Improving Function While Living with Rheumatoid Arthritis: A Case Study

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Abstract

The effectiveness of joint protection techniques was tested in a case study involving a 23 year old female with rheumatoid arthritis. The Functional Status Index was used to measure the subject's pain and functional status before and after joint protection techniques were used. The study was conducted over six weeks. The first 2 weeks were a baseline period, which did not include the use of joint protection, and the last 4 weeks involved the use of joint protection techniques. The subject demonstrated a decrease in pain and difficulty performing daily activities after practicing joint protection techniques. This study concluded that joint protection is beneficial to individuals with rheumatoid arthritis; however, more research is needed to clearly define the benefits of joint protection for patients with rheumatoid arthritis.

Improving Function While Living with Rheumatoid Arthritis: A Case Study

Rheumatoid arthritis is a chronic disease that affects approximately 0.3 to 1.5% of the population in the United States (Trombly, 1995). Although, the etiology of rheumatoid arthritis has not been identified, much has been learned about the inflammatory process involved in rheumatoid arthritis. The disease appears to be a systemic autoimmune reaction in the synovial tissue, which causes inflammation; hypertrophy of the synovium; weakening of the capsule; tendons, and ligaments; and eventual destruction of the cartilage and bone (Melvin, 1989). People suffering from rheumatic disease experience exacerbations and remissions, as well as progressive joint deterioration. It is important to note that complete remissions are rare. Most people with rheumatoid arthritis experience some discomfort even when they are in remission (American College of Rheumatology Ad Hoc Committee, 1996).

The first indications of rheumatoid arthritis are usually seen in the small joints of the hands and feet. The inflammatory process, seen during an exacerbation phase, causes destruction to the bony and intrinsic structure of an involved joint. Increased pain and altered biomechanics causes an imbalance between the external muscle force and the intrinsic structure of the joint, causing deformity, pain, decreased range of motion, fatigue, and functional limitations (Hasselkus, Kshepakaran, and Safrit, 1981). Physicians may suspect rheumatoid arthritis by the physical characteristics and symptoms, but can confirm that the diagnosis is

rheumatoid arthritis by testing for the presence of an antibody in the serum called rheumatoid factor (RF) (Melvin, 1989).

The course and prognosis of rheumatoid arthritis varies. There are three different patterns that people with rheumatoid arthritis might experience. One is an intermittent pattern in which patients have a variable course of remissions and flare-ups. The patient may regress with each exacerbation. The second course is a long clinical remissions pattern. Patients experiencing this course may have one or few episodes of inflammation followed by ten to thirty years of prolonged remission. The third pattern, known as the progressive unremitting course, involves the more severe cases of rheumatoid arthritis. In this case, a patient follows a destructive course slowly or quickly, with no remission (Melvin, 1989).

A patient's functional level varies between exacerbations and remissions. Some people are completely independent during remissions, but may need maximal assistance during flare ups. The American Rheumatism Association (ARA) created the ARA Functional Classification guideline, used by most practitioners, to determine the functional level of an individual with rheumatoid arthritis as follows:

Class I: Complete functional ability to carry on all usual duties without handicaps.

Class II: Functional capacity adequate to conduct normal activities despite handicap or discomfort or limited mobility of one or more joints.

Class III: Functional capacity adequate to perform only a few or none of the duties of the patient's usual occupation or of self-care.

Class IV: Largely or wholly incapacitated with patient bedridden or confined to a wheelchair, permitting little or no self-care (Arnett, Bloch, & Edworthy, 1988).

It is important for practitioners to understand the physiological and functional limitations caused by rheumatoid arthritis in order to provide effective treatment. The rehabilitation process aims to decrease pain, increase functional abilities, and slow down the progression of joint deformity.

Occupational therapy treatment for rheumatoid arthritis generally consists of heat, gentle exercise, cryotherapy, splinting, and teaching the patient joint protection and energy conservation techniques (Aiello, Clark, Eckhaus, Eddington, and Wilgis, 1997). Joint protection and energy conservation address managing pain and inflammation, maintaining joint structure, and preventing deformity (Agnew, 1987). Energy conservation is integrated with the principles of joint protection. It can also be used outside the realm of musculoskeletal disease, such as cardiopulmonary disease and various autoimmune illnesses; however, when a patient is following the principles of joint protection, energy conservation is included in the protocol for treatment. For this reason, the term joint protection will be used to represent both joint protection and energy conservation.

Joy C. Cordery (1965) discussed eight principles of joint protection, which she felt were necessary for treating rheumatoid arthritis in occupational therapy practice.

They are:

1. maintaining muscle strength and joint range of motion through therapeutic exercise and activities of daily living.
2. avoid positions of deformity.
3. use the strongest joints available for the job.
4. use of each joint should be in its most stable anatomical and functional plane.
5. ensure correct patterns of movement.
6. holding joints or using muscles in one position for any undue length of time is contraindicated.
7. The patient should never attempt an activity that cannot be stopped immediately if it proves beyond his power to complete it.
8. respect sensation of pain.

The first principle emphasizes maintaining muscle strength and joint range of motion. This is based on the idea that strong muscles are important for supporting and stabilizing a joint; however, people with rheumatoid arthritis, may require a different approach to therapeutic exercise because of the altered biomechanical structure of the joint (the direction of the muscle pull may be more destructive to the joint because of the joint abnormality). A recommended exercise program involves isometric exercises and a progressive resistive method, which should be carried out by the patient for ten to fifteen minutes twice a day (Cordery, 1965). If this is too strenuous for some patients, an exercise program can be designed by the therapist to fit the needs of the patient. The other form of exercise involves participating in daily activities, such as grooming and/or washing dishes, as a way of maintaining function and range of motion. It is important that the patient rest when fatigued or in pain, but activities should not be reduced unnecessarily (Cordery, 1965).

The second principle involves avoiding positions of deformity. This is important and should be carried out on a daily basis. External forces acting on a joint, such as lifting a heavy load or grasping an object tightly for a prolonged period of time, should be minimized or counseled against in order to protect the ligaments and tendons (Cordery, 1965). Movement patterns should be opposite the direction of the potential deformity, and the hand should avoid prehensile patterns when possible. Trombly (1995) reports some alternate methods for certain activities might be:

1. open a jar by stabilizing the jar on a wet towel, place palm of the right hand on jar lid, press down, and turn in radial direction (towards thumb). Avoid pushing or twisting in an ulnar direction (towards little finger), even if this means using the nondominant hand.
2. press water from a cloth or sponge--do not wring it.
3. smooth towels, bed sheets, clothes, etc. using the ulnar side of the hand.
4. apply pressure on the heel, not the knuckles of the hand, when using the hands to assist in standing up.
5. use adapted tools and utensils in which the handles are angled and built up to eliminate wrist and metacarpal joint deviation and tight grip.

The third principle involves using the strongest, largest joints to perform a task. Because the proximal joints are stronger and more stable than the distal joints, it is more effective to protect the weaker joints by using the proximal joints to support or carry out a load or task. It is recommended that people carry a bag or purse over their shoulder, instead of in their hand. Pots and pans should be carried by putting the hands and forearms under the pan. Oven mitts should be worn if the pan is hot. (Trombly, 1995).

Principle four discourages using rotational or lateral force for certain

movements, such as leaning to one side to help rise up from a chair. Lifting objects should be done in a straight plane without rotating the trunk or knees, because the torsional force may be transmitted to joints that are incapable of withstanding it (Cordery, 1965).

Principle five breaks down the different patterns of movement, and suggests the correct sequence or pattern that should be practiced. One important strategy for the movement of the hand is maintaining the intrinsic and extrinsic balance of the hand, which is maintained by using the long extensors for finger movement. Finger flexion should begin distally and end proximally, and finger extension should begin proximally and end distally. When a patient stands from a chair, hip and knee extension should occur simultaneously, not sequentially; the patient should straighten up completely before moving away from the chair (Cordery, 1965).

Principle six states that holding joints for a prolonged period of time is contraindicated. Because muscles fatigue quickly when in a contracted state over a particular length of time, they may begin to wear out different segments of the joint. The muscle may shorten or lengthen, which may compromise blood circulation near the joint, causing deterioration. Principle six states that an activity taking longer than ten minutes to complete should be done seated, but the patient should stand and stretch every twenty minutes during the activity. When writing for a prolonged period of time, it is suggested that the pen be put down every ten minutes and the hand and fingers should be rested flat on the table (Cordery, 1965).

Principle seven addresses the need for a patient to stop or not attempt an activity if it is beyond his power to complete it. When a muscle fatigues, the capsule and ligament take the strain. Therefore, it is important that a patient only do activities that can be stopped immediately if the task is too complex or beyond his capabilities (Cordery, 1965).

Principle eight is important because it is the body's natural way of communicating it's limitations to the patient. Generally, therapists and physicians suggest that an activity is too strenuous if increased pain persists for more than one to two hours after completion of the activity (Aiello et al., 1997). Either the activity needs to be eliminated or modified.

These principles can be applied to areas of work, leisure, and self-care. Many patients with rheumatoid arthritis find that vocation, leisure, and social activities are negatively affected by the disease. Approximately, 50-60% of people with rheumatoid arthritis find that their work capacity is impaired after ten years disease duration, and 37% find a decrease in their work capacity after 3 years disease duration. It has been estimated that individuals with rheumatoid arthritis have a yearly earnings deficit of $6.5 billion dollars compared with earnings of individuals without arthritis. This shortfall is attributed to rheumatoid arthritis. Because rheumatoid arthritis affects many people in their most productive years, this deficit creates a major economic loss for the individual and the community (American College of Rheumatology Ad Hoc Committee, 1996).

Leisure time and social activities decline over time as well. People with rheumatoid arthritis report that they are unable to do the activities that they want to do due to having arthritis (Eberhardt, K., Fex, E., Larsson, B., & Nived, K., 1998). It is important to provide early intervention to people with rheumatoid arthritis, because of future problems associated with the disease. Educating patients about joint protection may be a necessary step in slowing down the progression of rheumatoid arthritis, and helping people with rheumatoid arthritis maintain function in different areas of their life.

Joint protection has been used by occupational therapists as part of their treatment protocol for patients with arthritis and other debilitating illnesses. However, little empirical research has been done in this area. Melvin (1989) reports that although efficacy studies have not been done on joint protection, they can easily be demonstrated in the clinic. Therapists have reported seeing immediate results using joint protection to reduce pain. For example, a patient performing a task, such as picking up a saucepan using both hands to grasp the handles, and then repeating the task using joint protection techniques, will feel an immediate difference in pain level. When patients are taught joint protection principles, they are able to appreciate the benefits by monitoring the changes in pain and inflammation (Melvin, 1989).

These clinical observations are the basis for the current study. The theoretical foundation for joint protection is compelling, but research needs to be done to give it scientific value (Palmer, P., and Simons J., 1991). Stewart (1996) has recently

reported that there was no substantial research done to prove the effectiveness of occupational therapy and physical therapy treatments with patients who have rheumatoid arthritis. He summarized that current literature available in this area demonstrates a lack of scientific proof; including preventative strategies such as joint protection.

This study was designed to demonstrate that practicing the principles of joint protection would decrease pain and increase functional abilities, by decreasing the level of difficulty it took to perform a task, in a patient with rheumatoid arthritis. A case study was conducted to provide a basis for an initial investigation about the positive effects of joint protection.

Methods:

Subject:

The subject for this study was twenty-three years of age with a diagnosis of rheumatoid arthritis. She was diagnosed with rheumatoid arthritis one and a half years ago, but demonstrated symptoms a year prior to being diagnosed. She was not taking medication at the time of the study, and no indications of a secondary medical condition affecting her musculoskeletal condition was present.

At the time of the study, her functional capacity was categorized as Class I; however, when she experienced an exacerbation, she became limited in her functional abilities due to pain and stiffness. She was working as a secretary at a local

medical center, which required her to do a great deal of typing and filing. She enjoyed running, when it wasn't painful for her to do so.

The subject's chief complaints were increased pain and functional limitations caused by illness, especially after work. She appeared to be in remission at the time of the study; however, she still suffered from pain and stiffness due to her job responsibilities, which were taxing on the joints of her hands.

Procedure:

A baseline was established for the first 2 weeks before joint protection was introduced to the patient. The following 4 weeks involved the use of joint protection in the subject's daily life. Data was collected weekly, using a functional status form, to determine if any changes occurred during the six weeks of treatment. Each session involved a follow-up discussion about joint protection to allow for any questions the patient had. Joint protection education was taught through handouts and videos. An outline of the schedule is shown in Appendix A. The appropriate joint protection program was determined according to the subject's needs and lifestyle. This program involved resting hands flat on the table for thirty seconds every thirty minutes between typing and filing at work. Another area addressed was the subject's workout routine at the gym. Because it is important to exercise and maintain balance between antagonist and agonist muscles for joint integrity, it was crucial that the subject exercised correctly and used proper body mechanics. See

Appendix B for details of the joint protection protocol used for this study.

Measurements:

A baseline was established by measuring the subject's functional status and pain level by using the Functional Status Index (FSI) (see Appendix C, Jette, 1980). The FSI was designed by Jette to evaluate functional outcomes among chronically disabled individuals living in the community (1980). It is a self-report measure which is divided into six categories: mobility, personal care, home chores, hand activities, vocational, and avocational. Each category lists representative activities which the subject grades using a numerical scale to assess three dimensions of function. The three dimensions are measured by the following scale:

1. Assistance (1-5)
1= independent, 2=uses devices, 3=uses human assistance, 4=uses devices and human assistance, 5=unable to do.

2. Pain (0-7)
0=no pain and 7=extremely severe pain.

3.difficulty (0-7)
0=not difficult and 7=extremely difficult

The FSI was given once a week to keep track of any changes that occurred during the week. Once the data was collected, the measurements were compared and presented in graphs and tables to illustrate improvements in function; by showing a decrease in difficulty, and a decrease in pain after the subject practiced joint

protection.

Results:

At the end of the first two weeks of treatment, minimal changes in the FSI scores for pain and difficulty to perform a task were seen. The scores for level of assistance in the FSI were disregarded because the subject was classified as Class I, according to the ARA guidelines, and did not need assistance at this time.

The FSI scores were broken down into six categories and the averages for pain and difficulty were calculated for each category. Most of the scores for pain, from week one to week two, increased; demonstrating that the subject had an increase in pain during this time. There was a slight decrease in pain in the hand activities category; however, the subject reported not having a lot of typing to do at work during week two. The average scores for pain in each category of the FSI can be seen in Table 1. Between week one and week two, the scores for level of difficulty stayed the same, with a slight increase in difficulty in personal care and hand activities. The average scores for difficulty in each FSI category can be seen in Table 2.

By week three and four the scores began declining, demonstrating a decrease in pain and difficulty after joint protection principles were implemented. Total average scores for pain and difficulty were calculated, showing an increase in pain and difficulty during the first two weeks, and a decline in pain and difficulty by week

three. The scores for weeks four through six showed minimal changes compared to week three, which demonstrated that; overall, there was little to no increase in pain or difficulty when performing certain activities. Table 3 illustrates the total averages of pain and difficulty in each of the FSI categories. Figures 1 and 2 demonstrate these averages as graphs to better illustrate the decline in pain and difficulty after the first two weeks of the study.

Of the six categories, the activities that caused the most pain were personal care, hand activities, and vocational tasks. Figures 3, 4, and 5 illustrate the pattern of pain from week one through week six. In the personal care category, the most painful activities were putting on pants, buttoning clothes, and putting on shoes/slippers. The most painful hand activities were writing, opening containers, and turning faucets. The least painful activities were mobility, home chores, and avocational tasks. Refer to Figures 6, 7, and 8 for an illustration of the pattern of pain for these activities. The subject did not have pain walking inside, transferring to and from the toilet, and driving a car. For home chores, the subject did not have pain vacuuming a rug, reaching into high cupboards, washing windows, and doing yardwork. For avocational tasks, the least painful areas were attending church, and socializing with friends and relatives.

The most difficult activities were personal care, hand activities, and vocational tasks, (illustrated in Figures 9, 10, and 11). For personal care and hand activities, the most difficult tasks were also the most painful tasks. The least difficult

activities were mobility and home chores, (illustrated in Figures 12 and 13). The least difficult tasks in home chores and mobility were the same as the least painful activities in these areas. Figure 14 illustrates difficulty with avocational tasks. Avocational tasks fell between the most difficult and the least difficult tasks; however, there was a significant decrease in difficulty for avocational tasks after joint protection techniques were implemented.

Discussion:

The subject for this case study was suffering from the early stages of rheumatoid arthritis, and was fairly functional at the beginning of the study. The occupational therapy graduate student and subject discussed the importance of honestly rating the FSI scores to decrease the possibility of a halo effect, prior to the initiation of the study.

The subject's initial baseline demonstrated low scores for pain and difficulty. However, her symptoms of pain increased during the first two weeks, before following the joint protection protocol, and decreased after utilizing these techniques. Activities that were difficult for her in the beginning of the study became less difficult as the study progressed, which is a positive reflection on the benefits of using joint protection principles with daily life activities.

According to the FSI scale, the categories that demonstrated the greatest improvement in pain reduction were personal care and hand activities. The level of

difficulty declined the most in personal care, vocational activities, and hand activities. It was interesting that pain caused by hand activities started to decline during week two, before joint protection was initiated. It was also shown that the level of difficulty to perform hand activities increased the same week that pain decreased, which appeared to be conflicting information. One reason for this may have been that during week two, the subject reported a decrease in the amount of typing she had to do for work. This decrease in hand use may have increased stiffness in the hand, making it more difficult to use. Principle one of joint protection states that maintaining joint range of motion through activities of daily living is important for people with arthritis; therefore, activities should not be reduced unless it is necessary (Cordery, 1965). The subject's decline in hand use during week two may have helped to alleviate pain, but may have contributed to the increase in difficulty using the hand. This is why it is important to monitor activities and create a balance between what is too strenuous on the joint, and what is too lenient on the muscles surrounding the joint.

It was found that personal care, hand activities, and vocational activities were the most painful and most difficult for the subject. For each of these categories, the activities that caused the most pain or were the most difficult were ones that the subject needed to use a gross grasp or pinch grasp. For example, putting on pants or shoes requires the fingers to hold the object tightly. Buttoning clothes requires a pincer grasp, which requires less force, but requires a person to use the most distal

joints, as opposed to using the most proximal joints for the job. Writing requires the person to use a dynamic tripod grasp over a thin surface, which over a prolonged period of time causes muscle fatigue and cramping. Other activities, such as opening containers or turning faucets, can be destructive to the joints because torsional force is used if the activity is not done properly.

Although the FSI did not list specifics for vocational activities, it is not surprising that it was one of the most painful activities for the subject. Her job requirements included typing, filing, and writing. These activities can be strenuous on the joints of the hand, because they are performed using the distal joints over a prolonged period of time. If proper body mechanics and rest breaks are not incorporated into the day, the hands will react by becoming inflamed and painful.

Once joint protection principles were included in these areas, the subject reported feeling a difference in the evening, when she would normally experience increased pain. She included rest breaks and stretching in her daily routine, as well as improved body mechanics, especially for her hands.

It was interesting that mobility, home chores, and avocational activities were the least painful tasks, and mobility and home chores were the least difficult tasks. Walking, transferring from the toilet, and driving a car could be expected to be more painful and difficult for a person with more advanced stages of rheumatoid arthritis. Vacuuming, reaching into high cupboards, washing windows, and yardwork are activities that require more force from the shoulder joint than the hands. These

activities follow principle three of joint protection, which suggests using the strongest, largest joints to perform a task. This helps to protect the smaller, weaker joints, such as the joints in the hand. Therefore, these activities may have been less difficult and painful because the subject was not putting too much strain on her hands.

The avocational activities that did not give the subject pain were attending church and socializing with friends. These questions on the FSI were vague. Attending church was not applicable because the subject did not attend church. Socializing with friends and relatives did not require strenuous activity for the hands and feet, therefore the subject did not have pain while socializing.

This study represents a first step towards scientific evidence to support the principles of joint protection. However, there are some limitations in this case study. For one, the study did not have a long baseline, which would have been more beneficial for gathering data and following an ABA pattern. Secondly, the subject was in remission, and demonstrated low pain and difficulty levels before joint protection was integrated into her daily life. Still, it is important to note that her pain and difficulty level increased from week one to week two, and then decreased the following four weeks, once joint protection was practiced.

It was found, in this study, that an individual with rheumatoid arthritis can benefit from incorporating joint protection principles into their daily lives. Occupational therapists need to understand these principles in order to develop an

individualized protocol for each patient. According to this study, application of these principles were effective in decreasing pain and difficulty performing daily tasks. However, there can be a great deal of information for an individual to remember, which can influence patient compliance in following a protocol. This is why it is important for therapists to review the information in each session, and to individualize the protocol to meet the specific needs of the patient.

Other factors that could influence patient compliance are the individual's age, or how recently the patient was diagnosed. Young patients, or those with a recent diagnosis, may not be ready to adjust to the changes required when following this protocol. A patient's self-perception may influence how he/she adapts to a new lifestyle. Those who have a negative self-perception related to their illness, may be less inclined to follow through on joint protection. This may be due to feelings of embarrassment, depression, or denial (Kubsch & Wichowski, 1997). In order for joint protection to be beneficial, therapists need to address the psychosocial issues surrounding their patients to ensure quality treatment.

This case study is a beginning. More empirical research is needed, so a better understanding of joint protection can be incorporated into the rehabilitation process. Longitudinal studies involving larger populations and control groups are necessary for targeting specific questions about joint protection, such as its effects on deformity prevention. Other questions involve the usefulness of joint protection at different stages of rheumatoid arthritis, and variables affecting patient compliance with joint

protection protocols.

Rheumatoid arthritis can be a debilitating illness for those who have it. It is essential that methods for decreasing pain and increasing function be investigated and refined to better fit the needs of patients suffering from this disease.

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Table 1

Average Pain Level According to the FSI

Average Pain Level (0-7) 0=no pain 7=extremely severe pain

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Mobility	1.0	1.2	0.2	0.4	0.4	0.4
Personal Care	1.8	2.8	0.8	0.8	0.6	0.6
Home Chores	0.4	1.0	0.6	0.4	0.4	0.4
Hand Activities	4.3	3.8	2.5	2.3	2.0	1.8
Vocational	3.0	3.0	2.0	2.0	2.0	1.0
Avocational	1.0	1.0	0.3	0.3	0.3	0.3

Table 2

Average Difficulty Level According to The FSI

Average Difficulty Level (0-7) 0=not difficult 7=extremely difficult

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Mobility	0.6	0.6	0.2	0.4	0.4	0.4
Personal Care	3.6	3.8	1.0	0.8	0.4	0.6
Home Chores	0.8	0.8	1.8	0.4	0.2	0.4
Hand Activities	4.5	4.8	1.8	2.0	1.8	2.0
Vocational	4.0	4.0	1.0	1.0	1.0	1.0
Avocational	1.3	1.3	0.3	0.3	0.3	0.3

Table 3

Average of Pain and Difficulty According to the FSI

Average Pain (0-7) 0=no pain 7=extremely severe pain

Average Difficulty (0-7) 0=not difficult 7=extremely difficult

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Pain	1.7	2.0	0.9	0.9	0.8	0.7
Difficulty	2.2	2.4	0.7	0.7	0.6	0.7

Figure 1

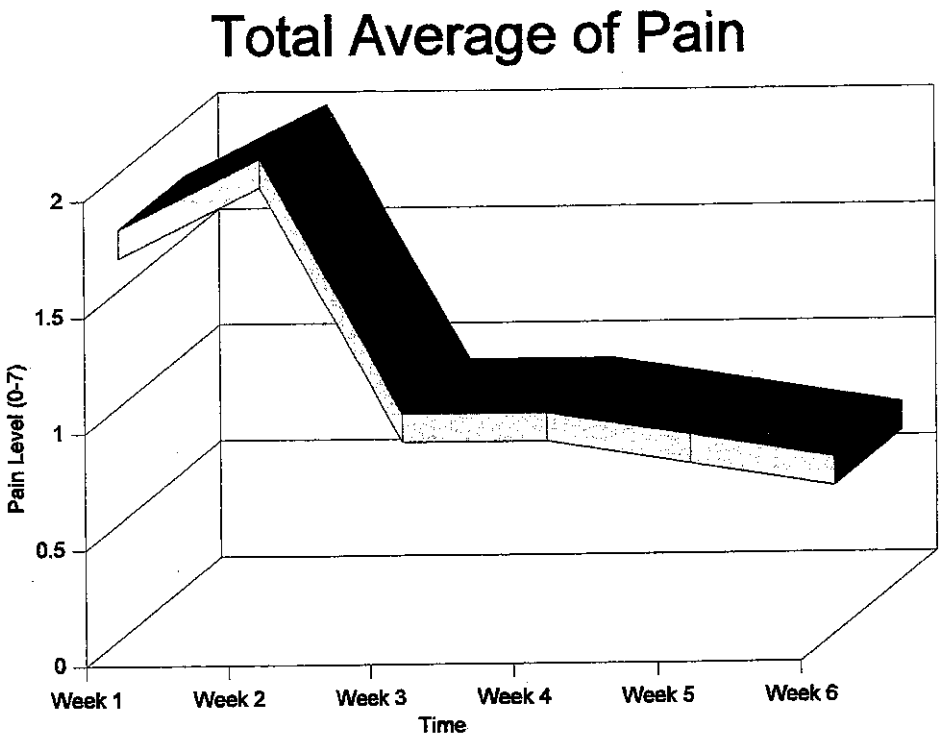

Total Average of Pain
Pain Level (0-7)
2
1.5
1
0.5
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 2

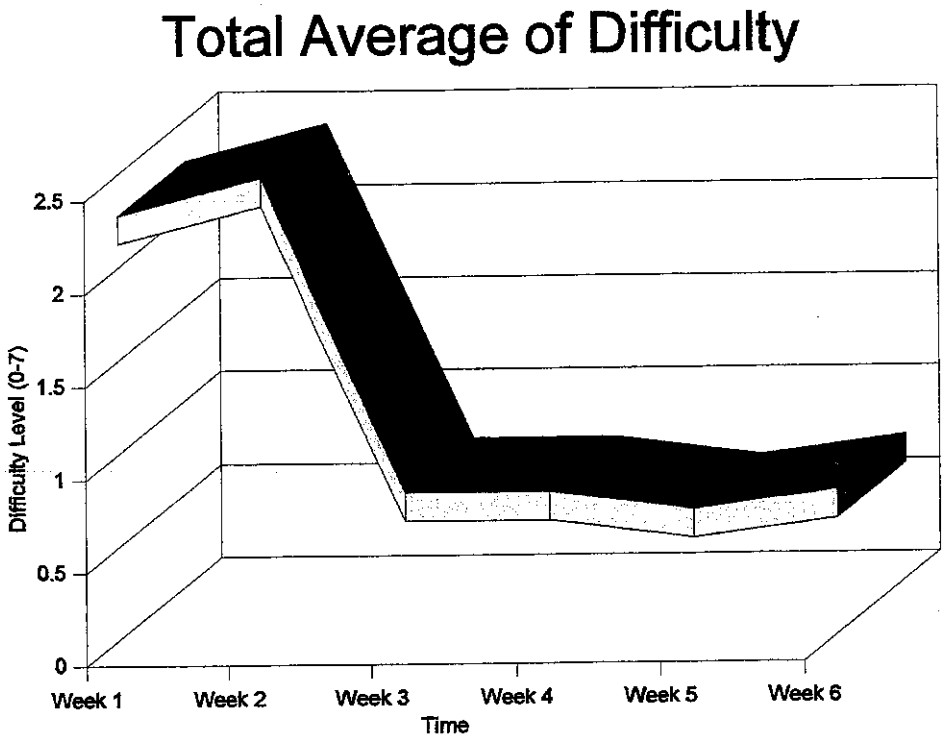

Total Average of Difficulty
Difficulty Level (0-7)
2.5
2
1.5
1
0.5
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 3

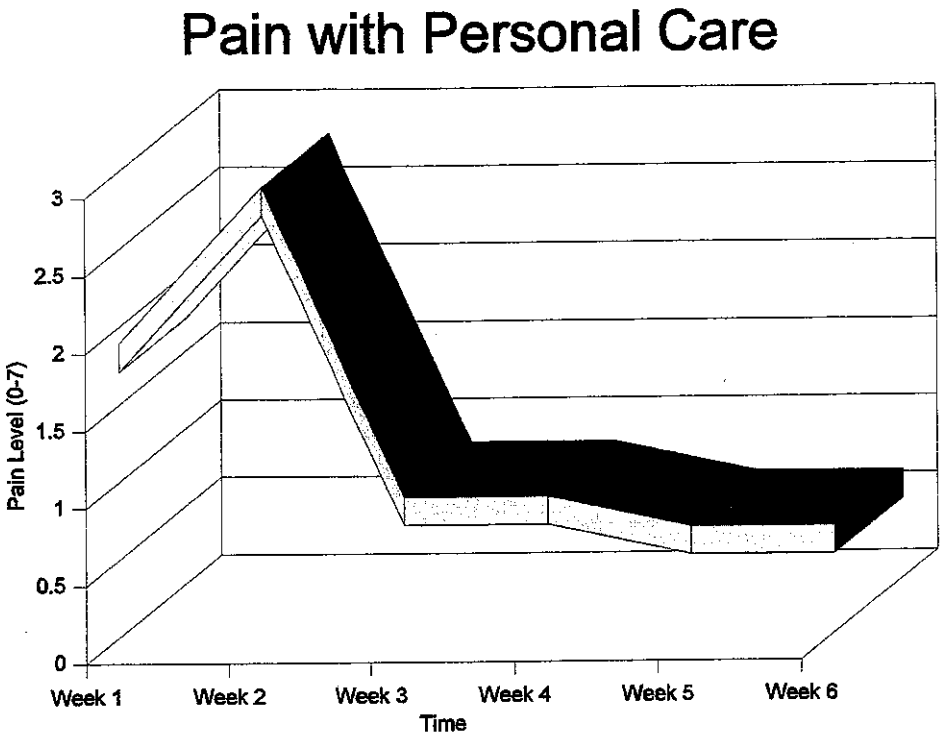

Pain with Personal Care
Pain Level (0-7)
3
2.5
2
1.5
1
0.5
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 4

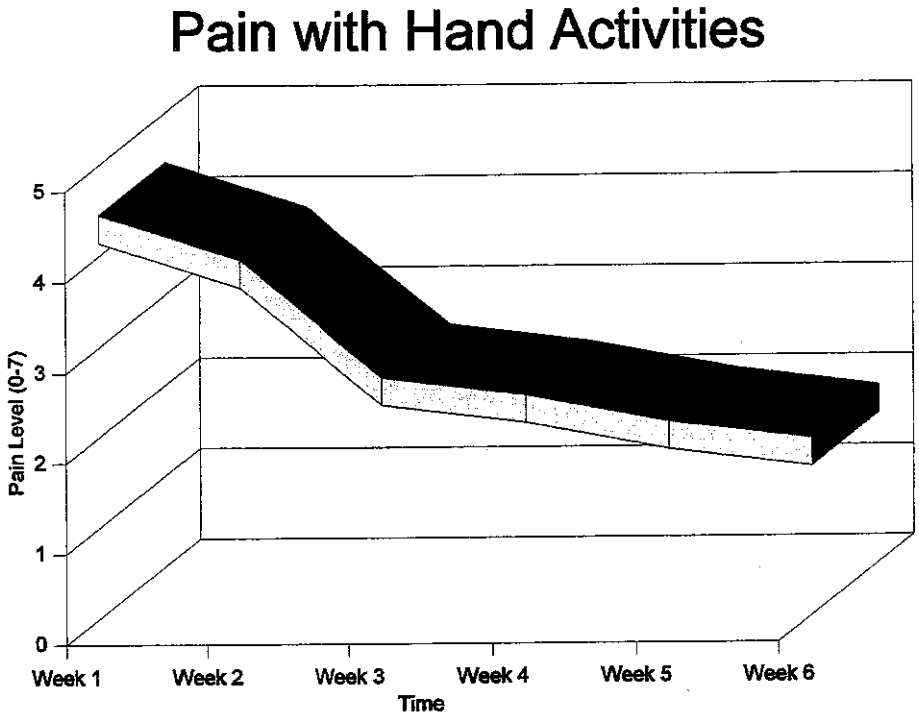

Pain with Hand Activities
Pain Level (0-7)
5
4
3
2
1
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 5

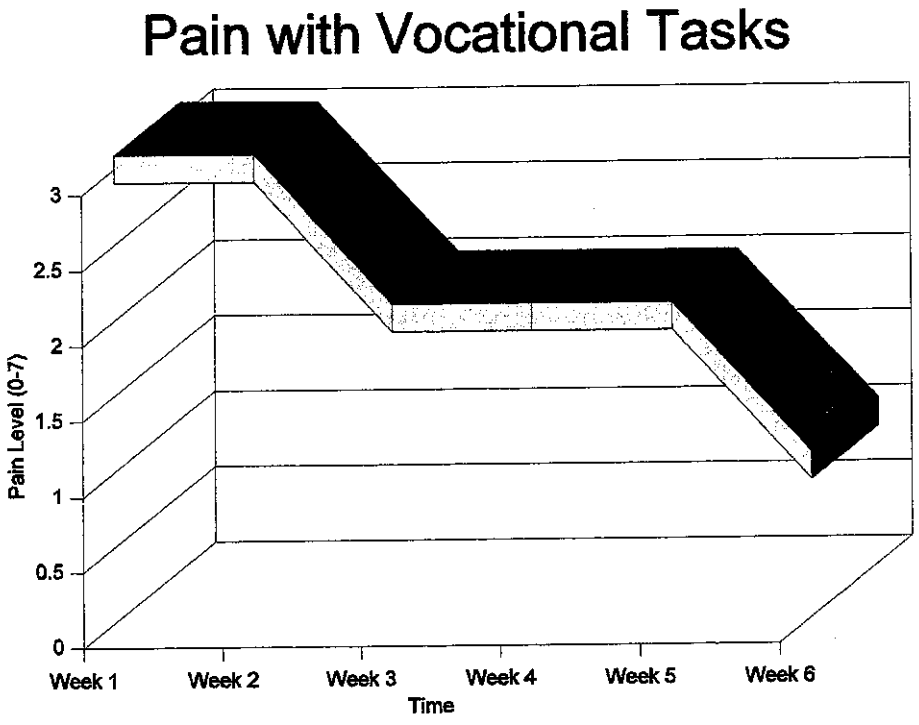

Pain with Vocational Tasks
Pain Level (0-7)
3
2.5
2
1.5
1
0.5
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 6

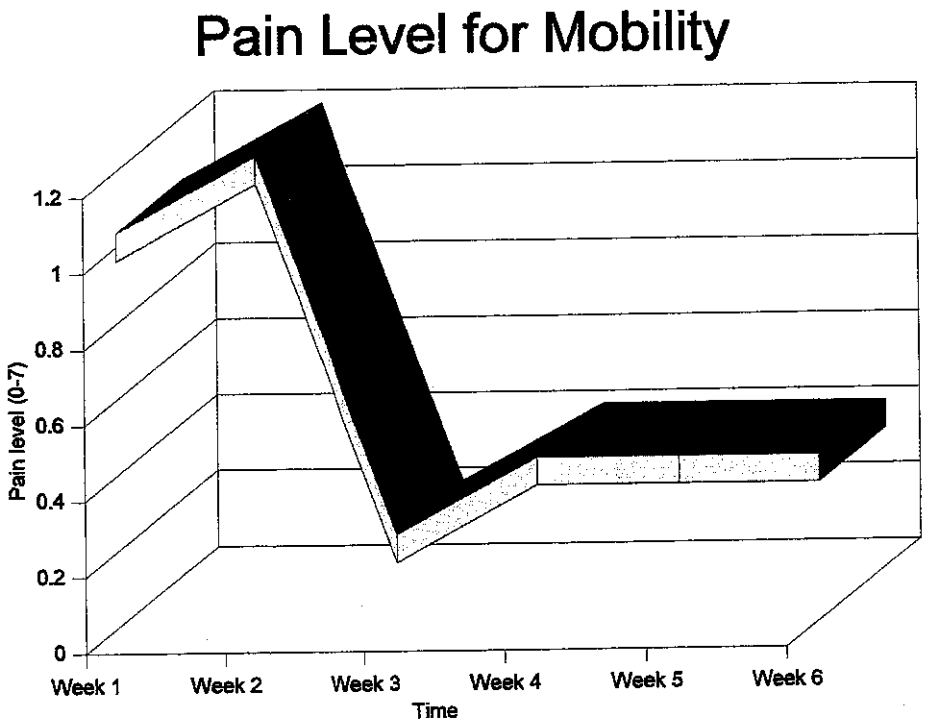

Pain Level for Mobility
Pain level (0-7)
1.2
1
0.8
0.6
0.4
0.2
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 7

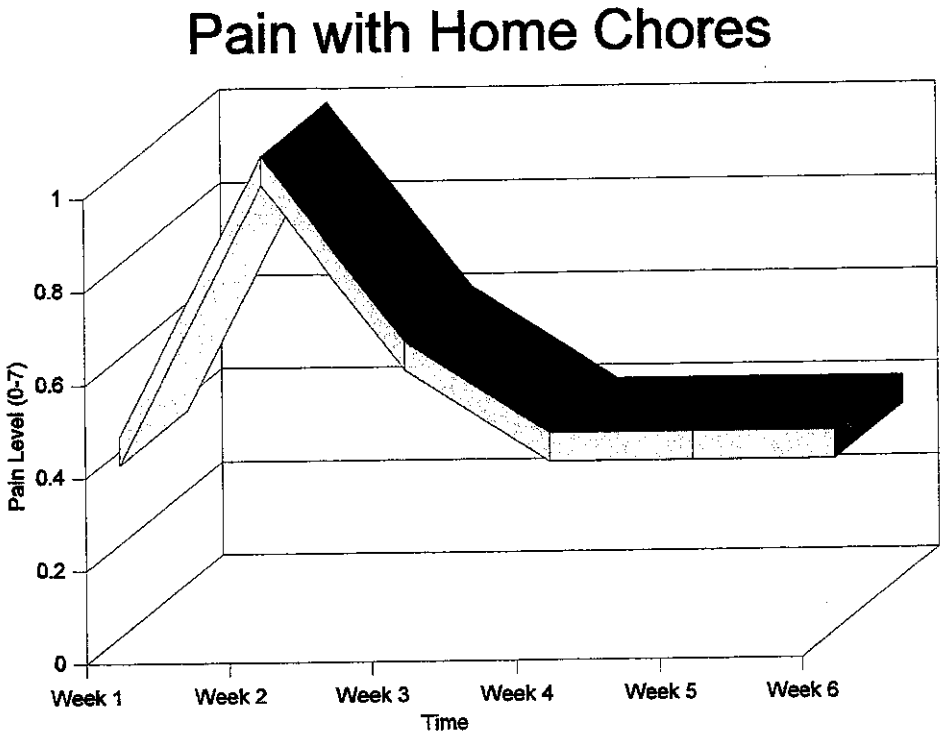

Pain with Home Chores
Pain Level (0-7)
1
0.8
0.6
0.4
0.2
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 8

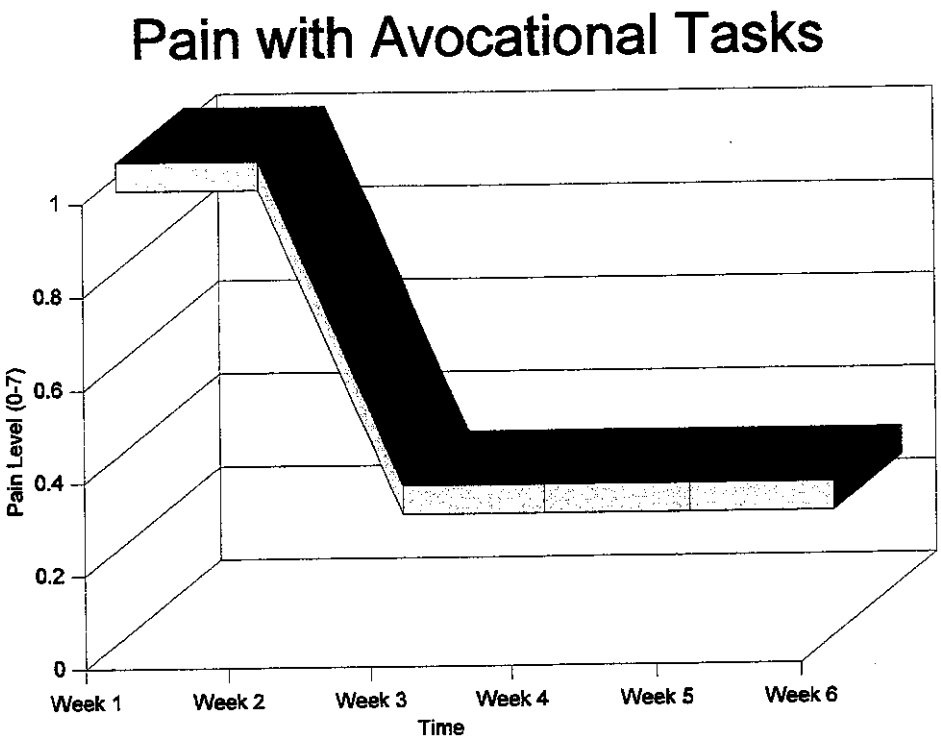

Pain with Avocational Tasks
Pain Level (0-7)
1
0.8
0.6
0.4
0.2
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 9

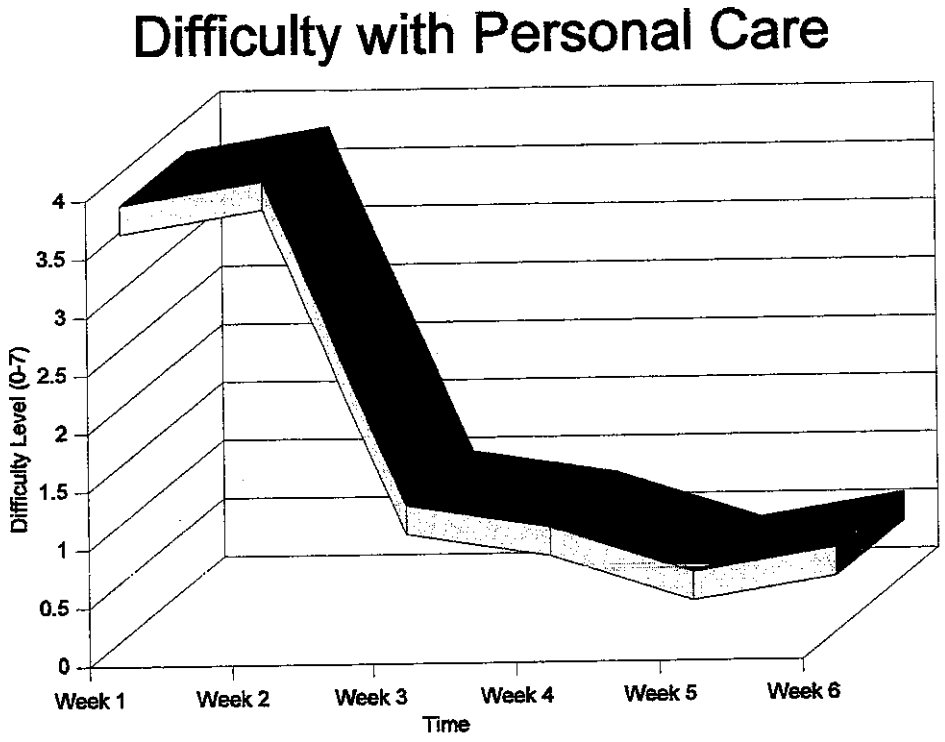

Difficulty with Personal Care
Difficulty Level (0-7)
4
3.5
3
2.5
2
1.5
1
0.5
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 10

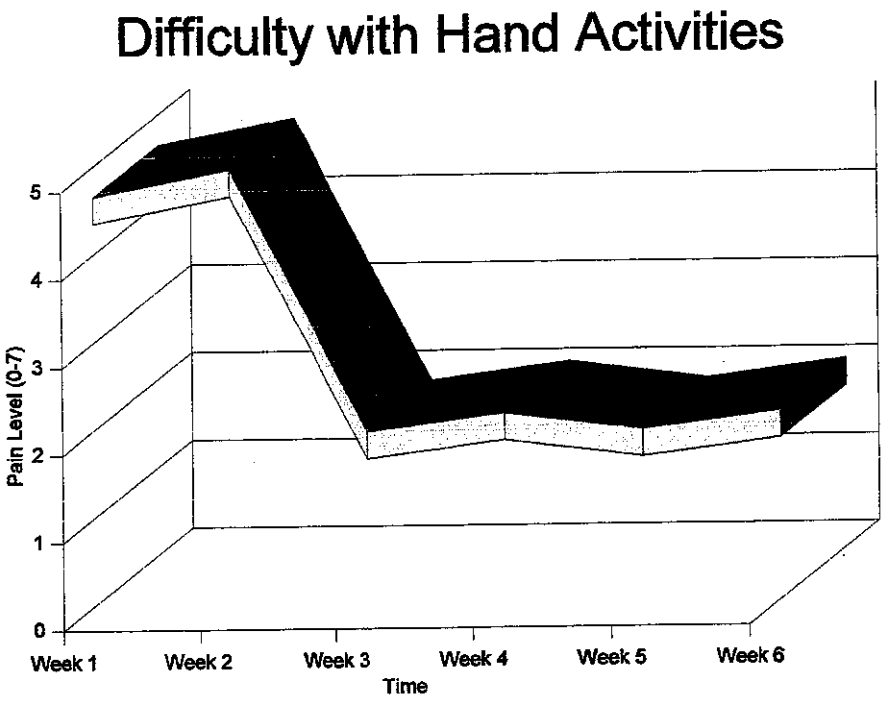

Difficulty with Hand Activities
Pain Level (0-7)
5
4
3
2
1
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 11

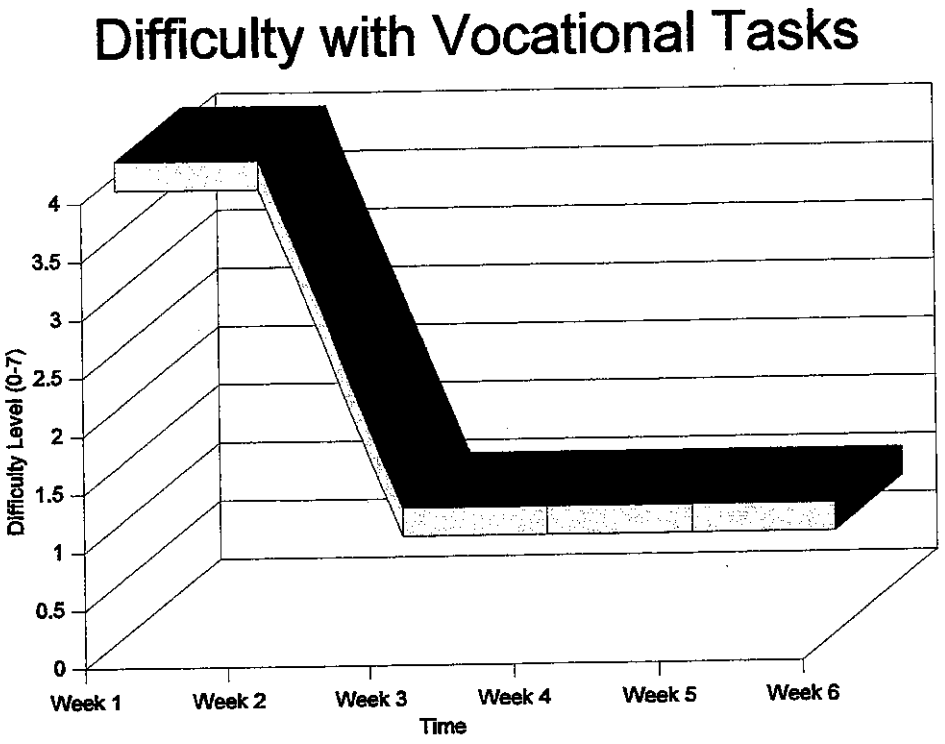

Difficulty with Vocational Tasks
Difficulty Level (0-7)
4
3.5
3
2.5
2
1.5
1
0.5
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 12

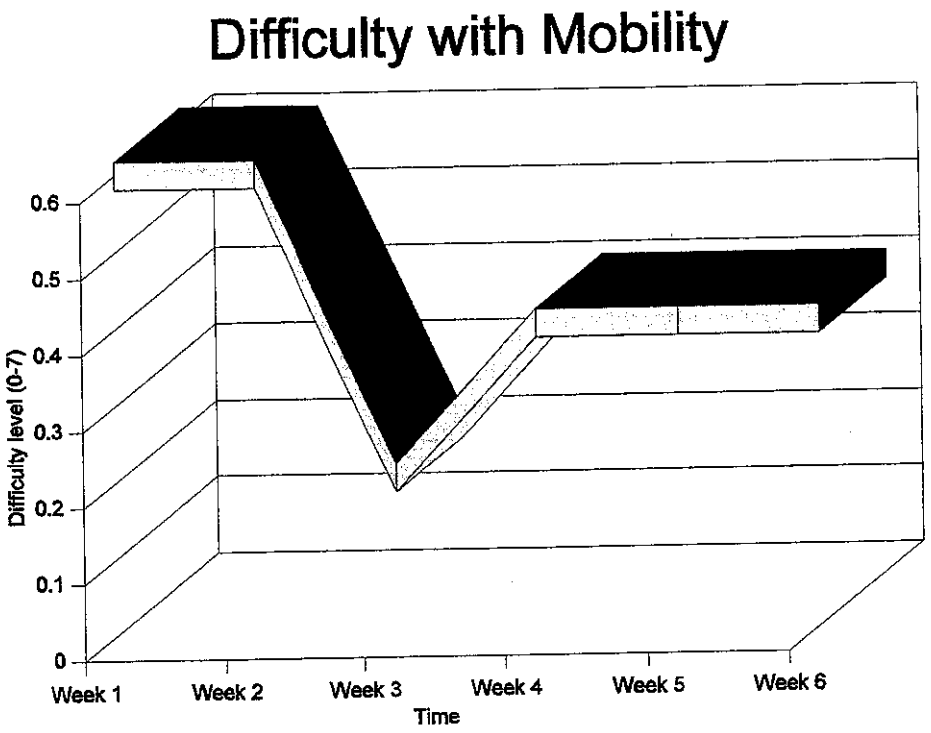

Difficulty with Mobility
Difficulty level (0-7)
0.6
0.5
0.4
0.3
0.2
0.1
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 13

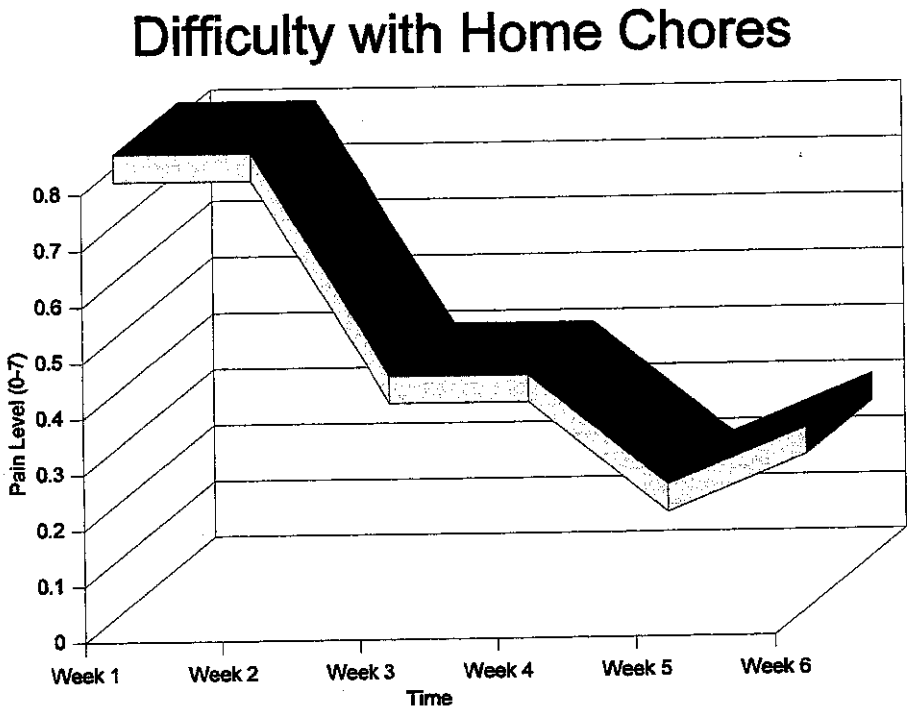
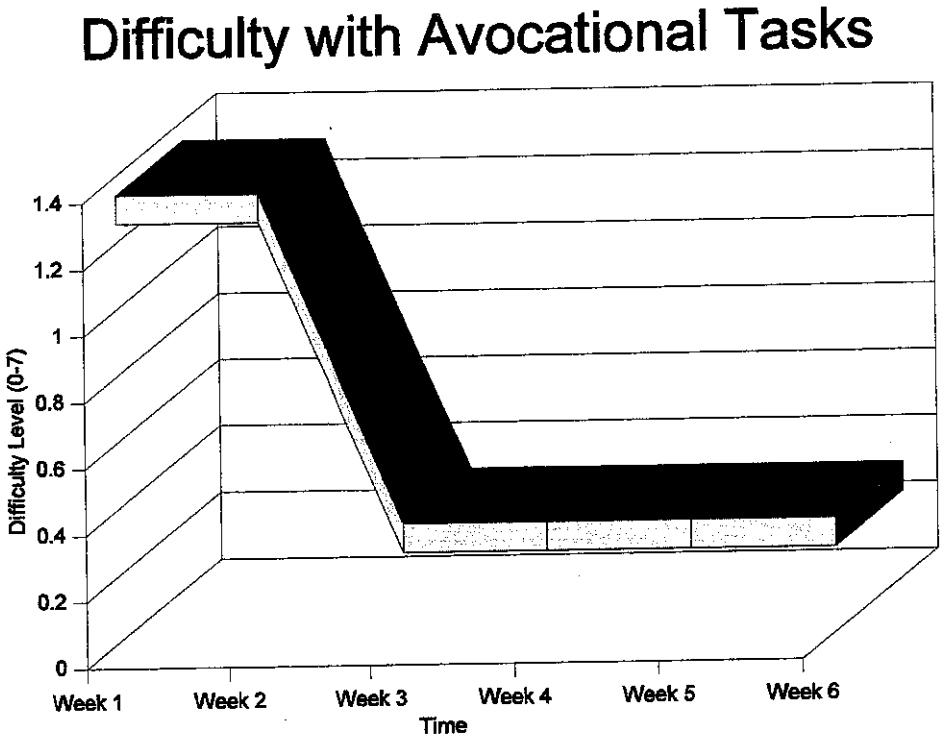

Difficulty with Home Chores
Pain Level (0-7)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Figure 14


Difficulty with Avocational Tasks
Difficulty Level (0-7)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Time

Appendix A

Schedule of Study

Week One: patient will fill out the Functional Status Index to establish a baseline for pain and functional limitations.

Week Two: Patient will fill out the Functional Status Index to record any possible changes in pain and functional status. Patient will receive joint protection education. The joint protection protocol will be based on the arthritis foundation guidelines and the principles of joint protection. The protocol will be designed to meet the patient's needs. For example, the patient's job requires her to do a lot of typing and filing. Therefore, the protocol will include a time schedule for rest breaks, such as resting her hands flat on the table for 30 seconds every half hour.

Week Three: Patient will fill out the Functional Status Index to keep track of any changes that may have occurred during the week. Protocol will be reviewed by patient and therapist.

Week Four: Patient will fill out Functional Status Index. Patient will watch a thirty minute video about joint protection called Arthritis: Best Use of the Hands.

Week Five: Patient will fill out Functional Status Index. Patient will watch a second thirty minute video about rheumatoid arthritis called Arthritis Self-Help, Exercise, and Joint Protection.

Week Six: The Functional Status Index will be filled out by patient to measure for any improvements in functional abilities and to determine if there was a decrease in pain.

Appendix B

Joint Protection Protocol

Principle I:

-Maintain muscle strength and joint range of motion through therapeutic exercise and activities of daily living.

1. Flex and extend wrists and joints of all fingers (10 reps each)
   Oppose thumbs to each finger (10 reps each)

2. Continue to do activities of daily living to limits of pain.

(Do this 3 times a day)

3. When working out at gym, make sure you balance your routine so that all the muscles surrounding one joint are being strengthened. This helps keep the joint aligned properly. For example, if you do bicep curls, make sure to do tricep extensions to maintain elbow joint integrity. Make sure you use light weights and do not feel pain.

Work-Out Routine: (examples of balancing muscle strength for different joints)

bicep curls.....tricep extension
leg curls.....leg extension (do not attempt squats, it is too stressful for knee joints)
chest.....upper back
abdominals.....lower back

*****rest between sets, and break up routine so you do upper body one day, and lower body the next time.

Appendix B

Principle II:

-Avoid positions of deformity.

1. Open a jar by stabilizing the jar on a wet towel, place palm of the right hand on jar lid, press down, and turn towards thumb. Avoid pushing or twisting towards the little finger---even if this means using the non-dominant hand.

2. Press water from a cloth or sponge---do not wring it.

3. Smooth towels, bed sheet, clothes, etc. using the side of the hand with the little finger.

4. Apply pressure on the heel, not the knuckles of the hand, when using the hands to assist in standing up.

5. When opening door, use left hand and turn doorknob towards the thumb.

Principle III:

-Use the strongest joints available for the job.

1. For example, carry groceries from bottom of bag. Do not carry groceries by gripping handles. Carry bag using forearms to support bottom of bag.

Principle IV:

-Use of each joint should be in its most stable anatomical and functional plane.

1. For example, lift objects with back and neck aligned with pelvis. Do not rotate trunk or knees when lifting objects.

Principle V:

-Ensure correct patterns of movement.

1. For example, when standing up from chair, you should straighten your hip and knees simultaneously, and stand up completely before moving away from the chair

Appendix B

Principle VI:

-Do not hold your joints and muscle in one position for a long period of time.

1. Rest hands flat on the table for 30 seconds every half hour when typing or filing at work for a long period of time.

Principle VII:

-Do not attempt an activity that cannot be stopped immediately if it proves beyond your power to do it.

1. For example, try not to lift heavy weights at the gym. Try to use nautilus machines, instead of free weights. If lifting heavy weights, always have someone spot you.

Principle VIII:

-Respect sensation of pain.

1. If pain persists for more than 1-2 hours after completing an activity, modify the activity or eliminate doing the activity.

NOTE: The eight principles of joint protection were developed by Joy C. Cordery.

Cordery, J.C. (1965). Joint protection: A responsibility of the occupational therapist. American Journal of Occupational Therapy, 19, 285-294.

Appendix C

Functional Status Index

Activity	Assistance (1-5)	Pain (0-7)	Difficulty (0-7)
Mobility			
Walking inside	____	____	____
Climbing up stairs	____	____	____
Transferring to and from toilet	____	____	____
Getting in and out of bed	____	____	____
Driving a Car	____	____	____
Personal care			
Combing hair	____	____	____
Putting on pants	____	____	____
Buttoning clothes	____	____	____
Washing all parts of the body	____	____	____
Putting on shoes/slippers	____	____	____
Home chores			
Vacuuming a rug	____	____	____
Reaching into high cupboards	____	____	____
Doing laundry	____	____	____
Washing windows	____	____	____
Doing yardwork	____	____	____
Hand activities			
Writing	____	____	____
Opening containers	____	____	____
Turning faucets	____	____	____
Cutting food	____	____	____
Vocational			
Performing all job responsibilities	____	____	____
Avocational			
Performing hobbies requiring hand work	____	____	____
Attending church	____	____	____
Socializing with friends and relatives	____	____	____

Key: Assistance: 1-5: 1=independent: 2= uses devices: 3=uses human assistance: 4=uses devices and human assistance: 5=unable to do. Pain: 0-7: 0=no pain and 7=extremely severe pain. Difficulty: 0-7 0=not difficult and 7=extremely difficult. Time frame, on average, during the past seven days.

Functional Status Index. Reprinted with permission: Jette, A. (1980). The functional status index: Reliability of a chronic disease instrument. Archives of Physical Medicine and Rehabilitation, 61, 395.

Appendix D

Institutional Review Board

REVISED 1994

IRB Guidelines
October 1994

****
IRB#_____ Date Received_____ Accepted_____ Denied_____
Date_____
Dept._____ Prof._____ Student_____NYSIRB____
Pop._____
AMCIRB_____ UG_____ G_____ INT_____ EXT_____
Grant_____
****

APPLICATION FOR PROJECT REVIEW
SAGE COLLEGES INSTITUTIONAL REVIEW BOARD
(For all questions use additional sheets, as necessary)

Please Type or Print Using Black Ink

1. Title of Project: Improving Function While Living with Rheumatoid Arthritis
2. Proposed Starting Date: February 1998
3. Funded By: Heather Raviv
4. Principal Investigator(s)
   (Faculty supervisor if student project)
   Ed Hickling, Ph.D. and Theresa Hand, OTR, CHT
   (If student project, student(s) involved)
   Heather Raviv, OTS
5. Qualifications of Investigator(s): I have had eighty hours of experience working with hand injuries in a level one fieldwork at Samaritan Hospital, and three months of experience working at Lawrence Hospital. I have taken sixty-three credits as a full time student in the occupational therapy program at Russell Sage College. Some of the classes involved were: research methods, gross anatomy, kinesiology, neuroscience, physical dysfunction in adults, clinical problems involving the hand and upper extremity, and many other occupational therapy related topics.
6. Description of the Project:

Appendix D

A. *Identify the problem under investigation and the purpose of the study.*

Joint protection and energy conservation techniques have been used by occupational therapists as a treatment protocol for patients with rheumatoid arthritis. The theoretical basis for these techniques are convincing, however little research has been done to support that joint protection and energy conservation have positive effects on people with rheumatoid arthritis (Agnew, 1987). This study proposes to demonstrate that joint protection and energy conservation techniques decrease pain, and increase functional abilities in a person with a diagnosis of rheumatoid arthritis.

B. *Describe the procedures involved in the collection of the data.*

The subject for this study will be eighteen years or older with a diagnosis of rheumatoid arthritis. No indications of a secondary medical condition affecting the musculoskeletal system will be present.

The subject will receive occupational therapy treatment at Russell Sage College for four weeks. The therapy will include: paraffin, gentle range of motion of the wrist and fingers, tendon glides, isometric exercise, and a cold pack if needed. During the fifth week, the patient will continue to receive occupational therapy with the added component of joint protection education. A joint protection protocol will be set up by the treating therapist. These techniques will be taught through verbal and visual demonstrations, and a handout.

A baseline will be established by measuring the subject's functional status, pain level, and active range of motion of the wrist and digits of both hands during the initial evaluation. The Functional Status Index (FSI) (Jette, 1980) and the Health Status Questionnaire 2.0 (HSQ) (Radosevich, D., Wetzler, H., & Wilson, S., 1994) will be used to measure the subject's functional status involving ADLs and IADLs. The FSI is a self-report measure which is divided into six categories: mobility, personal care, home chores, hand activities, vocational, and avocational. Each category lists representative activities which the subject will grade using a numerical scale for assessing three dimensions of function: assistance (1-5), pain (0-7), and difficulty (0-7). The HSQ is a well rounded survey that asks questions about the person's overall health; and addresses ADL and work limitations, pain, and psychosocial aspects of having a chronic illness. Active range of motion measurements will be taken for wrist extension, flexion, radial deviation, and ulnar deviation, and for flexion and extension of the distal interphalangeal and proximal interphalangeal joints in all ten digits using a goniometer.

At the end of the fourth week, the patient will be re-measured using the same tools used during the initial visit. At the end of the eighth week, after the patient has

Appendix D

incorporated the principles of joint protection into his/her daily life, the same tools will be used to re-measure the patient's pain level, range of motion, and functional abilities. A comparison of the measurements taken at the end of the fourth week and at the end of the eighth week will be made to determine if increased function and range of motion, and decreased pain were more influenced when joint protection was incorporated into treatment.

7. Participation of Human Subjects in the project:

A. Age: 18 years or older

B. Will there be female subjects?
not known at this time

C. If so, can the study have any adverse effects on pregnancy?
No

D. Identify the subject population.
-Patient will have a diagnosis of rheumatoid arthritis. Patient will not have any secondary health conditions that would affect the musculoskeletal system.

E. Will the study involve any of these special populations? Circle all that apply.
Minors Prisoners Mentally Disabled Persons Incompetent Persons

F. State how subjects will be selected and what remuneration they will receive.
-Subject will be selected by referral. Subject will not have any secondary health conditions as stated above, and will be chosen on the basis that he/she has not practiced or used joint protection techniques in the past or at the present time. The subject will be allowed to see the results of the study once the study has been completed.

G. How will confidentiality be maintained?
-a pseudo name will replace the patient's actual name.

8. Are subjects at risk?
No

9. Will deception (purposely misleading subjects as to the purpose of the study) be used?
No

10. List all other institutions operating in the project. (None)

Appendix D

11. Name, address, and telephone number of person to contact if additional information is required

and to send the IRB decision: Heather Raviv
Russell Sage College Box 1104
Troy, NY 12180

12. PLEASE NOTE: Where projects involve risk to subjects, the Investigator must notify the Board immediately of any harm or injury suffered by subject while participating in the study, or any potential or emergent problems posing additional risks to subjects. In addition, a report regarding human subjects (including the consent procedure and protection of subject's rights and welfare) is required annually and within 90 days of the completion of the project. Remember also that any alterations or changes in procedures or protocols requires notification and approval of the Board.

_____ _____

Signature of Principal Investigator Date

_____ _____

Signature of Student Date

Appendix D

IRB Revision:

February 11, 1998

To the IRB committee,

Since date of submission (2/4/98), my treatment protocol has been modified. It now involves significantly less risk with all manipulations; as revision of treatment will focus solely on joint protection. Treatment to follow arthritis foundation guidelines. Treatment protocol is as follows:

Week One: patient will fill out the Functional Status Index and Health Status Questionnaire so a baseline for pain and functional limitations is established.

Week Two: patient will fill out the Functional Status Index to record any possible changes in pain and functional status.

Week Three: Patient will receive joint protection education. The joint protection protocol will be based on the arthritis foundation guidelines and the principles of joint protection. The protocol will be designed to meet the patient's needs. For example, the patient's job requires her to do a lot of typing and filing. Therefore, the protocol will include a time schedule for rest breaks, such as resting her hands flat on the table for 30 seconds every half hour. Patient will fill out the Functional Status Index to keep track of any changes that may have occurred during the week.

Week Four: Protocol will be reviewed by patient and therapist. Patient will fill out Functional Status Index.

Week Five: Same as week four.

Week Six: The Health Status Questionnaire and Functional Status Index will be filled out by patient to measure for any improvements in functional abilities and to determine if there was a decrease in pain.

The Functional Status Index is a test found in the public domain. I have received verbal permission from A. Jette (Dean of Allied Health at Boston U.). He told me the test was in the public domain, and I was free to use it. I have his office number and e-mail address if needed.

Thank-you,
Heather Raviv, occupational therapy student

Appendix E

Informed Consent

Improving Function While Living with Rheumatoid Arthritis

This form describes factors associated with my participation in a study involving the use of joint protection as a treatment for rheumatoid arthritis. The study aims to find out if joint protection decreases pain and increases functional abilities. I understand the following about the study:

(My participation)

1. I will learn about joint protection two weeks post establishing a baseline. I will participate in the joint protection protocol set up by the treating therapist.

2. I will do my best to comply with these techniques.

3. If I request it, a copy of the results of the study will be given to me.

4. My name will not be used in the study to preserve confidentiality.

Risks

1. Initially, I may find that following the principles of joint protection is more time consuming than
my regular routine.

Benefits

A. These techniques may decrease pain caused by rheumatoid arthritis
B. These techniques may increase my functional abilities and range of motion.
C. Future patients may benefit from what is learned in this study by my participation in this research.
D. I will receive occupational therapy services free of charge.

Discontinuation

I understand that I may discontinue my participation in this research at any time. I should notify the occupational therapist treating me of my decision.

_____ _____

subject date investigator date

SAGE GRADUATE SCHOOL

Troy, NY 12180

February 19, 1998

Heather Raviv
Russell Sage College
Box 1104
45 Ferry Street
Troy, New York 12180

Dear Ms. Raviv:

Your research project has been assigned 9862 as a file number. Any subsequent correspondence with the IRB concerning your study should reference this number.

The IRB review of your project indicates that subjects are not at risk, or appropriate steps have been taken to protect the subjects. You may proceed with your project.

If you have any questions, please contact the Graduate School office at 518/244-2264.

Sincerely,

Edward Hickling/nac

Edward Hickling Psy.d
Co-chair, Institutional Review Board

EH/nac

cc: Prof. Edward Hickling
Prof. Theresa Hand