Multidisciplinary team evaluation of upper extremity injuries in a single visit: the UPPER Program

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Musculoskeletal disorders are the leading cause of disability among people between 18 and 64 years of age. Patients with musculoskeletal injuries of the upper extremities are usually evaluated and treated by an individual physician and therapist. However, for patients who have problems, especially after being treated by a hand surgeon and a certified hand therapist, there are few other management options. A multidisciplinary assessment program for patients with chronic upper limb pain has not been described in the literature. As part of The University of Michigan RERC (Rehabilitation Engineering Research Center), the UPPER Program (UPper extremity Protocol Evaluation in Rehabilitation) was developed to evaluate patients who have disabling upper limb musculoskeletal disorders. At the center of the program is a multidisciplinary team composed of a physiatrist (physical medicine and rehabilitation specialist), occupational therapist, physical therapist, exercise physiologist, vocational counselor and pain psychologist. The UPPER Program elements include a pre-evaluation questionnaire, individual team member assessments and a team meeting. It is followed by a patient appointment with the team physician to review the results and recommendations. The essential details of the program are presented in this article so it can be reproduced elsewhere.

Key words: Arm injuries; cumulative trauma disorder; patient care team; vocational guidance.

Introduction

Musculoskeletal disorders are the leading cause of disability among people between 18 and 64 years of age [1]. It has been estimated that the total costs of these disorders in 1984 (one-third of which were due to upper extremity conditions) exceeded $65 billion [2]. In 1989, the total direct US workers’ compensation costs for upper extremity carpal tunnel syndrome were estimated to be $563 million [3].

Patients with musculoskeletal injuries of the upper extremities are usually evaluated and treated by an individual physician and therapist. However, for patients who continue to have problems, especially after being treated by a hand surgeon and a certified hand therapist, there are currently few other management options. There has been one report of a multidisciplinary treatment approach for repetitive use syndrome where all patients received medical management with medications, occupational therapy with workplace simulation and job-site evaluations, and psychological treatment with pain management and biofeedback training [4]. Following this treatment, 54% of the patients returned to their previous jobs. The result of this study is not generalizable to all patients with upper extremity musculoskeletal disorders since 83% of the cases were related to occupational computer keyboard use. Another, more comprehensive multidisciplinary rehabilitation program for chronic work-related upper extremity disorders included physical conditioning, work conditioning, work-related pain and stress management, ergonomic consultation and vocational counseling/placement [5]. Results of the program revealed that 74% of patients returned to work or were
involved in state-supported vocational training, in contrast to 40% for the control group.

A multidisciplinary assessment program for patients with chronic upper limb pain has not been described in the literature. However, an out-patient multidisciplinary evaluation program has been shown to help with functioning and quality of life in patients with chronic neurological and general musculoskeletal conditions [6].

As part of the University of Michigan RERC (Rehabilitation Engineering Research Center), the UPPER Program (UPPer extremity Protocol Evaluation in Rehabilitation) was developed to evaluate patients who have disabling upper limb musculoskeletal disorders. We present the essential details of the program in this article so that it can be reproduced elsewhere.

**The UPPER Program**

At the center of the program is a multidisciplinary team composed of a physiatrist (physical medicine and rehabilitation specialist), an occupational therapist, a physical therapist, an exercise physiologist, a vocational counselor and a pain psychologist. The patients are referred for an assessment if they continue to have significant symptoms after they have received treatment from a hand surgeon and either a certified hand therapist or physical therapist. The UPPER Program elements include a pre-evaluation questionnaire, individual team member assessments and a team meeting. It is followed by a patient appointment with the team physician to review the results and recommendations.

**Pre-evaluation questionnaire**

Prior to the initial visit, the patient is mailed a questionnaire to fill out that includes validated psychometric questionnaires and questions regarding his/her medical history, demographics, current and past therapy, medications, and current functioning in activities of daily living (ADLs). The psychological questionnaires used include the CES-Depression Scale [7], the Pain Disability Index [8], the Visual Analog Pain Scale [9], the Multidimensional Pain Inventory [10], the SF-36 [11] and the Tampa Scale of Avoidance and Fear [12,13].

**Individual team member assessments**

The patient is scheduled for a one-time evaluation consisting of a half day of appointments. The physical therapist, occupational therapist, pain psychologist and physician each have an hour allotted; while the vocational counselor and exercise physiologist each spend 30 min with the patient. A significant portion of the time is spent obtaining data on a standardized database set up by each discipline. This standardization encourages team members to avoid any overlap in data collection. However, each therapist is free to use his/her own judgement to devote more time to any part of the examination he/she feels is necessary and will contribute to the patient’s care.

The physical therapist evaluates the patient’s spine and scapular alignment, scapular stabilizer muscle strength, spine and upper extremity passive range of motion, muscle tightness, and spinal and rib joint restrictions. The occupational therapist evaluates ADLs, upper extremity fine and gross motor skills, distal upper extremity strength, sensation, current splint type/wear schedule and the patient’s perceived functional limitations, and administers the Progressive Isoinertial Lifting Evaluation [14]. The physician evaluates the patient’s medical history, social history, review of systems, strength, sensation and reflexes, and administers specific tests to look for tendinitis, bursitis or other medical problems that may be causing the patient’s symptoms. The exercise physiologist evaluates the patient’s cardiovascular risk factors and administers a submaximal bicycle ergometer cardiovascular assessment. The vocational counselor assesses the patient’s educational background, work history, social stressors, avocational interests and legal issues. The pain psychologist bases his/her assessment of psychological disorders and psychological barriers to functioning on the integration of psychometric test data and information obtained in the clinical interview.

**Team meeting**

After the assessments are completed and the questionnaire items are scored, the team members assemble for a 30 min team meeting. Each team member presents relevant findings, and a list of recommendations is developed by the team. Emphasis is placed on improving the patient’s functioning and quality of life.

**Patient meeting**

After the team meeting, the physician and the patient meet for 30 min to discuss team recommendations. The patient is made to feel comfortable to accept, reject or modify any or all of the recommendations. Based on the decisions made by the physician and the patient, appropriate referrals are then made.

**Documentation**

Documentation for each therapy is designed to be simple and efficient for the internal records. Because many of the individual therapist evaluations are standardized, standardized forms are used to record the data from the evaluations. The forms used are given in the Appendix. The forms are copyrighted, but may be freely copied and used for the purpose of clinical care by any practitioner trained in the particular discipline addressed by that section.
The physician dictates a comprehensive summary report. It begins with a brief identifying paragraph, summarizes the findings of each individual therapist, summarizes the goals of the patients, and closes with a list of concrete goal-directed recommendations.

Discussion

An initial trial of 10 subjects demonstrated that the program was carried out smoothly. The questionnaire gave the team members quick baseline information about the patient’s level of functioning prior to the evaluation, allowing the team to be more efficient and avoid duplication of effort by the different team members. This was evident in a few cases where the patient forgot to bring the forms with them, and team members had to ask duplicate questions in order to complete their individual assessments. After a brief learning period, each team member was able to complete the evaluation within the time allotted. Occasionally, a patient was not able to perform an assigned task due to pain or fatigue. In these instances, the therapist did not force the patient and reported the reason for not completing the task to the team.

The 30 min for the team meeting were more than adequate and the meetings usually finished early. The team meeting was run by the physician, but could just as easily have been run by any of the other team members. For about half the cases, the physician’s input was not felt to be necessary. For the other half, physician input was important for patient care.

In our program, the physician dictates the 15 min summary report. In a busy practice, this task could also be carried out by the vocational counselor or any other team member, since it summarizes what was presented then closes with the list of recommendations made at the team meeting.

The charges for this program are based on the time each team member spends with the patient. The total cost of the assessment varies according to insurance schema and billing policies. (For the purposes of this grant, the vocational counselor’s time was free.) In actual practice, total charges would include 30 min each of physiotherapy, occupational therapy and vocational rehabilitation, plus appropriate charges for each discipline to attend the team meeting. The psychologist charges for a 1 h visit. Typically, the physician would bill for a detailed or comprehensive consultation plus a brief follow-up visit with the patient. Total Medicare billing at our institution in 2000 would be approximately $650. If the cost of work disability is estimated at $100/day, this assessment would be cost-effective if it resulted in 6–7 fewer days of liability for work disability.

Conclusion

The UPPER Program allows the patient to be seen by all members of a multidisciplinary team in a short time frame, thus providing the patient with a more organized, cost-saving method of care. The team members are better able to develop creative recommendations for the patient, since a well-rounded picture of the individual and the problems associated with the disabling conditions is developed in a team setting. The physician also interacts with the multidisciplinary team. This may be important to care properly for patients with complex and difficult upper limb problems. Since the physician is part of the team meeting, the ability to communicate findings and recommendations to the team is enhanced. During the follow-up physician visit, the patient receives feedback on the overall findings, and the recommendations. With this program, the patient’s care is better coordinated and cost-effective, and duplication of effort is reduced during the evaluation process. This should provide cost savings to the patient and/or insurer.

The UPPER Program is a viable multidisciplinary assessment, which may be clinically useful in a number of settings. It should prove useful to a community hospital or in a specialty hand clinic. It may also be useful in a rural setting, where patients living far away can make one trip for the evaluation, rather than making several trips for each individual evaluation session.

There are plans to evaluate the patients’ outcomes to determine the ability of this program to return patients to work. Future projects may evaluate changes in quality of life, evaluate which patient characteristics help predict success with this program, or look at the program’s cost-effectiveness.

Acknowledgements

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References


Appendix

The Spine Program
UNIVERSITY OF MICHIGAN MEDICAL CENTER

University of Michigan Health System
325 E. Eisenhower Parkway, 2nd FLOOR
Ann Arbor, MI 48104-0744 (734) 998-7676

The UPPER Assessment
Individual Test Result (ITR)

Date of testing: ____________________ Diagnosis: _______________________________
Referring Physician: _______________________

The UPPER (UPper extremity Protocol Evaluation in Rehabilitation) Assessment provides treatment options for the rehabilitation of individuals with upper extremity injury or other medical conditions which interfere with work and/or life activities. It involves extensive questionnaires followed with evaluations by a Physiatrist, an Occupational Therapist, Rehabilitation Counselor, Rehabilitation Psychologist and Ergonomist. The ITR report provides a condensed summary of client's performance during this testing period. A Physical Medicine and Rehabilitation Specialist (Physiatrist) leads the team meeting following the UPPER team meeting and dictates a summary report with recommendations.
PHYSICAL TESTING  right / left handed

Medical History: Name: __________________________

CPI No. ________________________

Previous Physical Therapy:

Posture/Alignment:

Cervical: 1 2 3 4 5 6 7

Thoracic: 1 2 3 4 5 6 7

1st rib: 4 5 6 7 8 9 10

Scapula: 1 2 3 4 5 6 7 8 9 10 11 12

Lumbar: 1 2 3 4 5 6 7 8 9 10 11 12

Strength:

Middle trapezius 1 2 3 4 5

Lower trapezius

Range of Motion Limitations:

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<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Flexion</th>
<th>Extension</th>
<th>Abduction</th>
<th>Ext/Int</th>
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<tbody>
<tr>
<td>Cervical Spine</td>
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<td></td>
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<tr>
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<tr>
<td>Lumbar Spine</td>
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<tr>
<td>Rib Cage</td>
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Palpation/Structural tightness

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<th></th>
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<th>Moderate</th>
<th>Severe</th>
</tr>
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<tbody>
<tr>
<td>Pectorals</td>
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<td></td>
<td></td>
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<tr>
<td>Scalenes</td>
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<tr>
<td>SCM</td>
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<tr>
<td>Upper Trap/Lev. Scap.</td>
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<tr>
<td>Shoulder capsule</td>
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<td></td>
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<tr>
<td>Subscapularis</td>
<td></td>
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<td></td>
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<tr>
<td>Latissimus dorsi</td>
<td></td>
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</table>

Submaximal Cardiovascular Assessment:

<table>
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<tr>
<th>Achieved % of Max. Heart Rate</th>
<th>Projected Max. Met Level &amp; VO2</th>
<th>Highest Rating of Perceived Exertion (6-20)</th>
<th>Stopped test because of:</th>
<th>ACSM Classification:</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>end of test</td>
<td>Superior</td>
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<td></td>
<td></td>
<td></td>
<td>muscle fatigue</td>
<td>Fair</td>
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<td></td>
<td></td>
<td></td>
<td>c/o pain</td>
<td>Excellent</td>
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<td></td>
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<td>other:</td>
<td>Poor</td>
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<td></td>
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<td></td>
<td></td>
<td>Good</td>
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<td></td>
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<td></td>
<td></td>
<td>Very</td>
</tr>
</tbody>
</table>

Comments: ________________________________

Signature/Credentials: ____________________ Date: ________________

Signature/Credentials: ____________________ Date: ________________

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SUMMARY OF FUNCTIONAL UPPER EXTREMITY ABILITIES

Client is  hand dominant  Key:  NA  = Not applicable

1  = Unable to perform task
2  = Able, but causes pain, needs to rest
3  = Able but difficult, takes a long time
4  = Able to perform task with some difficulties
5  = Independent, full functional ability.

Manipulating small objects
Picking up small objects using right/left hand
Holding on objects
Releasing object
Repetitive Overhead Reaching
Repetitive Forward Reaching
Pushing/Pulling

<table>
<thead>
<tr>
<th>Problem/Issue</th>
<th>Recommended Solutions</th>
</tr>
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<tbody>
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Test  Client’s score/performance  Norm  Comments

Lifting - Progressively increasing weight lifting (PILE protocol)

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<tr>
<th></th>
<th>Maximum</th>
<th>% Maximum</th>
<th>Rating of</th>
<th>Maximum</th>
<th>Rating of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight (lb.)</td>
<td>Expected Heart rate</td>
<td>Perceived</td>
<td>Weight (lb.)</td>
<td>Perceived</td>
</tr>
<tr>
<td>Lifted@12/min.</td>
<td>Performance Achieved</td>
<td>Exertion*</td>
<td>1 lift/min.</td>
<td>Exertion*</td>
<td></td>
</tr>
<tr>
<td>Floor to Waist</td>
<td>lb.</td>
<td>lb.</td>
<td></td>
<td>lb.</td>
<td></td>
</tr>
<tr>
<td>Waist to Shoulder</td>
<td>lb.</td>
<td>lb.</td>
<td></td>
<td>lb.</td>
<td></td>
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</table>

Carrying - pounds maximum (standard 40 foot distance).
*Client’s perceived exertion is rated on the BORG scale, where 6 = very, very light,  20 = very, very hard.
Client chose to stop the lifting at noted maximums due to reports of pain in
Note: Physiological effort is extrapolated from the % maximum heart rate achieved - 70% is considered good effort.

Key issues:

Signature/Credentials: _____________________________ Date: ________________

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Personal/Background Information

Education: (highest completed)
☐ less than 8th grade  ☐ 12th grade
☐ 9th grade  ☐ some college / tech. school
☐ 10th grade  ☐ college
☐ 11th grade  ☐ graduate school

Literacy:   Write English ☐  Read English ☐

Job Title: __________________________
Employer Name: _____________________
Location: ___________________________
Length of employment: ___________________________

Work Status:  ☐ Job being held  ☐ Unemployed
☐ Retired  ☐ Medical leave
☐ Fired  ☐ Other: ___________________________

Insurer:
☐ Workers Comp.  ☐ Medicaid/Medicare
☐ Auto No-Fault  ☐ HMO ______________________
☐ BC/BS  ☐ Other
☐ Self

Litigation?  ☐ Yes  ☐ No

Attorney?  ☐ Yes  ☐ No

Applied for SSDI?  ☐ Yes  ☐ No

Social Stressors:
☐ Family  ☐ Health
☐ Finances  ☐ Recent death
☐ Housing  ☐ Other: ________________________

Avocational interests:
☐ Sports  ☐ Outdoor Activities
☐ Crafts  ☐ Reading
☐ Travel  ☐ Other: ________________________

Goals: ___________________________

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Signature/Credentials: ___________________________ Date: ______________

**PSYCHOSOCIAL / PAIN TESTING**

Name: ___________________________ Reg. No. ___________________________

- **CES-Depression Scale** (mean = 23, s.d. = 13; > or = 27 is possibly indicative of major depression)
- **Pain Disability Scale** (mean = 60, standard deviation = 18)

- **Visual Analog Pain Scale** (0 “no pain” to 10 “worst possible pain imaginable”)
  - Worst _______  Best _______  Average _______

- **Multidimensional Pain Inventory (T-Scores)** (mean = 50, standard deviation = 10)
  - Pain severity _______  Punishing resp. _______  Act. away from home _______
  - Interference _______  Solicitous resp. _______  Social activities _______
  - Self control _______  Distracting resp. _______  General activities level _______
  - Negative mood _______  Household chores _______
  - Support _______  Outdoor work _______  Profile type: ___________________________

- **McGill Pain Questionnaire**
  - Sensory _______ (mean = 18, s.d. = 7)  Evaluative _______ (mean = 3, s.d. = 2)
  - Affective _______ (mean = 3, s.d. = 3)  Total Pain Rating _______ (mean = 30, s.d. = 12)
  - *Words Circled* ___________________________

- **Tampa Scale**
  - Avoidance _______ (mean = 22, s.d. = 5)  Fear _______ (mean = 14, s.d. = 4)  *Total Score* _______

- **SF-36 Health Status Questionnaire**
  - General Health Perceptions 57.0 72.0 85.0  General Mental Health 64.0 80.0 88.0
  - Physical Functioning 70.0 90.0 100.0  Vitality 45.0 65.0 75.0
  - Social Functioning 75.0 100.0 100.0  Bodily Pain 61.0 74.0 100.0
  - Role Limitations (physical) 50.0 100.0 100.0  Comparative Health _ (not available)
  - Role Limitations (emotional) 66.7 100.0 100.0

**Statement:**

____________________________________

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____________________________________

____________________________________

Signature/Credentials: ___________________________ Date: ______________

*The information presented on this form is for documentation purposes only. The data should be interpreted only by persons who are familiar with the use of the various tests in persons with chronic illness, and who are familiar with the individual being tested.*

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