

- Lateral medullary syndrome
- Meniere's disease and other balance disorders
- Multiple Sclerosis
- Optic nerve hypoplasia
- Pelizaeus-Merzbacher disease
- Superior canal dehiscence syndrome
- Stroke (the most common cause in older people)
- Tullio phenomenon
- Wernicke-Korsakoff syndrome
- Whipple's disease

Causes of Nystagmus

The cause of pathological nystagmus may be congenital, idiopathic, or secondary to a pre-existing neurological disorder. It also may be induced temporarily by disorientation (such as on roller coaster rides) or by certain drugs (alcohol and other central nervous system depressants, inhalant drugs, stimulants, psychedelic drugs and dissociative drugs).

Vertical Nystagmus

Central nervous system (CNS) disorders, such as with a cerebellar problem. In that case the nystagmus can be in any direction *including* horizontal. Purely vertical nystagmus is usually central in origin, but it is also a frequent adverse effect of high phenytoin toxicity.

Causes include:

- Cerebellar ataxia
- Chiari Malformation
- Multiple sclerosis
- Stroke
- Thalamic hemorrhage
- Trauma
- Tumor

So in this instance the question is, was his increased nystagmus due to injury. The neurologist's findings of TBI provide a basis for suspecting that the patient has an increased likelihood of nystagmus.

I agree with Dr. Kane and Mr. Corroto assessment that, in the words of Mr. Corroto:

"Here the Officer did not document that he assessed whether or not Mr. Awerbach's eyes exhibited the property of equal tracking. In my field of proper police practices, failure to document that this condition was satisfied means the Officer did not check or that condition was not satisfied. Either way, this invalidates the result because proper police procedure was not followed.

In my opinion finding 6 out of 6 clues on HGN in no way correlates to consumption, intoxication or impairment of cannabis during the psychoactive or

non-psychoactive phase. I opine with Dr. Kane in his research regarding NHTSA and the correlation to alcohol consumption and BAC numbers. In my field of police procedure, the SFST is not deemed valid as a measurement of impairment due to marijuana because the validation studies on which the SFST was based only dealt with BAC's."

Problems with Balance

Vision, brain function, either genetic or acquired such as from TBI, problems or damage to the vestibular apparatus all can adversely affect balance. The officer indicates that the defendant had balance problems and at one time fell or almost fell. If he fell or almost fell, the question is not did he fall, but why.

The failure in balance can be indicative of brain injury. In this case the defendant had brain injury affecting his eyes, has a hx of concussion, and a recent PET scan demonstrating changes consistent with TBI.

Lack of Medical Inquiry by Officer Figueroa

Here we have the case of a victim who was severely beaten at age 13 by a gang of young hooligans. Mr. Awerbach was hit in the eye with brass knuckles. The beating resulted in a concussion with 15 minutes of unconsciousness. He had a macular hole which was later repaired. The macular hole left him with decreased visual acuity and a scotoma. He has decreased peripheral vision. He also indicated in his deposition that he had fractures to his facial bones in his skull.

Comment:

Basically a police officer is looking for possible crime, not making a medical diagnosis. The police officer is not a trained medical doctor. According to the Officer, Mr. Awerbach admitted at the scene that he had smoked marijuana an hour before the accident (though he never admitted it impaired his ability to drive), an admission that Mr. Awerbach now retracts and says he made only in an effort to avoid a worse penalty than DUI. The Officer did not consider other causes for the failure on the FST. He did not make a differential diagnosis. This deficit is covered by Dr. Kane in his critique of lack of scientific results of the FST being accurate.

This PET scan finding, plus the defendant's history of eye injury and brain injury, and lack of officer taking medical issues into consideration makes the FST findings totally invalid and non-contributory. This is why law enforcement personnel are directed to inquire as to possible medical problems. Many medical conditions can cause a driver to fail a FST.

Even under the best of circumstances and even with alcohol, the FST is not a completely reliable predictor of impairment. The FST has a moderate relationship to elevated BAL (85% in some studies, 50% in others) but the FST was never designed for assessing the impact of any other substances. Further its accuracy was never tested with marijuana.

We do not know how much the person smoked, nor what strain nor concentration of THC or CBD. Since the defendant has a history of eye injury, eye surgery, decreased peripheral vision, S/P repair hole in macula, scotoma, hx of concussion not making such an inquiry as to medical history

We also know that THC, per Department of Transportation and FDA, in many cases has no affect on driving. There is no evidence that the THC affected his driving. The FST proved that the defendant still has neurologic signs. These signs may be as a result of the severe beating that he took. TBI does affect his balance.

In my professional medical opinion I am convinced that the FST

- 1) Much more likely demonstrated that the defendant was suffering from the sequelae of a brain injury than any drug ingestion.*
- 2) Was not done in accord with police officer training.*
- 3) Does not provide a reasonable basis for reaching a conclusion of drug induced impaired.*
- 4) In the case the FST is not only non-contributory but is misleading.*

• **DRUG RECOGNITION EVALUATION (DRE)**

There was no DRE on the scene. Dr. Kane covers this very well in his report so I will not repeat it.

Do DRE evaluations reliably identify subjects under the influence of cannabis?

According to Kane in 2013 "The accuracies reported by these studies do not quantify the accuracy of the DIE (drug influence evaluation) process now used by U.S. law enforcement. These studies do not validate current DIE practice." (Kane. 2013. *The methodological quality of three foundational law enforcement drug influence evaluation studies*)

Discussion

As discussed earlier the police officer did not ask Mr. Awerbach about even having a hx of being beaten and sustaining injury to his eye. If he did not ask this important question about medical hx, this is a serious omission. There are other deficiencies related to the FST.

FST has:

- 1) Not been tested for cannabis.
- 2) Subjective.

—The SFST administered by Officer Figueroa is invalid because:

—The SFST has not been validated for detection of marijuana blood levels and has not been validated for detection of impairment from any substance, whether alcohol or marijuana, according to Dr. Kane's report.

—The Defendant has hx of serious eye injury.

—The Defendant has hx of concussion, loss of consciousness, and has sustained resulting traumatic brain injury that has led to equilibrium symptoms and migraines, according to his deposition and the reports by Dr. Joseph Wu and Dr. Russell Shah.

—The Defendant was unable to retain control over his equilibrium during the IME and clinical assessment by Dr. Russell Shah.

—The Defendant has experienced equilibrium and headache symptoms regularly since the injury in 2005.

—The Officer did not inquire as to medical hx as required by the SFST test protocol he was using.

Mr. Corroto points out that the FST was not done correctly. As Mr. Kelly points out even if done correctly it is not a scientifically accurate predictor of impairment.

In short, as indicated below, my opinion to a reasonable degree of professional probability is that the SFSTs administered to Mr. Awerbach on January 2, 2011 by Officer Figueroa from the LVMPD was not administered in accordance with the required protocol and the results were, therefore, totally invalid to evidence whether Mr. Awerbach was impaired in his driving by marijuana or other drug (including alcohol, or not).

The results of the SFSTs administered to Mr. Awerbach would not be relied upon by police acting properly in accordance with the applicable police protocols as having any evidence value on the issue of marijuana or alcohol impairment either criminally or civilly.

• **FIELD SOBRIETY TEST ACCURACY**

As to the specific accuracy of the Field Sobriety test, do FSTs reliably identify subjects under the influence of cannabis? The answer is FSTs inconsistently predict cannabis-induced impairment. In this instance by not taking into consideration the defendant's neurological status, for practical purposes the FST value in determining or excluding DUI is useless.

Bosker, Kuypers et al. in 2012 reached this conclusion relate to FST:

• **“Current SFSTs are insufficiently sensitive to detect (oral) THC induced driving impairment.”** (Bosker and Kuypers et al., 2012. *Medicinal THC (dronabinol) impairs on-the-road driving performance of occasional and heavy cannabis users but is not detected in standardized field sobriety tests*)

Papafotiou makes a somewhat more optimistic assessment on FST accuracy (e.g., uses the terminology ‘moderate’ than ‘insufficiently sensitive’ is used by Bosker et.al.

- SFSTs may provide a moderate predictor (success rate between 65-75%) of driving impairment following the consumption of THC.” (Papafotiou et al., 2004. *The relationship between performance on the SFSTs, driving performance and the level of THC in the blood*).

Comment

In my assessment 65-75% is not proof beyond a reasonable doubt. In this case the FST is non-contributing. The state has made an extremely strong case for doubt.

FSTs do not reliably identify subjects under the influence of cannabis

This is because not only is it questionable of the reliability with FSTs and assessing DUI alcohol but is a much bigger problem assessing cannabis DUI because FST were designed to be sensitive to alcohol-induced impairment, not cannabis.

- “SFST have been validated for alcohol, but their sensitivity to impairment induced by other drugs is unknown.” (Bosker et al., 2012. *A placebo-controlled study to assess SFST performance during alcohol and cannabis intoxication in heavy cannabis users*)
- “The overall score of SFST did not discriminate between THC and baseline [in regular consumers]” (Bosker et al., 2012. op cit)

Subjects are far more likely to demonstrate altered performance on the HGN test, WAT test, and OLS “when THC was consumed together with alcohol” compared to instances where subjects consumed THC alone. (Downey et al. 2012. *Detecting impairment associated with cannabis with and without alcohol on the SFST*)

- *It is important to note that cannabis consumption impacts the psychomotor performance of naïve and experienced subjects differently.*

-“THC did not affect performance of heavy cannabis users in the critical tracking task, the stop-signal task, and the Tower of London. These tasks have previously been shown to be very sensitive to the impairing potential of THC when administered to infrequent cannabis (users). The lack of THC on these tasks basically confirms the previous notions that heavy cannabis users can develop tolerance to behaviorally impairing effects of THC.” (Ramaekers et al., 2010. op.cit)

-“Patients who take cannabinoids at a constant dosage over an extensive period of time often develop tolerance to the impairment of psychomotor performance, so that they can drive vehicles safely.” (Grotenhermen and Mueller Vahl. 2012. *The therapeutic potential of cannabis and cannabinoids*)

Discussion

- 1) FSTs are subjective

- 2) FSTs are designed for alcohol and have been shown to be 15% short of accuracy even in that regard
- 3) The officer did not inquire about a hx of confounding medical history
- 4) The defendant has a hx of head trauma and eye injury which together or separating could be contributing to his balance issues.

FINDINGS INCONSISTENT WITH DUI

- Pupil size normal.
- Speech normal!
- Defendant was cooperative
- NO problem presenting documents
- NO problem exiting car
- Understood FST instructions
- So the defendant spoke clearly, was cooperative, polite
- Found documents and exited with no problem.
- Any true FST results and conclusions are confounded by the patient's history of injury to his brain (concussion, eye injury).

Dr. Creighton Record

Chart Note 2-1-06

The defendant was hit in the R eye at age 13 with brass knuckle. He lost consciousness for 15 minutes, so we know he had a concussion. His vision prognosis was poor.

IMPORTANT ISSUES AND SCIENCE

Following is discussion and references relating to a series of relevant issues. Trying to address these issues in a manner that would be favorable to the plaintiff appear to set a high bar for the plaintiff to make his case.

BLOOD TEST

—Is a positive blood test result for the presence of THC evidence of behavioral impairment?

The answer is an emphatic **NO**. This is because cannabis is fat soluble. THC rather quickly decreased in the blood because of rapid metabolism by liver and being deposited in body fat because THC once entering the goes into body fat a regular user of cannabis has residual levels of THC. The slowly come back into the blood stream by the process of osmosis.

The detection of THC and its metabolites has conservatively been shown for 28 days or longer. Aguilar's 1986 case study using tagged THC found on day 2 after cessation of cannabis use, the THC level can be 9 nanograms of THC for fat repository, on day 3 it was 8. On day one it was 20 u.

The study showed that 3 days after cessation a cannabis user may have 8 ug/ml of THC. Even more compelling is the findings of Tonnes, et al. Because if the fat solubility of THC it is obvious why Toennes et al. concluded that.

-“A threshold of 2-3 ng/ml THC as an indicator of recent drug use (i.e., smoking within the previous 6 hours) as recommended by Huestis et al appears to be valid only for occasional users.”

Tonnes, et al’s position is more conservative than the findings of Aguilar. “Heavy users might exhibit measurable cannabinoid concentrations in blood (median: 3.2 ng/ml THC in blood serum), even if the last cannabis use was more than 24 hours ago. So here we see 24 hours not 5 or 6 days. Their condemning is that ...Therefore, cannabinoid concentrations in heavy users’ blood from a later elimination phase might not be distinguished from an acute use of an occasional user.” (Toennes et al., 2008.

Comparison of cannabinoid pharmacokinetic properties in occasional and heavy users smoking a marijuana or placebo joint)

A new study done by Skopp et al. in 2008. Skoop et al. confirms Aguilar’s findings. Skoop et al. concluded a longer time period than Toennes but shorter than Aguilana.

-“Detection of psychoactive cannabinoids seem possible over a time period of more than 24-48 hours after abstaining from cannabis smoking. ...Impairment could not be assessed... in any subject at the time of blood sampling.” (Skopp et al., 2008.

Cannabinoid concentrations in spot serum samples 24-48 hours after discontinuation of cannabis smoking.)

—Okay, so our next question is: *Is a positive blood test result of the presence of THC evidence of behavioral impairment?*

Not surprisingly the answer is no. The FDA weighs in on this one. The FDA approved package insert contains a warning on THC and driving. The FDA says that if THC does not interfere with driving, operating heavy equipment or engaging in dangerous activity, it’s okay to do these things while using Marinol (THC).

• “Patients receiving treatment with MARINOL® capsules should be specifically warned not to drive, operate machinery, or engage in any hazardous activity until it is established that they are able to tolerate the drug and to perform such tasks safely.” (<http://www.fda.gov/ohrms/dockets/dockets/05n0479/05N-0479-emc0004-04.pdf>)

-FDA statement regarding Marinol (oral synthetic THC) and driving says ‘don’t drive until you are acclimated to the effects of Marinol’ not ‘Don’t ever drive after taking Marinol’.

-“On day 7, 6 full days after entering the unit, six participants (out of 25) still displayed detectable THC concentrations. ...The highest observed THC concentrations on admission (day 1) and day 7 were 7.0 and 3.0 ng/ml, respectively. ...Conclusions: Substantial whole blood THC concentrations persist multiple days after drug discontinuation in heavy chronic cannabis users. ...These findings also may impact on

the implementation of per se limits in driving under the influence of drugs legislation.” (Karschner et al., 2009. *Do Delta-9-tetrahydrocannabinol concentrations indicate recent use in chronic cannabis users?*)

- Residual levels of THC may be present in the blood of chronic consumers for several days without evidence of new use or any associated impairments of psychomotor performance, thus confounding proper interpretation.

—*Is a positive blood test result for the presence of THC evidence of behavioral impairment?*

The answer per the Department of Transportation is no.

A 1993 study of cannabis and driving (Robbe & O'Hanlon, 1993) which was sponsored by the U.S. National Highway Safety Traffic Administration included a review of the literature. The authors' comments in summary of their literature review and of their own results include the following:

The foremost impression one gains from reviewing the literature is that no clear relationship has ever been demonstrated between marijuana smoking and either seriously impaired driving performance or the risk of accident involvement. The epidemiological evidence, as limited as it is, shows that the combination of THC and alcohol is over-represented in injured and dead drivers, and moreso in those who actually caused the accidents to occur. Yet there is little if any evidence to indicate that drivers who have used marijuana alone are any more likely to cause serious accidents than drug-free drivers.

The U.S. Transportation study results were more than confirmed by a 1998 Australian study of 2500 injured drivers which found that drivers who use marijuana are less likely to cause road accidents than drunk drivers or even drug-free drivers. This goes even further than the Australian Government Report (1996) "There is no controlled epidemiological evidence that cannabis users are at increased risk of being involved in motor vehicle or other accidents."

• **There is No Relationship between Blood Levels of Cannabinoids and Psychomotor Impairment**

The basic problem with trying to link the blood level of cannabinoids or their metabolites with level of impairment is that, unlike alcohol, cannabinoids' concentration in bodily fluids has no clear correlation to their activity in the brain. Urine tests of THC and/or metabolites are clearly useless for the obvious reason that they lag hours and days behind actual exposure. Blood concentrations are somewhat more useful in that they can at least help determine whether one has used marijuana recently. High levels of blood THC, (≤ 10 ng/ml), are a good sign of having used marijuana in the last hour or two. The problems are that (1) blood levels are highly variable and (2) have no clear-cut relation to actual impairment, i.e., "being under the influence."

This was aptly illustrated in the most realistic study on marijuana and driving to date, HWJ Robbe's "Influence of Marijuana on Driving," (Institute for Human Psychopharmacology, Univ. of Limburg, Maastricht, 1994; sponsored by the U.S.

National Highway Transportation Safety Administration). In this study, drivers were dosed with marijuana and observed while actually driving on the road in the Netherlands. Robbe looked at the blood THC of the subjects and found the following:

"Plasma Concentrations of the Drug: Though consumed dose differed little between subjects, THC and THC-COOH (e.g., metabolite) varied enormously. Thirty minutes after smoking 300 micrograms/kg, for example, THC ranged between 1.6 and 29.6 ng/ml..." "Drug Plasma Concentrations and Driving Performance": One of the program's objectives was to determine whether it is possible to predict driving impairment by plasma concentrations of THC and/or its metabolite, THC-COOH. The answer is very clear: it is not. Plasma of drivers showing substantial impairment in these studies contained both high and low THC concentrations; and, drivers with high plasma concentrations showed substantial, but also no impairment, even some improvement..."

The authoritative Consensus Report of NIDA's Research Technology Branch ("Drug Concentrations and Driving Impairment (JAMA, Nov. 8, 1985 – Vol. 254 #18) said:

"What is known about correlations between driving impairment and drug concentration? – Except for ethanol, determinations of drug concentrations in body fluids are at present of limited value for establishing driving impairment..."

Although this report dates from 1985, its conclusions are still valid.

In a forensic review (Mason et al., 1985), the issue of marijuana's effect on driving was addressed, and it was indicated that isolated reports of adverse outcomes secondary to impairment by Cannabis as a sole inebriant were rare. The authors concluded that there was no suitable correlation between plasma or blood levels of THC and the degree of apparent impairment a human might exhibit.

The blood concentration of THC is meaningless as any predictor of psychomotor effect. Dr. Barry Beyerstein of Simon Fraser University said, "The relationship between THC (the psychoactive ingredient in marijuana) levels in blood and impairment of eye-hand coordination, reaction time and other components of driving skill is not a straightforward one. Also, individual differences of impairment among different users are so great that it would be very difficult to set a fair legal standard of impairment that would apply to everyone." This is the same conclusion which the U.S. Department of Transportation reached.

"A finding of 20 ug/L of THC in plasma (10 ug/L in blood) probably indicates that marijuana was smoked with the hour and with 10 uL plasma within two hours. THC concentrations greater than 50 ug/L indicate smoking within 20 minutes. Concentrations of THC-COOH THC metabolite. It is unlikely that a range of plasma THC concentrations could be reliably equated with impaired performance.

Solowij (1998) states that blood plasma levels of THC of 10-15 ng/ml are suggestive of recent consumption but determining just how recent use was is not possible. A more

precise measure is the ratio of THC to THC-COOH. If THC-COOH levels are greater than THC, use was probably more than 30 minutes ago but only in naive users.

The predictive value of THC levels is of little value. What we can say is that regular users are often unimpaired with high THC levels, while novice users may be impaired with low levels of THC. In this instance we have no evidence of impaired driving. The FST is not evidence of impairment for several reasons:

EFFECTS ON DRIVING

National Highway Safety Study 1993

According to the National Highway Traffic Safety Administration study titled "Marijuana and Actual Driving performance" (published November 1993), "THC's adverse effects on driving performance appear relatively small" and "Evidence from the present and previous studies strongly suggests that alcohol encourages risky driving, whereas THC encourages greater caution."

According to this study, it is not possible to conclude anything about a driver's impairment on the basis of his/her plasma concentrations of THC and THC-COOH determined in a single sample.

A study from Tilburg, The Netherlands reported in May 2004, "Researchers at the St. Elisabeth Hospital in the Netherlands estimated the association between drug use and motor vehicle accidents by conducting a prospective observational case-controlled study. Cases were drivers involved in road crashes requiring hospitalization. Controls were drivers recruited at random while driving on public roads.

Authors found that driver's risk for road trauma significantly increased with the use of benzodiazepines and alcohol. Increased risks, although not statistically significant, were also assessed for drivers using amphetamines, cocaine, or opiates. The authors concluded that,

"No increased risk for road trauma was found for drivers exposed to cannabis."

• THERE IS A WIDE VARIANCE OF THC'S EFFECTS AMONG INDIVIDUAL CONSUMERS.

- "Individual drivers can vary widely in their sensitivity for THC induced impairment as evidenced by the weak correlations between THC in serum and magnitude of performance impairment." (Ramaekers et al., 2009. *Dose related risk of motor vehicle crashes after cannabis use: an update.* In: Drugs, Driving, and Traffic Safety. World Health Organization)

- "It should be stressed however that the predictive validity of any *per se* limit is confined to the driving population at large, and not necessarily applicable to each and every driver as an individual." (Ramaekers et al., 2009. op.cit.)

-Plasma of drivers showing substantial impairment in these studies contained both high and low THC concentrations; and drivers with high plasma concentrations showed substantial, but also no impairment, and even some improvement." (Robbe, 1993, op.cit.)

It should come as little surprise that there is no consensus regarding what THC/blood standards are appropriate predictors of psychomotor impairment. In this case we have a regular consumer of cannabis who a low level of THC. The THC could be from recently consuming cannabis. It is also being contributed to by THC which has in fat and then osmotically returning to the blood.

-“There is no direct correlation between driving impairment and THC concentration.” (Hartman and Huestis. 2013. *Cannabis effects on driving skills*)

-“It is difficult to establish a relationship between a person’s THC blood or plasma concentration and performance impairing effects. ... It is inadvisable to try and predict effects based on blood THC concentrations alone, and currently impossible to predict specific effects based on THC-COOH concentrations. (NHTSA website: <http://www.nhtsa.gov/People/injury/research/job185drugs/cannabis.htm>)

•**THE PRESENCE OF CARBOXY THC IS NOT A PREDICTOR OF IMPAIRED DRIVING.**

-“It must be emphasized that neither qualitative nor quantitative analysis of urine permits an evaluation of the effect of the drug or chemical on human behavior.” (SOFT/AAFS Laboratory Guidelines, 2006)

-“Drug tests detect drug use but not impairment. A positive test result, even when confirmed, only indicates that a particular substance is present in the test subject’s body tissue. It does not indicate ... recency, frequency, or amount of use; or impairment.” (U.S. DOJ, Bureau of Justice Statistics. *Drugs, Crime, and the Justice System: A National Report from the Bureau of Justice Statistics*. December 1992, page 119).

Is a positive urinalysis result for the presence of Carboxy-THC evidence of behavioral impairment?

-“There is little scientific evidence to show that the detection of ... THC-COOH in bodily fluids can be taken as proof of impairment in any circumstance.” (Ramaeckers et al., 2006. op.cit.)

-“Quantitation of THC-COOH can neither accurately predict the time of last cannabis use nor suggest any relationship between urine concentration and psychomotor performance.” (Musschoff et al., 2006. *Review of biologic matrices as indicators of recent or ongoing cannabis use.*)

-"It is ... impossible to predict specific effects based on THC-COOH concentrations." (NHTSA website:

<http://www.nhtsa.gov/People/injury/research/job185drugs/cannabis.htm>)

- THC is the primary psychoactive component in cannabis
- Peak Blood/THC levels do not precisely correlate with peak of impaired cannabis performance
- THC is metabolized to 11-hydroxy-THC and carboxy THC
- 11-hydroxy-THC is psychoactive; has a relative short half-life
- Carboxy THC is not psychoactive; has a relatively long half-life (especially in urine)
- "There are two important metabolites of THC. ...The other important metabolite is carboxy THC. There is no evidence at this time that this metabolite is psychoactive."
(U.S. DOT. *Drug Evaluation and Classification Training Manual*)

CANNABIS-INDUCED CHANGES IN PERFORMANCE DIFFER FROM ALCOHOL. Cannabis actually causes people to drive more carefully.

- Less aggressive driving
- "In contrast to the compensatory behavior exhibited by subjects under marijuana treatment, subjects who have received alcohol tend to drive in a more risky manner."
(Smiley, 1999. *Marijuana: On-Road and Driving-Simulator Studies*. In: Kalant et al., *The Health Effects of Cannabis*.)
- Slower speed
- "After THC administration, subjects drove significantly slower than in the control condition, while after alcohol ingestion, subjects drove significantly faster than in the control condition."
(Ronen et al., 2008. op. cit.)
- Increased distance between vehicles
- "Coefficient of headway variation increased slightly following THC." (Robbe, 1993. op. cit.)

Driving Simulation Studies

There were driving simulator studies done by the Washington State Highway Department. This study found that, "Simulated driving scores for subjects experiencing a normal social 'high' and the same subjects under control conditions are not significantly different. (47.46 errors to 47.49 errors out of a possible 405) after two marijuana cigarettes. However, there were significantly more errors for alcohol-intoxicated subjects than for control subjects," (95+ errors) after two shots of distilled spirits.

Further evidence that the accident in question in the article was not associated with cannabis is the fact that the driver was speeding. According to the DOT the effect of cannabis on driving is that drivers drive slower and more carefully.

The article quotes the prosecutor, who never spent one day in medical school, that there was a potential lethal combination of "speed and weed." As the DOT points out, there is no basis for this conclusion. Many studies have shown a decrease in accidents with people using cannabis compared to drivers using no drugs at all. One reason is that cannabis use is associated with driving slower not faster. On the other hand speed and alcohol has been conclusively proven to be associated with each other and an increased accident risk.

We have over a decade of experience with medicinal cannabis which demonstrates an impressive decrease in traffic deaths in states where medicinal cannabis is legal. For instance, from 2008 to 2012 the fatality rates in California fell by 20%. In contrast, Texas, a non-medicinal cannabis state, had a decline of less than 1% over the same time period. California and Texas both had about the same number of fatalities in 2008, a shade under 4,000 in each state. If cannabis use increased motor vehicle accident fatality rate then the fatality rate should be higher in California than Texas. It is clearly decreasing in California while Texas remained essentially the same over the same time period.

A 1993 study of cannabis and driving sponsored by the U.S. National Highway Safety Traffic Administration included a review of the literature. The authors Robbe & O'Hanlon comments in summary of their literature review and of their own results include the following:

"The foremost impression one gains from reviewing the literature is that no clear relationship has ever been demonstrated between marijuana smoking and either seriously impaired driving performance or the risk of accident involvement.

Yet there is little if any evidence to indicate that drivers who have used marijuana alone are any more likely to cause serious accidents than drug-free drivers."

GENERAL DISCUSSION ON CANNABIS, CANNABINOIDS AND DRIVING

As to cannabis having a clear adverse affect on driving, that also does not hold up to scientific scrutiny. Going back prior to the NIDA consensus report and the Robbe study, the Nixon Marijuana Commission concluded that there is no conclusive evidence that cannabis impairs driving. This was in part based on studies by Crancer et.al. for the Washington State Highway Department, a similar study done at UCLA, and another at Boston University. Crancer found that, "Simulated driving scores for subjects experiencing a normal social 'high' and the same subjects under control conditions are not significantly different. However, there are significantly more errors for alcohol-intoxicated than for control subjects."

This assessment is affirmed by the FDA approved package insert language for Marinol that driving and operating heavy equipment after use of synthetic Δ^9 THC is permissible. The package insert states that patients receiving treatment with Marinol should be specifically warned not to drive, operate machinery, or engage in any

hazardous activity until it is established that they are able to tolerate the drug and to perform such tasks safely.

According to research by British scientists, a moderate amount of cannabis may actually improve driving performance. A group of 20 drivers aged 21-40 participated in a driving simulator test. Ten of them smoked the equivalent of about half a cannabis cigarette. Subjects under cannabis scored superior than the sober subjects in most of the tasks, including reaction time and number of collisions. Simon Smith Wright, director of the laboratory where the studies were conducted, said "The results of our test clearly show that a small or moderate amount of cannabis is actually quite beneficial to someone's driving performance."

A story published in January 2004 in Britain's Evening News characterized the results this way:

"A group of 20 volunteers participated in the study, which tested respondents' performance on a video game that simulated driving. Half of the drivers played the game after smoking the equivalent of half a marijuana cigarette. The results showed that for those who had smoked...cannabis, 80 percent demonstrated superior reaction times; 60 percent finished a lap faster; 70 percent experienced a lower number of collisions; 60 percent reached a higher level in the game."

• **FDA Administrative Law Judge – The Last Word**

In 1988 action was initiated through the FDA to reclassify marijuana to Schedule 2, potentially making it available for prescription to patients. The FDA Administrative Law Judge, Francis Young, reviewed a tremendous amount of testimony from patients, scientists, and politicians in rendering his ruling. He stated, "By any measure of rational analysis marijuana can be safely used within a supervised routine of medical care."

When it comes to cannabis safety, we have (1) the findings of the FDA by Administrative Law Judge Young, (2) the FDA's approval of Marinol (synthetic \square 9 THC), (3) Marinol (dronabinol) is far more dysphoric than cannabis, but driving is permissible. This finding on the dysphoria with Marinol is per GW Pharmaceuticals (GW is the manufacturer of Sativex - tincture of cannabis - which was approved for sale by Health Canada two or three weeks ago and will soon be distributed by Bayer). This is because the cannabinidiols (CBDs) in cannabis counter the euphoric impact of THC. Marinol is all THC. One of the best supports for the safety of cannabis is the fact that Marinol is used by tens of thousands, and with the approval of the FDA.

SUMMARY:

It is clear from the facts. The analyses of Kelly, Dr. Shah, Dr. Wu and Mr. Corroto, as well as the research cited and the position on THC, cannabis and driving from the FDA and the DOT. What is clear is that:

- FST are not reliable even for alcohol and certainly not for any other substance
- That the FST was not done correctly

- That Mr. Awerbach has a confounding existing medical condition
- That that condition is a traumatic brain injury
- The diagnosis of traumatic brain injury is confirmed by his history of a beating at age 13 resulting in unconsciousness and an eye injury
- The damage is evidenced by a recent MRI and PET scans
- His symptoms of easy anger is a common symptom of TBI.

My professional opinion is that there is no credible evidence that Mr. Awerbach was impaired by drugs.

/s/David Bearman

EXHIBIT 1-B

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Elizabeth A. Brown
Clerk of Supreme Court

To: Roger Strassburg
From: David Bearman, M.D.
Re: Awerbach Case

Supplementation
December 5, 2014

Due to the press of time, during my first report I feel it is appropriate to supplement and elaborate on my discussion of my opinion. Attached is an exhibit of images from the brain scan report that appeared to be especially relevant to my discussion below.

I review the report of the:
UCI Neurocognitive Imaging
PET Imaging
DTI Imaging

The expert who interpreted these studies (Dr. Wu) and Mr. Awerbach's history is well-qualified. He reviewed the November 10, 2005 assault with brass knuckles on Mr. Awerbach. He documents significant permanent visual impairment from the assault which led to a traumatic macular hole. The macular hole was treated by a Dr. Yepremian with a vitrectomy, membrane peeling and gas injection. This vision impairment would interfere with performance on a FST.

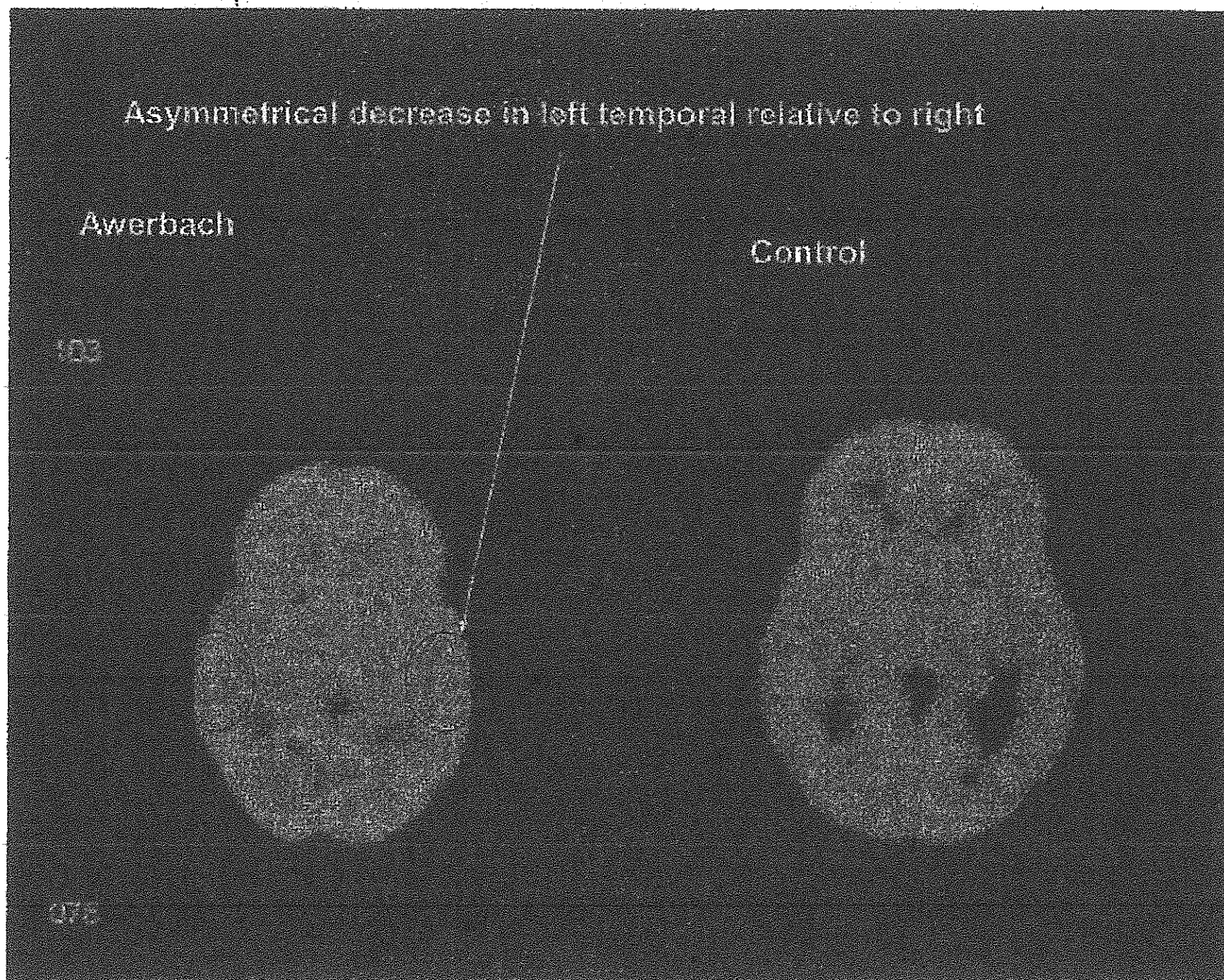
In addition Dr. Wu documents the defendant's diagnosis of PTSD which was a result of his being viciously attacked in his teens. Dr. Wu documents that Pam Goldberg and Dr. Bhusan treated Mr. Awerbach for PTSD. Symptoms of PTSD include being hyperalert, having easy startle and having anger management issues. All of these symptoms of PTSD could affect Mr. Awerbach's post accident behavior and could confound the results of the FST. The statement of being nervous after the accident is consistent with the physical findings and the history of patients with PTSD.

Note: Attached are two articles and the use of cannabis to treat PTSD. In my experience cannabis has been effective for many sufferers of PTSD including veterans of the VietNam War, the Iraq War and the War in Afghanistan.

MRI

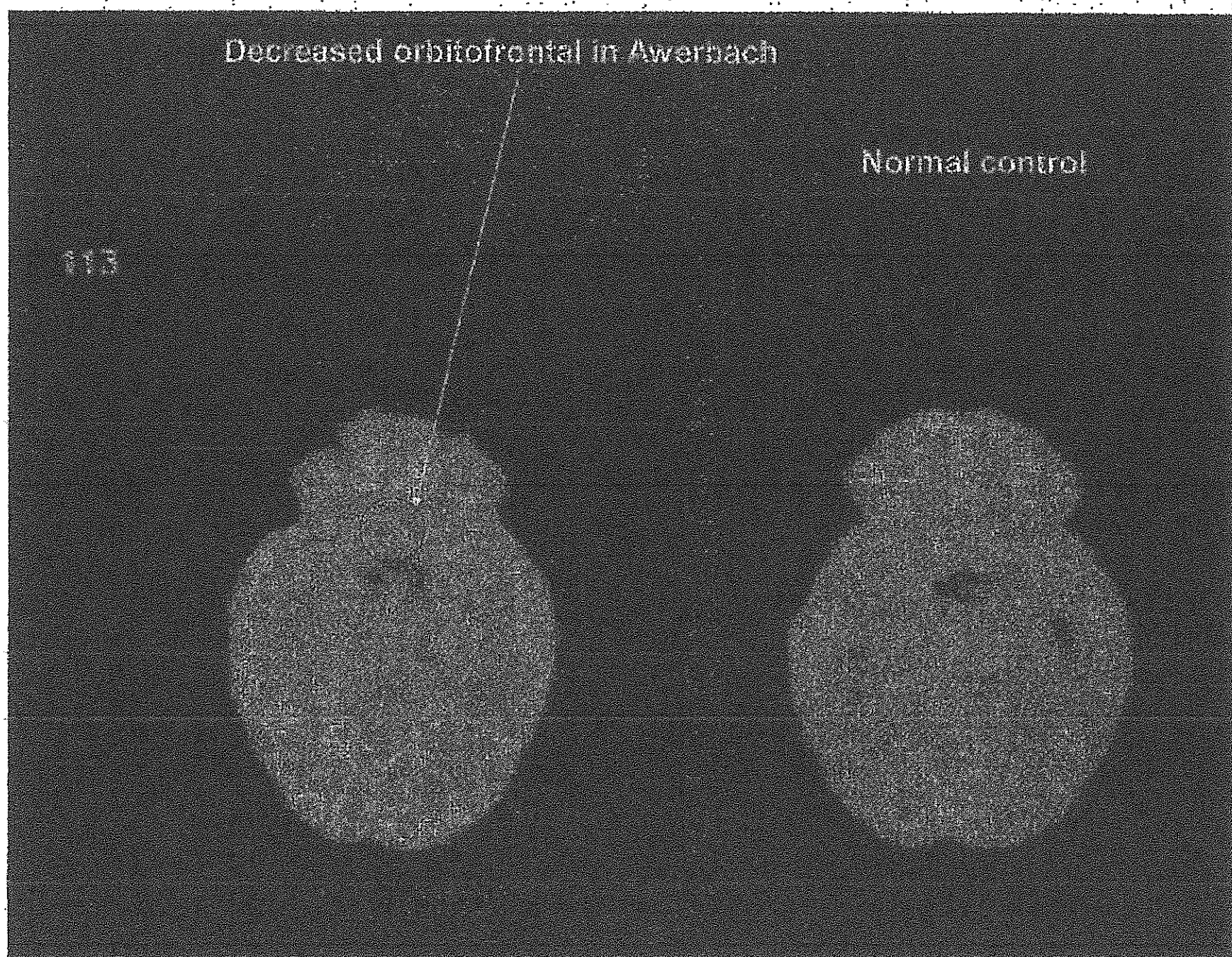
The findings of the MRI of the brain were consistent with parenchymal atrophy. The MRI revealed significant asymmetry in "left right differences in lateral ventricle. The report states that the left ventricle was larger than the right in "both absolute and relative analysis."

Below demonstrates asymmetry between the left and right temporal region.



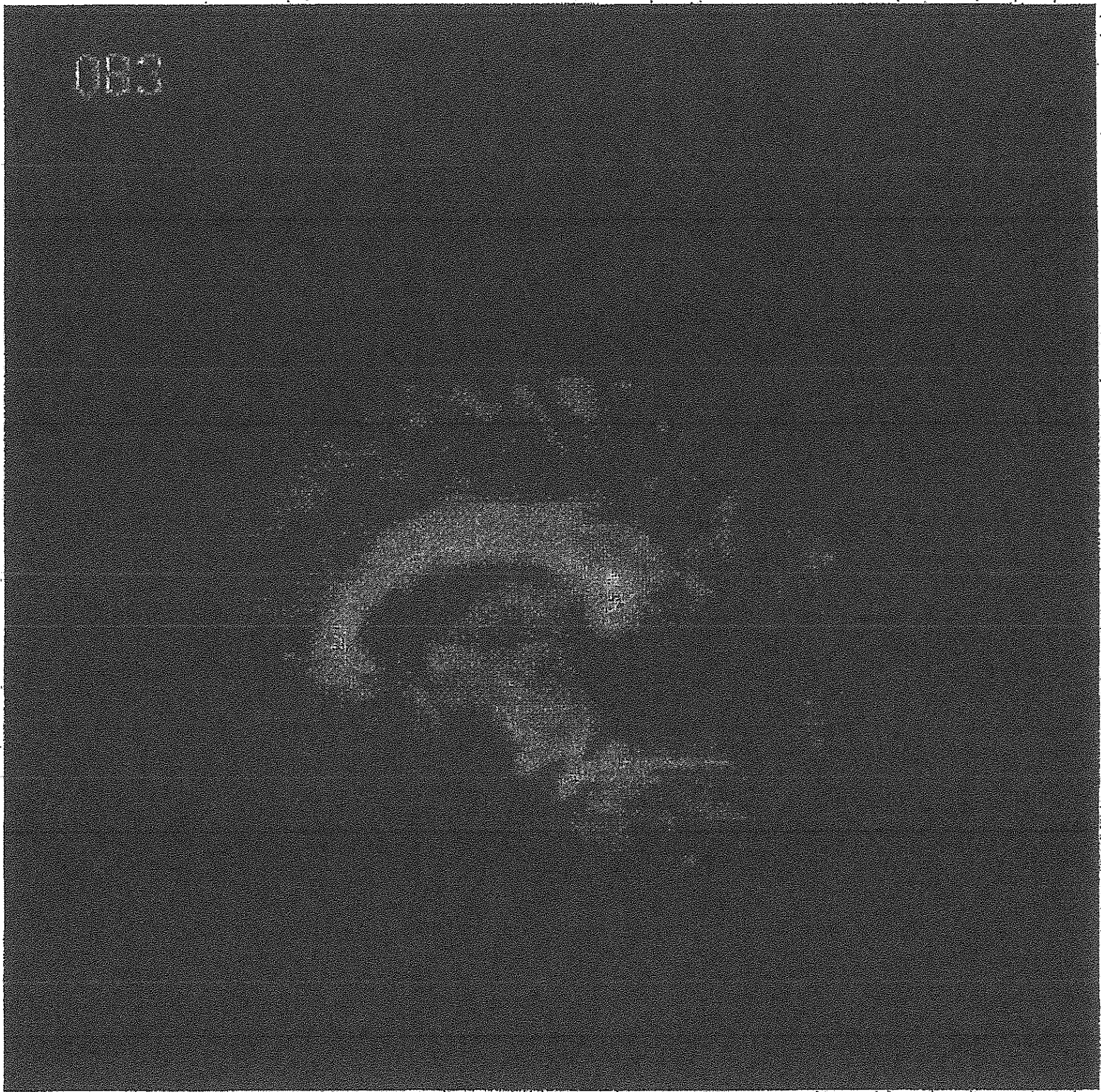
103 asymmetric decrease in the left temporal compared to the right.

Dr. Wu goes on to note significant decrease in left forebrain parenchyma. In addition he found increase in left interior lateral ventricle, "significant decrease in right caudate volume," significant decrease in left amygdala volume. His conclusion, "Mr. Awerbach's MRI QV abnormalities are consistent with brain abnormalities such as brain injury. As a person trained in primary care and who has some knowledge of neuroanatomy and neurophysiology, I accept Dr. Wu's conclusion and independently concur with it.



113 decreased orbital brain area is decreased.

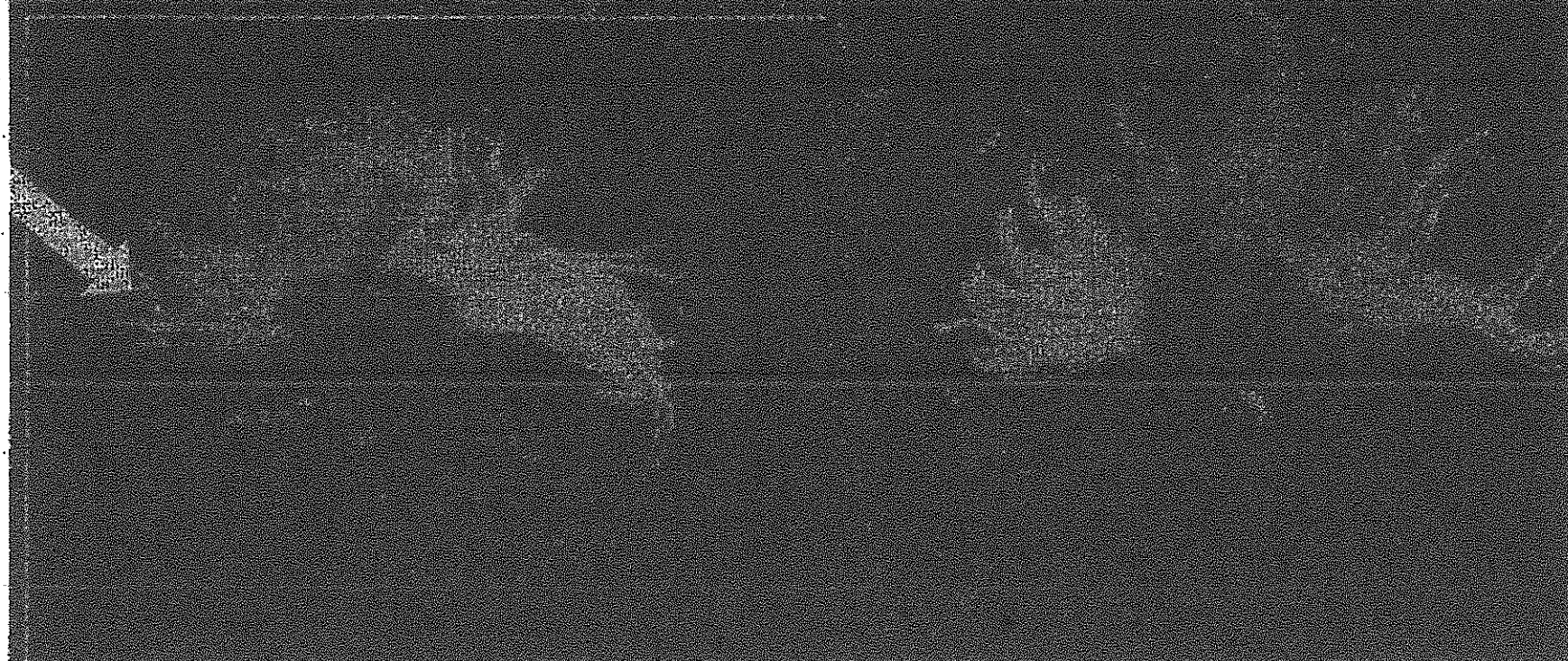
Dr. Wu found that the pattern of abnormality noted in Mr. Awerbach's quantitative volumetric analysis is inconsistent with the pattern reported in methamphetamine-dependent subjects (Jeong et al. 2013) or with marijuana dependent subjects (Wilson et al. 2000). Mr. Awerbach shows significant enlargement of his left lateral ventricle whereas methamphetamine dependent subjects without a history of traumatic brain injury show normal left lateral and enlarged right lateral ventricles (Jeong et al. 2013). Stimulus dependent individuals and their nondependent sibling have been shown to have abnormally enlarged left amygdala (Ersche et al. 2012). Awerbach shows abnormally atrophied left amygdala volume which would be inconsistent with nonbrain injured stimulus dependent individuals. Marijuana users do not have enlarged ventricles (Wilson et al. 2000).



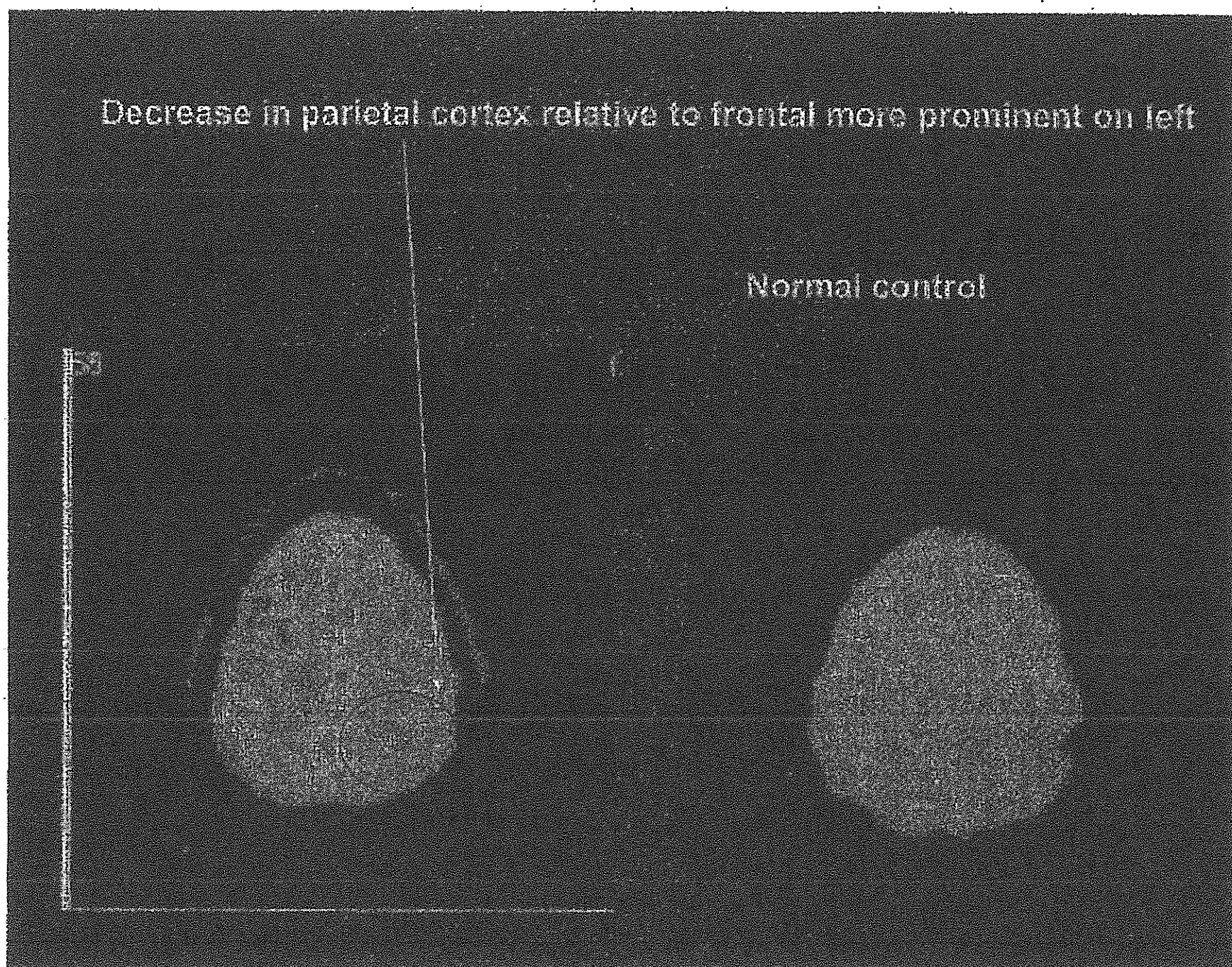
83 We visuals decrease in fractional anistrophy signifying traumatic brain injury.

Jared Awerbach in
DTI corpus callosum

Normal control DTI
corpus callosum



The following documents a decrease in the parietal cortex on the left relative to the right.



Dr. Wu then lays out a small sample of the literature which supports his conclusion. He also debunks that these brain changes might be related to stimulant or marijuana abuse. The small amygdala is inconsistent with recent findings of excessive cannabis use being related to larger amygdala size.

MRI/DTI 9/30/14

The conclusion of this study is "consistent with brain abnormalities such as brain injury."

I have reviewed Dr. Wu's interpretation of the brain scan and I have reviewed these scans myself and I agree with the assessments that Dr. Wu made.

Discussion:

One of the consequences of TBI is the likelihood of an increased response to stress. This may be contributed to by difficulty with anger management and control of impulsivity.

The combination of PTSD and TBI can cause the mid-brain to increase its influence on thinking. The midbrain is the old reptilian brain. It sees things as black and white, life and death. While this is important for survival, it is also associated with people acting first and thinking later.

PET Scan 9/30/14

This study is also read as abnormal. The "PET findings are consistent with brain abnormalities such as brain injury."

Dr. Wu's discussion lays out some of the research documenting that "brain injury is characterized by functional brain imagery findings." He points out that the literature in "well-accepted, peer-reviewed published studies... that functional brain imagery techniques are useful in assessing chronic neurological and behavioral defects in patients with brain injury." In my experience people with TBI have shown dramatic resiliency in adapting to their TBI.

The review of literature makes it clear that Dr. Wu's conclusions are based on very solid science. He points out not only the benefit of MRI but also PET scan in assessing evidence of TBI. He quotes Rao "This the agreement of neurophysiological and PET finds lends support to the validity of the neurophysiological test results, because they are substantiated by an objective neuroimaging technique."

Field Sobriety Test (FST) and Traumatic Brain Injury

So what we have here in Mr. Awrebach is a man who has a clear history of receiving a traumatic brain injury, with a history of being viciously attacked, who has radiological evidence of the sequelae of having had a TBI. He suffered a vision diminishing ocular injury and has brain atrophy from suffering his traumatic brain injury. He also suffers from PTSD. The FST findings in the case of DUI marijuana are dubious to begin with. With these neurological and MRI findings we can safely conclude that the FST has no probative value. The results of the FST are consistent with a person who has PTSD and TBI.

As the radiology expert points out the diagnosis of Traumatic Brain Injury is made by the totality of the patient's medical history, physical findings, lab, radiological and other test findings. This patient has impaired brain functions based on DTI scan and history.

Now we know that the FST is of questionable accuracy even in the case of alcohol. Some studies have shown that when police officers watch video of FST that they are only 50% accurate in assessing sobriety. In addition the FST was never designed to address any substance other than alcohol and is less reliable for other drugs. Further, the reason why a peace officer administering a FST is supposed to ask about medical conditions is that many medical conditions can adversely affect performance on the FST and further invalidate it as a useful tool in assessing sobriety.

A presentation by Dr. Harris Meisel, founder of RJSB, at Southwestern Neurological Conference in Lake Tahoe several years ago addressed the brain's remarkable neuroplasticity and the ability of people with brain injury to improve over the span of years and decades.

Cannabis and Driving

Next we have the issue of cannabis use and the impact it might have on driving. As has been pointed out the position of the federal government, in the institution of the FDA has said that having THC in your system is no barrier to driving. The FDA warning for Marinol (THC) is don't drive, operate heavy equipment or engage in dangerous activity until you determine if Marinol interferes with these activities. This is similar to the advice given for Sativex (tincture of cannabis) by the manufacturer GW Pharmaceuticals.

There are several prescription products on the market which contain THC. Marinol (dronabinol), Nabalone, Cesamet and Sativex. Dronabinol (THC in sesame oil) is legal in the U.S. and Sativex (a whole cannabis plant alcohol tincture of cannabis which is legal in Canada, UK and the EU.) As noted in a previous report and above the FDA has said that if you have found in your experience that dronabinol has no effect on "driving, operating heavy equipment or engaging in dangerous activity" you are free to do so.

Sativex states that "it is an offense to drive if Sativex is affecting your ability to drive safely. Do not drive until you know how the medicine affects you. However, you would not be committing an offense and are able to drive so long as Sativex is not affecting your ability to drive safely."

In the case of Mr. Awerbach he has found that cannabis does not interfere with his driving.

Toxicology

Now as to the findings on the toxicology screen, the lack of 11 hydroxy THC suggests that last use of cannabis could have been 12-24 hours prior to the accident. A level of 3.3 mg/mL could mean use within the past three days.

COMMENT ON RAYMOND KELLY, PH.D.

I agreed with Dr. Kelly regarding the relevance of the records subpoenaed from the forensic laboratory at LVMPD. They included an internal document called a Corrective Action Report (CAR), dated 6/26/12. Due to problems with lab procedures and interpretation at the lab at LVMPD, the toxicology lab results for Mr. Awerbach, are of no value in documenting DUI marijuana.

Corrective Action Report (CAR)

Dr. Kelly writes what the implication of this report:

"This document revealed a problem with the lab's analytical method for cannabinoids (marijuana components) in blood. The CAR disclosed that during the time frame in which Mr. Awerbach's blood sample was analyzed, the lab's method was not able to discriminate between Δ^9 -tetrahydrocannabinol (THC), the main active component of marijuana, and another cannabinoid found in the marijuana plant, cannabidiol (CBD). The Corrective Action Report referred to a published paper where this problem had been

characterized. Because of this problem, when the lab reported a THC concentration in blood of 3.3 ng/mL, it is not possible to know how much of that result actually might have been CBD, whose effects on the body differ from THC. In particular, one cannot determine, retrospectively, whether Mr. Awerbach's blood contained THC itself at a concentration exceeding the Nevada *per se* level for marijuana (2.0 ng/mL)."

I concur with Dr. Kelly.

Dr. Kelly concludes by writing,

"This variability factor, considered along with those mentioned above, further supports my conclusion that one could not determine, in a scientifically valid fashion, whether the THC concentration in Mr. Awerbach's blood in 2011 in fact equaled or exceeded 2.0 ng/mL." It should be noted that CBD is a non-euphoric component of the cannabis plant.

In fact my opinion is that based on the facts at hand, it is clearly possible that the THC was zero. This Concrete Action Report calls into serious question the disputed testimony that Mr. Awerbach smoked cannabis 20 minutes before the accident.

In Item #8 Dr. Kelly states that there "inherent variability of such drug tests and that this variability is + or - 20%. "This variability factor is compounded by a test that does not discriminate between CBD and THC. So this difference 1.2-1.4 ng./ml noted by Dr. Kelley actually over estimates the reliability of the toxicology test results because what is reported as THC may have been CBD in all or in part.

DR. KELLY NOV. 18, 2014 LETTER.

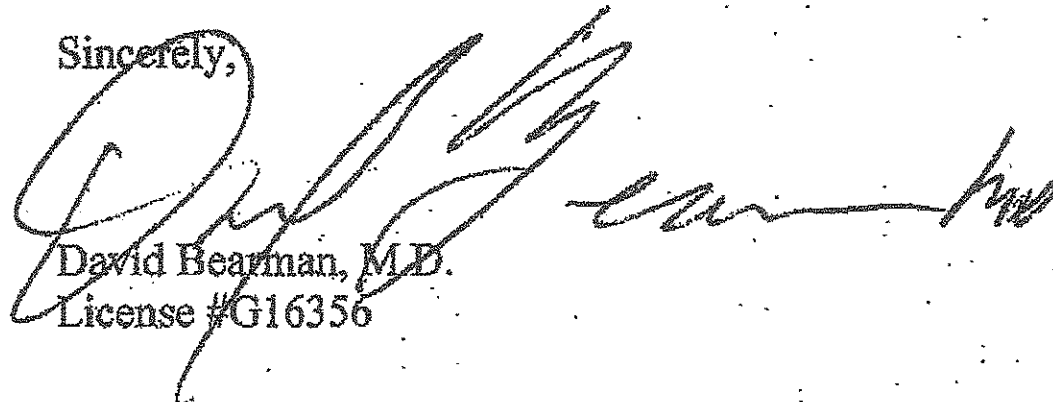
Dr. Kelly makes several excellent points in his critique of Vina R. Spiehler, Ph.D.

1. She does not seem to have considered potentially confounding factors such as Officer Figueroa's limited qualifications in identifying drug use, his failure to ask medical questions, deficiencies in the performance of the SFST's according to police practices expert Tony Corrotto, and Mr. Awerbach's brain injuries, reportedly leaving him with impaired balance and impaired vision in his right eye.
2. Dr. Spiehler did not address the issue of tolerance and how it might have affected driving in a chronic marijuana users.
3. Her interpretation of the cannabinoid blood levels did not acknowledge that use could have occurred outside the interval of driving impairment, particularly in a chronic user.
4. She does not show how Mr. Awerbach's marijuana use contributed to this accident in particular, as distinguished from general statements on how marijuana affects the body and driving.

5. She does not mention that a positive finding on the HGN test is not a typical finding for marijuana.
6. Dr. Spiehler states that Mr. Awerbach "would have" impaired judgment, mental confusion, impaired perception and impaired perception-reaction time due to "marijuana intoxication", but does not cite specific case-related evidence of those symptoms here. She also seems to view being "under the influence" of marijuana as being the same as "marijuana intoxication". Neither term is defined.
7. Her letter did not address the Metro forensic laboratory's problem distinguishing THC from CBD and how that may have impacted her interpretation of the blood levels."

She also ignores the FDA position on THC (dronabinol), as well as the experience with Sativex in Canada, UK, and the EU. The mere presence of THC does not indicate impairment, nor does recent use. There is no evidence of typical affects of cannabis on driving as articulated by the DOT, driving slower and more carefully.

Sincerely,



David Bearman, M.D.
License #G16356

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1 man, so he was chosen. I think possibly because of our
2 family's involvement with the mission -- I helped
3 facilitate a Thursday night meeting at the mission. We
4 had -- actually, we had our wedding -- my husband and I
5 got married in July. We had our wedding at the
6 mission.

7 Q. Does -- you said Jared has a job?

8 A. Yes.

9 Q. Prior to the time that he got the job --
10 which he got during this trial at the mission?

11 A. Yes.

12 Q. Did he have a prior job?

13 A. Yes, he worked at --

14 Q. What was that?

15 A. I'm sorry. He worked at CaptionCall, which
16 is a relay service. It's for hearing-impaired and deaf
17 people. You get a subscription. And one party calls,
18 and the -- I think they're called communications
19 assistants -- speaks into a program called Dragon
20 Speak. The computer types that. The other person
21 reads it. My husband works there as well.

22 Q. And, to your knowledge, do you know what
23 Jared was making at that CaptionCall job?

24 MR. ROBERTS: Objection. Irrelevant.

25 MR. STRASSBURG: Oh, I'm sorry. I thought

1 there was a punitive damages claim.

2 THE COURT: Come on up.

3 (A discussion was held at the bench,
4 not reported.)

5 THE COURT: Objection is overruled.

6 BY MR. STRASSBURG:

7 Q. Do you know what he was making?

8 A. I want to say 11 and change, between 11 and
9 \$12. That was when he was working for CaptionCall.

10 Q. How long did he work at CaptionCall?

11 A. A few months. He left the position to go to
12 the rescue mission, which was really his dream.

13 Q. To your knowledge, he didn't have any income
14 while he was in the program at the mission?

15 A. In the beginning phases, no. They're not
16 allowed to earn money. At Phase 4, they have day jobs
17 where you can earn -- you -- you may go out and move
18 someone's house there --

19 And then, when he was Phase 4 and eligible,
20 he went to work at CaptionCall. He started working
21 while he was in the program.

22 Q. The rates they pay in the mission are, like,
23 minimum wage?

24 A. \$10 an hour, I think. I don't know how much
25 they -- I think they get \$10 an hour.

1 Q. To your knowledge, when Jared started in the
2 program, he was broke?

3 A. Yes.

4 Q. You said he helped you with the rent; right?

5 A. Currently?

6 Q. Yeah.

7 A. He -- he puts a portion of his income into
8 the house. He's an adult living in the house.

9 Q. Sounds fair. He just moved home the Thursday
10 before the trial started?

11 A. I'm not -- I think so, yes. I think that was
12 it.

13 Q. And what's the rent that he's paying?

14 A. We have a formula based on either half of
15 what he's making -- first we said two-thirds, but he
16 had more things that he wanted to -- to take care of
17 for the children and things like that.

18 So he turns half his check -- when he -- the
19 two weeks that he was in trial, when he got his
20 CaptionCall check, I said, "Go ahead and keep that
21 money."

22 But, again, he's not -- he's not a child. He
23 doesn't keep that money so he can go to the movies. He
24 keeps that money because he has to pay his insurance
25 and he has to buy things for the girls. So he

1 contributes in that way. For a long time, I was
2 carrying everyone.

3 Q. You said that he is pursuing -- he just
4 started pursuing an educational goal?

5 A. Yes. The mission -- not the mission --
6 Goodwill helped him find a program. It's a certificate
7 program through UNLV, not a degree program, nonprofit
8 management. He'll start classes -- I think his first
9 class is tomorrow morning.

10 Q. Okay. And do you know who bought him that
11 suit he wore the first day of trial?

12 A. I believe that Goodwill gave him a voucher
13 for that, and he went to Ross's with it.

14 There -- there is -- I don't think he wore a
15 jacket. There is a suit that my husband and I went and
16 got him for work interviews.

17 It's part of the mission's program that they
18 take you on interviews for Cosmopolitan casino. And he
19 asked for that. And they went to, I think, Burlington
20 and got a suit jacket for \$100.

21 Q. Do you know what he's making at the mission?

22 A. I believe it's minimum wage. It is
23 full-time, but it's minimum. It'll be around what he
24 made at CaptionCall, I would guess, because it's less
25 an hour.

I

1 age 19, talk about pain. She went through all that day
2 in, day out. Lying. He manipulated. She stuck with
3 him, and even she, October 24th, was done. Because even
4 a mother's love has limits, and he reached hers.
5 And so when nobody would take him in, he saw,
6 he went to the mission, and for the first time in his
7 life it wasn't somebody making him do it. It wasn't
8 somebody imposing it on him as punishment like they want
9 you to do today. It was because he knew he couldn't do
10 it alone. He knew he was broke, and he had to change
11 and he did the 12-step program. He did all their
12 programs. He hung in there over a year, and you saw
13 when he graduated, they picked three of the most
14 improved, he was one of them. You know, 12-step
15 programs, they don't ever end. You do it your whole
16 life. And he's doing it day by day right now. You
17 heard her talk about it. What it was like and they want
18 you to punish him again. It wasn't enough, the jail,
19 the program --

20 MR. ROBERTS: Objection. Move to strike.

21 THE COURT: Come on up.

22 (A discussion was held at the bench,

23 not reported.)

24 MR. STRASSBURG: Judge, I'll withdraw that
25 question -- or statement.

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1 THE COURT: All right. It's stricken.

2 MR. STRASSBURG: Now, what should you
3 consider? And this was in Instruction 41. Let me show
4 you this.

5 "The amount of a punitive
6 damages award is not to compensate
7 the plaintiff for damages suffered,
8 but what is reasonably necessary in
9 light of the defendant's financial
10 condition."

11 You think he's got any money? He's --

12 MR. ROBERTS: Objection.

13 THE COURT: The jury is going to have to make
14 the determination based on what the evidence has been.

15 MR. STRASSBURG: He's got a job at the
16 Mission. March 7, Page 77.

17 "Q The rates they pay at the mission
18 are like minimum wage?"

19 Answer -- and this is mom.

20 "A Ten bucks an hour, I think. I

21 don't know how much they -- I think

22 they get 10 bucks an hour."

23 March 7, Page 77, mom.

24 "Q To your knowledge, he didn't have

25 any income while he was in the

110

1 program at the mission?

2 "A In the beginning phases, no,

3 they're not allowed to earn money.

4 At Phase 4 they have day jobs. Well, you can

5 earn -- you may go out and move somebody's house there,

6 and then when he was in Phase 4 and eligible he went to

7 work at CaptionCall. He started working while he was in

8 the program."

9 What did he have going in? March 7, Page 78,

10 mom.

11 "Q To your knowledge, when Jared

12 started in the program he was broke?

13 "A Yes."

14 The job he got at CaptionCall. March 7,

15 Page 76, mom.

16 "Q And to your knowledge, do you

17 know what Jared was making at that

18 CaptionCall job?"

19 And I'll skip all the objections.

20 "A I want to say 11 and change.

21 Between \$11 and \$12."

22 That is when he was working at CaptionCall.

23 But he has expenses. March 8, Page 78 -- I'm sorry,

24 March 7, Page 78, mom.

25 "Q You said he helped you with the