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PHYSICAL RECOVERY IN ARTHROSCOPIC KNEE SURGERY: UNIQUE CONTRIBUTIONS OF COPING BEHAVIORS TO CLINICAL OUTCOMES AND STRESS REACTIVITY

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Few studies have examined whether certain coping behaviors are associated with physical outcomes following surgery. This prospective, longitudinal study investigated the effect of active and avoidant coping behaviors on two physical outcomes over time, pain and knee function, in a group of patients experiencing knee arthroscopic surgery ($n = 81$). Structured interviews and physician clinical assessments were conducted preoperatively and at 3 and 24 weeks postoperatively. Coping behavior was assessed during the preoperative interview, and patients were divided into high and low avoidant and active coping groups. Using repeated measures MANCOVA/ANCOVA, avoidant coping was significantly associated with knee pain and active coping was associated with knee function. Serum cortisol levels were available for a patient subset ($n = 16$); higher cortisol was related to both avoidant coping and poorer functioning during early recovery. Results suggest that these divergent coping behaviors are differentially associated with stress reactivity and physical outcomes in healthy patients undergoing minor knee surgery.

Keywords: Coping; Surgery; Recovery; Cortisol; Pain; Function

INTRODUCTION

More than 46 million surgical procedures are performed in the United States annually (Owings and Kozac, 1998). Nearly 1.3 million Americans underwent ambulatory arthroscopy, cartilage excision, or other repair of the knee in 1995 (National Center for Health Statistics, 1997). Patients undergoing surgery must cope with the psychological and physical stress that often accompanies injuries and surgical procedures. In addition, patients must cope with the demands of the recovery process, which likely include managing postoperative pain and limitations in physical functioning. Coping with surgery and the recovery process have been investigated; however, the
majority of studies have emphasized the association of coping with psychosocial and quality of life outcomes following surgery (e.g., Gross, 1986; King et al., 1998; Moskovitz et al., 2000; Smith and Zautra, 2000; Boudrez and DeBacker, 2001; Van der Zee et al., 2002). The association of coping behavior with surgery-related physical health outcomes remains relatively unexplored.

Coping behavior may influence postoperative physical outcomes through a variety of channels, including appropriate management of postoperative pain and discomfort, adherence to prescribed postoperative treatment regimens (e.g., medication, physical therapy) and promoting self-care activities such as obtaining adequate rest. However, the few studies investigating coping behaviors and their relationship to short- and long-term postoperative physical recovery have revealed mixed results. Agren and colleagues (1993) found that patients who coped by minimizing symptoms prior to coronary bypass surgery were more likely to have returned to full-time work one year postoperatively. Additionally, Stephens and colleagues (2002) reported that avoidant coping behavior assessed six weeks postoperatively was associated with greater knee pain and poorer knee function six months following total knee replacement surgery. Specifically, patients were less likely to perform such actions as using stairs, and were slower in timed walking tests. In contrast, three studies investigating recovery from back surgery found no relationship between preoperatively assessed coping behaviors and physical outcome, including physical complaints (e.g., headache, nausea) three days following surgery (deGroot et al., 1997); pain and clinical ratings (e.g., walking on hospital ward, general activity level) five days and six weeks postsurgery (Gross, 1986); and, back pain, leg pain, function, and analgesic use one year postsurgery (Graver et al., 1995).

While the literature suggests that some coping behaviors are associated with some postoperative physical outcomes, the nature and the extent of this relationship remains unclear. In part, this lack of clarity reflects the use of different conceptualizations of coping and levels of analysis (i.e., lower versus higher order categories; see review by Skinner et al., 2003). The methodological differences between studies make the literature difficult to interpret. Moreover, studies have been heterogenous with regard to the type of surgical procedures investigated and consequently choice of outcome variables to assess physical recovery. Studies investigating coping and physical outcomes have been limited to patients experiencing major surgery requiring inpatient hospitalization. Hospital policies regarding postsurgical care and treatment may influence the assessment of physical recovery. Finally, the physiological demands of recovery from major surgery likely supercede the role that psychosocial factors play. These factors may render it more difficult to detect the potential effect of coping behaviors on recovery.

Studies investigating the association between coping and physical outcomes with ambulatory surgeries using healthier patient samples offer three important advantages. First, the influence of such external factors is removed, allowing a closer examination of the association of coping styles and physical recovery. Second, such studies can extend the existing literature on coping and surgical outcome, by establishing whether coping behaviors influence physical recovery similarly when less invasive surgical procedures are required. Third, determining the association between coping behaviors and physical recovery following ambulatory surgery can inform the development of interventions to promote a faster and more complete recovery, that in turn can enhance the lives of millions of patients who undergo these procedures annually.
Coping behaviors may also influence surgical recovery by modulating the neuro-endocrine stress response to surgery, that is, by increasing hypothalamic-pituitary-adrenal (HPA) axis arousal. Cortisol may be an important mediator in that high levels of cortisol have been associated with slower wound healing, an essential component of surgical recovery (Glaser et al., 1999). Several studies have found associations between coping behaviors and cortisol. Active coping has been related to lower cortisol reactivity (Nicholson, 1992), quicker cortisol recovery (Houtman and Bakker, 1991), and lower basal cortisol (Hrobsky, 1991). Conversely, avoidant coping (Nicholson, 1992) and rumi-native cognitions (Hellhammer et al., 1985) have been related to higher cortisol reactivity. In particular, two studies have specifically examined cortisol response to surgery. Ho and colleagues (1988) found that avoidant coping, such as “keeping one’s mind off” surgery, was related to higher preoperative cortisol among dental patients. In a preoperative intervention study, Manyande and colleagues (1995) gave one group of abdominal surgery patients an audiotape that taught active coping skills, while the control group received an educational audiotape; the treatment group had lower cortisol on surgery day. As summarized above, avoidant coping tends to activate the HPA axis, which in turn may delay recovery from surgery. No studies we are aware of have related coping to cortisol reactivity in response to surgery, nor how reactivity relates to physical surgery outcomes.

The primary objective of this study was to examine the effects of coping behaviors on surgical outcomes – pain and functional recovery – over time. The secondary objective was to examine whether HPA axis activity was related to coping behaviors and physical outcomes. We included two types of coping behaviors, avoidant and active. Avoidant coping behaviors lead people away from the stressor, either emotionally, cognitively, or behaviorally (e.g., withdrawal, distraction), such that the stressor is never directly addressed (Taylor, 1998). In contrast, active coping behaviors typically attempt to directly change the nature of the stressor or how one responds to it. People who use active coping behaviors acknowledge the stressful situation and may use physical activity and problem solving to relieve their stress (Aldwin, 1994; Taylor, 1998). This may include engaging in activities that can be characterized as promoting positive health outcomes.

This study extends previous research by focusing on a relatively young and healthy cohort undergoing arthroscopic knee surgery. While many clinical factors contribute to speed of recovery (e.g., severity and chronicity of the injury, presence of degenerative joint changes), there remains a large amount of variability in the course of surgical recovery that may potentially be explained by psychosocial factors. Second, this prospective, longitudinal study measures physical status at crucial time-points – preoperative, early recovery (3 weeks postoperative), and late recovery (24 weeks postoperative) – to document recovery over time. Finally we include HPA activity to examine a possible mechanism by which coping may have its effects on surgical recovery.

We hypothesized that the patient group reporting more avoidant coping behaviors would have more pain and poorer functional recovery across all recovery time-points. Additionally, we hypothesized that the group reporting more active coping behaviors would have better functional recovery and lower pain across time. Finally, extrapolating from laboratory stress studies of cortisol reactivity and coping, we hypothesized that more frequent use of avoidant coping behaviors would be related to greater cortisol reactivity to surgery.
METHODS

Participants

Participants were patients referred to the Yale Sports Medicine Center for elective arthroscopic knee surgery. Two types of surgery were included: anterior cruciate ligament (ACL) reconstruction and meniscectomy/meniscal repair. Inclusion criteria included: ages 16–80 years, no history of bilateral knee injuries, prior surgical treatment to the contralateral knee, or chronic comorbidities that resulted in restricted physical activity; and not requiring emergency surgery. The criteria ensured a relatively healthy study sample, free from severe comorbidity.

Of the 126 patients who completed a preoperative interview and had arthroscopic surgery, 82 patients completed both postoperative interviews. One patient was dropped from the study because of knee re-injury at 20 weeks following surgery, leaving a final study sample of 81 patients. There were no significant differences between patients included versus excluded in longitudinal analyses on any study variables, including preoperative coping, knee pain, knee function, surgery type, and demographic characteristics (age, sex, marital status, mean years of education). A complete set of serum cortisol measures across five preoperative and postoperative collections was available for 16 patients. All 16 patients (9 men, 7 women) had ACL surgery, so that the impact of type of surgery on hormones and recovery trajectory was consistent across the subsample.

Procedures

Participants were screened and recruited by phone once identified by clinic staff as needing arthroscopic knee surgery. Patients were typically identified two to six weeks in advance of their surgery. Data were collected during psychosocial interviews at regularly-scheduled medical appointments: 3–10 days preoperatively, and 3 and 24 weeks postoperatively. The preoperative structured psychosocial interview lasted approximately 40 min, and each postoperative interview lasted approximately 15 min. Interviews were conducted by trained research staff.

Serum cortisol was measured preoperatively 3–10 days before surgery to obtain a baseline level. Serum cortisol also was measured 1 h before surgery, immediately postoperatively, 2 h postoperatively, and 1 week postoperatively. All serum collection was conducted in the morning to account for diurnal variability. Blood samples were kept on ice at all times, centrifuged within 1 h of collection, and frozen immediately.

Approval for all procedures was obtained from the Yale University Human Investigations Committee. Participation in the study was completely voluntary and did not affect delivery of health care in any way.

Measures

Coping Behaviors

The Brief COPE (Carver, 1997) is a condensed form of the COPE, consisting of 12 subscales (Carver et al., 1989). Each subscale includes two items that are rated on a 4-point scale ranging from “not at all” to “a lot.” In the present study, at the time
of their preoperative visit, patients were asked to rate the ways that they were coping with their knee symptoms over the past month. This assessed the current behaviors that patients were using to cope with their knee difficulties, including biomechanical and functional difficulties and pain. The Brief COPE has been used in studies investigating the relationship between coping strategies and pain, functioning, symptom status, and adherence to medication (Greenhouse et al., 2000; Hart et al., 2000; Meyer, 2001). The subscales reflect different types of coping behaviors that have been combined to reflect different coping strategies or styles, (i.e., see discussion on inductive and deductive approaches to classify coping; Skinner et al., 2003). As in other studies of recovery following orthopedic surgery (Stephens et al., 2002), the present study divided the coping behaviors into two general categories, avoidant and active. The avoidant category included behaviors that reflected turning away or distracting oneself from the stressor, while the active category included behaviors that reflected direct acknowledgment of the stressful situation. For the present study, the avoidant coping category included the behavioral disengagement, substance use, denial, self-distraction, and humor subscales. The active coping category included the active coping, planning, emotional support, positive reframing, religion, acceptance, and venting subscales. The two categories are not mutually exclusive. We expected patients to utilize both types of coping behaviors to a greater or lesser extent, and wanted to determine whether certain coping behaviors were differentially associated with knee pain and function over time. Cronbach’s alpha scores were 0.73 and 0.81 for the avoidant and active dimensions, respectively, indicating adequate to good reliability.

**Knee Pain**

Severity of knee pain and degree of interference in daily life were assessed through two subscales of the West Haven Yale Multidimensional Pain Inventory (WHYMPI) (Kerns et al., 1985). The pain severity subscale (3 items) assesses severity of pain and amount of suffering experienced by the patient, while the interference subscale (9 items) assesses the degree to which pain impacts daily functioning and satisfaction experienced when performing daily activities. Responses are scored using a 7-point Likert scale. The scales were adapted to the present study by specifying “knee pain.” In the present study, alpha reliability estimates were 0.79 for the pain subscale and 0.84 for the interference subscale. Preoperative pain and interference WHYMPI subscale scores were significantly correlated ($r = 0.63$, $p < 0.001$), indicating that they were highly related, but distinct, aspects of pain.

**Knee Functioning**

The Lysholm rating scale was used to determine change in knee functioning over time, combining mechanical function of the knee, mobility, and ability to perform daily activities (Tegner and Lysholm, 1985). Eight items assess degree of knee pain, swelling, instability, and locking, and the ability to bear weight, walk, squat, and climb stairs. Items are differentially weighted based on clinical criteria, and a summary score of 0 to 100 points is obtained. The Lysholm rating scale has been validated and used extensively in outcome studies of arthroscopic knee surgery
Demographic and Background Information

Patient demographic and background information was obtained during the preoperative interview, including age, marital status, ethnic background, occupation, and health history. Medical record review documented type of surgery performed. Of the 81 patients included in the patient sample, 52% had ACL reconstruction surgery and 48% had meniscectomy or meniscal repair surgery. Mean age at the time of surgery was 39 years. Approximately one-half were female (47%), and most were Caucasian (84%). Overall, participants were well educated, with 93% having some education beyond high school, and 21% currently in school. Fifty-nine percent were married.

Data Analyses

Physical Recovery Analyses

The primary objectives of the present study were to examine the relationship between coping behaviors and surgical outcomes – pain and knee function – over time, and to determine patterns of recovery based on whether patients were more or less likely to use specific coping behaviors. A repeated measures analytical design was selected because it offers the most economical and efficient approach in analyzing changes in knee pain and function status across preoperative and postoperative timepoints (Girden, 1992). Furthermore, it allows for comparison in recovery patterns across coping groups. In particular, the study sought to determine whether patients engaging in more avoidant and/or active coping behaviors would display different recovery patterns than patients engaging in fewer avoidant and/or active coping behaviors. Median splits were used to dichotomize patients into different coping behavior groups: high versus low avoidant coping, and high versus low active coping. Patients in the high avoidant coping group had scores greater than 15, and patients in the high active coping group had scores greater than 25. Multivariate analyses of covariance (MANCOVA) and analyses of covariance (ANCOVA) with repeated measures were conducted to analyze differences in pain (severity and interference) and functioning, respectively, by coping group over time (preoperative assessment, postoperative assessments at weeks 3 and 24). Analyses were conducted separately for avoidant versus active coping groups to assess potential differential associations between coping and postoperative outcomes.

Active coping scores were entered as covariates when analyzing differences in the avoidant coping groups, while avoidant coping scores were entered as covariates when analyzing differences in the active coping groups. Avoidant and active coping were positively correlated ($r = 0.58, p < 0.001$). Therefore, entering each as a covariate in turn removed the influence of the other coping behaviors when analyzing the relationship between coping and outcome, allowing a more direct test of specific coping group differences. In all analyses, type of surgery also was entered as a covariate to control for expected differences in recovery patterns for patients undergoing ACL and meniscectomy surgery. When a significant interaction over time was revealed,
simple contrasts analyzed short-term (preoperative to week 3) and long-term (preoperative to week 24) change in scores to determine differences in outcome patterns between the coping groups.

**Cortisol Analyses**

To examine zero order associations between the coping behaviors and cortisol, Pearson correlations were performed between cortisol at each timepoint and the avoidant and active coping subscales. In addition, ANCOVAs with repeated measures were performed on cortisol levels at each of the five timepoints to examine differences in coping groups over time. As above, active coping scores were entered as covariates when analyzing differences in the avoidant coping groups, while avoidant coping scores were entered as covariates when analyzing differences in the active coping groups. In these cortisol analyses, age and gender were entered as covariates to control for individual differences. Because of the limited sample size, cortisol was not examined as a mediator between coping and postoperative outcomes, pain and function. However, Pearson correlations were used to assess the relationship between cortisol and the outcome variables. All statistical analyses were conducted using The Statistical Packages for Social Sciences (Version 11.5 for Windows) SPSS for windows general linear model procedures (version 10.0).

**RESULTS**

**Knee Pain and Function Outcomes**

Repeated measures MANCOVAs on pain severity and interference documented a significant main effect for avoidant coping, with the high avoidant coping group reporting more pain across all study visits, $F(2, 76) = 4.19, p < 0.02$. There was no main effect for time, nor for an avoidant coping group by time interaction. Patterns in pain severity and interference were similar for both high and low avoidant coping groups. Pain severity was highest at the preoperative visit, decreasing slightly by week 3, and lowest at the week 24 visit (Fig. 1A). The amount of interference in daily activities because of pain was similar at both the preoperative and week 3 visits, and was noticeably reduced by week 24 (Fig. 1C). In contrast, there was no main effect for active coping, time, or an active coping group by time interaction (Figs. 1B and 1D).

Repeated measures ANCOVAs for knee function revealed no main effects for avoidant coping group, time, or group by time interaction, indicating that high and low avoidant coping groups reported similar knee function scores over time (Fig. 2A). In contrast, repeated measures ANCOVAs for knee function revealed a significant group by time interaction for active coping, $F(2, 73) = 3.50, p < 0.04$ (Fig. 2B). Contrast analyses revealed that knee function was different between the high and low active coping groups for both short- and long-term recoveries. Specifically, the change in knee function ratings from the preoperative visit to the postoperative week 3 visit, $F(1, 74) = 4.71, p < 0.04$, and the preoperative visit to the postoperative week 24 visit, $F(1, 74) = 6.40, p < 0.02$, were significantly different between the high and low active coping groups. The high active coping group reported poorest knee function preoperatively, with improvements in knee function 3 and 24 weeks postoperatively.
FIGURE 1  Estimated marginal means of WHYMPI pain severity and interference scores for coping groups across time*. (*The high avoidant coping group reported more pain across WHYMPI subscale scores across all study visits ($p < 0.02$)).

FIGURE 2  Estimated marginal means of LYSHOLM function scores for coping groups across time*. (*A time by group interaction effect was found for active coping ($p < 0.04$)).
The low active coping group displayed a different pattern, with knee function decreasing between the preoperative and week 3 postoperative visits, and then improving at long-term follow-up (24 weeks).

Cortisol and Coping Analyses

The Pearson correlations between cortisol at each timepoint and coping subscale scores revealed that avoidant coping was associated with cortisol measured on the day of surgery, immediately preoperatively, \( r = 0.57, p > 0.02 \). A trend was revealed for active coping and immediate preoperative cortisol, \( r = 0.38, p = 0.15 \). There were no other significant correlations of coping style with cortisol at other timepoints (i.e., one week preoperatively, on the day of surgery, or one week postoperatively). Mean cortisol was not related to week 3 postoperative pain interference \( (r = -0.08, p < 0.76) \), but was marginally related to pain severity \( (r = 0.41, p < 0.11) \) and was significantly related to knee function \( (r = 0.66, p < 0.005) \).

The repeated measures ANCOVAs revealed a significant main effect over time for the avoidant coping groups, \( F(1, 9) = 6.05, p < 0.04 \), with the high avoidant coping group having higher cortisol levels on average and at each timepoint (Fig. 3A). No interaction effects were revealed. In contrast, no significant main or interaction effects across time were revealed for the active coping groups and cortisol level (Fig. 3B).

\[ \text{FIGURE 3 Estimated marginal means of cortisol level for coping groups across time*} \] (*The high avoidant coping group had higher cortisol levels across time \((p < 0.04)\).
DISCUSSION

Recovery from knee injuries can range from improved functional status to a downward spiral of repeated injuries, joint degeneration, and osteoarthritis. Typically, patients seek knee surgery to improve function and decrease pain, and to enable a return to activities. Reduced pain and functional recovery is of primary importance to patients. Postoperative limitations can be as distressing and debilitating as the primary injury that required surgery (Hillers et al., 1994). In addition, limitations in functional recovery can result in greater utilization of health care services, additional lost work days, and delays in return to sports and other activities.

Results of this study indicate that divergent coping behaviors were differentially associated with physical outcomes and stress reactivity in healthy patients undergoing minor knee surgery. Results supported the hypothesis that avoidant coping behaviors were related to knee pain. Patients in the high avoidant coping group reported greater pain than patients in the low avoidant coping group across all timepoints. The two pain components, although highly correlated, acted differently across time, with reduction in pain severity the most immediate response to surgery. In another study of patients undergoing total knee replacement surgery, avoidant coping was also associated with pain reduction (Stephens et al., 2002). The present study supports and extends these findings to younger and healthier patients experiencing less invasive knee surgery.

The results of this study also supported the hypothesis that active coping was related to knee function. It is notable that the high active coping group had better overall improvement from baseline knee function than the low active coping group; however, this may be because they start off at a lower functional level. Contrary to expectation, results indicated that the differences in patterns of knee function between the active coping groups were driven by preoperative function rather than postoperative function. Preoperatively, the high active coping group had lower knee function compared to the low active coping group. Postoperatively, high and low active coping groups had similar knee function.

Previous studies of coping behaviors and surgical outcome have not been successful at demonstrating an association between active coping and physical recovery (Gross, 1986; Graver et al., 1995; deGroot et al., 1997). However, unlike previous studies, the present study included both preoperative and postoperative functional status in the analysis of the relationship. Taylor and colleagues have suggested that active coping may enable people to guard against or offset stressful events before their full implications may be felt. Such abilities to cope actively and proactively with respect to health may minimize adverse physiological effects of stress (Taylor et al., 2000). In this sample of surgical patients, results suggested that active coping skills were used in response to lower knee function experienced preoperatively rather than in response to the surgery itself. The use of active coping behaviors preoperatively may have offset the stress of surgery such that patients were able to make greater gains in knee functioning postoperatively.

That coping strategies have differing effects in medical populations depending on their timing has been supported by previous research (Aldwin, 1994). Results of the present study support the importance of including both preoperative and postoperative functional status in examining the association of active coping with knee function outcomes. Furthermore, in light of recent research supporting that postoperative functioning is similar regardless of whether patients undergo real versus sham arthroscopic
knee surgery (Mosely et al., 2002), this suggests that in certain contexts (e.g., minor surgery) preoperative expectancies and preoperatively driven behaviors associated with the level of functioning may be as important as the type of surgical experience itself in predicting patterns of recovery.

Furthermore, this study investigated the association between cortisol with coping and outcomes in a small subsample of patients. The high avoidant coping group had significantly higher cortisol levels preoperatively, throughout surgery day, and postoperatively. In turn, average cortisol and specifically cortisol level taken at the morning of surgery (i.e., immediately before) were significantly related to poorer knee function 3 weeks postoperatively. Although our sample was small, these preliminary data suggest that coping may affect outcomes in part through shifting the body’s hormonal milieu into a catabolic state that may impede physical recovery (Epel et al., 1998). Avoidant coping was not associated with poorer knee function postoperatively; nevertheless, avoidant coping associated with higher preoperative pain may result in higher cortisol levels pre- and postoperatively which in turn affect physical outcome.

The findings of the present study that those high on avoidant coping tend to respond to surgery with greater cortisol are consistent with the idea that avoidance may be a more potent stimulus of HPA axis activity (Kalin et al., 1998; Buss et al., 2003). In addition, they are consistent with previous findings that avoidant or passive coping is related to higher cortisol reactivity to a stressor (Hellhammer et al., 1985; Ho et al., 1988; Nicholson, 1992). We are currently examining the relationships found among cortisol level, coping behavior, and postoperative outcomes further in a larger study.

In summary, we found unique contributions of specific coping behaviors to specific postoperative physical outcomes and neuroendocrine markers: avoidant coping behaviors were employed when the stressor involved pain, and active coping behaviors were employed when the stressor involved functional impairment. In contrast, results did not support the hypotheses that avoidant coping would interfere with postoperative knee function and active coping would promote greater pain reduction. Future research is necessary to determine the surgical factors and the behavioral, neuroendocrine, and other mechanisms that link avoidant coping to poorer physical outcomes. Further studies will be necessary to determine under what conditions one stressor takes precedence over the other stressor (e.g., pain versus desire for improved knee function), and the resulting impact on choice of coping strategies.

Limitations of this study include its small sample size and combined surgical sample. We included patients undergoing two types of arthroscopic knee surgery. ACL surgery typically involves a slightly longer recovery period than meniscectomy; however, the rate and extent of recovery following either surgery varies between patients, and surgical outcomes are similarly dependent on physical factors such as patient age and time between injury and surgery, as well as psychosocial factors and participation in health-promoting behaviors such as physical therapy. In addition, pain and knee function are critical outcome measures for both types of arthroscopic knee surgeries. Replication will be necessary to ensure generalizability to other surgical patients, especially for the neuroendocrine findings. Although there was considerable loss to follow-up, the lack of differences in preoperative measures indicated that patients included in the longitudinal analyses were representative of the initial study sample.

There were also several notable strengths of this study. The prospective, longitudinal design allowed for the examination of the association between coping behaviors and
physical status over time. The repeated measures approach provided the opportunity to examine the dynamics between coping and physical recovery up to six months postoperatively. The inclusion of patients undergoing relatively minor orthopedic surgery can also be considered as a strength: their relative homogeneity with regard to category of injury, surgical procedures, and lack of comorbid conditions allowed for a more powerful study of psychosocial and neuroendocrine mechanisms influencing physical recovery. Finally, the present study is the first to examine coping behaviors and stress reactivity both preoperatively and postoperatively. The generalizability of these findings can be investigated in recovery from other surgical procedures as well as recovery from injury or illness in other domains.

The results of this study have implications for the development and implementation of clinical interventions to enhance recovery. Choice of coping behaviors may in part be driven by preoperative health status. This suggests that preoperative assessment and intervention aimed at mobilizing coping skills could have a beneficial impact on both preoperative and postoperative health status. One intervention study found that athletes who used a problem solving coping style were significantly more likely to be adherent to physical therapy following knee surgery (Udry, 1997), which in turn can impact long-term recovery. More rapid and complete postoperative recovery can result in reduced hospital stays, more effective rehabilitation services, and less risk of re-injury – ultimately reducing both the financial as well as the human costs associated with serious injury and illness. With better physical outcomes following knee surgery, patients can return to fitness activities that will influence continued health promotion throughout adulthood.

References


