

# Montreal Cognitive Assessment, a screening tool for Mild Traumatic Brain Injury: Prospective 117 patients Study

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## INTRODUCTION

Montreal Cognitive Assessment devised by Nasreddine et al in 2005 as a quick screening tool to detect cognitive impairment, validated for dementia, of any neuro-degenerative pathology. MoCA is proven to be effective in sensitivity and specificity for detecting cognitive impairment in dementia.

No published study has examined the clinical utility of MoCA test in neuro-cognitive assessment of patients with mild traumatic brain injury.

According to a recently published data by the CDC, approximately 40% of mTBI patients have at least one unmet need / with problem even after one year of injury. The top three unmet needs were:

improving memory and problem solving, managing stress and emotional upsets, and improving vocational skills at pre injury level

*All the above needs are related to the neuro-cognitive impairment.*

Most ER physicians will focus on vital signs maintenance and rule out major brain trauma by clinical and radiological investigation (CT scans). If no abnormality is found: Majority patients are released with instructions to watch for warning signs, no cognitive screening test or no follow-up instructions or any support system are provided.

We, as specialized out-patients center for mild and stable TBI patients, had an opportunity to study MoCA as an effective screening tool in mTBI patients or concussion head injury and to study neuro-cognitive types of deficit in mTBI with 7 cognitive modules of MoCA.

## MATERIAL AND METHODS

In the past 36 months, we assessed 117 patients of mild traumatic brain injury at our center. The patient-age ranged from 19 to 82 years (mean age 44 years). There was male gender predominance (M:F = 60:57). The mean period elapsed between the injury and presentation varied from 0.5 -36 months. Post traumatic headaches were the most common associated symptom (n = 83) followed by vertigo in 45 patients.

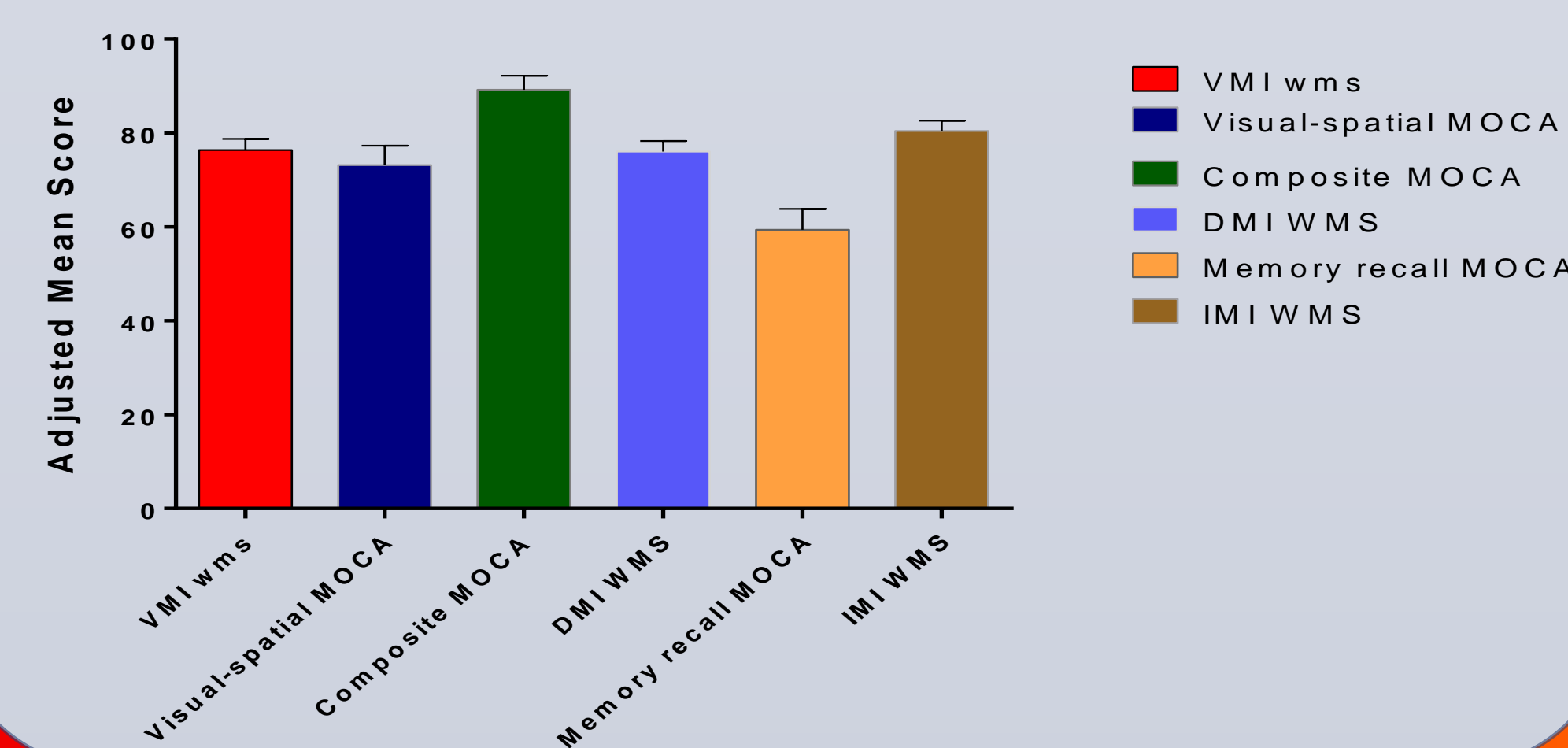
## Method Cont.

Symptoms at present	Number
Age	18-82 Years
F: M	57:60
Headaches	83
Vertigo(BPPV)	45
cognitive complaints	32
Seizure symptoms	7

Exclusion criteria were patients who had presented to us for the first time after >36 months post injury ( n = 22), any pre-morbid conditions in CVA, insomnia, depression and previous TBI. After deliberation, a composite score lower than 27/30 points was considered indicative of post TBI cognitive impairment due to the fact that mTBI patients **DO NOT** generally have impairment of “orientation” ability (6 points) that is commonly found in dementia .

We administered MoCA to all patients at the intake visit. This test makes assessment of 7 cognitive functions, namely: visuo-spatial, naming, memory, attention, language, abstraction, and orientation and allocated individual scores. The composite score ranges from 0 to 30. We consider a score of  $\leq 27$  as indicative of cognitive impairment.

To assess the sensitivity and specificity of MoCA, we compared the 31 patients’ sample of MoCA, composite score, and delayed recall to the Weschler Memory Scale IV at 50<sup>th</sup> Percentile as normal.



## Result:

The comparison to the MOCA composite scores of 27 correspond to the WMS IV 50 percentile with sensitivity 87.9 % and specificity 66.7 %.

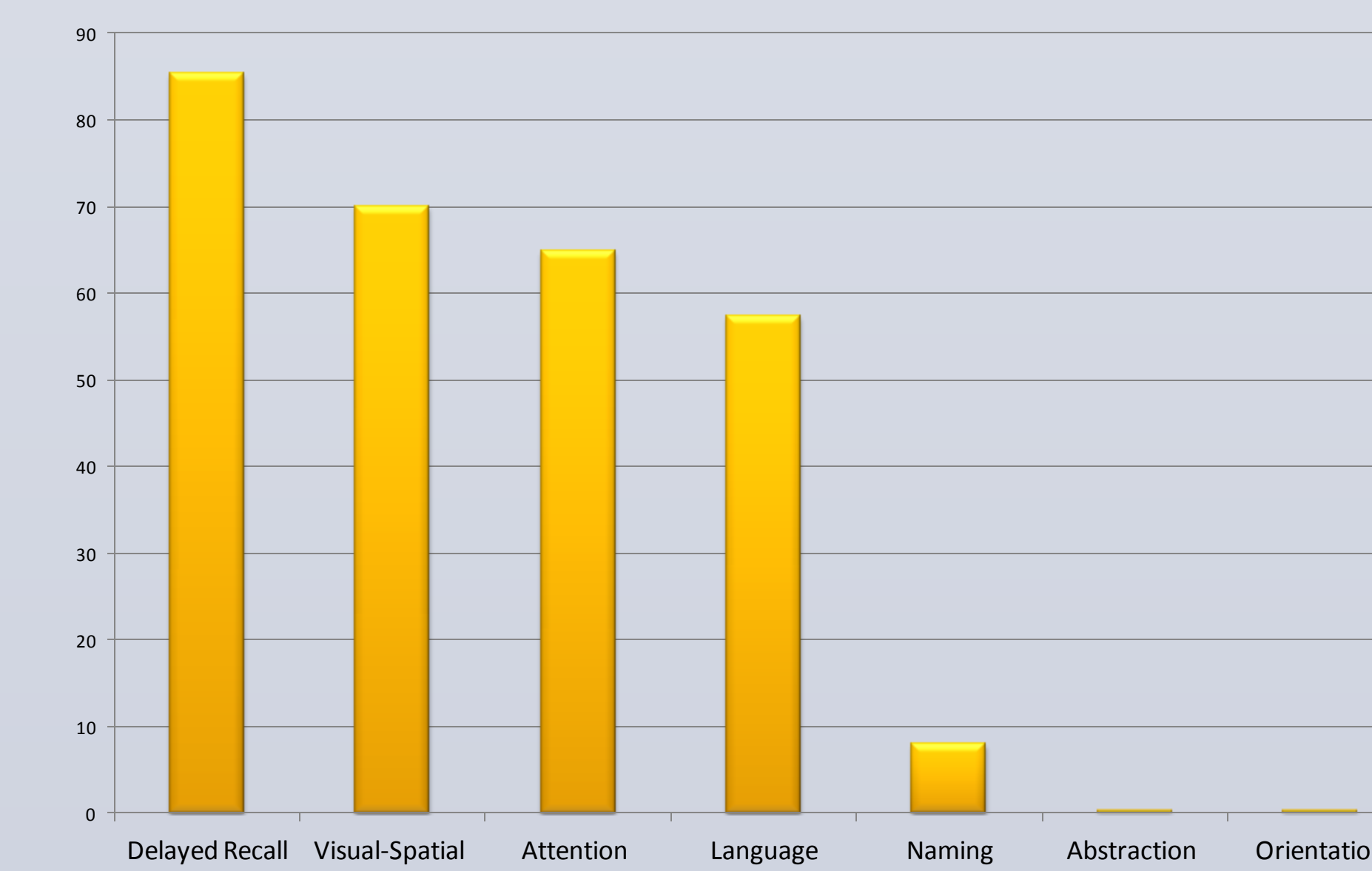
Sensitivity of delayed recall 87.9% compare to the WMS IV at 50 percentile with 66.7 % specificity. Average period of the WMS IV test from the TBI in mTBI group was 20 months.

The scores between 21-24 were most frequently noticed (44%) moderate followed by 25-27 (39%) mild and  $\leq 20$  (17%) sever.

Two thirds (66.6%) of the mTBI patients population had MoCA scores between 21 and 27 points mild to moderate cognitive deficit.

Memory Module	# Abnormal	Percentage
DELAYED RECALL	96	82.1
VISUO-SPATIAL/ EXECUTIVE	78	66.7
ATTENTION	76	64.9
LANGUAGE	67	57.3
NAMING	11	9.4
ABSTRACTION	6	5.1
ORIENTATION	10	8.5

## Percent of Patients with Abnormal Cognitive Score



## Results Cont..

Cognitive impairment persists in majority (75%) of patients even a year after mTBI from the point prevalence in our study.

## CONCLUSIONS

Assessment of cognitive impairment should be a mandatory protocol while evaluating patients of mTBI. MoCA is a quick and reasonably sensitive (87.9%) and specific (66.7% ) test for cognitive impairment following mTBI and is a good screening tool.

A majority of the patients (67%) with mTBI will demonstrate a composite MoCA score between 21 and 27.

The modules of *Visuo-spatial, Delayed recall, Attention and Language are the most commonly impaired cognitive functions in patients with mTBI. Orientation assessment is not significant in mTBI.*

## Recommendations:

- Mandatory 2 week and 3 month follow up after mTBI with Trained physician in TBI.
- Routine screening of mTBI patients with MoCA.
- MoCA can be further simplified as a spot screening tool but may need further study
- MoCA also can be an effective tool to stratify the treatment plan for MTBI patients and needs further studies.

We are studying MoCA to further validate with Std WASI IV and NAB battery neuropsychology test.

## CONTACT:

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