Case Report
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EFFECTS OF PROPRIOCEPTIVE TRAINING ON MOTOR FUNCTION AND DISABILITY IN A PATIENT WITH TRAUMATIC BRAIN INJURY AND POST CRANIOTOMY BLINDNESS

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ABSTRACT

Study was conducted on 18 years old male patient with head and brain injury and post craniotomy blindness. After receiving the initial intensive care unit (ICU) services and interventions, patient was discharged from the hospital and presented to outdoor physical therapy clinic. Intervention was proprioceptive training by using gym ball and approximation techniques on joints combined with strengthening exercises with manual resistance. Interventions were carried out in 05 days in a week and continued for 03 months. Patient was assessed and scored on disability rating score (DRS) and functional independent measure (FIM) before starting interventions and re-assessed after 03 month on same scales. Pre intervention DRS score was 20 and post intervention score was 05. Pre intervention FIM score was 21 and post intervention score was 96. Proprioceptive training (by using gym ball and approximation techniques on joints combine with strengthening exercises with manual resistance) can improve the motor function and can reduce disability significantly in patients recovering from traumatic brain injury.

Keywords: Blindness, Craniotomy, Proprioception, Training, Traumatic brain injury.

INTRODUCTION

After traumatic brain injury there is additive factors that affect the motor function in these patients. Post craniotomy blindness and lesion in motor areas are major factors that affect the motor function[1]. Both proprioception and vision combine in an efficient way in the central nervous system to execute a motor function[2]. There is improved motor function when there is viewing the hand as compared to when vision is excluded from the motor function[3]. Accuracy of movement is dependent on vision[4]. Properioception play a minor role in the execution of motor function when there is intact vision system, but when there is vision system is impaired then proprioception is the system to control the motor function[5].

CASE REPORT

Study was conducted on 18 years old male patient with head and brain injury and post craniotomy blindness. After receiving the initial ICU services and interventions, patient was discharged from the hospital and presented to outdoor physical therapy clinic. Disability rating score (DRS) and functional independent measure (FIM) was used as outcome measurement tools. Intervention was propriceptive training by using gym ball and approximation techniques on joints combined with strengthening exercises with manual resistance. Interventions were carried out in 05 days a week and continued for 03 months. Patient was assessed and scored on DRS (table-I) and FIM (table-II) before starting interventions and re-assessed after 03 month on same scales.

RESULTS

Mean pre-interventional disability rating score was 20 that reduced to 05 after 03 month of intervention. Functional independent measure consists of measurements in self care, sphincter control, transfers, locomotion and communication. Mean pre-intervention FIM score was 21 and post intervention FIM score was 96. FIM score can be divided into motor subtotal

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score and cognitive subtotal score. Motor subtotal score was 13 before the intervention and after 03 month increased to 63. Cognitive subtotal score was 08 before the intervention and after 03 month increased to 33.

DISCUSSION

After traumatic brain injury and blindness, motor control is difficult. Proprioception is the major component to transmit information from environment to nervous system in the absence of vision. Proprioceptive training should be focused in these patients to overcome the impaired vision system. Study focused that in patient with blindness, the proprioceptive interventions should be encouraged to strengthen the joint sense to execute motor function when vision is impaired. This study supports the results of a similar study that was conducted by Glittenberg and Brickner, in which they concluded that a multidimensional physical therapy program can improve the activity limitation in patients with ataxia resulted by traumatic brain injury[6]. Comprehensive rehabilitation programs have more effectiveness as compared to traditional treatments[7]. In another case report the efficacy of Rhythmic Exercises with Auditory Cues was measured in traumatic brain injury on gait and functional assessment and they concluded that Rhythmic Exercise improve the motor function of patients in a year[8]. Currently there is limited data on rehabilitation of patients with post craniotomy blindness and traumatic brain injury. More focused interventions and researches are required immediately to fulfill this gap.

Table-I: Disability rating score (DRS) and functional independent measure (FIM).

Tool	Pre-score	Post-score	Change in score
DRS	20	05	15
FIM	21	96	75

Table-II: Proprioceptive training description.

Intervention	Methodology	Intensity	Volume	Frequency	Duration
Proprioceptive training by using gym ball	Gym ball was used in the method to Bobath, with weight bearing on joints.	Start with minimal resistance to progress with maximum safe resistance	15 repetitions on key joints, shoulder, elbow, spine, hip, knee, ankle	05 sessions per week	03 months
Approximation techniques on joints	Manual approximation of joint according to tissue resistance principle by Maitland and Kaltenborn	Start with minimal resistance to progress with maximum safe resistance	15 repetitions on key joints, shoulder, elbow, spine, hip, knee, ankle	05 session per week	03 months
Strengthening exercises with manual resistance	Movements according to action of group of muscles and functional patterns	Start with minimal resistance to progress with maximum safe resistance	15 repetitions on key joints, shoulder, elbow, spine, hip, knee, ankle	05 session per week	03 months

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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