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Status post rotator cuff repair with interrupted therapy and comorbidities: a case report

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STATUS POST ROTATOR CUFF REPAIR WITH INTERRUPTED THERAPY AND COMORBIDITIES: A CASE REPORT

by

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Bachelor of Science in Psychology & Human Performance and Fitness
North Dakota State University, 2006

A Scholarly Project Submitted to the Graduate Faculty of the Department of Physical Therapy
School of Medicine
University of North Dakota

in partial fulfillment of the requirements of the degree of

Doctor of Physical Therapy

Grand Forks, North Dakota
May 16, 2009
This Scholarly Project, submitted by Whitney Lesnau in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.

(Graduate School Advisor)

(Chairperson, Physical Therapy)
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ACKNOWLEDGEMENTS

I would like to thank my husband and family for their understanding and emotional support throughout the physical therapy program. I would also like to thank Mark Romanick and my group members for all their time and effort to make this case study the best it could be. Lastly, I would like to thank the faculty and staff in the University of North Dakota physical therapy department for believing that I am capable to be a part of this rewarding profession.
ABSTRACT

**Background & Purpose:** The purpose of this case study is to describe the plan of care that was completed despite interruption from multiple complications. Interrupted therapy has not been explored in research even though it is something physical therapists encounter often.

**Case Description:** This 45-year-old patient went through a right rotator cuff repair surgery followed by physical therapy to regain functional use of her shoulder. Her therapy was interrupted twice; first by her mother’s heart condition and then by her own neurological condition.

**Intervention:** The main component of treatment with this patient was range of motion exercises including passive, active-assistive, and active. Along with those activities the patient participated in ultrasound and exercise on the upper body ergometer.

**Outcome:** This particular patient did not recover as quickly as expected but still regained full passive motion of her shoulder. Also, the patient’s pain was decreased but not eliminated. The patient reported being able to perform daily activities more comfortably and hobby activities without much modification.

**Discussion:** Physical therapy rehabilitation is an important key in recovering from surgical intervention. If this therapy becomes interrupted, the patient’s recovery could be prolonged. This case study shows that interrupted therapy can cause a decrease in motion, which then needs to be regained when able to return to therapy.
CHAPTER I

BACKGROUND AND PURPOSE

Rotator cuff tears are a common cause of shoulder pain and disability. The four muscles that make up the rotator cuff include the supraspinatus, infraspinatus, teres minor, and subscapularis. These four muscles function to rotate the humeral head, stabilize the humeral head in the glenoid fossa, and stabilize the shoulder complex when other muscles in the area contract. These are all important functions; therefore, if one of the rotator cuff muscles tears, it could greatly affect the way a shoulder operates, which in turn affects the way an individual functions.

In the literature there is some controversy over what leads to rotator cuff pathology. Researchers are now saying that rotator cuff injury is not dependent on one factor but multiple. There are intrinsic and extrinsic factors that contribute to shoulder pathology. Extrinsic factors refer to different types of impingement that occur in the shoulder. Intrinsic factors include vascularity of the involved areas and degeneration. The shape of an individual’s acromion has also been researched as a cause of rotator cuff pathology. A study that investigated the correlations of acromion shape and rotator cuff tears found that the subjects who had tears were more commonly seen in patients with type II and type III acromions. Another structural influence of rotator cuff pathology is the position of the humeral head in comparison to the acromion process. Research has found that this relationship is related to the occurrence and size of rotator cuff tears.
There are two different ways to treat rotator cuff tears, conservatively and surgically. Conservative treatment could include physical therapy, a home exercise program, steroid injection, or anti-inflammatory medications. This type of treatment may be all that is needed for a patient to return to previous level of functioning.\textsuperscript{6} The other treatment option is surgical intervention. This type of treatment is used for patients who have symptoms for a significant period of time, whose pain is more intense, or who have not had any relief with conservative treatment.\textsuperscript{6,7} According to Mantone, Burkhead, and Noonan\textsuperscript{8}, there are limited populations that should be treated surgically. These populations include: 20 to 30-year-old individuals with an acute tear and severe deficits, 30 to 50-year-old individuals who have an acute tear because of a specific incident, highly competitive athletes, and individuals that do not respond to conservative treatment.

The outcome of a patient depends on many factors. Every patient is different when it comes to recovery time and type of lifestyle, a fact that can greatly affect their outcomes. The following factors may have affected this particular patient’s outcome: smoking, life-altering event, comorbidities and labor conditions.

Lifestyle habits can play a large role in a patient’s risk of developing a rotator cuff tear. Rehabilitation after the injury occurs or after surgery is also greatly influenced by an individual’s lifestyle. This particular patient was a smoker but the daily quantity was not recorded. Habits such as tobacco, alcohol, and caffeine use can negatively influence tissue healing.\textsuperscript{9} One study found poorer outcomes for smokers versus non-smokers following an anterior cruciate ligament surgery.\textsuperscript{10} Another study studied cadavers and found a strong correlation with smoking history and advanced microscopic rotator cuff pathology.\textsuperscript{11}
Comorbidities also affect the plan of care both before and after surgery. At times, health professionals are not sure whether surgery is the appropriate treatment for patients and comorbidities can be a factor when making that decision. These comorbidities should be understood prior to surgery to assess which type of treatment is most appropriate. Then, if surgery is the chosen treatment, comorbidities need to be evaluated to assess the right post operative treatment. There is always the option of conservative treatment for patients with complications. Conservative treatment has been found to decrease discomfort, improve performance of daily activities, and increase range of motion in patients with rotator cuff tears.

This patient had comorbidities of which the most influential to her recovery were neurological symptoms, including episodes of syncope, dizziness, and loss of balance that occurred during some therapy sessions. This comorbidity did not allow for treatment to progress as originally planned. Therapy had to be based on treatment that would not aggravate her dizziness. Standing exercises were also not an option due to the episodes as described above; these restrictions limited the patient’s rehabilitation process.

Another way therapy can be affected is by life changing events. Life is unpredictable and as therapists we have to take this into consideration when working with people. Physical therapists have to be ready to work with an individual no matter what turn the patient’s life may take. These obstacles can interrupt the sequence of therapy and the plan of care.

After 4 weeks of therapy this patient could no longer attend therapy because of a family illness. Therapy was stopped before the patient’s goals were met and as a result she lost motion in her shoulder. When the patient came back to therapy, 4 weeks later,
she had to regain motion that had been lost because of her absence from therapy. Due to the loss of range of motion, progress was set back and the patient became quite frustrated. The average recovery for a rotator cuff repair ranges from 4 to 5 months, with a return to physical hobbies possible at this time. From surgery to her appointment with her surgeon it had been 5 months for this patient and she was still unable to achieve full active range of motion.

Type of occupation may also have an influence on the patient’s risk of sustaining an injury and the length of the recovery period. A study was conducted that examined manual versus nonmanual workers. The focus of the study was to determine if manual workers were at a higher risk for upper limb injuries. This article found that manual workers, as in this case, were more likely to develop upper limb injuries, such as rotator cuff syndrome. It was also found that worker’s compensation patients have a less favorable outcome.

This particular patient was in a manual labor work setting and was performing repetitive activities such as pushing, pulling, drilling and twisting for 8 to 9 hours per day, 4 days per week. Even though the patient was supposed to be on light duty, with lifting restrictions, she was still completing these types of tasks. The patient was still drilling but in a slightly modified position and lifting boxes to move them out of her way.

Despite these complications, therapy was continued using passive range of motion exercises, ultrasound, soft tissue massage, and active range of motion exercises. The suggested progression would be to start with passive range of motion and progress to active range of motion. A similar approach was taken with this patient. Along with passive range of motion, ultrasound was used in the beginning of the session. In this
particular patient ultrasound did not seem effective in helping the patient regain motion. This is supported by van der Heijden et al, 19 who found that ultrasound was ineffective in treatment of soft tissue shoulder disorders.

Soft tissue massage was a large part of this patient’s plan of care. One study found that patients who participated in soft tissue massage at the shoulder were able to gain more motion, reported a lower amount of pain and self-reported themselves at a higher functioning level than their counterparts who were on the two week waiting list.20 The afore mentioned interventions assisted with patient’s range of motion and decreased her pain.

This particular patient experienced a considerable amount of complications during her therapy. There is not much documentation on interrupted physical therapy, making this case study unique. The purpose of this case report is to provide an example of what therapy can be like when there are multiple complications as well as to show how those issues were managed.
CHAPTER II
CASE DESCRIPTION

This right hand-dominant patient is a 45-year-old female who underwent a right rotator cuff repair. About 1 month after her surgery she was referred to physical therapy for manual therapy, modalities, and strengthening to restore motion and function to her shoulder. The patient then participated in a little over 5 weeks of physical therapy at 3 days per week. At that point in time the patient encountered a family emergency. Her mother was having heart complications and this patient would therefore not be able to participate in therapy for an undetermined amount of time. This inability to continue treatment resulted in her discharge. Approximately 4 weeks after her discharge, the patient returned to therapy at the same location and was re-evaluated by a new therapist. She then participated in 3 weeks of therapy before she had an episode of syncope at the end of a treatment session.

At this time the patient made an appointment with the physician assistant. The PA referred her to the nearest hospital where the patient stayed for 4 days. The doctors at the hospital referred her to a larger hospital in a larger city, which specialized in neurological care. The doctors believed a lesion on her cerebellum was causing her dizziness, loss of balance, and episodes of syncope. She was in the hospital for 3 days. Her doctors at the hospital did not state any reason to discontinue her therapy for her shoulder. She continued the therapy for another 2 weeks before having an appointment
with her surgeon. The focus of this case study is on her 2nd round of physical therapy, but data from her prior sessions were available and will be used for comparison.

The patient’s past medical history included a brain aneurysm (15 years prior), asthma, chronic obstructive pulmonary disease, lipoma on her right scapula, and left rotator cuff repair (2 years ago). She reported occasionally using Aleve® to relieve pain but denied use of any other medications. The patient also used a breathing apparatus at night because of her COPD. At the time of the initial examination the patient rated her pain a 4/10 (0=no pain, 10 =extreme pain). She stated her pain reached a 7/10 when at work, which included activities such as pushing and pulling. At examination she rated her pain a 2/10 and during activity a 4/10. Behaviors such as reaching overhead or lying on her right side increased the patient’s symptoms.

To reduce pain the patient would rest and break up her activities so she could complete them. The patient stated she had to modify her activities at work as well as some activities of daily living, such as dressing. Prior to the rotator cuff surgery, the patient was able to complete all her daily activities independently. She was able to build furniture, garden and cut wood without pain or physical modification. The patient worked 10-hour days at an electrical utility manufacturing company. This job required repetitive activities such as pushing, pulling and drilling. She was also carrying 25 to 50 lbs on a regular basis for extended periods of time. Her goal after completion of therapy was to return to work and hobbies without limitations or pain.

As stated above the patient had been seen for about 5 weeks before having to stop therapy. This set of sessions will be summarized for comparison but the main focus will be the 2nd set of sessions in which the patient participated.
Examination, Evaluation and Diagnosis

As part of her evaluation, her previous history of physical therapy for this particular shoulder surgery was taken into consideration. For her first examination immediately after the surgery the patient’s right shoulder range of motion was measured. (see Table 1 for exact measurements both at initial examination and discharge)

Table 1. Right Shoulder Range of Motion (in Degrees)

<table>
<thead>
<tr>
<th></th>
<th>Initial Examination</th>
<th>Discharge</th>
<th>Last Examination</th>
<th>Recorded</th>
</tr>
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<tbody>
<tr>
<td>PROM</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Flexion</td>
<td>40</td>
<td>160</td>
<td>130</td>
<td>160</td>
</tr>
<tr>
<td>Abduction</td>
<td>55</td>
<td>115</td>
<td>110</td>
<td>180</td>
</tr>
<tr>
<td>Internal Rotation</td>
<td>50</td>
<td>70</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>External Rotation</td>
<td>8</td>
<td>55</td>
<td>70</td>
<td>90</td>
</tr>
<tr>
<td>AROM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexion</td>
<td>32</td>
<td>--</td>
<td>120</td>
<td>160</td>
</tr>
<tr>
<td>Abduction</td>
<td>50</td>
<td>--</td>
<td>90</td>
<td>150</td>
</tr>
<tr>
<td>Internal Rotation</td>
<td>25</td>
<td>--</td>
<td>53 (at 30°)</td>
<td>85</td>
</tr>
<tr>
<td>External Rotation</td>
<td>5</td>
<td>--</td>
<td>60 (at 30°)</td>
<td>70</td>
</tr>
</tbody>
</table>

During the initial examination, she was extremely limited in all motions of the shoulder with empty end feels due to pain. A gross strength assessment was performed
which measured her at a 2/5 (0=no perceivable muscle contraction, 1=trace, 2=poor, 3=fair, 4=good, 5=normal) for strength.

At this time I would like to describe briefly the 1st set of sessions the patient participated in before her mother’s heart complication. Interventions included passive range of motion of the right shoulder, ultrasound, pulleys, isometric strengthening, and revolutions on an upper body ergometer. During one of the patient’s last sessions before being discharged because of her mother’s illness, she had an episode of syncope. Following the incident her blood pressure measured 118/78 mmHg and she was given orange juice and crackers. At discharge the patient’s passive range of motion was measured (see Table 1). Her strength was found to 4+/5 for all right shoulder motions. At the end of this set of therapy sessions the patient started to complain of shortness of breath and difficulty sleeping, but the patient was discharged due to the family illness.

The following describes the 2nd examination, which was completed after interruption of therapy. Upon observation nothing significant was noted, she was not bracing her right arm and she seemed comfortable in the situation. Range of motion was measured for flexion, abduction, and internal and external rotation of the right shoulder (see Table 1). Range of motion (ROM) was measured with a goniometer as per protocol presented by Norkin and White, a system with fair-good reliability for flexion, abduction, and external rotation. One article found that when taken in supine goniometric measurements for passive lateral rotation are also reliable. The patient had lost motion since her previous sessions. All end feels were noted as empty due to pain.

Resisted isometrics were performed with all movements being painful. The assessment was performed as described by Cyriax for resistive movements. The
reliability of this method has been demonstrated when used by experienced physical therapists.\textsuperscript{25} For shoulder flexion, extension, adduction, and internal rotation the patient was measured with 5/5 strength. The patient was slightly weak in shoulder abduction and external rotation, both being measured at 4/5.

The cervical spine, elbow, wrist, and fingers were all cleared with the peripheral joint scan by assessing range of motion. Myotomes, special tests, reflexes, and dermatomes were all deferred because the patient had no signs of neurological involvement and her diagnosis was known. There were no restrictions on joint play assessment. Upon palpation the patient had increased tone in the biceps but no swelling or warmth was noted.

PT diagnosis for this patient was 4I: Impaired Joint Mobility, Motor Function, Muscle Performance, and Range of Motion Associated with Bony or Soft Tissue Surgery. ICD-9-CM Code: 726.1.\textsuperscript{26}

\textbf{Prognosis and Plan of Care}

This patient’s prognosis was fair; due to her lifestyle and comorbidities this patient was going to have a long recovery. According to the examination the patient’s problems were pain, limited range of motion, modified activities of daily living, and light work duty. Goals set for this particular patient included increasing range of motion and decreasing pain, so she could return to her previous level of functioning. The plan of care was established to see the patient 2 times per week for 8 weeks. This was changed during treatment to 3 times per week for 8 weeks; it was decided the patient would benefit more if she were seen more times per week.
The interventions included on the patient’s referral were stretching, strengthening, modalities, and manual therapy. Ultrasound was chosen because it was used in her previous therapy with good results such as decreasing the patient’s pain. The type of manual therapy chosen was soft tissue massage at the recommendation of a colleague; he had good outcomes with previous patients with rotator cuff pathology. These interventions would be used with general stretching and strengthening of the right shoulder. This patient would be reassessed every week with her goals being modified according to performance in therapy. A reexamination would be done prior to discharge, at approximately 8 weeks from start date, so her progress could be reported to her doctor.
CHAPTER III
INTERVENTION

Overall, physical therapy for shoulder problems has proven beneficial for those suffering from the injury.\textsuperscript{27,28,29} As for a specific physical therapy intervention that provides good outcomes for shoulder pain, it is still uncertain.\textsuperscript{30}

For the first 7 sessions the patient participated in passive range of motion stretching exercises, with the most focus on flexion, abduction, and rotation. Soft tissue massage was performed on the biceps area near the tendon to make the tissues more pliable. This type of therapy has been said to increase range of motion and function as well as decrease pain.\textsuperscript{20} At the end of these sessions, with the exception of 2 sessions in which time was constrained due to high patient load, ultrasound was used for 7 min at 1.5 W/cm\textsuperscript{2} and 3.3 MHz. Ultrasound was used during her previous therapy sessions and the patient thought it relieved her pain; therefore it was used despite the lack of evidence to support its use.\textsuperscript{27}

After 5 sessions, the patient was given supine active-assistive range of motion exercises to do at home, including flexion, abduction, rotation, and limited extension. She returned the next session saying those exercises caused her a large amount of pain. For the next few sessions the focus of the treatment was to break up any binding tissues with soft tissue massage and to perform passive range of motion techniques.
On the 9th session the patient performed revolutions on the upper body ergometer (UBE) for 10 minutes prior to starting her skilled therapy. It was decided to use the UBE to try to improve her endurance. An upper body ergometer had been used in the protocol described by Williams & Kelley. This article described using the UBE with athletes and had good results. After participating in passive range of motion stretching exercises, she had an episode of syncope during which she attempted to sit up, was unable, then collapsed back down to the treatment table. She recovered within a few seconds but had to take some time to regain her awareness. Before leaving, the patient was coherent and walking normally.

At her 10th session the patient reported she had started taking Zoloft® for seasonal affective disorder. The same intervention techniques were used as described above except the upper body ergometer was used at the end of the session. As the patient began to move her arms on the ergometer, she started to lean to the right side. The patient reported feeling weak and dizzy. The patient was advised to stop her arm movement and sit still. She followed the directions and was given a cup of water. It was mentioned to the patient to make an appointment with the physician assistant; after the discussion she decided to make an appointment. After the patient left, the physical therapist talked with the physician assistant about the issues occurring during the therapy sessions.

For the patient’s 11th session she participated in soft tissue massage and passive range of motion. At the end of this session, the patient reported feeling “worn out.” When she sat up she stated she felt weak and was given a can of grape juice, which seemed to help. The patient was scheduled to see the physician assistant after this session. The physician assistant referred her to the hospital so the patient was unable to attend her next session.
scheduled physical therapy appointment. At her next session, after she had been discharged from the hospital, she informed the physical therapists that the doctors believed she had a lesion on her cerebellum, but did not limit her physical therapy for her shoulder. She was in the process of making an appointment at a larger hospital that specialized in her care.

During the next 2 sessions treatment continued as described above without the upper body ergometer, because it aggravated her dizziness. Instead, the patient participated in pulley exercises for active-assistive range of motion. During the last 3 sessions before seeing her surgeon the patient attempted active range of motion exercises, including flexion, abduction and rotations. She was asked to go through these motions up to mild/moderate discomfort at home as part of her home exercise program. Refer to Table 1 for ROM measurements.
CHAPTER IV

OUTCOMES

This patient did progress despite her complications. Comparison of her range of motion can be seen in Table 1.

The patient was still having pain at the time she had her appointment with her surgeon but her rating had decreased by 3 points on the visual analog scale. Her strength was assessed with resisted isometrics and had increased by 2 to 3 points for all motions of the shoulder. As for function, the patient was still on light duty at work and still had to modify activities at home. Overall, the patient was responding well to treatment. As for her discharge the information is unavailable because the physical therapist working with the patient had to refer her to a new therapist because was leaving the facility.
CHAPTER V
DISCUSSION

At the last documented session the patient’s shoulder was progressing but as a whole this patient was not doing as well as she was at initial examination. Since her surgery the patient was battling emotional troubles, family troubles, and an apparent neurological dysfunction. As for her shoulder, the interventions used with this patient have been proven effective based on her outcomes,\textsuperscript{18,20} and she tolerated the treatment plan rather well.

Since this patient’s diagnosis was already known, the examination completed was used more to assess where the patient had either progressed or regressed since her discharge date. The examination tools used, such as muscle testing and goniometric measurement, helped establish this.\textsuperscript{21,24} In this situation the patient had regressed; therefore therapy had to start as if she had just had surgery. Passive range of motion, soft tissue massage, and exercise on the UBE were all chosen based on previous experience with the patient and research.\textsuperscript{18,20,31}

When looking at the patient’s outcomes she did improve range of motion and decreased pain. This is in agreement with the research performed. She did not progress as quickly as planned but none the less still improved.

The complications experienced with this patient could easily occur with anyone, so this case study is a realistic example of steps taken to resume therapy. Physical
therapists need to realize there are many ways to accommodate a patient’s plan of care when complications occur. For example, instead of using the upper body ergometer, which aggravated the patient’s dizziness, she used the pulleys in a seated position. Accommodations like this can be made and still have sound results. This case study shows that despite different types of complications a patient can still progress, as long as the therapist uses all available resources to put together the most appropriate plan of care.

As for further research to be done in this area, physical therapists need to understand better what works in therapy and what does not. Everyone responds differently to different treatments. If what works best can be supported by research, then physical therapists can treat their patients more efficiently and effectively. Also, it needs to be understood that none of the patients treated are the same and must not be given a cookie-cutter program. Physical therapists need to adapt a protocol or program to the needs of the patients, whatever they may be.

A limitation of this case report is the continuity of therapy. This patient was seen by two different therapists and then referred to another. This patient would have received better care if the same therapist had done it. Also, the documentation would have been more consistent if the same therapist had been doing it. Another limitation may be the caseload the facility was trying to take on with a limited number of therapists. If the therapist had more time to spend with this patient then her treatment would have been more complete.

As stated previously the purpose of this case report was to describe an intervention that was conducted throughout multiple complications. This case report shows that even though the patient regressed, resuming therapy was beneficial. Also, this
patient had comorbidities that could have affected her progress, but since the therapist adjusted the plan of care to suit her needs the patient was able to improve.

Reflective Practice

As for the influence of this research for future clinical situations, this information can be used to assist physical therapists with deciding their plan of care. If a patient with a similar presentation were to come to this location again, I believe things would be handled differently. The intervention would have progressed more quickly for the best outcomes for the patient. She would also have been encouraged more to continue physical therapy during her mother’s illness by attending sessions less often per week. Outcome measures would have been measured more precisely and more regularly. A functional outcomes questionnaire would be used to assess the patient on a more functional scale. As for the type of interventions, they would stay the same with the exception of ultrasound. The exercises chosen for this patient did work; they just needed to be progressed more quickly.

As for the cost for this patient, she was under worker’s compensation; therefore not much of her cost was paid out of pocket. I believe the cost this location was charging for their services was reasonable and fair. If this particular patient had an average insurance plan and was not under worker’s compensation, than the cost may not have been fair. She would have had to pay about 20% of all that was charged to the insurance company. Also, an average insurance company may have been stricter with her allowed visits and type of treatment given. All her sessions may not have been covered, and therefore she would have paid 100% of the charged amount for those sessions not covered by insurance.
This experience made me realize how important it is to stay current with the type of interventions that are available for use as well as which interventions have been proven to work and which ones have been proven ineffective. Because of this experience I have made a point to continue my education even after schooling.
REFERENCES


