

# Current Effects of Methylmercury on Health around Minamata

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## [Case: 65 years old, male]

Our subject was born in Miyanokawachi, Kawaura-machi, Amakusa in 1954 to a fisherman family. His ancestors have always included fishermen. As a child he often sailed on the fishing boats. His parents brought fish home daily and he and his family ate fish at every meal.

Since 1968, when his father contracted a disease and was hospitalized, he took his father's place and went fishing every night, after returning from school. He said that he and his mother often went fishing out from Minamata city, but on separate fishing boats. In his family, fish was the staple diet. In his childhood, he rarely ate chicken and never ate pork or beef. Even now he is engaged in fishing.

The numbness in his hands and feet has appeared gradually since he was 40 years-old. Simultaneously, he began stumbling easily while walking, and started dropping things from his hands. At first, he said that he had definite leg cramps in his 40's. Later, however, when he gave it more thought he remembered that he had had cramps in his twenties.

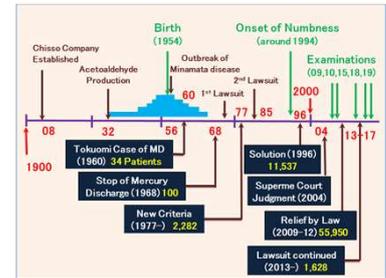
Even now, he has a feeling of numbness and pain in his hands and feet. Even if he is touched with a brush, it does not feel like it is a brush but something more rigid like chopsticks. He frequently stumbles when he walks. He often catches his feet in the nets and stumbles because he doesn't have full control of his legs, also he often dropped things. He has muscle cramps in his arms and legs, and their frequency has been increasing recently. His condition is not so bad that he cannot carry out many everyday actions like driving a car, although his ability to see his surroundings is deteriorating these days.

We, four medical doctors, have examined him five times: Sep 20, 2009; July 27, 2010; Oct 31, 2015; Dec 21, 2018 and June 22, 2019. For this Poster Presentation, we are using the data from Sep 20, 2009 and Dec 21, 2018.

From our examinations and collected data, we can discover and recognize examples of the tardive onset of Minamata disease, discover health problems in the non-designated areas and find fluctuations in complaints and symptoms.



Birthplace and home of our case



Timeline of events relating to our case



Complaints (by subject)

Symptoms (by physician)



Complaints in Head and Face	Exposed		Control	
	Always+ Sometimes	Always	Always+ Sometimes	Always
Eyestrain	96.4%	69.2%	50.7%	4.2%
Disturbed vision	86.4%	42.1%	15.3%	2.9%
Surprised by passing vehicles while out walking	83.1%	24.2%	18.0%	0.7%
Difficulty in finding what one is looking for when shopping	77.7%	33.2%	6.4%	0.0%
Limited peripheral vision	77.2%	34.5%	4.3%	0.7%
When staring at things, one gradually becomes unaware of what one is looking at	66.0%	20.9%	1.4%	0.0%
Tinnitus	82.5%	38.4%	16.3%	5.7%
Difficulty in hearing	77.0%	40.6%	16.7%	8.0%
Difficulty in understanding speech	54.5%	13.5%	6.4%	0.7%
Bite Tongue	78.8%	13.5%	2.7%	0.0%
Difficulty in articulating oneself	61.4%	13.1%	2.1%	0.0%
Perioral numbness	55.4%	13.0%	0.0%	0.0%
Difficulty in tasting	58.2%	16.5%	1.4%	0.0%
Difficulty in smelling	58.0%	18.8%	3.6%	0.0%
Difficulty in judging the taste of one's own cooking	54.5%	16.6%	1.4%	0.7%
Headache	86.8%	27.1%	24.6%	0.0%

Patterns	Findings on Sep 20, 2009	Findings on Dec 21, 2018
	-	-
	-	+
	+	-
	+	+

Motor or Sensory Complaints of Hands	Exposed		Control	
	Always+ Sometimes	Always	Always+ Sometimes	Always
Shoulder stiffness	95.3%	66.7%	48.6%	7.7%
Sensory numbness in both hands	93.0%	49.5%	5.8%	2.2%
Difficulty in fine finger tasks	85.6%	50.4%	7.8%	0.0%
Hand weakness	84.1%	50.5%	5.1%	2.2%
Dropping things from one's hand	81.7%	22.6%	5.7%	0.0%
Postural hand tremor	72.0%	20.7%	4.3%	1.4%
Carrying bags on the elbows or shoulders instead of holding them with hands	71.8%	35.6%	3.6%	1.4%
Difficulty in buttoning	68.1%	25.2%	0.0%	0.0%
Dropping chopsticks while eating	66.8%	9.4%	0.0%	0.0%
Hot sensation in the hands	61.7%	17.1%	0.0%	0.0%
Hand tremor while resting	59.8%	13.8%	0.7%	0.7%
No pain when injured	48.0%	10.5%	0.0%	0.0%
Difficulty in judging the correct temperature of bath water	45.2%	14.1%	0.0%	0.0%

Symptoms of Head and Face	Exposed	Control
Dysarthria	16.9%	1.4%
Auditory disturbance	25.8%	8.5%
Visual constriction	25.6%	1.4%
Perioral Touch disturbance	19.5%	0.0%
Perioral Pain disturbance	23.6%	0.0%

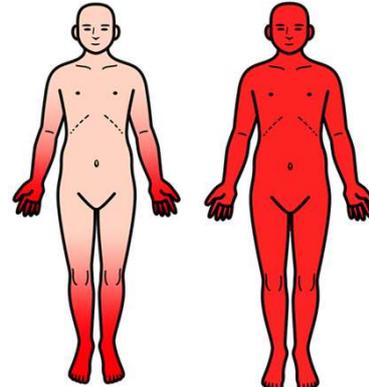


Confrontation Visual field test



Perioral sensory disturbance

Sensory Symptoms	Exposed	Control
Touch disturbance: trunk and limbs	19.1%	0.0%
Touch disturbance: four limbs	87.9%	2.8%
Pain disturbance: trunk and limbs	24.3%	0.0%
Pain disturbance: four limbs	93.0%	2.8%

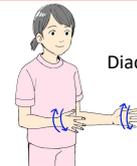


Sensory disturbance (four limbs)

Sensory disturbance (trunk and limbs)

General Complaints	Exposed		Control	
	Always+ Sometimes	Always	Always+ Sometimes	Always
General fatigue	93.1%	45.5%	20.6%	1.4%
Dizziness when standing up	89.0%	23.6%	13.5%	0.0%
Lack of motivation to do things	87.1%	22.3%	19.9%	0.7%
Difficulty in sleeping	85.6%	35.6%	17.7%	3.5%
Inability to persevere or keep working	73.1%	24.1%	11.5%	0.0%
Vertigo	64.4%	9.5%	5.0%	0.0%
Loss of Appetite	61.8%	8.7%	2.8%	0.0%
Swaying dizzily	58.3%	7.6%	5.0%	0.0%
Fainting (syncope like) dizziness	45.6%	4.9%	2.1%	0.0%

Symptoms of Arms and Hands	Exposed	Control
Finger nose test (eyes open): impossible	8.5%	0.0%
Finger nose test (eyes open): impossible-unstable	26.9%	0.0%
Finger nose test (eyes closed): impossible	21.7%	0.0%
Finger nose test (eyes closed): impossible-unstable	44.7%	2.1%
Diadokokinesis: apparent abnormal	10.5%	0.0%
Diadokokinesis: mild-apparent abnormal	31.4%	0.7%
Upper-limb tremor	24.2%	2.2%

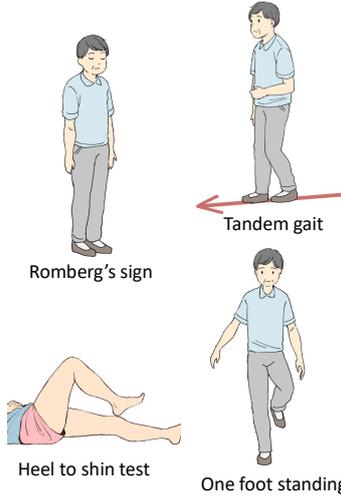


Diadokokinesis

Motor or Sensory Complaints of Legs	Exposed		Control	
	Always+ Sometimes	Always	Always+ Sometimes	Always
Muscle cramps	95.1%	32.9%	31.2%	2.9%
Lower back pain	93.5%	55.9%	47.5%	3.6%
Stumbling tendency	91.2%	39.1%	18.0%	0.0%
Sensory numbness in both legs	90.4%	48.0%	5.7%	0.7%
Staggering	84.9%	27.4%	9.8%	0.0%
Leg weakness	81.7%	48.0%	4.4%	2.2%
Losing one's slippers or sandals while walking	72.0%	21.4%	1.4%	0.0%
Hot sensation in the legs	71.1%	25.9%	0.7%	0.0%
Stumbling on flat ground	71.0%	16.3%	1.4%	0.0%
Difficulty in wearing slippers	69.1%	25.9%	0.7%	0.0%



Intellectual or Mental Complaints	Exposed		Control	
	Always+ Sometimes	Always	Always+ Sometimes	Always
Forgetfulness	95.3%	33.1%	52.5%	0.7%
Irritation	88.7%	30.4%	30.5%	0.0%
Anxiety	86.3%	32.7%	7.2%	0.0%
Talking distracts one while looking for something	80.9%	24.0%	10.1%	1.4%
Losing one's train of thought during conversations	75.5%	13.3%	6.4%	0.0%
Feeling sad	74.7%	15.6%	17.3%	0.0%
Feeling as if one's mind is blank or empty	59.9%	6.9%	4.3%	0.0%
Difficulty thinking about anything	55.0%	6.3%	0.7%	0.0%
Feeling as if one is not oneself	50.4%	7.0%	0.0%	0.0%



Symptoms of Gait and Legs	Exposed	Control
Normal gait	19.6%	0.0%
Tandem gait: impossible	13.1%	0.0%
Tandem gait: impossible-unstable	56.8%	9.2%
Romberg's sign: positive	5.2%	0.7%
Romberg's sign: unstable	17.5%	0.7%
Mann: impossible	30.3%	2.7%
Mann: impossible-unstable	66.8%	23.2%
One foot standing (eyes open): impossible	19.1%	0.7%
One foot standing (eyes open): impossible-unstable	54.6%	9.2%
One foot standing (eyes closed): impossible	54.7%	9.1%
One foot standing (eyes closed): impossible-unstable	87.3%	51.0%
Heel to shin test: apparent abnormal	10.5%	0.0%
Heel to shin test: mild-apparent abnormal	32.7%	1.5%

Data for the complaints and symptoms were taken from the study between November 2004 and March 2016. We have examined 10,196 residents from different regions of the polluted area (M/F=4,846/5,350, average age=62.7±12.0), who hoped to be examined for possible Minamata disease. 214 residents from a non-polluted area were selected as the control group (M/F=91/123, 52.7±15.0). The data collected on complaints and neurological signs for the exposed and control areas were compared. We carried out this study in collaboration with the Asahi Newspaper, who published articles on it on October 3rd and 10th, 2016.