

Occurrence of Physical Therapy Treatment in the Management of Patients with Degenerative Joint Disease

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퇴행성 관절질환 환자에 대한 물리치료 빈도

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<Abstract>

목적 : 노년층의 대부분이 가지고 있는 골관절염이라고도 알려진 퇴행성 관절 질환은 척추에 영향을 끼친다. 그리고 이 질환은 통증과 일상생활에서의 활동 제한을 초래한다. 본 연구는 퇴행성 관절질환 환자의 물리치료 빈도에 따른 효과를 검증하는 데 있다.

방법 : 퇴행성 관절 질환을 가진 30명의 환자가 이 연구에 참여하였고 이들에 취해진 물리치료의 빈도에 따른 효과를 평가하여 그 결과를 물리치료 임상 지침서와 비교분석하였다. 본 연구에 참여한 환자들은 시각적 사상 척도(Visual Analog Scale, VAS), 맥길 통증 설문지, 일반적인 설문지에 응했으며 물리치료 전과 후를 물리치료 빈도에 중점을 두어 평가받았다.

결과 : 본 연구에 참여한 환자들은 제시된 치료 빈도와 평가에 근거하여 불 때 놀랄만한 호전을 보였다. 치료 초기와 물리치료를 시작하기 전의 평가 자료를 비교하여 보았을 때 설문지로 평가된 점수에서 큰 향상을 보였다.

결론 : 본 연구는 물리치료가 퇴행성 관절 질환 환자들에게 효과가 있음을 보여주었다. 또한 물리치료 임상지침서는 따라야 할 좋은 자료가 될 수 있지만 물리치료 처방에는 정해진 기준은 없다는 것을 보여주었다.

핵심단어 : 퇴행성 관절 질환, 시각적 사상 척도(VAS), 맥길 통증 설문지, 일반적인 설문지

I. Introduction

The determination of treatment frequency or the timing of prescribed therapy is a topic that is

lacking in research. In order to achieve success or maximal medical improvement for most conditions, one must be able to apply exercise and strengthen the structure in question. Studies conducted on strength training and exercise suggested that a more frequent and consistent therapy program is beneficial (Moore, 2004; Hurley, 2002; Deyle, 2005).

Several factors must be considered in the determination of treatment frequency. Factors such as: the severity of the condition, the age of the patient, the level of impairment and physical function, the patient's compliance, and secondary impairments. The "Guide to Physical Therapist Practice"(2003) described the intervention patterns and suggested time frames and frequency of treatment Physical Therapists(PTs) may follow in order to implement optimal care in patient management. The Guide pointed out the fact that duration often varies greatly among subjects based on a variety of factors that the therapist considers throughout the evaluation process.

Degenerative joint disease(DJD), also known as osteoarthritis, is a disease that affects the joints and is the most common form of arthritis affecting the majority of the aging population. It is estimated that 54 percent of people over the age of 65 suffer from degenerative joint disease and 10% of the population over 50 years of age suffer from some form of DJD of the knees (Arthritis Research Campaign, 2004). Although rheumatoid arthritis(RA) is often confused with osteoarthritis, it is a separate condition. Rheumatoid arthritis is one of the most common forms of inflammatory arthritis and is one of the major causes of disability(Firestein, 2003). Rheumatoid arthritis is characterized by chronic inflammation and destruction of the synovial joints which leads to progressive joint damage (Kurreeman, 2007). The breakdown of the cartilaginous structures between the vertebrae or

bony structures is the cause of DJD as pointed out by Dawson and Shaffrey of the Spine Universe. According to their article, healthy cartilage permits the gliding of bones over one another and serves as shock absorption during normal or strenuous physical activities(Dawson & Shaffrey). In DJD, the cartilage is worn and causes the bones to grind against each other. This mechanism causes pain, swelling and the loss of normal range of motion(Dawson & Shaffrey).

Degenerative joint disease may occur in several sites, often affects individuals that are over 45 years of age, and tends to occur in several regions of the body. Corti and Rigon(2003) demonstrated that arthritis is the cause for major functional impairments among older adults. According to their study, DJD that occurs in the hip and knee are two of the major causes of pain and physical disability in community dwelling adults(Corti & Rigon, 2003). In the aging population DJD often affects the cervical, thoracic, and lumbar spine, hand/wrist, hip and/or knee(Dawson & Shaffrey). The symptoms of osteoarthritis start slowly and they include any or all of the following: loss of range of motion in the joints, stiffness and restriction when getting out of bed especially in the morning, swelling or tenderness in several joints especially with weather changes, pain and lumps on the joints of the fingers or base of the thumb, and a crepitation type sound or rubbing on bones(Dawson & Shaffrey). Obese patients are often at risk due to the constant increased weight bearing on the joints. Sports injuries and accidents are risk factors because injury to a joint halts the regeneration of the cartilage, and the new forces and stress to that joint exacerbate the symptoms associated with this condition(Dawson & Shaffrey).

Since DJD is a disease of the joints, improving range of motion of the joints and improving

flexibility of the surrounding muscles and soft tissues is helpful. Deyle et al(2005) concluded that physical therapy treatments were beneficial in management of patients with DJD of the knee(Deyle et al, 2005). The results of this particular study indicated that a “home exercise program for patients with DJD of the knee provided important benefits. It was concluded that adding a small number of additional clinical visits for the application of manual therapy and supervised exercise added greater symptomatic relief(Deyle et al, 2005).

II. Methods

1. Participants

The study involved 30 subjects suffering with degenerative joint disease. The ages ranged from 50 to 65 years old. The population of subjects were broken down to the following subcategories: 12 subjects show signs of cervical, thoracic, lumbar degeneration. 8 out of the 30 subjects complained of knee pain and show signs of degenerative disease in the knee and mild degeneration in the cervical segments. 5 of the individuals complained of pain in the hip and low back; their radiology reports included decrease in joint space which is indicative of hip and lumbar degeneration. The remaining 5 subjects have chief complaints of pain in the hand/wrist with movement and weather

changes. The group is consist of 13 males and 17 females. Subjects were asked to complete a visual analog scale. This was followed by completion of a history, range of motion, and palpation. To be included in the case study, subjects had to complain of pain from degenerative joint disease, and answer at least a 2 from on a 1 to 10 VAS (Visual Analog Scale) pain scale. It was determined that these subjects were suffering from degenerative joint disease based on their past medical records, radiology reports and diagnosis by prior or current physicians.

2. Measurements and Instruments

The Visual Analog Scale(VAS) is a measurement instrument that measures a characteristic or attitude that is believed to range across a continuum of values and is not directly measured(Robinson, 2001). The pain does not take discrete jumps, as a categorization of none, mild, moderate and severe would suggest. Operationally a VAS is usually a horizontal line. The patient marks on the line, the point that they feel represents their perception of their current state. In this study, the VAS was used to assess the pre and post treatment outcomes as it relates to the frequency of physical therapy treatments prescribed based on the scores from this tool.

Patients were also asked to complete a McGill’s Pain Questionnaire. This questionnaire can be used to evaluate a person experiencing significant pain. It can be used to monitor the pain over time and to determine the effectiveness of any intervention (Melzack, 2005). The 3 main sections of the questionnaire cover the questions. What does your pain feel like? How does your pain change with time? And how strong is your pain? A score of 0 signifies that the patient is experiencing no pain. The maximum score that can be obtained is a 78. The higher the pain score, the greater the pain.

Table 1. Subjects scores on McGill Pain Questionnaire Pre-Treatment

Scores on McGill Pain Questionnaire	#of Subjects
Score 0 to 20	3
Score 20 to 40	9
Score 40 to 60	13
Score 60 to 78	5

In the initial phases of treatments, patients are urged to complete a general questionnaire describing their limitations. This questionnaire assists in the assessment of evaluating the performance of activities of daily living. Subjects were asked to select one choice from each section. The sections included: pain when lifting, walking, standing, traveling, the rating of pain intensity, and pain when performing personal care such as dressing.

3. Data Analysis

Data Analysis is used independent sample t-test to verify the comparison of mean differences between before and after providing physical therapy to each patient group.

III. Results

Range of motion was moderately restricted in 16 subjects, mildly restricted in 9 subjects and severely restricted in 5 subjects. Palpation was moderately tender for 19 subjects, mildly tender for 6 subjects and severely tender for 5 subjects. Muscle testing was a 4 for 22 subjects, a 5 for 2 subjects and a 3 for 6 subjects.

The following results as noted in Table 1 were obtained at the initial phase of treatment.

The patients were asked to complete a general questionnaire documenting their limitations performing the activities of daily living. Table 2 demonstrated that the amount of pain varied with the specific activity of daily living; however, pain with lifting seemed to be a common factor among patients.

Patients were prescribed physical therapy treatment based on the results from the McGill's pain questionnaire, examination and answers provided on the general questionnaire. Other factors that influence the treatment frequency, included the practitioner's experience and results obtained from the examination. Table 3 showed treatment frequency, reevaluation time, and discharge plan of patients.

Following the physical therapy intervention, the subjects were asked to complete the general questionnaire and the McGill's Pain Questionnaire. The results show that after the physical therapy treatment, the majority of subjects scored low on the McGill's Pain Questionnaire which is a sign of overall improvement.

IV. DISCUSSION

The overall results of this study indicate that treatment frequency plays an important role in the patient's outcome. As noted in the results, patients show remarkable improvement in the post treatment

Table 2. Subjects rate their pain with activities of daily living on the general questionnaire Pre Treatment

Limitations	Mild Pain	Moderate Pain	Severe Pain	No Pain	Mean±SD
Pain with lifting	2	19	9	0	7.50±8.58
Pain with walking	3	20	7	0	7.50±8.81
Pain with sitting	12	11	4	3	7.50±4.65
Pain with standing	8	16	6	0	7.50±6.61
Pain with sleeping	18	4	0	8	7.50±7.72
Pain with social life	20	7	3	0	7.50±8.81
Pain with traveling	15	10	3	2	7.50±6.14
Pain with dressing	8	18	4	0	7.50±7.72
Mean±SD	10.75±6.65	13.13±5.96	4.50±2.78	1.63±2.83	

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Table 3. Treatment frequency based on the pain level of the McGill's pain questionnaire

McGill Pain Questionnaire	Subjects	Initial Treatment	Re evaluation/ Frequency	Re evaluation/ Frequency	Discharged or Outcome
Score 0 to 20	3	3x/wk for 2wks	Felt better 2x/wk for 3wks	All Felt better Discharged	Discharged early due to improvement
Score 20 to 40	9	3x/wk for 2wks	8 show minor to little improvement 3x/wk for 2wks	7 Felt better 2x/wk for 2wks	The Majority of subjects felt better except for 2
Score 40 to 60	13	3x/wk for 4wks	Felt better 2x/wk for 3wks	Felt better 1x/wk for 3 wks	Condition show improvement
Score 60 to 78	5	4x/wk for 2wks	4 show minor improvement 3x/ wk for 2wks	4 show minor improvement 2x/wk for 4wks	Condition show minor to no improvement

Table 4. Patient scores on McGill Pain Questionnaire Post Treatment

Scores on McGill Pain Questionnaire	#of Subjects
Score 0 to 20	20
Score 20 to 40	5
Score 40 to 60	2
Score 60 to 78	3

Table 6. Range of No Pain (Numbers of Improvement following Treatment Across Areas)

Range No Pain	
lifting	<2
walking	<12
sitting	<6
standing	<17
sleeping	<17
social life	<19
traveling	<14
dressing	<16

of the physical therapy intervention. The primary factors that influenced the number of treatments were pain intensity and the severity of the condition. It can be concluded from this study that physical therapy and the frequency of treatment can increase function, decrease pain and increase the ability to perform the activities of daily living.

Subjects with moderate and severe pain displayed the greatest improvement. Table 6 confirms the fact that an increase in patients without pain was

Table 5. Subjects rate their pain with activities of daily living Post Treatment

Limitations	Mild Pain	Moderate Pain	Severe Pain	No Pain	Mean±SD
Pain with lifting	16	8	4	2	7.5±6.19
Pain with walking	11	4	3	12	7.5±4.65
Pain with sitting	17	2	2	9	7.5±7.65
Pain with standing	6	3	4	17	7.5±6.45
Pain with sleeping	9	0	0	21	7.5±9.94
Pain with social life	6	3	3	19	7.75±7.63
Pain with traveling	5	6	3	16	7.5±5.80
Pain with dressing	8	2	4	16	7.5±5.80
Mean±SD	9.75±4.59	3.5±5.96	2.875±1.36	14±6.14	

Table 7. Pre/Post Comprehensive Statistical Analysis

Pain	Pre	Post	Pre	Post	Pre	Post	Pre	Post
	Mild	Mild	Mod.	Mod.	Sev.	Sev.	No Pain	No Pain
lifting	2	16	19	8	9	4	0	2
walking	3	11	20	4	7	3	0	12
sitting	12	17	11	2	4	2	3	9
standing	8	6	16	3	6	4	0	17
sleeping	18	9	4	0	0	0	8	21
social life	20	6	7	3	3	3	0	19
traveling	15	5	10	6	3	3	2	16
dressing	8	8	18	2	4	4	0	16
Mean	10.75	9.75	13.125	3.50	4.50	2.875	1.625	14.00
±SD	±6.65	±4.59	±5.96	±2.51	±2.78	±1.36	±2.83	±6.14
t test	0.732		0.002		0.167		0.0004	
correlation	0.470370119		0.492141801		0.739544161		0.370511577	

reported with performance of activities of daily living such as lifting, walking, sitting, standing, sleeping, social life, traveling and dressing.

The Guide to Physical Therapist practice sets a range for the frequency of visits that a practitioner should prescribe under certain conditions and diagnosis. For a patient suffering with musculoskeletal disorder, the expected range of number of visits per episode of care is 3 to 18. The Guide stated that this limit should achieve the expected outcome during a single continuous episode of care. The expected outcomes according to the guide are the ability to perform physical actions, tasks or activities; knowledge of personal and environmental factors associated

with the condition; physical function and performance levels in self care, improvement of home management or activities; improvement of risk of recurrence.

The Guide also addresses the factors that may modify the frequency of visits. Factors such as: accessibility and availability of resources, adherence to the intervention program, age, chronicity or severity, cognitive status, level of impairment, level of physical function, multisite or multisystem involvement, nutritional status, premorbid conditions, social support, psychomotor abilities and several other health related factors.

Based on the results of this case study, it is

Table 8. Ranges Across Individual Pre & Post Areas Demonstrate Improvement

Pain	Range Mild	Post	Range Moderate	Post	Range Severe	Post	Range No Pain	Post
lifting	2-16	<14	19-8	>8	9-4	>5	0-2	<2
walking	3-11	<8	20-4	>16	7-3	>4	0-12	<12
sitting	12-17	<5	11-2	>18	4-2	>2	3-9	<6
standing	8-6	>2	16-3	>17	6-4	>2	0-17	<17
sleeping	18-9	>9	4-0	>4	0-0	~	8-21	<17
social life	20-6	>14	7-3	>4	3-3	~	0-19	<19
traveling	15-5	>10	10-6	>4	3-3	~	2-16	<14
dressing	8-8	~	18-2	>16	4-4	~	0-16	<16

important that physical therapists do not rely solely on the Guide in determining or prescribing physical therapy treatment. The Guide is an effective and well research source; however, the Guide failed to mention a very important factor, that of the practitioner's experience. The ability to properly assess and evaluate a patient and determine the frequency of visits based on past experiences and expertise are statements not covered in the guide. While the majority of the treatment frequencies for this case study fell under the recommendations of the Guide, patients who scored 40 or above on the McGill's pain questionnaire did not follow that pattern. The decision to augment treatment was based on the practitioner's experience.

It is essential that we understand as practitioners that the Guide does not necessarily provide specific protocols for treatments, it was merely "developed using expert consensus to identify common features of patient/client management for selected patient client diagnostic groups". As previously mentioned, key factors such as the practitioner's assessments and experience play important roles in determining treatment frequency. We as practitioners, must utilize all of our resources; our skills, our experiences, our Guide to Physical Therapist Practice, and our good judgment.

The post data results indicate notable improvements in the area of no pain for subjects participating in the study as noted in tables 6 to 8. It is important to note that greater improvement in the areas is likely due to the individual scores within the categories under the pain recorded.

Further research should be conducted to explore the validity of this study with a more large scale sample and explore variables associated with age, history variables, and gender that may affect treatment outcomes which were not controlled in this study.

V. Conclusion

Our study demonstrated several points. It is evident that physical therapy intervention is beneficial for patients suffering from degenerative joint disease. Patients showed remarkable improvement on the post treatment analysis. As demonstrated by the results of this study, one should not rely on any gold standard when prescribing a treatment plan. Several factors can affect the frequency of treatment and the practitioner's experience plays an important role.

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