The effect of self-talk on injury rehabilitation


Yannis Theodorakis¹, Anastasia Beneca¹, Marios Goudas², Panagiotis Antoniou¹, & Parascevi Malliou¹

¹Democritus University of Thrace, Greece
²University of Thessalia, Greece

Manuscript Submitted: April 1, 1997
Revision Submitted: November 8, 1997

Running head: Psychological factors and injury rehabilitation

Address for correspondence: Yannis Theodorakis, Department of Physical Education & Sport Science, Democritus University of Thrace, 69100 Komotini,
Abstract

It has been argued that psychological interventions may help athletes to overcome the potential psychological barriers set by injury and speed up the rehabilitation process (Wiese, Weiss, & Yukelson, 1991). One psychological technique that has been proposed toward this aim is positive self-talk (Ievleva and Orlick, 1991). This study examined the effectiveness of self-talk on increasing performance during an injury rehabilitation program. An experimental (N=16) and a control group (N=14) were studied. Both groups underwent a quadriceps strengthening program on isokinetic dynamometer. During the training sessions the experimental group was presented positive messages by means of a computer multimedia program. Results showed that the experimental group improved its performance significantly more than the control group. It appears that the self-talk technique would be beneficial to performance enhancement during rehabilitation. Further, the results support the recommendation for psychological skills training in injury rehabilitation.

Key words: self-talk, rehabilitation, multimedia

The effect of positive self-talk on injury rehabilitation

Injuries present major roadblocks in the careers of athletes. An athletic injury is often accompanied by depression, tension, anger, low self esteem, problems with attention, or concentration and exercise addiction (Larson, Starkey, & Zaichkowsky,
One interactional theoretical model (Anderson & Williams, 1988) combines cognitive, physiological, attentional, behavioral, interpersonal, social and stress history variables that may influence injury occurrence and prevention. Thus, considerable attention is being devoted to the injury rehabilitation process, often from different disciplines.

Rehabilitation is a dynamic method of preventing or reversing the deleterious effect of inactivity while referring an individual to his or her former level of inactivity (Marino, 1989). It is a complex and long time process often involving medical support, surgery, physiotherapy sessions, strength training of the relevant muscle groups, and progressive induction in a training program. Isokinetic training is often used for strength training during injury rehabilitation because it involves minimal risk for re-injury. It seems that both researchers and practitioners advocate the use of psychological techniques within the rehabilitation process (Heil, 1993; Pargman, 1993; Udry, 1997). It is argued that psychological interventions may assist athletes in overcoming the potential psychological barriers set by injury and speed up the rehabilitation process (Wiese, et al., 1991).

Psychological skills and methods that have been identified in the literature as contributing to recovery from injury are: imagery (Greene, 1992; Lynch, 1988; Rotella & Heyman, 1993; Ilevleva and Orlick, 1991), self-talk (Brewer, Jeffers, Petitpas, & Raalte, 1994; Smith, 1996; Ilevleva and Orlick, 1991), goal setting (Ermler & Thomas, 1990; Theodorakis, Malliou, Papaioannou, Beneca, & Filactacidou, 1996; Theodorakis, Beneca, Malliou, & Goudas, 1997), and stress control (Ievleva & Orlick, 1991).

Although, the application of psychological skills in injury rehabilitation is considered beneficial, there is little experimental evidence for this notion. Ievleva
Self-talk and injury rehabilitation

and Orlick (1991) point out that little systematic research has been carried out on the mental components of healing with athletes. Smith (1996) emphasized that although positive self-talk, relaxation, goal setting and imagery seem appropriate to assist athletes in coping with injury, their effects are not well researched. It seems that there is currently a need for the establishment of the possible effects of psychological skills in the process of injury rehabilitation.

One of the techniques that have been proposed toward assisting recovery from injury is self-talk. The term self-talk is used to describe one's internal dialogue. It is usually categorized either as positive or as negative. According to Bunker and Williams (1986), positive self-talk facilitates enhanced performance in various ways. It can aid in skill acquisition by fostering proper attentional focus, it can assist athletes in building confidence, and it can create positive mood. Furthermore, positive self-statements can be used to trigger desired actions more effectively, to provide self-reward, to increase effort, control attention and anxiety, and aid in the rehabilitation process (Hardy, Jones, & Gould, 1996). Weinberg and Gould (1995), emphasized the effect of self-talk on skill acquisition, breaking bad habits, initiate action, and sustain effort. Regarding injury rehabilitation, it has been suggested that positive self-talk can assist the injured athlete to overcome negative emotional states such as fear, anxiety, and depression which often affect negatively his or her behavior in the rehabilitation program (Williams & Roepke, 1993). Also, positive self-talk can help in elevating the decreased self-confidence of injured athletes. Ievleva and Orlick (1991) reported that among injured athletes, fast healers used positive self-talk more frequently than slow healers. Athletic trainers rated methods for encouraging positive self-thoughts as one of most important for facilitating athlete recovery (Wiese et al., 1991).
In the sport domain, experimental studies have provided controversial evidence regarding the effects of self-talk on performance. In their study, Meyers, Schleser, Cooke, and Cuvillier (1979) did not find differences in gymnastic skills acquisition among groups that used various types of self-talk. Palmer (1992) also reported that self-talk was not effective in improving figure skating performance. On the contrary, the studies by Ziegler (1987), and Ming and Martin (1996) provided evidence for the utility of positive self-talk in improving performance. Ziegler (1987) reported that tennis players improved their forehand and backhand skills when taught to use cue words for attention focusing. Mallett and Hanrahan (1997) indicated the effect of specific cognitive race plan on 100 m sprint performance, in which participants were asked to think about specific thought content in each of the three segments of the 100 m run. Another study (Thomas & Fogarty, 1997) showed the positive effects of imagery, and self-talk training on the psychological skills and performance levels of amateur golfers. Ming and Martin (1996) also found that novice figure skaters who were instructed to use self-talk improved their performance in compulsory figures.

Similarly, sport studies that examined self-reported self-talk provided mixed results. Van Raalte, Brewer, Rivera, and Petitpas (1994) reported that observed and self-reported negative self-talk was associated with losing in junior tennis players whereas there was no association between positive self-talk and winning. Also, Rotella, Gansneder, Ojala, and Billings (1980) could not differentiate successful by non-successful elite skiers in terms of self-talk used.

Hardy et al. (1996) concluded that given the important role of self-talk in sport performance the amount of systematic research in this area is rather disappointing, but not surprising considering the obvious difficulties in carrying out relevant empirical
work. Ming and Martin (1996) argued that the studies that failed to provide evidence regarding the positive effect of self-talk on performance suffer from methodological limitations. According to them, it is important that the self-talk is simplified to include only a few key words, and that participants should be asked whether they actually use self-talk in practice. In the present study, it was attempted to follow these suggestions utilizing a computer multimedia application.

Apart from performance, it is assumed that self-talk has the potential to diminish negative affect such as anxiety and depression and create positive mood (Bunker & Williams, 1986). However, this notion has not been empirically tested yet. Regarding injury rehabilitation, post injury stress reactions often present major setbacks in the rehabilitation process. Thus, it seems rather important to examine techniques, such as self-talk, that may assist athletes in overcoming this problem.

Today, to the best of our knowledge, there is not a study that has examined the effects of positive self-talk on injury rehabilitation. This seems warranted for two reasons. First, evidence about its usefulness in injury rehabilitation programs would facilitate the enrichment of such programs with this technique. Second, such a study would add to our, limited at the moment, knowledge base regarding the effects of self-talk on sport performance and on performance related anxiety. Based on the above, the aim of the present study was to examine the effects of positive self-talk during injury rehabilitation process on performance and anxiety. It was hypothesized that positive self-talk would enhance performance and would be associated with lowered pre-test anxiety.

Method

Participants
The participants of the study were 30 athletes (21 men and 9 women) from various sports (eg. soccer, basketball, track and field, swimming, and volleyball) 18 to 23 years of age (M=19.2). They were randomly split in an experimental (N=16) and a control group (N=14). The participants met the following criteria: a) they had underwent knee arthroscopic surgery at least six weeks prior to the study, b) they had physician's recommendation for quadriceps strengthening, and c) no motion deficits or effusion were observed during physical examination. Data collection took place at a sport physiology laboratory located at a physical education department. All the participants gave informed consent for their participation in the study and no incidents of pain occurred during the intervention and the testing sessions.

Rehabilitation protocol

The rehabilitation protocol was the same for all the participants. It consisted of six training sessions- three sessions per week. Although six training sessions are not enough for completely restoring muscle strength after knee surgery, this length was chosen since it is argued that it is sufficient for performance improvement (Davis, 1992). A CYBEX 6000 isokinetic dynamometer was used in training to strengthen the quadriceps during the program. Each set of the knee extension exercise involved 10 sets of ten repetitions at 180°/sec. These were preceded by a 10 min warm-up period on an ergometer bicycle.

Experimental manipulation

In each training session and prior to each set of repetitions, the participants of the experimental group were presented a number of different messages such as "strong", "I can", and "I can achieve great performance". The messages were presented on a computer screen in the form of a pull-down menu and the participants were instructed to choose one of them using a mouse. Once the participants began the
set of repetitions on the CYBEX, the message they had chosen appeared on the computer screen continuously on various forms (circles and squares whose size increased and decreased continuously) and in various colors (blue, green, yellow and red). The participants were instructed to focus on the computer screen while performing and to repeat the message on their own aloud or just thinking about it. Participants of the control group trained without using this computer program and were instructed to try to do their best.

**Measures**

**Performance.** The participants were tested prior to the first, third, and sixth training session. Performance was recorded by means of the CYBEX computer system. After a ten minute warm-up they were allowed two sets of three repetitions at 180/sec with 30 sec break between the two sets. Then, during a 5 min interval the participants of the experimental group watched the positive self-talk instructions presented on the computer screen. Next, the participants performed another two sets of three repetitions at 180°/sec. The higher score of the latter two sets of repetitions served as a measure of performance.

**Ability.** The higher score of the first two sets of repetitions during the first testing session served as a measure of participants' initial ability on the knee extension exercise.

**Anxiety.** Krane's (1994) revision of the Mental Readiness Form anxiety scale (Murhy, Greenspan, Jowdy, & Tammen, 1989) served as a measure of pre-testing anxiety. This scale consists of three items. Cronbach's alpha was .63, .67, and .77 for the first, second and third trials respectively.

**Results**
A t-test on performance showed that the experimental and the control group were equivalent prior to the experimental manipulation ($t_{28}=.53$, $p>.05$). Table 1 presents means and standard deviations for the two groups across the three trials. As can be seen, the experimental group exhibited considerable improvement in performance in contrast with the control group. A profile analysis (Tabachnic & Fidell, 1989) was performed on the four performance variables (ability, trial 1, trial 2, and trial 3), with experimental/control group membership serving as the grouping variable. Mauchly's test of sphericity indicated that the assumption of sphericity was not violated ($\chi^2=5.9$, $p>.05$). The test of parallelism was significant ($F_{3,84}=3.19$, $p<.05$), indicating differential change of the two groups over the four measures. Examination of the univariate F-tests on the difference contrasts indicated that the two groups had different performance change in the third trial ($F_{1,28}=4.04$, $p=.05$). The pattern of performance change for the two groups is presented in figure 1.

To test whether the pattern of change for anxiety was the same for the two groups across the three trials, profile analysis was performed on the three anxiety variables. The sphericity assumption was not violated as examined by Mauchly's test ($\chi^2=2.5$, $p>.05$). The test of parallelism was not significant ($F_{2,56}=2.96$, $p>.05$) indicating that the experimental manipulation did not alter the participants' pre-test anxiety.

**Discussion**

The results showed that self-talk may have positive effects on performance enhancement. Participants that used positive self-talk during training improved their performance on a strength task significantly more than the control group. However, testing anxiety was not decreased in the experimental group. These results parallel
those of Ziegler (1987) and of Ming and Martin (1996) and support the utility of positive self-talk as a tool for increasing sport performance.

As has been suggested (Hardy et al. 1996), the positive effect of self-talk on performance may be due to a number of reasons. Self-talk is supposed to facilitate proper attentional focus, to assist in confidence building as well as to foster enhanced effort. Although, we are not in a position to ascertain the exact mechanisms for this effect, it appears that the self-talk technique can be used effectively by athletes towards performance enhancement. Nevertheless the possibility that a Hawthorne effect occurred for the experimental group cannot be ruled out and should be examined in future research.

Nevertheless, there are studies that did not provide evidence for the effects of positive self-talk on performance (e.g. Palmer, 1992). As commented, one of the drawbacks of these studies, is that they did not check for the actual use of self-talk by the participants (Ming & Martin, 1996). Indeed, this is rather difficult methodologically since participants may not use self-talk verbally. A possible solution in experimental studies, would be to present participants with positive messages while they are performing and to instruct them to focus on these messages. This approach was followed in the present study. The participants while performing were presented a positive message they had chosen from a pool messages by means of a multimedia application. While actual use of the messages can not be guaranteed in this case, it is obvious that asking participants to focus on them while performing increases the probability that self-talk is actually used. Further, this procedure facilitates proper attentional focus which is one of the proposed benefits of self-talk.

Regarding the effect of self-talk on anxiety, the relevant hypothesis was not confirmed. Anxiety levels were not decreased in the experimental group relative to
the control group. This may be due to the nature of the messages that participants were instructed to use. These messages were motivational in nature and relevant to performance enhancement but not to relaxation. Perhaps messages such as "relax", "easy", and "calm" would be more suitable in reducing tension. However, this needs to be examined in future studies. Further, we do not know whether such messages would be beneficial for increasing performance, since a certain amount of anxiety (optimal anxiety, see Hanin, 1997) is essential for maximum performance.

These results provide evidence that self-talk may be used effectively in assisting injured athletes improving their performance in strength training during the rehabilitation period. It is rather important for injured athletes to be able to see improvement in their performance and to build their confidence which usually deteriorates after the incident of injury.

Further, these results support the recommendation for the application of psychological skills methods during injury rehabilitation (Heil, 1993; Pargman, 1993). This study presented evidence that positive self-talk is effective in assisting athletes to increase their performance during rehabilitation. Future studies may examine the role of other psychological skills such as goal setting, imagery and/or relaxation in this domain. Moreover, comprehensive packages involving combinations of these techniques should be tested for their effectiveness in injury rehabilitation.
References


Table 1: Descriptive statistics for all variables.

<table>
<thead>
<tr>
<th></th>
<th>Performance</th>
<th>Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ability</td>
<td>Trial 1</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>142.13</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>133.93</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>414.6</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>5.29</td>
</tr>
</tbody>
</table>
Figure 1: Group performance across trials
Η επίδραση του αυτοδιαλόγου στην αθλητική αποκατάσταση

Περίληψη

Από ερευνητές έχει συζητηθεί η άποψη ότι τεχνικές ψυχολογικής παρέμβασης μπορούν να βοηθήσουν τους αθλητές και τις αθλήτριες να ξεπεράσουν βασικά ψυχολογικά εμπόδια και να συντομούσουν τη διαδικασία της αποκατάστασης (Wiese, Weiss, & Yukelson, 1991). Μια ψυχολογική τεχνική που έχει προταθεί για το σκοπό αυτό είναι η τεχνική του αυτοδιαλόγου (Ievleva and Orlick, 1991). Στην εργασία αυτή εξετάσθηκε η επίδραση της τεχνικής του αυτοδιαλόγου στην αύξηση της απόδοσης των τραυματισμένων ατόμων κατά τη φάση της μυϊκής ενδυνάμωσης ενός προγράμματος αποκατάστασης μετά από τραυματισμό. Για το σκοπό αυτό χρησιμοποιήθηκαν δύο ομάδες μια πειραματική (n=16) και μια ομάδα ελέγχου (n =14). Εάν ένα αθλητής ακολούθησε το ίδιο πρόγραμμα μυϊκής ενδυνάμωσης στο ισοκινητικό μηχάνημα. Κατά τη διάρκεια της εξάσκησης η πειραματική ομάδα είχε την ευκαιρία να παρακολουθεί μπροστά στην οθόνη ενός υπολογιστή ένα θετικό μήνυμα. Το μήνυμα αυτό είχαν επιλέξει προηγούμενα τα άτομα από μια σειρά πέντε διαφορετικών θετικών μηνυμάτων με τη βοήθεια ενός προγράμματος πολιμέσων. Από τη στιγμή που τα άτομα επέλεγαν το μήνυμα αυτό εμφανίζονταν διαρκώς στην οθόνη του υπολογιστή. Τα αποτελέσματα εδείξαν ότι η πειραματική ομάδα βελτιώθηκε πιο πολύ από την ομάδα ελέγχου, η οποία ακολουθούσε το ίδιο πρόγραμμα εξάσκησης αλλά χωρίς τη βοήθεια του προγράμματος αυτοδιαλόγου μέσω του υπολογιστή. Φαίνεται ότι η τεχνική του αυτοδιαλόγου είναι μια χρήσιμη τεχνική για βελτίωση της μυϊκής ενδυνάμωσης κατά τη διάρκεια ενός προγράμματος αποκατάστασης. Επιπλέον τα αποτελέσματα εδείξαν ότι τεχνικές εξάσκησης ψυχολογικών δεξιοτήτων είναι αποτελεσματικές και σε προγράμματα αποκατάστασης.