotherapists know what they are doing and would not prescribe exercises that were not going to be beneficial. For example, one physiotherapist reported, “it (adherence) is of the utmost importance I think. At the end of the day I’m trained and I know what I’m doing so if they don’t listen to me they’re not going to achieve what they want to” (Interviewee 5). No comments were made suggesting that adherence was not important for rehabilitation.

Factors That Influence Good Adherence

Figure 1 illustrates the first and second order themes, and general dimensions that emerged relating to factors that influence good adherence. The general dimensions were labeled Adaptive Characteristics of the Athlete, Good Support Structures, and Positive Injury and Rehabilitation Experience, and each will be presented in turn with raw data themes and quotes used to illustrate.

**General Dimension: Adaptive Characteristics of the Athlete.** This theme refers to attributes of the athletes that the physiotherapists perceived were related to good adherence and emerged from two second order themes: Positive Individual Attributes and Adaptive Thoughts. Attributes of athletes who adhered well included having a professional approach to their sport by doing their training, being organized, and taking responsibility for their injury. For example, one participant discussed an athlete who had adhered well: “she took a mature attitude towards it, like she wanted to help herself” (Interviewee 5). Other attributes related to being adaptable, educated, confident, used to pain, and enjoying physical activity. Further, it was also suggested that athletes competing at a higher level would adhere better, and that athletes who are funded may adhere better as there is an incentive to return to fitness in order to earn money. Being motivated and driven to succeed were identified several times as being associated with good levels of adherence. For example, one physiotherapist noted that being motivated by an upcoming competition would improve adherence:

the goal of a competition for example—say for one of the rugby players whose motivation to get better and go to the World Cup in October and you know he doesn’t need any more better motivation to do his rehabilitation than that and you nearly need to hold him back because he is going to do so much. (Interviewee 3)
Figure 1 — Factors that influence good rehabilitation adherence in practice.

The second order theme, Adaptive Thoughts, incorporated suggestions made by the participants that athletes who adhere well have self-belief in their ability to overcome the injury, view their injury and rehabilitation in a positive light, and maintain a positive perspective. Additionally, the physiotherapists suggested that if the athletes understand their injury and have a realistic understanding of the requirements, benefits, and relevance of the rehabilitation, then they would adhere better. For example, one physiotherapist noted that,

I think that probably the patience and understanding of the condition—what’s wrong with them, why you ask them to do the exercises as a result of that; I think that this to me is the most important factor of predictive outcome. I think that will influence the compliance much more than anything else.
(Interviewee 3)

General Dimension: Good Support Structures. This theme incorporated comments by the physiotherapists that the situation the athletes are in and how this environment supports the athletes will influence their level of adherence. The theme
included three second order themes: Good Social Support, Trust in Physiotherapist and Rehabilitation Process, and Facilitative Environment.

The theme Good Social Support included comments relating to the importance of social support provided by family, therapists, fellow-athletes, coach, and fellow patients in encouraging adherence. The coach’s involvement in the rehabilitation was also seen as helpful in improving adherence. Specifically, one physiotherapist noted,

> Sometimes you’ll get a coach who will come in with the athlete and that’s fantastic because you can discuss everything with the coach and the athlete and get agreement on what the athlete can do. It’s good to have the coach on your side and to work as a team. (Interviewee 6)

The second, second order theme related to having trust in the physiotherapist and the rehabilitation process. It was suggested that if the athlete develops a good relationship with the physiotherapist and trusts and values the physiotherapist and
the rehabilitation being prescribed, then adherence would be good. For example one physiotherapist suggested, “they have got to have confidence in you though, they have got to believe that you know what you are talking about” (Interviewee 7).

The theme Facilitative Environment emerged from comments related to how the characteristics of an environment can encourage adherence. For example, a first order theme related to the value of being given time to rehabilitate without pressure from others. Additionally, having resources, space, equipment, and scheduled rehabilitation time were all seen as important in creating an appropriate environment to rehabilitation. Finally, it was suggested that if the athletes were able to fit rehabilitation into their lifestyle, then this facilitated adherence. For example, one physiotherapist noted, “I have one athlete who doesn’t work and whose husband is also an athlete, so she can dedicate all of her time to doing her exercises” (Interviewee 6).

**General Dimension: Positive Injury and Rehabilitation Experience.** This theme emerged from first order themes relating to how the nature of the injury and rehabilitation could aid adherence. For example, the stage of season in which the injury occurred was viewed as influential and it was suggested that if the injury occurred preseason, then the athlete would be motivated to adhere well. Previous experience of injury was viewed as being useful in encouraging adherence because the athlete would know what was required to get fit again. For example, one physiotherapist reported that “people who have a history of injury (adhere) because they know from experience what they need to do to get better and perhaps listen more and comply” (Interviewee 6). Finally the nature of the rehabilitation was viewed as influential on adherence, in that athletes in the later stages of rehabilitation or undergoing a short period of rehabilitation will adhere well. It was also suggested that if the athletes are paying for the physiotherapy themselves, then this could lead to improved adherence. For example, “I think there are issues with who’s paying for it. People come in and pay for it themselves comply much better than those who are funded. They’ve bought the advice and information so they are going to benefit from it” (Interviewee 7).

**Factors That Influence Poor Adherence**

Figure 2 illustrates the first and second order themes, and general dimension that emerged relating to factors that influence poor adherence. The general dimensions were labeled Unhelpful Characteristics of the Athlete, Poor Support Structures, and Negative Injury and Rehabilitation Experience, and each will be presented in turn with raw data themes and quotes used to illustrate.

**General Dimension: Unhelpful Characteristics of the Athlete.** This dimension refers to attributes of the athletes that the physiotherapists perceived were associated with poor adherence and emerged from four second order themes. The second order theme, Negative Individual Factors, included comments related to the following: having an unprofessional approach to being an athlete and not training a great deal, not having goals, being a recreational athlete, shirking responsibility for the rehabilitation, and making excuses for not completing the rehabilitation. For example, one physiotherapist suggested, “I would say, in most cases, it tends to come from people who don’t train very hard to begin with. So I would associate
under compliance with a lower level of sport” (Interviewee 8). Poor motivation emerged as another first order theme and related to athletes not being motivated or being too laid back. Additionally, it was noted that if the athlete is extrinsically motivated, then this could lead to poor adherence, because due to injury, the athlete would not receive extrinsic rewards from competing, and this could result in a decrease in motivation. Additional individual factors that emerged included being less intelligent and not having the ability to do the rehabilitation.

The second order theme, Negative Emotions, emerged from comments by the physiotherapists that having a negative emotional response to injury (eg, catastrophizing the injury) or having fear of re-injury or fear of pain resulted in poor adherence. The theme Maladaptive Thoughts emerged from comments relating to how the athletes’ thoughts, understanding, and attitude toward the injury and rehabilitation could negatively influence adherence behavior. For example, the physiotherapists suggested that a lack of confidence in oneself and confidence in following the rehabilitation program would lead to low adherence. Lack of understanding about the injury and the rehabilitation program were also viewed as being major contributors to poor adherence. For example, one physiotherapist noted,

Quite often you find with athletes that they don’t understand that a wee niggle can become much worse if they don’t take the time to heal properly, they don’t appreciate the long term effect if they persist with their training. (Interviewee 5)

Further, having a negative attitude toward the rehabilitation, perhaps because an opportunity for a successful performance has passed, was viewed as having a detrimental effect on adherence.

The second order theme, Individual Factors Related to Over-Compliance, included comments from the physiotherapists about why athletes might over-comply with rehabilitation recommendations. For example, athletes who over-comply were viewed as often being very enthusiastic and keen to get back to their sport. Additionally, it was suggested that elite athletes, long-distance runners, and individuals with a very intense personality were more likely to over-comply.

**General Dimension: Poor Support Structures.** This general dimension was labeled as such because it emerged from four second-order themes that related to the situation that the athlete is in and how this environment hinders the athlete in adhering effectively. The theme, Lack of Social Support, included comments relating to how the coach could exert a negative influence on the athlete’s rehabilitation by putting pressure on the athlete, not fully understanding the process, and not working with the physiotherapist. For example, one physiotherapist reported that “you’re telling an athlete one thing and they’re going away and saying to their coach and the coach says that’s nonsense. And the coach can think he knows better and has the athlete maybe doing too much” (Interviewee 6). Additionally, it was suggested that if the athlete is not adequately supervised by the therapist, then that could lead to poor adherence. Further, it was noted that having a limited level of social support could lead to poor adherence. As one physiotherapist noted “if they feel abandoned and alone then the compliance isn’t going to be good” (Interviewee 7).

The second order theme, Environmental Constraints, emerged from comments related to how the characteristics of an environment such as poor access to resources
(eg, equipment and facilities) can prevent adherence. External demands from family, job, and other commitments were also identified as having a constraining effect on adherence. For example, one physiotherapist reported, “also the athlete might have a job on top of their training and might not be able to fit it all in” (Interviewee 5). Finally, being in an unhelpful environment where it may not be possible to carry out one’s rehabilitation exercises at work or at home was seen as being influential. One physiotherapist suggested that “students living away from home in chaotic environment, halls (of residence), etc., that is probably the most difficult situation to comply with physiotherapy” (Interviewee 8).
The second order theme, Skepticism About the Physiotherapist and Rehabilitation, included themes relating to how not having trust and confidence in the physiotherapists and their recommendations could lead to poor adherence. For example, one physiotherapist noted that “not every athlete that you treat is going
to like you, if they don’t like you they are not going to do what you are asking
them to do” (Interviewee 5). It was also reported that the athletes might not adhere
because they do not perceive the recommendations to be beneficial, or the athletes
may believe that they know better than the physiotherapist.

Finally, the second order theme of Pressure emerged from three first order
themes all relating to pressure. The physiotherapists noted that social pressure
from parents and peers could influence the rehabilitation behavior of athletes.
For example, it was suggested that “if the parents are pushing too hard then the
athlete may resent doing the rehabilitation” (Interviewee 5). Competitive pressure
to compete or retain a place on the team was viewed as leading to both over- and
under-compliance. For example, one physiotherapist suggested that “if a team
needs to win a cup, the pressure comes from everybody, family, rest of the play-
ers” (Interviewee 2). The second order theme of pressure also included comments
related to general pressure from others to recover from injury.

**General Dimension: Negative Injury and Rehabilitation Experiences.** This
dimension (Figure 2) emerged from themes related to how a poor previous experi-
ce of injury can lead to poor adherence and how the nature of the rehabilitation
can prevent good adherence. Specifically, it was suggested that if the athlete viewed
the rehabilitation program as being too demanding, long, or boring, then it would
lead to poor adherence. For example, Interviewee 1 suggested “someone with a
groin strain, there is a 12 week program to be worked through and it’s quite rigid,
patients find it a little boring.”

**Strategies Used to Improve Rehabilitation Adherence**

Figure 3 illustrates the physiotherapists’ suggestions of strategies to facilitate
athlete’s adherence to rehabilitation. Eight general dimensions emerged from
12 first order themes. The general dimension, Set Goals and Monitor Progress,
emerged from themes related to setting goals, monitoring progress, and provid-
ing feedback on progress. Goal setting was viewed as a useful strategy in order
to improve adherence. Indeed, Interviewee 9 suggested “goal setting is the most
important thing.” Further, the physiotherapists suggested that checking the athletes’
level of compliance when they return to the clinic for the next session was a good
method to make the athletes accountable and therefore adhere. For example, one
physiotherapist said, “quite often if they know they are coming back helps them
to comply as well. They feel that they have to show me what they have improved”
(Interviewee 6). It was also suggested that demonstrating that progress is being
achieved by using functional markers could improve adherence.

The general dimension, Prescribe Rehabilitation to Engage the Athlete, related
to prescribing rehabilitation that would involve the athletes and encourage them to
buy into the program. This dimension included a first order theme related to tailor-
ing the rehabilitation program to accommodate the needs of the athletes, including
their lifestyle, sport, and how they respond to the rehabilitation program as well as
involving the athletes in the rehabilitation. One physiotherapist suggested, “I think
it’s important to try and get input from them as to what they think would be useful,
especially if they had previous injuries before, what worked well and what didn’t”
(Interviewee 9). Another first order theme relates to prescribing rehabilitation that
will engage the athlete by making it interesting, enjoyable, and realistic.
The general dimension, Ensure Clarity and Understanding of Rehabilitation Recommendations, emerged from themes relating to the importance of providing written, unambiguous, detailed instructions for the athletes in order to improve adherence and making sure the athletes understand how to correctly complete their rehabilitation exercises. Interviewee 5 suggested, “you’ve got to try to spend the time in the clinic showing them what to do so that they’ll comply with it at home.”
Increasing the athlete’s confidence in the rehabilitation process was also viewed as important in improving adherence. This dimension included comments relating to building a relationship with the athlete by treating the athlete as an individual and with respect and demonstrating knowledge of the athlete’s sport. The physiotherapists also reported building confidence in the rehabilitation processes by demonstrating commitment to the process themselves, being confident, and selling the program to the athlete.

Several physiotherapists reported that in order to improve adherence, they aim to instill responsibility in the athletes so that they will be accountable for their rehabilitation behavior and do it. For example, Interviewee 4 reported that,

For someone who’s clearly not taking part in a program, I will lay the choice and I will present the consequences of their actions to them as well. I’ll make clear to them that if they don’t do it then you know the likelihood of their injury.

A number of physiotherapists recognized that involving the coach, other athletes, and a support network could be useful in improving levels of adherence. For example, one physiotherapist noted that “in the past I have also gone and liaised with their coach and put together a program in conjunction with them, which is very useful” (Interviewee 8). Further, the physiotherapists reported that being accessible to the athletes to support them and having facilities for rehabilitation available at the physiotherapist’s clinic would improve adherence.

Finally, the general dimension, Miscellaneous Strategies, emerged from a number of single raw data strategies that could not be satisfactorily grouped elsewhere and included being accessible, using role models, motivating the athlete, getting angry at the athlete, using mental rehearsal, allowing the athlete to over-comply because they will learn from the consequences how to adhere accurately, encouraging the athlete to exercise away from teammates to avoid pressure of over-doing rehabilitation, working with the athlete to deal with pressure from coach to do too much, and finally informing the team management if the player does not adhere.

**Comments**

The aim of this study was to further understanding of the issue of adherence to sport injury rehabilitation by using a qualitative methodology to gain insight into physiotherapists’ perceptions and experiences of adherence issues in practice. The rich findings from the interview data have provided information on the incidence of adherence issues in practice, the factors that both facilitate and prevent athlete adherence, and strategies used by physiotherapists to improve adherence in practice.

Most physiotherapists interviewed noted that under-adherence and over-adherence were issues in practice. This supports previous research that identified adherence as a problem in practice. Much of the research to date appears to have focused on under-adherence. In this study, however, over-adherence, where the athlete may do too much too soon, was consistently reported as an issue, especially among very motivated and elite athletes. This is an area that is worthy of further investigation, as the consequences of over-adherence to injury rehabilitation could be severe. It should be noted that some physiotherapists commented that adherence
was not an issue in their practice, suggesting that adherence levels could vary across different practices. There was general agreement that adherence to the physiotherapist's recommendations is important in order to rehabilitate effectively and prevent reinjury, and this finding supports previous assumptions made that adherence positively influences recovery.

From both the major categories, Factors that Influence Good Adherence and Factors that Influence Poor Adherence, three key themes emerged relating to the role that athlete characteristics, features of support structures available to the athlete, and the injury and rehabilitation experience play in affecting adherence levels.

Several individual attributes were identified that facilitated adherence, and being motivated, confident, and able to cope with pain were findings that are consistent with previous studies. The characteristics of being professional, adaptable, educated, and someone who enjoys physical activity also emerged but do not appear to have been previously recognized in the literature. In contrast, major characteristics associated with poor adherence included being unprofessional and poorly motivated. In addition to athlete attributes, the cognitive responses that the athletes adopt were recognized as influencing adherence. Specifically, adopting a positive instead of negative mind-set toward the injury and rehabilitation was perceived as increasing adherence. Previous research has also noted the influence of adopting a positive attitude on generally coping well with rehabilitation. The athlete’s level of understanding of the injury and rehabilitation were also identified as influencing adherence. Specifically, having a good and accurate understanding of the process would result in good adherence, and a poor understanding would not. Ninemedek and Kolt also reported that athletes who were willing to learn about their injury and recovery coped better with rehabilitation. However, to date, there has been limited consideration of the influence of understanding about the injury and rehabilitation on adherence specifically.

The findings indicated that if the athlete is experiencing negative emotions about the injury and rehabilitation such as catastrophizing the injury, then this would also lead to poor adherence. This is consistent with the findings of previous studies which reported a negative relationship between emotional response and attendance at rehabilitation sessions; however, other studies have reported contradictory findings, and further research is required on the influence of emotional response on adherence.

A number of individual characteristics specifically related to the issue of over-compliance were identified. For example, being very enthusiastic and keen to get back to one’s sport were associated with over-compliance. It was also suggested that elite athletes, long distance runners specifically, and individuals with an intense personality might be more likely to over-comply. As noted above, there has been limited previous research focusing specifically on the issue of over-compliance in injury rehabilitation.

Consistent with previous research, features of the athlete’s environment emerged as influencing adherence. Having good social support from significant others including the physiotherapist, coach, parents, and teammates was deemed to improve adherence, whereas a lack of support was associated with poor adherence. Previous research has also noted the importance of social support in facilitating adherence and in coping with injury in general. Being given time and resources, such as space and equipment, to rehabilitate also emerged as being perceived as
contributing to good adherence. In contrast, having poor access to resources, being in an environment that is not conducive to carrying out rehabilitation exercises, and having external demands to deal with were all environmental factors that the physiotherapists suggested resulted in poor adherence. These findings are generally consistent with previous research that suggests time available to rehabilitate and convenience and comfort of facilities will influence adherence.3

The level of trust in the physiotherapist and the prescribed rehabilitation program emerged as being perceived as important factors on adherence. Specifically, if the athlete has a good relationship with the physiotherapist and values the recommendations made, then it was suggested that adherence would be good. In contrast, the findings of this study indicated that if the athlete does not like the physiotherapist and does not believe that the prescribed rehabilitation will be effective, then it was suggested that adherence would be poor. Previous studies have noted the influence of belief in treatment efficacy in adherence, including studies based on the protection motivation theory.5 The quality of the client-practitioner relationship is important in influencing adherence levels and has been discussed within general physiotherapy,22 but there appears to be limited research within a sport injury setting. The situational theme of pressure emerged as an influence on poor adherence. Specifically, it appeared that pressure from parents and peers and upcoming competitions could lead to poor adherence. This variable does not appear to have been examined in detail previously.

The characteristics of the injury and rehabilitation, as well as previous experience of injury, emerged as influencing adherence levels. With regard to the nature of the injury, the stage of season in which the injury occurred appears to influence adherence, and a preseason injury results in greater adherence. The timing of the injury has not been addressed in previous research, although the duration of the injury has.3 Interestingly, previous experience of injury was identified as both facilitating and preventing adherence. It was suggested that previous experience could be beneficial because the athlete would understand the level of adherence necessary to rehabilitate effectively. However, it was noted that a poor experience with a previous injury could hinder adherence. The nature of the rehabilitation was also viewed as influencing rehabilitation behavior. For example, a short rehabilitation program would result in greater adherence than a long rehabilitation program. This is consistent with previous reports that suggested adherence would decrease with lengthy rehabilitation.1 Furthermore, it was suggested that boring or demanding rehabilitation would also result in lower adherence.

Strategies to Facilitate Adherence

A number of strategies to improve adherence emerged from the interviews. The strategies suggested by the physiotherapists generally appear to address the factors that were identified as influencing adherence, namely athlete characteristics, features of support structures, and injury and rehabilitation experience. In addressing athlete characteristics that influence adherence, the physiotherapists reported using a number of strategies. For example, the physiotherapists aim to improve motivation by using the strategy of goal setting to set goals and monitor progress. Previous research has supported the use of goal setting on increasing rehabilitation adherence.23, 24, 25 Additionally, in order to encourage a professional attitude, the
physiotherapists reported working to encourage the athletes to take responsibility for the rehabilitation program. The physiotherapists reported that they work to ensure the athlete has a good understanding of the injury and the rehabilitation to facilitate adherence. Ninedek and Kolt\textsuperscript{10} also reported that increasing athletes’ understanding of the rehabilitation strategy and injury mechanisms could facilitate effective coping with injury.

In order to create a supportive environment to encourage adherence, a number of strategies were recommended. For example, consistent with previous recommendations, it was suggested that working to establish a relationship with the athlete was important\textsuperscript{22} and increasing confidence in the physiotherapist and the recommended rehabilitation would be useful strategies to improve adherence. Further, the physiotherapists recommended involving the athlete’s support network (eg, coach) in the rehabilitation program to enhance social support, which has previously been shown to influence rehabilitation.\textsuperscript{21} In order to develop positive characteristics of the injury and rehabilitation experience, the physiotherapists reported developing a rehabilitation program that will involve and engage the athletes so that they buy into the rehabilitation program and adhere to it. This finding is also consistent with previous reports in the literature.\textsuperscript{26} These reported strategies to enhance adherence have clear application, but nevertheless there is a need for future research to explore the effectiveness of these strategies in controlled intervention studies.

In conclusion, this study found that most of the sport physiotherapists interviewed believe that inadequate adherence to rehabilitation is an issue in practice. Further, all interviewees reported that adequate adherence is necessary to achieve a positive outcome. The physiotherapists suggested a large number of athlete characteristics, features of the support structures, and the injury and rehabilitation process that they perceive influence the rehabilitation adherence behavior of athletes. Several of these factors have been identified in previous research and this qualitative study supports their importance in understanding the determinants of rehabilitation adherence. Other factors that emerged do not appear to have been addressed previously, and these findings highlight areas for further research. On the basis of these findings and the physiotherapists’ suggestions, a number of strategies to improve adherence in practice are highlighted. Further empirical studies would be useful to assess the effectiveness of these strategies in improving adherence levels.

References


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