

Case Report

Postural improvement in young deaf and mute boy in post 2 weeks pineal gland tumour removal after 3 balance rehabilitation: A Case Study

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Pineal region tumours are primary central nervous system (CNS) tumours. Pineal region tumours may cause increased pressure inside the skull due to the production of too much CSF or blockage of its normal flow known as hydrocephalus. Imbalance is one of the features in this case. Vestibular Rehabilitation (VRT) is a specific form of physical therapy designed to habituate symptoms and promote adaptation to and substitution for various aspects of deficits related to a wide variety of balance disorders. Bal Ex is a home-based module of VRT with specific modules that are available in three forms; manual book, poster and DVD. This module was developed with a combination of customized Cawthorne Cooksey Exercise and prayer movements. The patient is a 14-year-old boy, disabled (mute and deaf), known case of pineal gland tumour since 2016, then post tumour removal 2 weeks ago. The patient experienced balance problem 8 years ago before he was diagnosed with pineal tumour. He did not complain of any dizziness and vertigo according to his mother. The patient then underwent intensive BAL Ex therapy inward for 3 sessions starting with Level 1, once per day, 40 minutes each session, and without taking any medicine during the treatment. He underwent one-to-one sessions with the trainer and also followed the balance exercise video in every session. After 1 week of balance exercise only in level 1, the patient showed a small difference and 10% improvement.

Keywords: *Bal Ex, Postural improvement, Bal Ex Module, imbalance*

INTRODUCTION

Pineal gland tumour is not a common type of tumour which is reported at less than 1% of the primary type of brain tumour¹. This type of tumour is divided into four different grades referred to their characteristics and it originates from a normal cell inside the pineal gland that is commonly experienced among children compared to adults. The exact location of the pineal gland is in the third ventricle center part of the brain and the primary central nervous system that is responsible for melatonin hormone secretion².

Overproduction of the CSF or obstruction of the drainage can cause hydrocephalus in pineal gland tumors. So symptoms are most often caused by blockage of the cerebrospinal fluid flow which then causes obstructive hydrocephalus. Common symptoms faced by the patient include headache, nausea, vomiting, imbalance and double vision³.

The formal treatment for these tumours is surgery removal proceeded with the biopsy of the tumour tissues to determine the grade and staging of the tumour. After the surgery, there are a few cases that need to be continued with radiation and chemotherapy.

Case Report

A 14-year-old disabled, mute and deaf boy, a known case of pineal gland tumour since 2016, then post tumour removal 2 weeks ago from the clerking date, presented with a balance problem 8 years ago. He was diagnosed with profound hearing loss and was underwent unilateral cochlear implant (CI) surgery. There was no detailed

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assessment done and referral for this problem. Post-CI, his parents reported poor speech and communication even after they followed all the speech therapy sessions. Till now there is no speech seen and not much progress reported by his mother. Detailed pictures of pre- and post-tumour removal are shown in Figure I. He did not complain of any dizziness and vertigo apart from imbalance and difficulty in walking after surgery.

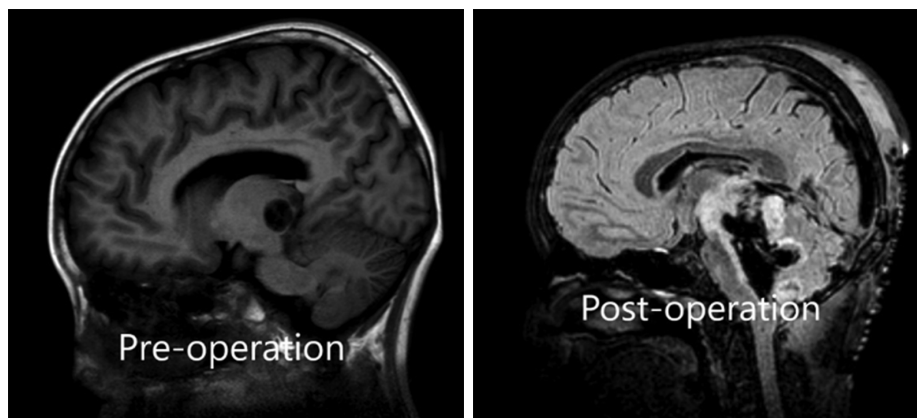


Figure I: MRI finding in pre- and post-pineal tumour removal

The patient then underwent 3 sessions of intensive BAL EX therapy in-ward starting with Level 1, once per day, 40 minutes each session, and without taking any medicine during the treatment. To evaluate the postural control pre- and post-therapy we used the Bal Exzz Foam test pre- and post-balance rehabilitation. This Bal Exzz Foam test has a structured scoring foam that is divided into seven sections (Table I). A positive Fukuda test has been identified (Table I). The patient previously experienced symptoms in the past 8 years before he was diagnosed with pineal tumour but improved after the treatment.

Table I: Bal Ex Scoring Foam

LEVEL	DESCRIPTION	PRE THERAPY	POST 3 SESSIONS THERAPY
1	Stand on the floor with arms across your chest and feet together and hold for 30 seconds (opened eyes)	Normal	Normal
2	Stand on the floor with arms across your chest and feet together and hold together and hold for 30 seconds (closed eyes)	< 4 seconds	< 5 seconds
3	Stand on the floor with arms across your chest, toe touching the other side of heel and hold for 30 seconds (opened eyes)	< 2 seconds	< 2 seconds
4	Stand on the floor with arms across your chest, toe touching the other side of heel and hold for 30 seconds (closed eyes)	< 1 second	< 2 seconds
5	Stand on a 3-inch-high density foam cushion with your arms crossed, feet together and hold for 30 seconds (opened eyes)	< 3 seconds	< 3 seconds
6	Stand on a 3-inch-high density foam cushion with your arms crossed, feet together and hold for 30 seconds (closed eyes)	< 2 seconds	< 3 seconds
7	Fukuda test	Unable to perform	Unable to perform

VRT is a type of physical therapy that aims to habituate symptoms and encourage adaptation to and substitution for various aspects of deficits associated with a wide variety of balance problems. The vestibular system must be stimulated and retrained, hence the majority of VRT activities include head movement. The prognosis for patients with post-removal pineal gland tumour is good³.

Bal Ex is a home-based module that is available in three forms namely video, manual book, poster, and DVD. The Bal Ex Home-based balance is a VRT with specific modules and a video guide. To assist people

with various balance disorders, it includes nine distinct languages (Malay, English, Mandarin, Tamil, Hokkien, Nigeria, Parsian, and Arabic)⁴. The Bal-Ex module video is a completely structured home-based video and audio-guided tool designed to help individuals with Peripheral Vestibular Disorder (PVD). This module was created using a modified exercise and prayer movements. One of the VRT exercises is foam exercise. There are numerous advantages to use this physical exercise module. This exercise consists of 20 movements and is divided into 3 levels targeting specific functions of balance organs (Table II). Bal Ex is an adaptation from Customized Cawthorne Cooksey Exercise and prayer movement.

Figure II: Balance rehabilitation using Bal Ex video session

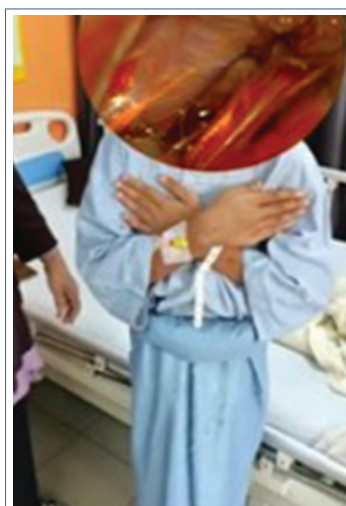


Table II: Three levels in the Bal Ex module video

Level 1	Level 2	Level 3
<ul style="list-style-type: none"> • Head & neck • Eye focusing • Heaviness of the neck 	<ul style="list-style-type: none"> • Positioning • Daily activities (i.e., prayer, up and down) • Return to normal daily activities 	<ul style="list-style-type: none"> • Postural • Increase the postural control • Return to normal walk, running and use a stair

Discussion and Conclusion

Pineal region tumour is one of the commonest central lesions or tumours in the young age population. Any central lesion in the brain can cause a balance disorder that can impair quality of life. Poor postural control, recurrent fall, floating sensation are common balance symptoms. Usually, the prognosis for patients with post-removal pineal gland tumour is good. In this case, the pre- and post-op patient experienced poor postural control and was unable to walk properly. After several sessions of intervention using the Bal Ex module in a balance rehabilitation clinic in level 1, the patient showed some recovery whereby he improved with mild imbalance after 3 sessions and more for the head and

neck movement. Since the patient is mute, we were unable to have proper feedback and family member feedback was used for this patient. Bal Ex is a home-based module that can be used and practiced at home. In this case, it was able to improve the postural control when the patient continuously underwent balance rehabilitation at home with family member support. In every tumour case, one of the key supports post-operation that needs to be emphasized is balance rehabilitation. If the patient's postural control is not improved, it will cause poor quality of life whereby the patient cannot walk and continue daily activities normally. Surgical and physiotherapy is a great combination of therapy in tumour cases having balance problems.

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