

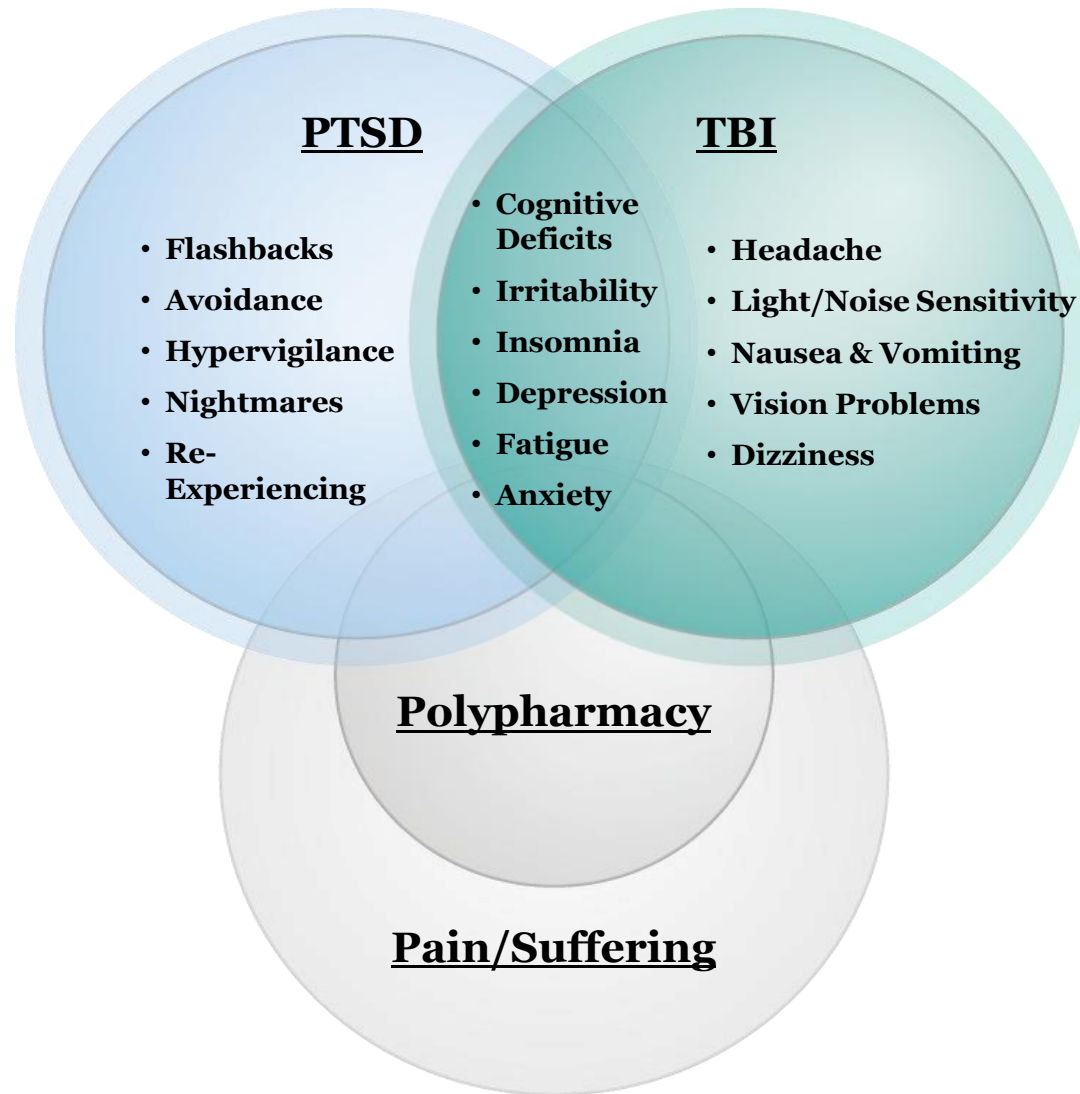
Cognitive Assessment and Rehabilitation in mTBI Patients

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Disclaimer

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Challenging Co-morbidity



Common Symptoms in Patients Being Assessed for mTBI

➤ Cognitive Limitations

- Difficulty with memory, concentration, and attention
- Delays in processing speed and executive functioning
- Difficulty with dual tasking and word finding
- Speech fluency
- Pragmatic Language

➤ Vision Limitations

- Accommodation Insufficiency
- Convergence
- Double vision

➤ Hearing Limitations

- Tinnitus
- Decreased loss of hearing in noisy environments

➤ Vestibular Limitations

- Balance problems
- Dizziness

➤ Psychiatric Limitations

- Hypervigilance
- Depression
- Anxiety
- Irritability/Anger
- Apathy

Speech Pathology Evaluation

➤ Language

- Boston Naming Test
- WJ III COG: Rapid Picture Naming, Verbal Comprehension
- WJ III Tests of Achievement
- Word fluency

➤ Speech

- Oral Motor Exam
- Speech Articulation
- Speech fluency: Stuttering Severity Instrument, 4th Edition

➤ Attention/Concentration

- The Test of Everyday Attention
- Attention Process Training Test
- WJ III COG

➤ Memory

- Rivermead Behavioral Memory Test, 3rd Edition
- Repeatable Battery for the Assessment of Neuropsychological Status
- WJ III COG

➤ Executive Function

- Behavioral Assessment of Dysexecutive Syndrome
- The Functional Assessment of Verbal Reasoning and Executive Strategies

➤ Pragmatic Language

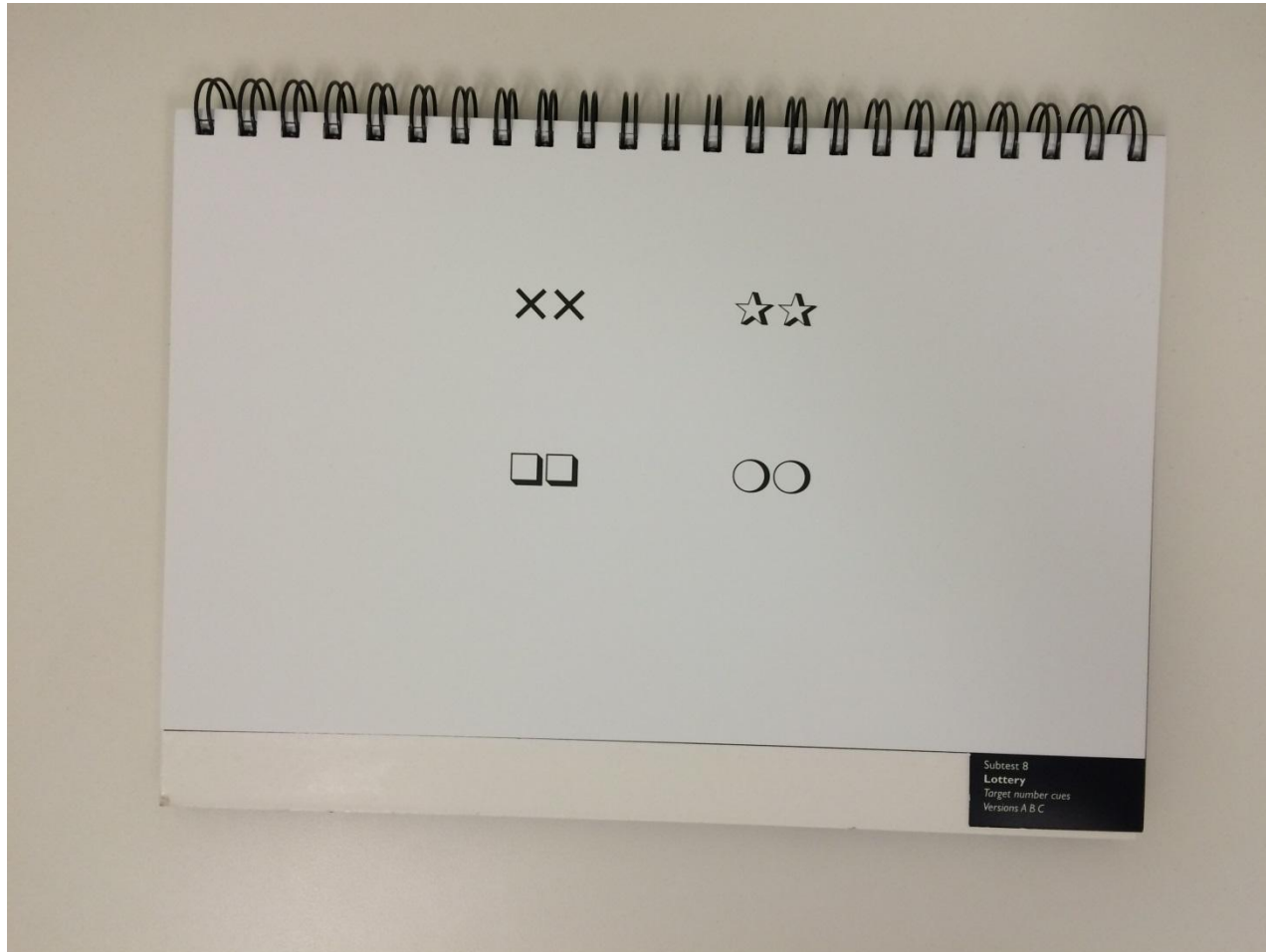
Cognitive-Linguistic Treatment

- Effective Goal Setting with Patient
- Functionally-Based TX
 - Collaborate with AT
 - Study Skill Acquisition
 - High Level Attention Tasks
 - Mind/Body Techniques
- Role of Medication
- Barriers to Success
 - Chronic pain
 - Sleep disorder
 - Depression, anxiety
 - Dependence on family member

Auditory & Visual Attention

- Impacted by vision and hearing
- Input from neuro-optometry and audiologist
- Sustained/selective auditory and visual attention assessed using the Test of Everyday Attention (TEA)

Test of Everyday Attention: Selective Visual Attention



Test of Everyday Attention: Selective Visual Attention

Subtest 6 Telephone Search
Subtest 7 Telephone Search while Counting
Yellow Pages Plumbers

206 PLUMBERS

24 HOUR SERVICE 831-8528
Plumbing, Heating & Drains
A1 Plumbing 215-9475
Emergency Service
AAA Magic Plumbing 218-5862
A-OK Plumbing 652-6940
Excellence In Service
Abbey Plumbing Associates 211-9425
"The Professionals"
Able Plumbing Company 764-7251
Prompt & Efficient
Ace Plumbing 206-3217
Repairs Guaranteed
Act Plumbers 263-2117
A Complete Service
Alan Simpson, Plumber 802-1841
Alleghany Plumbing 953-6020
Established 1952
ALLIED Plumbing Service 275-8203
"Your plumbing ally"
Alpha Plus Plumbers 697-1508
The Quality Answer
Ames Quali-Service 409-6293
ANDERSON BROS. 216-7373
Supply, Fit, Plumbing Supplies
Apex Plumbers 218-5078
"Our Region's No. 1"
Apex Plumbers 780-8977
AQUA-Way Plumbing 803-9070
Honest advice; rapid action
Arrow Plumbers 477-1408
"Will Visit Within 2 hrs After Your Call"
Arrowhead Plumbing 215-4932
"A Name You Can Trust"
Art's Plumbing 258-8096
ASPEN Plumbers 348-5278
"Plumbing Worries? Call us!"
Autoflow Plumbing 225-4220
We Install and Service all Brands
Baker, Marvin, Plumber 512-3476
Bedford Plumbing 290-7785
1-Year Guarantee of All Work
Bellweather Plumbers 226-6221
What we Fix, Stays Fixed!
Bennett, Jacob, Plumber 843-7906
Benson Brothers 284-4132
We stand Behind Our Work
Benton, G. & Sons 473-2167
Fast, Efficient, Fair Prices
Bestway Plumbing 983-3411
Experienced, Lo Rates
Bloom's, Plumbing Service 521-5824
"For Trouble-free Plumbing"
Brier Plumbing Company 218-4719
BRYSTAN, GROUP, the 213-3627
Brystan Plumbers
Builder's Emporium 553-7696
"We Know Our Job"
C. & B Plumbing 954-5000
Quality Work Reasonably
C. G. K. 223-2906
All Plumbing Services

Capitol City Plumbing 779-6267
Guaranteed to Please
Carr & Sons 585-4126
Drip/Leak Busters
Appliance Installation
CHAMPION Plumbers 218-0239
"The people you can trust"
Corey & Sons, Plumbers 895-6381
"We want to Help"
Coulson Builders 379-7833
Plumbing our Specialty
Crenshaw Plumbing 963-3806
One in Your Area
Cummins, A., Plumber 256-8058
DP Plumbing 284-7639
Drains Unblocked
DVN Plumbing 214-4702
Dave's Plumbing & Heating 215-7041
DAVIS, Joseph & Daughter 843-7906
"The luckiest call you'll make today!"
Dawsons of Applegate 212-0437
Plumbing, Plumbing Supplies
Decor-Rite Plumbing 315-8058
DRAINWELL Plumbers 218-2157
The Best at an Affordable Price
Dyno-Rod 215-1805
Repairs & Installation
EAMES Plumbers 336-4126
Licensed Contractors
ELLIOTT, Mark 275-1305
No. 1 in Plumbing
Finbow, George & John 216-6853
Serving 3 Counties area for over 20 years
Finchley, Amos, Plumber 213-9523
FlowTech 235-2956
"Plumbing at its Best"
Forest Plumbers 219-9215
"Solid Work, Fair Price"
Franklin Plumbing 702-3438
Radio-Controlled Cams
Friendly Plumbing 860-1749
Domestic & Industrial
Garner's, Family Business 257-6565
Plumbing, Heating, all Repairs
George Brown Plumbers 953-8813
Stockist, Ideal Standard
George Brown & Ptnrs. 662-2412
Plumbing
Latest Technology at Affordable Rates
Glen Plumbing Systems 670-9221
We Back Our Work
Greens of Gateway 570-1148
Plumbing/Heating
Grey & Company, Plumbers 439-2156
Free Quotations
"The small firm with the big reputation"
Guardian Plumber 284-7541
"No Job Too Small"
Hancock Plumbing 921-8274
Free Quotations
Home Care Plumbing 215-7411
(Four Offices)

Home Comfort 452-8210
Licensed Plumbers
Home Depot Plumbers 362-6987
Low, Low Prices
Hudson Plumbing Contract. 216-8468
Free Consultations
Inter-City Plumbing 245-8977
"A Name to Trust"
Jesse Jones Plumbing 282-9023
Hassle-Free Service
John Peterson 657-9916
Competitive Prices
Outstanding Workmanship
Johnson & Associates 353-6623
"Your local plumber!"
Jones Property Services 669-1302
Plumbing, all Maintenance
K & B, the Plumbing Experts 215-0401
KEYSTONE Plumbers 750-3867
Professional, Water Softeners
Kingmasters - Plumbing 507-3912
The Homeowners Friend
Liberty Bell Plumbers 218-4207
"Freedom from Plumbing Problems"
Lloyd's Heating, Electric & Plumbing 441-4095
M & R Plumbing 218-9270
"No Monkey Business"
MacKay Construction 782-0459
"Where the professionals work"
MARR, Tony & Sons 965-6303
Over 5000 satisfied customers
Master Plumbers 322-8684
"Satisfaction Guaranteed"
Matthew Webber, Plumber 434-0458
Top-Right Work at Fair Prices
Morelle & Partners 544-1876
Lo Hourly Rate, Free Estimates
Morgan & Sons 279-4188
Mobile Phone to Plumber
Morris Johnson, Plumber 683-9875
"An Early Response"
Max Keating 487-6148
Put Plumbing Problems Behind you Today
National Plumbing & Heating 604-0608
Known Throughout the Country
NAUTILUS Plumbing 218-9216
Harry Green & Sons
Neat Plumb 645-6269
Joe & Tom Barker
Quick, Clean, Reasonable
NEPTUNE Plumbers 218-2217
Kitchens, Bathrooms
Start your Remodelling with Us
New Dimensions 654-7403
Safe, Modern Plumbing
Norristown Contractors 764-3206
"The Plumbing Experts"
Oakhouse Plumbers 604-1112
All Appliances Installed

PLUMBERS 207

O'Brien and Sons 215-8421
A Family Business Since 1954
Olympic Plumbers 535-3380
Bathrooms, Kitchens, Jacuzzis
PG Plumbing & Electrical 215-0942
Park Avenue Plumbers 225-5751
Expert Repair Service
Excellent Range of Showers, Baths
Parkside Contractors 219-9547
Installation, Plumbing Repairs
Paul, The Plumber 215-8799
All Jobs Guaranteed
Paul Drayton, Plumber 275-2691
7 Days a Week
Phoenix Plumbers 282-7812
You Can Have Confidence in us
Plumb Center 362-6987
Agency Shopping Center
Plumb-Sure 213-0942
Located in the Liberty Mall
Plumbing Specialists 369-1115
Ray and Ed Brown
Poly Plumbers 269-1036
Merchants for All Fittings
QUICK-SOLVE PLUMBING 541-3439
Recommendations provide
RAINBOW PLUMBING Co. 213-3512
"The best in town!"
Reynolds, A., Plumber 604-0608
"Do you know a good Plumber?"
(our customers do!)
Robertson, P. D. & Co. 890-1100
Established for 15 years
ROCKWELL Plumbers 213-5870
"Your Job Done Right"
Rollins Plumbing 634-2409
Est. 1975, Free Estimates
Russell, Tom, Plumber 462-0161
Specialist in Water Heaters
Ryan Plumbing 315-6536
"Put your Pipes in our Hands and say 'Good-bye' to Problems"
SBJ Property Maintenance 582-6894
Sabre Plumbing 228-3522
"We Have the Edge"
Sam Wood's, Plumbing & General Skilled Work 507-2613
Telephone Advice Service
Sargents Plumbing 838-0132
Sound Advice for Over 10 Years
SEARLE Plumbing Co. 636-0360
If we can't fix it, nobody can
Call us for fast/free estimate
Stanford & Sons 295-8379
Call on Us for Carefree Plumbing
STAR Plumbers 377-0154
We Take Pride in Pleasing You
STOP-DRIP 225-1248
Careful, Courteous Service
SUNSHINE Plumbers 269-7628
Domestic, Commercial, Industrial
"Large or small, we do it all"

Test of Everyday Attention: Sustained Auditory Attention

- Subtest 1: Elevator Counting
 - Listen and count low tone beeps
- Subtest 2: Elevator Counting with Distraction
 - Listen and count only the low tones that are intermixed with high tone beeps

Case Study:

Impact of hearing on cognition

- 42 year old WM, active duty US Navy SEAL, diagnosed with mTBI secondary to multiple concussive events that occurred during combat missions, training, and sporting events; Anxiety; Depression; and, s/p ETOH abuse. Seen during NCoE 4 week program
- **Somatic complaints:** chronic pain, headache, dizziness, irritability, poor sleep, ringing in ears.
- **Cognitive-linguistic complaints:** memory, attention, word finding in conversation.
- **Brain MRI:** 3 small areas of T2 hyperintensity in bifrontal white matter. Mild cerebellar volume loss.

Speech Pathology Evaluation Results

- Executive function and sustained/selective visual attention were in the **Average** range.
- Memory (verbal & new learning), sustained/selective auditory attention, word retrieval/verbal fluency, and divided attention were in the **Low Average** range
- Cognitive test results correlated with patient's subjective cognitive complaints
- Speech-cognitive therapy recommended as well as simultaneous tx of medical and psychological symptoms

Audiology Evaluation & Recommendations

- Pure tone testing showed borderline-normal hearing sensitivity.
- The patient endorsed hearing problems in many listening situations along with bilateral tonal tinnitus
- Recommendations: Fit with binaural low-level, open-fit, hearing aids

Speech Pathology Follow-up

- Re-evaluation of selective attention using the TEA: Elevator Counting with Distraction subtest.
 - Raw score improved from 3/10 (SS in low average range) to 10/10 (SS in high average range) with use of hearing aids
 - Patient commented that he has to exert less energy/effort to attend during group discussions when wearing hearing aids
- Cognitive rehabilitation to improve complex attention, verbal memory, and speech articulation.