Does evidence exist on whether specific interventions can improve adherence to a home exercise program in a patient with intermittent claudication?

Michael Buck and Charles D Ciccone


The online version of this article, along with updated information and services, can be found online at: http://ptjournal.apta.org/content/84/5/465

Collections
This article, along with others on similar topics, appears in the following collection(s):
Cardiovascular/Pulmonary System: Other Evidence-Based Practice Therapeutic Exercise

e-Letters
To submit an e-Letter on this article, click here or click on "Submit a response" in the right-hand menu under "Responses" in the online version of this article.

E-mail alerts
Sign up here to receive free e-mail alerts
A 71-year-old man was referred by his physician to our clinic for examination and treatment with reports of bilateral lower-extremity pain, which was worse on the right side than on the left. The patient reported that his symptoms were most noticeable while walking distances greater than 2 city blocks. He did not report any pain while at rest, and his leg pain was relieved by sitting for 5 to 10 minutes. He also had a history of type 2 diabetes mellitus, hypertension, and hyperlipidemia.

His current medications included glipizide (Glucotrol XL®) for control of diabetes mellitus, clopidogrel bisulfate (Plavix†) to reduce platelet-induced thrombosis, simvastatin (Zocor‡) to improve his plasma lipid profile, and amlodipine besylate (Norvasc*) for treatment of hypertension. He reported that he has smoked cigarettes for 46 years. Although he tried to quit unsuccessfully several times, he reduced his consumption to ½ pack per day for the past 5 years. He reported that his leg symptoms began approximately 2 years ago, but he initially attributed his pain with walking to his age and arthritis. He felt that the intensity of his symptoms were becoming progressively worse and that the symptoms seemed to come on sooner, causing his walking distances to become shorter. For example, he recently started walking several mornings each week with his wife and several acquaintances at a local shopping mall; however, he was unable to keep up with his wife and fellow “mall-walkers” because of his leg pain.

Before referral to our clinic, the patient underwent radiographic studies of the lumbar spine and both hips and knees. The results of these imaging studies were negative and essentially ruled out lumbar canal stenosis, arthritic conditions in the hips or knees, and Baker cyst as the cause of his leg pain. In addition, he underwent electromyographic and nerve conduction velocity testing, which ruled out radiculopathy and plexopathy as well as diabetic peripheral neuropathy as possible diagnoses.
During our initial physical therapist examination, the patient described a slow and insidious onset of lower-extremity pain. He was unable to recall any precipitating event, which made a diagnosis of ligament/tendon injuries or muscle strains unlikely. No appreciable muscle atrophy was noted, and active and passive range of motion of the lower extremities appeared normal and did not cause pain. Manual muscle testing (performed according to the procedures described by Hislop and Montgomery) indicated strength to be within normal limits throughout the lower extremities, except for plantar flexion which was graded 4/5 bilaterally. He did not report any pain with manual muscle testing. A passive straight leg raise did not reproduce his leg pain, but he did report some hamstring stretching sensation in the posterior thigh when the leg rose beyond 70 degrees.

In an attempt to reproduce the patient’s symptoms, we had him walk on a treadmill at 2.5 mph without elevation. After 6 minutes, he reported pain in the right calf that he rated as 1/10 on a visual analog scale (VAS). He continued to walk for an additional 2 minutes (8 minutes total) when he reported right calf pain to be 5/10 on the VAS and left calf pain to be 1/10. The patient then sat in a self-selected posture. After 1 minute, he reported that his left calf pain had disappeared and that his right calf pain was 3/10 on the VAS. After 5 minutes of rest, he did not report pain in either calf (0/10). Our interpretation of the findings of this examination and our evaluation of the data was that this patient’s symptoms were consistent with a diagnosis of intermittent claudication (IC).

We referred the patient back to his physician and recommended that he undergo peripheral vascular testing. Results of Doppler testing indicated partial occlusion in the femoral and popliteal arteries, and his resting ankle-brachial pressure index measured 0.78 and 0.84 on the right and left, respectively. Ankle-brachial pressure was measured with the patient supine and was calculated by dividing ankle systolic blood pressure by brachial systolic blood pressure. A resting value of less than 0.90 is considered to be abnormal in adults over 55 years of age and indicative of lower-extremity arterial disease. Based on the results of these tests, the physician made a diagnosis of IC. The patient was prescribed the anticlaudicant medication cilostazol (Pletal), and his physician referred him back to our clinic for physical therapist management to decrease his symptoms and improve his overall cardiovascular fitness.

Based on an article we read in Physical Therapy, we were aware that a program of walking exercises can be used to improve maximal walking distance and walking time in people with IC. The authors systematically reviewed 10 studies, and each study used a program of walking exercises to improve walking distance in people with IC. Walking distance, for example, increased from 28% to 210% depending on the specific study, with a mean increase in maximal walking distance of 105% (SD=56). We also performed a search of the Cochrane Database of Systematic Reviews and found a systematic review of studies that used exercise for people with IC. (For details on accessing the Cochrane Database of Systematic Reviews, see Powers et al.) This review likewise indicated that regular exercise programs (primarily walking programs) were associated with a mean increase in walking ability of 150% (range=74%-230%). Consequently, there seemed little doubt in our minds that walking exercise can significantly improve walking ability in people with IC, and, therefore, we were interested in designing and implementing a structured walking program for our patient.

Ideally, we wanted to supervise the patient directly while he exercised in our clinic. This patient, for example, could walk on the treadmill in our clinic several times each week for several weeks while we monitored his progress and encouraged adherence to the exercise program. A long-term, physical therapist–supervised exercise program did not seem practical, however, because this patient’s insurance would only allow a limited number of physical therapy visits. In light of these restrictions, we considered several potential courses of action, including self-payment for services beyond the limited visits authorized by the insurance payer, providing free (pro bono) or discounted treatments, or initiating a home exercise program. The patient had limited financial resources, which prohibited self-payment; and our clinic does not offer pro bono or discounted services. A logical alternative, therefore, would be to design a walking program that this patient could perform in his home and community. The idea of a home program seemed reasonable, especially because he had already shown some interest in walking at his local shopping mall. Recent work by Degischer et al has indicated that, although home exercise programs produce improvements in the distance ambulated before the onset of pain, “structured, supervised rehabilitation” is more effective. For our patient, however, a home exercise program seemed to be the best available and most potentially effective option remaining.

We were concerned, however, that our patient might not adhere to a home program of walking exercises. According to reports in the literature, patients with IC should walk up to and past the point that they experience leg pain. It seemed to us that adherence to exercise is an especially difficult problem for people with IC. Adherence to a long-term home exercise regimen can be challenging for any patient, but the apparent need to tolerate substantial levels of leg pain during exercise creates an additional deterrent that could adversely affect motivation and adherence in a patient with IC. Therefore, we felt that achieving adequate adherence might be especially problematic for patients with IC, and particularly difficult for our patient given his recidivistic tendencies when trying to adhere to other regimens such as smoking cessation.

The articles addressed in the systematic review by Brandsma et al were concerned primarily with establishing effectiveness of walking exercises rather than level of adherence to a home program. Moreover, all of the articles covered by the review looked at exercise programs that were supervised at a medical institution, with the frequency of supervised exercise ranging from 2 to 5 times each week, depending on the study. Although 5 of the 10 studies also used a home program, adherence to these programs, in our opinion, was certainly influenced by involvement in the supervised program. The

---

1 Otsuka America Pharmaceutical Inc, 2440 Research Blvd, Rockville, MD 20850.
review article, therefore, suggested that walking exercises could benefit our patient, but it did not lend any particular insight into how we might encourage our patient to adhere to a home exercise program.

We decided to search the literature to determine whether there was evidence that specific strategies can be used to enhance or maximize our patient’s adherence to a walking exercise program. Again, we were not interested in establishing the effectiveness of the walking program because we already had found substantial evidence that such a program can increase walking distance and decrease functional limitations in people with IC.

Database used for search: CINAHL

The Cumulative Index to Nursing and Allied Health Literature (CINAHL)\(^{11}\) is a database that covers approximately 1,200 journals related to nursing, physical therapy, and other allied health professions. Although other databases such as MEDLINE might cover more journals, we wanted to focus on journals from several disciplines that influence compliance with or adherence to a home exercise program. We believed that, in addition to physical therapy and nursing journals that deal with these issues, CINAHL also might cover journals that are not indexed in MEDLINE or other more traditional medical databases. In addition to providing abstracts for most articles, CINAHL also provides access to the full text of some articles. Access to these full-text articles would be helpful if these journals are not directly available in our institution’s medical library. Access to CINAHL is not free to the public and this database requires a user fee. Many libraries, however, provide access directly to CINAHL or enable the user to access CINAHL through another search engine.

We accessed CINAHL through our college library by first accessing ProQuest\(^*\) (proquest.umi.com/pqdweb). ProQuest is a search engine that provides access to several databases including CINAHL. Within ProQuest, we clicked on CINAHL–Database of Nursing and Allied Health Literature. This database is updated weekly, and we performed our search on March 22, 2004.

Initial keywords: compliance OR adherence

To start the search, we clicked on the tab near the top lefthand corner of the screen labeled Advanced Search. We selected this option rather than the “basic search” option because the “advanced search” option would make it easier to add keywords and modify the search. We wanted to start with a keyword that reflected the patient’s ability to remain engaged in a self-directed exercise program. The problem, however, is that we have heard several terms commonly used to describe this ability, including “adherence” and “compliance.” In order to retrieve articles that used either term, we typed adherence into the first query box on the search interface. We then clicked on the second query box and typed in compliance. There was a button located to the left of the second query box, with a pulldown menu providing options for several Boolean operators (AND, OR, NOT; and so forth). We selected the operator for “OR” to combine our first 2 keywords and clicked on the Search button below the query boxes. The result was more than 11,000 articles, so we clearly needed to narrow our search.

We returned to the search screen by clicking on the browser’s Back button. The original keywords (adherence, compliance) still appeared in the first and second query boxes, respectively. We typed exercise into the third query box and selected “AND” from the pulldown menu to the left of the third query box. Clicking on the Search button resulted in more than 1,500 articles or “hits.” We needed to refine the search once again.


Figure 1. Citations retrieved by search using the keywords “Adherence” OR “Compliance” AND “Exercise” AND “Intermittent Claudication”
We used the Back button to return to the search screen. In order to add a fourth keyword, we clicked on the option Add a row located beneath the third query box. A fourth box appeared, and we typed intermittent claudication and selected the “AND” operator. It seemed logical to select “intermittent claudication” as a keyword because this problem was our patient’s primary impairment. We realized that this addition might narrow the search too much; that is, a more general term such as “peripheral vascular disease” might provide more citations. Nonetheless, we wanted to narrow the search as much as possible because we believed that adherence to exercise in people with IC represents a special problem because pain during exercise is apparently necessary to achieve a beneficial effect.

In summary, our search string was: adherence OR compliance AND exercise AND intermittent claudication.

Selection of articles for review: In scanning the article titles, we were especially interested in articles that focused on factors affecting adherence. The first article (Ehrenberg et al) did not seem appropriate because it dealt with auditing patient records for quality assurance. The remaining 7 articles, however, all appeared to lend some insight toward our clinical question. We reviewed the abstract from each article by clicking directly on the article’s title on the search screen. Based on the content of the abstracts, we chose not to read the full text of the Gibson and Kenrick article (citation #6) because it dealt with a small sample of patients who had undergone bypass surgery and because it examined coping abilities in these patients rather than adherence to an exercise program. We also did not read the full text of the Murray article (citation #8) because it dealt with providing care to patients in an acute care setting rather than encouraging adherence to a home exercise program. The remaining 5 articles appeared to be worth further investigation. The abstracts of these articles also reproduced and discussed below.


OBJECTIVE: To determine the effects of a 6-month exercise program on ambulatory function, free-living daily physical activity, peripheral circulation, and health-related quality of life (QOL) in disabled older patients with intermittent claudication. DESIGN: Prospective, randomized controlled trial. SETTING: University Medical Center and Veterans Affairs Medical Center, Baltimore, Maryland. PARTICIPANTS: Thirty-one of 61 patients with Fontaine stage II peripheral arterial occlusive disease (PAOD) were randomized to exercise rehabilitation and 30 to usual-care control. Three patients from the exercise group and six patients from the control group dropped out, leaving 28 and 24 patients, respectively, completing the study in each group. INTERVENTION: Six months of exercise rehabilitation. MEASUREMENTS: Treadmill distance walked to onset of claudication and to maximal claudication, ambulatory function, peripheral circulation, perceived QOL, and daily physical activity. RESULTS: Compliance with the exercise program was 73% of the possible sessions. Exercise rehabilitation increased treadmill distance walked to onset of claudication by 134% (P<.001) and to maximal claudication by 77% (P<.001), walking economy by 12% (P=.003), 6-minute walk distance by 12% (P<.001), and maximal calf blood flow by 30% (P<.001). Changes in distance walked to maximal pain correlated with changes in walking economy (r=-.50, P=.013) and changes in maximal calf blood flow (r=.38, P=.047). Exercise rehabilitation increased accelerometer-derived daily physical activity by 38% (P<.001); this change correlated with the change in distance walked to maximal pain (r=.45, P=.020). These improvements were significantly better than the changes in the control group (P<.05). CONCLUSION: Improvements in claudication following exercise rehabilitation in older PAOD patients are dependent on improvements in peripheral circulation and walking economy. Improvement in treadmill claudication distances in these patients translated into increased accelerometer-derived physical activity in the community, which enabled the patients to become more functionally independent.

© 2001 American Geriatrics Society. Abstract reprinted with permission of Blackwell Publishing.]

Purpose: In a pilot study, the hypothesis was tested that a home-based walking exercise program with structured coaching would improve walking performance and adherence in patients with intermittent claudication (IC). Methods: Thirty-one IC patients with a rest ankle-brachial pressure index < 0.90 started a 24-wk walking program in the home environment. They were coached according to the Health Counseling Model (HCM). Patients were instructed to walk at least 9 bouts x wk-1 and to walk through the pain. The main effect measures were pain-free (initial claudication distance (ICD)) and maximum walking distance (absolute claudication distance (ACD)) measured with a graded treadmill test, a corridor exercise test, a walking-diary, and the score on the Walking Impairment Questionnaire (WIQ). Results: Twenty-four participants completed the program. The reported walking frequency was 7.4 times x wk-1. The average ICD improved from 289 m (95% CI, 209-369) to 347 m (95% CI, 244-449) (P<0.05) and from 241 m (95% CI, 171-310) to 373 m (95% CI, 273-472) on the treadmill and the corridor test, respectively. The average ACD improved from 499 m (95% CI, 397-593) to 544 m (95% CI, 438-650) and from 564 m (95% CI, 412-717) to 726 m (95% CI, 546-906) (P<0.01) on the treadmill and the corridor test, respectively. The average maximum distance reported in the walking-diary improved from 957 m (95% CI, 291-1623) to 1294 m (95% CI, 646-1941). The score of the walking distance on the WIQ improved from 57% (95% CI, 42-71%) to 60% (95% CI, 46-74%). Conclusion: IC patients improved their average ICD and ACD. The walking exercise program in the home environment with coaching according to the HCM seems a promising intervention to be tested in a randomized controlled trial.

We were interested in this prospective study because the authors mentioned a specific intervention (coaching according to the Health Counseling Model [HCM]) that was used to improve adherence. We were not familiar with this intervention, so we obtained a copy of the complete article from our college’s library. The authors described the HCM as a counseling technique that a health care practitioner can use to educate, support, and encourage adherence to behavioral changes in people with medical conditions. They further defined the goals of HCM in this study as a means to “stimulate patients to perform walking exercises and to achieve long-term exercise adherence.”

According to the authors, HCM consists of 6 stages:

1. Awakening: recognition that there is a (vascular) problem
2. Weighing the advantages and disadvantages of present behavior
3. Decision making about walking or not walking
4. Alteration of behavior: start walking
5. Maintenance of behavior: continue walking
6. Relapse prevention: analyze risk situations and solve problems

The authors stated that each subject met with a counselor every 3 weeks and that the counselor discussed the stages of the HCM and provided support to continue with the walking program. The exact background and qualifications of the counselor, however, were not described. Subjects also kept a “walking diary” where they recorded their walking frequency and distance and described their experiences while walking (problems, solutions, and so forth). The information in the diary also was apparently reviewed and discussed with the counselor at each meeting.

Although the results from this study gave us some insight into our clinical question, these authors could not state conclusively that using the HCM and walking diaries improved adherence in these patients. This was a prospective study where all the subjects received the counseling sessions. There was no control group that was given alternative instructions or was simply told to begin a walking program without the periodic counseling and review of diaries. We decided to review the remaining articles retrieved from our search.


Background: Findings from the literature and clinical practice describe the various strategies necessary on a regular basis to control blood sugar levels in people with diabetes and suggests that guided imagery techniques aid clients in adhering to the rigorous diabetic routine. Methods and Results: An imagery script was developed and used to aid diabetic clients in maintaining their diabetic regimen. Participants in this cognitive experience indicated that the motivation script used with them by health-care practitioners was effective. The major treatment areas were
blood testing, regular exercise, weight management, and consumption of a restricted lifetime diet. Several of these areas showed modification after the use of guided imagery.

[© 1999 Elsevier Science Ltd. Abstract reprinted with permission of Elsevier.]

At first glance, this article did not appear very relevant to our clinical question because it dealt with patients with diabetes mellitus. We were intrigued, however, with the idea that an imagery technique was used to help these people adhere to their treatment regimen and (presumably) maintain tight glucose control. We tried to obtain a copy of this article from CINAHL because the full text is provided for some of the articles indexed in this database. We could not obtain a copy of the full text from CINAHL, and our college library does not subscribe to this journal. We could not get any more information about this article that might help answer our clinical question in a timely manner. Because this article also dealt with a different medical condition (diabetes mellitus), we decided to move on and look at the remaining articles retrieved by our search.


Peripheral vascular disease leading to intermittent claudication causes disability in a significant number of people. Exercise rehabilitation is of known benefit, and many centres provide such treatment. There is however no consensus on the most effective types of exercise. This report describes and discusses a specific programme which incorporates important factors identified from the literature. Suggestions are made for future research.

[© 1999 The Chartered Society of Physiotherapy. Abstract reprinted with permission of The Chartered Society of Physiotherapy.]

This article appeared to be a clinical perspective that described a specific exercise program used to decrease disability in people with IC. We were curious, however, whether the exercise program also used some method of encouraging motivation or adherence. We obtained a copy of the complete article from our college library. A total of 42 subjects with IC (mean age=65 years) were considered suitable for this study. The exercise program consisted of 4 “core” exercises: alternate heel raises while standing, simultaneous heel raises while standing, step-ups on a low bench, and toe walking. Although the details were sketchy, it appeared that subjects participated in group sessions twice a week and were also encouraged to independently perform a daily home program consisting of at least 2 core exercises and a walk. They were encouraged to exercise up to and beyond the point of claudication. Subjects used a “simple diary” to record the number of repetitions and length of time for each exercise.

This study lacked the scientific rigor needed to make any conclusions about the effects of this exercise intervention. For example, it had no control group, and the outcome measurements were poorly defined and poorly quantified. It was interesting, nonetheless, that a home program was combined with semiweekly group sessions in an attempt to achieve good adherence. The authors reported anecdotally that subjects enjoyed working in a group and that this activity “provided peer support and encouragement, thus enhancing motivation and compliance.” Again, there was no indication of whether this fact was true (ie, no data on adherence were provided), and there was no comparison with a control group that did not attend the group sessions. This article, therefore, did not lend much insight into our patient and clinical question.


BACKGROUND AND PURPOSE: There is no consensus about the indication for exercises for patients with intermittent claudication of the lower extremity and the characteristics of an exercise program to improve walking distance. The effect of walking is assessed by a systematic review of randomized clinical trials. METHODS: Literature databases were accessed using the relevant key words. The references of identified articles were screened for additional studies. A checklist was developed to screen the studies with respect to the variables of interest. A methodological assessment form was developed to assess the methodological quality of the studies (maximum possible score: 100). RESULTS: Eighty-two articles were identified, of which 21 studies were considered relevant for inclusion in the review. Following the analysis of the articles, 11 studies were for various reasons eliminated, leaving 10 studies for the systematic review. The score for methodological quality of the studies ranged from 47 to 75 (mean=62.5, SD=8.5). Percentage of improvement in walking distance or time ranged from 28% to 210% (mean=105%, SD=55.8%). CONCLUSION AND DISCUSSION: All studies showed that walking exercises improved walking distance in patients with intermittent claudication. Further research is needed to determine the optimal exercise program, the effect of adherence to the treatment protocol, and the duration of the effects following a formal exercise program.

As indicated earlier, we were aware of this systematic review and the authors’ conclusion that a walking exercise program can increase maximal walking distance in people with IC. Having already read this review article, we also were aware that the articles addressed in this review were concerned primarily with establishing effectiveness of walking exercises rather than level of adherence to a home program and that all of the articles in this review used some type of regularly supervised walking exercises. This article, therefore, did not lend any specific insight to our primary concern about improving adherence to a home program.

At this point, we had not retrieved any conclusive evidence that a specific intervention could improve adherence to a walking exercise program in patients with intermittent claudication. We realized that some studies that deal with issues of motivation and adherence might appear in the psychology literature and that a database focusing specifically on this literature might provide additional information about this topic. We, therefore, decided to repeat our search strategies using the PsycINFO database.

**Alternative database used for search:** PsycINFO

PsycINFO** is the computerized equivalent of Psychological Abstracts, and this database covers the international psychology literature from 1887 to the present. This database also incorporates literature from related disciplines such as medicine, psychiatry, education, social work, law, criminology, social science, and organizational behavior. Access to PsycINFO is not free to the public, however, and this database requires a user fee. Nonetheless, many libraries provide access directly to PsycINFO or enable the user to access PsycINFO through another search engine.

We accessed PsycINFO through our college library via FirstSearch from the Online Computer Library Center Inc (OCLC)** (firstsearch.oclc.org). OCLC is a database vendor that provides access to several databases, including PsycINFO. On the main search page, a pulldown menu of 19 databases appears next to the term “Search in database:”. We selected

*American Psychological Association, 750 First St, NE, Washington, DC 20002-4242.
**OCLC Inc, 6565 Frantz Rd, Dublin, OH 43017-3395.*
PsycINFO 1887 from this list to allow us to access the full database. According to the information appearing next to the menu, this database was updated on March 16, 2004. This search was performed on March 22, 2004.

**Keywords:** (adherence OR compliance) AND exercise AND intermittent claudication

The search screen provided 3 query boxes (Fig. 2). As suggested by FirstSearch’s Help feature, we typed (adherence OR compliance) into the first query box, which would search for articles with either of these keywords. We then typed exercise in the second box and intermittent claudication in the third box. The pulldown menus for Boolean operators to the left of boxes 2 and 3 indicated “AND,” so we left these operators as they already appeared on the screen so that we would combine all our keywords. We decided to use the same keywords that we used in our previous search of the CINAHL database because we wanted to narrow our search as much as possible to exercise adherence in people with IC.

After typing in the keywords, we clicked the Search button near the top of the screen. The results indicated only one article—the study by Wullink et al10 from our CINAHL search. Therefore, our search of the alternative database did not provide any additional information that might help answer our clinical question.

**Clinical decision:** There was little evidence in the literature to suggest that specific interventions or strategies might improve adherence to exercise in people with IC. The article that was most relevant to our clinical question was the study by Wullink et al.10 This article was a prospective study that lacked a control group. They used several strategies to encourage adherence to walking exercises (eg, use of coaching according to the HCM, use of walking diaries), but they did not compare adherence in the treatment group to that of a control group that did not use these strategies. Nonetheless, we needed to design an exercise plan for our patient, and this article offered the best suggestions for encouraging adherence to a walking program.

During our patient’s initial visit, the majority of our time was spent gathering information for evaluation and diagnosis. We determined that there was evidence to suspect a diagnosis of IC. As previously stated, the patient was referred back to his physician for further testing. As a result of this testing, a diagnosis of IC was made and appropriate pharmacological intervention was initiated, and he was referred back to our clinic. Before his referral back to our clinic, we performed the literature search. At the second visit, we attempted to incorporate the first 4 stages of the HCM strategy described by Wullink et al.10 Specifically, we first talked with the patient and made sure that he was aware that he had a vascular disorder and understood the nature of this disorder (stage 1). We then talked about the advantages and disadvantages of his present behavior and emphasized that continued sedentary behavior would not help his condition (stage 2). To further accomplish the intent of stage 2, we then discussed the advantages of beginning a walking program by focusing on the following issues: (1) walking is inexpensive and does not require any elaborate equipment, (2) the patient was familiar with this form of exercise (eg, walking does not take any new learning experiences or resources), (3) he might get social support from his wife and friends (other mall walkers), and (4) walking can produce other benefits such as improved glycemic control, decreased blood pressure, improved blood lipid profile, and so forth. Based on our discussion and our patient’s desire to return to activities that involve or require long-distance walking, he made an informed decision to initiate the recommended walking program (stage 3).

Based on the patient’s goals and concerns about completing a walking program, at the second visit, we established specific guidelines for him to alter his behavior and start a walking program (stage 4). These guidelines were adapted from the exercise variables advocated in a recent review article Falcone et al.12 which was discussed at a presentation on peripheral arterial occlusive disease at a professional conference we had recently attended. We provided written directions that specifically instructed the patient to warm up for 5 minutes with some stretching and slow walking and then walk at a pace that produced leg pain within 5 or 10 minutes and continue walking until the pain became intolerable. He then should rest until the pain subsided and resume walking. These walk/pain/rest cycles should be repeated as necessary for at least 35 minutes. He should finish with a 5-minute cool-down of slow walking and stretching. He was instructed to walk in this fashion at least 3 to 5 times each week. Moreover, we told the patient that leg pain was a necessary and reasonable symptom and that he should recognize that leg pain indicated that he was walking at an acceptable intensity. The patient was instructed to contact us if he had any concerns about his symptoms that occur while exercising or if he had any questions about the walking program. We intended these instructions to (1) enable the patient to manage and progress his program based on his symptom response to the walking activities or resources), and (2) contact us to help in his decision making.

As suggested by Wullink et al, the patient also was given a notebook to use as a walking diary. He was instructed to record the date, duration, approximate distance, and number of pain/rest cycles of each walk. He was also encouraged to record any other subjective feelings or experiences noted during each walk. We informed the patient that we would contact him by phone in approximately 1 week to see if he had started his program and to ask if he had any questions, if he was using the diary, and if he had any untoward responses (eg, problems other than his IC pain).

We also scheduled a third visit at our clinic 3 weeks later to check on his progress and to implement stage 5 of the HCM strategy (maintenance of behavior: continue walking). At this session, we planned to review the patient’s diary and to gauge his progress based on data from his diary. Specifically, we hoped to see an increase in distance walked and a decrease in the number of pain/rest cycles during each walk. We hoped to illustrate to the patient that he was improving and that he would be motivated to maintain his current level of activity and continue this program. We also intended to discuss any
problems and to lengthen the walking duration by 5 minutes, so that each session consisted of a 5-minute warm-up, 40 minutes of walking, and a 5-minute cool-down.

A final visit was scheduled 3 weeks later (8 weeks after the initial visit) to implement stage 6 of the HCM strategy (relapse prevention: analyze risk situations and solve problems). Again, the diary would be reviewed and the data summarized to help provide motivation. We would discuss any problems and would attempt to find solutions and help the patient continue to adhere to the program. He also would be encouraged to increase the duration of each walk to 45 minutes, with a 5-minute warm-up and 5-minute cool-down, for a total exercise duration of 50 minutes per session. After another 3 weeks, we planned on phoning the patient. If he was still progressing well, we would advise him to increase the walking bouts to 60 total minutes (5-minute warm-up, 50 minutes of walking, and a 5-minute cool-down) and to continue this regimen indefinitely.

In conclusion, the literature search did not provide conclusive evidence that would answer our original question. Nonetheless, we did find an article that described specific strategies that might improve adherence. By incorporating these strategies into an exercise regimen, we hoped to provide a reasonable and appropriate way for our patient to maintain a long-term walking exercise program.

References
Does evidence exist on whether specific interventions can improve adherence to a home exercise program in a patient with intermittent claudication?

Michael Buck and Charles D Ciccone