

The Effect of Relaxation and Relaxation with Resisted Exercises in Osteoarthritis of Knee A Randomised Prospective and Comparative Study

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Abstract

One hundred and thirtyone cases of osteoarthritis of the knee joint were randomly treated with relaxation exercises (Group A) and relaxation and resisted exercises (Group B) and followed up for more than eight weeks. 69.8% of Group A and 82.1% Group B patients showed excellent to good results. Relaxation and osteoarthritis and in those patients who could not relax. Weight reduction, proper understanding of instructions and follow up are also important factors in determining the outcome of the physiotherapeutic programme.

Keywords :

Exercises, Knee, Osteoarthritis, Physiotherapy, Relaxation Exercises, Resisted Exercises.

Introduction

Osteoarthritis of the knee joint is the commonest arthropathy in the Indian subcontinent as also elsewhere. In one survey (Lawrence et al, 1963), the prevalence of severe joint disease was 19% in men and 22% in women. Osteoarthritis of the knee is usually primary. There is an increased water content and biochemical changes in the matrix of hyaline articular cartilage leading to cartilage loss, eburnation, subchondral cysts and osteophytes, eventually causing deformity and instability³. In any physiotherapeutic clinic these patients are treated by heat or cold and variety of exercise techniques¹. It is obviously desirable that randomised prospective evaluation of new treatments are performed especially with large number of cases before it becomes established into the physiotherapeutic practice.

In this study of 131 cases of primary osteoarthritis of the knee, the results of clinical effectiveness of relaxation exercises and relaxation and resisted exercises are compared.

Method

The patients attending physiotherapy clinic of our outpatient department were selected for this study. The clinical and radiological evidence of primary osteoarthritis were taken as the criteria for the diagnosis of osteoarthritis⁴ thus excluding all cases of secondary osteoarthritis. The patients were randomly divided into two groups, A and B (Table 1 & 2). The exercise regime for Group 'A' consisted of Relaxation Exercises (by progressive Relaxation techniques) in sitting position, in supine position with hip and knee flexed and in prone position for 2-5 minutes each depending on the relaxing ability, along with thermotherapy (Short Wave Diathermy) for 20 minutes using the condenser field technique. All patients were instructed to continue these exercises at home 3-4 times daily.

Exercises for Group 'B' consisted of relaxation Exercises for two to seven days followed by Resisted: Exercises in the physiotherapy

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Table 1 : Group-wise Distribution of Cases

S.No.	Sex	Group A	Group B	Total Number in each Sex	Percentage in each Sex
1.	Male	34	15	49	37.4%
2.	Female	52	30	82	62.6%

TOTAL NUMBER OF CASES : 131

Table 2 : Age and Sex-wise Distribution of Cases.

S.No.	Age Group	Male	Female	Total Number Of Cases in each age Group
1.	24 TO 35	3	8	11
2.	30 TO 60	38	40	78
3.	61 TO 80	8	34	42

TOTAL NUMBER OF CASES : 131

Table3 : Grading of the Result

S.No.	Grade of the Result	Score	Percentage of Improvement
1.	EXCELLENT	0-2	71% TO 100%
2.	GOOD	3-4	51% TO 70%
3.	FAIR	5-6	31% TO 50%
4.	POOR	More than 6	Less than 30%

department. Ten isotonic warm up contractions of the quadriceps starting at 90° flexion and proceeding through available pain free range of knee extension were carried out initially. Then the knee was kept in 40° - 60° flexion and manual resistance to extension was applied. The resistance was submaximal at first-three contractions each of half and three-fourth of 10 Repetition maximum. This was followed by-three sets of three maximal ten second quadriceps (isometric) contractions with three minutes interval between sets. The exercises were done with ten seconds hold each time. They were repeated in the physiotherapy clinic every alternate day for four weeks. Home programme consisted of self-resisted knee exercises at 40 -60 flexion of the knee.

Patients of both the groups were initially treated every alternate day for four weeks and then weekly. All the patients were reviewed weekly for four weeks and then again after four weeks.

Patients in both the groups were instructed in joint protection (precautions to be taken during sitting, standing, walking, toilet activities, stair climbing etc.) gait training, and using walking aids.

Assessment

All the patients were assessed by one of the authors before, during the treatment (every week) and later every four weeks. In these occasions, both objective and subjective evaluations were carried out. The objective factors assessed (by one of the authors) were joint movement, alignment, deformity, gait, squatting, cross leg sitting, stair climbing and exercise efficiency. The subjective factors assessed (and graded by the patient himself/herself) were pain, tenderness, swelling, crepitus, morning stiffness and restriction of movement. All these factors were scored on a 0 to 10 scale (10 being poorest) and graded as in Table 3.

Results

The results which were analysed group and sexwise are shown in Table 4 and 5. In group

A (using only relaxation exercises) there were 39.5% excellent and 30.3% good results. In group B (using relaxation and resisted exercises) there were 64.4% excellent and 17.7% good results.

Discussion

Osteoarthritis is a painful and usually disabling condition affecting significant part of the middle age and elderly population. They are so frequently treated by a variety of physiotherapeutic measures that it becomes imperative and desirable to conduct controlled prospective trials to find out the efficacy of various techniques ⁴.

A variety of physiotherapeutic measures like thermotherapy ⁴, transcutaneous electrical Nerve stimulation (TENS) ⁹ various exercise techniques ^{7,10} gait training and joint protection ¹ are used. Many studies comparing efficacy of these techniques have been carried out in the past ^{4,5,8,11}.

In this study, comparing relaxation exercises (Group A) with relaxation and resisted exercises (Group B) in the treatment of osteoarthritis of the knee joint, better results were noted in group B (82.1% excellent and good results) than in Group A (69.8% excellent and good results). Moreover, it was noted that those patients who couldn't relax even after detailed instructions in the physiotherapy clinic are the ones who did not have better results with only relaxation exercises. Although we have not used this as a strict criteria, these patients are better treated with relaxation and resisted exercises. Also, in general, patients with little osteoarthritic changes (early osteoarthritis) responded to relaxation exercises alone whereas late osteoarthritic cases needed relaxation and resisted exercises for symptomatic improvement. Although there is some difference between male and female patients (better results in female both the groups) (Table 5) this is not statistically significant. Moreover there were more number of female patients.

Many of these patients with osteoarthritis of the knee joint have quadriceps

Table 4 : Group-wise Analysis of the Results

S.No.	Result Grade	Group-A Relaxation Exercises Only		Group-B Relaxation & Resisted Exercises	
		No. Of Patients	Percentage	No. Of Patients	Percentage
1.	EXCELLENT	34	39.5%	15	64.4%
2.	GOOD	26	30.3%	8	17.7%
3.	FAIR	13	15.1%	7	15.5%
4.	POOR	13	15.1%	1	2.4%

Table 5 : Sex-wise Analysis of the Results

S.No.	Result Grade	Group-A Relaxation Exercises Only		Group-B Relaxation & Resisted Exercises	
		Male	Female	Male	Female
1.	EXCELLENT	12	22	9	20
2.	GOOD	10	16	2	6
3.	FAIR	5	8	4	3
4.	POOR	7	6	0	1

Table 6 : Causes of Fair & Poor Results

S.No.	Cause	No. of Patients
1.	Duration and Severity of involvement more than 5 years.	10
2.	Did not follow instruction, so could not relax	8
3.	Over weight	12
4.	No proper follow-up	4

or hamstring muscle weakness and faulty postural and gait pattern^{5,10}. They were having a tendency to keep the muscles tight due to fear of pain. Relaxation exercises have helped these people along with other forms of physiotherapy. Dynamometric measurements including isometric knee extension torque are not valid measurements to judge the outcome of treatment⁵. As direct measurement of functional performance is a more valid procedure, the objective factors evaluated by us are of this nature, especially in the context of our socio-economic circumstances.

Weight reduction^{1,4}, gait training including climbing and descending stairs^{1,10}, correct use of walking aids¹, posture correction and joint protection^{1,10} compliment the exercises and thermotherapy, thus greatly helping in relieving the pain. Self care by above measures and continuing exercises at home is an important aspect of physiotherapeutic treatment, of osteoarthritis. Continuing interest in the patient demonstrated by review at intervals⁶ is important². Poor results in our study were chiefly due to absence of follow ups and instructions about physiotherapy not being carried out properly in addition to duration and severity of involvement. (22 cases-Table 6) Failure to reduce weight is also a significant cause of failure (12 of 34 cases)

Conclusions

Exercise programme is an important part of treatment of osteoarthritis of the knee. Proper assessment of the patient in the physiotherapy clinic, followed by relaxation or relaxation and resisted exercises complimented by other physiotherapeutic and joint protection measures are needed to provide best functional outcome. A combination of relaxation and resisted exercises gives better results than relaxation exercises alone.

Summary

One hundred and thirty one cases of osteoarthritis of the knee joint were randomly treated with relaxation exercises (Group A) and relaxation and resisted exercises (Group B) and followed up for more than eight weeks.

69.8% of Group A and 82.1% Group B patients showed excellent to good results. Relaxation and resisted exercises together did better in late cases of osteoarthritis and in those patients who could not relax. Weight reduction, proper understanding of instructions and follow up are also important factors in determining the outcome of the physiotherapeutic programme.

References

1. Adler S. : Self care in the management of the Degenerative Knee joint. 71 (2), 58-60, 1985
2. Care, G.R.F. Harfield B. Chamberlain, N.A. : And have You Done Your Exercises? *Physiotherapy* 67(6), 180, 1981.
3. Gardner, D. L.: The Nature and Causes of Osteoarthritis. *British Medical Journal* 286, 418-424, 1983.
4. Hamilton, D. E. Bywaters, E.G.L. Please, N.W. : A Controlled Trial of Various Forms of Physiotherapy in Arthritis. *British Medical Journal* 1,542-544, 1959.
5. Lankhorst, G. J. Van de Stadt, R. Van der Korst, J. K. Hinlopen-Bonrath, E. Griffioen, S.M. and de Beer, W. Relationship of Isometric Knee Extension Torque and Functional Variables in Osteoarthritis of the Knee. *Scandinavian Journal of Rehabilitation Medicine* 14, 7- 10, 1982
6. Lawrence , J. S. Bremner, J. M. Bier, F. : Osteoarthritis . Prevalence in the Population and relationship between Symptoms and X-ray changes. *Ann. Rheum. Dis.* 22, 237-255, 1963.
7. Marks R: Quadriceps Exercises for Osteoarthritis of the knee - A single case study comparing short term versus long term training effects. *Physiotherapy* 80(4), 195- 199, 1994.
8. Quirk AS, Newman RJ, Newman J: An evaluation of interferential therapy, shortwave diathermy and exercises in the treatment of Osteoarthritis of the knee. *Physiotherapy* 71(2), 55-57, 1985.
9. Tulgar M, MC Glone F, Bowsher D, Miles JB: Comparative effectiveness of different stimulation modes in relieving pain- part-II. A double blind controlled long term clinical trial. *Pain* 47, 157-162, 1991.
10. Wilson, D.J. Treatment of Anterior Knee Pain by Calf Stretching and Walking Re-education *Physiotherapy* 75(2), 127-128, 1989.
11. Wright, V : Treatment of Osteoarthritis of the Knees. *Ann. Rheum. Dis.* 23, 389-391, 1964.