

Proprioceptive Exercise Training among a Knee Osteoarthritis Subject – Case Study Report

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ABSTRACT: An increasing prevalence of obesity and osteoarthritis knee are widely reported. This study subject treated with Proprioceptive exercises have exhibited an improved quality of life, good glycemic control, reduction in obesity in a 3 months follow up. Combined with lifestyle modification, regular physiotherapy, walking, Proprioceptive exercise training, various clinical, psychological and physical benefits were discussed.

KEYWORDS: BMI – Body Mass Index, ROM: Range of Motion of Joint, Womac Score – Subject Rating on Scale With Various Physical Functioning Involving Knee Joint

I. INTRODUCTION

1. Osteoarthritis was considered as a disease of articular cartilage, but recent studies have reported that it involves the entire joint tissues, synovium, capsule, bone and ligaments leading to subchondral bone attrition and remodeling, meniscal degeneration, ligament laxity, fat pad extrusion and impairments of neuromuscular control (Dicesare et al 2009).
2. Osteoarthritis is the most common joint disease causing disability (Ambrosia et al 2005) with more disability and clinical symptoms result from osteoarthritis of the knee than from any other joint (Felson et al 1995) and thus of great socio economic significance (Badely & Tennant et al 1993).
3. The principle of managing osteoarthritis is reduction of pain, stiffness, maintenance of function, retarding the disease progression of joint damage and improve quality of life (Arya et al 2013) and weight reduction, life style changes helps to reduce pain and improves physical function (Richette et al 2011)
4. Obesity is a major or risk factor for developing osteoarthritis knee (Srinivasan et al 2012). Obesity and physical activity are major health problems, with 2/3rd of Americans are obese and majority do not engage in regular physical activity (Simpson et al 2000)
5. A decline in the strength and mass of quadriceps can cause a decrease proprioception and balance (Zazulak et al 2007) while knee joint proprioception is essential to neuromotor control (Lephart et al 1997).
6. Proprioception is the process by which the body can vary muscle contraction in immediate response to incoming information regarding external force, any pathology that adversely affects muscle function may impair force generation and Proprioceptive activity system, then balance and production of stable gait are impaired with (Srinivas et al 2012). The aim of this case study with osteoarthritis knee was to analyse pain and physical function with knee joint Proprioceptive exercises.

II. BACKGROUND INFORMATION

This case study of a 62 year old female subject with osteoarthritis of knee was treated with physiotherapy with three year follow up strives to analyse the impact of various physical exercises, home programme, regular supervised exercises, life style changes and weight reduction in the subjects sustained improvement in her quality of life.

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C/O

Pain in left knee, increasing with floor level activities, walking and change of postures

Anthropometric and Physical parameters:

Height: 156 cm Resting Heart Rate: 90/mt Weight: 63 kg

Blood Pressure: 124 / 86mm/Hg BMI: 25Kg/m²

Past medical history of the subject includes having undergone closed heart surgery for PDA, when she was 7 years old, presently she is a hypertensive, diabetic, thyroid disorder, hypertensive, diabetic, hyper lipedemia and is medically treated with tablet thyronorm, T. Losar, Glycomet 500 mg, atorva 10 mg. X-ray in standing has revealed decreased joint space in both knee joints left> right with osteophyte formation, she was treated with a course of interferential therapy elsewhere and is attending this center for her knee rehabilitation from 18 -01-2016

O/E

- Exaggerated lumbar lordosis, with weak spinal and abdominal muscles
- Hip joints were fully mobile but motor power of extensors and abductors were 3/5
- Bilateral genu recurvatum and flexion beyond 90⁰ was painful on left knee with right active ROM was 0⁰ -105⁰
- Bilateral Vastus Medialis lag positive
- Ambulant unaided with mild antalgic gait
- Left knee laxity positive with special tests for anterior cruciate ligament, posterior Cruciate ligament, menisci were negative.

III. PROVISIONAL DIAGNOSIS

Obesity, bilateral Osteoarthritis of knee joints

Treatment Given:

- i. Weight reduction exercises using Physioball
- ii. Strengthening of both, hips knees and core muscles
- iii. Proprioceptive exercises to both lower extremities

Set: 12 Exercises, gradual progression of exercises were done with increase in repetition and holding period, each session lasting for 30-35 minutes

Prognosis:

Within 3 months period of thrice a week session, this subject has shown the following results:

Results of pre and post ROM, Womac Score, BMI, Waist Circumference

	Waist Circumference Cm	BMI kg/m ²	Womac score %	ROM	
				Right	Left
Pre	88	Height: 156 cm Weight: 63 kg, 25Kg/m ²	59	0 ⁰ -105 ⁰	0 ⁰ -90 ⁰
Post	76	58 Kg, 21Kg/m ²	19	0 ⁰ -120 ⁰	0 ⁰ -110 ⁰

IV. DISCUSSION

The subject after 3 months of therapy was instructed to walk regularly, keep body weight in control and continue a set of home exercises to report to center once in every 15 days for review to sustain the progress achieved. The purpose of

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this study was to analyse the outcome whether be extended to other patients with Osteoarthritis and the possible mechanism for the positive prognosis this subject was able to achieve:

- a) Reduction in body mass index
- b) Drop in waist circumference
- c) An improved womac score
- d) An increased range of motion in knee joints
- e) A better gait pattern
- f) Regular walking for 25-30 minutes daily
- g) Glycemic control has improved with hba_{1c} at 6% from 6.8%
- h) Impact of Proprioceptive exercises on quality of life.

1. Weight reduction is quite effective among osteoarthritis knee, which reduces pain and improves physical function, with life style changes must be continued throughout life (Richette 2011). **A drop in body weight by 5kg and waist circumference by 8 cm this subject has an improved pain and physical function in line with the above study.**
2. An improved womac score and active ROM were reported in a study of two weeks using Proprioceptive exercises among osteoarthritis knee subjects (Srinivas et al 2012) **womac score of this subject has improved from 59% to 19%.**
3. Subjects with osteoarthritis knee have difficulty with activities of daily living such as walking, stair liming and housekeeping, and commonly have a number of coexisting. Obesity related disorders such as heart disease, hypertension and diabetes (Reeuwri et al 2010). **This subjects being a type II diabetic on medication with regular physiotherapy hba_{1c} has improved from 6.8% to 6%, an improved lipid profile and good control on hypertension, which are added benefits along with an improved obesity and functional means from having osteoarthritis knee.**
4. The quadriceps muscle strength in patient who with osteoarthritis knee has been seen to be consistently lower due to disease atrophy secondary to joint pain (Baker et al 2001 & Srinivas 2012) with possible decrease in proprioception and balance (Zazulayk et al 2007). Various studies have recorded the effects of an exercises regime on quadriceps strength and Proprioceptive activity and disability in patients with knee osteoarthritis (Thomas et al 2002). In patients with osteoarthritis knee, deficits in knee joint Proprioceptive activity were recorded (Koralewiz and Eng 2000) and few studies have demonstrated link between Proprioceptive impairment to pain and physical function (Pail et al 1997) have found decrease in pain among osteoarthritis knee to improve proprioception. **This study subject who was treated mainly with Proprioceptive exercises using Physioball has shown an improved physical function as reflected in the womac score by more than 30% improvement.**

V. CONCLUSION

Benefits of weight reduction with exercises, when coupled with Proprioceptive exercise training can be more effective in reducing the pain, promoting physical function and improving associated medical condition are prudent as inferred from this original case study. Further studies with larger sample sizes, other variables such as vibration exercises, electrical modalities are recommended, limitations of this study being unable to measure exclusive impact of Proprioceptive training among osteoarthritis knee.

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