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PARKINSON`S DISEASE AND INFLUENCE OF MUSIC IN THEIR REHABILITATION

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Abstract

Psychomotor rehabilitation in parkinson disease

Parkinson disease (PD) is a progressive neurodegenerative disease characterized by bradykinesia, rigidity, resting tremor, gait disturbance, stooped posture, autonomic dysfunction and mental symptoms, such as dementia, delirium and depression. The available therapies for PD include pharmacologic management, rehabilitation and education. Exercise for patients with PD can improve primary and secondary symptoms and can be beneficial in all stages of PD. An exercise program should include aerobic exercise, stretching exercises and strengthening exercises. Twenty minutes of exercise three times a week is best. In addition, use of an external pacemaker, such as rhythmic sounds and music therapy, might be effective for improving gait disorder and motor performance in patients with PD. Patient education program provide a useful adjunct to medical therapy and are needed for early and middle disease stages in PD.

Key-words: progressive neurodegenerative disease, rehabilitation, patient physical education programs.

Introduction

Parkinson `s disease (PD) is a progressive neurodegenerative disease characterized by bradikinesia, rigidity, resting tremor, gait disturbance, stooped posture, autonomic dysfunction and mental symptoms, such as dementia, delirium and depression. The available therapies for PD include pharmacologic management, rehabilitation and education. Exercise for patients with PD can improve primary and secondary symptoms and can be beneficial in all stages of PD. An exercise program should include aerobic exercise, stretching exercises and strengthening exercises. Twenty minutes of exercise three times a week is best. In addition, use of an external pacemaker, such as rhythmic sounds and music therapy, might be effective for improving gait disorder and motor performance in patients with PD. Patient education programs provide a useful adjunct to medical therapy and are needed for early and middle disease stages in PD.

It is a degenerative disease with familiar autosomal dominant transmission. In this disease the Black Substance is more affected due to unknown etiology and Globus Pallidus also affected.

Males are more affected than females. **Symptoms:**

1. Akinesia.
2. Hypertony /Rigidity.
3. Tremor.

1. Akinesia.The patient has difficulty in starting the movements. All the movements are slow. The automatic movements (balance of arms) are absent. The face is like a mask without expression. The blinking of the patient is rare. Walk is made by short shuffling steps. The position of the body during walk is like a " ? " (body, neck, legs and arms are flexed). The voice of the patient is slow and monotonous. Some verses (words) are repeated - Palylalia. The thinking process is slowed. The handwriting is small and illegible.

2. Hypertony /Rigidity The whole body is flexed like a " ? " due to rigidity.The rigidity is of plastic type.

"Pillow sing" positive - Head of patient remains elevated for along time after the pillow is removed. Expression of this rigidity is the "Cog-wheel" phenomenon or the "Noica" sing.

3.Tremor**:** It is an involuntary movement which usually affects the fingers, hands, head and the legs sometimes. It is a Static Tremor (during rest it appears and disappears during active movements). It appears during emotional states and disappears during sleep. It`s frequency is 4-7 / sec. This tremor has a typical aspect. It is an alternans b /w flexor and extensor muscles. Hence it appears as "Pill-rolling" movenment or in the hands and pedal movement in foot. Nodding movement of head and neck.

Tendon reflexes are normal.The patient has no motor deficit and no problem of sensitivity..The sweating of the skin is excessive. Salivation is also excessive. The Sebum production is in excess(greasy face). This patients has some psychic disturbances- the patient is selfish, with increased irritability bradypsychia and Dementia appears later.

In Parkinsons lesion predominantly affects the Black Substance and Globus Pallidus. The number of neurons in Black Substance at 30 years of age is 500.000 , at 80 is remains at 250.000. In pathological state it is 80.000. The levels of Dopamine is decreased.(Mano, 2003)

Evolution: It is longer than 10 years, after this the pacient is in bed needing assistance.(Docu, 2012)

Most treatments of Parkinson's disease (PD) are aimed at the reduction of motor and nonmotor symptoms but patients often report a deterioration of their daily lives. Thus, to achieve a global improvement in personal well-being, not only drugs, but also complementary therapies, such as physical exercise, occupational therapy, speech therapy, and active music therapy, have been used. **(**Pacchetti et al., 2000).

Experimental

Used materials

We analyze 40 patients with PD. From them,

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20 received only medication and for 20 of them we initiate music and exercise. We used a questionnaire who include age, sex, age at disease onset, disease duration, symptoms, activities of daily living, gait disturbance, history of falls, etc. The rehabilitation program includes twenty minute of exercise three times a week. We performed Beck depression scale, UPDRS scale.

Work methodology

We investigated changes in non-motor symptoms (anxiety, depression etc) function in relation to repetitive voluntary thumb movement in patients with PD. We observed that they respond well to instrumental hymns and spirituals. Music therapy has proven to be particularly effective in decreased of anxiety, depression.

We studied the short – term effects of axial rotation exercises. We measured thoracolumbar range of motion, supine to stand before and after individual instruction once a week for 4 weeks.

Next, we studied the effect of training for inpatients with disuse muscle weakness.

Our recovery objective was to:

- educate the patient for a good life
- to optimize his postural stability
- to optimize his respiratory capacity
- to optimize his functional capacity;

Characterizations

Instruction in appropriate exercises might prevent disuse weakness and cardiopulmonary insufficiency and help maintain ADL and QOL in patients with PD.

Results and discussions

We initiated a questionnaire survey of patients with Parkinson disease because patients with PD falls represent one of the risk factors for disability in ADL.

Researchers reported that falls occurred in 68.3% of patients with PD, and falls were significantly associated with disease severity, balance impairment and depression They stressed the need for interventions to prevent falls in patients with PD. (Wood et al.2005)

The idea of PD as a pure motor disturbance must be reconsidered. Phenomena like kinesia paradoxica, i.e., the sudden mobility and agility of otherwise akinetic PD patients in situations of great emergency, suggest that the nature of this pathology cannot be motor in a strict sense. In line with this hypothesis, (Mazzoni et 2007al) showed that patients can exhibit "normal" motor behavior even in simple arm-reaching movements, not just in extreme cases.

Some of them reported that fractures due to falls were significantly more common in a PD group (15%) than the corresponding control group (7.5%), and the commonest site of fractures in the PD group was the femur, wile it was the forearm in the control group .The risk of fracture was significantly increased in PD relative to the control group, and hip fractures can cause disuse syndrome, impairment of ADL and poor quality of life (QOL). (Genever et. Al, 2005)

Same clinicians reported that fear of falling was significantly associated with a qualitative estimate of postural control in patients with PD. (Adkin et al. 2003)

In Constanta Ambulatory Unit we used a questionnaire to survey 40 patients with PD. Study sample included 25 men and 15 women, with an average of 68.3 ± 8.5 years.

The items included on the questionnaire covered age, sex, age at disease onset, disease duration, symptoms, activity of daily living (ADL), medication, gait disturbance, history of falls, fracture due to falls, etc.

Our results showed that the risk of falls increased with worsening Hoehn and Yahr (H-Y) disease, and patients of H-Y stages 3-4 were likely to fall when starting to walk, and at the end of walking period and when adjusting their posture. About 30% of patients with H-Y stage 3-4 PD experienced fractures of limbs and trunk due to falls.

PD patients were most likely to fall over between 10:00- 12:00 am, and between 02:00- 04:00 pm. The result reflects the effects of gradually decreasing PD medication levels, between 10:00-12:00 am, when patients are working actively, being involved in house working during both periods.

Patients with PD are likely to lose confidence in gait control after experiencing a fall, and then may not want to walk unaided. Fig. 4 shows where the patients experienced falls indoors. Patients with PD were most likely to fall in a living room and this reflected that they spent most of their time in a living room during daytime. The other common places for falls included bedroom, corridor, kitchen, bathroom, and entrance.

Exercise and education

Exercise is an important non-pharmacologic therapy, which can be beneficial for patients at all stages of PD. The aims of exercise are 1) training for primary symptoms such as rigidity, bradykinesia, balance impairment and gait disturbance; and 2) training for secondary disuse syndrome, such as muscle weakness, range of motion restriction, low strength, and cardiopulmonary insufficiency, due to inactivity caused by primary symptoms.

Schenkman reported that exercise (three times per week for 10 weeks) significantly improved functional axial rotation and functional reach in patients with the early and mid stages of PD. (Schenkman et al.,1998) Appropriate exercise is effective in improving ability of functional movements.

Pacchetti et al. studied the effect of active music therapy and physical therapy, and reported that active music therapy had a significant effect on bradykinesia, Happiness measure and QOL. Music therapy is effective for both motor and emotional function.(Pacchetti et al.,2000).

Thaut et al. studied the effect of gait training with rhythmic auditory stimulation and self-paced training. They reported that patients with PD who trained with accompanying rhythmic auditory stimulation significantly improved gait velocity, stride length, step cadence and timing of EMG pattern. In addition, Frenkel-Toledo et al. reported that treadmill walking reduced stride time variability and swing variability in patients with PD. Music therapy, rhythmic auditory stimulation and treadmills play the role of an external pacemaker when influencing movement and gait control in patients with PD. Training with an external pacemaker is often useful during training in PD of all stages.

Exercise and music for patients with PD can improve motor and nonmotor symptoms and can be beneficial for patient with PD. Our study wants to identify the possibility of exercises program associated with music to improve the quality of life for these patients. The PD available therapy includes pharmacologic management, deep brain stimulation of the thalamus and subthalamic nucleus, rehabilitation and education. Here, I would like to explain a method of rehabilitation for our patients with PD.

We analyze 40 patients with PD. From them, 20 received only medication and for 20 of them we initiate music and exercise. We used a questionnaire which includes age, sex, age at disease onset, disease duration, symptoms, activities of daily living, gait disturbance, history of falls, etc. The rehabilitation program include twenty minute of exercise three times a week. We performed Beck depression scale, UPDRS scale.

Two routes for voluntary movement are available in the nervous system. The decreased function of basal ganglia due to PD impaired the route from the basal ganglia to the supplementary motor cortex. These data suggest that the route from sensory input to cerebellum to premotor cortex could compensate for the decreased function of the route via the basal ganglion to the premotor cortex. Once change occurred in the motor cortex, the change persisted even after interruption of the training. These phenomena suggest that motor memory can be stored in the motor cortex. In addition, rhythmic sounds may be an effective rehabilitation tool for improving gait disorder and motor performance in PD patience who experience the freezing phenomenon.

Montgomery et al. assessed the effect of an education program for PD. (Montgomery et al.,2000) The health promotion program (PRORATH) was designed to improve health confidence, provide information and support, improve physical function through exercise, and promote cooperation with the physician to optimize medical treatment and compliance. A total of 140 patients in the intervention of PRORATH group and 150 patients in a control group questionnaires by mail at 0, 2, 4 and 6 months. The intervention group had significantly increased exercise, decreased „time off'' and percentage of time off, fewer side effects, and decreased summary Parkinson scores. During the study period, levodopa dose rose for controls and the intervention group, although only slightly in the latter group. The authors concluded that the patient education program provided a useful adjunct to medical therapy of PD. Education programs for patients with PD are one of the important therapy modalities needed for early and mild stages of PD.

We studied the short – term effects of axial rotation exercises. We measured thoracolumbar range of motion, supine to stand before and after individual instruction once a week for 4 weeks. The patient` s active thoracolumbar range of motion significantly increase after axial rotation exercises over 4 week.

Next, we studied the effect of training for inpatients with disuse muscle weakness. The subjects were 15 inpatients with muscle weakness of lower limbs and 11 inpatients without muscle weakness. The average age was 71.8 ± 6.4 years in the muscle weakness group and 63.6 ± 10.7 years in the normal muscle group. There was a significant difference between the average age in two groups. In the muscle weakness group, 5 patients had iliopsoas muscle weakness, 2 patients had gluteus medius muscle weakness and 8 patients had iliopsoas muscle and other muscle weakness. The patients received 4 weeks of music therapy. The patients in the muscle weakness group improved the weakness of their lower limbs, decreased the average 10-metre gait time from 13.1 seconds to 10.5 seconds, and decreased step number for 10-metre gait from 23.8 steps to 19.4 steps. Thus, increased muscle strength in the lower limbs resulted in improvement in gait velocity and brachybasia.

Conclusions

Proving beneficially, a set of exercises can improve motor and non-motor symptoms of the patients with PD, but does not apply in advances case. The best option would be a controlled exercise program of 20 minutes, with various exercises picked form aerobic, stretching and strengthening disciplines, repeated three times a week. In addition, music therapy might be effective, improving gait disorder and motor performance in patient with PD in all stages. It is important to perform a recovery training knowing very well the stage of the disease and the balance sheet of the principal complication of the disease.

We hypothesized that active theater, which shares some features with active music therapy, might have a stronger effect than music because of the special features required by this discipline. In order to be able to impersonate a character, patients need to control their bodies and minds carefully so patients have to be aware of and control each movement they produce and, at the same time, they also have to represent their character‟s emotions, i.e., they need to be able to feel and reproduce his/her feelings. In addition, both during

the performance and off the set, patients have to interact continuously, so they are forced to socialize.

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