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STUDY TO APPLY THE POSSIBILITY OF THE STIMULATION TEST BY VIBRAIMAGE TECHNOLOGY AND ITS APPLICATION IN POLICE PERFORMANCE

Lee Jai Seok¹, Choi Jin Kwan²

¹ Korean Police Agency, South Korea (js09535@police.go.kr);

² VIBRASYSTEM Co., Ltd., South Korea (kwan.choi@vibrasystem.co.kr).

Abstract: *The purpose of this research is to suggest the utilization of Vibraimage, a high-end device, to improve the reliability and the accuracy of the polygraph, which is actively used in the investigation process in spite of the controversies including the theoretical issue. To meet this goal, the database that can show the possible improvement in reliability and the accuracy is needed to be constructed by comparing the performance of the previous polygraph and the non-contact type Vibraimage and by inducing the conformity degree between the devices. Guiltiness Recognition Test in the simulated internal irregularity investigation case for police cadets is used to compare the performance of the previous polygraph and the non-contact type Vibraimage and to induce the conformity degree between the devices. The simulated case "18 million won cash have been stolen from the office safe" was investigated for 12 weeks at the Seoul Metropolitan Police Agency by the 6 examining officer trainees, consisting of the roles of 3 examining officers and 3 subjects. Conclusion: All of the examining officer trainees have succeeded in searching out the internal criminals in this simulation. Every result from the result from Vibra Image matched the result from the precious polygraph. Vibraimage can improve the public order service for the subjects by offering the convenience of non-contact type method and by decreasing the time required. Furthermore, it can be used in various cases such as recently increasing need for polygraph, information leakage, dealing with sex offenders, hiring a police officer, regular aptitude test for nuclear plant employees and etc. It is expected that, if the standardization of it can be achieved by gathering the future case studies which could be done in the institutions other than Seoul Metropolitan Police Agency, the reliability and the accuracy of the previous polygraph will be improved.*

Keywords: Polygraph, Vibraimage, Vestibulo-emotional reflex (VER).

1. Introduction

Somebody doubt, "Is a lie detector test (Polygraph) reliable when an investigation response comes out?" Is the response just a nervous and upset response? Or, Is the nervous reason caused by the detection: exposure of lie? There is a lot of stress for the officer who is being examined during the course of the investigation in the pre-testing audit function and the investigation into the identity of the suspect due to job accusations. This external barrier (Outside Issue) may reduce the reliability of the test results. The investigator of lie detection are confused as to whether the mental disorders or the environmental obstacles to physiological mental function have occurred. The existing polygraph test is to examine the information of autonomic nerves, and the testee has the room for distortion, and the deviation in distortion caused by contact is severe.

To alleviate this confusion, the contactless Vibraimage was studied as an alternative to ensuring the trust and feasibility. Exploring the theory and principle of Vibraimage to

complement the existing lie detectors to enhance the reliability and to infer the state of human emotion, the police examined the reliability of the virtual crime-recognition test, which targeted the police trainees, using the existing Polygraph test and Vibraimage test in lie detection, and then compared the results with each other. And then, the reliability was reviewed, and the screen tests, such as the regular checks on police officers, and the pre-employment inspections, are discussed for the future active utilization measures.

2. Theoretical background

2.1. VER (Vestibular Emotional Reflex)

As the Vibraimage system uses the measuring devices for the emotional response to visualize the micromovement of the head caused by the brain's vestibular system (equilibrium senses), it is a lie detection device that analyzes and evaluates a person's psychophysiological and emotional state using a algorithm measuring the parameters to determine the authenticity of a statement [1, 2, 3, 4, 5].

The physiological studies of movement began with the ancient Aristotle and even in modern times, many scholars have mentioned the relationship between human emotions and reflections. The reflection is a mind to do and it is also mind to suppress one's desire to do so.

Every reaction of brain activity can be characterized by muscular movement (Reflexes of the brain, 1863, Ivan Sechenov).

In humans and animals, reflex movements associated with emotions (The expression of the emotions in man and animals, 1872, Charles Darwin)

The amplitude and intensity of reflex movements characterized aggression (On Aggression, 1966, Conrad Lorenz)

Vestibulo-emotional reflex (VER) is a reflex 3D head movement that stabilized vertical equilibrium of head by producing head-neck muscle movement with the frequency depending on the emotional and psychophysiological state of a person. Vestibulo-emotional reflex (VER) is the one of vestibular reflexes, linked human physiology and emotions [4, 5, 6].

Physiology and pathology of vestibular system and vestibular apparatus were researched by Robert Bárány receiving the 1914 Nobel Prize in Physiology. The vestibular system, which contributes to our balance and our sense of spatial orientation, is the sensory system that provides the dominant input about movement and equilibrioception. Vertical human head position controlled by vestibular system by the means of head-neck anatomy. Two month old child begins to poise the head in vertical position on reflex level, firstly performs visible movements for it. Adult people also performs micromovements for poise vertical head position, because it is impossible to coordinate vertical mechanical balance of heavy object without movements. Vestibular system as typical sensory system reacts to stimulus. But gravitation is constantly working stimulus, so vertical head coordination becomes constantly working and reflex process. This is the main physiology difference between vertical head coordination and any other sensory process that works sometimes.

This difference transfers vertical head coordination into typical physiological process as heart rate (HR) measured by ECG and blood pressure, brain activity measured by electroencephalography (EEG), or thermoregulation measured by galvanic-skin respond (GSR).

2.2. Stimulation test in the existing Polygraph

The existing Polygraph investigation is composed by four major stages. There are pre-investigating preparation stage, pre-investigating interview stage, main investigation stage, and finally post-investigating interview stage [10, 11, 12]. The stimulation test is conducted just before performing the main investigation stage after interviewing with a testee. It can be considered a preliminary examination before the main investigation test. For instance, the Stimulation Test usually gives the testee a piece of paper to write only one favorite number on it. Let's assume the testee wrote the number '3'. And the examiner will ask a question like this. 'Is the number on the paper three?' And then, even if the testee writes number '3', but the examiner asks the testee to answer 'No' in order to make him induce a lie. That is to say, the testee would say 'No' to all answers if the examiner asked the questions from number one to number nine. Eventually, the testee is deliberately lied to, and the physiological reaction is examined. This is the stimulation test that is one of the pre-investigation test just before the main investigation test.

There are many purposes to perform the stimulation test. When the examiner attaches some devices and electrodes to the testee for performing the stimulation test before the main investigation test, naturally, he can get the chance to be allowed to attach the devices and electrodes and then, the resistance will also disappear.

And the examiner will also introduce the procedures and methods for testing lie detector before testing. When measuring the blood pressure in hospital, if the nurse inputs too much air, the testee's arm will feel tight and hurt. The same testing device for blood pressure is applied in Polygraph testing. And the examiner will check when the testee may feel hurt and pain or not according to how much the air puts into the device. If there is pain caused by wearing the equipment during the inspection, it is a valid issue that may affect the test results. And by allowing the person to lie intentionally, you can check the reactions and patterns of the testee's physiological responses. When the examineer explains the physiological responses by showing the stimulation test results to testee. The examiner lets him recognize that the responses are really well indicated and registered if he lies. Naturally its activity will stimulate the testee's psychology and if he says the truth, the testee will get the psychological stability to avoid the anxiety that the polygraph testing result may be distorted, by supplying the confidence of the polygraph investigation. It can be the purpose of the Stimulation Test to determine if the conditions are suitable for the test [10, 11, 12]. In other words, in the existing polygraph investigation, the stimulation inspection is a process performed for conditioning the investigation. The stimulation test checks for physiological responses to the numbers answered by lying to maximize the conditioning of the test. The conditionization of the test

is to make the testee who lies about the incident more anxious and less anxious to the really true testee.

The stimulation test plays an important and valuable role of polygraph testing. Because there is a psychology to believe easily what is seen and not to believe what is not seen, the stimulation test is performed for this purpose and intent. And through the stimulation testing, the real person has the faith that he or she can be cleared of his false charges, but it shows the person who tells the lie will be found guilty.

3. Vibraimage utilization

3.1. Examination cases using the existing Polygraph and Vibraimage technology

The virtual crime-investigation used the screen test, the meaning of screen test is to have a person through the specified examination before he or she is admitted to a given position. It is a kind of lie detection test performed with the purpose of hiring the right person.

There are the pre-employment test and the regular tests on screen test. In USA, the pre-employment test is used for hiring the person who can work in the national agency and a various company. Before hiring, the Polygraph investigation should be performed and there are many cases that should be passed by its investigation.

The regular inspection refers to the test performed on preventing the leakage of information and examining major employees, and on persistent sexual violence etc.

For example, the test results for the employment and major positions include drinking (drugs), problems of the opposite sex, and bribery

The case study examined the use of lie detection for the internal irregularities by police officers.

Three of the six preliminary testers who had passed the month's training period among the preliminary examiners who took the investigation training course for 12 weeks were roled by the testees and the other three were performed by the examiners.

The setting of the virtual crime-case was "The 18 Million Korean won composed of the 50,000 Korean won bill was lost in the office safe". Randomly, the three preliminary examiners of Yu preliminary examiner, Yeo preliminary examiner, Kim preliminary examiner, played a role as an examiner and other three preliminary examiners of Hong preliminary examiner, Joo preliminary examiner, Yang preliminary examiner played a role as a testee.

The investigation method (technique) was selected as the unknown — test (STIM) to train the basic POT concepts. The three preliminary examiners who would play the part of a testee were given a swallow to pick three pieces of the folded paper.

The paper has the number of the stolen cash on it. Only one person is the criminal. But in fact, all the three sheets of paper had 1,800 number. The testees looked for numbers in the paper where they were the only one in their possession.

They are also silent about their paper numbers to each other or to investigator. The preliminary investigator may find it hard to imagine the investigator who led them lying. The rapport may have been formed between the preliminary inspector and the training investigator, and the psychological dominance relationship may have been established. The preliminary inspectors, acting as testees, will be convinced that they are the only real criminals, making it a condition for the tests. Two times investigation will be performed. The first test is to be carried out in a forward direction but the second test in a reverse order. The assessment was made to bring the results together by all who served as investigators. At the same time when the existing polygraph was examined, Vibraimage's lie detection application was used to support the comparative method, which is uniquely modified and developed by VIBRASYSTEM [7, 8, 9].

The main purposes of this investigation test are,

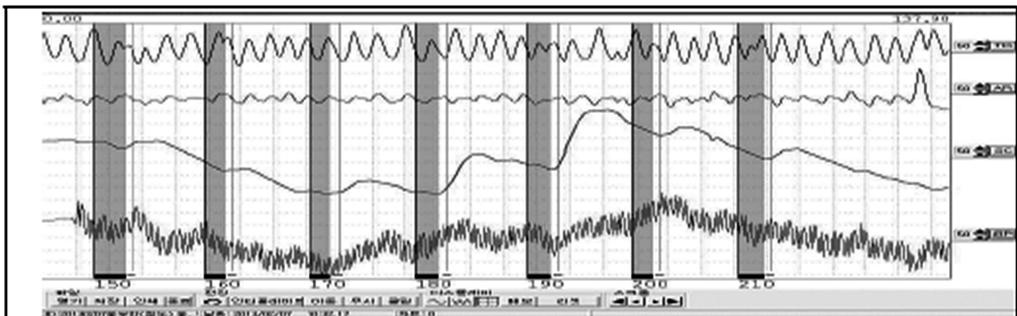
First, to check the consistency of the existing polygraph and Vibraimage test result. Second, to check the possibility that the simple stimulation test could be feasible to Vibraimage test. Third, to check the crime-activity of the information leakage could be investigated.

3.2. The result and analysis between the existing Polygraph and Vibraimage's investigation

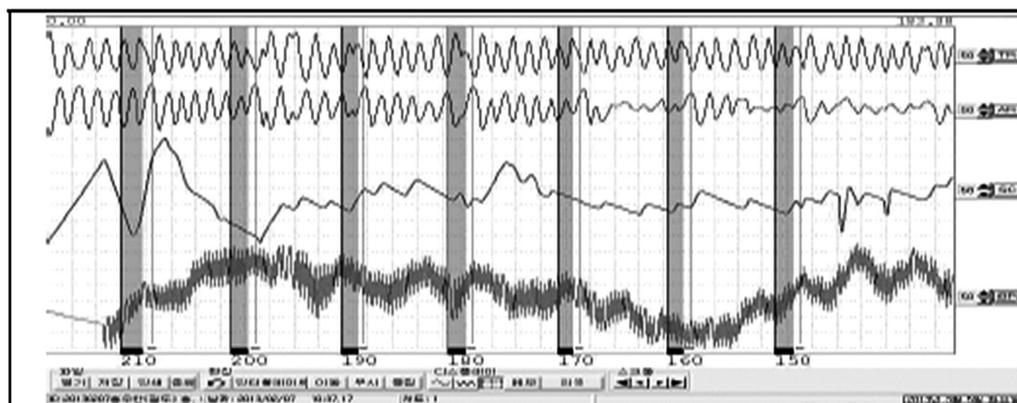
1) Theft case — 18 million Korean won/Testee: Mr. Hong **

The testee, Mr. Hong **, was tested by Ms. Yu **, preliminary investigator. But it is observed that some distortion was attempted, there is a significant response in 1,800 number. As a novice preliminary examiner, 18 million Korean won and 19 million Korean won must have been chaotic in the appearance of the first and second chart. The third chart was performed, but after the completion of the examination, the cuff (cardiovascular response equipment) was poorly handled, thereby the graph form was lost. To show the significant psychophysiological response, it is the investigation result that the training examiner directly demonstrated.

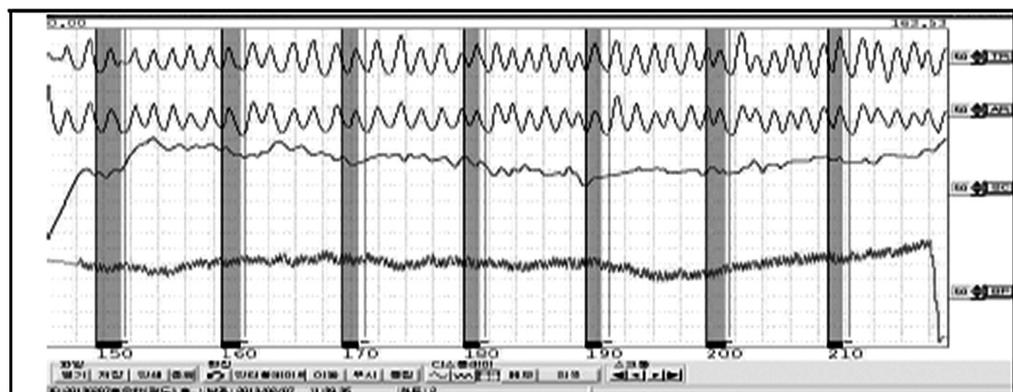
1st chart — Ms. Yu ** Examiner



2nd chart — Ms. Yu ** Examiner



3rd chart — Ms. Yu ** Examiner



4th chart — Mr. Lee Jai Seok Examiner

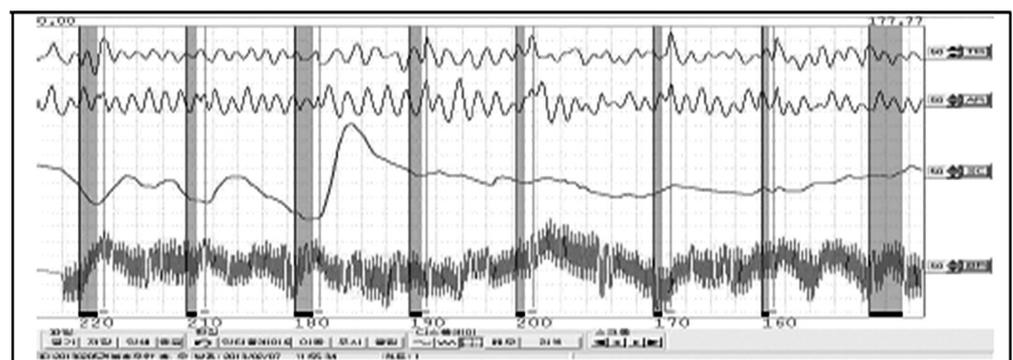


Fig. 1. Theft case — 18 million Korean won/Testee: Mr. Hong ** chart

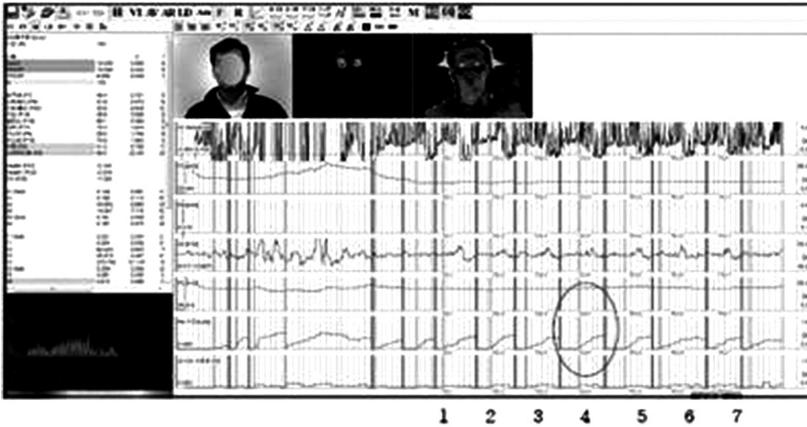


Fig. 2. Mr. Hong ** Vibraimage's investigation (4th — 18 million Korean won) for the 2nd chart

Vibraimage's testing result was compared with the second chart of the existing Polygraph's result. In Vibraimage's testing result, Mr. Hong's testee showed that the response on RQ4 (18 million Korean won) was so significant against other 6 RQ (Questions). That is, the fourth question (RQ4) that was registered from the left side showed the significant results in three group results (Max: 2.0, Average: 41.07, Integrated: 250.53).

Table 1

Vibraimage testing results

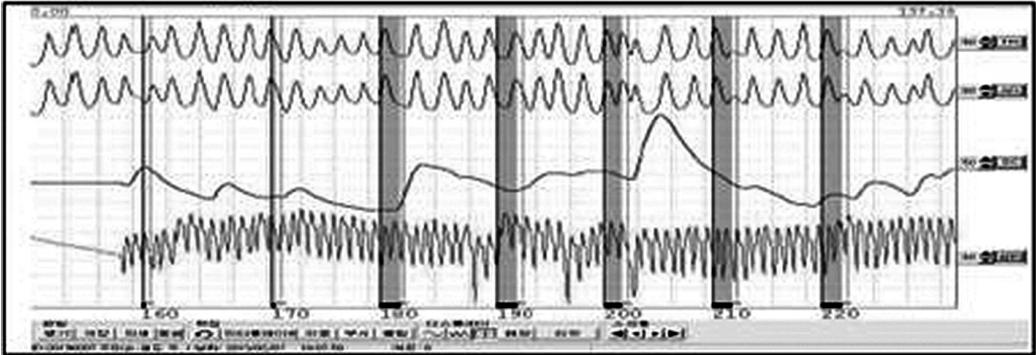
===== Peak result =====									
Q(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(3)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(4)	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Q(5)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(6)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(7)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
===== Average result =====									
Q(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(3)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(4)	41.07	41.07	41.07	41.07	41.07	41.07	41.07	41.07	41.07
Q(5)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(6)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(7)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
===== Integrated result =====									
Q(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(3)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(4)	250.53	250.53	250.53	250.53	250.53	250.53	250.53	250.53	250.53
Q(5)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(6)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q(7)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
===== Global result =====									

2) Theft case — 18 million Korean won / Testee : Ms. Ju **

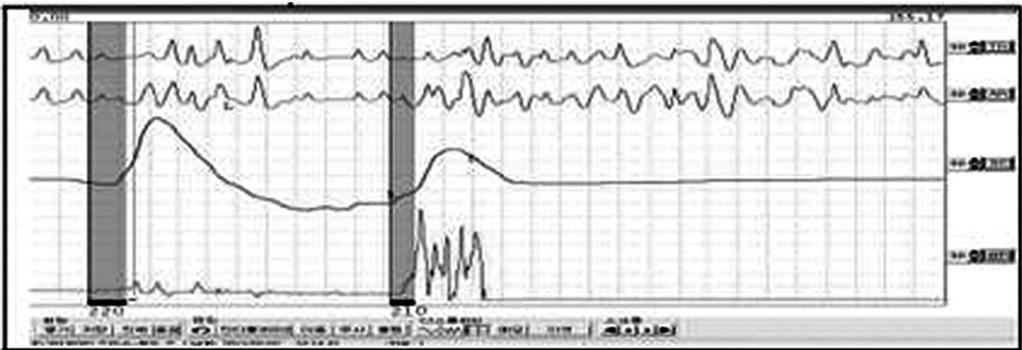
The testee, Ms. Ju **, was tested by Mr. Yeo **, preliminary investigator. After the 1st examination, the preliminary investigator was changed to Ms. Yu ** from the 2nd examination due to the lack of Mr. Yeo's concentration. There was a significant

response at the question of 18 million Korean won and 20 million Korean won. The 2nd chart examination was stopped and, the 3rd chart showed the significant responses at the question of 18 million Korean won.

1st chart — Mr. Yeo examiner



2nd chart — Mr. Yeo examiner



3rd chart — Ms. Yu examiner

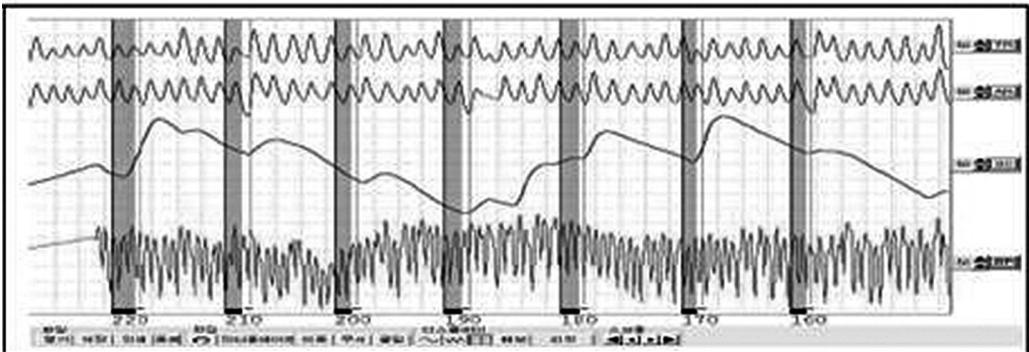


Fig. 3. Theft case — 18 million Korean won/ Testee: Mr. Ju ** and Ms. Yu ** chart

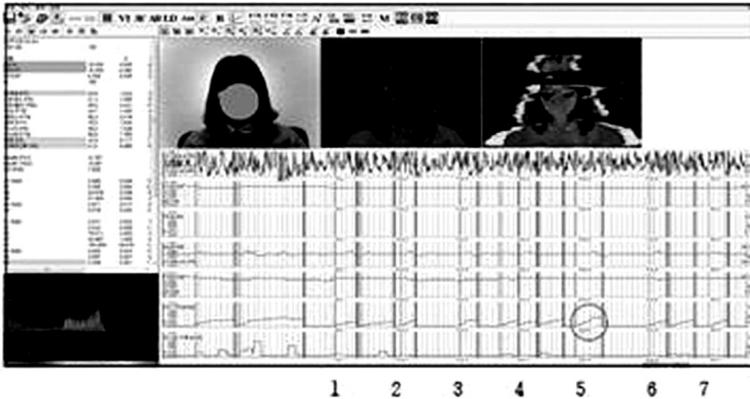


Fig. 4. Ms. Yu ** Vibraimage's investigation (5th — 18 million Korean won) for the 3rd chart

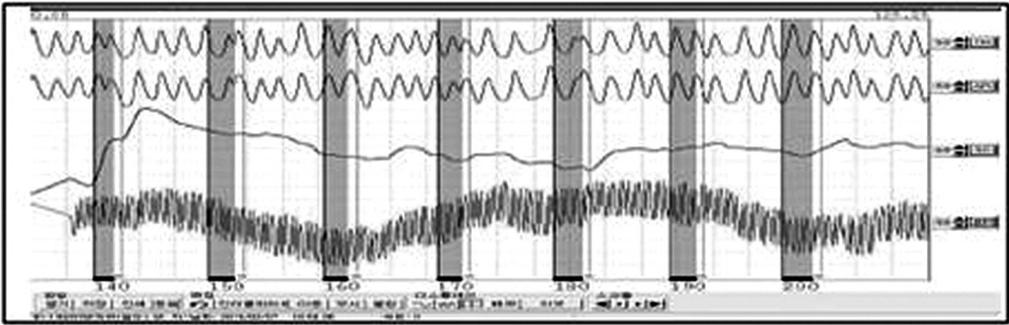
Vibraimage's testing result was compared with the second chart of the existing Polygraph's result. In Vibraimage's testing result, Ms. Ju (testee) showed that the response on RQ5 (18 million Korean won) was so significant against other 6 RQ (Questions). That is, the fifth question (RQ5) that was registered from the left side showed the significant results in three group results (Max: 1.0, Average: 35.71, Integrated: 229.76).

Table 2

Vibraimage testing results

Raw Result									
Q1 (R)	0.00	0.00	-1.00	-1.00	1.00	-2.00	-2.00		
Q2 (R)	0.00	0							
Q3 (R)	0.00	0							
Q4 (R)	0.00	0							
Q5 (R)	0.00	0							
Q6 (R)	0.00	0							
Q7 (R)	0.00	0							
Q8 (R)	0.00	0							
Q9 (R)	0.00	0							
Q10 (R)	0.00	0							
Q11 (R)	0.00	0							
Q12 (R)	0.00	0							
Q13 (R)	0.00	0							
Q14 (R)	0.00	0							
Q15 (R)	0.00	0							
Q16 (R)	0.00	0							
Q17 (R)	0.00	0							
Q18 (R)	0.00	0							
Q19 (R)	0.00	0							
Q20 (R)	0.00	0							
Q21 (R)	0.00	0							
Q22 (R)	0.00	0							
Q23 (R)	0.00	0							
Q24 (R)	0.00	0							
Q25 (R)	0.00	0							
Q26 (R)	0.00	0							
Q27 (R)	0.00	0							
Q28 (R)	0.00	0							
Q29 (R)	0.00	0							
Q30 (R)	0.00	0							
Q31 (R)	0.00	0							
Q32 (R)	0.00	0							
Q33 (R)	0.00	0							
Q34 (R)	0.00	0							
Q35 (R)	0.00	0							
Q36 (R)	0.00	0							
Q37 (R)	0.00	0							
Q38 (R)	0.00	0							
Q39 (R)	0.00	0							
Q40 (R)	0.00	0							
Q41 (R)	0.00	0							
Q42 (R)	0.00	0							
Q43 (R)	0.00	0							
Q44 (R)	0.00	0							
Q45 (R)	0.00	0							
Q46 (R)	0.00	0							
Q47 (R)	0.00	0							
Q48 (R)	0.00	0							
Q49 (R)	0.00	0							
Q50 (R)	0.00	0							
Q51 (R)	0.00	0							
Q52 (R)	0.00	0							
Q53 (R)	0.00	0							
Q54 (R)	0.00	0							
Q55 (R)	0.00	0							
Q56 (R)	0.00	0							
Q57 (R)	0.00	0							
Q58 (R)	0.00	0							
Q59 (R)	0.00	0							
Q60 (R)	0.00	0							
Q61 (R)	0.00	0							
Q62 (R)	0.00	0							
Q63 (R)	0.00	0							
Q64 (R)	0.00	0							
Q65 (R)	0.00	0							
Q66 (R)	0.00	0							
Q67 (R)	0.00	0							
Q68 (R)	0.00	0							
Q69 (R)	0.00	0							
Q70 (R)	0.00	0							
Q71 (R)	0.00	0							
Q72 (R)	0.00	0							
Q73 (R)	0.00	0							
Q74 (R)	0.00	0							
Q75 (R)	0.00	0							
Q76 (R)	0.00	0							
Q77 (R)	0.00	0							
Q78 (R)	0.00	0							
Q79 (R)	0.00	0							
Q80 (R)	0.00	0							
Q81 (R)	0.00	0							
Q82 (R)	0.00	0							
Q83 (R)	0.00	0							
Q84 (R)	0.00	0							
Q85 (R)	0.00	0							
Q86 (R)	0.00	0							
Q87 (R)	0.00	0							
Q88 (R)	0.00	0							
Q89 (R)	0.00	0							
Q90 (R)	0.00	0							
Q91 (R)	0.00	0							
Q92 (R)	0.00	0							
Q93 (R)	0.00	0							
Q94 (R)	0.00	0							
Q95 (R)	0.00	0							
Q96 (R)	0.00	0							
Q97 (R)	0.00	0							
Q98 (R)	0.00	0							
Q99 (R)	0.00	0							
Q100 (R)	0.00	0							
Q101 (R)	0.00	0							
Q102 (R)	0.00	0							
Q103 (R)	0.00	0							
Q104 (R)	0.00	0							
Q105 (R)	0.00	0							
Q106 (R)	0.00	0							
Q107 (R)	0.00	0							
Q108 (R)	0.00	0							
Q109 (R)	0.00	0							
Q110 (R)	0.00	0							
Q111 (R)	0.00	0							
Q112 (R)	0.00	0							
Q113 (R)	0.00	0							
Q114 (R)	0.00	0							
Q115 (R)	0.00	0							
Q116 (R)	0.00	0							
Q117 (R)	0.00	0							
Q118 (R)	0.00	0							
Q119 (R)	0.00	0							
Q120 (R)	0.00	0							
Q121 (R)	0.00	0							
Q122 (R)	0.00	0							
Q123 (R)	0.00	0							
Q124 (R)	0.00	0							
Q125 (R)	0.00	0							
Q126 (R)	0.00	0							
Q127 (R)	0.00	0							
Q128 (R)	0.00	0							
Q129 (R)	0.00	0							
Q130 (R)	0.00	0							
Q131 (R)	0.00	0							
Q132 (R)	0.00	0							
Q133 (R)	0.00	0							
Q134 (R)	0.00	0							
Q135 (R)	0.00	0							
Q136 (R)	0.00	0							
Q137 (R)	0.00	0							
Q138 (R)	0.00	0							
Q139 (R)	0.00	0							
Q140 (R)	0.00	0							
Q141 (R)	0.00	0							
Q142 (R)	0.00	0							
Q143 (R)	0.00	0							
Q144 (R)	0.00	0							
Q145 (R)	0.00	0							
Q146 (R)	0.00	0							
Q147 (R)	0.00	0							
Q148 (R)	0.00	0							
Q149 (R)	0.00	0							
Q150 (R)	0.00	0							
Q151 (R)	0.00	0							
Q152 (R)	0.00	0							
Q153 (R)	0.00	0							
Q154 (R)	0.00	0							
Q155 (R)	0.00	0							
Q156 (R)	0.00	0							
Q157 (R)	0.00	0							
Q158 (R)	0.00	0							
Q159 (R)	0.00	0							
Q160 (R)	0.00	0							
Q161 (R)	0.00	0							
Q162 (R)	0.00	0							
Q163 (R)	0.00	0							
Q164 (R)	0.00	0							
Q165 (R)	0.00	0							
Q166 (R)	0.00	0							
Q167 (R)	0.00	0							
Q168 (R)	0.00	0							

1st chart — Mr. Kim examiner



2nd chart — Mr. Kim examiner

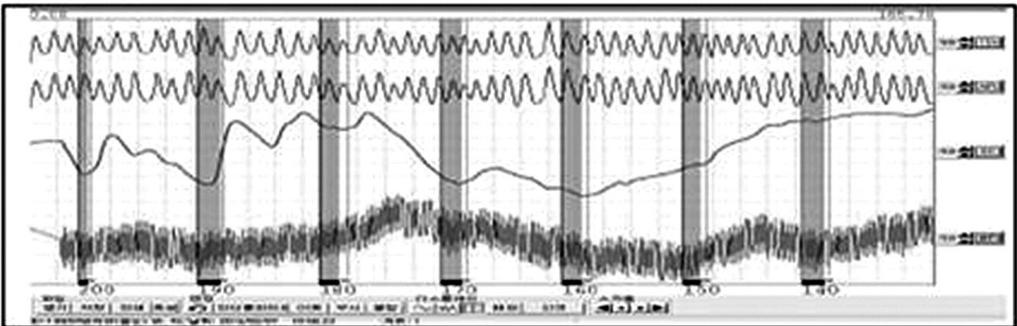


Fig. 5. Theft case — 18 million Korean won/Testee: Mr. Yang ** chart

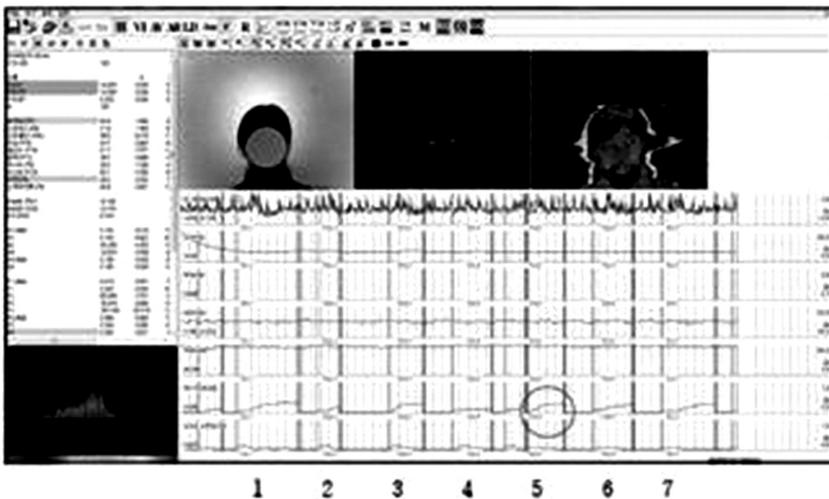


Fig. 6. Mr. Ynag ** Vibraimage's investigation (5th — 18 million Korean won) for the 1st chart

Vibraimage’s testing result was compared with the second chart of the existing Polygraph’s result. But if the 2nd chart can not be compared due to the poor quality or some distortion, the 1st chart can be selected for comparison with Vibraimage testing result. In Vibraimage’s testing result, Mr. Ynag ** (testee) showed that the response on RQ5 (18 million Korean won) was so significant against other 6 RQ (Questions). That is, the fifth question (RQ5) that was registered from the left side showed the significant results in three group results (Max: -1.0, Average: 30.36, Integrated: 171.27). As shown on Fig 5, Mr. Yang **’s testing result (testee) was a significant response against Mr. Hong ** and Ms. Ju **’s ones (testee) at the part of 18 million Korean won. But Max level was not concordant with Average level and Integrated level that indicated the most significant response. In this case, when the Average level and Integrated level is the most significant at the same time, the final judgment can be confident by adding some weight rates

Table 3

Vibraimage testing results

The screenshot displays the following data:

Section	Max	Average	Integrated
Raw Result (RQ5)	-1.00	30.36	171.27
Average Result (RQ5)	30.36	30.36	171.27
Integrated Result (RQ5)	171.27	171.27	171.27

4. Results and Suggestion

By the sham examination, we could get the following results from the preliminary examiners who were taken the training course by comparing the testing results between the existing polygraph and Vibraimage application.

First, by examining the existing polygraph and Vibraimage application, all testing results were concordant to detect the internal theft-criminal. Second, the stimulation test is the most important procedures to the physiological conditioning of the testee. This testing involved to six persons from 30s to 50s, despite the lack of physiological conditioning, all testing results concordantly specified the exact criminal. In other words, the Vibraimage test confirmed that the reliable testing results can be obtained even for POT testing in the form of a simple stimulation test. Third, the internal testing, such as information leakage, conditioned the internal theft incidents to achieve the similar emotional effects and, the testee and examiner also had the concordant testing results. Fourth, in fact, the testees are decided as the criminals all, the intentional condition of the training observer, which “the criminal is only one person”.

Even though the evaluation of the preliminary's charts was found that the specific point about 18 million Korean won was caused by three testees, by discussing three examiners' testing results, Mr. Yang's chart showed the very significant response and so, his chart was selected and decided as the real criminal.

Therefore, as the above evaluation results, the followings can be suggested progressively for enhancing police's performance.

First, even though a few of cases were tested, which were used in conjunction with the existing polygraph, as the testing results of Vibraimage application indicated the high concordance with the existing polygraph, if the polygraph investigation requires to operate Vibraimage application at the same time, the reliability of the polygraph evaluation could be improved so highly. Second, the lie detection system by using Vibraimage application can be expanded and operated from the close question to the opened question. The Vibraimage application can be analyzed later by recording the captured video image, which is one of Vibraimage's advantage.

Third, the early investigation is the most important thing in the lie detection. The intangible evidence is highly volatile. In response to this change. The lie detection system of Vibraimage application was firstly installed and operated by Seoul Metropolitan Police Agency and so, other regional police officers should help and join the standardized lie detection system.

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