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Simple New Method of Detecting Lies By Identifying Invisible Unique Physiological Reflex Response Appearing Often Less Than 10-15 Seconds on the Specific Parts of Face of Lying Person; Quick Screening of Potential Murderers & Problematic Persons

Yoshiaki Omura, M.D., Sc.D., FICAE, FRSM,
Adjunct Prof., Family & Community Medicine Dept., New York Medical College; President & Prof., International College of Acupuncture & Electro-Therapeutics; Director of Medical Research, Heart Disease Research Foundation; Former Adjunct Prof., Dept. of Pharmacology, Chicago Medical School; Former "Maitre de Recherche" of INSERM (National Institute of Health & Medical Research), France; Former Visiting Prof. of Anesthesiology & Psycho-Physiology at University of Paris IV.
Abdallah Nihrane, Ph.D., FICAE
Visiting Associate Prof. of Integrative Medicine, International College of Acupuncture & Electro-Therapeutics; Former Assistant Prof., Dept. of Medicine, Mount Sinai Medical School, New York City
Dominic Lu DDS, FICAE,
Clinical Prof. of Oral Medicine, School of Dentistry, University of Pennsylvania; President of American Society for Advancement of Analgesia in Dentistry
Marilyn K. Jones DDS, MS, FICAE,
Associate Prof. of Holistic Dentistry, International College of Acupuncture & Electro-therapeutics; Director, Holistic Dental Center of Houston; Former Assistant Prof. of Chemistry, University of Houston, Texas
Yasuhiro Shimotsuura MD, FICAE,
President of Japan Bi-Digital O-Ring Test Association; Visiting Prof. of Integrative Medicine, International College of Acupuncture & Electro-Therapeutics; Executive Director ORT Life Science Research Institute, Kurume City, Japan
Motomu Ohki MS., FICAE (Hon.),
ORT Life Science Research Institute, Kurume City, Japan
(Correspondence: Dr. Omura, 800 Riverside Drive (8-I), New York, N.Y. 10032, Tel: 1 (212) 781-6262; Fax: 1-212-923-2279; E-mail: icaet@yahoo.com)

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ABSTRACT:

Frequently, we cannot find any significant visible changes when somebody lies, but we found there are significant invisible changes appearing in specific areas of the face when somebody lies and their location often depends on whether the lie is serious with or without physical violence involvement. These abnormalities were detected non-invasively at areas: 1)

lobules and c) a small round area of each upper lateral side of forehead; 2) the skin between the base of the 2 orifices of the nose and the upper end of upper lip and 3) Alae of both sides of nose. These invisible significant changes usually last less than 15 seconds after telling a lie. In these areas, Bi-Digital O-Ring Test (BDORT), which received a U.S. Patent in 1993, became significantly weak with an abnormal value of (-)7 and TXB2, measured non-invasively, was increased from 0.125~0.5ng to 12.5~15ng (within the first 5 seconds) and then went back down to less than 1ng (after 15 seconds). These unique changes can be documented semi-permanently by taking photographs of the face of people who tell a lie, within as short as 10 seconds after saying a lying statement. These abnormal responses appear in one or more of the above-mentioned 3 areas 1), 2) & 3). At least one abnormal pupil with BDORT of (-)8~(-)12 & marked reduction in Acetylcholine and abnormal increase in any of 3 Alzheimer's disease associated factors Apolipoprotein (Apo) E4, β -Amyloid (1-42), Tau protein, viral and bacterial infections were detected in both pupils and forehead of murderers and people who often have problems with others. Analysis of well-known typical examples of recent mass murderers was presented as examples. Using these findings, potential murderers and people who are very likely to develop problems with others can be screened within 5-10 minutes by examining their facial photographs and signatures before school admission or employment.

Key Words: Detecting Lies; Organ Representation Areas of the Face; 3 brain related areas of face; Pupils of Eyes; Ear lobules; Alae of nose; TXB2; Acetylcholine; Apolipoprotein (Apo) E4; β-Amyloid (1-42); Lyme Disease; Borrelia Burgdorferi; Forensic Medicine.

INTRODUCTION

When a person tells a lie, in spite of many previous reported innovations in lie detection, without continuous video recording of the face before and after a person is telling a lie, it is difficult to tell whether the person is telling the truth or not unless undeniable evidences exist [1-41]. Using our non-invasive method of detecting and measuring various molecules, including various neurotransmitters, bacteria, viruses and fungi infections in brain, we evaluated the effect of telling simple obvious insignificant lies that will not create any fear or bad influence on the person who is telling such a lie. To our surprise, we found invisible abnormal changes in face at areas 2) Alae of both sides of the nose and 3) the area between the base of the 2 orifices of the nose and in the upper end of the upper lip as shown in Fig. 1. These findings indicated that the human body might have Involuntary Reflex Responses to even insignificant lies. In the past 10 years, there are many such lie instances including a famous baseball player who was accused of using some steroid hormone. During the hearing, the player openly denied using any drugs, but his past photographs available provide us a different story. Recently, some famous football player was accused of taking advantage of a deflated football to win an important football game. A male hotel employee brutally murdered an around-70-year-

old female hotel guest but he denied it, while indirect evidences incriminated him. A married politician had an affair with another woman but first he denied it. A woman killed her own 2 children; she first denied her crime but later confessed it. Several women came forward recently to denounce an old famous male actor for sexual misconduct, but the latter denied it. Similar well-known examples of suspected lying individuals were evaluated in this article.

It is very easy to rapidly screen and detect potential murderers or people who are very likely to create problems frequently with others by measuring existing pathological substances by examining photographs of the face and signature. Screening of a suspected lying candidate's brain abnormalities requires less than 5-10 minutes. Detection of more specific quantitative information such as markedly reduced Acetylcholine & DHEA, significantly increased Alzheimer's disease associated 3 markers, Apolipoprotein (Apo) E4, β-Amyloid (1-42) & Tau Protein, virus infection (CMV, Epstein-Barr Virus, Human papillomavirus etc.), bacterial infection (*Mycobacterium tuberculosis*, *Borrelia burgdorferi* etc.) and fungal infection (*Candida albicans* etc.) requires 1-3 hours, depending on the case. In this article, we also present 3 recent well-known cases of multiple murderers. Typical example is the German copilot who killed himself and about 150 innocent people. From his photograph alone, we can rapidly screen him as a potential murderer. But no simple method of detecting serious lie is available.

Oftentimes, however, when there are no supporting substantial evidences available, the lying individual would insist that he was telling the truth. Therefore, by examining these real cases, we decided to see what abnormal invisible changes could be detected in different parts of the face during or immediately after telling supposedly lies. More serious lies create various degree of fear and activation of the Amygdala, the almond shaped brain's center for fear and imminent danger (In Greek, Amygdala means almond, located near the hippocampus in each side of the brain), and automatic defense mechanism, first through sensory thalamus to amygdala by short-circuiting most of the sensory cortex. In this article, we are introducing a newly found and useful technique for lie detection as well as screening of potential murderers and problematic people before school admission or employment, a technique which may be helpful in psychiatry and forensic medicine.

MATERIALS & METHODS

We examined the effect of telling obvious insignificant lies as well as some significant lies that can create serious punishment, on the same person or others. According to our study with 25 male and 25 female adults ranging between 20-80 years old, we originally measured any abnormal invisible changes by grading the degree of abnormal opening of O-Ring made by 2 fingers of examinee by simple non-invasive Bi-Digital O-Ring Test (BDORT), which received a US Patent in 1993 [52]. If an abnormal part of body is stimulated, by minute force (by touching by fingertip or even by touching by one thread of hair) or light beam or monochromic red light, BDORT of the examinee's O-Ring will open very easily. This is defined as (-) response. When more O-Ring open, then the

number of O-ring that opened becomes large (-) number. For example, if 7 O-Rings of examinee is opened, it is called (-)7. On the other hand, when any normal part of body is touched, the examinee will not be able to open. When O-Ring of examinee's hand is closed and cannot be opened, it is called (+) response. The stronger the normal condition exists, the more additional fingers must be used to open O-Ring of examinee made by thumb and other finger.

Although most of our previous studies were done immediately after telling a lie, here we are documenting the face of a lying person by taking photographs of the face of lying person making an insignificant obvious lie. From the photographs, we have semi-permanent records, and we can measure any biochemical changes appearing in the specific areas of the face where we detected abnormal increase in TXB2, which indicates the presence of mild circulatory disturbances with increased value of number of opening of the O-Ring Test (relatively large (-) values, of often (-)7) were detected. When an insignificant lie such as man saying "I am a woman" is told, we detected significant changes in the following areas of face: 2) skin between base of 2 orifices of nose and upper part of the upper lip and 3) Alae of the both sides of nose. Using one typical example of analysis, we present the effect of unique invisible changes in the face before and immediately after telling an insignificant, obvious lie. We examined how much time duration these invisible but significant changes will last. We found invisible but significant short lasting (less than 10 to 15 seconds) changes on the face of the person before and during or immediately after telling a lie in the following 2 categories: Part 1) insignificant obvious lie, and Part 2) significant lie associated with many serious implications to the lying person or others.

Part 1): Telling an insignificant obvious simple lie such as a man saying "I am a woman" will not make any significant influence on anyone. At the same time, this person will not experience any fear when telling that lie.

Part 2): We selected well-recognized examples of suspected lies reported by TV news and shows, newspapers and YouTube, depending on different nature and seriousness of the lies.

To evaluate a lie, we measured levels of TXB2 by non-invasively detecting maximum Electro-Magnetic Field (EMF) Resonance phenomenon between TXB2 as reference control substance held by examiner's hand, and TXB2 in the specific areas on the face. Increase in TXB2 indicates presence of circulatory disturbance. By our preliminary studies, we found TXB2 is a compound that usually increases during or immediately after telling a lie [67-75]. To measure TXB2, we used reference control substances of known amount of pure TXB2 completely encapsulated in transparent plastic slide obtained from Japan ORT Life Sciences Research Institute of Kurume City. For this study we obtained reference control substances of Acetylcholine, β-Amyloid (1-42), Tau Protein, DHEA, Apo E4, Dopamine, Serotonin, Cytomegalovirus, Epstein-Barr Virus, *Borrelia Burgdorferi*, *Chlamydia trachomatis* and *Candida albicans*. For Bacteria, Virus and Fungus, we used reference control substance of Monoclonal Antibody. For each

reference control substances, we use at least 10 different known exact weights. Our analysis involves examining photographs of the person suspected of telling the lie.

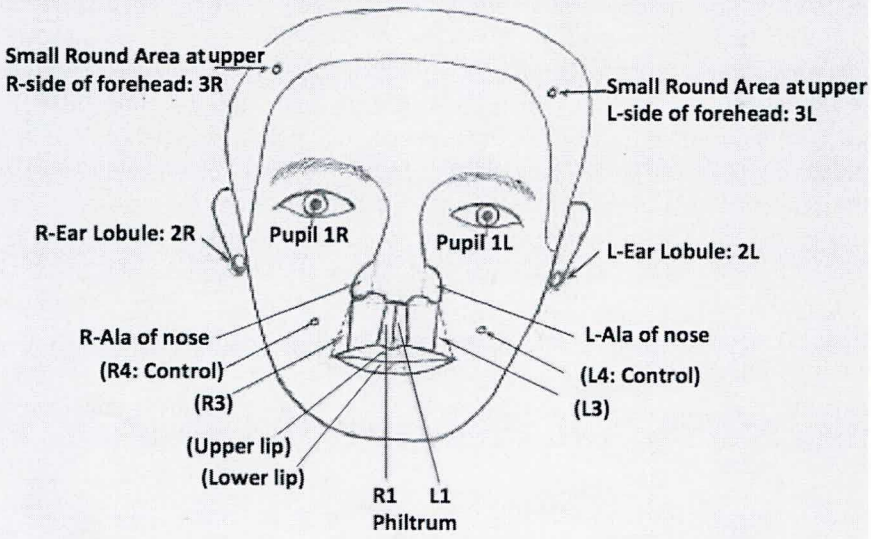


Figure 1: All the invisible abnormal areas found during or immediately after making a lie. When a serious lie is made, areas 1) 3 brain related abnormal locations (at, a) both pupils (representing retina) 1R and 1L, b)Ear lobules 2R and 2L, and c) small round area of each upper side of the forehead) always appear together at the same time with or without additional changes on 2) Alas of the nose and 3) area between the base of the 2 orifices of the nose and the upper end of the upper lip.

BDORT used in this study has following unique advantages: It is a simple non-invasive method of making a screening of any medical problems at their early stage. Also, using EMF Resonance Phenomenon between 2 identical molecules with identical weight, we can detect non-invasively any molecules including various neurotransmitters, bacteria, viruses, fungi & drugs as well as malignancy in brain rapidly without using any expensive bulky instruments. By applying pressure to certain specific locations known to represent specific internal organ by traditional method, by the time the abnormality was detected by finding pathological tenderness, often diseases have significantly progressed since in the early stage you cannot provide useful diagnostic response. With BDORT, if any abnormal part is touched directly or indirectly the skin above abnormal organ by giving minute mechanical force by even touching by one hair or weak red laser beam projection, O-Ring made between two fingers will open and show significant changes and the more O-Ring opens the more advanced the problems are. Compared with traditional tenderness by putting pressure, sensitivity of BDORT is much greater than 1000 times and can detect early stage of pathological condition. Therefore, this simple unique but highly sensitive technique was given U.S. patent in 1993 and this is the only patent in the world given to such a method that involves the human body. Another important reason using this principle is that we can detect any molecules non-invasively without biopsies including neurotransmitters, specific cancer of specific internal organs without using any expensive instrument [42-66]. In addition, before giving any medicine to the patient, we can select the best medicine with minimum side effect among many

choices of medicine, their optimal dose for individual patient as well as detecting undesirable drug interaction when a patient is taking multiple drugs, and also can tell how much of the effective medicine is reaching to pathological area to be treated after medication is given. In addition, outline of normal & abnormal internal organs can be drawn on body surface in less than 10 minutes without using any expensive instruments or exposing to X-ray or γ-ray and the distribution of drug or neurotransmitter or various infections can be localized. All the acupuncture meridians & corresponding internal organs & acupuncture points & shape, size, depth of acupuncture points as well as unique content of different meridian acupuncture points can be measured. For example, large amount of DHEA in Pericardium meridian & corresponding 9 acupuncture points which produce strong EMF Resonance with adrenal gland as well as DHEA. We teach this technique to qualified MDs, DDSs, PhDs, nurses, pharmacists & acupuncturists who are seriously interested. BDORT has been successfully used in many difficult cases by physicians with good background, trained by the first author, in Japan, U.S.A., Germany, Scandinavian countries, France, Italy, Belgium, England, Turkey, Former Yugoslavian countries, Ukraine, China, Korea, Venezuela and Brazil since the early 1980's.

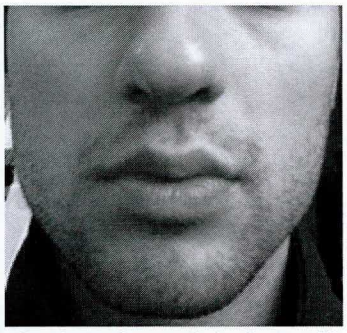
RESULTS

Part 1: Typical example of abnormal changes found in the face immediately after telling a simple, obvious insignificant lie

In this article, we are going to show one typical example of a series of photographic documentations before and after telling an insignificant obvious lie. We found that depending on the nature and significance of the lie, we usually detected certain abnormal changes at different parts of the face, indicating that this response is an Involuntary Physiological Reflex induced by telling simple insignificant lie.

In this example, a 26-year-old college male student told a lie saying, "I am a woman." A photograph was taken before and immediately after telling the false statement and one photograph was taken every 5 seconds after completion of telling the lie up to 25 seconds, and changes in face are shown with non-invasively measured value of TXB2 and abnormal change detected by simple BDORT evaluation.

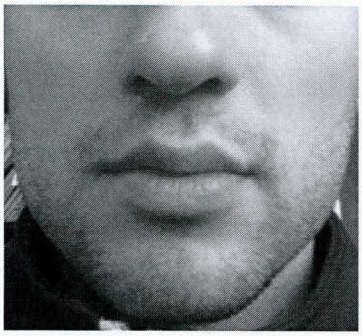
Part 1: Changes found in the face before and after telling an obvious insignificant lie



BDORT Grading	TXB2 (ng)	Space between nose & upper lips	TXB2 (ng)	BDORT Grading
(+)7	0.05	R1 L1	0.05	(+)7
(+)7	0.05	R2 L2	0.05	(+)7
(-)2	0.125	R3 L3	0.0125	(-)2
(+)7	0.025	R4 control L4	0.025	(+)7

BDORT Grading	TXB2 (ng)	R-Ala of Nose-L	TXB2 (ng)	BDORT Grading
(-)2	0.03	R-Ala of Nose-L	0.03	(-)2
(-)2	0.05	R-Tip of Nose-L	0.05	(-)2

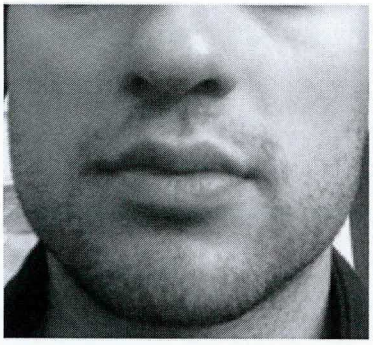
Fig. 2-1: Control, before telling insignificant lie



BDORT Grading	TXB2 (ng)	Space between nose & upper lips		TXB2 (ng)	BDORT Grading
(-)2	15.0	R1	L1	15.0	(-)2
(-)2	15.0	R2	L2	15.0	(-)2
(-)2	2.5	R3	L3	2.5	(-)2
(+)4	0.05	R4 control	L4	0.05	(+)4

BDORT Grading	TXB2 (ng)	R-Ala of Nose-L	TXB2 (ng)	BDORT Grading
(-)3	3.0	R-Ala of Nose-L	3.0	(+)3
(-)3	8.0	R-Tip of Nose-L	8.0	(-)3

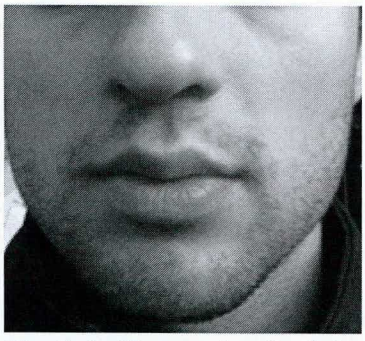
Fig. 2-2: Immediately after telling an insignificant lie ("I am a woman")



BDORT Grading	TXB2 (ng)	Space between nose & upper lips		TXB2 (ng)	BDORT Grading
(-)6	15.0	R1	L1	15.0	(-)6
(-)6	15.0	R2	L2	15.0	(-)6
(-)2	2.5	R3	L3	2.5	(-)2
(-)4	0.05	R4 control	L4	0.05	(-)4

BDORT Grading	TXB2 (ng)	R-Ala of Nose-L	TXB2 (ng)	BDORT Grading
(-)2	3.0	R-Ala of Nose-L	3.0	(-)2
(-)4	6.05	R-Tip of Nose-L	6.05	(-)4

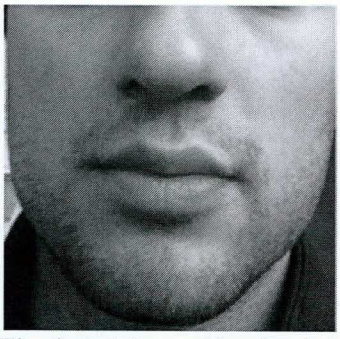
Fig. 2-3: 5 seconds after lying



BDORT Grading	TXB2 (ng)	Space between nose & upper lips		TXB2 (ng)	BDORT Grading
(-)1	13.0	R1	L1	13.0	(-)1
(-)1	13.0	R2	L2	13.0	(-)1
(-)2	4.0	R3	L3	4.0	(-)2
(-)4	0.05	R4 control	L4	0.05	(-)4

BDORT Grading	TXB2 (ng)	R-Ala of Nose-L	TXB2 (ng)	BDORT Grading
(-)4	2.5	R-Ala of Nose-L	2.5	(-)4
(-)4	7.5	R-Tip of Nose-L	7.5	(-)4

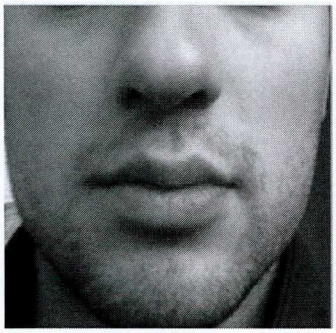
Fig. 2-4: 10 seconds after lying



BDORT Grading	TXB2 (ng)	Space between nose & upper lips		TXB2 (ng)	BDORT Grading
(+)7	0.35	R1	L1	0.35	(+)7
(+)7	0.35	R2	L2	0.35	(+)7
(-)3	0.045	R3	L3	0.045	(-)3
(+)7	0.05	R4 control	L4	0.05	(-)1

BDORT Grading	TXB2 (ng)	R-Ala of Nose-L	TXB2 (ng)	BDORT Grading
(+)7	0.125	R-Ala of Nose-L	0.125	(+)7
(-)2	0.125	R-Tip of Nose-L	0.125	(-)2

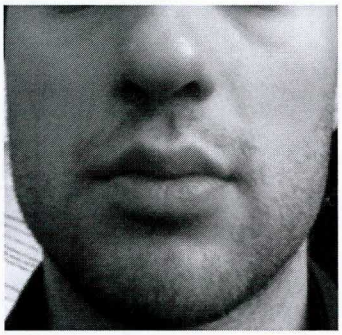
Fig. 2-5: 15 seconds after lying



BDORT Grading	TXB2 (ng)	Space between nose & upper lips	TXB2 (ng)	BDORT Grading
(+)7	0.10	R1 L1	0.10	(+)7
(+)7	0.10	R2 L2	0.10	(+)7
(-)1	0.10	R3 L3	0.10	(-)1
(-)1	0.10	R4 control L4	0.10	(-)1

BDORT Grading	TXB2 (ng)	R-Ala of Nose-L	TXB2 (ng)	BDORT Grading
(-)2	0.10	R-Ala of Nose-L	0.10	(-)2
(-)1	0.10	R-Tip of Nose-L	0.10	(-)1

Fig. 2-6: 20 seconds after lying



BDORT Grading	TXB2 (ng)	Space between nose & upper lips	TXB2 (ng)	BDORT Grading
(+)7	0.10	R1 L1	0.10	(+)7
(+)7	0.10	R2 L2	0.10	(+)7
(-)2	0.10	R3 L3	0.10	(-)2
(-)4	0.10	R4 control L4	0.10	(-)4

BDORT Grading	TXB2 (ng)	R-Ala of Nose-L	TXB2 (ng)	BDORT Grading
(-)2	0.10	R-Ala of Nose-L	0.10	(-)2
(-)1	0.10	R-Tip of Nose-L	0.10	(-)2

Fig. 2-7: 25 seconds after lying

From the analysis of this example as well as other previous similar experiments, we found the following facts: after a 26-year-old man told the insignificant obvious lie "I am a woman", invisible physiological changes appear at the following 2 areas: 1) at the space between the upper part of the upper lip and below bases of 2 orifices of the nose and 2) left-Ala of the nose and often right-Ala of the nose. These 2 areas always create significant changes of BDORT & TXB2. A characteristic largest increase of 15ng in TXB2 can be detected within 10 seconds and large decrease in BDORT appeared within 10 seconds after telling a lie. These changes are unique invisible involuntary physiological changes as Involuntary Reflex. However, largest change in TXB2 & BDORT appeared at location between base of 2 orifices of nose and upper end of upper lips. Although we did not write down values of acetylcholine, they often reduced. In this example, acetylcholine reduced to about 1/2 immediately after telling a lie.

Part 2: Typical example of abnormal changes found in the face immediately after telling a serious lie.

In this result section, we are introducing 4 very serious and well-publicized murder cases. We found that significant invisible changes appeared at maximum 10 different locations on the entire face immediately after telling a lie. In these cases at each side of face, maximum 5 different areas show significant invisible abnormal changes. All the cases below are real ones. However, in order to present mainly results of our analysis but avoid additional problems, we omitted the identity of all the cases except last 3 cases of mass murderer.

Case 3A and 3B: A Middle-aged Man suspected of Killing his wife & her boyfriend

Analysis of photographs of the face taken immediately after denying he has killed his wife & boyfriend showed very significant abnormal changes characterized by TXB2 (which increases in the presence of circulatory disturbances) increased from 0.125ng to 15ng, plus significant BDORT weakening response of (-)1 to (-)7. These abnormal changes in the face were found in: 1) 3 brain-related areas of the face consisting of a) pupils of both eyes, b) ear lobules of both ears and c) small round area at each upper lateral side of the forehead, all simultaneously; 2) Alae of each side of the nose; 3) space between the base of the 2 orifices of the nose and upper end of the upper lip. All these changes were found at the same time and last less than 15 seconds.

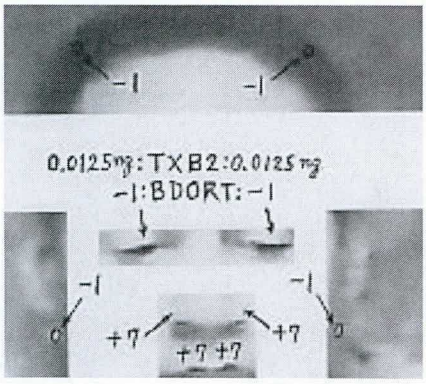


Fig. 3-A: middle-aged man, before making a denying statement.

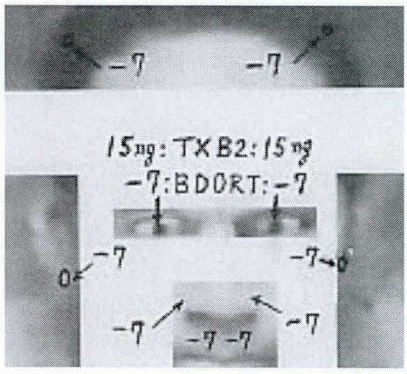


Fig. 3-B: Immediately after denying killing his wife and her boyfriend

Case 4A and 4B: Male hotel employee's brutal and bloody murder case of an elderly female hotel guest and he stole money & metal necklace from her.

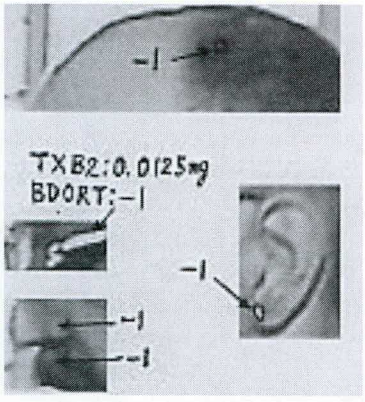


Fig. 4-A: Hotel employee before making a denying statement

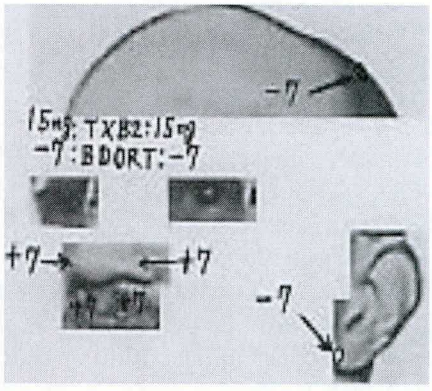


Fig. 4-B: Immediately after he denying killing a hotel guest

We found invisible changes in the photograph of face taken immediately after denying he has killed the female guest in the following areas of his face: 1) 3 brain-related areas of the face consisting of a) pupils of both eyes, b) ear lobules of both ears and c) small round area at each side of the forehead, at the same time. However, 2) Alae of each side of the nose and 3) space between base of the two orifices of the nose and upper end of upper lip, had completely opposite response with reduction of TXB2, indicating circulatory improvement and also improvement of BDORT (-)1 to (+)7. This may be related with primary reason of entering her room to steal money and other valuables. After he allegedly stole $400, the female guest suddenly came out of both room and then he was suspected of killing her with her metal necklace and his hands. During the fight, the guest bit his arm so strong that her front teeth broke off. He developed a severe tooth bite infection and required medical treatment.

Case 5A and 5B: A 23-year-old housewife and mother accused of killing her two little boys by directing a moving car with both boys inside into a lake without using direct brutal force

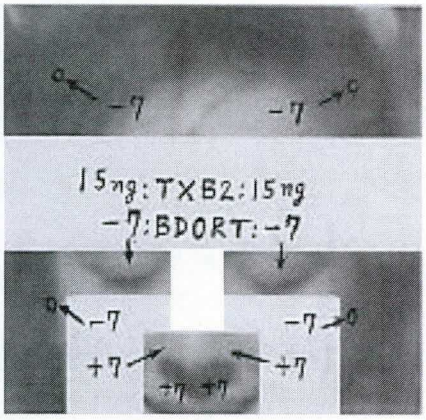


Fig. 5-A: A 23-year-old housewife & mother before making a denying statement

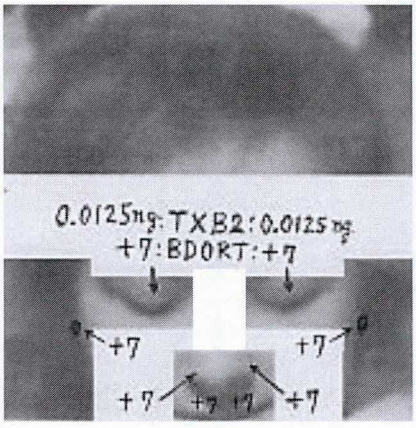


Fig. 5-B: Immediately after she denied drowning her 2 small boys

She blamed the crime on a non-existing Afro-American male for kidnapping her 2 kids. She later confessed to have killed her kids by pushing her car with her 2 kids inside into the lake. Our analysis of her face immediately after denying drowning her 2 little boys also showed very large change from (+)7 to (-)7 at areas of her face: 1) 3 brain-related areas of the face consisting of a) pupils of both eyes, b) ear lobules of both ears and c) small round area at each upper lateral side of the forehead, at the same time. However, 2) Alae of the both sides of the nose and 3) the area between base of two orifices of the nose and upper end of upper lip also did not show any changes. In areas of face 2) &3), no change happened and they were (+) 7 both before & after lying. Although her eyes are closed, our experiment with different subjects indicates that even if we examine with eyes closed, if you test areas above the pupils indirectly, the test result is still almost identical. Therefore, closing the eyes does not affect our study.

Case 6A and 6B: A middle-aged man charged killing with his pregnant wife without using direct violent force

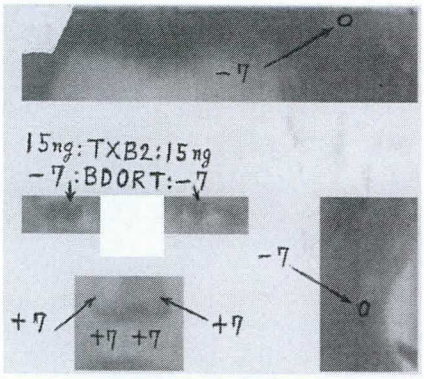


Fig. 6-A: a middle-aged man before he made statement about the suspected crime

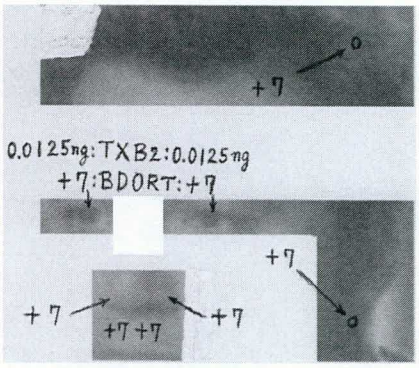


Fig. 6-B: Immediately after denying killing his pregnant wife

In the photograph taken immediately after he denying murdering his pregnant wife, we detected changes at following areas of his face: 1) 3 brain-related areas of the face consisting of a) pupils of both eyes, b) ear lobules of both ears and c) small round area at each upper lateral side of the forehead, at the same time. However 2) Alae of the both sides of the nose and 3) the area between base of orifices of the nose and upper end of upper lip did not show any changes.

Case 7A and 7B: An actor accused of sexual misconduct against several young women

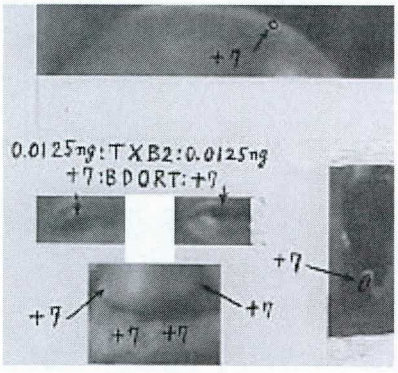


Fig. 7-A: an actor before making his statement

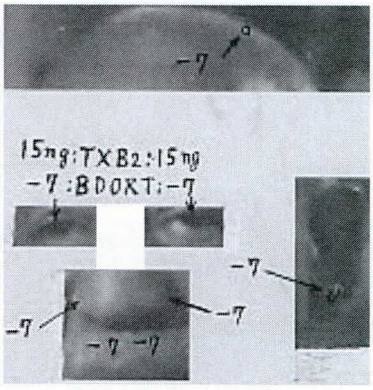


Fig. 7-B: Immediately after he made a statement denying sexual misconduct

In the photograph taken immediately after he rejected the accusations, we detected changes in the following areas of his face: 1) 3 brain-related areas of the face consisting of a) pupils of both eyes, b) ear lobules of both ears and c) small round area at each upper lateral side of the forehead, at the same time; 2) Alae of each side of the nose; 3) space

between the base of the two orifices of the nose and upper end of the upper lip. All these changes were found at the same time and last less than 15 seconds. Here, TXB2 increased from 0.0125ng to 15ng, and BDORT changed significantly from (+)7 to (-)7.

Case 8-A and 8-B: A married politician denies having an affair with a woman who was suspected giving birth to their child later

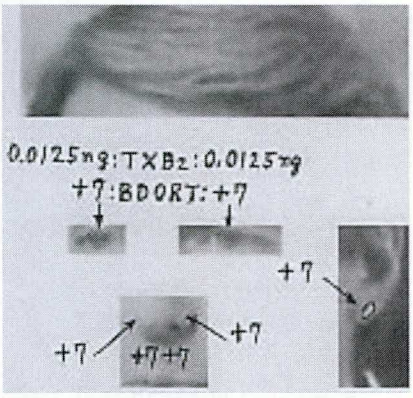


Fig. 8-A: Married politician before denying the affair

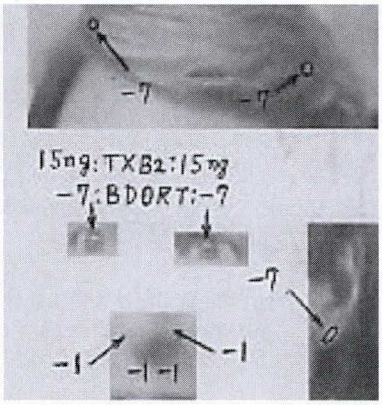


Fig. 8-B: Immediately after denying the affair

After the denial, we immediately detected changes in the following areas of his face: 1) 3 brain-related areas of the face consisting of a) pupils of both eyes, b) ear lobules of both ears and c) small round area at each upper lateral side of the forehead, at the same time; 2) Alae of each side of the nose; 3) space between the base of the two orifices of the nose and upper end of the upper lip. At areas of face 1) 3 brain-related areas, TXB2 increased from 0.0125ng to 15ng, and BDORT changed from (+)7 to (-)7. But at areas 2) & 3), changes were less than those of the 3 brain-related areas.

Case 9-A and 9-B: A middle-aged public official was blamed for causing traffic problem

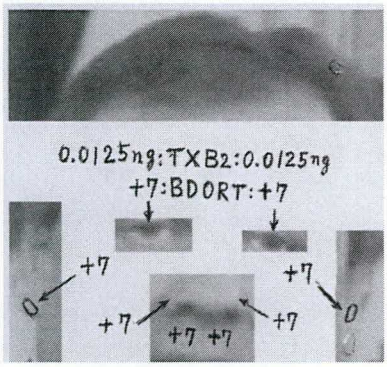


Fig. 9-A: the middle-aged public official

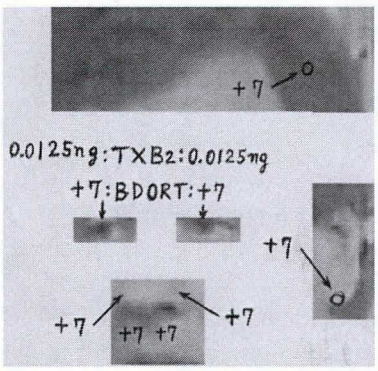


Fig. 9-B: Immediately after his statement

before his statement denying causing the traffic problem
Two close aides to the public official were dismissed from their work due to their direct involvement in the traffic problem. Both aides claim that the public official knew about the details of the traffic problem. The public official denied any involvement in this scandal. From the analyzed video tape, as you can see in our analysis, there were no changes at all in any part of his face, from before to after denying the accusation, suggesting that he did not lie about the incident. Those claimed that the public official was lying show significant changes on their faces. However, we did not include these pictures and analysis in this article for confidentiality.

Case 10-A and 10-B: 27-year-old German co-pilot, allegedly locked the captain out of the cockpit, changed the direction of the plane into an early descent on a flight from Barcelona to Duesseldorf on 24 March 2015 and crashed Germanwings Flight 4U9525 100 kilometres northwest of Nice, in the French Alps

Before the crash, He went to see the doctor in Dusseldorf University clinic. The doctor declared him to be "unfit to work". However, he hid this mental illness from his employer. Using BDORT, we screened him from the picture of his face in less than 5-10 minutes and found the invisible abnormalities in his pupils, on the forehead as well as in part of the ear lobules. The findings are so significantly abnormal that a firm conclusion can be drawn without any doubts.

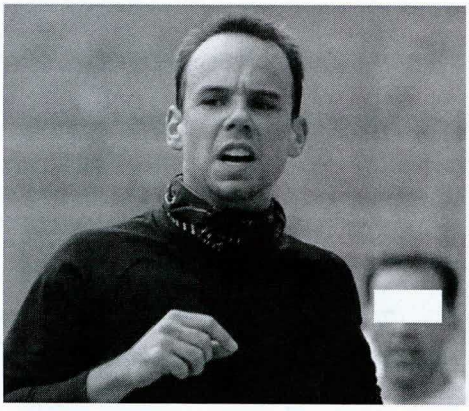


Fig. 10-A 27-year-old German co-pilot before he crashed Germanwings Flight 4U9525 in the Alps near the Nice

Fig. 10-B 27-year-old German co-pilot before the crash

Our analysis of pupils alone shows that pupils of right and left eyes have BDORT of (-)9, while normal range is between (-)2 and any (+) values. As long as BDORT result is a negative amount greater than (-)7 in (-) value, serious brain problems usually exist. Particularly, in the presence of brain tumor, BDORT always becomes (-)12 in the same side of the brain and part of the ear lobules. His TXB2 was abnormally as high as 53ng in both pupils, while normal values are less than 0.5ng. Even in the case of the lying, TXB2 can at most increase to the maximum amount of 15ng. However, in this pilot case, TXB2

is high with values of 53ng at both pupils, indicating a definite existence of real circulatory disturbance of both sides of brain. In addition, acetylcholine of each pupil was 0.25ng. Usually when the acetylcholine is less than 1ng, brain function reduces significantly and memory becomes very poor. Once this potential abnormal condition of the brain is detected from randomly selected photographs by quick screening, then we can find causes of the abnormalities.

Right Side	Pupil & Forehead	Left Side
(-)9	BDORT	(-)9
53-55ng	TXB2	53-55ng
0.25ng	Acetylcholine	0.25ng
7ng	β-Amyloid (1-42)	7ng
7.5ng	Tau Protein	7.5ng
0.25ng	DHEA	0.25ng
250ng	Dopamine	250ng
200ng	Serotonin	200ng
2700ng	*Chlamydia trachomatis*	2700ng

Table 1-A: Results of analysis of photographs

Right Side	Pupil & Forehead	Left Side
1950ng	Cytomegalovirus (CMV):	1950ng
170ng	Epstein-Barr Virus	170ng

Table 1-B: 2 Viral infections in both pupils & forehead

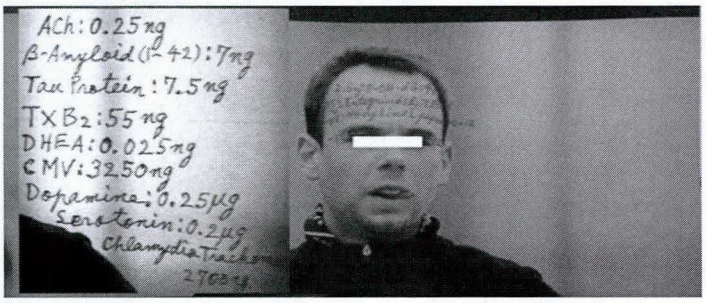


Fig. 10-C: 27-year-old German co-pilot before suicidal collision of airplane, together with result of measurement of pathological condition of the brain. His bone marrow representation area under each side of eyebrows showed Non-Hodgkin's Lymphoma response.

From these findings, we can certainly tell that he has an abnormally high amount of β-Amyloid (1-42) & Tau Protein, as high as the amount of the early stage of Alzheimer's disease [76-85; 86-91]. Viral infections (Cytomegalovirus, Epstein-Barr Virus) and strong infection by *Chlamydia trachomatis* were also detected. Further study indicated that he also had a mild form of Non-Hodgkin's Lymphoma, which was detected from bone marrow representation area located at each side of below lateral side of eyebrows

and Integrin $\alpha_5\beta_1$ was as high as 135ng. 8-OH-dG was 2.5ng at right side but 4ng at left side, which suggests that the malignancy becomes more aggressive at left side of bone marrow representation area. His both pupils had no response of Cocaine or Heroin.

Since we are not checking the changes between before and after asking a question, we show pictures taken from different occasions. These pictures give almost identical abnormal results of analysis of the brain.

Case 11: Immigrated South Korean 23 years old, Seung-Hui Cho killed 27 students and 5 faculty members before killing himself with 2 pistols on the Virginia Polytechnic Institute & State University campus in Blacksburg, Virginia on the windy, snowing morning of April 16, 2007.

Fig. 11-1: 23-year-old Korean student Cho before he killed 27 students & 5 faculty members at Virginia Polytechnic Institute & State University campus

Cho was a senior student at Virginia Tech, majoring in English. He was unresponsive in class and unwilling to speak. A quick screening by examining Cho's pupils, forehead and ear lobules indicates that Cho's BDORT was (-)12 and TXB2 at both pupils & forehead was 54.5ng. Without any knowledge of him, a simple screening of less than 5 minutes by examination of the photograph of his face can accurately determine him to have a serious brain problem. Particularly when BDORT of any pupil is (-)12, 1st possibility is the presence of malignant brain tumor with increased integrin $\alpha_5\beta_1$. Our analysis with cancer screening kit produced strong EMF Resonance with brain tumor, Anaplastic Astrocytoma with significantly increased integrin $\alpha_5\beta_1$ of 295ng only at right side of pupil but not at left side. Integrin $\alpha_5\beta_1$ increases in the presence of malignant cells and normally it is much less than 0.1ng. Anaplastic Astrocytoma responses were only detected at right side of 3 brain-related areas of a) right pupil b) small round area of right upper side of forehead & c) right ear lobule.

β-Amyloid of 12ng indicates Cho had an equivalent condition of moderately advanced Alzheimer's disease; markedly reduced Acetylcholine of only 1ng shows Cho's brain was

not able to function normally; viral and bacterial infections and high amount of Asbestos in the brain were also contributing to Cho's brain abnormalities.

Right Side	Pupil & Forehead	Left Side
(-)12	BDORT	(-)12
295ng	Integrin $\alpha_5\beta_1$	0ng
(-)12	Anaplastic Astrocytoma	(+)1
1ng	Acetylcholine	1ng
12ng	β-Amyloid (1-42)	12ng
0.45ng	Asbestos	0.45ng
1750ng	CMV	1750ng
1000ng	HHV-6	1000ng
750ng	*Chlamydia trachomatis*	750ng
20ng	Mycobacterium T.B.	20ng

Table 2: Additional pathological factors contribution to Cho's problems
Pease note: Anaplastic Astrocytoma response at right side of (-)12 means there is a strong response of the tumor, (+)1 at the left side means normal response without any tumor. Mycobacterium T.B. of 20ng is an insignificant infection.

In addition, EMF Resonance of Cocaine was also detected only in the right pupil together with 3 right brain-related areas & right nose. In these same 3 brain-related areas, Anaplastic Astrocytoma responses were also detected. However, at left side of pupil, forehead, ear lobule & nose, no Cocaine response was detected. This may indicate possibility that he recently was sniffing Cocaine through right nose. At all other visible parts of face & neck, no Cocaine response was detected. Therefore, he probably sniffed Cocaine from right nose. On the contrary, Heroin response was detected at pupils of both eyes & also at all 3 brain-related areas but could not be detected at the rest of his face, arms & hands. This indicates he most likely used Cocaine & Heroin very recently but probably no blood test showed these drugs.

If Cho's photograph and signature were evaluated by our technique before he entered into high school or college, these abnormalities could have been detected within 5~10 minutes and therefore Cho's existing abnormalities could have been treated much earlier. Cho could have been able to function normally rather than end up mass murdering. Unfortunately, we did not have his signature. Otherwise we could have gotten further information.

Case 12: 21 year old white South Carolina male, Dylann Roof suspected of killing 9 members of a Bible study group with .45-caliber handgun in a historical church in Charleston on June 17, 2015 around 9 pm.

Dylann Roof legally purchased .45-caliber handgun in April 2015 by the money he received for his birthday. He went to a historical church in Charleston at 8 pm and one hour later he stood up and said he was there "to shoot black people" and he shot 9 people

repeatedly except one woman who pretended to be dead, but the killer said he did not kill her so that she could tell people what happened.

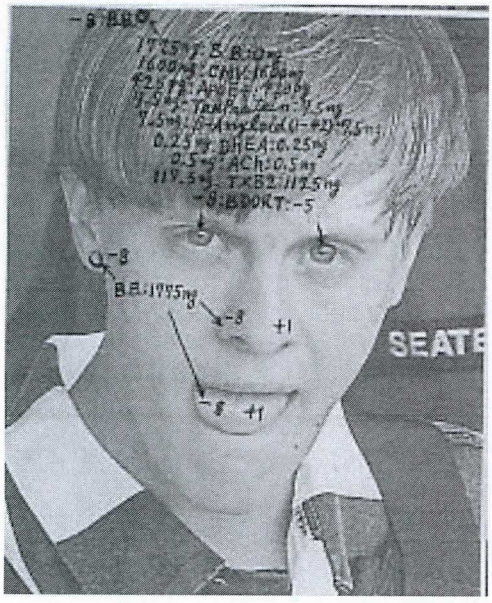


Fig. 12-1: 21 years old suspected murderer about 14 hours after murdering 9 innocent Afro-Americans, under custody of the Police. All the result of abnormal parameters measured at right & pupils left are shown on each of his right & left side of forehead.

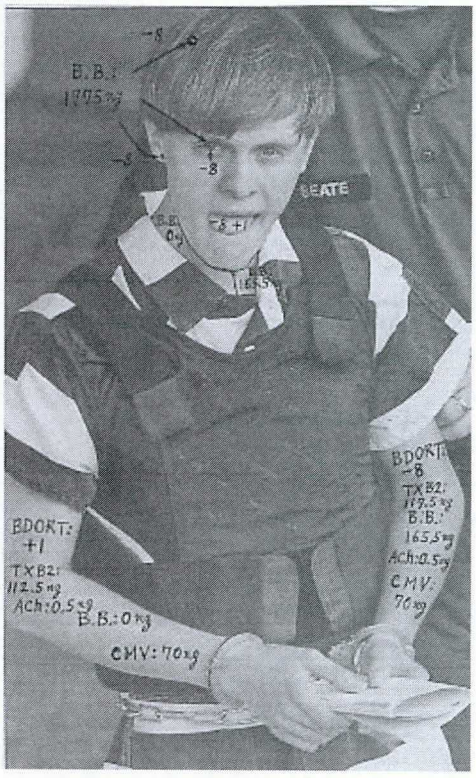


Fig. 12-2: Note that 3 brain-related areas used for detection of the serious lie also showed strong identical *B.b.* response of 1775ng at same time. This may be used as a new non-invasive criteria for estimation of *B.b.* infection in the brain. Notice similar abnormalities at opposite side arm & hand corresponding to of pupil.

We examined his pictures from the newspapers and television reports. BDORT of right pupil was (-)8 which immediately indicates that some serious abnormalities exist in the right side of the retina as well as the right side of brain. Also left pupil was (-)5 indicating some abnormality exist but right side of the brain was more severe. In both pupils, amount of TXB2 was abnormally increased to 117.5ng (left side of brain) and 119.5ng (right side of brain). This indicates the presence of significant circulatory disturbance in both side of the retina. Acetylcholine at both pupils was reduced to extremely small value of 0.5ng. When it is 1ng or less, brain cannot function normally, short-time memory deficiency & misinterpretation of reality can occur and the person will have difficulty with surrounding people. In this photograph of his face, part of his tongue is sticking out and his tongue is deviated towards right side. BDORT of right half of the visible tongue

was (-)8 and TXB2 was 117.5ng which indicate he has same degree of circulatory disturbance in right side of the tongue as in his retina. BDORT of the left side of the visible tongue was (+)1 and TXB2 was 0.06ng, which is within normal limit.

As can be seen from our analysis of both right & left pupils and both sides of the forehead, his β-Amyloid (1-42) was 7.5ng, which belongs to early stage of Alzheimer's disease and Apo E4 420pg also indicates Alzheimer's disease compared with normal range between 100-125pg. In the presence of Alzheimer's disease, Apo E4, Tau Protein & β-Amyloid (1-42) are known to increase. As can be seen often Tau Protein & β-Amyloid (1-42) have very similar values therefore usually we did not measure Tau Protein but we found Apo E4 is more sensitive since Apo E4 show the larger difference between normal control. Therefore, we now began to use Apo E4 along with β-Amyloid (1-42).

Right Side	Pupil & Forehead	Left Side
1775ng	*B.b.*	0ng
1600ng	CMV	1600ng
425pg	Apo E4	420pg
7.5ng	Tau Protein	7.5ng
7.5ng	β-Amyloid (1-42)	7.5ng
0.25ng	DHEA	0.25ng
0.5ng	Acetylcholine	0.5ng
119.5ng	TXB2	117.5ng
(-)8	BDORT	(-)5

Table 3: List of Analysis of the abnormality found from both pupils of Mr. Roof from the photographs of his face
Please note: *B.B.* or *B.b.* stands for *Borrelia burgdorferi*, which is the cause for Lyme disease; CMV stands for Cytomegalovirus; Apo E4 stands for Apolipoprotein E4.

We found significant infection of CMV, 1600ng, at both pupils& both sides of his forehead. Due to their small size, Cytomegalovirus particles often spread to both sides of the brain. From both side of forehead, 1600ng of Cytomegalovirus was also detected all over forehead in spite of hair is covering. However, at ear lobules and small round area at both sides of lateral upper side of forehead no Cytomegalovirus was detected.

The most significant infection was spirochete *Borrelia burgdorferi*, which is the cause of Lyme disease and it was a rather strong infection of 1775ng at right pupil while at the left pupil and entire forehead it was 0 with exception of one small round area at right forehead. The most interesting finding is, in the small round area at right upper lateral side of the right upper forehead, *Borrelia burgdorferi* is not only positive but also its amount is the same as that of right pupil and small area of right ear lobule and BDORT was (-)8. This mysterious location is the same location as abnormal change was found as one of the 3 brain-related areas of face after telling a serious lie.

In this mysterious location of the small, round, upper, lateral side of forehead has large amount of 1775ng *Borrelia burgdorferi* infection. Recently we have found 5 cases of Lyme disease infection of the brain, which has high amount of *Borrelia burgdorferi* infection as found in infected side of the pupil. This small round area of the upper lateral side of forehead has a diameter of about 1cm or slightly less in adult. In the same side of the ear lobule the small part of the ear lobule again had the same amount of the *Borrelia burgdorferi* as the infected side of the pupil but at forehead of infected side of the pupil (i.e. right pupil & right side of forehead) did not have any detectable amount of *Borrelia burgdorferi* with exception of small round area.

In addition, EMF Resonance of Cocaine was also found in only right pupil together with 3 right brain-related area & also at right nose; but we could not detect any Cocaine response in both right & left side of forehead except small round area of right upper side of forehead & corresponding left hand. However, Heroin response was found at pupils of both eyes & at all 3 brain-related areas, but the response was not detected at other part of his face or both arms & hands. This indicates probably he was sniffing Cocaine from right nose recently & he probably also used Heroin recently.

In relationship between right pupil & brain & corresponding left arm & hand & between left pupil & brain & corresponding right arm & hand shown in Fig. 12-2. Please note the 2 major differences of the value of BDORT & *Borrelia burgdorferi* infection between left arm-hand & right arm-hand. If signature is available, corresponding brain condition can often be detected.

DISCUSSION

During and immediately after lying, we found there are definite invisible but significant changes that take place on different parts of face. These areas are shown in Fig. 1. These significant invisible changes last only less than 10-15 seconds. We have to take photographs of the face or take continuous video to cover before at control and at least 20 seconds after telling lie. These invisible changes were usually characterized by increase in TXB2 (which increases in the presence of circulatory disturbances) from normal value of 0.0125~0.05ng to often 15ng BDORT units increase & significant decrease in BDORT value from control value of (+) value or low (-) value to often (-)7.

In part 1, we showed a typical example of insignificant obvious lie not affecting anyone. Still, it always makes similar invisible abnormal changes at areas: 2) Alae at the both sides of nose & area 3) quasi square space between base of 2 orifices of noses & upper end of upper lip consisting of R1+L1+R2+L2 by examining after a man saying "I am a woman" or a woman saying "I am a man". But these invisible significant changes usually last less than 10-15 seconds. Therefore abnormal invisible changes found immediately after telling this type of lie appears as Physiologically Involuntary Reflex phenomenon. Also we examined invisible changes, after saying "I killed a policeman". Still we found similar abnormal response at areas 2) & 3) immediately after the lying statement. Unless an individual had strong emotional connection or actual experience, area 1) representing 3 brain-related areas most likely does not produce any significant invisible changes.

In part 2, first we examined 4 serious suspected murdering cases. In these all 4 cases, areas 1) 3 brain-related areas involving a) pupils of both eyes, b) ear lobules of both ears & c) small round area at each upper lateral sides of forehead became (-)7. However, in the first 2 cases, murder was performed directly using violent forces by the murderer. When the murder is committed using violent force, all 5 locations in each side of the face illustrated in Fig. 1 produced invisible abnormal responses. However in case 4-A & 4-B, a male hotel employee killed a female hotel guest and then denied killing, the following changes appeared. In addition to areas 1) 3 brain-related areas, became abnormal, instead of areas 2) & 3) became (-)7 & TXB2 became 15ng, BDORT became (+)7 and TXB2 reduced significantly (indicating improvement of circulation was developed). In this case, in area 2) & 3) neurotransmitter Dopamine increased from 0.75ng to 11ng.

A male hotel employee who went to a hotel room and his primary motive was to steal money and valuables. He found and took $400, money that probably made him happy. When he was still searching for valuables, the female hotel guest suddenly came out from the bathroom after taking a bath and he probably killed her using brutal violent force of his hands. The initial satisfaction of finding money may be the reason why response at location at 2) Alae of both sides of nose & 3) area between base of 2 orifices of nose and upper end of upper lip showed opposite change in both pupils of eyes with 3 brain-related areas became (-)7 from (-)1 while 2) Alae of both sides of nose & 3) space between base of 2 orifices of nose & upper end of upper lip became (+)7 instead of (-)7.

In case 5-A & 5-B, a housewife & mother was suspected of killing her 2 little children without using violent force. She directed her moving car (with her 2 children still sitting inside) to lake water. When killing did not involve direct violence, immediately after lying, no change was detected at area 2) & area 3). While in case 6-A & 6-B, just like the housewife in Case 5, immediately after this middle-aged man suspected of killing his pregnant wife making a statement to deny the crime, only significant invisible changes were found in areas 1) 3 brain-related areas: a) pupils of both eyes, b) ear lobules of both ears & c) small round area of both upper side of forehead, but at areas 2) & 3) no change appeared which indicate he probably did not use violent force.

In case 7-A & 7-B, the actor did not kill anyone but immediately after he denied the accusation of sexual misconduct towards several women, not only at both pupils at facial areas 1) 3 brain-related areas showed extremely large change from (+)7 to (-)7 indicating possibility of denying some serious problem, but also similar large changes at areas 2) & 3) are detected from (+)7 to (-)7 indicate possibility of using force by his hand.

In case 8-A & 8-B, the married politician never killed or harmed but denied he had an affair with a woman and is suspected of fathering her child. If his affair became widely known, his chance of getting important position will be completely destroyed. Because of this serious reason, he had strong abnormal changes in all areas of 1), 2) & 3).

In Fig. 9-A & 9-B, the public official seems to have told the truth since no abnormal changes were found in all areas of face at areas 1), 2) & 3). In addition, people blamed

this official showed significant invisible changes in face, although we omitted these pictures.

In Fig. 10-A & 10-B, 27 year old German co-pilot has BDORT of (-)9 in both pupils, on the forehead and in part of the ear lobules. This finding indicates a serious brain problem. Even in the case of the lying, TXB2 can at most increased to 15ng. However, his TXB2 at pupils abnormally increased to a very high value of 110ng at his right pupil and 105ng at his left one, indicating the existence of serious circulatory disturbance of retinas. If we use our screening method, we could detect such dangerous person due to existing brain problem in less than 5-10 minutes. Since the abnormal condition in this kind of cases is so significant, it is much easier than determining if somebody is telling a lie. No response to Cocaine & Heroin was detected at pupils of both eyes & rest of visible part of his body.

In Fig. 11-1, 23 year old Korean-born student has BDORT of (-)12 at both pupils, indicating possibility of brain tumor. Our analysis revealed he probably has brain tumor Anaplastic Astrocytoma with significantly increased integrin $\alpha_5\beta_1$ of 295ng, but the tumor response was found only at right pupil & 3 brain-related areas of right side of his face. Further analysis indicated he had significantly increased β-Amyloid (1-42) & significantly reduced Acetylcholine indicating moderately advanced Alzheimer's' disease & additional viral infection of CMV & HHV-6 in both sides of brain. In addition, we detected some Cocaine responses at right pupil together with 3 brain-related areas & at right nose. But at the left side of pupil & left nose, no Cocaine response was detected. All these findings indicate he has serious brain problems. However, Heroin response was detected at pupils of both eyes & also at all 3 brain-related areas but could not be detected at the rest of his face, arms & hands, indicating he most likely used Heroin very recently.

In Fig. 12-1 & Fig. 12-2, our analysis of 21 years old white suspected murderer's pupils showed he had serious brain problems characterized by markedly reduced acetylcholine & DHEA, which indicate Vitamin D3 deficiency & early stage of Alzheimer's disease & Viral infection of CMV & Bacterial infection of *Borrelia burgdorferi* spirochetes infection of brains. According to newspaper reports, he had a very abusive father. After his parents divorced in 2009, Dylann who was 15 at the time was left with his father. He soon quit school and spent most of his time playing video games and using drugs, according to his family members. If he continued going to school, instead of killing church members, he probably would have ended up killing students and teachers. Also, there are so many causes of severe depressions & short-term memory defect & impulsiveness, etc. Even in normal person, if BDORT at pupil becomes (-)5~(-)8 by bacterial infection, it is very irritable and it is difficult read & difficult to concentrate until bacterial infection is eliminated & BDORT became (-)1 or (+) value. In addition, he may have used Cocaine, although Cocaine response was only detected at right side of 3 brain-related areas but could not be found at left side of the brain because he most likely sniffed Cocaine through right nose very recently. Also, he also probably had Heroine recently before this picture was taken.

However, these problems can be improved by proper medical treatment and the markedly decreased Acetylcholine of 0.5ng & DHEA of 0.25ng indicate he had severe Vitamin D3 deficiency syndrome. Since every cell in the human body has receptors for active derivative of Vitamin D3 namely 1α, 25-$(OH)_2$ D3, some of the symptom of early stage of Alzheimer's disease should improve significantly by taking optimal dose of Vitamin D3 or DHEA, since Acetylcholine & DHEA will increase significantly if there is no problem with liver (where Vitamin D3 is converted to 25-OH D3) & kidney (where 25-OH D3 is converted to 1α, 25-$(OH)_2$ D3). However, we found optimal dose of Vitamin D3 is in average 400 I.U., while many doctors are recommending somewhere between 2000-5000 I.U. [65-66]. These doses are highly overdosed. With some exception, most patients become worse with overdose of Vitamin D3. With optimal doses, Alzheimer's disease related parameters often begin to reduce. With proper treatment, there is good possibility of improving significantly and can have a normal life if treatment will be given within 3 years of 1st detection of problems. In order to detect and save these people, it is essential to have a quick non-invasive screening of our method using BDORT & Acetylcholine measurement which will only take less than 10 minutes by examining photograph of face, particularly pupils of both eyes. Therefore, it is important to have at least screening of students for school admission or potential employees for recruitment, which can be performed non-invasively, and quickly using photographs of the face of the applicant and their signatures, ideally signature of dominant & other hand, namely left & right hands.

When *Borrelia burgdorferi* goes to the heart, it often produces atrial fibrillation or atrial flutter by multiplying at area of right atrium & around SA node. We found that repeated acupuncture treatment of joints pain due to *Borrelia burgdorferi* infection is one of the major significant unrecognized causes of atrial fibrillation or atrial flutter. Since many acupuncturists insert needle at painful joint areas without evaluating if bacterial, virus or fungal infections exist. Evaluation can be quickly made using BDORT & anti-viral, anti-bacterial & anti-fungal agent for quick testing if patient holds effective drug, BDORT became strong (+) from strong (-). However, when it goes to the brain, it often creates serious problems including headache, short-term memory loss, severe depression, impulsivity, paranoia, obsessive compulsive disorder, personality changes with irritability & mood swing and fatigue. Before treating these infections and early case equivalent of Alzheimer's disease, first we treat with optimal dose of 400 I.U. of Vitamin D3, which is for average adult rather than 2000 I.U. or higher amount which instead of improving usually worsens condition. By taking optimal dose of D3, often Acetylcholine increases and DHEA returns to a normal value. Cytomegalovirus is usually much easier to treat than *Borrelia burgdorferi* in the brain. In his case, *Borrelia burgdorferi* infection was found at right pupil simultaneously at 3 brain-related areas; but unlike the presence of brain infection of CMV, which also shows same infection at the forehead of the infected pupil, in the case of *Borrelia burgdorferi* infection of the brain detected at the pupil, *Borrelia burgdorferi* infection cannot be detected in most part of forehead of the infected pupil with exception of small round area at lateral upper side of forehead. This finding indicates infection of *Borrelia burgdorferi* exists selectively at small round area at lateral upper side of forehead.

This may indicate in some people *Borrelia burgdorferi* infection in the brain & simultaneous appearance of infection on these 3 brain-related areas of one pupil can be found. This unique phenomenon may be regarded as clinically useful supplemental information to quickly screen B*orrelia burgdorferi* infection of the brain. Because of the many different symptoms of Lyme disease, one can have so many different or coexisting possible causes, in order to specify Lyme disease involvement in the brain, Andrew R. Pachner and his associates P. Duray and A.C. Steere of George Washington University, used the following 4 criteria to make definite Central Nervous System (CNS) involvement of *Borrelia burgdorferi* [92-100]:

1) CNS abnormalities without another documented cause
2) consistently positive IgG serologic test for *B.B.* in the serum
3) lymphocytic pleocytosis in the cerebrospinal fluid (CSF)
4) beneficial response to intravenous penicillin or ceftriaxone administration.

In their article of 1989 in one patient, they even did a biopsy of the brain to microscopically confirm the presence of spirochetes of *Borrelia burgdorferi* in brain tissue, since some of the patients did not show positive IgG serological test [92].

According to our own study, for some patients, bacteriostatic antibiotics Doxycycline is often more effective than the above 2 antibiotics according to simple BDORT. When 100mg 2 times per day is given (as recommended by PDR for many years), brain infection often do not improve significantly even after 2 months treatment. As we checked, for every dose of 100mg is given, the effect appears to last about 8 hours, as expected by many medications, in spite of excretion amount is very little & excretion time is very long as reported by PDR. During first 8 hours, initial 200~2000ng *Borrelia burgdorferi* infection reduces to about 1/100~1/200, then it began to increase again rather rapidly than reducing rate. Therefore, to be effective for 24 hours, we tried oral intake of Doxycycline 100mg 3 times per day, with supplemental Selective Drug Uptake Enhancement Method (SDUEM), which often reduces brain infection of *Borrelia burgdorferi* very significantly within 5~7 days at 3 brain-related areas at level of about 0.00000005ng from 200~2000ng of pretreatment infection and symptoms may be reduced significantly, but if Doxycycline is discontinued, infection will return. To prevent reinfection, we give optimal dose of about 400I.U. Vitamin D3 once or two times per day since our research indicated it promotes excretion of Virus, Bacterial & Fungus into Urine. But widely used 2000 I.U. or higher dose of Vitamin D3 worsens existing condition. There is possibility that some *Borrelia burgdorferi* may be intact by the covering of biofilm and may create healthy carrier with negative blood test [55]. Doxycycline has side effect of gastrointestinal & skin problems, particularly nausea, vomiting & diarrhea and difficult to tolerate for a long time, particularly 3 times per day. However, use of SDUEM increases drug uptake not only in brain but also face & surrounding area, as a result skin reactions on face and surrounding areas increases with swelling & itching of face & eyes, which increases by exposure to sunlight. For severe itchiness & swelling of skin, anti-histamine Benadryl 25mg may reduce problems for adults. Probably, from beginning, combined use of 400 I.U. Vitamin D3 & Doxycycline or any other drugs may be more beneficial. Without SDUEM, even when Doxycycline

100mg is taken 3 times a day, it may take longer to get improvement. In such difficult case, possibility of Bartonella & Babesia infection may also exist. Bartonella's transmitting vectors are blood-sucking arthropods (invertebrates with many body joints) or fleas, lice & sand fleas; they grow at endothelial cells every 5 days and are released into the blood stream and then infect red cells. Babesia sometimes shows Maltese-cross shape or tiny round ring in the infected red cells. Babesia species are spread through the saliva of a tick when it bites. Ticks of domestic animals that transmit Babesia & cause disease, including the very widespread cattle ticks. In the Americas, *Ixodes scapularis* is the most common vector. This hard tick, commonly known as a deer tick, is also the vector for other tick-associated illness, such as Lyme disease. As of 2003, though, the Centers for Disease Control and Prevention (CDC) acknowledged more than 40 cases of babesiosis contracted from packed red blood cell transfusions and two infections documented from organ transplantation.

Brian A. Fallon and his associates at The New York State Psychiatric Institute of Columbia University reported abnormal changes in the sagittal views of the human brain with technetium-99m HMPAO in color picture [95; 101-103]. There are 2 views of the patients with severe Lyme encephalopathy. It showed significantly reduced uptake of technetium-99m but when we examined the abnormal photograph of the brain at all the dark reddish areas had less than 100ng of *Borrelia burgdorferi* response and that dark gray area had more than 1500ng. Right 2 pictures of 2 normal brains had much brighter yellow colors in most of the brain but no *Borrelia burgdorferi* was found. Although this was a SPECT using the technetium, with our technique even with MRI we should be able to detect the presence of *Borrelia burgdorferi*, non-invasively if cross section of brain can cover this small round area of upper lateral side of forehead with *Borrelia burgdorferi* involvement.

It is well known that spirochetes of the *Borrelia burgdorferi* can go to most part of the body. When it goes to the brain, it can produce headache, short-time memory loss, severe depression, impulsivity, paranoia and obsessive compressive disorder, etc. [92-100]. Therefore, as our analysis indicated, Dylann's brain (Fig 12) had enough detectable abnormal parameters, which can cause serious problems including possibility of multiple murdering.

In all the famous mass murderer cases we analyzed above, every mass murderer's photographs showed distinctively abnormal brain characterized by markedly reduced 1ng or less amount of 1) acetylcholine 2) DHEA and abnormally increased 3) TXB2 4) β-Amyloid (1-42), Tau Protein & Apo E4 & 5) viral & bacterial infections. If we can use our screening technique and examining photograph of candidates' faces and signatures by both right and left hand in a school or job application, we can figure out whether the candidate has brain abnormalities and will be potential harmful to others, within 5-10 minutes without any difficulties simply by non-invasively evaluating using 1) BDORT & 2) Acetylcholine. However, again, in the case of detecting serious lies, it was more difficult since similar responses may appear in different conditions. For example, we examined pictures of the pupils of those who were informed that one of their close family

members has been killed. Immediate response of their faces was similar as that of Case 3, murderer who used violent force to kill two persons, when he denied his suspected crime.

Concerning all of these multiple murder cases, they could be prevented by simple screening of photographs of face & signature, which takes less than 10 minutes before admission to school or employment.

CONCLUSIONS

From this study, we can make following list of conclusions:

1. Most of available methods of detecting lies have various degrees of limitations and usefulness. By detecting invisible changes in face, before and immediately after someone tells a lie, we found invisible changes at different areas of face, with significant changes, which last often less than 10 seconds. These changes were detected using photographed pictures of face before & after telling lie described in Fig. 1, as 3 areas of face 1), 2), 3). However, location of invisible changes depends on the seriousness & nature of the problems, such as violent force is used or not.

2. When somebody tells a lie and the lie is obvious, insignificant and has very little emotional connection with the subject matter, we can still find invisible changes in the areas 2) & 3) of face in Fig. 1. The changes were increase in TXB2, indicating the presence of circulatory disturbance. Normal value of BDORT, which often is a low value of (-) or (+) of BDORT, changed to large negative value of (-)7. TXB2 increases from normal value of less than 0.1ng before lying to 15ng during or immediately after telling a lie. These significant changes last only less than 10 seconds. Since no emotion is involved and no threatening or fear will be caused telling simple insignificant obvious lie such as man saying, "I am a woman", it produced the same amount of changes for most of the time by repeating the same lie. We consider these invisible changes at face immediately after telling an insignificant lie as "Involuntary Physiological Reflex Response" to tell a lie. In every type of lies even when not involving actual murdering of people, if the lie is always associated with a certain strong emotional attachment, they seem to produce 3 brain-related invisible changes in the following areas of the face: 1) 3 brain-related areas of the face consisting of a) pupils of both eyes, b) ear lobules of both ears and c) small round area at each upper lateral side of the forehead. All these 3 brain-related changes appear simultaneously.

3. Everyone in 1st group of 4 suspected murderers showed invisible significant changes in areas 1), which are 3 brain-related areas. These changes are not only found in all the murderers, also in anybody who is not murderer but had a significant immediate or future implication and emotional association with the lie. They always seem to produce changes immediately after telling a lie in 3 brain-related areas simultaneously. The maximum effect lasted only less than 10 seconds.

4. Since insignificant lie such as a man telling a lie "I am a woman" can produce invisible changes in the areas of face at 2) & 3), although we have not described, for curiosity, we tested a lying statement "I killed a policeman." Since there is no emotion involved, 3 brain-related locations did not produce significant changes. However, for many people, it produces the same response as man telling a lie "I am a woman". But one new foreign female graduate student who came from China did not produce any changes in all the areas 1), 2) & 3), among about 50 subjects tested.

5. In this article, we described 4 different suspected murderers starting with Case 3A & 3B. All of them denied their suspected crimes first. However, there is one common fact among these murderers - their acetylcholine in both pupils and brain is as low as 1ng or even less, which indicates that they probably had a problem in their brains at the time these facial photographs were taken and their brains could not function normally with markedly reduced short term memory problems and difficulty in concentration.

6. The fact is that all these 4 suspected murderers have other abnormal increase in Alzheimer's disease related 3 factors of Apo E4, β-Amyloid (1-42) & Tau Protein. Apo E4 was increased to about 400~450pg, compared with 100~125pg of a normal person. Similarly, Tau protein and β-Amyloid (1-42) are abnormally high between 6.5-7ng, which is almost equal to the level of Alzheimer's disease, while a normal person has the amount less than 3ng. Therefore, the ratio of normal person to that of murderer is not more than 2 or 3 times. But among all these 3 Alzheimer's Disease related factors, Apo E4 gives the largest increase to about 400~425pg, compared with the normal value of around 100~125pg. Therefore, they are the easiest to identify since increase of Apo E4 is about 3.5~4 times. This increase in all of the 4 suspected murderers as high as the value of a Alzheimer's disease indicating that their brains were having difficulty of short-term memory. As a result, their judgment is markedly interfered together with extremely reduced acetylcholine of brain.

7. When we examined the background of confirmed mass murderers who have killed multiple people, most of them had some type of abnormal behavioral problems that were noticed by people close to them. However it is much easier to detect or screen who is the potential mass murderer or who has difficulties with other people because the acetylcholine of their brain examined at pupils and forehead are very low values of 1ng or less and Alzheimer's disease related factors such as Apo E4, Tau protein and β-Amyloid (1-42) have been abnormally increased to the level of Alzheimer's disease. Screening such kind of person is much easier, since the brain abnormalities have already been established & it takes only less than 5~10 minutes to screen.

8. When there is bacterial spirochetes infection of *Borrelia burgdorferi*, detected at pupil of one eye, often *Borrelia burgdorferi* cannot be detected at most parts of the same side of forehead including hairless area, with exception of small round area (about 1cm diameter or less) at upper lateral part of forehead. Brain infection of *Borrelia burgdorferi* often creates headache, frequent mood changes to aggressiveness & abnormal behavior, severe depression, fatigue. We can often detect

same degree of *Borrelia burgdorferi* infection at 3 brain-related areas consisting of a) pupil of eye, b) part of ear lobule of same side of infected pupil & c) small round area with diameter of about 1cm or less in adult at upper lateral side of forehead, where hair is growing. Therefore, detection of *Borrelia burgdorferi* at 3 brain-related areas can be used as new additional criteria of brain involvement of *Borrelia burgdorferi* infection.

9. One pupil may represent not only condition of retina of the same eye but also often represents condition of the same side of brain in the forehead area. Non-invasive simple BDORT can be performed at each pupil even when pupil is completely covered by eyelid. BDORT performed at eyelid covering pupil by closing eyes gives almost the same result as measurement directly above pupil. It is abnormal when BDORT at pupil is larger than (-)3 in (-) value. If BDORT is more than (-)4~(-)5, most people have difficulty concentrating & reading for a long time. If it is very large as (-)10~(-)12, often brain tumor such as Anaplastic Astrocytoma or Glioblastoma exists. When (-) value is between (-)4 & (-)9, most common cause is viral or bacterial infection or their mixed infection or early stage of brain tumor, or Alzheimer's disease.

10. Recent well-known cases of confirmed mass murderers could be screened in less than 10 minutes by examining their photographs of face particularly at both pupils of eyes. All these 3 cases of mass murderers described in this article could be prevented by simple screening. In order to prevent potential murderers or people who will frequently have problems with others should be screened before entering schools, colleges or employments. In this way we are not only preventing future problems, but also we can save people suffering from their problems, since they can be examined and treated by proper medical specialists once the cause of the problem is identified. As the causes of decreased acetylcholine in the brain and the equivalent conditions as Alzheimer's disease, there are always contributing factors. For us to detect these contributing factors, it will take additional 2 or 3 hours. Then it is often possible to improve problems rather than getting serious problems in the future.

11. For screening of the potential murderers and people who often have problems with others, in this article we only showed the detection of the existing abnormalities from the picture of face alone. However, additional diagnostic information can be obtained from signature. Since signature by right hand normally represents condition of left side of the brain and left hand signature normally represents right side of the brain with some pathological exception, ideally it is more valuable to use the signatures of both right and left hands instead of using only dominant hand in addition to the photograph of the face.

12. Through all these analyses, we found that 3 brain-related areas of face will produce significant changes when people are telling serious lies. Also, we found in Lyme disease infected brain or brain with malignancy, abnormalities are often detected in the same 3 brain-related areas. In addition, those who used Cocaine or Heroin in the recent past also show Cocaine or Heroin responses in these 3 brain-related locations.

When only right pupil shows Cocaine response, Cocaine is sniffed through right nose since these drug responses can also be detected from right nose but not found at left nose. Therefore there is possibility of detecting Lyme disease infected brain, brain tumor, Cocaine, Heroin & some other drugs affected the brain. Question is what this small round area at the upper lateral side of brain of abnormal pupil of the eye is. This area could be used for detection of various medical problems and requires further researches.

We hope this new information will be useful for lie detection and supplement existing methods, as well as screening potential murderers and people who most likely create problems, and prevent serious future problems in school, company or society.

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