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## Description of Pillow Fold Experiments

James Wentzel

*Cuyahoga County Coroner's Office*

Elizabeth K. Balraj

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## **PILLOW FOLD EXPERIMENTS**

**December 14, 1998**

Present were James Wentzel, Linda Luke, Dr. Sandra Caramela-Miller, Curtiss Jones, Brian Peck, and Dr. Elizabeth K. Balraj.

71 degrees (Fahrenheit) in room number 008.

All pillows were down-filled with a 100% cotton cover except for the unnumbered Control Pillow.

All pillow cases were a cotton-polyester blend.

Unless otherwise noted, all blood was obtained from autopsies.

**Control Bloodstain:** Unless otherwise noted the control bloodstain was prepared with 10 ml of human blood. The blood was applied with a combination of brushing and pouring, using an acetate template to determine size. The acetate template has an elliptical hole measuring 5 inches by 6 ¼ inches (the approximate dimensions of the soaking-type bloodstain on Marilyn Reese Sheppard's pillow case).

**Dry to the Touch:** Dry to the touch is defined as touching the approximate center of the Control Bloodstain with a gloved finger and having the latex glove remain clean (no visual indication of blood transfer).

**Control Pillow - 1:02 p.m.**

Control pillow was polyester-filled with a 50/50 cotton-polyester blend cover.

This unnumbered pillow has 3 ml bloodstains applied in order to compare relative drying times of blood. Blood stored in a red-topped tube (BJP, no additives) dried the fastest, blood stored in a purple-topped tube (LML, EDTA added) dried slightly slower and expired blood from the Red Cross (RC) dried the slowest. After 1 hour and 21 minutes all blood but the Red Cross blood had dried to the touch. No pillow case was used.

Red Cross (RC) blood was red blood cells, white blood cells and platelets mixed with 0.9% saline solution (5 parts of blood cells to 1 part of saline solution).

At 5:25 p.m. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow (on bloodstain LML), left for two minutes, and removed.

**Pillow #1** – 3:15 p.m.

This pillow has a control bloodstain applied first which was then immediately followed by a wet tool mark placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for *1 minute*. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #2** – 3:33 p.m.

This pillow has a control bloodstain applied first which was then immediately followed by a wet tool mark placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for *10 minutes*. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #3** – 3:34 p.m.

This pillow has a control bloodstain applied first which was then immediately followed by a wet tool mark placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for *20 minutes*. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #4** – 3:34 p.m.

This pillow has a control bloodstain applied first which was then immediately followed by a wet tool mark placed on the surface of the pillowcase. 12 inch CHANNEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for *30 minutes*. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #5 – 3:35 p.m.**

This pillow has a control bloodstain applied first which was then immediately followed by a wet tool mark placed on the surface of the pillowcase. 12 inch CHANNEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for *40 minutes*. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #6 – 3:36 p.m.**

This pillow has a control bloodstain applied first which was then immediately followed by a wet tool mark placed on the surface of the pillowcase. 12 inch CHANNEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for *50 minutes*. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #7 – 3:38 p.m.**

This pillow had a control bloodstain applied first which was then immediately followed by a wet tool mark placed on the surface of the pillowcase. 12 inch CHANNEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow.

The pillow was then folded along the major (long) axis and kept closed for *60 minutes*. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #8** – 03:57 p.m.

This pillow had a control bloodstain applied first which was allowed to air dry for *10 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHANNEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for 1 minute. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #9** – 03:58 p.m.

This pillow had a control bloodstain applied first which was allowed to air dry for *20 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHANNEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for 1 minute. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #10** – 3:59 p.m.

This pillow had a control bloodstain applied first which was allowed to air dry for *30 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHANNEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for 1 minute. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #11** – 4:00 p.m.

This pillow had a control bloodstain applied first which was allowed to air dry for *40 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for 1 minute. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #12** – 4:02 p.m.

This pillow had a control bloodstain applied first which was allowed to air dry for *50 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for 1 minute. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #13** – 4:03 p.m.

This pillow had a control bloodstain applied first which was allowed to air dry for *60 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for 1 minute. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**Pillow #14** – 04:05 p.m.

This pillow had a control bloodstain applied. The pillow was folded along the major axis and held closed for 1 minute. The pillow was then folded along the minor axis and held closed for 1 minute. The pillow was then folded diagonally and held closed for 1 minute. Finally the pillow was folded along the second diagonal (blank corner to blank corner) and held closed for 1 minute. The pillow

was then opened.

**Pillow #15** – 04:10 p.m.

No control bloodstain was applied. A wet tool mark was placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a 250 ml beaker full of human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The pillow was then folded along the major (long) axis and kept closed for 1 minute. The pillow was weighted down using 2540 gram metallic discs. The pillow was then opened and the pliers removed.

**December 16, 1999**

Present were James Wentzel, Linda Luke, Dr. Sandra Caramela-Miller, Curtiss Jones, and Brian Peck.

72 degrees (Fahrenheit) in room number 008.

All pillows were down-filled with a 100% cotton cover.

All pillow cases were 100% cotton.

All blood was collected from live donors in red-topped tubes (*no* anti-coagulant).

**Control Bloodstain:** Unless otherwise noted the control bloodstain was prepared with 10 ml of human blood. Each control bloodstain was made with the blood of one donor (no mixtures). The blood was applied with a combination of brushing and pouring, using an acetate template to determine size. The acetate template had an elliptical hole measuring 5 inches by 6 ¼ inches (the approximate dimensions of the soaking-type bloodstain on Marilyn Reese Sheppard's pillow case).

**Dry to the Touch:** Dry to the touch is defined as touching the approximate center of the Control Bloodstain with a gloved finger and having the latex glove remain clean (no visual indication of blood transfer).

**Pillow 16 – Control** - 3:14 p.m.

This pillow had a control bloodstain applied which was allowed to dry to touch. Pillow was dry to touch at 5:59 p.m. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood at 3:14 p.m. Blood on pliers were dry to touch at 3:57 p.m.

**Pillow 17 - 3:17 p.m.**

12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow for 5 minutes then removed. Imprint was allowed to dry to touch (41 minutes). After imprint had dried to touch, a control bloodstain was applied. Pliers were dry to touch after 37 minutes.

**Pillow 18 - 3:18 p.m.**

12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow for 5 minutes then removed. Imprint was allowed to dry (dry to touch after 42 minutes).

Afterwards, at 5:26 p.m. pillow was inverted and placed in a 250 ml bloodstain made on a mattress and left for five minutes. After examination, the pillow was reapplied to the bloodstain at 5:37 p.m. and left on the stain for an additional five minutes. The pillow was weighted down using 2540 gram metallic discs.

**Pillow 19 - 3:19 p.m.**

12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow for 5 minutes then removed. Imprint was allowed to dry to touch (45 minutes).

Blood was applied to a USAF crash dummy face with a brush. Pillow (with plier imprint down) was manually pressed down onto face for 1 minute and then removed.



**Pillow 20** - 2:56 p.m.

This pillow had a control bloodstain applied first which was allowed to air dry for *30 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow for 5 minutes. The pillow was then inverted and placed on the mattress to look for blood transfer to the sheet.

**Pillow 21** - 2:57 p.m.

This pillow had a control bloodstain applied first which was allowed to air dry for *40 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow for 5 minutes. The pillow was then inverted and placed on the mattress to look for blood transfer to the sheet.

**Pillow 22** - 2:57 p.m.

This pillow had a control bloodstain applied first which was allowed to air dry for *50 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow for 5 minutes. The pillow was then inverted and placed on the mattress to look for blood transfer to the sheet.

**Pillow 23** - 2:58 p.m.

This pillow had a control bloodstain applied first which was allowed to air dry for *60 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow for 5 minutes. The pillow was then inverted and placed on the mattress to look for blood transfer to the sheet.

**Pillow 24 - 2:59 p.m.**

This pillow had a control bloodstain applied first which was allowed to air dry for *70 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow for 5 minutes. The pillow was then inverted and placed on the mattress to look for blood transfer to the sheet.

**Pillow 25 - 2:59 p.m.**

This pillow had a control bloodstain applied first which was allowed to air dry for *80 minutes*. A wet tool mark was then placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow for 5 minutes. The pillow was then inverted and placed on the mattress to look for blood transfer to the sheet.

**Pillow 26 - 3:07 p.m.**

This pillow had a control bloodstain applied first which was then immediately followed by a wet tool mark placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The control bloodstain and the pliers were allowed to air dry together for *40 minutes*. The pliers were then removed.

**Pillow 27 - 3:09 p.m.**

This pillow had a control bloodstain applied first which was then immediately followed by a wet tool mark placed on the surface of the pillowcase. 12 inch CHAN NEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The control bloodstain and the pliers were allowed to air dry together for *60 minutes*. The pliers were then removed.

**Pillow 28 - 3:13 p.m.**

This pillow had a control bloodstain applied first which was then immediately followed by a wet tool mark placed on the surface of the pillowcase. 12 inch CHANNEL LOCK® tongue and groove pliers were dipped (up to the blue grips) into a beaker containing human blood. Excess blood was removed from the pliers by swinging them twice. The pliers were then placed on the surface of the pillow. The control bloodstain and the pliers were allowed to air dry together for *80 minutes*. The pliers were then removed.

**Pillow 29 - 3:04 p.m.**

This pillow had a control bloodstain applied first which was allowed to dry to the touch (2 hours, 43 minutes). A 50's-vintage flashlight and a pulley puller were coated in human blood. Excess blood was removed from the flashlight and pulley puller by swinging them twice. The objects were then placed on the surface of the pillow for 15 minutes and then removed.

**Pillow 30 - 3:03 p.m.**

This pillow had a control bloodstain applied first which was allowed to dry to the touch (2 hours, 42 minutes). Two orthopedic tools were coated in human blood. Excess blood was removed from the tools by swinging them twice. The objects were then placed on the surface of the pillow for 15 minutes and then removed.

**December 30, 1999**

Present were James Wentzel, Linda Luke, Christine Sashko, Curtiss Jones, and Brian Peck.

71 degrees (Fahrenheit) in room number 008.

All pillows were down-filled with a 100% cotton cover.

All pillow cases were 100% cotton.

All blood was from the Red Cross. Red Cross blood was red blood cells, white blood cells and platelets mixed with 0.9% saline solution (5 parts of blood cells to 1 part of saline solution).

All pillows were allowed to dry completely in the closed position (drying time >24 hours).

**Control Bloodstain:** Unless otherwise noted the control bloodstain was prepared with 10 ml of human blood. The blood was applied with a combination of brushing and pouring, using an acetate template to determine size. The acetate template had an elliptical hole measuring 5 inches by 6 ¼ inches (the approximate dimensions of the soaking-type bloodstain on Marilyn Reese Sheppard's pillow case).

**Pillow 31 - 11:14 a.m.**

This pillow had a control bloodstain applied. The pillow was folded along the major axis and held closed using 2540 gram metallic discs.

**Pillow 32 - 11:16 a.m.**

This pillow had a control bloodstain applied. The pillow was folded along the major axis and held closed using 2540 gram metallic discs.

**Pillow 33 - 11:17 a.m.**

This pillow had a control bloodstain applied. The pillow was folded along the major axis and held closed using 2540 gram metallic discs.

**Pillow 34 - 11:18 a.m.**

This pillow had a control bloodstain applied. The pillow was folded along the major axis and held closed using 2540 gram metallic discs.

**Pillow 35 - 11:19 a.m.**

This pillow had a control bloodstain applied. The pillow was folded along the minor axis and remained closed without weight.

**Pillow 36 - 11:20 a.m.**

This pillow had a control bloodstain applied. The pillow was folded along the minor axis and remained closed without weight.

**Pillow 37 - 11:21 a.m.**

This pillow had a control bloodstain applied. The pillow was folded along the minor axis and remained closed without weight.

**Pillow 38 - 11:21 a.m.**

This pillow had a control bloodstain applied. The pillow was folded along the minor axis and remained closed without weight.

**Pillow 39 - 11:22 a.m.**

This pillow had a control bloodstain applied. The pillow was folded diagonally and held closed using 2540 gram metallic discs.

**Pillow 40 - 11:24 a.m.**

This pillow had a control bloodstain applied. The pillow was folded diagonally and held closed using 2540 gram metallic discs.

**Pillow 41 - 11:25 a.m.**

This pillow had a control bloodstain applied. The pillow was folded diagonally and held closed using 2540 gram metallic discs.

**Pillow 42 - 11:26 a.m.**

This pillow had a control bloodstain applied. The pillow was folded diagonally and held closed using 2540 gram metallic discs.

**January 5, 2000**

Present were James Wentzel, Linda Luke, Curtiss Jones, and Brian Peck.

73 degrees (Fahrenheit) in room number 008.

All pillows were down-filled with a 100% cotton cover.

All pillow cases were 100% cotton.

All blood was collected from live donors in red-topped tubes (*no* anti-coagulant).

**Control Bloodstain:** Unless otherwise noted the control bloodstain was prepared with 10 ml of human blood. Each control bloodstain was made with the blood of one donor (no mixtures). The blood was applied with a combination of brushing and pouring, using an acetate template to determine size. The acetate template had an elliptical hole measuring 5 inches by 6 ¼ inches (the approximate dimensions of the soaking-type bloodstain on Marilyn Reese Sheppard's pillow case).

**Pillow 43** - 1:33 p.m.

This pillow had a control bloodstain applied. The pillow was folded along the major axis and held closed using 2540 gram metallic discs. The pillow remained closed for 2 hours.

**Pillow 44** - 1:36 p.m.

This pillow had a control bloodstain applied. The pillow was folded along the minor axis and held closed using 2540 gram metallic discs. The pillow remained closed for 2 hours.

**Pillow 45** - 1:38 p.m.

This pillow had a control bloodstain applied. The pillow was folded diagonally and held closed using 2540 gram metallic discs. The pillow remained closed for 2 hours.

**Pillow 46** - 1:30 p.m.

This pillow had a control bloodstain applied. The pillow was folded along the major axis and held closed using 2540 gram metallic discs. The pillow remained closed for 4 hours.

**Pillow 47** - 1:31 p.m.

This pillow had a control bloodstain applied. The pillow was folded along the minor axis and held closed using 2540 gram metallic discs. The pillow remained closed for 4 hours.

**Pillow 48 - 1:32 p.m.**

This pillow had a control bloodstain applied. The pillow was folded diagonally and held closed using 2540 gram metallic discs. The pillow remained closed for 4 hours.