

Vestibular Office Tests: A Battery Approach to Guide the Diagnosis of Dizzy Patients

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Eman Galal

بسم الله الرحمن الرحيم

“قالوا سبحانك لا علم لنا الا ما علمتنا انك انت العليم الحكيم“

صدق الله العظيم

سورة البقرة – الآية (٣٢)

List of Abbreviations

- **ABC scale:** Activities Specific Balance Confidence Scale.
- **ADT:** Adaptation Test.
- **CDP:** Computerized Dynamic Posturography.
- **CS:** Composite Score.
- **CTSIB:** Clinical Test of Sensory Integration and Balance.
- **BPPV:** Benign Paroxysmal Positional Vertigo.
- **DHI:** Dizziness Handicap Inventory.
- **DVA:** Dynamic Visual Acuity Test.
- **ENG:** Electronystagmography.
- **EOG:** Electrooculography.
- **FRT:** Functional Reach Test.
- **HIT:** Head Impulse Test
- **HTT:** Head Thrust Test.
- **HSN:** Head Shake Nystagmus.
- **HST:** Head Shake Test.
- **MLB:** Medial Longitudinal Bundle.
- **MS:** Multiple Sclerosis.
- **OPK:** Optokinetic.
- **OTR:** Ocular Tilt Reaction.
- **PPRF:** Para-pontine Reticular Formation.
- **SCC:** Semicircular Canal.
- **SCM:** Sternocleidomastoid Muscle.
- **SHA:** Sinusoidal Harmonic Acceleration Test.
- **SOT:** Sensory Organization Test.

- **SVV/ SVH:** Subjective Visual Vertical/ Subjective Visual Horizontal.
- **UVH:** Unilateral Vestibular Hypofunction.
- **VEMPs:** Vestibular Evoked myogenic Potentials.
- **VOR:** Vestibulo-ocular reflex.
- **VAR:** Vestibular Autorotation Test.
- **VNG:** Videonystagmography.
- **VBRT:** Vestibular and Balance Rehabilitation Therapy.
- **VSR:** Vestibulo- spinal reflex.
- **VCR:** Vestibulo- colic reflex.

List of Figures

Figure	Title	Page
Figure(1)	Anatomy of the Peripheral vestibular system	6
Figure(2)	Action of SCC	8
Figure(3)	Action of Otolith	8
Figure(4)	The Vestibulo-ocular reflex	9
Figure(5)	The five pathways involved in the control of coordinated limb and body movements.	10
Figure (6)	Physiological and pathological vertigo	12
Figure (7)	Principal pathways of pursuit, OPK and vestibular control systems.	24
Figure (8)	Optokinetic nystagmus be elicited by the moving drum	26
Figure (9)	Frenzel's goggles	31
Figure(10)	Head Thrust Test	37
Figure(11)	Fukuda Stepping Test.	43
Figure(12)	The Functional Reach Test	45
Figure(13)	(a) Maddox Rod placed on the right eye	50
Figure(14)	Right Dix-Hallpike Test.	55
Figure(15)	The side-lying maneuver.	56
Figure(16)	Representation of the electrode placement of the ENG	60
Figure(17)	Computerized Dynamic Visual Acuity Test	65

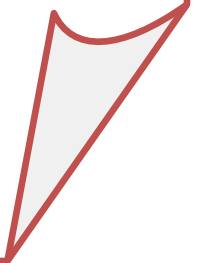
List of Tables

Table	Title	Page
Table(1)	Mean, Standard Deviation (SD) and range for age of the patients	84
Table (2)	Distribution of patients according to the description of Dizziness	84
Table (3)	Distribution of patients according to the duration of Dizziness	85
Table (4)	Correlation between duration of illness and bedside tests (HST, HTT, Fukuda and CTSIB)	85
Table (5)	Mean, SD and range for ABC scale score of the study group	86
Table (6)	Mean, SD and range for DHI score of the study group	86
Table (7)	Correlation between ABC score and unilateral caloric weakness and SOT composite score	86
Table (8)	Correlation between DHI and unilateral caloric weakness and SOT composite score	87
Table (9)	Correlation between ABC score and DHI.	87
Table (10)	Distribution of dizzy patients according to the results of Audiological evaluation	87
Table (11)	Distribution of patients according to VNG results	88
Table (12)	Distribution of patients according to VNG subtests results	88
Table (13)	Distribution of patients regarding VEMPs results	89
Table (14)	Mean & Standard Deviation (SD) of VEMP Latency in msec.	89
Table (15)	Distribution of patients regarding CDP results	90
Table (16)	Results of Sensory Organization Test (SOT): Mean scores, standard deviation (SD) of each condition and number of	90

	patients with abnormal results	
Table (17)	Results of Head Shake Test (HST)	91
Table (18)	Correlation between HST and caloric weakness	91
Table (19)	Distribution of patients according to results of caloric irrigation and HST	92
Table (20)	Distribution of patients in groups according to the results of caloric irrigation and Head Shaking Test	92
Table (21)	Results of Head Shaking Test considering caloric test and Jonkees's formula as the "gold standard"	93
Table (22)	Distribution of patients with HSN towards the opposite side of UW, and the same side	93
Table (23)	Correlation between HSN side and side of caloric weakness	93
Table (24)	Results of Head Thrust Test (HTT)	94
Table (25)	Correlation between HTT and caloric weakness	94
Table (26)	Distribution of patients according to results of caloric irrigation and Head Thrust Test	94
Table (27)	Results of Head Thrust Test considering caloric test and Jonkees's formula as the "gold standard"	95
Table (28)	Correlation between +ve HTT side and side of caloric weakness	95
Table (29)	Results of Fukuda Test	95
Table (30)	Descriptive analysis for Fukuda Stepping Test	96
Table (31)	Distribution of patients according to results of caloric irrigation as a gold standard test and Fukuda Test	96
Table (32)	Results of Fukuda Test considering caloric test and Jonkees's formula as the "gold standard"	97
Table (33)	Distribution of patients according to results of SOT composite score as a gold standard test and Fukuda Test	97
Table (34)	Results of Fukuda Test considering SOT composite score as the "gold standard"	98

Table (35)	Correlation between angle of deviation of Fukuda test and unilateral caloric weakness and composite score of CDP	98
Table (36)	Correlation between side of deviation and side of unilateral caloric weakness and side of abnormal VEMP response	98
Table (37)	Results of Modified CTSIB	98
Table (38)	Distribution of patients according to results of CDP(SOT) composite score and Mod.CTSIB	99
Table (39)	Results of CTSIB considering SOT composite score as the “gold standard”	99
Table (40)	Mean in inches and Standard Deviation (SD) of FR Test in inches according to gender	100
Table (41)	Distribution of patients according to the etiological diagnosis	100

Introduction & Rationale



Introduction & Rationale:

Vertigo and dizziness are common complaints encountered in clinical practice (**Fretter, 2000**). However the term dizziness encompasses a variety of different sensations each points in distinct diagnostic direction; vertigo, imbalance, tilt illusion, oscillopsia, etc (**Halmagyi, 1996**).

Dizziness may be due to vestibular or non-vestibular causes. Vestibular causes of dizziness is classified Peripheral vestibular disorders as Ménière's disease, benign paroxysmal positional vertigo, acute vestibulopathy (vestibular neuritis) etc. which is encountered as the most common causes of vertigo, Central vestibular disorders as CNS trauma, multiple sclerosis and cerebellar atrophy, etc. and mixed disorders. Other non-vestibular causes of dizziness must be considered including psychogenic causes, anemia and cardiovascular disease, etc. (**Delany, 2003; Ojala & Palo, 1991**)

The principle purpose of balance-function evaluation is detection of the site of vestibular lesion (peripheral, central, or mixed) also helps to estimate its extent, and functional disability experienced by the patient, finally the possible etiology could be reached (**Shepard, 2002**).

Currently, with the evolution of high technology advances, a battery of laboratory tests used for evaluation of the balance system includes: VNG/ENG test battery which is the gold standard in evaluation of the vestibular system. It can assess the site of lesion and its extent focusing mainly on examination of the oculomotor system, vestibule-ocular reflex (VOR). Rotatory chair and VORtg tests are also used to evaluate VOR through expanding the range of frequencies (up to 2 KHz) (**Shepard, 2000**).

Currently Vestibular Evoked Myogenic Potential (VEMP) is considered as objective test that evaluates the Otolith function; the saccular part, inferior vestibular nerve and the central connections (angular VOR) (**Brantberg and Franson, 2000**)

Computerized dynamic Posturography involves a battery of tests that helps to assess the functional capacity of the balance disorder patients, rather than provide information about extent and site of lesion (**Shepard and Telien 1996**)

The use of this high technology vestibular laboratory testing provides adequate information about localization and quantification of vestibular abnormalities. However, it is expensive, needs expert physician for its interpretation, and not available in a wide scale.

While, with the basic understanding of vestibular physiology and proper examination techniques, correct diagnosis can generally be made at the office.

The bedside vestibular examination includes evaluation of static vestibular balance which involves the assessment of vestibule-ocular and vestibule-spinal systems e.g.; spontaneous nystagmus (VOR), assessment for ocular alignment (VSR mediated by lateral SCC), Romberg tests (VSR mediated by vertical canals), etc. While assessment of a VOR response to head rotations provides a measure of dynamic vestibular function e.g. Head Thrust test, Head Shake test, etc.

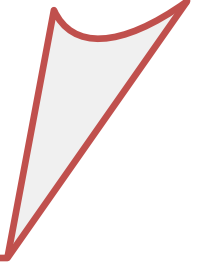
Additional oculomotor testing is an essential part of the neuro-otologic evaluation e.g: Range of motion, Smooth Pursuit testing, Optokinetic Nystagmus etc (**Walker & Zee, 2000**).

The bedside vestibular examination should also include the effect of provocative maneuvers, example: Positioning (Dix-Halpike) & positional testing which are useful in the diagnosis of BPPV (**Walker & Zee, 2000**).

Information regarding functional compensation, sensory input cues for the postural control could be accessed through CTSIB (**Shepard 2002**).

So in order to achieve best results of management, it is of utmost importance to reach highly refined approach to diagnose dizzy patients. Since laboratory vestibular tests are expensive and are not available in every clinic, on the other hand, office tests can be easily performed and of low-cost. Accordingly, this study is designed with the goal of developing a test battery office approach that would be able to detect peripheral versus central vestibular disorder, also unilateral versus bilateral lesion, and evaluation of the functional disabilities experienced by the patient.

Aims of the work



Aims of the work.

- 1- To select the appropriate Vestibular office battery approach to diagnose vestibular disorders in dizzy patients.
- 2- To measure the sensitivity and specificity of this battery in fulfilling these goals.
- 3- To standardize and develop Arabic version of Activities-specific Balance Confidence Scale (ABC).