Exercise Therapy for Chronic Knee Osteoarthritis

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ABSTRACT

The main purposes of this study were to determine the most suitable exercise program provided to osteoarthritic knee patients in the different hospitals and clinics in Cairo and to detect the difference between the provided and the standard exercise programs.The study was conducted at 60 hospitals and clinics which were chosen randomly:12 govermental,10 educational,29 private,and 9 military hospitals.In all,80 therapists were interviewed.A checklist was designed to collect the appropriate data regarding therapeutic exercises provided to osteoarthritic knee patients,year of graduation,and professional degree of the therapist.It was found that the most commonly provided exercises were quadriceps setting and straight leg raising by 77% and 62% respectively,also, hamstrings stretching(30.4%),and hip exercises (26.6%). These results revealed that,there is a lack of provideing of adequate and proper therapeutic exercises that are needed to rehabilitate osteoarthritis knee patients. Also, there is a great difference between the ideal exercise program and the few exercises which are provided to such patients.Furthermore,analysis of the results showed that,private clinics were the best among the other categories.

Key Words : ***Osteoarthritis,Knee joint,Exercise Therapy.***

INTRODUCTION

Knee osteoarthritis is a very common diagnosis that physiotherapist deal with in most hospitals and clinics.Treatment of knee osteoarthritis includes pharmacological and non pharmacological therapies.Both therapies are directed toward relieving pain and improving function[8]. Non steriodal anti-inflammatory drugs (NSAIDs), are most widely used for treating osteoarthritis. Although NSAIDs reduce pain and allow the patient to function, they cause serious gastrointestinal (GIT) problems[2]. Non pharmacological therapy includes physiotherapy and operative treatments. Surgery is mainly indicated for advanced cases of osteoarthritis when pain is intolerable and result in sever disabilitiy. Physiotherapy is indicated for mild to moderate cases[9]. Physiotherapy includes physical modalities and exercises.Different physical modalities like heat,cold,and electrical stimulation are used to prepare the patient for exercise sessions through reducing pain and helping the patient to relax[9]. Exercises programs include strengthening exercises, stretching, range of motion (ROM), and mobilization exercises to areas related to the involved knee joint. Also, conditioning and functional exercises, balance, co-ordination, posture training, and gait re-education are recommended[9]. Exercise therapy is a very important component of the

rehabilitation program of the osteoarthritis patients. Exercises restore normal joint mechanics and function, which prevents deformity, improve muscle strength, range of motion joint stability, and aerobic capacity[7]. Kover et al., (1992)[6], addressed the efficacy of supervised fitness walking functional status and reducing pain with a decrease in drug use in patients with knee osteoarthritis. Also, they reported that functional exercises such as walking, bicycling, and swimming could improve aerobic fitness without adverse effects on the joints. Exercises, also, reduce pain and improve functional capacity in patients with osteoarthritis. They are a safe non-medical and non invasive alternative therapy for knee and hip osteoarthritis[9]. Therapeutic exercises physical training and, aerobic exercises are significantly improve patient's function, as in the ability to climb stairs; rise from a chair; and walk[8]. Hurley and Scott (1998)[4] found that osteoarthritis knee patients showed a decrease in proprioceptive acuity, and that there was a relation between quadriceps sensorimotor dysfunction and functional disability. This study showed also that quadriceps strengthening exercises improved quadriceps strength, voluntary quadriceps activation, quadriceps sensorimotor function as proprioceptive acuity, and disability.

METHOD AND PROCEDURES

Subjects

Sixty hospitals and clinics were chosen randomly in Cairo city. These hospitals included govermental, private, and military categories. Eighty therapists, who were in charge at these hospitals, were interviewed.

Materials

A checklist with two main parts was created for the interviews. The first part includes the therapist's name, year of graduation, and professional degree. The second part of the checklist includes different forms of exercises, which are essential in the rehabilitation of osteoarthritis knee patients. The checklist also, includes questions about the techniques used for the application of each form of exercise.

Procedure

The study was conducted through personal visits to the different hospitals and clinics.;12 hospitals were govermental,10 were educational,29 were private, and 9 were military hospital.

The data were collected by interviewing the therapist who was providing the physical therapy rehabilitation program for osteoarthritis knee patients at each location. During each interview, the therapist was asked about the physical therapy that was described for the osteoarthritic knee patients.

Statistical Methods

As the variables of the study were nominal or independent samples,a descriptive analysis and non parametric tests were used for data analysis.The obtained data were represented by percentages.

RESULTS

The results revealed that the most commonly provided exercises to the osteoarthritic knee patients, were quadriceps setting (77%), and straight leg raising exercises (62%). Most of the therapists provided these exercises as a home program, instead of applying them at the clinic.

As regarding quadriceps isometric execises,60% of the therapists assumed that these exercises were synonymous to static exercises, isometric exercises were delivered by 17.7%. Dynamic quadriceps strengthening exercises were not encouraged, as70% of the therapists believed that these exercises enhance degeneration. Thus, quadriceps short arc exercises were provided by 8.9%. Also, progressive resistive exercises(PRE) were provided in concentric contraction and closed chain form by 12.7%.Knee flexibility exercises, hamstrings and calf muscles stretching were provided by 30.4% and 16.5% respectively. Knee range of motion and mobilization exercises were limited to knee active free exercises(24%).In other words, tibiofemoral and patellofemoral joints mobilization exercises were almost not provided to osteoarthritic knee patients.

As regarding exercises of the related areas, it was found that: hip joint exercises were provided by 26.6%, while ankle, abdominal, and back exercises were not provided The different ratios of the applied therapeutic exercises were shown in table (1).

Most of the therapists recalled that there was no relation between co-ordination, balance, posture training exercises, gait re-training, and knee osteoarthritis, so these exercises were not provided to our patients, except for gait re-education, which was provided by only 6.3%. Regarding functional exercises which increase total body endurance and functional capacity of the patient, such as: walking and bicycling activities,65% of the therapists believed that walking could progress knee joint degeneration and 90% recalled that bicycling was contra-indicated. As a result of these assumptions, only 27.8% advised patients to practice walking activity.

Also, the obtained results shown that private clinics and the 1990s graduated therapists were relatively better in administering appropriate treatment than the other categories as shown in table (2).

Table (1): Exercises provided to O.A knee patients in various hospitals and clinics.

Name of the ex.	Frequency of application	Percent of application
Strengthening ex's for quad. Muscle:		
Static form: quad. Set.	61	77%
S.L.R.	49	62%
S.L.R. w (R)	9	11.4%
* Isometric form	14	17.7%
* Dynamic form:	7	8.9%
short terminal arc ex's.		
P.R.E in concentric cont.	10	12.7%
P.R.E in eccentric cont.	1	1.3%
P.R.E in open chain.	10	12.7%
P.R.E in closed chain.	0	0%
Flexibility & stretching		
* Hamstring muscle	24	30.4%
* Calf muscle	13	16.5%
R.O.M & Mobilization		
* Active free exs.	19	24.1%
* F-T.J. distraction	7	8.9%
* F-T.J. & patellar gliding	1	1.3%
Ex's to related areas		
* Hip joint ex's	21	26.6%
* Ankle joint ex,s.	1	1.3%
* Back and abd ex's.	0	0%
Co-ordination and balance ex's.	1	1.3%
Posture training ex's.	1	1.3%
Gait re-education	5	6.3%
Functional training		
* walking	22	27.8%
* Bicycling	1	1.3%

N.B. Short arc ex's. with and without resistance have the same percentage of application.

Table (2): Year of graduation and its relation to the provided exercises.

Name the ex.	1990s n=14	1980s n=14	1970s n=7
Quad setting ex's	79.3%	71.4%	71.4%
S.L.R. ex's	76.2%	42.9%	57.1%
S.L.R. with (R)	13.8%	7.1%	0%
Isometric ex's	24.1%	0%	0%
P.R.E. in conc. and o.c. ex's.	12.1%	7.1%	28.6%
Short arc ex's.	12.1%	0%	0%
Ham stretch ex's.	19%	7.1%	14.3%
Calf stretch ex's.	19%	7.1%	14.3%
Active free ex's.	20.7%	21.4%	57.1%
F-T.J. dist. Ex's.	10.3%	0%	0%
Hip ex's.	29.3%	28.6%	14.3%
Gait re-education	8.6%	0%	0%

DISCUSSION

Most of the studies recommended the use of exercise therapy for osteoarthritic patients[1,4,5,7,11]. The current study revealed that: execises therapy were applied by most of the physical therapists in Cairo but the private clinics provided better care to osteoarthritis knee patients than the others. The military categories were shown as relatively better than the govermental, and the educational categories. This could be ascribed to more than one cause: firstly, the knowledge, qualification, and professional degree of the therapists difference. In the private categories, 34% of the therapists were faculty members with post professional degrees in physical therapy, and 35% of the therapists were clinical instructors at the faculty of physical therapy. The caseload in the private clinics and military hospitals is relatively lower than that of the governmental and educational hospitals. As a matter of fact, when caseload are too high, there is less chance for the therapists to provide their patients with proper rehabilitation programs, no matter what are the therapists qualifications. Thirdly, the financial resources of the private and military clinics are relatively higher than those of the governmental and educational hospitals. Finally, many of the physical therapy clinics, especially the governmental and the educational ones are directed by rehabilitation medicine physicians who do not have the appropriate qualifications to plan an ideal exercise therapy program for the osteoarthritic patients.

Also, the analysis of the percentage of application of the appropriate therapeutic exercises for osteoarthritic knee patients in relation to the therapist's year of graduation showed an uneven improvement in the personal knowledge base of therapists by decades;1990s graduates were relatively the best, and 1970s graduates were better than 1980s.However,this study showed that the exercises provided to osteoarthritic knee patients were limited to quadriceps setting and straight leg raising exercises, which were provided by most of the therapists as home exercise routine. Although a few exercises were offered to such patients, thier percentage of application was minimal. Many therapists were having a number of incorrect concepts (their beliefs were not in accord with present theory and practice) regarding the proper exercises that should be provided to rehabilitate the osteoarthritic knee patients. Although the recent graduates were better qualified in this area, their self reported practice was not adequate for this patient population.

Also, the results of this study revealed some wrong concepts and beliefes, regarding osteoarthritis knee rehabilitation. Some of these concepts are:

1- The only safe exercises that can be practiced by such patients are quadriceps setting and straight leg raising exercises.

2- Quadriceps isometric exercises are the same as quadriceps static exercises.
3- Dynamic strengthening exercises for the quadriceps muscle is contraindicated as they progress the degenerative process.
4- Osteoarthritis knee patients should not move their knees in flexion.
5- Hamstrings and calf muscles stretching is only indicated for knee contracture.
6- Conditioning exercises such as walking and bicycling enhance joint degeneration.
7- Balance exercises, posture training, and gait re-education are not considered in the rehabilitation program of osteoarthritic patients.

CONCLUSION

Exercise therapy is recommended by most of the physical therapists in the different hospitals and clinics in Cairo, but there is a lack of provision of adequate and proper therapeutic exercises that are needed to rehabilitate osteoarthritic patients. Also, there is a great difference between the ideal exercise program and the actually provided exercises. In order to provide a proper exercise therapy for knee osteoarthritis patients, balance and conditioning exercises should be included .

REFERENCE

1- Chadwick, A.: Osteoarthritis.In -DAVID J (eds): Rheumatological Physiotherapy, Mosby, London, 84-90, 1999.
2- Ganriel, S.E.; Jaakkimainen, L. and Bombarier, C.: Risk for Serious Gastrointestinal Complications Related to the Use of Non Steriodal Anti-inflammatory Drugs .Ann Intern Med 115:787-796,1991.
3- Hertling, D. and Kessler, R.M.: Arthology. In Management of Common Musculoskeletal Disorders: Physical Therapy Principles and Methods 3rd ed. Lippincott-Raven, Philadelphia, 107-115, 1996.
4- Hurley, M.V. and Scott, D.L.: Improvement in Quadriceps Sensorimotor Functions Following a Clinically Practicable Exercise Regime 37:1181-1187,1998.
5- Kisner, C. and Colby, L.A.: The knee. In Therapeutic Exercise, Foundation, and Techniques.2nd ed. FA Davis, Philadelphia, 1990 .
6- Kover, P.A.; Allegerante, J.P. and Macknzie, R.: Supervised Fitness walking in Patients with Osteoarthritis of The Knee. Ann of Intern med 116:529,1992.
7- Lane, N.E. and Thompson, J.M.: Management of Oteoarthritis in the Primary Care Setting: An Evidence-Based Approach to Treatment. Am J Med 103:25s-30s, 1997.
8- Lechner, D.E.: Rehailitation of the Knee with osteoarthritis In GREENFIELD BH (ed): Rehabilitation of the Knee: A Problem solving approach. FA Davis, Philadelphia, 1993.
9- Puett, D.W. and Griffin, M.R.: Published Trails of Nonmedicaland Noninvasive Therapies for Hip and K nee Osteoarthritis. Ann Intern Med 121:133-140,1994.
10- Schilke, J.M.; Johnson, G.O.; Housh, T.J. and O'Dell, J.R.: Effects of Muscle Strength Training on the functional Status of Patients with Osteoarthritis of the Knee Joint. Nursing Res 45:68-72,1996.
11- Thomson, A.; Skinner, A. and Piercy, J.: Degenerative Arthropathies. In Tidy's Physiotherapy, 12th ed Butterworth-Heinemann Oxford, 1991.

الملخص العربي

استخدام التمرينات العلاجية في حالات الالتهاب المفصلي العظمي للركبة

(دراسة مسحية)

استهدفت هذه الدراسة تحديد البرنامج المناسب للعلاج بالتمرينات في حالات الالتهاب العظمي المفصلي المزمن للركبة وذلك في مستشفيات وعيادات القاهرة المختلفة ، ولقد شملت هذه الدراسة حوالي ستون مستشفى وعيادة تم اختيارهم عشوائياً ، وقد تم استطلاع لرأي حوالي ثمانون إخصائي علاج طبيعي في هذه المستشفيات واشتمل هذا الاستطلاع على تحديد سنة التخرج وعدد سنين الخبرة للإخصائي وتحديد أكثر البرامج العلاجية استخداماً وأنسبها لمرضى الالتهاب المفصلي العظمي المزمن للركبة وكانت نتائج هذا البحث كما يلي :

أكثر التمرينات العلاجية استخداماً هي التمرينات الساكنة للعضلة الرباعية للركبة (77%) والتمرين الخاص برفع وفرد الطرف المصاب لأعلى (62%) ولقد كانت هذه التمرينات تستخدم كبرنامج منزلي للمريض فقط ، أما تمرينات شد العضلات الخلفية لمفصل الركبة فكانت نسبتها 30.4 % وتمرينات مفصل الفخذ حوالي 24% كما أوضحت هذه الدراسة بعض المعتقدات الخاطئة الخاصة بالتمرينات العلاجية للمريض مثل : عدم تشجيع المريض على ثني مفصل الركبة المصابة حتى لا يؤدي ذلك إلى زيادة تآكل غضاريف المفصل وأيضاً عدم الحاجة إلى تمرينات التوازن وتدريبات المشي حيث أنها تؤدي إلى إساءة حالة مفصل الركبة المصابة .