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December 4, 2015

**Preliminary Expert Report Re: Shooting Death of Tamir Rice**

To date, my assignment in this case has been to perform a forensic biomechanical engineering and kinematic analysis including, but not limited to, the timing of the incident, injuries sustained, movements and body positions of the decedent (Tamir Rice) surrounding the time of the incident by reviewing available materials, physical evidence and information including, but not limited to, the recently released Cuyahoga County Prosecutor's office enhanced surveillance video stills.

Forensic biomechanical engineering and kinematic analysis are scientific disciplines concerning the application of physics, mathematics, geometry, etc., to the human body, particularly involving injurious situations, and the study of human movements.

I have a Ph.D. in biomedical engineering from UCLA, with an emphasis in biomechanics, biomaterials and tissue engineering. I am also trained in the evaluation, interpretation and reconstruction of shootings. I have been retained and testified as an expert in these fields hundreds of times around the United States, as well as in Canada and Mexico.

To date, I have reviewed the following information:

- News articles and interviews
- Medical Records:
  - Autopsy photos
  - Medical Examiner's Verdict
  - Cleveland Emergency Medical Service
  - MetroHealth Medical Center
- Cuyahoga Sheriff's Department Documents:
  - Incident Summary
  - Parties Involved
  - Investigative Process
  - Background on Parties Involved
  - Witness Interviews
  - Final Notes
  - Interview transcripts
  - Emergency Department Summary
  - Trace Evidence laboratory Examination Report
  - DNA Laboratory Examination Report

- Toxicology Laboratory Report
- Preliminary and Supplemental Expert Reports of Jeffrey Noble
- Judge Adrine's rule regarding probable cause
- Report and Opinions of W. Ken Katsaris, Police Consultant and Trainer
- Ohio State Highway Patrol Reconstruction Report
- Department of Justice Investigation of the Cleveland Division of Police
- Defendant City of Cleveland's Answer to Second Amended Complaint
- Letters to Timothy McGinty
- Second Amended Complaint
- Separate Answer of Defendants Loehmann and Garmback to the Second Amended Complaint of Plaintiffs
- Preliminary and Supplemental Reports on the Shooting Death of Tamir Rice authored by Roger Clark
- Review of Deadly Force Incident: Tamir Rice, authored by Kimberley Crawford
- Investigative Report of S. Lamar Sims
- Employment Records of Timothy Loehmann
- Surveillance Video
- Cuyahoga County Prosecutor's Office Enhanced Video Analysis
- Weather History for November 22, 2014
- Statement of Officer Frank Garmback
- Statement of Officer Timothy Loehmann

### **Kinematic Analysis**

While performing the kinematic analysis, I reviewed the enhanced video stills released by the prosecutor's office and have included Frames 119 to 124 below. The annotations typed on these slides are not my words but, were written by someone else. By including them in this report, I do not mean to suggest that I agree with them.

It should be noted that the enhanced surveillance video stills are best viewed on a large screen, in order to see the movements of Tamir Rice more clearly. Based on the information currently available, the surveillance videos were capturing 2 frames per second therefore, there are 0.50 seconds between each frame.



**Frame 119, Tamir Rice's hands are in front of his body**

In Frame 119, we see Tamir Rice's hands together, in front of his body, while he is moving slowly toward the front of the gazebo and the police vehicle is moving forward.



**Frame 120, Tamir Rice's hands are still in front of his body**

In Frame 120, we see that Tamir Rice's hands are still together, in front of his body, while he continues moving slowly forward. The police vehicle is moving forward.



**Frame 121, Tamir Rice's hands have moved into his jacket pockets and are no longer visible**

In Frame 121, Tamir Rice's hands are no longer visible and he has moved them into his jacket pockets. The annotation on the frame that "Rice's right arm moves toward his waist" is not accurate. Rice's right leg is forward and his left leg is rearward, in the stance phase of his gait. The police vehicle continues moving forward.



**Frame 122, Officer Loehmann opens the passenger door, while the vehicle is still in motion, and Tamir Rice's hands are still in his jacket pockets**

In Frame 122, while the vehicle is still in motion, Officer Loehmann opens the passenger door. Tamir Rice's hands are still not visible and in his jacket pockets. The annotation that Rice "lowers his arm to waist" is not accurate. Rice has stopped moving forward and is stationary.



**Frame 123, Officer Loehmann exits the vehicle while it is still in motion and Tamir Rice moves his right arm upward in a defensive manner, while his right hand is still in his jacket pocket**

In Frame 123, Tamir Rice’s right shoulder and arm move upward, with his right elbow bent, in a defensive-type position. Tamir Rice is shot at this approximate point in time. This defensive-type movement causes his jacket to move upward and to the right, which is consistent with the location of the bullet hole in his outer jacket, compared to his abdominal wound. This significant difference is described in more detail below in the “injury” portion of this report. The vehicle is still in motion when Officer Loehmann exits and begins shooting.



**Frame 124, Tamir Rice begins falling to the ground as a result of being shot by Officer Loehmann**

In Frame 124, Tamir Rice “reacts to the gunshot”, by falling to the ground. It is clear that Rice has already been shot at this point in time. As indicated above, Rice was actually shot at approximately Frame 123.

It has been mentioned in previous reports, that this incident occurred over a duration of approximately 1.7 seconds. However, that is not completely accurate. The subject incident occurred within a time frame of 1.0 seconds, according to the enhanced video. In Frame 122, Officer Loehmann opens the passenger door, while the vehicle is still in motion, and Tamir Rice’s hands are in his jacket pockets. In Frame 124, Rice has already been shot and is falling to the ground. With a 0.50 second interval between frames, the time elapsed between Frame 122 and 124 is 1.0 seconds and the shooting occurred during this time period. According to the crime scene photos and Officer Garmback’s statement, the vehicle windows were up so, no audible commands could have been heard by Rice before Loehmann opened the door. The timing of the incident is consistent with Officer Loehmann having already drawn his gun when he exited the car (Frame 123). Meaning, he must have unholstered it prior to exiting the vehicle because there is simply not enough time for him to have drawn his gun, aimed and fired it in the less than 1.0 second timeframe shown on the video. Based on the timing of this event, Tamir Rice did not have enough time to perceive and react to any verbal commands, which is exemplified by the fact that his right hand was

still in his jacket pocket at the time he was shot. It is clear that Officer Loehmann shot Tamir Rice immediately upon exiting the vehicle, such that Rice did not have enough time to take his hands out of his jacket pockets.

The above findings are consistent with the Police Procedures Expert, Roger Clark, who states:

“Officer Loehmann is still shown in the enhanced video as jumping out of the patrol unit just as it pulled up to the gazebo and immediately shooting Tamir.”

“The enhanced video also indicates that Officer Loehmann had his gun already in hand when he jumped out of the car, having apparently unholstered it while he was en route to the scene.”

## **Injuries**

The injuries to Tamir Rice are documented in the autopsy report and photos. The autopsy report documents that:

**Injuries, Internal and External:** There is a penetrating gunshot wound of the torso. Directions are given on standard anatomical planes.

There is an entrance gunshot wound on the left side of the abdomen slightly above the umbilicus located 23 ½” below the top of the head and ½” to the left of midline. It is a ½” ovoid defect with a margin of abrasion measuring up to 1/16” to the left. There is no soot or stippling of the adjacent skin. There is a 1 ½” area of violet contusion lateral to the gunshot defect. The gunshot lies within suture closing a 12 ½” vertical incision which extends through the midline of the abdomen from the epigastrium

towards the pelvis. There is violet discoloration at the inferior abdomen near the bottom of the incision.

### **Path of the bullet:**

After perforating the skin and subcutaneous soft tissue the bullet continues through the peritoneal cavity. At this point the wound track is altered by surgical intervention. There is a resection of a portion of jejunum and transverse colon. There are stapled resection margins at either side of the jejunum and transverse colon. The surgical margins are intact and free of disruption. There are multiple surgical vascular ligations including a closure of the inferior vena cava proximal to a gunshot injury below the level of the renal veins. The bullet perforated the right side of the pelvis near the spine. There is apparent bone wax in the pelvis defect. There is approximately 75 ml. of bloody fluid in the abdomen and two surgical sponges (saturated with bloody fluid) are recovered. The aorta and spine adjacent to the wound path are not injured.

Figure 1 shows the bullet hole to the outer jacket.



**Figure 1, Bullet hole to the lower left portion of Tamir Rice’s outer jacket**

The bullet hole is located in the left lower portion of his outer jacket, instead of the center (midline) where his abdominal wound was because Tamir Rice lifted his right arm up and to the right, prior to being shot. He did this while his right hand was in his jacket pocket and because his right hand was “attached” to the jacket, as he moved his right arm up and to the right in a defensive-type manner, the jacket also moved upwards and to the right. This explains the different locations between the bullet hole location in the jacket and the midline abdominal wound location on the body. Tamir Rice was shot at the moment his arm was raised, in a defensive manner, as show in Frame 123.

## Opinions

Based on my review of the available evidence and information, it is my opinion, to a reasonable degree of scientific certainty that:

- 1) Officer Loehmann shot Tamir Rice within 1 second of opening the vehicle door.
- 2) Tamir Rice did not have enough time to remove his hands from his jacket pockets, prior to being shot.
- 3) The vehicle was still in motion when Officer Loehmann exited and began firing.
- 4) Officer Loehmann's gun was drawn and unholstered when he exited the vehicle.
- 5) The windows of the vehicle were up at the time Officer Loehmann exited the vehicle thus, making any verbal commands issued from inside the vehicle inaudible to anyone outside.
- 6) The toy gun was not visible to the officers prior to the shooting.
- 7) The video shows that at no point in his encounter with the police did Tamir Rice reach into his waistband.
- 8) Tamir Rice's hands were not visible to the officers prior to the shooting because they were in his jacket pockets.
- 9) The movement of Tamir Rice's elbow and shoulder in Frame 123 is consistent with Rice moving his right arm up in a defensive manner, at the time of the shooting.
- 10) The significantly different location of the bullet hole in Rice's jacket as compared to the bullet entry wound in his midline abdomen is consistent with him being shot at approximately Frame 123, when his right elbow and arm moved upward in a defensive manner, causing his jacket to also move upward and to the right.
- 11) The scientific analysis and timing involved do not support any claim that there was a meaningful exchange between Officer Loehmann and Tamir Rice, before he was shot.

The findings in this report are based on currently available information, within a reasonable degree of scientific certainty, and subject to revision upon acquisition of additional information or materials.

Sincerely,



Jesse L. Wobrock, Ph.D.  
Accident Reconstruction & Biomechanics