Metacarpal-Phalangeal Arthroplasty: A Post-Operative Approach

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Metacarpal-phalangeal Arthroplasty: A post-operative approach

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A Scholarly Project
Submitted to the Occupational Therapy Department
of the
University of North Dakota
in partial fulfillment of the requirements for the degree of
Master of Occupational Therapy

Grand Forks, North Dakota
November 2006
This Scholarly Project Paper, submitted by Lance Norman in partial fulfillment of the requirement for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

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Department Occupational Therapy

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CHAPTER I
INTRODUCTION

Arthritis and its debilitating factors of pain and weakness affect 46 million Americans and limits activity in 17 million. It remains the leading cause of disability in the United States (National Center for Chronic Disease Prevention and Health Promotion, 2006). The disease further influences the function of the patient as it causes nearly one-third of those diagnosed to be unable to work after five years (Alderman, Chung, Kim, Fox & Ubel, 2003).

The primary categorization of arthritis is a systemic inflammation and disease that affects joints and surrounding tissues. It does not have a single factor regarding the cause however biological and genetic components are influential in its onset and progression. These changes occur at the cellular level including but not limited to the joint synovial lining and fluid. Degrading enzymes, synovial fibroblasts and lymphocytes also play into the degradation of the joint (Callahan, Mackin, Osterman, Skirven & Schneider, 2002).

The primary complaint of patient’s suffering with arthritic changes are pain, loss of range of motion (ROM) and weakness all resulting in decreased function. Energy level also decreases further exacerbating the symptoms by decreasing active ROM capabilities. These multi-faceted aspects of arthritis are increased by the instability that results from the disease in the affected joints (Davidson, Doyle, Highton, & Markham, 2005).

The benefits of improving joint alignment, strength and decreasing pain are documented in many research and journal articles. The advancements in pharmaceutical and surgical techniques has also improved patients overall outcomes (Beckenbaugh, Cook, Klawitter, Linsheid & Redondo, 1999). The approach however from a therapy
standpoint has had little change in both the treatment and terminology used. The timelines and progression to active ROM and even more so function are limited to vague and generic terms that are antiquated. The most comprehensive treatment approach to date was developed by the Hand Rehabilitation Center of Indiana. This most likely relates to the influence and contributions of certified hand therapists and hand surgeons to the text (Beal et al., 2001; Callahan et al., 2002). Thus the lack of a functionally based post-operative approach to joint replacement of the metacarpo-phalangeal (MCP) joint has prompted the need for further development of a program to address the limitations that currently exist.

The following scholarly project describes the Occupational Therapist’s (OT) approach to the pre and post-operative treatment of the MCP joint replacement. The treatment protocol is based on the review of literature including pre-morbid deficits and function, wound and scar management and splinting. The program is designed to be integrated into the comprehensive treatment and education of the patient affected with arthritis involving the MCP’s.
Chapter II

REVIEW OF THE LITERATURE

The diagnosis of arthritis and the pain associated with it create a challenge for the practicing OT and multidisciplinary team members who treat this destructive disease. The challenge is further exacerbated by the lack of consistent terminology and approach in the protocol language between the individual disciplines providing care to the patient. These discrepancies serve to limit the potential outcomes of the patient. The lack of occupation based terminology including activities of daily living create a barrier in instruction of exercise, precautions and contra-indications with the patient (Harkin, Kirwan, & Tooth, 2002). The vague use of the terms light, appropriate and moderate activity can evoke a variety of negative responses and non-compliance issues with the patient. This may also create an unconscious non-compliance with patients resulting in limited end ROM and functional performance of the limb (Alderman, Chung, Demonner, Hayward, & Spilson, 2002). Confusion over post-operative terminology and the need for clarity on what is meant by occupational based treatment in all aspects of rehabilitation is the focus of this scholarly project.

The following literature review describes the prevalence and etiology of the disease process of osteoarthritis (OA) and rheumatoid arthritis (RA). Aspects of rehabilitation and prevention are also described. It includes a discussion of current therapeutic and surgical interventions and specifically describes factors affecting recovery after surgery. These factors include the current approaches physicians and
therapists use in rehabilitation to describe functional outcomes and measure improvements.

According to the Center of Disease Control (2006) 20 million individuals in the United States are diagnosed with arthritis by their health-care provider. By 2030, 20 percent or 70 million people will pass their 65th birthday placing them at a greater risk for arthritis related deficits (Center for Disease Control, 2006). The incidence of arthritis is overall 0.3 to 1.5% in North America (Callahan et al., 2002). Arthritis in and of itself encompasses an array of statistical data and research that at times focuses heavily upon the pharmaceutical and surgical control of the disease while failing to address the occupational performance areas such as daily activity affected by the disease and the various interventions. Much has been learned from the standpoint of the disease process including its effects on the various tissue components including joint degradation, joint instability and pain (Callahan et al., 2002; Hills & Thomas, 1998).

The impact that arthritis has upon the patient is documented from a variety of factors. Studies have been completed to determine the effects including functional status (Aliabadi et al., 2002), compliance in hand therapy programs (Harkin et al., 2002), and a variety of post-operative responses. These studies have furthered the evidence that a uniform comprehensive approach to the post-operative care of the MCP is necessary.

The term arthritis encompasses many types of what are considered systemic diseases primarily affecting the articular cartilage and connective tissue (Hills & Thomas, 1998). These include lupus, gout, rheumatoid, osteo and psoriatic arthritis. For the
purposes of this scholarly project, the focus of the following post-operative metacarpal phalangeal (MCP) rehabilitation program will be limited to OA and RA. Pharmaceutical and surgical advances have greatly changed over the last 20 years yet the post-operative rehabilitation has changed very little (Hills & Thomas, 1998). This is also reflected in many articles of post-operative follow-up including the findings of Miehlke, Schmidt, Willburger, and Witt (1999) indicating a marginal overall increase in the active ROM in a ten year follow-up. The primary focus has been reduction of pain and addressing aspects of function has been secondary. This further exemplifies the need for a greater consistency in the post-operative approach to MCP arthroplasties.

Osteoarthritis is a disease based on changes in the joints of the body. Its primary effect is deterioration of the joint surface and new bone formation in the form of osteophytes. The joint changes are caused by metabolic, systemic, and traumatic influences. Hyper-mobility may serve as a catalyst to the onset of OA (Callahan et al., 2002). OA is more prevalent in females and research suggests that this may be associated with hormonal differences (Hallert, Hass, Skargen, Skogh, & Thyberg, 2003). Age factors also influence the disease, often with early signs and symptomology occurring in the distal interphalangeal joints (DIP’s). The effects of OA are typically localized in and around the joints and this is termed intra and extra-articular. The primary disease has relatively little inflammation however a secondary peripheral inflammation can be found in surrounding tissue. The joint changes alter the axis and fulcrum biomechanics and create intra and extra-articular instability and pain that reduce strength, ROM, and functional performance (Callahan et al., 2002).
The diagnosis of OA is classified as primary and secondary. Primary OA is localized to the joint surface. The secondary form is more erosive in nature and affects the synovium and creates joint erosion. It often is a response to trauma, hyper mobility, infection and other diseases (Callahan et al., 2002). Also the ability to perform functional tasks such as self-feeding or vehicle operation by the individual with OA is limited secondary to crepitus (joint noise and pain), triggering or adherence of tendons, loss of active and passive joint range of motion (AROM/PROM) and overall pain usually localized to the joint.

Rheumatoid arthritis is chronic in nature and more systemic through the body than OA. Women have a greater incidence than men and the typical onset usually occurs between 20-60 years of age (Callahan et al., 2002). The deficits associated with RA affect 2.1 million Americans and hand deficits are present in 70% of the population (Alderman et al., 2002). The current etiology of RA indicates that the early effects include decreased blood supply to the synovium and swelling of the endothelium. Synovium is a 1-2 cell thick membrane that provides lining and protection to the joint capsule (Callahan et al., 2002). There are two types of cells that are present in the synovium. Type A cells are a derivative of bone marrow while type B cells have a synthetic function that creates a lubricating component to the joint. An increase in the joint size is associated with the increase in cell layers secondary to the infiltration of hypertrophic cells. Lymphocytes and neutrophils also invade the joint capsule and create a matrix of damaging enzymes (Callahan et al., 2002). Protaglycan concentration in the joints is reduced and creates depletion in the force absorbing ability of the joints leading to mechanical deformation.
Over time these effects worsen and eventually include bone, ligaments, tendon and muscle (Hills, & Thomas, 1998). Its overall effect on the synovium is the driving factor in its debilitating effect on the patient and predominant ulnar drifting that occurs in the MCP’s. Early signs and symptomology of RA include sudden onset of joint swelling and inflammation (Callahan et al., 2002). Typically these changes present in the MCP and proximal interphalangeal (PIP) joints of the hands. The signs are often symmetrical and the joints take on an enlarged appearance in the form of hypertrophic synovial lining called pannus. In RA histological changes occur primarily in the connective tissue but also have general musculoskeletal involvement. The primary inflammatory condition includes joint destruction and systemic breakdown of the connective tissue leading to pain, joint and soft tissue instability and loss of functional performance (Alderman et al., 2002).

Both OA and RA progress in stages. These stages are based on the level of joint involvement including instability and radiographic changes being the determining factors. The treatment options continue to rise including pharmacological and surgical interventions and research on arthritis tends to focus on the advancements in technique and pharmaceuticals from a physician standpoint (Kerschbaumer, Porch, Rittmeister, & Starker, 1999). Davidson, Dole, Highton, and Markham (2005) compared functional measurements to radiological findings and they found a strong association between the functional outcomes and degree of joint deformity on radiograph. These differences found were in correlation to an anatomical hand index that primarily focused on hand alignment and dimensions. This has been used to determine the relationship of the
severity of arthritis to outcomes. It however once again demonstrates the incongruence in the current research and lack of true functional outcomes and the understanding of their meaning (Davidson, Doyle, Highton & Markham, 2005).

The current two most researched and widely used MCP joint replacement protocols regarding operative approach are the Swanson and pyrolytic carbon implants. The criteria for each are documented in literature (Beckenbaugh, Cook, Klawitter, Linsheid & Redondo, 1999). The Swanson implant has been shown to have a greater failure rate based on findings of post-operative follow-up yet still is widely used in the general population (Miehlke, et al., 1999). The failure rate of the actual silicone joint is associated with reactivity and breakdown by surrounding tissue rather than the actual silicone integrity. Also taken into account is the perspective of variance in the pre-operative work-up of the rheumatologist and orthopedic surgeon. It is noted the discrepancy that arises in what each physician sees as the most appropriate course of treatment (Alderman et al., 2002). This poses the question of performing less invasive or intensive surgeries such as a tenosynovectomy or removal of synovium, in lieu of the joint replacement. It is found that the orthopedic surgeon has traditionally performed more invasive surgical intervention on women quite possibly due to the higher and earlier incidence of occupational deficits. The replacement of the MCP is typically based on the radiographic findings, joint stability and the patient’s indicators of functional loss and pain.

The Swanson MCP joint arthroplasty in 1968 was the beginning of the research and treatment of MCP arthroplasty. This particular joint replacement introduced the use
of silicone joint replacement for the MCP joint and also initiated the discussion of the determining factors that would indicate the success of the joint replacement (Cooney, Meletiou, Sauerbier & Takigawa, 2004). The factors in the Swanson research focused only upon a subjective patient rating of good, fair and poor results along with radiographic and active/passive ROM. The term functional performance has been used in relationship to RA (Escalante, Haas, & Rincon, 2004) and measuring the outcome of function pre-operatively was addressed by (Machold, Ploner, Smolen, & Stamm, 2003). These findings focused on the use of the Moberg pick-up and Button Test with results indicating a greater relationship of the Moberg to the combined pinch and distal upper extremity function than the button test. Both however limited the scope of the patient’s function to a minimally intensive and limiting task or tasks. The introduction of function tests was utilized to enhance the ability to measure the arthritic effects. These tests of function included standardized grip, walking velocity, and a timed button test. Also the Modified Health Assessment Questionnaire, SF-36 Physical Function Scales and the Steinbrocker Functional Classification were used (Escalante et al., 2004). The results were placed into a Global Functional Performance Scale and indicated that the poly-articular nature of the disease caused multiple impacts on function. This information also however limited the ability to correlate functional activities of daily living terminology to post-operative care of the MCP joint replacement.

The incidence of both OA and RA are greater in women than men. Some attribute this to the greater complaint of occupational performance loss in women than men rather than actual physiological findings (Hallert et al., 2003). These researchers found men
and women initially had similar results following initial diagnosis on a health assessment questionnaire. It was after a timeframe of one year that women continued to regress with regard to performance and worsening pain. Age is an additional indicator in the effects of arthritis as evidenced by decreased grip strength and occupational performance. Also the results of the elderly findings included radiography and interviewer administered questionnaires (Aliabadi et al., 2002). The radiographic findings included osteophyte growth, joint narrowing, sclerosis and cystic changes occurring at the highest incidence in the DIP’s. A scale of the above changes was further utilized to determine overall joint involvement. The questionnaires included assessment of six basic activities of daily living. These included carrying ten pounds, eating, drinking, dialing a phone, taking ones medication and dressing and demonstrated a 9% and 17% incidence of functional impairment respectively for men and women.

Many factors affect the post-operative care of OA and RA. These include pre-morbid function, occupational performance requirements and psycho-social/cognitive aspects (Miehlke et al., 1999) described the impact of the MCP joint replacement on function including turning a key, opening a bottle, doing a button, washing oneself, use of cutlery and writing. The concern of the results was the high incidence 28 of 102 implants had either mal-rotation or fracture indicative of the necessity of a structured post-operative program with greater physician and therapist convergence. The results also reiterate the need to have functional education and terminology in the post-operative protocol. This certainly would enhance the outcomes and brings to the forefront the need for establishing a post-operative protocol for the (MCP) joint replacement that includes
timelines and functional-based activity and exercise that is shared by the physician, therapist as well as the patient. This is especially true of this arthroplasty secondary to the extensive and rigid post-operative protocol and complexity of the surgery techniques as well as the length of disease prior to the surgical intervention that many times is one decade or more (Miehlke et al., 1999).

Post-operative rehabilitation has significance in that the first 12-16 weeks it is crucial for establishing joint stability and congruity while promoting an increase in functional based performance (Beal et al., 2001; Beckenbaugh et al., 1999). This delicate balance requires greater consistency and a multi-disciplinary team approach for better functional outcomes. The OT and physician share the same goals yet the terminology and approach vary particularly post-operative. The vague use of the terms light use and appropriate activities of daily living are common among the current post-operative rehabilitation literature and further confuse the patient as to what the terms indicate. These approaches to early function are often implemented at four weeks post-operative but that also varies based on the literature (Burr, Pratt & Smith, 2002). The use of the above terminology places the OT in the position to educate the patient of all of the potential complications and precautions/contra-indications yet also promote early ROM and greater function (Brotzman et al., 2003). Prosthetic and donor tissue advances have allowed earlier engagement in functional performance activities. These advancements provide the ability to surgically treat at a younger age and timeline. This is primarily due to the advancements in prosthetic durability and surgical technique (Callahan et al., 2002). Historically physicians have determined the need for surgery based on a patient’s
level of pain and loss of function associated with the disease. This has placed the patient in a precarious position in that pain is a subjective measure often resulting in delayed surgical intervention and longer periods of unnecessary pain and occupational loss.

Recent research has documented improvements in occupational tasks and pain relief associated with joint replacement in the arthritic patient (Goldfarb & Stern, 2003). The post-operative treatment of the MCP joint replacement is an excellent example of the significant advancements that are currently used. Noted improvements include increased strength and expedited function with patients. The improvements as a whole have allowed the OT to begin sooner, treat more aggressively and have greater involvement in the occupational outcomes of the patient. This however also places the OT in the position of educating the physician, patient and family of the necessity to follow a post-operative protocol. Performance is further complicated by the variability in the post-operative treatment protocols currently published (Beal et al., 2001; Brotzman & Wilk, 2003; Callahan, 2002). The lack of functional based terminology diffuses the physician and patient interaction and may result in a decrease in the final functional outcome (Alderman et al., 2003). The concept of implementing functional based intervention based on clinical evaluation findings have been and are the root of the OT approach to treatment.

Today as the outcome based approach to treatment is greater there exists the need to address the functional based aspects of OT. This being said the traditional OT intervention has been based on clinical evaluation findings and ideally focuses on outcomes of the patient’s ability to engage in meaningful occupations. The difference in how a Physician prescribes treatment and how the therapist prescribes the program
creates an environment of great challenge as the post-operative pathways that are now implemented in many rehabilitation programs limit the individuality of the client-centered approach (Brotzman & Wilk, 2003). Each patient in this treatment approach has an expectation to recover in a timeframe established by a multi-disciplinary team to assure expedient discharge and fiscally responsible treatment.

The most current and widely used protocols of treatment post-operative of the MCP arthroplasty include the Rehabilitation of the Hand and Upper Extremity and also the Diagnosis and Treatment Manual for Physicians and Therapists (Beal et al., 2001; Callahan et al., 2002). These collectively present with the most generic and conservative approach to treatment. The emphasis however is on the splinting, wound/scar care and therapeutic exercise. Therapy goals primarily are to obtain optimal performance of activities of daily living. These two protocols do not define range limitations, force and overall occupational performance demands.

The current post-operative protocol information highlights the implementation of an edema reduction and wound/scar management program at day 5-7 (Beal et al., 2001). This is preceded by the post-operative dressing removal with the patient in an anti-edema position and implementation of compression to reduce edema. This compression is best achieved by implementing one inch compressive wrap such as Coban. A patient may find the need to seek assistance in application and take into account the need to promote supination of the fingers. Also a dynamic forearm-based MCP extension splint is to be worn daily alternating with a resting hand splint or using the resting hand each night. The dynamic splint angle presentation is critical in that the wrist requires 15 degrees
extension and padding to the ulnar head and dorsal aspect of the hand/fingers. A radial bar also is important to limit distal migration of the splint during use. Importance also lies in the need to provide dynamic support of the digits two through five in order to allow passive only digit extension for the first four weeks. Supination of digit two with an outrigger is also important to facilitate strong joint healing and minimize subluxation.

It is advantageous to block interphalangeal (IP) motion as to direct forces on the MCP’s (Upper Extremity Tech, update 2002). This further allows the collateral ligaments and surrounding tissue to mature through the inflammatory and fibroblastic stages as well as begin scar remodeling. Emphasis is placed on the need to provide a radial lateral pull to the digits to relieve the radial collateral ligament strain. This is due to ligaments being released and reattached in the Swanson implant. This angle of ulnar splinting is initiated immediately post-operative as well as at four weeks along with light prehensile activities and joint protection principles (Beal et al., 2001). These examples of post-operative rehabilitation are completed beginning in the first week post-operative.

Occupational therapy has its roots established in the analysis of activities of daily living and designing programs to increase occupational performance. Occupational therapists are involved in the establishment and direct treatment of the patient utilizing traditional and cutting edge techniques for intervention. The outcome measurements have shown that the interaction of the patient with their environment and engagement in occupation increase long-term performance (Cooney et al., 2004). The implementation of a comprehensive post-operative MCP program would serve to enhance the outcomes for the patient and create a better partnership between the therapists, patients and physicians.
Chapter two provided a review of current literature regarding the etiology and symptoms of OA and RA. In addition current therapeutic and surgical interventions were described. The chapter identifies the need for a more comprehensive functional rehabilitative and biomechanical approach. These areas are unique OT and provide an excellent framework in which to develop the post-operative protocol. Chapter three describes the methodology used to develop the post surgical protocol for MCP arthroplasties.
Chapter III

METHODOLOGY

Arthritis as a disease process affects many aspects of individual’s daily activities (Brauer, et al., 2005). The reduction in independent performance and subsequent reliance upon a support system further progresses the reduction in range of motion and strength. It is these aspects that come into play and often serve as a catalyst to the decision making process of the MCP arthroplasty.

Current and recent approaches to post-operative treatment of MCP arthoplasties have focused on the traditional approach to increase ROM and strength without adequately defining the structured process of how to achieve the best outcomes (Goldfarb & Stern, 2003). This has brought about the need to converge the anatomical and biomechanical aspects of post-operative care with the outcome performance increase in patients (Kjeken, Kvien, Slatowsky-Christianson & Uhlig, 2004). The convergence of these approaches has been the concept of this scholarly project. Previously each area has been addressed in specific arenas of literature and research yet the melding of the two has been virtually absent in treatment.

The literature review for this scholarly project was completed to include information from various entities. These included clinical-based textbooks, research articles, therapist written treatment approaches and journal articles. These information sources have provided rationale and clarity to the evident need for a uniform approach to the MCP arthroplasty take into account the high incidence of pre-morbid factors that
come into play. The use of outcome-based evaluations has been well presented (Hallert et al., 2003; Kjeken et al., 2004) yet how best to establish a treatment protocol to reach this level is where the project rationale lies.

The focus of the scholarly project is to develop a post-operative treatment protocol. The goal was to create a structured yet adjustable approach to treatment that encourages patient compliance and also increases functional outcomes. Emphasis was placed on consistency in the use of post-operative terminology that allows patients to begin activities of daily living and yet perform only within the confines of the contra-indications and precautions the surgeon's protocol has indicated. The patient exercises were designed using the Tool RG Physiotools program (Higginbotham, 2003). This program is designed for the therapists to individualize the treatment program for each patient.

Chapter four provides a summery of the protocol. Included are guidelines for assessing individual patients, suggested evaluation measures and post-operative treatment interventions and recommendations for implementation.
CHAPTER IV

PRODUCTS

OCCUPATIONAL THERAPY MCP JOINT REPLACEMENT PROGRAM

Based on the current literature on arthritis and the current pre- and post-operative approach to the MCP arthroplasty a treatment protocol was developed. This was established to treat the patient with a comprehensive and individualized program to enhance the functional performance of the patient i.e. activities of daily living. The protocol was also developed to protect the joints, regain ROM and increase strength. It also takes into account the preference of completing a pre-operative evaluation of the individual patient. The patient will have immediate feedback available of their pre and post-operative function and pain level. This will further enhance the outcome as each individual will have a baseline to be post-operatively evaluated against to enhance future literature and evidence-based outcomes.

The diagnosis of arthritis and the common deficits associated with it create an excellent opportunity to establish an MCP post-operative treatment protocol. The symptomology includes pain at rest as well as during active ROM and also during activities of daily living, weakness, loss of active and passive ROM and cosmetic soft tissue and joint changes. It is these varying and complex aspects that created the need for a more comprehensive treatment program.

The approach to the patient begins pre-operatively with an OT evaluation. This includes a physician referral and scheduling the patient for 75 to 90 minutes. The patient’s information assessed includes pain, active and passive range of motion, strength,
crepitus, activities of daily living, SF-36 health survey (Ware, 2000), and the patient’s perception of their anticipated outcome of the MCP arthroplasty.

The pain component is assessing the patient’s report of pain at rest, during active and passive ROM and while performing functional tasks. This may be completed with the verbal rating scale or visual analog scale (Callahan et al., 2001) (see Appendix A). Also the body image schematic may be used to further define the localized areas of pain (see Appendix A).

Tasks are assessed while completing various motions and positions. These include cylindrical grip, palmer, tip and lateral pinch. The weight is measured in ounces and pounds collaborating this with items of daily activity. The use of a force measurement gauge is implemented to assess the forces necessary to perform such tasks as pushing open doors, moving wheeled and no-wheeled furniture etc. This can be done in a structured format by always using the same door or doors, furniture and surfaces. Also tasks are completed utilizing the entire limb to lift and/or carry as well as isolating the wrist and hand. This can be done at various levels of work surface including floor, counter and overhead. To complement this portion of the evaluation the Jebson hand test, Minnesota Rate of Manipulation (Lafayette Instrument, 1998) and Purdue Pegboard (Lafayette Instrument, 1985) tests can be completed. These tests are an excellent approach to the fine two point pinch and overall functional deficits seen in the arthritic hand. A vast array of activities of daily living checklists or assessments is also available and provides additional support of pre-operative deficits.

The patient also participates in an arthritis program including instruction in energy conservation, joint protection and exercise. This includes the approach of joint neutral
function to limit joint stress as well as unloading the hand and arm as allowable to reduce stress. Enlarged or increased diameter handles are recommended to be used to decrease composite joint stress.

Assessment of ROM needs to specify the active and passive components of the entire upper extremity and in particular the ulnar drifting of the MCP’s. The patient’s verbal response as to their anticipated outcomes needs to be well documented. This will help decrease the discrepancy that at times occurs between the patient and multi-disciplinary team as to the post-operative protocol timelines and complexity (see Appendix A for evaluation outlines).

The patient is next scheduled five to seven days post-operative for the initiation of a comprehensive and time intensive initial visit. This may be scheduled over two to three visits as to allow the patient the ability to absorb and retain the program. The initial visit may be two to two and one-half hours. The visit is completed in a private one-on-one treatment area. The patient is asked if they have any further questions from the previous visit. The patient is then instructed in the necessity to perform no active ROM once the surgical dressing is removed. The patient is instructed in the anticipated look or nature of the wound. They are assured of the normal edematous nature and that the use of consistent compression will alleviate this. The surgical dressing is then removed utilizing the soft ulnar and radial aspect of the dressing to cut with a bandage scissor. The drainage noted at the surgical site is often significant and care is taken to remove the non-adherent without bleeding. A four by four dressing may be hydrated with sterile water or hydrogen peroxide to assist in dressing removal. The dressing at the proximal phalanges should be cut dorsally or volar to minimize abduction and decrease collateral ligament damage risk.
The need exists to re-iterate the complications that edema presents in the form of articular gelling and invasion of the joint area thus limiting ROM (Hills & Thomas, 1998). The wound is cleansed and the patient is instructed in daily dressing changes until the wound has no drainage. If the contra-lateral hand is also involved with regard to arthritic deficits the patient is encouraged to arrange daily assistance or is supplied with an adhesive one piece island dressing that can be applied one handed.

The dynamic MCP extension and static volar resting hand splints are now fabricated. Stockinet is placed onto the forearm and hand to protect the skin and absorb perspiration. The dynamic splint consists of the wrist placement in 15 degrees of extension using a one-eighth inch thermoplastic for strength. The dynamic extension pull is achieved with a number 18 rubber band to assure appropriate dynamic tension (Beal et al., 2001). The MCP should be placed in zero to ten degrees of extension and avoid hyper-extension. The radial pull of the outriggers are at 60 degrees to assure rest and healing of the radial collateral ligaments. Thermoplastic IP volar finger splints or two inch firm strapping may be implemented to assure focus on MCP flexion by placing the IP joints into extension. These are to be removed for IP flexion exercises four times per day.

The resting hand splint positions the wrist at 15 degrees extension and the digits in near full extension. This splint also is fabricated in one-eighth inch thermoplastic. Dividers are placed in each web space to assure alignment.

A splint home instruction sheet is supplied with specific physiological signs and symptoms to look for (see Appendix B). These include an increase in the dys-aesthesia that may already be present from edema or the incision site. Also monitoring redness of
the contact areas of every splint every two to four hours is explained. The wearing
schedule is given and emphasis is placed on the need to decrease the strap tension
especially on the dynamic splint as the propensity to create a line of congestion distal of
the dorsal aspect of the splint is evident (see Appendix B). This line often corresponds
with the MCP surgical site and adds to the difficulty with tolerance of splinting and MCP
area heating. Each splint is applied and removed by the patient to assure compliance and
understanding of the process (see Appendix B). A photo may be implemented to assist in
the correct application as appropriate splint fitting is essential.

The exercise program consists of hourly active ROM in the dynamic splint
completing MCP digit flexion. If the patient is unable to complete active ROM he/she
may assist by reducing tension on the outrigger rubber bands with the contra-lateral hand.
This can be achieved by pinching the rubber bands and reducing flexion tension during
the active ROM. The outriggers are removed four times per day and full composite
passive ROM is completed with emphasis on composite flexion 15 repetitions and a short
duration hold of 3 to 10 seconds. Also the MCP’s are isolated and passively stretched for
the same duration. Active ROM is also completed with the IP joints to encourage
musculo-tendinous excursion and limit adhesions. During ROM the patient is instructed
to limit pain to a four or five often on a verbal rating scale of pain. The pain also should
subside between each repetition and have overall minimal residual pain following the
program.

During splint changing from the night-time resting to the day-time dynamic splint or
visa-versa the patient is to complete elevation with the limb above the chest area and
completing manual edema mobilization. This is completed proximal of the edema and
progresses distally (Callahan et al., 2002). Instructional sheets are supplied for this also (see Appendix B). The scar is mobilized pending closure in ten to fourteen days. The importance of mobilization cannot be overemphasized as the adherence of the musculo-tendinous unit and sub-cutaneous tissue greatly reduces the active ROM arc and subsequent functional capabilities (see Appendix B). The mobilization pattern is circular, perpendicular and parallel over a five to seven minute period four times per day. Gentle mobilization is important due to the common skin integrity issues with long-term cortisone medications and the geriatric population.

If the patient is demonstrating a flexion lag with the MCP’s such as less than 50 degrees passively then a dynamic MCP flexion splint will be implemented to enhance the flexion arc. This is to be worn three to four times per day for 15 to 30 minutes. This splint is also fabricated of one-eight inch thermoplastic and is volar based. The outriggers are directly attached from the proximal phalanges to the volar aspect of the splint with a number eighteen rubber band force.

The initial program is completed through four weeks post-operative and if edema persists a partial fingered glove may be implemented to be worn at all times. Also at this time the dynamic extension splint is discontinued and a hand based ulnar deviation splint (Biese, J., 2002) is implemented. These are pre-fabricated in a neoprene but may also be fabricated from one inch soft strapping. Both provide a passive radial pull as well as volar support and are used consistently during the day for joint protection and pain control. Patients are instructed to complete pronated position palm down active radial abduction of the digits four times per day for 10 to 15 repetitions each time. It is at this point that the patient is also instructed in utilization of the ulnar deviation splint during sedentary
function (see Appendix B). Further instruction including verbal and therapeutic activities that encompass external force of one once to a few pounds during week four through eight is provided. These include performing functional activity such as handling grocery or miscellaneous items preferably in a forearm pronated or supinated position to limit ulnarward force on the MCP’s. Limits are placed with examples being 14 ounce soup or vegetable cans, toothpaste tubes, dressing with the exception of tight fitting socks, shirts or hosiery, and data entry on a computer etcetera (see Appendix B). The patient is instructed to frequently unload the hand each few to several minutes during activity i.e. hand writing with a two to three inch built-up handle and putting it down when not actually writing.

In week eight through twelve the patient is instructed to complete sedentary function of one to a several pounds. These tasks include the ability to drive an automatic transmission vehicle with power steering, all dressing tasks and ability to stir food items and use of a broom or broom rake. Dynamic MCP flexion splinting continues through 10 to 12 weeks. Grip strengthening is implemented three times per day in a forearm neutral position to stabilize the MCP’s and limits ulnar deviation for composite grip and opposition pinch at 10 to 15 repetitions. The force is limited to a few pounds based on the resistance of the foam block or putty.

The final phase of therapy is the 12 week period and beyond. The patient is progressed to sedentary activity of several to ten pounds. This includes handing of grocery items such as quarts of liquid, cookware using both limbs and laundry. A manual transmission vehicle may be utilized and the patient may complete light bilateral tasks
such as raking with a hard tooth rake, taking out garbage and carrying up to 10 pound items. (see Appendix B).
CHAPTER V
SUMMARY

This occupational therapy program was developed to treat the pre and post-operative MCP arthroplasty. It was designed to be implemented by the OT and/or certified OT assistant. It is meant to be an integral part of the treatment approach to the patient prior to and following the MCP joint replacement. This program will serve to supplement the rheumatologic and orthopedic treatment process including the non-operative candidate with regard to implementing an arthritis exercise and joint protection program.

The post-operative program was developed through current literature regarding rehabilitation of the MCP’s pre and post-operative. This included the approaches by the two primary Physicians who treat OA and RA, rheumatologists and orthopedics (Alderman et al., 2002). It also addressed the post-operative rehabilitation protocols currently addressed (Callahan et al., 2002; Goldfarb & Stern, 2003; Harkin, 2002). Research has found there is a high frequency of joint failure and/or fracture with this replacement and a more systematic approach to the treatment is supported (Kerschbaumer et al., 1999; Miehlke, et al., 1999). The program was designed to increase patient compliance, functional outcomes and evidence of the efficacy that exists in the multi-disciplinary approach to the MCP arthroplasty.

The program is limited in that there is a need to have inter-rater reliability in the pre and post-operative assessment. Functional items tested such as those included in the Jebson test are used to enhance assessment consistency. Also use of the force measurement gauge, tensiometer and dynamometer need consistency as to the items used.
or at least the same therapist pre and post-operative to correlate the measurements for comparison. This program is an adjunct to the many treatment options pre-operatively that are completed such as splinting, use of superficial thermal agents and direct clinical physician care.

The implementation of this program should focus on the capability of the OT to complete the pre and post-operative program and provide outcome based data (Burr et al., 2002). This would provide the therapist and the physician the educational data to help the patient in the difficult decision making regarding the surgical procedure. Also the direct treatment pre and post-operative would be completed by the OT providing seamless care and reassuring the patient of their progress. An entire simulation of the program would be available in written format along with examples of the wound/scar management and splinting. Examples are presented of the joint protection techniques and adaptive equipment available.

It is recommended that further functional performance assessments along with the deficits of arthritis continue to be researched specifically in the realm of OT. The measurability of function allows for establishing a baseline to prove efficacy of the MCP joint replacement (Aliabadi et al., 2002; Kerschbaumer et al., 1999). Also needed is the concurrence of the multi-disciplinary team regarding the detailed use of functional terminology and post-operative splinting/strengthening.
REFERENCES


APPENDIX A

EVALUATION CONTENTS:

HISTORY AND PHYSICAL
PAIN RATING SCALES
ACTIVITIES OF DAILY LIVING CHECKLIST; SF-36
EVALUATION OUTLINES

The following is the evaluation completed pre-operatively to demonstrate efficacy with the implementation of a comprehensive post-operative rehabilitation MCP arthroplasty protocol. Each pre-operative visit is scheduled for one hour. A patient is instructed to bring any prior splinting and treatment instruction previously obtained. Also any previous OT or Physical Therapy (PT) is reviewed.

Pain Assessment is completed utilizing the verbal rating scale (Callahan et al., 2002) this is determined or assessed at rest, during active rom, and with loading of the hand and limb during activities of daily living. Also a body scheme image may be utilized to assist in determining the location and perhaps referred pain areas of the body. A schematic of this is available in the Schultz Pain Questionnaire (Callahan et al., 2002).

Joint ROM is assessed by measuring it both active and passive. Also the beginning ROM must be noted as there often is a lag or contracture in many of the surrounding joints as well as the affected. The drifting often noted particularly in the MCP joints requires measurement utilizing the metacarpal shaft as the long arm and the PCP joint as the axis. The end range feel also should be assessed using the uniform terminology of manual therapy and joint mobilization (Brotzman et al., 2003). Grip and pinch need assessment including the standard protocol established by the American Society of Hand Therapists Assessment and book. In particular the lateral pinch will be
of post-operative interest followed by grip as each has greater strength in the replaced joint (Beckenbaugh et al., 1999). Three trials will be obtained for each of the grip and pinch measurements. The Minnesota Rate of Manipulation or Jebson test may be implemented along with one of many activities of daily living assessments including the SF-36.

Post-operative assessment retains much of the pre-operative except active ROM of the wrist and hand, and grip/ pinch strength, and end range feel assessment are not completed the first four weeks. The activities of daily living and Minnesota Rate of Manipulation as well as Jebson need post-operative completion as soon as protocol allows at four weeks.

Wound/scar assessment post-operative is paramount as the therapist is the primary discipline to follow the patient until week four. The use of the Marion Laboratory color chart is utilized (Callahan et al., 2002). The scale will use the terminology red, yellow and black. Also scar hypertrophy will be measured in comparison to the surrounding tissue. It is important that the wound is cleaned to assess the true base of epithelializing tissue along with what the need will be for the contact layer of dressing.
EVALUATION OUTLINES

PAIN VISUAL ANALOG SCALE

No pain                     Pain as bad it could be

How you feel right now:  /------------------------------------------------------------------------/
When you feel the best:   /------------------------------------------------------------------------/
When you feel the worst:  /------------------------------------------------------------------------/
The worst pain you ever felt: /------------------------------------------------------------------------/

VERBAL RATING SCALE OF PAIN

0 /------------------------------------------------------------------------/ 10

No pain                     Worst pain

The visual analog scale is completed by the patient and may be done on each visit to track pain reduction treatment efficacy. The verbal rating scale is also completed on each visit with the results documented. As previously indicated the verbal scale is effective in obtaining a pain at rest, with active ROM and during function as the protocol post-operative allows.
Name: (Last) ____________________________ (First) ____________________________ (Middle) ____________________________

Birthdate: (month/day/year) ______/______/______ Sex: □ Male □ Female

Phone: (_____) _______ - _______ Cell Phone: (_____) _______ - _______

**Patient Health History:**

Sure you receive a complete and thorough evaluation, please provide us with the important background information. If you do not understand any of the information, your therapist will assist you. Thank you!

**Have you EVER been diagnosed as having any of the following conditions?** (check all that apply)

- Injuries (if YES, what type: ______________________)

□ Heart problems
□ Asthma
□ Aneurysm
□ Alcohol or drug dependency (e.g., alcoholism)
□ Thyroid problems
□ Diabetes
□ Multiple sclerosis
□ Rheumatoid arthritis
□ Her arthritic conditions
□ Depression

**Have you ever been hospitalized?**

Please list any surgeries or other conditions for which you have been hospitalized, including the approximate date and reason for surgery or hospitalization:

<table>
<thead>
<tr>
<th>Surgery / Hospitalization / Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Describe any injuries for which you have been treated (including fractures, dislocations, sprains) and the approximate date of injury:**

<table>
<thead>
<tr>
<th>Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Have you been prescribed any PRESCRIPTION medication you are currently taking (including pills, injections, skin patches, etc.):**

<table>
<thead>
<tr>
<th>Prescription Drug</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Do you smoke?**

□ NO □ YES: (How much per day) ______________________

**Do you drink alcohol?**

□ NO □ YES: (How much per day) ______________________
Orthopedic History Form:

Name: ___________________ Age __ Date: __________

Any previous surgery at problem site? ______________________________
Dates? ______________________________

Location of Problem: ___________________ Onset Date: __________

If injury, describe briefly: _______________________________________
________________________________________________________________

(Please Circle)

Injury/Symptoms:
Did you feel a pop or tear? Yes No Unsure
Did your joint pop out? Yes No Unsure
Did you have weakness? Yes No Unsure
Did you continue activity? Yes No
Did it feel loose/unstable? Yes No

Prior Treatment:
Did you see a physician? Yes No MD Name: ____________
Were X-Rays taken? Yes No RX Name: ____________
Medication Prescribed: Yes No
Physical Therapy: Yes No
Injection(s): Yes No
Other Treatment?: __________________________

Symptoms/Complaints:
Pain- part of body:
Location front back top side inside outside
Severity (rate 1-10) sharp aching throbbing burning
Type of pain: pushing reaching walking running twisting lifting
Aggravated by: squatting kneeling stairs overhead-use throwing

Stiffness: None Occasional Frequent
Numbness/Tingling: None Occasional Frequent
Swelling: None Occasional Frequent
Grinding/Grating: None Occasional Frequent
Giving way/Buckling: None Occasional Frequent
Nighttime Pain: None Occasional Frequent

Present Overall Function? __________ % How far can you walk? __________
Can you climb stairs? _______ yes _______ no _______ with assistance _______ w/out assistance
Are you currently working? YES NO (if no) last day worked? __________
EVALUATION OUTLINES

PAIN VISUAL ANALOG SCALE

No pain  Pain as bad it could be

How you feel right now: /-----------------------------------------------/
When you feel the best: /-----------------------------------------------/
When you feel the worst: /-----------------------------------------------/
The worst pain you ever felt: /-----------------------------------------------/

VERBAL RATING SCALE OF PAIN

0 /-----------------------------------------------/ 10

No pain  Worst pain

The visual analog scale is completed by the patient and may be done on each visit to track pain reduction treatment efficacy. The verbal rating scale is also completed on each visit with the results documented. As previously indicated the verbal scale is effective in obtaining a pain at rest, with active ROM and during function as the protocol post-operative allows.
SF36 Health Survey

INSTRUCTIONS: This set of questions asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Answer every question by marking the answer as indicated. If you are unsure about how to answer a question please give the best answer you can.

1. In general, would you say your health is: (Please tick one box.)
   - Excellent □
   - Very Good □
   - Good □
   - Fair □
   - Poor □

2. Compared to one year ago, how would you rate your health in general now? (Please tick one box.)
   - Much better than one year ago □
   - Somewhat better now than one year ago □
   - About the same as one year ago □
   - Somewhat worse now than one year ago □
   - Much worse now than one year ago □

3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much? (Please circle one number on each line.)

<table>
<thead>
<tr>
<th>Activities</th>
<th>Yes, Limited A Lot</th>
<th>Yes, Limited A Little</th>
<th>Not Limited At All</th>
</tr>
</thead>
<tbody>
<tr>
<td>3(a) Vigorous activities, such as running, lifting heavy objects,</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>participating in strenuous sports</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3(b) Moderate activities, such as moving a table, pushing a</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>vacuum cleaner, bowling, or playing golf</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3(c) Lifting or carrying groceries</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3(d) Climbing several flights of stairs</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3(e) Climbing one flight of stairs</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3(f) Bending, kneeling, or stooping</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3(g) Walking more than a mile</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3(h) Walking several blocks</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3(i) Walking one block</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3(j) Bathing or dressing yourself</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health? (Please circle one number on each line.)
   Yes            No

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>4(a) Cut down on the amount of time you spent on work or other activities</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4(b) Accomplished less than you would like</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4(c) Were limited in the kind of work or other activities</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4(d) Had difficulty performing the work or other activities</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (e.g. feeling depressed or anxious)? (Please circle one number on each line.)
   Yes            No

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>5(a) Cut down on the amount of time you spent on work or other activities</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5(b) Accomplished less than you would like</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5(c) Didn't do work or other activities as carefully as usual</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
6. During the **past 4 weeks**, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups? (Please tick one box.)

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
</table>

7. How much physical pain have you had during the **past 4 weeks**? (Please tick one box.)

<table>
<thead>
<tr>
<th>None</th>
<th>Very Mild</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Very Severe</th>
</tr>
</thead>
</table>

8. During the **past 4 weeks**, how much did pain interfere with your normal work (including both work outside the home and housework)? (Please tick one box.)

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
</table>

9. These questions are about how you feel and how things have been with you during the **past 4 weeks**. Please give the one answer that is closest to the way you have been feeling for each item.

(Please circle one number on each line.)

<table>
<thead>
<tr>
<th>All of the Time</th>
<th>Most of the Time</th>
<th>A Good Bit of the Time</th>
<th>Some of the Time</th>
<th>A Little of the Time</th>
<th>None of the Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9(a)</strong> Did you feel full of life?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>9(b)</strong> Have you been a very nervous person?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>9(c)</strong> Have you felt so down in the dumps that nothing could cheer you up?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>9(d)</strong> Have you felt calm and peaceful?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>9(e)</strong> Did you have a lot of energy?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>9(f)</strong> Have you felt downhearted and blue?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>9(g)</strong> Did you feel worn out?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>9(h)</strong> Have you been a happy person?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>9(i)</strong> Did you feel tired?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

10. During the **past 4 weeks**, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives etc.) (Please tick one box.)

<table>
<thead>
<tr>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
</table>

11. How **TRUE** or **FALSE** is each of the following statements for you?

(Please circle one number on each line.)

<table>
<thead>
<tr>
<th>Definitely True</th>
<th>Mostly True</th>
<th>Don't Know</th>
<th>Mostly False</th>
<th>Definitely False</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>11(a)</strong> I seem to get sick a little easier than other people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>11(b)</strong> I am as healthy as anybody I know</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>11(c)</strong> I expect my health to get worse</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>11(d)</strong> My health is excellent</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Thank You!
APPENDIX B

PATIENT EDUCATION MATERIALS AND EXERCISE PROGRAM
AXIS CLINIC
METACARPAL-PHALANGEAL ARTHROPLASTY PROGRAM
TABLE OF CONTENTS

JOINT PROTECTION
PARAFFIN
EXERCISE GUIDELINES FOR ARTHRITIS
RANGE OF MOTION EXERCISE PROGRAM
SPLINT GUIDELINES
EDEMA (SWELLING) CONTROL
SCAR MASSAGE
SEDENTARY ACTIVITY AT 4 WEEKS
SEDENTARY ACTIVITY AT 8 WEEKS
SEDENTARY ACTIVITY AT 12 WEEKS
PINCIPLES OF JOINT PROTECTION ARE TO BE UTILIZED PRIOR TO YOUR SURGERY AND AT 4 WEEKS AFTER WHEN YOU ARE ABLE TO START TO USE THE HAND FOR ACTIVITY.

Use the strongest joint and largest muscle group possible for an activity.
Avoid using a tight grasp.
Enlarge handles on items used frequently.
Avoid prolonged periods of time being in the same position.
Maintain normal body weight. Excessive weight puts increased strain on weight bearing joints - back, hips, knees, and ankle.
Respect pain. Modify activities and rest as needed.
Joint protection

BJC HealthCare

The next 5 pages are instructions that you may use prior to your surgery as well as when approved after surgery to reduce injury to the joints.

Use a cart with wheels to carry heavy items such as a briefcase.
See larger joints. Carry your purse over your forearm, close to your elbow.

Use a well insulated cup. Place both hands around the cup securely and press palms together to carry.
lace an aerosol can in the palm of one hand and use the palm of the other to press the button on top.

Ise a butter knife and slide it through the ring of a soda can to provide more leverage to open it.
Use a key holder device or a built up handle on your keys to make locking and unlocking easier.

Use a built up handle or a larger, ergonomic type pen/pencil to make writing easier.
Se mitten type hot pads on both hands. Place one hand under the hot pan and one hand on the handle. This will decrease the force on the hand holding the handle.

Keep the palms of both hands turned upwards.

Open jars with your right hand and close them with your left hand if possible. Do not overtighten jar lids. Use a piece of non-stick material to assist in opening the jar.

Running the jar under warm water or tapping the side of the lid with a butter knife may also help loosen the lid.
OME PARAFFIN TREATMENT IS DONE FOLLOWING SUTURE REMOVAL AND WOUND HEALING. THIS WILL BE PRESCRIBED BY YOUR THERAPIST.

MATERIALS NEEDED:
- Hermostatically controlled units are also available for purchase.
- Paraffin - approximately 3 lb (1.5 kg). Paraffin can be purchased in the canning section of the grocery store.
- Mineral oil - approximately 1 cup. For each lb (0.5 kg) of paraffin, you will need 1/3 cup of mineral oil. Mineral oil can be purchased at a pharmacy.
- Note: Pre-mixed paraffin and oil are available at a medical supply store.
- Any thermometer. This is very important to check the temperature of the paraffin/oil mixture.
- Plastic bags - small sandwich size.
- Towels.
- Pillows.

INSTRUCTIONS:
Heat paraffin and mineral oil mixture to 125 degrees Fahrenheit (52 degrees Celsius) and definitely no hotter than 130 degrees Fahrenheit (54 degrees Celsius).
Continues...
move paraffin mixture from heat.

move any jewelry from your hand and wrist.

p your hand and wrist into the paraffin and remove it immediately allowing the paraffin to form a thin 'at. When the paraffin loses its shine, dip your hand in again.

p your hand and wrist 12 to 15 times.

AUCTION:
\( \text{not move hand and fingers while dipping to avoid cracking of the paraffin "glove". If there are cracks the glove the hot paraffin running through may cause a burn. Do not dip your hand and wrist into the paraffin if you are wearing any jewelry or if you have an open sore.} \)

rap hand and wrist in plastic bag and then with a towel to help retain the heat.

our hand should be elevated higher than your heart while the paraffin is on (rest it on a pillow). Keep e paraffin on about 20 minutes.

el the wax off and replace it in the cooker. Turn off the cooker.

erform one or more times per day as needed to help control pain.

HERMOSTATICALLY CONTROLLED UNITS
araffin units that heat the paraffin/oil mixture and keep it at the proper temperature are available for urchase.
re-mixed paraffin and oil are also available for purchase.
ontact a local or catalog based medical supply store for details.

ome cases, insurance may pay for this device if your physician recommends this as a medically essary device and writes a letter to the insurance company.
Arthritis is a disorder which can cause significant pain and disability involving the joints and muscles. Exercising is essential in arthritis with the main goals being to:

- Decrease pain.
- Help maintain normal joint movement, strength, endurance, and daily activities.

A proper program of exercise and rest can help prevent many of the restrictions which arthritis can cause. For exercise to be beneficial, the following guidelines must be followed:

- Do exercises every day, including good days and bad days.
- During exercise you may feel discomfort, even pain. A certain amount of pain is expected; however, if pain lasts more than one hour after finishing an exercise, decrease the number of repetitions performed.
- Decrease repetitions and avoid resistance when joints are severely inflamed.
- Several short periods of exercise during the day are better than one long period.
- Many of the exercises are stretching exercises. Always go through full range of motion to help prevent stiffness and loss of movement. Do exercises slowly and completely.
- Do not substitute daily activities for exercise.
- Alert your doctor or therapist if you develop new problems with movement in the future.

Therapy may be able to help you with your arthritis in other areas as well:

- Instruction in posture, body mechanics.

(Continues... )
Continues)

Selecting appropriate assistive devices and splints to help protect your joints.
Use of physical modalities such as heat and cold.
Instruction in need of balance between activity and rest.
The above shoulder exercise is to begin on your first therapy visit. The objective is to reduce the

ance of stiffness due to lack of active range of motion.

tarting position

tand with your feet approximately one foot away from the wall. Start with your elbows bent. Place the
nail finger side of both hands on the wall in front of you.
Standing position

Lift both of your arms up the wall to a V position. Be careful not to shrug your shoulders too much.

Lift both of your arms to the same level on the wall. Move up only as far up the wall as your affected arm will go.

Your therapist suggests, lift your arms off of the wall slightly, tightening your shoulder blade muscles. Do not let your elbows bend or your back arch. Tighten your stomach muscles to help keep your body moving.

___ seconds, ___ repetitions, ___ times per day

After each repetition of the exercise, slide your arms back down the wall and relax.
The above shoulder exercises are to begin on your first therapy visit. The objective is to reduce the nuisance of stiffness due to lack of active range of motion.

1 starting position

tart with your affected arm slightly away from your side. Turn your arm so your palm faces backwards.
1 ending position

ing your affected arm up and across your body. As you move your arm, turn your arm so that your arm now faces your body. Keep the rest of your body from rotating.

our therapist may suggest that you add a light weight or exercise band.

___ seconds, ___ repetitions, ___ times per day

2 starting position

Start with your affected arm turned inwards with your hand in front of your other pocket (as though you were trying to get something out of your pocket).

Keep your upper body straight.
ending position

Bring your arm up and out away from the side of your body. Turn your palm so it now faces you as you move your arm.

Keep your body from rotating.

Your therapist may suggest that you add a light weight or exercise band.

___ seconds, ___ repetitions, ___ times per day
Active range of motion for the elbow

The above elbow exercise is to begin on your first therapy visit. The objective is to reduce the chance of stiffness due to lack of range of motion.

Stand with your arm by your side. Bend your elbow as far as you can with your palm facing upwards. Keep your forearm in line with your upper arm and not turned outwards or inwards as you bend your bow.

___ seconds, ___ repetitions, ___ times per day
Active range of motion for the forearm

Starting position

Art with your arm by your side and your elbow bent to a 90 degree (right) angle.
Starting position

Bring your palm upwards as far as possible. Keep your elbow next to your chest and do not let it move across the front of your body.

____ seconds, ____ repetitions, ____ times per day

Starting position

Start with your arm by your side and your elbow bent to a 90 degree (right) angle.
C HealthCare

ding position

rn your palm downwards as far as possible. Hold your arm tightly by your side, and do not let your
how move away from your body.

__ seconds, ____ repetitions, ____ times per day
Active range of motion for the wrist

The above wrist exercises are to begin on your first therapy visit. The objective is to reduce the chance of stiffness due to the lack of active range of motion.

Rest affected hand and wrist off the table. Keep the arm on the table. Move your hand down as far as possible bending at your wrist yet allowing your fingers to straighten.

___ seconds, ___ repetitions, ___ times per day
Rest the affected hand and wrist off of the table. Keep the arm on the table. Move your hand up as far possible bending at your wrist and letting your fingers relax. Your fingers will naturally stay in a bent position if they are relaxed.

___ seconds, ___ repetitions, ___ times per day
The above finger exercises are to begin on your first therapy visit. The objective is to reduce the chance of stiffness due to the lack of passive range of motion. These will continue for the first 4 weeks.

End your knuckles as far down as you can with your unaffected hand.

___ seconds, ____ repetitions, ____ times per day
Se your other hand to help position your hand as shown. Try to bend the top and middle knuckles, letting the end knuckles (those closest to the nails) stay straight.

___ seconds, ___ repetitions, ___ times per day

With your unaffected hand assist in making as tight a fist as possible.

___ seconds, ___ repetitions, ___ times per day
Active range of motion for the fingers

JC HealthCare

ake a fist only in the dynamic splint for the first 4 weeks being sure each joint bends as much as possible. Allow the dynamic splint to straighten the fingers.

___ seconds, ___ repetitions, ___ times per day
Active range of motion for the fingers

ake a fist, being sure each joint bends as much as possible. Only do this in the neoprene splint fitted the 4 week mark after surgery. Remember prior to this time only make a fist in the dynamic splint that u receive on your first therapy visit.

___ seconds, ___ repetitions, ___ times per day
Active range of motion for the fingers

JC HealthCare

ake an "O" by touching thumb to fingertips one at a time. This exercise is to be done only in the loprene splint at 4 weeks after surgery.

__ seconds, __ repetitions, __ times per day
Active range of motion for the fingers

Make a "tabletop" with fingers by keeping the wrist and the end and middle joints of the fingers straight and bending only at large knuckles (closest to the wrist). This exercise is to be done only in the spica splint at 4 weeks after surgery.

___ seconds, ___ repetitions, ___ times per day
Active range of motion for the fingers

ace putty in the palm of the hand and dig the fingers into the putty until they press through to the ilm. These exercises are to be done with a soft exercise putty only in the neoprene splint at 4 weeks ter surgery.

___ seconds, ____ repetitions, ____ times per day
IC HealthCare

Use putty at base of the fingers and squeeze only with the fingertips while keeping the palm of the hand open.

___ seconds, ___ repetitions, ___ times per day
Active range of motion for the fingers

ith palm flat on table, raise and lower fingers one by one. This exercise is to be done in the neoprene lint at 4 weeks after surgery. This is an important exercise in that it strengthens the tendons that were volved in the surgery.

__ seconds, ____ repetitions, ____ times per day
PLINT INSTRUCTIONS-STATIC (THERMOPLASTIC) THIS IS THE SPLINT YOU WEAR AT NIGHT

PURPOSE
___ Protect ___ Protect and immobilize

WEAR
___ At all times, remove for hygiene/exercise ___ times per day
___ All night only
___ All night and during the day as necessary
___ Wear ___ times per day for ___ minutes, and gradually increase wearing time to ___ minutes.
___ Other: __________________________________________

RECAUTIONS:
the splint causes any of the following problems, contact your therapist so the splint can be adjusted.

Pressure areas/red areas or skin problems
Increased pain
Increased swelling

While wearing your splint, adjust the straps. The straps on your splint should be snug but not tight.

To reduce swelling, keep arm elevated as much as possible, above the level of your heart is ideal, use pillows.

Exercise ___ shoulder ___ elbow ___ wrist ___ fingers as directed by your therapist.
Continues...
Continues)

Exsanguination is a problem you can wear stockinette over your arm, or apply powder/cornstarch to your arm or the splint before putting it on. NEVER use powder/cornstarch if an open wound/incision is present. If you use stockinette, wash it daily by hand with a mild soap and let it dry flat. Do not put the stockinette in the washer or dryer.

RE:
- Clean the splint with warm water and a mild soap and wipe inside with rubbing alcohol daily. This will help decrease any odor.
- Clean the outside of the splint as needed with warm soapy water and rinse or use a cleaner (such as Simple Green). Wash the straps as needed with warm soapy water, rinse them out, and dry flat.
- Never leave the splint in a hot place, like a dashboard of a car, or on a radiator, as it can melt.
- Bring your splint(s) EVERY time you come to therapy.
- Do NOT try to modify the splint by yourself at home.
- If there are problems or questions regarding your splint or splint program, contact your therapist.
PLINT INSTRUCTIONS - DYNAMIC, THIS IS THE SPLINT YOU WEAR DURING THE DAY

PURPOSE
- Increase motion

WEAR
- Wear ___ times per day for ___ minutes, and gradually increase wearing time to ___ minutes.

THERAPY: __________________________________________ __

PRECAUTIONS:
- If the splint causes any of the following problems, contact your therapist so the splint can be adjusted.

- Pressure areas/red areas or skin problems
- Increased pain
- Increased swelling

- Some increased soreness is to be expected with wearing a dynamic splint, but it should not be severe. Contact your therapist if questions.

- While wearing your splint, adjust the straps. The straps on your splint should be snug but not tight.

- To reduce swelling, keep arm elevated as much as possible.

- Exercise ___shoulder ___elbow ___wrist ___fingers as directed by your therapist.

Continues... )
Continues

Erosion is a problem you can wear stockinette over your arm, or apply powder/cornstarch to your
in or the splint before putting it on. NEVER use powder/cornstarch if an open wound/incision is
sent. If you use stockinette, wash it daily by hand with a mild soap and let it dry flat. Do not put the
skinette in the washer or dryer.

RE:

an the splint with warm water and a mild soap and wipe inside with rubbing alcohol daily. This will
ip decrease any odor.

an the outside of the splint as needed with warm soapy water and rinse or use a cleaner (such as
le Green). Wash the straps as needed with warm soapy water, rinse them out, and dry flat.

ver leave the splint in a hot place, like a dashboard of a car, or on a radiator, as it can melt.

ing your splint(s) EVERY time you come to therapy.

OT try to modify the splint by yourself at home.

here are problems or questions regarding your splint or splint program, contact your therapist.
Neoprene splint

IC HealthCare

\*\*\* INSTRUCTIONS STATIC, PRE-FABRICATED THIS IS THE SPLINT YOU WILL WEAR AT 4 WEEKS AFTER SURGERY. IT IS TO BE WORN DURING ALL ACTIVITY PRESCRIBED BY YOUR THERAPIST.

PURPOSE

- Protect ___ Protect and immobilize

EAR

- At all times, remove for hygiene/exercise ___ times per day
- All night only
- All night and during the day as necessary
- Wear ___ times per day for ___ minutes, and gradually increase wearing time to____ minutes.
- Other: ____________________________

RECAUTIONS:

- The splint causes any of the following problems, contact your therapist so the splint can be adjusted.

- Pressure areas/red areas or skin problems
- Increased pain
- Increased swelling

- While wearing your splint, adjust the straps. The straps on your splint should be snug but not tight.

- To reduce swelling, keep arm elevated as much as possible, above the level of your heart is ideal, use illovs.

Continues...)}
Exercise shoulder elbow wrist fingers as directed by your therapist.

Exsanguination is a problem you can wear stockinette over your arm, or apply powder/cornstarch to your arm or the splint before putting it on. NEVER use powder/cornstarch if an open wound/incision is present. If you use stockinette, wash it daily by hand with a mild soap and let it dry flat. Do not put the stockinette in the washer or dryer.

RE:

Our splint has a metal bar, remove it before washing the splint.

Rinse the splint by hand (not in the washing machine) in the sink using warm soapy water. Rinse with water and dry the splint on a flat surface. Replace the metal bar after the splint dries.

Clean your splint(s) EVERY time you come to therapy.

Do NOT try to modify the splint by yourself at home.

If there are problems or questions regarding your splint or splint program, contact your therapist.
Edema/swelling techniques

JC HealthCare

ANAGEMENT OF EDEMA/SWELLING WILL BEGIN AT YOUR FIRST THERAPY VISIT AFTER JRGERY.

Swelling can cause pain and decrease your ability to move your hand as easily as is normal. Swelling can make you form more scar tissue. You have some control over the amount of swelling you have in your hand.

WAYS TO HELP CONTROL SWELLING:

Elevation: Keep your hand elevated above the level of your heart as much as possible. Swelling is like water. It runs downhill. It takes two hours of holding your hand up to decrease the edema caused by each minute of having your hand down.

Massaging: You can help decrease swelling with massage -- like pushing toothpaste out of a tube of toothpaste. Massage from the fingertips towards the wrist. Keep your hand elevated while you massage it. Massage for at least 10 minutes, ___ times per day.

Compression: Your therapist may provide you with an compressive glove, self adherent wrap (such as Coban or Reflex type), an elastic bandage (such as Ace wrap), or elastic finger compression sleeve to help decrease swelling. These compression devices apply pressure to the outside to prevent build up of fluids. These should be worn as directed by your therapist.

Vear ________________________________________
Scar massage

AR MASSAGE

Scar massage is to begin after your stitches are removed and the wound heals to a scar. Your therapist will instruct you as to when you should begin.

Your body heals, following an injury or surgery, it forms scar tissue. Scarring is good in that it closes unds, but heavy, binding scar can prevent normal hand function. To gain a soft, supple scar that allows good movement of the hand, the scar must be stressed. You can stress and remodel your scar performing a variety of scar massage techniques. The following should be done frequently during the day.

1. Scar with thumb or one or two fingers using circular, up and down and sideways motion with firm, deep pressure. Perform massage slowly, allowing tissues to stretch. Do not just slide over the skin.

2. Separate skin from tissue below by pinching skin between fingers and thumb. Roll skin between fingers.

3. Scar with golf ball, twisting the ball to really grip the skin.

4. Vibration on scar. Any small electric appliance that vibrates, such as the handle of an electric aver or an electric toothbrush can be used on the scar.

5. Trogressive massage. As you straighten your fingers, rub the scar towards your _______. As you bend your fingers, rub the scar towards your _______.

6. Scar massage for _____ minutes, _____ times per day.
Sedentary week 4-8

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SEDENTARY ACTIVITY GUIDELINES AT FOUR WEEKS FOLLOWING SURGERY

You are now allowed to perform these activities with your affected arm. Beginning these activities will allow you to start using the hand. The first time you use your arm for a new activity you may have some light soreness. If you have pain for more than one hour after performing an activity or the pain is severe, you are not yet ready to perform that activity.

EXAMPLES:

ASHING AND DRESSING

You are allowed to:
- Wash your hair
- Apply lotion
- Shave
- Pull on loose clothing

You are not allowed to:
- Put on heavy boots
- Put on jeans or tight pants
- Put on pantyhose

DRIVING

You are not allowed to:
- Drive a car
- Change a tire

Continues...
Continue:
Perform repairs on a car

CARRYING
You are allowed to:
Pick up items weighing less than one pound (0.5 kg)

You are not allowed to:
Pick up items weighing one pound or more
Serve the cart
Terry the grocery bags

OKING AND EATING
You are allowed to:
Rin and dry cups, utensils and small plates, bowls etc.
Serve a fork to eat

You are not allowed to:
Serve plates, pots and pans
Serve a knife to cut difficult-to-cut foods
Serve pots and casserole dishes
Perform heavy chopping

UNDRY
You are allowed to:
Add clothes into the washing machine
Tidy laundry that is dry
Put laundry away

You are not allowed to:
Take wet laundry out of the washer
Ring out wet laundry
Terry the laundry basket

RD WORK
You are allowed to:
Perform sedentary tasks less than one pound of force

You are not allowed to:
Gather
Hoe, dirt or snow
Use shears
Use the lawn mower or weed eater

LEANING
You are allowed to:

You are not allowed to:
Vacuum
Move heavy items
Move furniture
Use a scrub brush
Fill a pail of water
Sedentary week 8-12

DENTARY ACTIVITY GUIDELINES AT EIGHT WEEKS FOLLOWING SURGERY

You are now allowed to perform these activities with your affected arm. Remember that these activities are only completed with the ulnar drift splint that has been fitted at four weeks post-operative. The first time you use your arm for a new activity you may have some slight soreness. If you have pain for more than one hour after performing an activity or the pain is severe, you are not yet ready to perform that activity.

SAMPLES:

ASHING AND DRESSING

You are allowed to:
- Wash your hair
- Apply lotion
- Have
t- Roll on loose clothing
- Put on panty hose

You are not allowed to:
- Put on heavy boots
- Put on jeans or tight pants

DRIVING

You are allowed to:
- Drive an automatic transmission car with power steering

Continues...
Continues)

I am not allowed to:
- drive a stick-shift car or one without power steering
- change a tire
- perform repairs on a car

CARRYING
I am allowed to:
- pick up items weighing less than three to five pounds (1.5 to 3 kg)

I am not allowed to:
- pick up items weighing five pounds or more
- carry the cart
- carry the grocery bags over five pounds

OKING AND EATING
I am allowed to:
- ash and dry cups, utensils and small plates, bowls etc.
- use a fork to eat
- ash plates, pots and pans

I am not allowed to:
- use a knife to cut difficult-to-cut foods
- carry pots and casserole dishes
- perform heavy chopping

UNDRY
I am allowed to:
- add clothes into the washing machine
- add laundry that is dry
- put laundry away

I am not allowed to:
- take wet laundry out of the washer
- ring out wet laundry
- carry the laundry basket

RD WORK
I am allowed to:
- perform sedentary three to five pound tasks

I am not allowed to:
- rake, hard tooth
- hovel, dirt or snow
- use shears
- use the lawn mower or weed eater

LEANING
I am allowed to:
- dust
- put small items away
- vacuum

I am not allowed to:
- continues... )
Continue

- One heavy item
- One furniture
- One scrub brush
- A pail of water
Sedentary week 12 and beyond

Sedentary Activity Guidelines at 12 Weeks Following Surgery and Beyond

You are now allowed to perform these activities with your affected arm. The ulnar drift splint will be continued to be used. The first time you use your arm for a new activity you may have some slight eness. If you have pain for more than one hour after performing an activity or the pain is severe, you are not yet ready to perform that activity.

Examples:

Shing and Dressing
- Are allowed to:
  - Wash your hair
  - Apply lotion
  - Take
  - Jill on loose clothing

Living
- Are allowed to:
  - Drive an automatic or manual transmission car with power steering
- Are not allowed to:
  - Change a tire
  - Perform repairs on a car over ten pounds
  - (continues... )
OPPING
are allowed to:
\* pick up items weighing less than seven to ten pounds (3.5 to 6.5 kg)

are not allowed to:
\* pick up items weighing ten pounds or more
\* try the grocery bags over ten pounds

OKING AND EATING
\* are allowed to:
\* wash and dry cups, utensils and small plates, bowls etc.
\* use a fork to eat

\* are not allowed to:
\* carry industrial level cookware or large family meal food items

JNDRY
\* are allowed to:
\* add clothes into the washing machine
\* load laundry that is dry
\* put laundry away

\* are not allowed to:
\* carry the laundry basket over ten pounds

RD WORK
\* are allowed to:
\* perform all sedentary tasks ten pounds or less

\* are not allowed to:
\*ake in hard soil
\*ovel, dirt or snow over ten pounds
\*she shears only on small branches
\*e the lawn mower on incline or declined surfaces

LEANING
\* are allowed to:
\* just
\* put small items away

\* are not allowed to:
\* move heavy items
\* move furniture
\* lift a pail of water over ten pounds