

## **RE/ME: AN IMMERSIVE INSTALLATION FOR REIMAGINING AND RESCULPTING BODILY SELF-PERCEPTION**

Diego Maranan<sup>1,2</sup>, Agi Haines<sup>2</sup>, Frank Loesche<sup>3</sup>, Sean Clarke<sup>4</sup>, Patricia Calora<sup>5</sup>,  
Angelo Vermeulen<sup>1,6</sup>, Pieter Steyaert<sup>1,7</sup> & Jane Grant<sup>8</sup>

<sup>1</sup> SEAD (Space Ecologies Art and Design), <http://sead.network>

<sup>2</sup> UP Open University, Los Baños, The Philippines

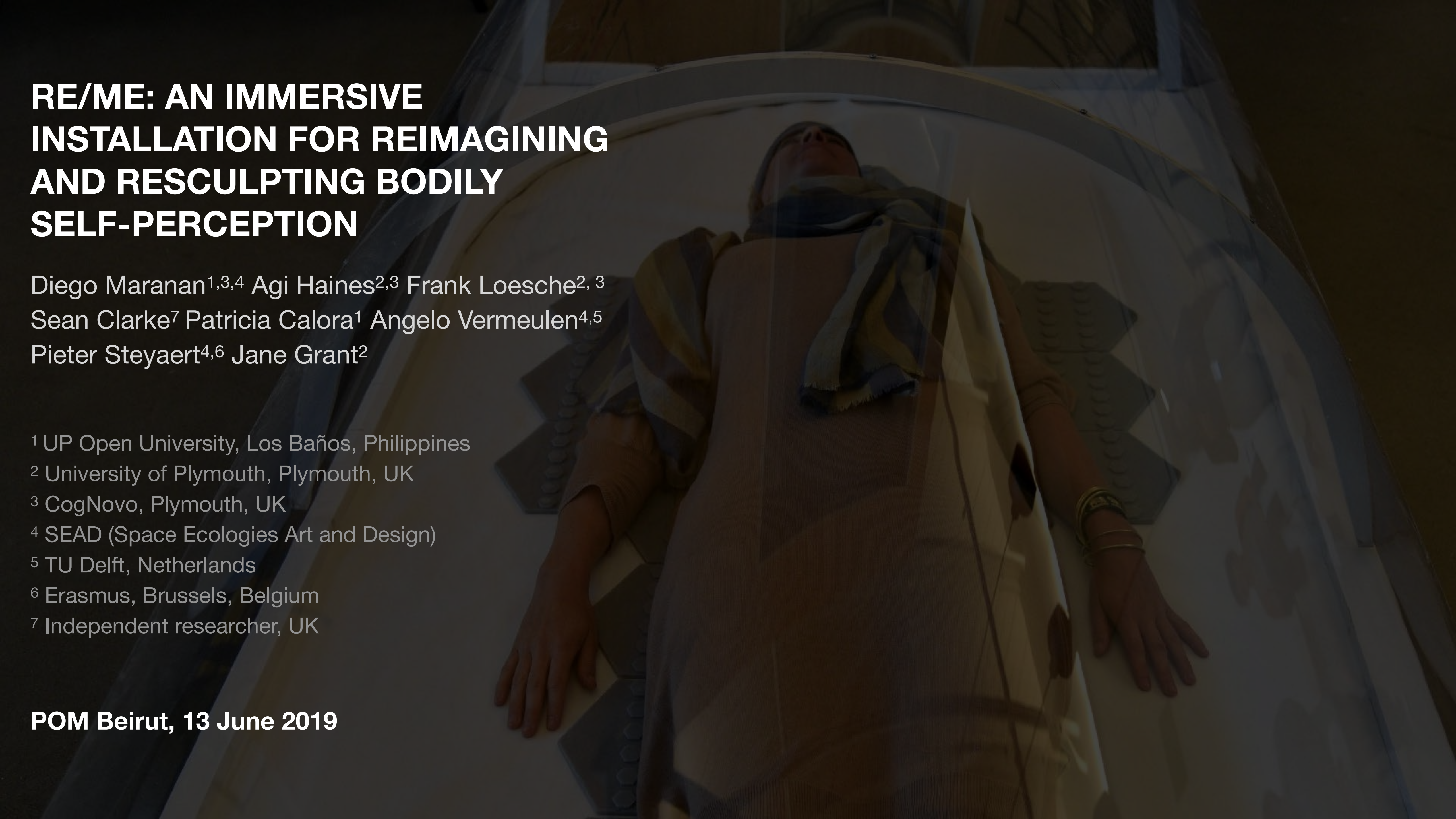
<sup>3</sup> University of Plymouth, Plymouth, UK

<sup>4</sup> Erasmus University College, Brussels, Belgium

<sup>5</sup> Delft University of Technology, Delft, The Netherlands

### **Abstract**

RE/ME ([re-me.cognovo.org](http://re-me.cognovo.org)) is a full-body, immersive installation that employs auditory and vibrotactile stimuli to create unusual, pleasurable, and perception-altering experiences. The installation uses both a carefully composed and richly textured soundscape, as well as vibrotactile patterns provided by over 200 tiny actuators contacting the skin. These stimuli aim to influence the user's affective state and alter the representation of their body in their somatosensory cortex. The installation is inspired by somatic studies (which explores the first-person experience of one's body) and technology design; it further draws from research in neuroscience and experimental psychology which suggests how vibrotactile stimulation can facilitate a range of different effects on neurophysiology. RE/ME can be simultaneously regarded as a low-cost medical device with a range of potential therapeutic applications; an immersive installation where users experience unusual, novel, and pleasurable external stimuli; and a creative tool for reimagining and resculpting the perception of the shape and size of one's own body. Unlike many digital technologies for the body – which aspire to extend or supplant some part of the human sensory system – RE/ME exemplifies a technology design sensibility that takes a specific and more widely applicable approach to the transhuman. Our aim is to create a cognitive aid that provides a learning scaffold for developing (not replacing) the self-sensing capabilities of individuals. In this presentation, we present initial findings from experiments involving 43 members of the public who experienced the RE/ME installation during a month-long artistic residency with DART ([www.dartlabs.io](http://www.dartlabs.io)), a San Francisco-based testing lab for design, art, research and technology. We share some of the highlights of the qualitative aspects of the experiments, including participant-drawn images that demonstrate how RE/ME altered their bodily self-perception. We conclude with describing ongoing work in developing and applying RE/ME in the Philippines for medical and therapeutic purposes. RE/ME represents an example not only of the potentially intimate and mutually beneficial exchange between scientific and artistic research, but also its relevance to non-Western contexts.



# RE/ME: AN IMMERSIVE INSTALLATION FOR REIMAGINING AND RESCULPTING BODILY SELF-PERCEPTION

Diego Maranan<sup>1,3,4</sup> Agi Haines<sup>2,3</sup> Frank Loesche<sup>2,3</sup>  
Sean Clarke<sup>7</sup> Patricia Calora<sup>1</sup> Angelo Vermeulen<sup>4,5</sup>  
Pieter Steyaert<sup>4,6</sup> Jane Grant<sup>2</sup>

<sup>1</sup> UP Open University, Los Baños, Philippines

<sup>2</sup> University of Plymouth, Plymouth, UK

<sup>3</sup> CogNovo, Plymouth, UK

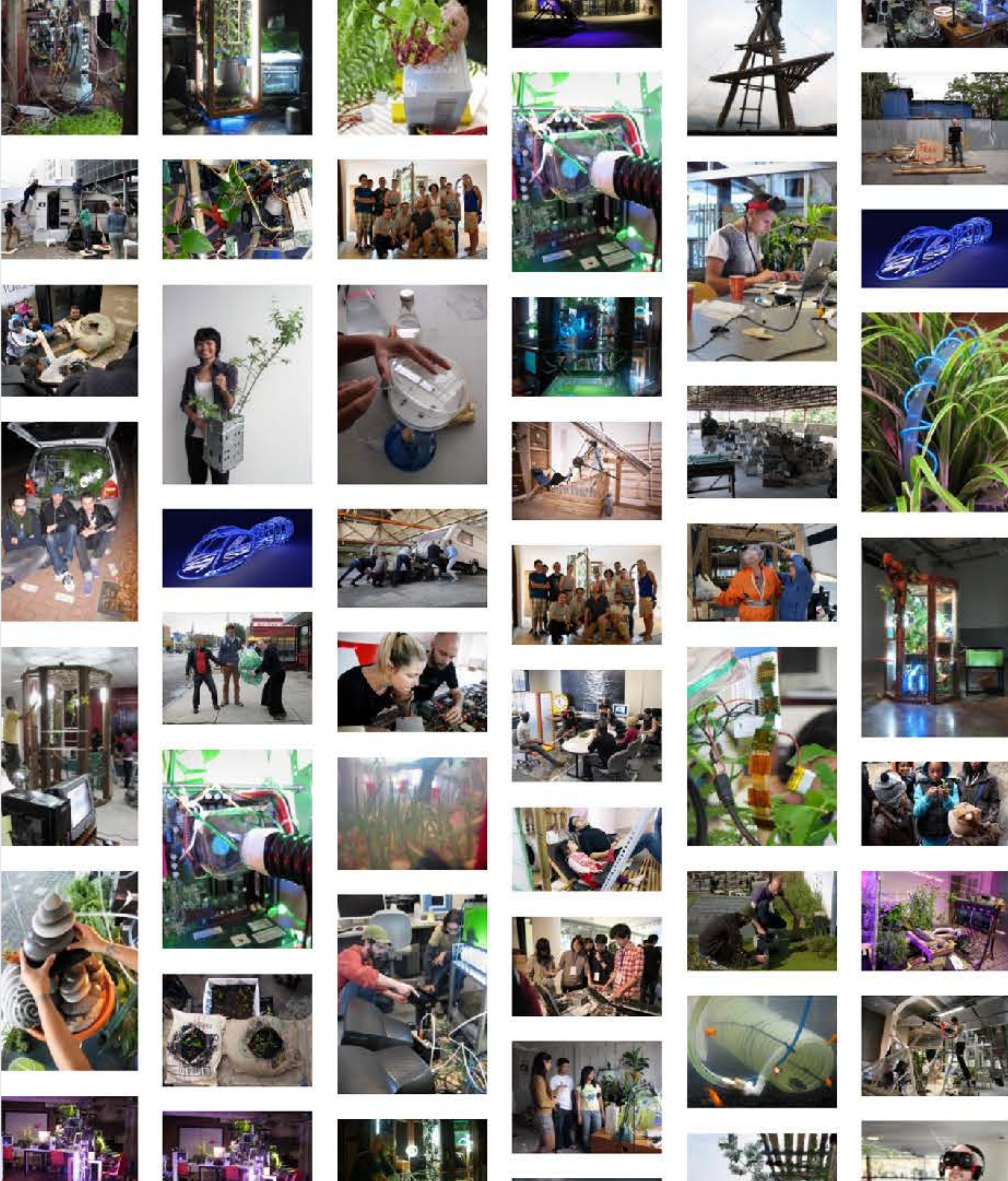
<sup>4</sup> SEAD (Space Ecologies Art and Design)

<sup>5</sup> TU Delft, Netherlands

<sup>6</sup> Erasmus, Brussels, Belgium

<sup>7</sup> Independent researcher, UK

**POM Beirut, 13 June 2019**




**SPACE  
ECOLOGIES  
ART AND  
DESIGN**

SEAD (Space Ecologies Art and Design) is an international transdisciplinary network of artists, scientists, engineers and activists. We reimagine and reshape the future through critical inquiry and hands-on experimentation. To achieve this, SEAD develops paradigm-shifting projects in which ecology, technology and community are radically integrated in unique ways.

SEAD was initiated in 2009 by Angelo Vermeulen (and Tine Holvoet), later joined by Diego Maranan and Pieter Steyaert. Since its inception, SEAD created more than 30 Biomodd and Seeker art projects, together with local communities in North and South America, Europe, and Asia. Besides Biomodd and Seeker, its most well-known projects, the SEAD collective has initiated many other projects such as H4aC, Drahory, Haplós, the Merapi Terraforming Project and the Biodiversity Tower. SEAD members already co-created with over a thousand people worldwide, questioning and prototyping the future together.







## **Angelo Vermeulen**

**Regenerative synthetic ecosystems  
and evolving asteroid starships**

T11 - The Ecosystem Analogy

*Today, 15.30, Orient Institute - lower seminar room (F1)*



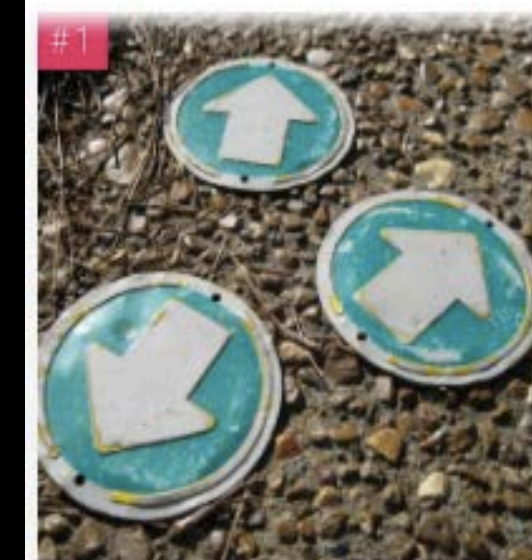
## **Pieter Steyaert**

**Excavating abandoned artificial life**

T06 - Living machines

*Tomorrow, 13.00, 302D (H2)*





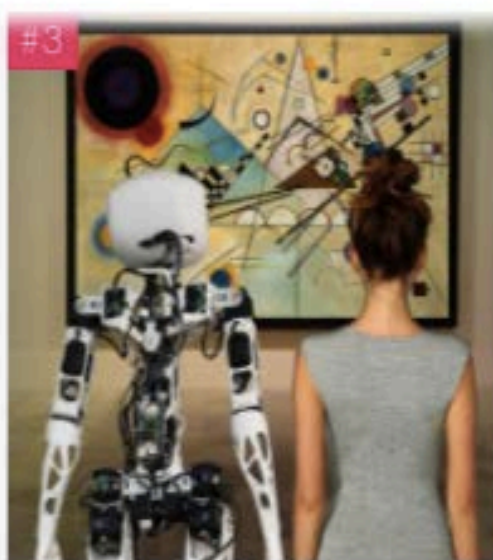
**VALUE JUDGMENTS AND CREATIVE THINKING**

Investigate the role of value based decision making in creative cognition. [\(more\)](#)



**CREATIVITY IN DECEPTIVE COMMUNICATION**

Compare the roles of creativity and visual imagery in honest and deceptive communication, using behavioural and cognitive neuroscience methods and paradigms. [\(more\)](#)



**MODELLING CREATIVE DECISION MAKING**

Investigate aesthetic pleasantness in the visual domain, in an inter-disciplinary manner. [\(more\)](#)



**SHARED CREATIVITY IN DANCE**

Exploring the roles of flow experience and metacognitive strategies: imagery and sense awareness in group creativity in dance improvisation. [\(more\)](#)



**BODYSHAPING THE MIND**

Designing technologies and aesthetic experiences to support embodied cognition. [\(more\)](#)



**DESIGNING PLAYFUL SYSTEMS IN MIXED REALITY**

Investigate the nature of play in a practice-based manner by designing and developing playful systems in mixed reality. [\(more\)](#)



**PREDICTING CREATIVITY FROM SPATIAL ABILITY & PERSONALITY**

Investigate the neurobiological basis for creativity, exploring how biological tendencies or temperament may shape the creative personality. [\(more\)](#)



**UNCONSCIOUS CREATIVITY: THE EUREKA MOMENT**

Investigate the 'Eureka' moment, using experimental observations of unconscious problem solving in architectural design [\(more\)](#)



**SCHEMATA AND THEIR APPLICATIONS**

Build a neural system that learns a conceptual hierarchy of (sound-objects), autonomously searches the underlying conceptual space, and presents the retrieved associative concept-sequence audio-visually [\(more\)](#)



**NEURALLY INSPIRED ALGORITHMS OF HUMAN COGNITION AND PROBLEM SOLVING**

Explore the neurophysiological basis of generative creative processes, using realistic neural models of cortical function and



**INDIVIDUAL DIFFERENCES IN VISUAL AND AUDITORY BISTABILITY**

Investigate the relationships between switching rates in multistable perception, executive functions, creativity and personality in adults and children, and determine the



**CREATIVITY THROUGH SOCIAL INTERACTION**

Investigate how creative products emerge through interactions in collaborative teams, and how inter-individual and social abilities influence social creativity in adults and



**EARLY CINEMA AND COGNITIVE CREATIVITY**

Investigate the cognitive impact of analogue and digital cinematic film projection technologies. [\(more\)](#)



**DEVELOPING CREATIVITY IN COGNITIVE ROBOTS**

I aim to build robots capable of insight using Hierarchical Reinforcement Learning. [\(more\)](#)



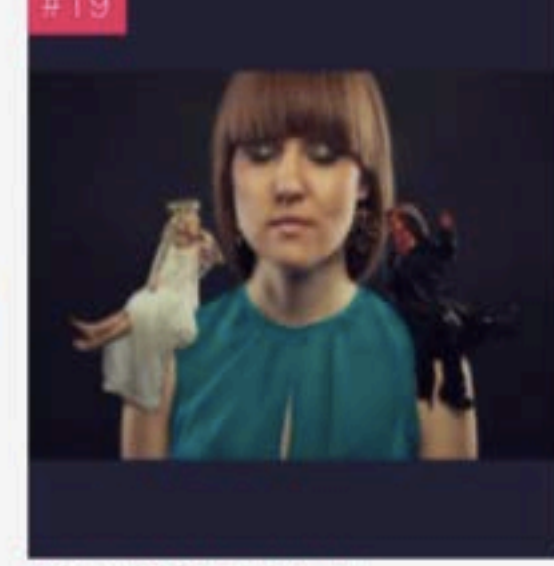
**SIGNS OF ALARM FATIGUE**

Investigates the cognitive-behavioural correlates of the subjective experience of 'alarm fatigue'. [\(more\)](#)



**THE ROLE OF COUNTERFACTUAL THINKING IN DECEPTION**

Investigate how people use alternatives to reality in order to deceive whilst also examining the mechanisms that underlie this



**MORAL COGNITION: AN INTERDISCIPLINARY INVESTIGATION OF JUDGEMENT VERSUS ACTION**

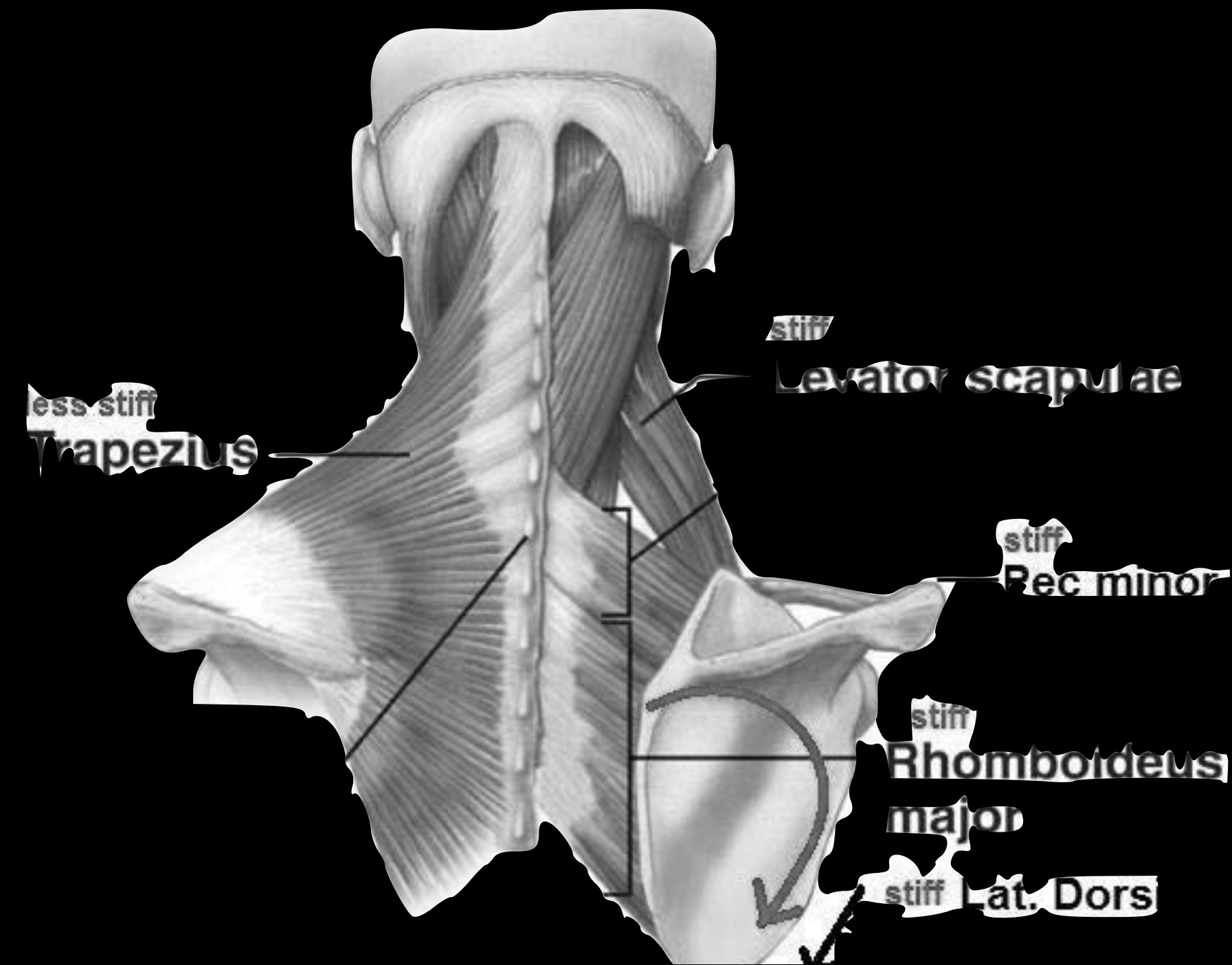
Investigating the role of personality traits and arousal factors on moral decision making and the moral action and judgement disparity.



**ATTENTION, ASSOCIATIVE LEARNING AND CREATIVITY**

Exploring learning about non-informative cues and how this relates to measures of creative thinking. [\(more\)](#)





- DIFFERENTIATING BETWEEN AREAS OF THE SHOULDER, NECK, AND CHEST
- FINDING MOVEMENT IN THE SHOULDERS
- FINDING MOVEMENT IN THE CHEST
- FINDING NEW MOVEMENT IN THE NECK, HEAD, AND EYES
- SEEING AND RELATING TO THE WORLD DIFFERENTLY



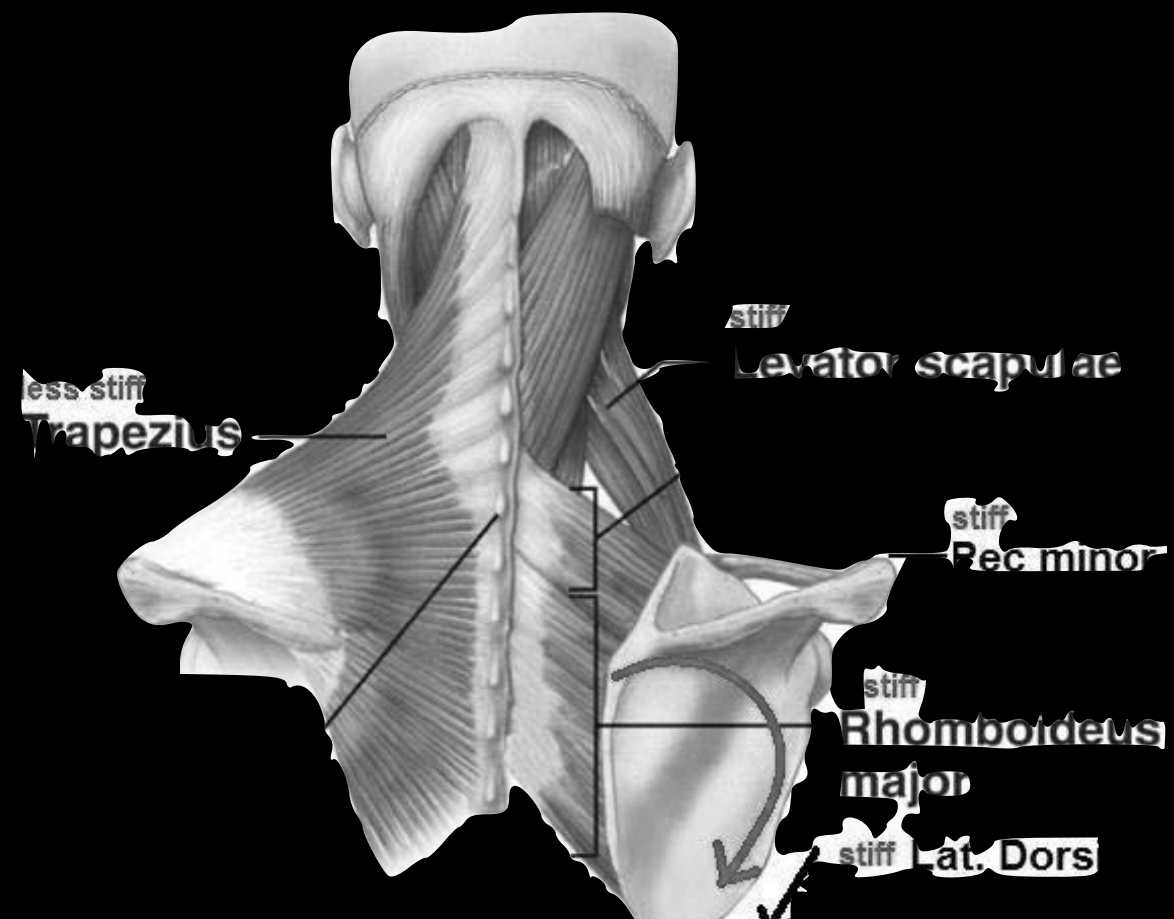


1

2

3

## (BODY) AWARENESS CAN AFFORD NEW (EMBODIED) CHOICES



**“If you know what you’re doing, you can do what you want.” (Moshe Feldenkrais)**

## (BODY) AWARENESS CAN AFFORD NEW (EMBODIED) CHOICES



- **Pain** (Lundblad et al, 1999; Lundqvist et al., 2014)
- **Self-regulation** (Ives, 2003)
- **Interoceptive awareness** (Paolucci et al., 2016)
- **Quality of life in individuals with degenerative neuromuscular disease** (Teixeira-Machado et al., 2015)

- Ives, J. C. (2003). Comments on “The Feldenkrais Method®: A Dynamic Approach to Changing Motor Behavior.” *Research Quarterly for Exercise and Sport*, 74(2), 116–123. <https://doi.org/10.1080/02701367.2003.10609072>
- Lundblad, I., Elert, J., & Gerdle, B. (1999). Randomized Controlled Trial of Physiotherapy and Feldenkrais Interventions in Female Workers with Neck-Shoulder Complaints. *Journal of Occupational Rehabilitation*, 9(3), 179–194. <https://doi.org/10.1023/A:1021301801292>
- Lundqvist, L.-O., Zetterlund, C., & Richter, H. O. (2014). Effects of Feldenkrais Method on Chronic Neck/Scapular Pain in People With Visual Impairment: A Randomized Controlled Trial With One-Year Follow-Up. *Archives of Physical Medicine and Rehabilitation*, 95(9), 1656–1661. <https://doi.org/10.1016/j.apmr.2014.05.013>
- Paolucci, T., Zangrando, F., Iosa, M., Angelis, S. D., Marzoli, C., Piccinini, G., & Saraceni, V. M. (2016). Improved interoceptive awareness in chronic low back pain: a comparison of Back school versus Feldenkrais method. *Disability and Rehabilitation*, 0(0), 1–8. <https://doi.org/10.1080/09638288.2016.1175035>
- Teixeira-Machado, L., Araujo, F., Cunha, F., Menezes, M., Menezes, T., & DeSantana, J. (2015). Feldenkrais method-based exercise improves quality of life in individuals with Parkinson’s disease: a controlled, randomized clinical trial. *The Journal of Pain - Abstracts Presented at the 34th Annual Scientific Meeting of the American Pain Society*, 16(4, Supplement), S113. <https://doi.org/10.1016/j.jpain.2015.01.471>

1

2

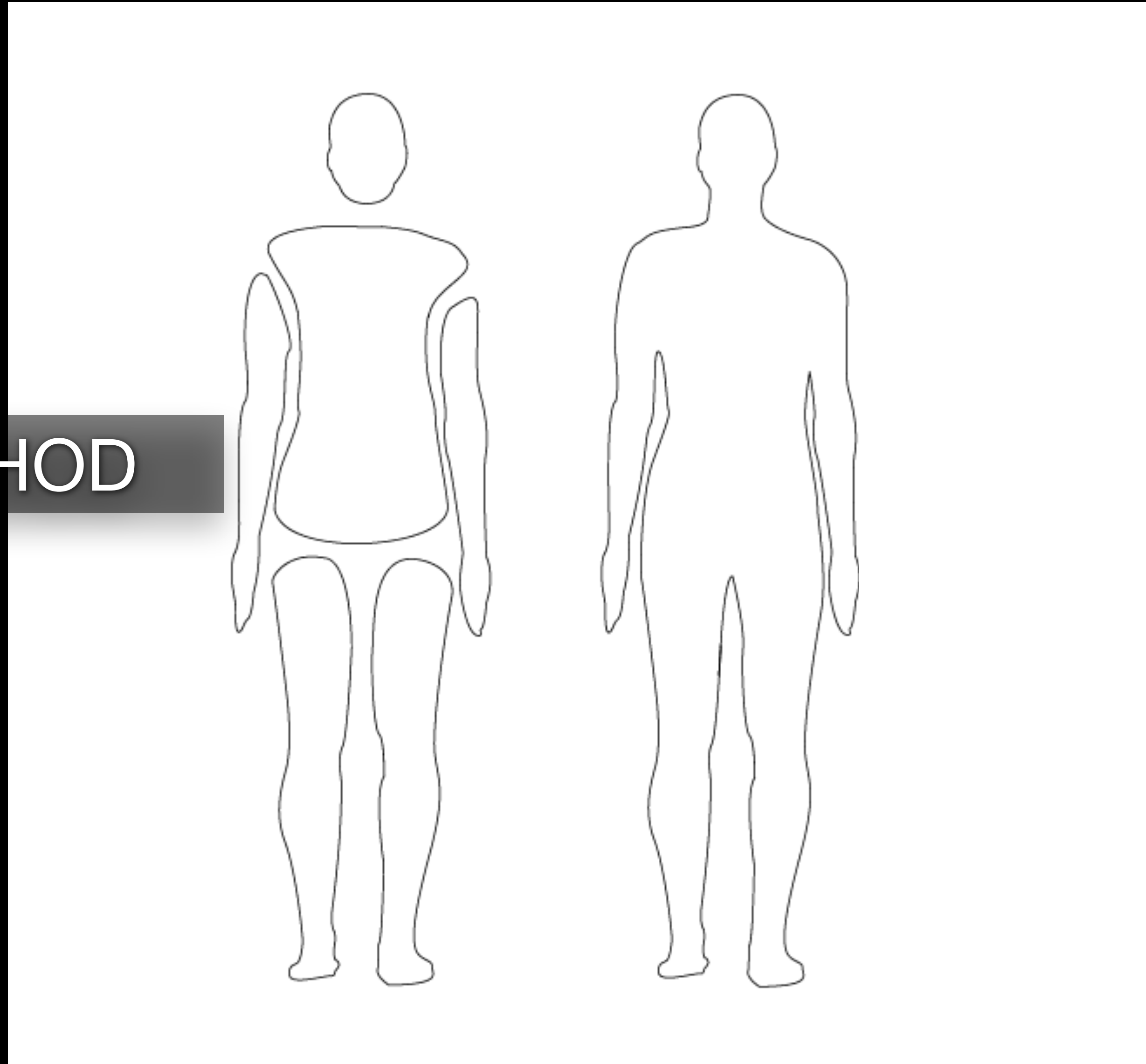
3

**(BODY) AWARENESS CAN AFFORD NEW (EMBODIED) CHOICES**

## THE FELDENKRAIS METHOD

**Feeling more whole**

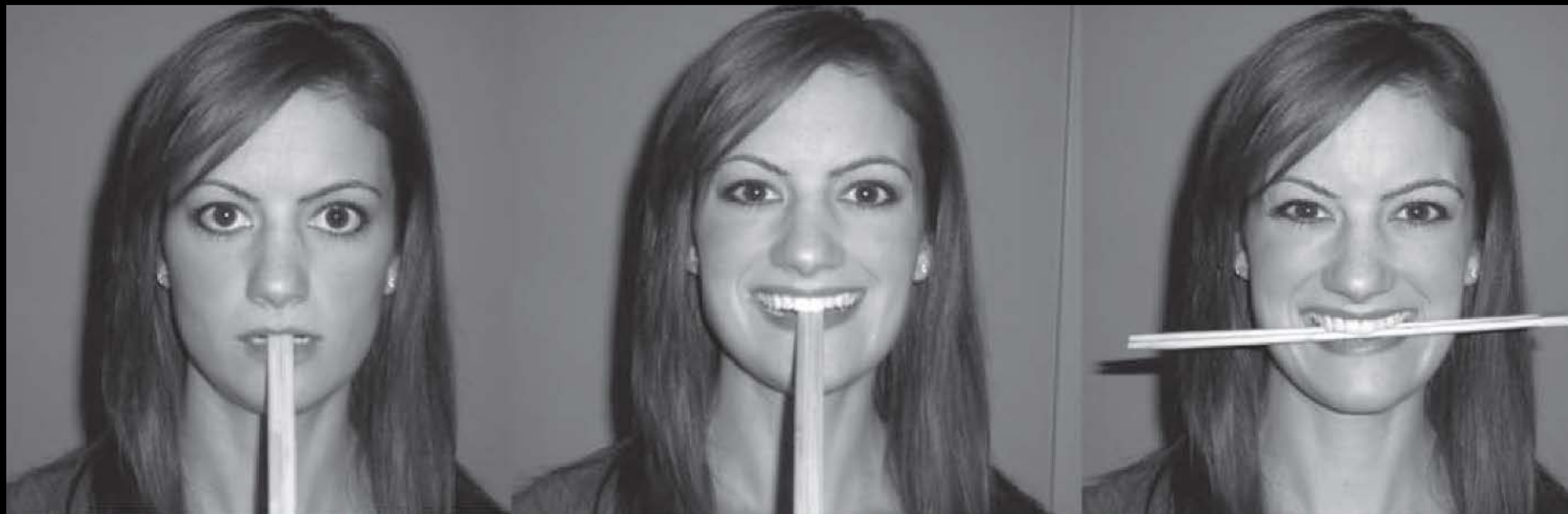
**“To make the impossible, possible; the possible, easy; and the easy, elegant.”**



## EMBODIED COGNITION: BRAIN ≠ MIND | THE BODY SHAPES THE MIND

Gallagher, S. (2005). *How the Body Shapes the Mind*.

Mahon, B. Z. (2015). What is embodied about cognition? *Language, Cognition and Neuroscience*, 30(4), 420–429. <https://doi.org/10.1080/23273798.2014.987791>



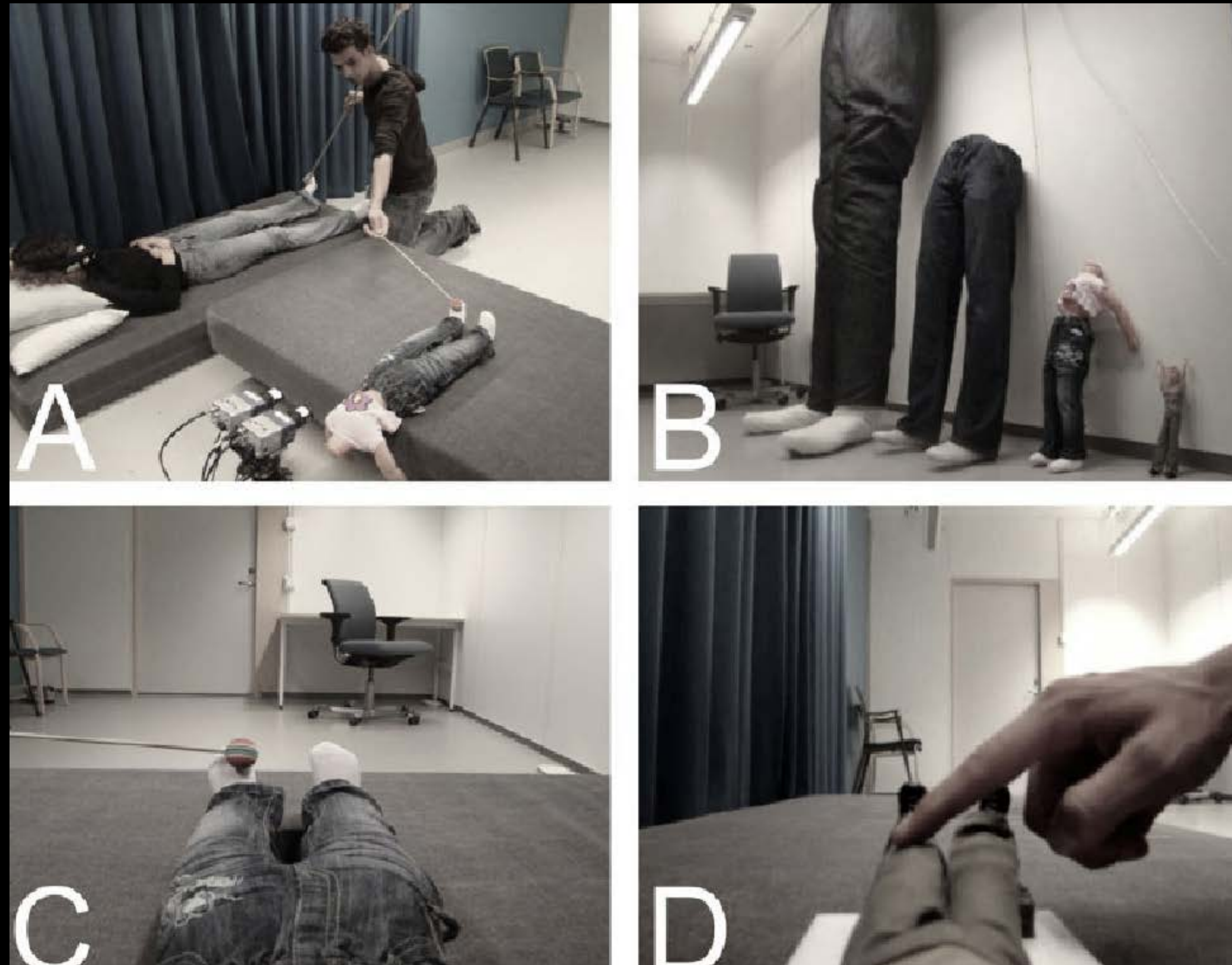
Kraft, T. L., & Pressman, S. D. (2012). Grin and bear it: the influence of manipulated facial expression on the stress response. *Psychological Science*, 23(11), 1372–1378. <http://doi.org/10.1177/0956797612445312>

1

2

3

## EMBODIED COGNITION: BRAIN $\neq$ MIND | THE BODY SHAPES THE MIND



van der Hoort, B., Guterstam, A., & Ehrsson, H. H. (2011). Being Barbie: The Size of One's Own Body Determines the Perceived Size of the World. *PLoS ONE*, 6(5), e20195.

1

2

3

## TOOLS AND MATERIAL DEVICES CAN HELP WITH BODY LEARNING AND AWARENESS



1

2

3

## TOOLS AND MATERIAL DEVICES CAN HELP WITH BODY LEARNING AND AWARENESS



**A MAT WITH RIGHT THICKNESS AND TEXTURE  
+ A PERFECTLY FLAT, PERFECTLY HORIZONTAL FLOOR  
= A LEARNING ENVIRONMENT**



1

2

3

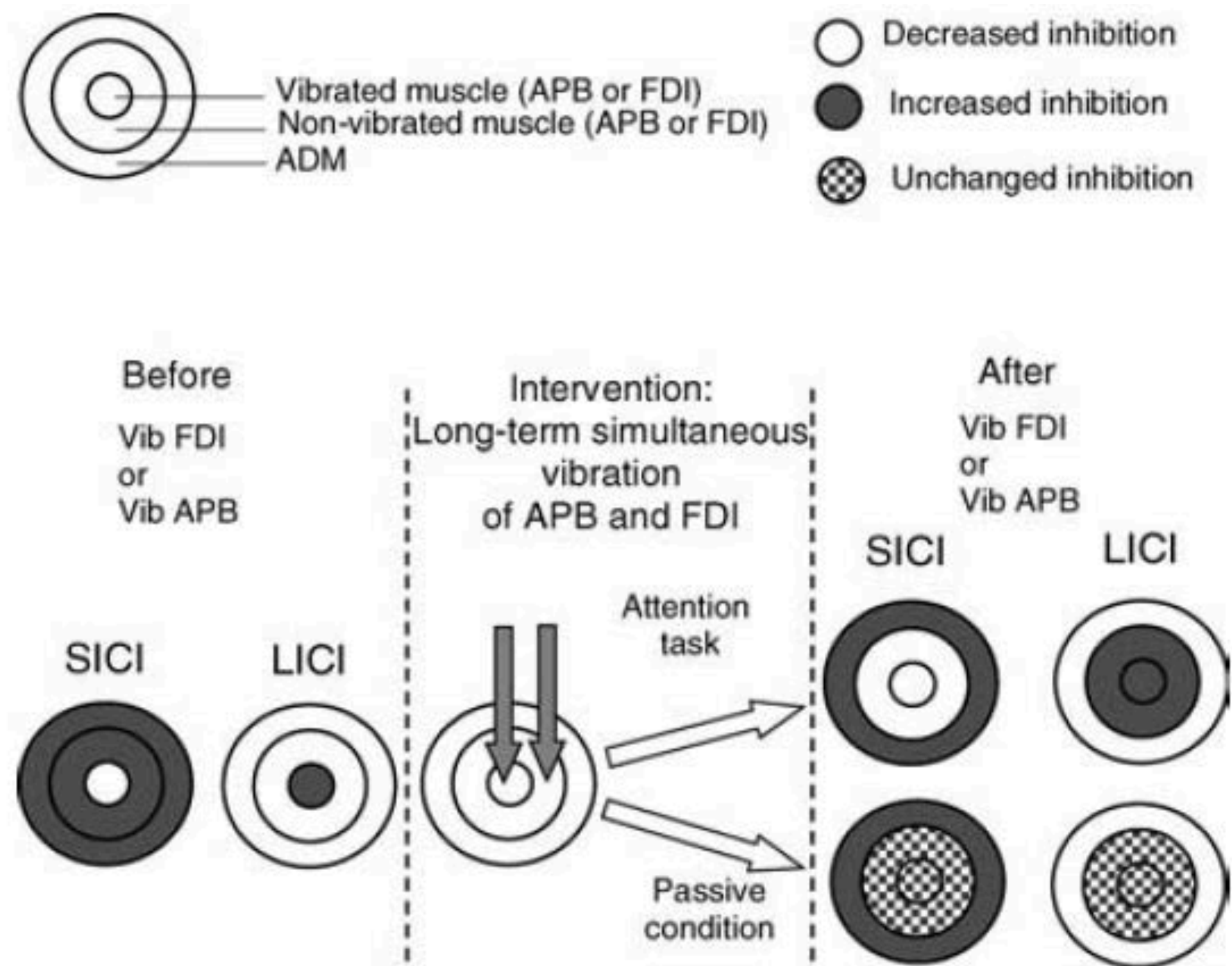
## TOOLS AND MATERIAL DEVICES CAN HELP WITH BODY LEARNING AND AWARENESS



Dean, S. E. (2014). Amerta Movement & Somatic Costume: Sourcing the Ecological Image. In K. Bloom, M. Galanter, & S. Reeve (Eds.), *Embodied Lives: Reflections on the Influence of Suprpto Suryodarmo and Amerta Movement*.



# Effects of vibrotactile stimuli on cortical representation of motor action



**Figure 6. Schematic summary of the effects of focal vibratory input on SICI and LICI in the three hand muscles**

In this diagram, the hand muscle representations are drawn as circles with the vibrated muscle (either APB or FDI) in the centre, and the 'near' (either FDI or APB) and 'far' (always ADM) non-vibrated muscles surrounding it. Shades represent the level of intracortical inhibition: white symbolizes a reduction of SICI or LICI, grey an increase, and patterned, an unchanged SICI or LICI compared to the non-vibration condition. Before the intervention (baseline), short-term vibration of one muscle reduces SICI in that muscle ('homotopic' effect) and increases it in other muscles ('heterotopic' effect), as symbolized here by the white centre surrounded by grey for SICI, and vice versa for LICI. After the long-term simultaneous vibration of the APB and FDI, the 'homotopic' effect of vibration spreads onto the co-vibrated muscle if subjects had attended to the vibratory stimulus (attention task). If subjects did not attend, vibration of either FDI or APB no longer had any effect on FDI or APB. The 'heterotopic' effects of short-term APB or FDI vibration on the ADM are preserved.

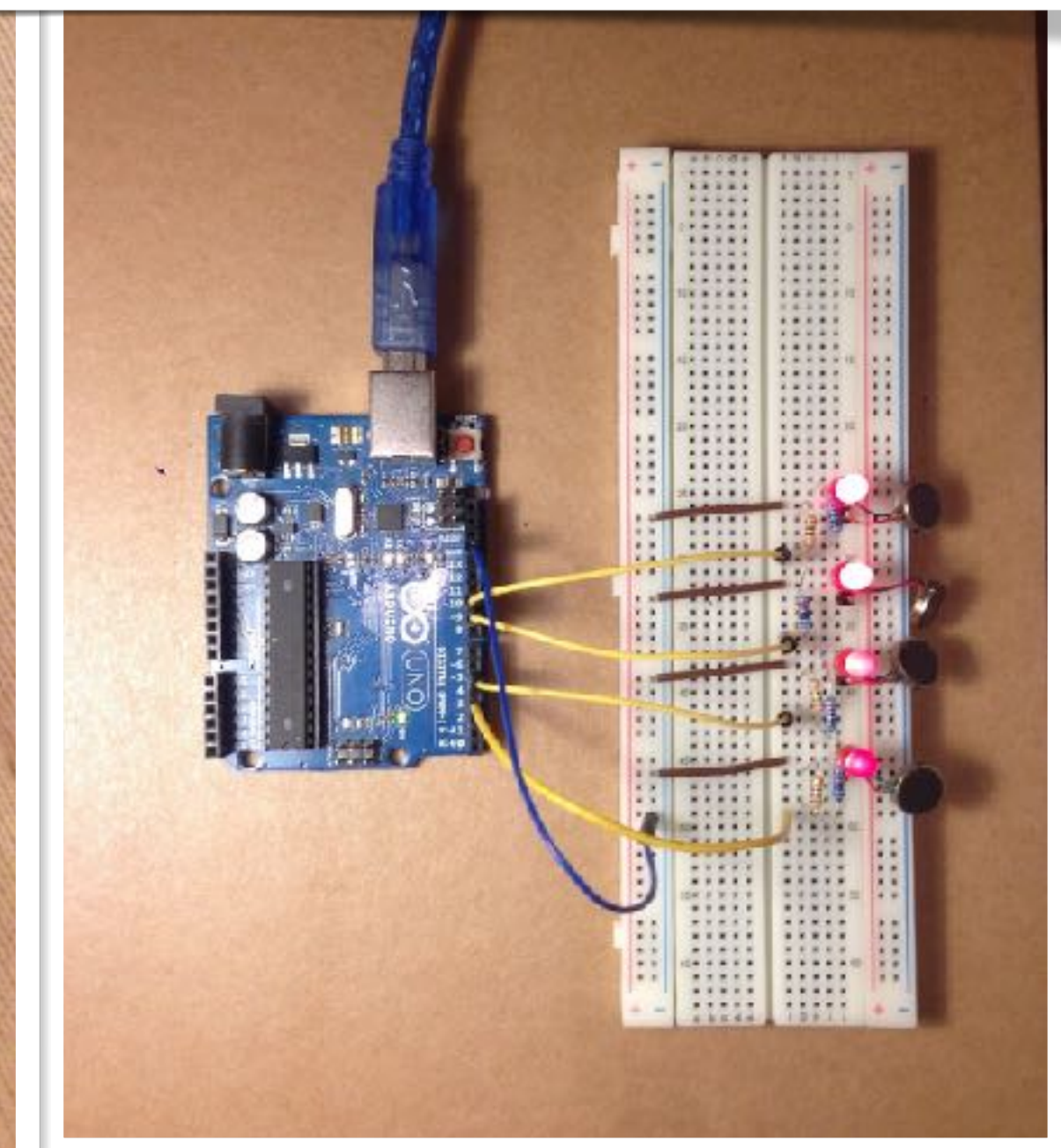
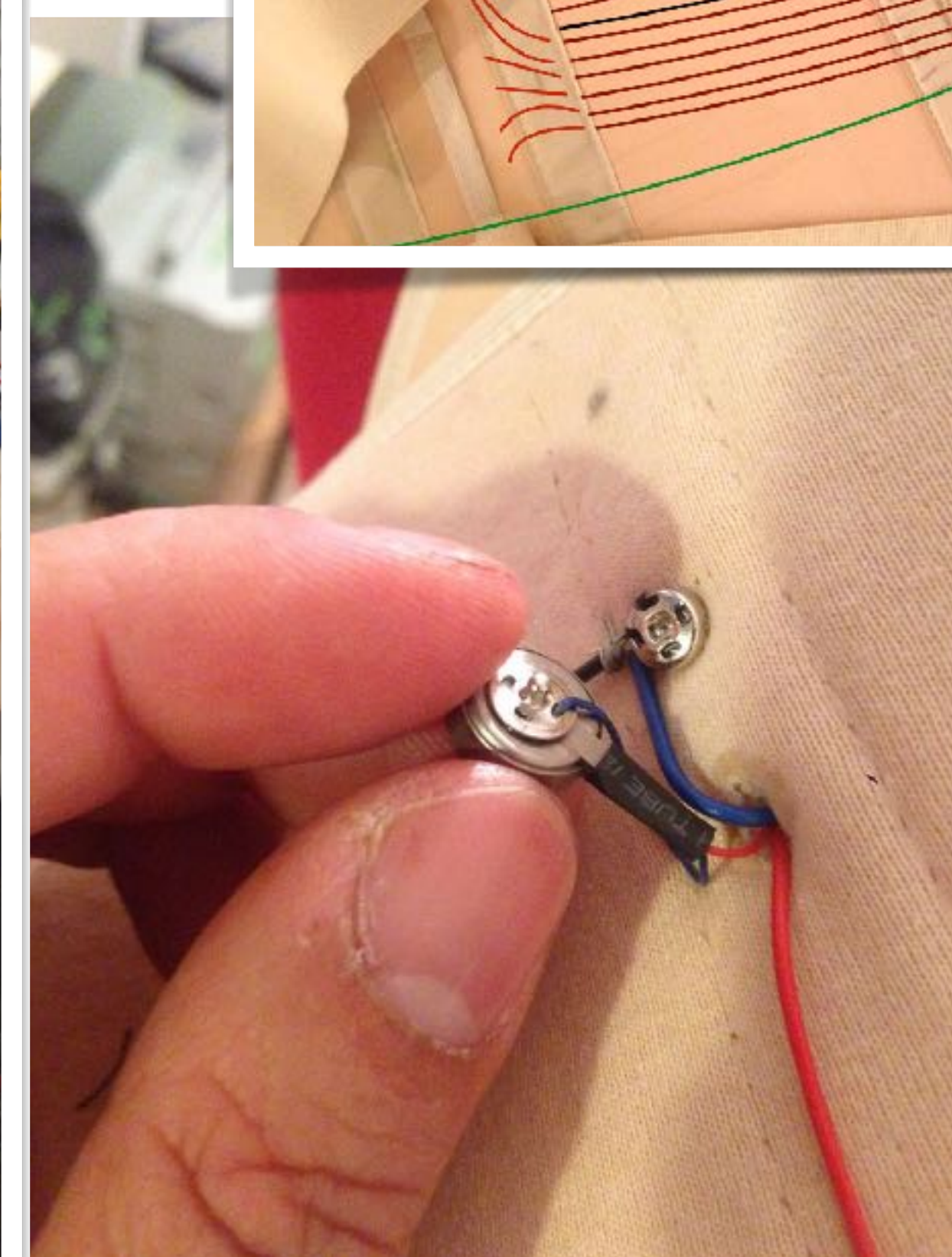
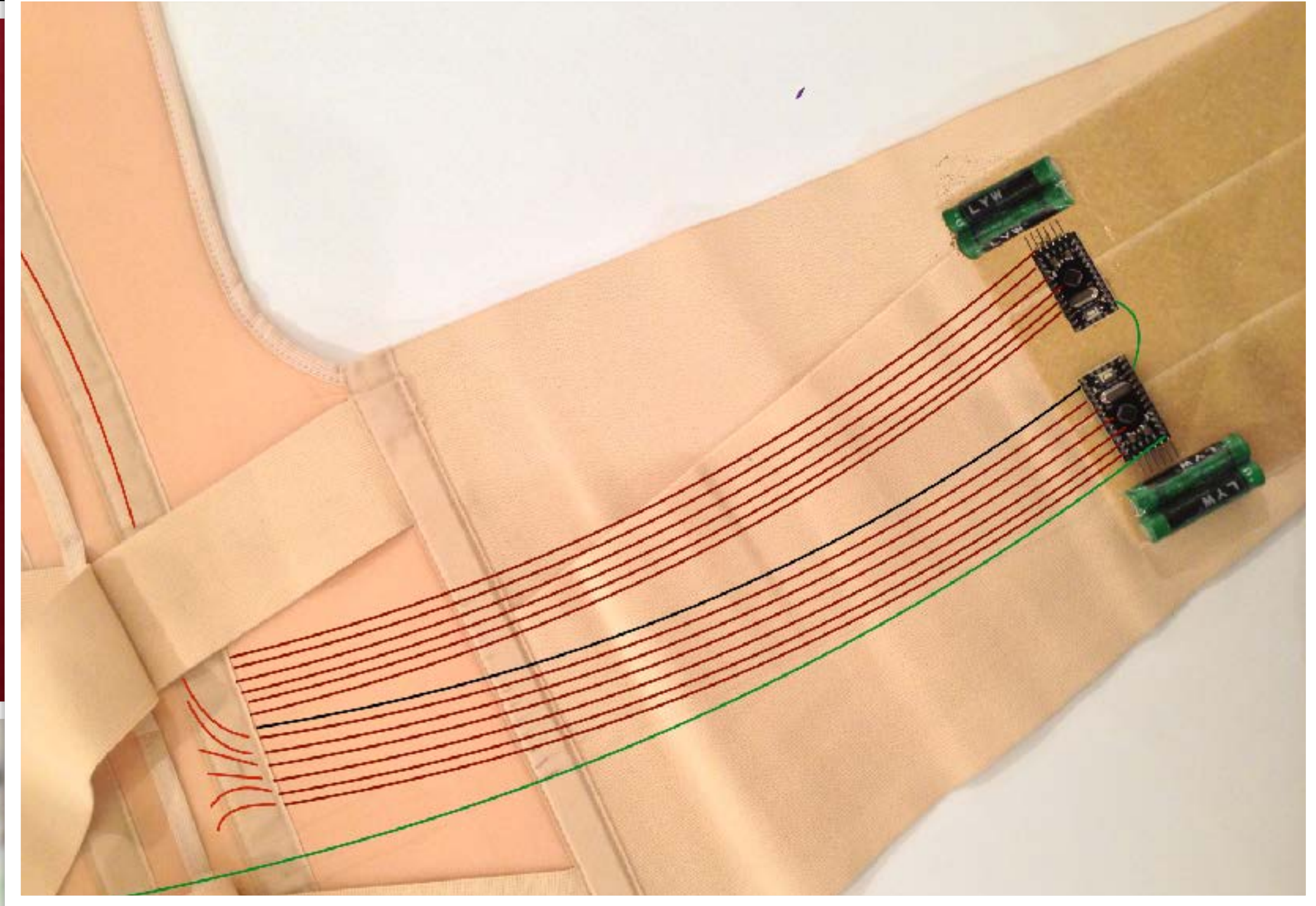
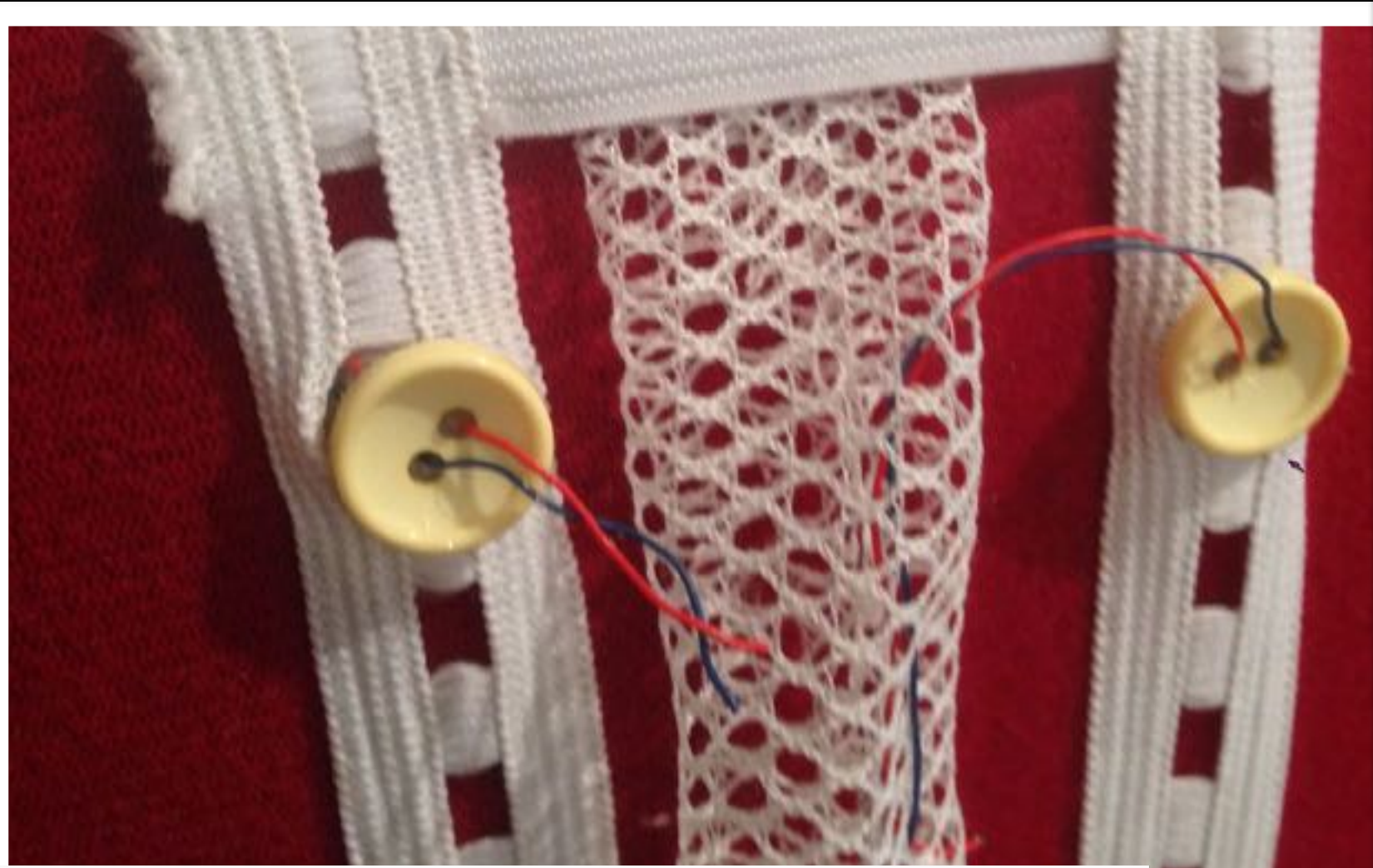
Rosenkranz, K., & Rothwell, J. C. (2003). Differential effect of muscle vibration on intracortical inhibitory circuits in humans. *The Journal of Physiology*, 551(2), 649–660. <https://doi.org/10.1113/jphysiol.2003.043752>

Rosenkranz, K., & Rothwell, J. C. (2004). The effect of sensory input and attention on the sensorimotor organization of the hand area of the human motor cortex. *The Journal of Physiology*, 561(1), 307–320. <https://doi.org/10.1113/jphysiol.2004.069328>

# Effects of vibrotactile stimuli on cortical representation of motor action

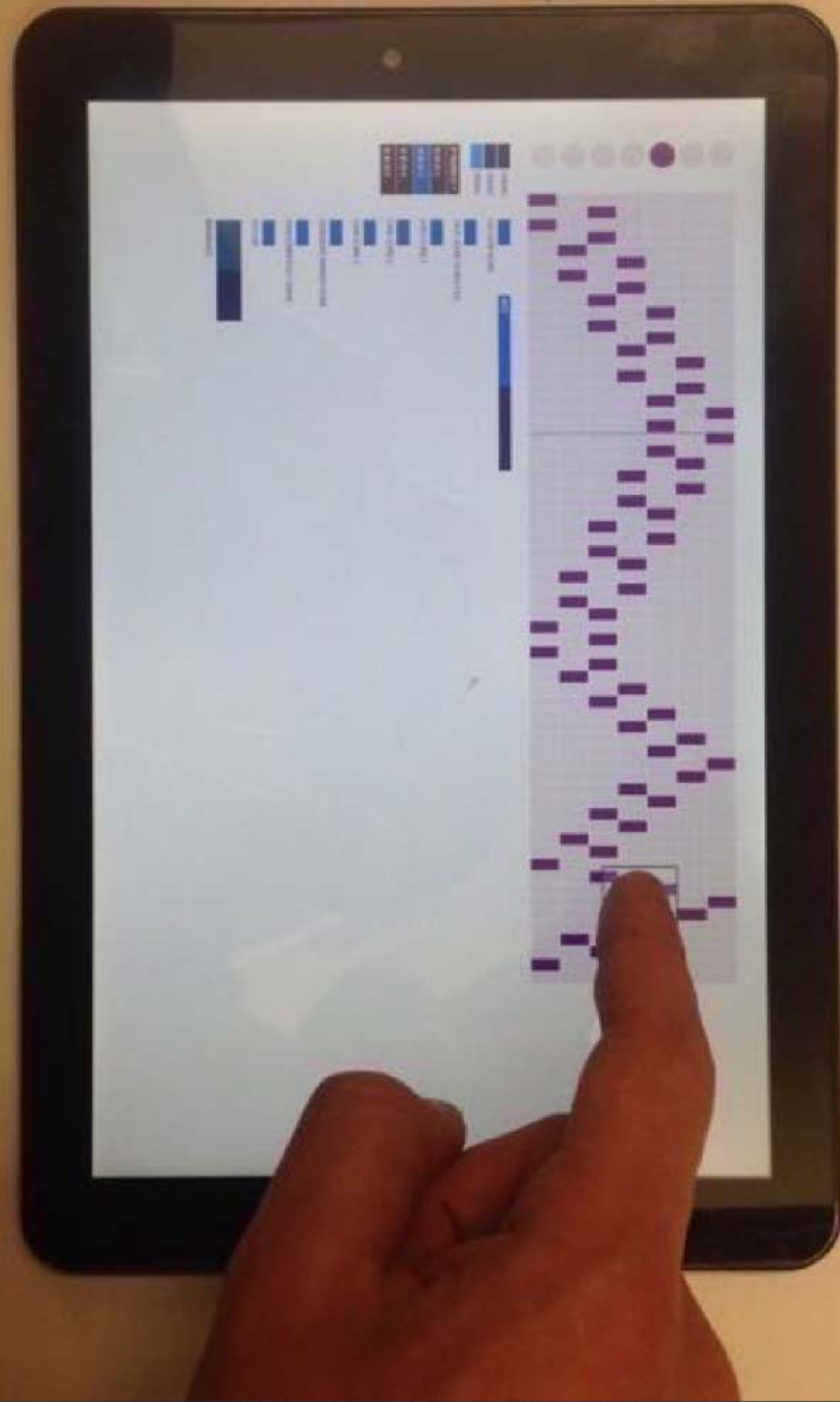
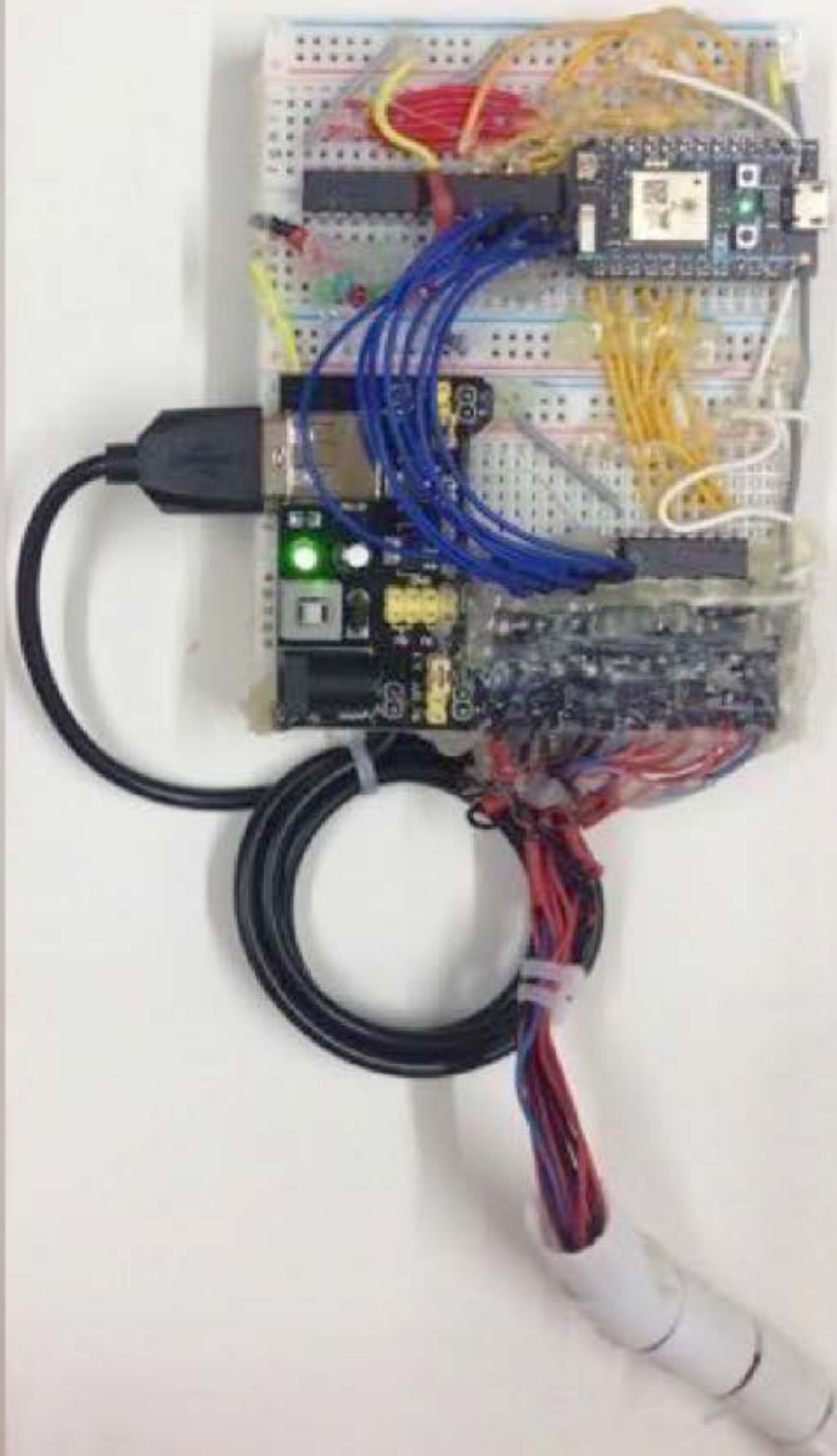
*“The objective was to investigate if whole-hand mechanical stimulation (MSTIM) in the tapping-flutter frequency range induces outlasting post-stimulus changes in the hand region of the primary motor cortex. MSTIM was delivered to 12 healthy subjects for 20 min using a therapeutic stimulation device (Swisswing BMR 2000)... We conclude that 20 min MSTIM with a frequency of 25 Hz induces outlasting plastic changes in the primary motor cortex. Paired-pulse stimulation further confirms that intrinsic intracortical mechanisms are involved in these changes... These results could be of relevance for hemiplegic patients with motor deficits, to improve the rehabilitation outcome with vibration exercise in combination with motor training.*”

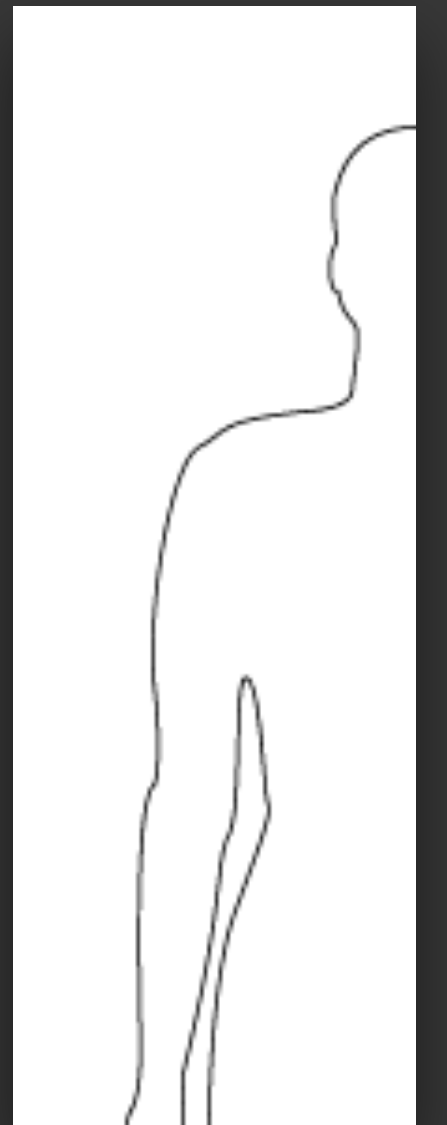
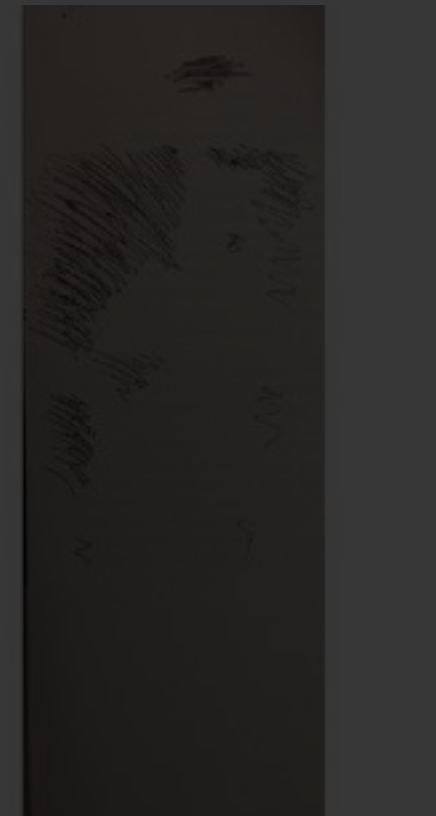
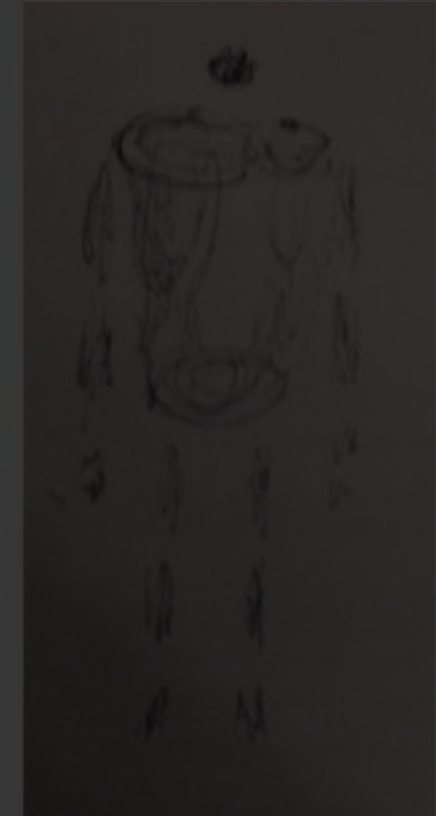
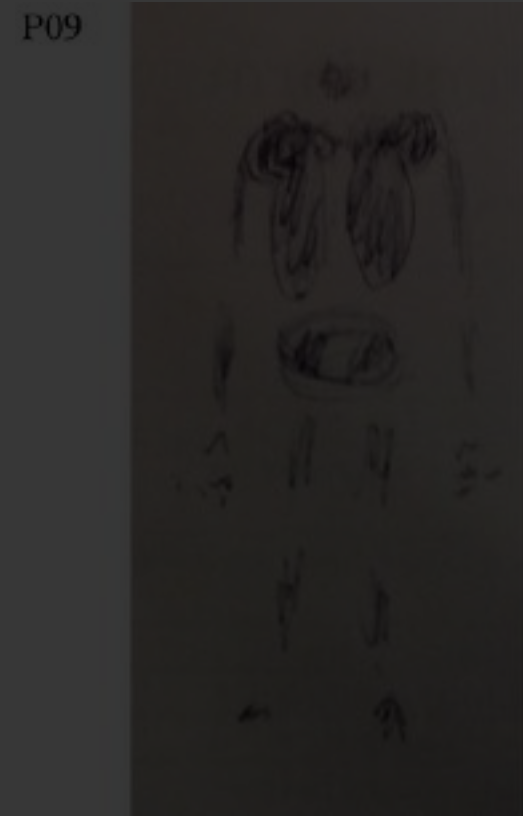
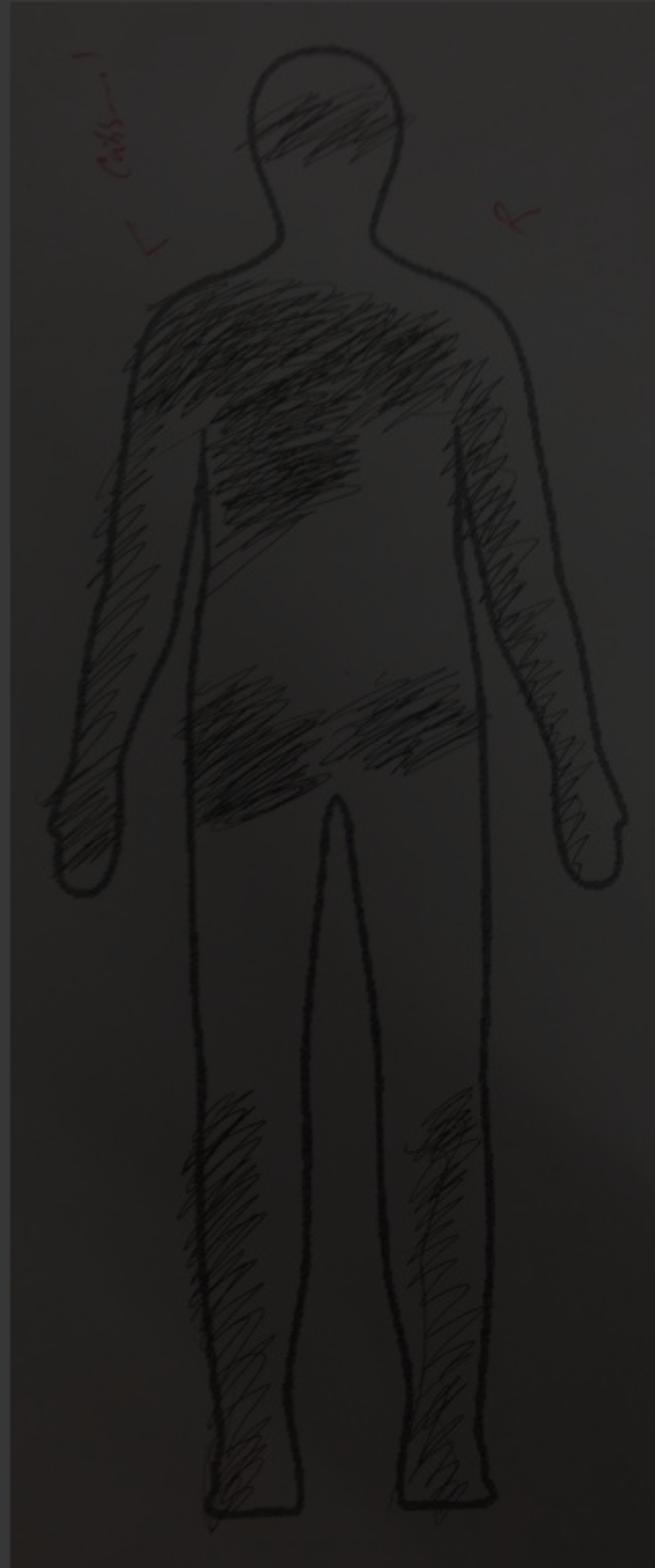
Christova, M., Rafolt, D., Golaszewski, S., & Gallasch, E. (2011). Outlasting corticomotor excitability changes induced by 25 Hz whole-hand mechanical stimulation. *European Journal of Applied Physiology*, 111(12), 3051–3059. <https://doi.org/10.1007/s00421-011-1933-0>



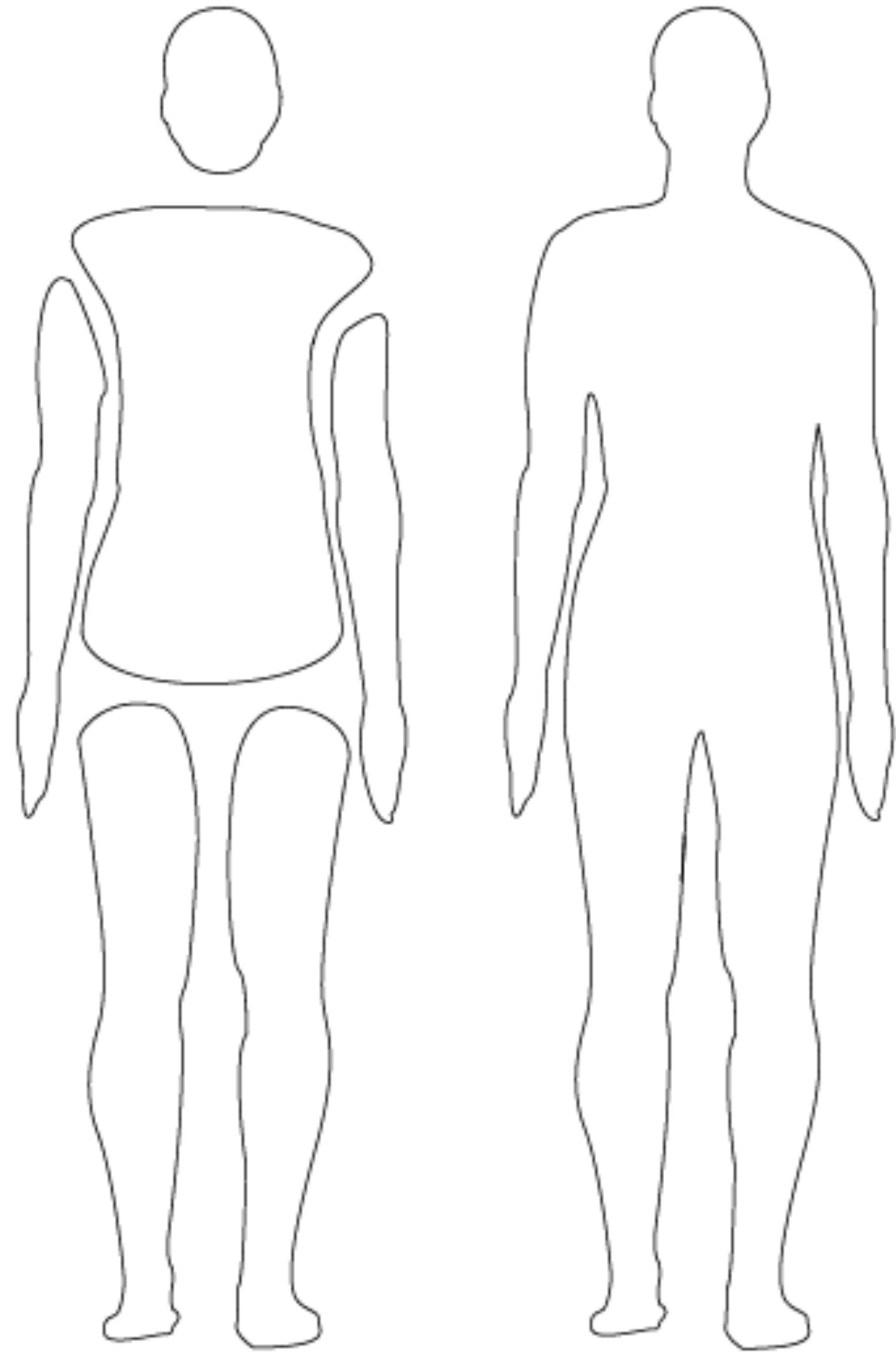


2016-10-18









RE/CONNECT : RE/IMAGINE

# RE/ME

BODILY WELL-BEING  
BODILY CREATIVITY



**Diego Maranan**

is a design researcher who uses technology to understand and improve individuals' relationships with their body. Diego has a background in computer science, dance, and somatic techniques and was a CogNovo PhD fellow. He is an Assistant Professor in Multimedia Studies at the University of the Philippines Quezon University.  
[www.diegomaranan.com](http://www.diegomaranan.com)



**Frank Loesche**

is an expert in computer science and EEG technologies, yet these are only facets of his incredibly varied research and work outputs. As a CogNovo PhD fellow he researched the "eureka" moment and his work focuses on problem solving and emerging solutions.  
[CogNovo.eu/Frank-Loesche](http://CogNovo.eu/Frank-Loesche)



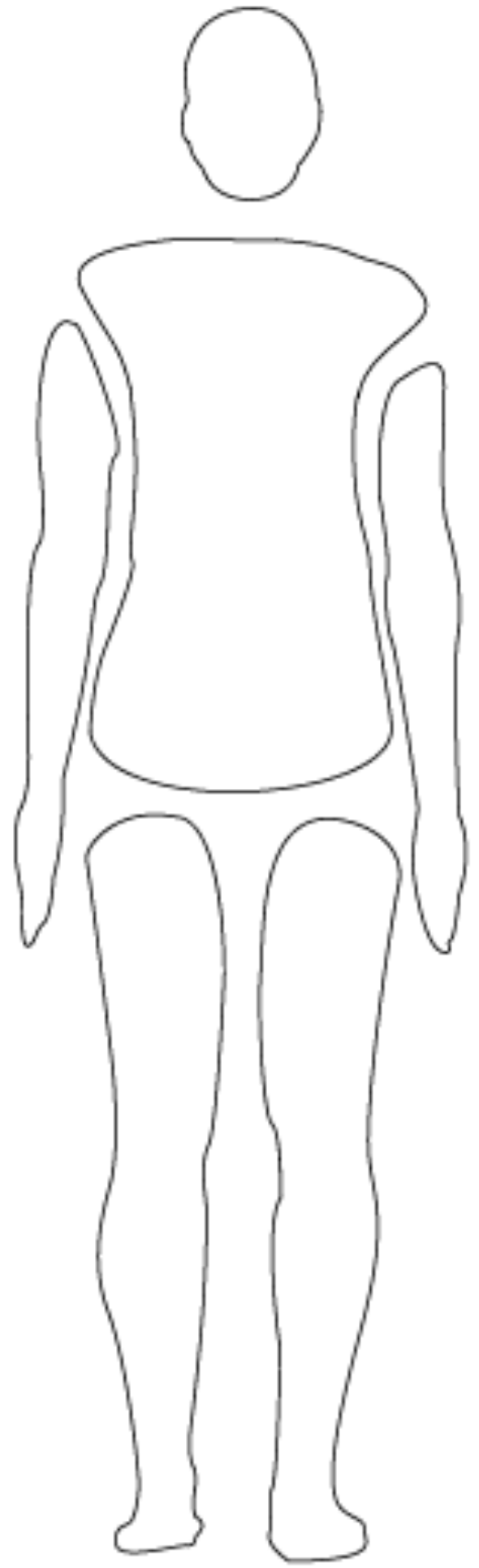
**Sean Clarke**

is an acclaimed composer whose work also comprises composition for film and experiential design installations. With a background in contemporary performance, composition and sound engineering, his work focuses on our contextual perception of sound and music.  
[www.seanclarkecomposer.com](http://www.seanclarkecomposer.com)

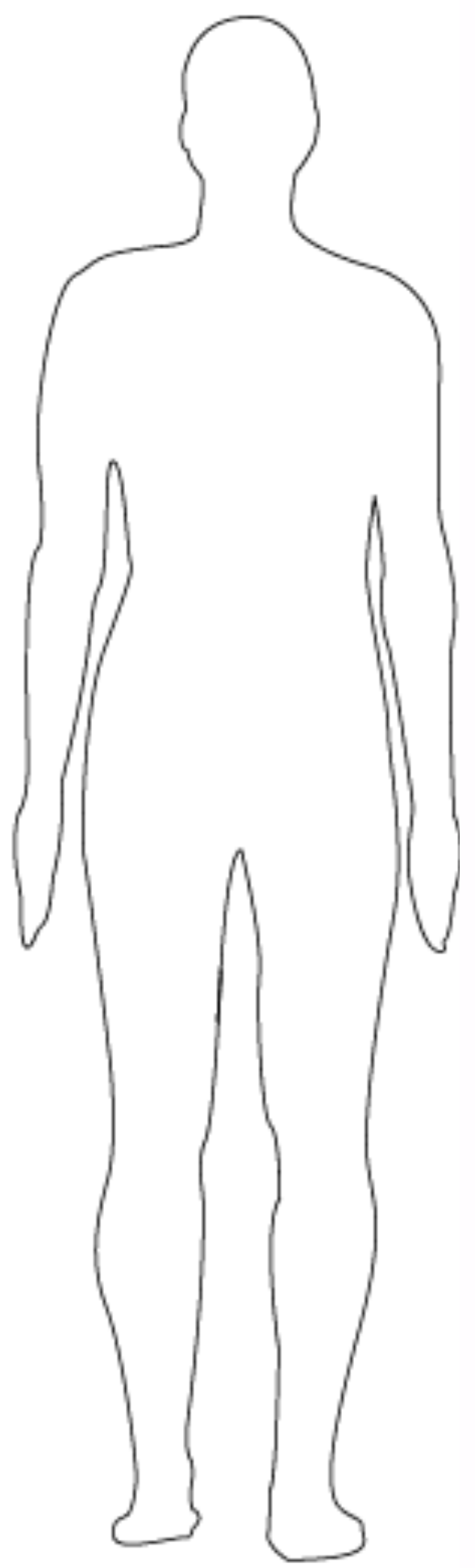


**Agi Haines**

is a multi-award winning speculative designer and artist whose work focuses on the design of the human body. As a CogNovo PhD fellow, Agi studies how people might respond to the possibilities of our body as another everyday material.  
[www.agihaines.com](http://www.agihaines.com)



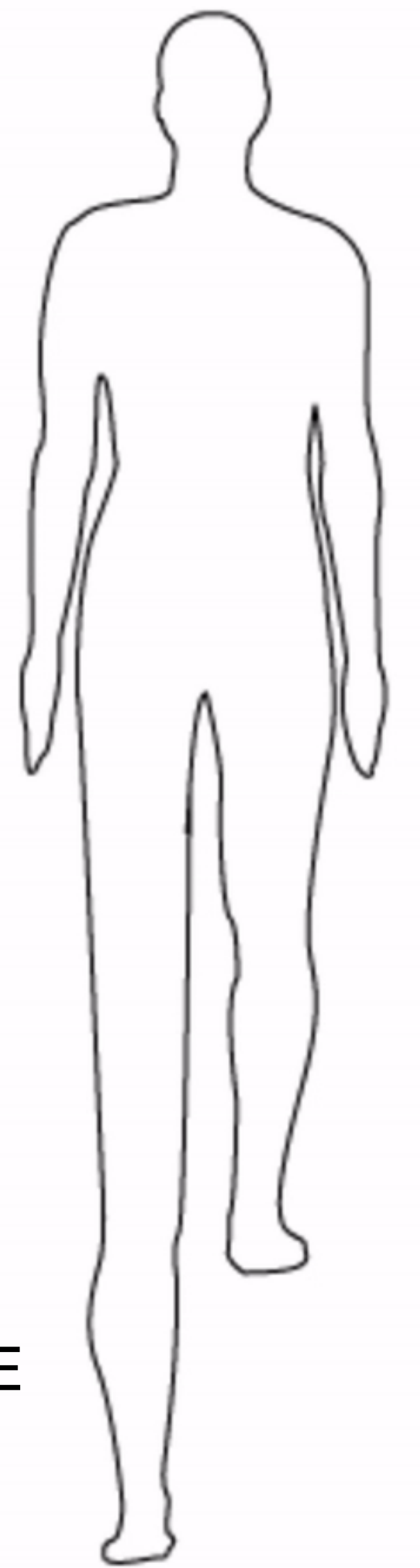
DISCONNECTED



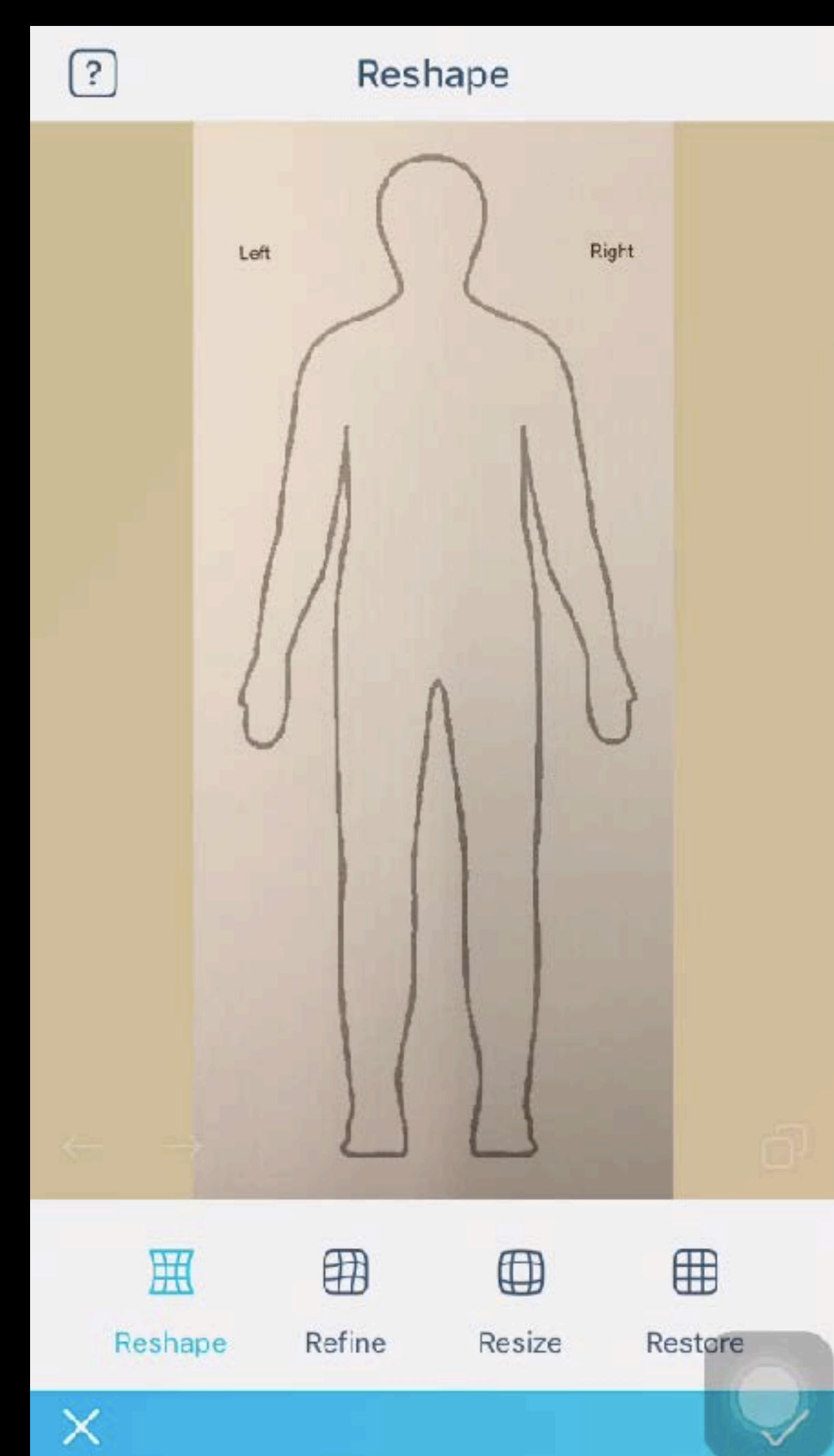
WHOLE



IMAGINATIVE

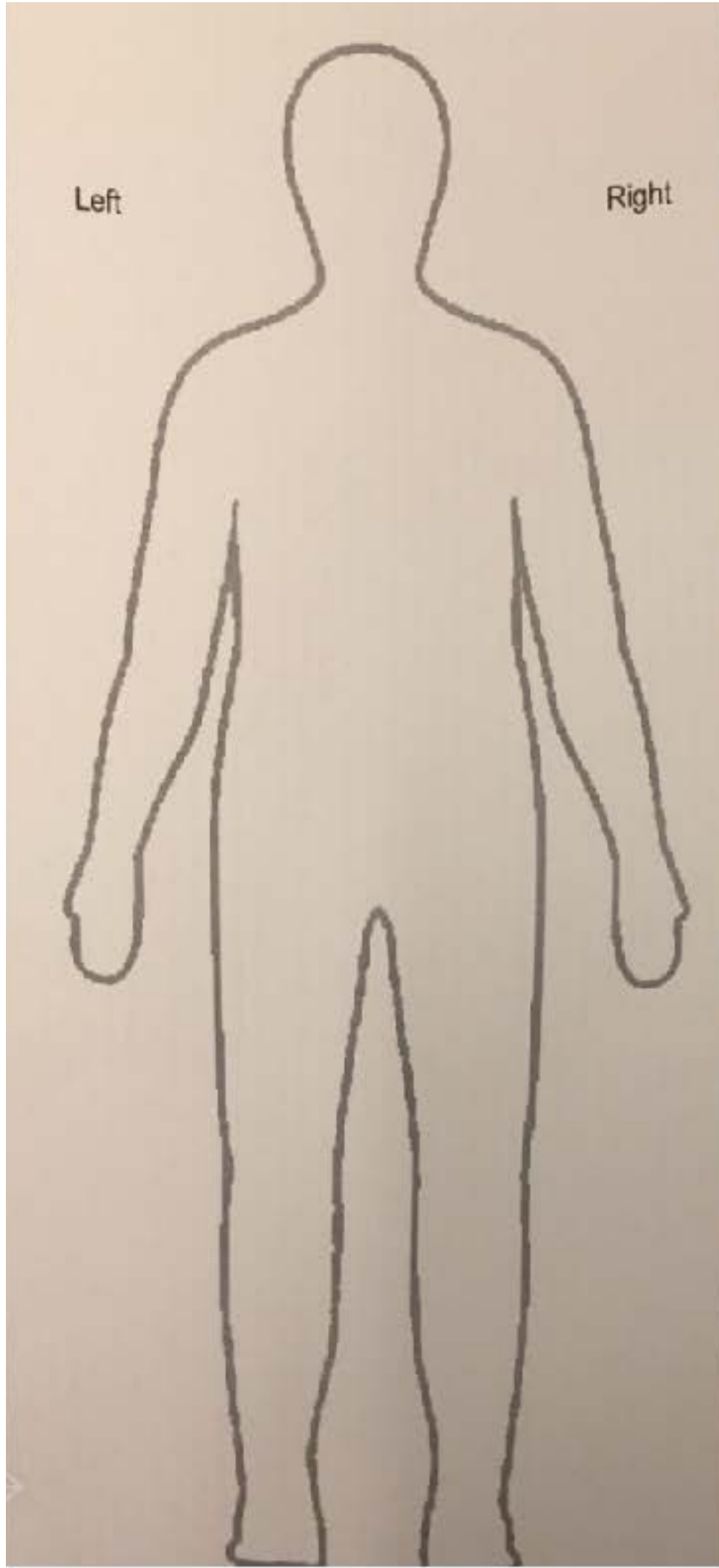
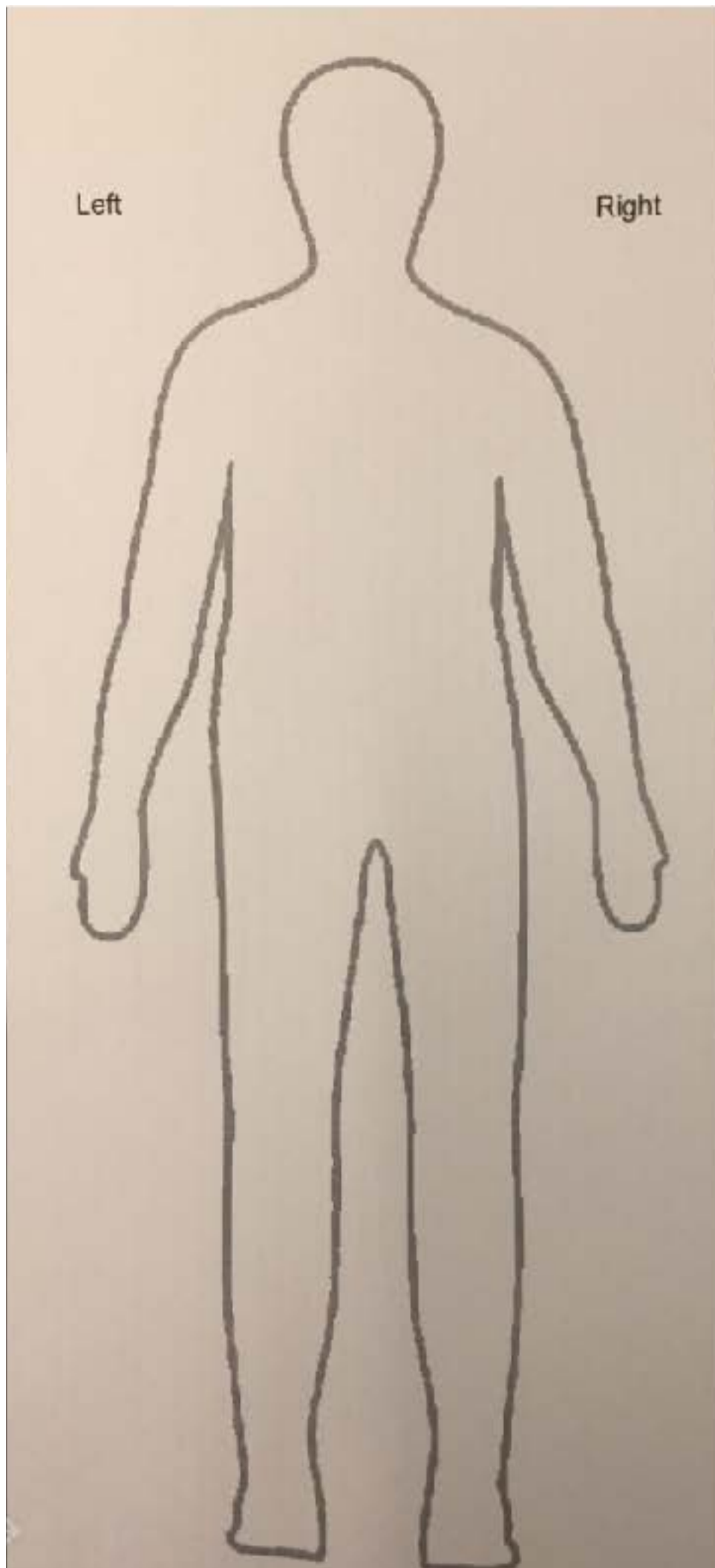




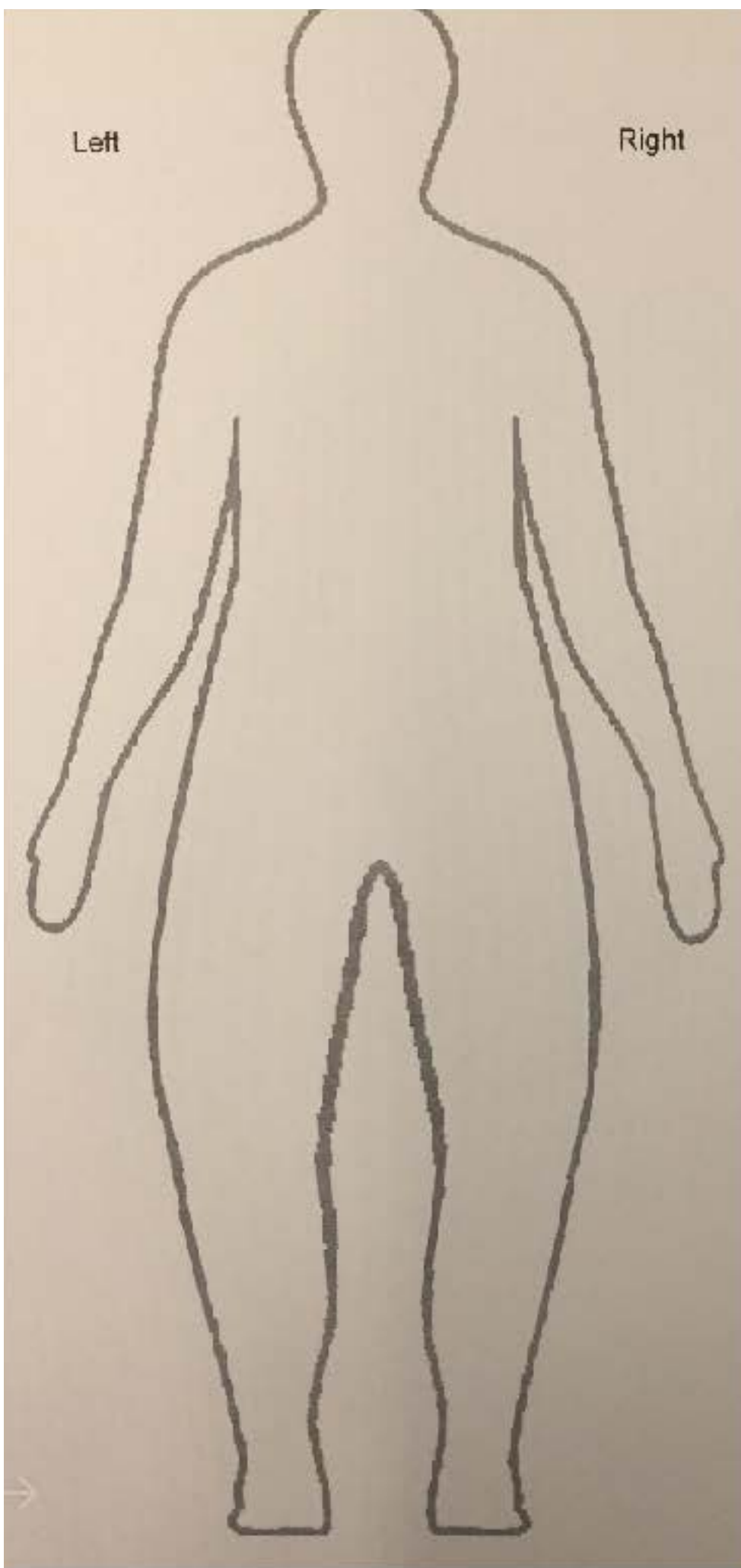
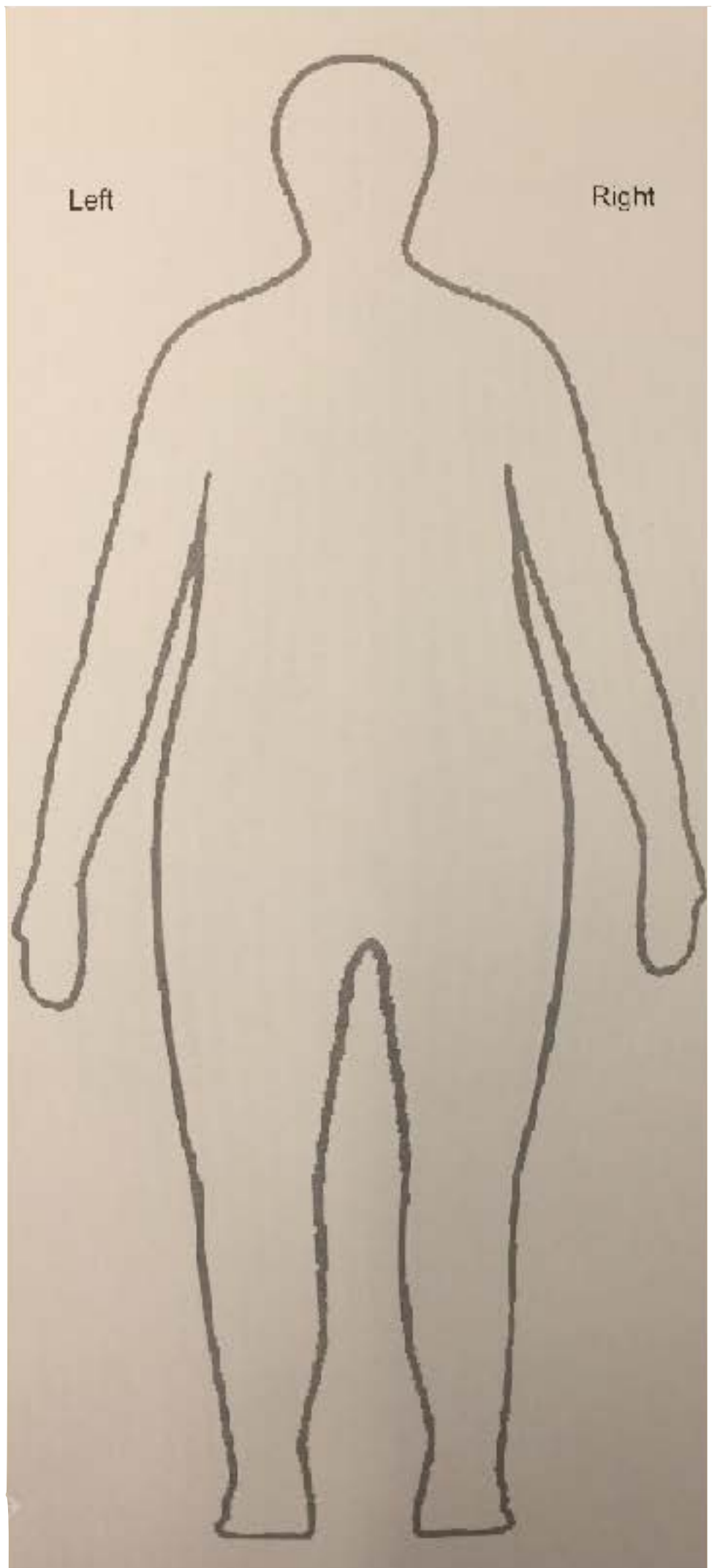


- **More than 50 participants**
- **Just one condition**
- **11 minutes each time in capsule**
- **Unilateral vibrotactile stimulation punctuated with musical and vibrotactile**
- **Carefully worded instructions to minimize biasing of data**
- **Collected different types of data (written self-reports, video of movement, typing patterns, interviews, visual representation of bodily perception)**

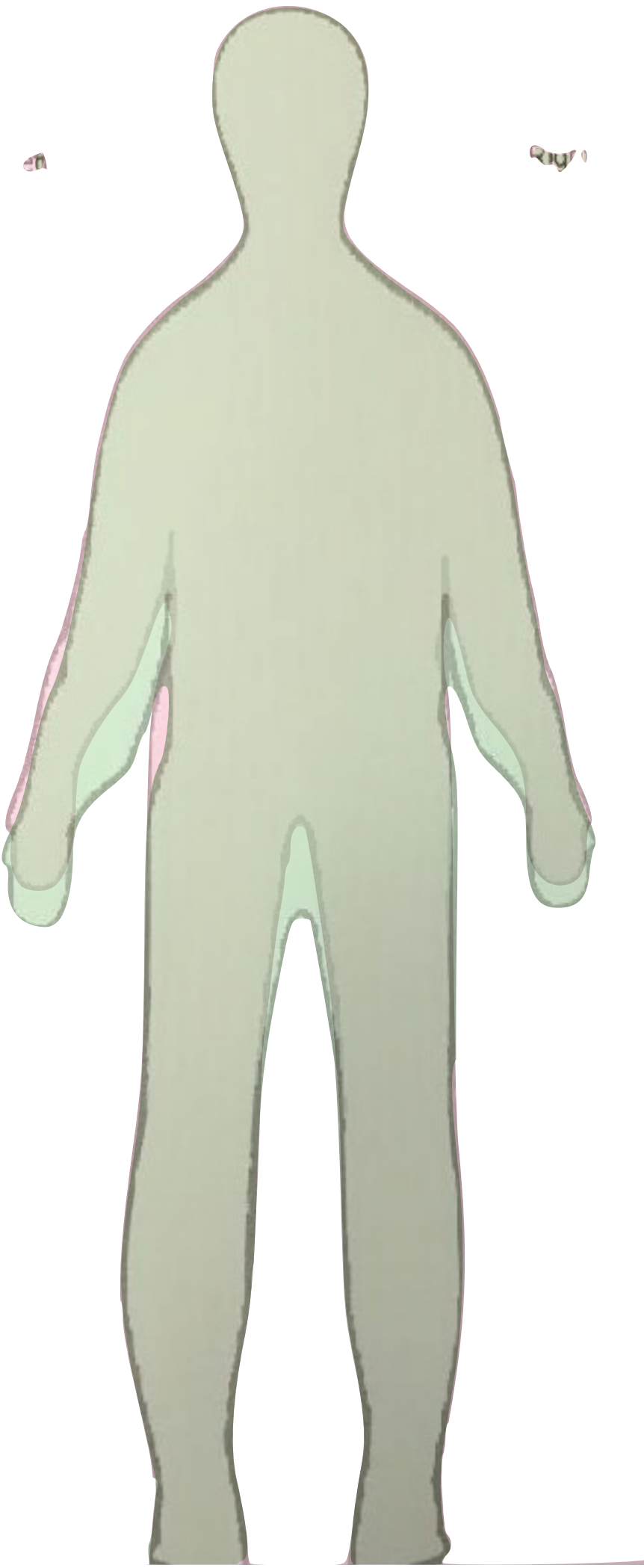
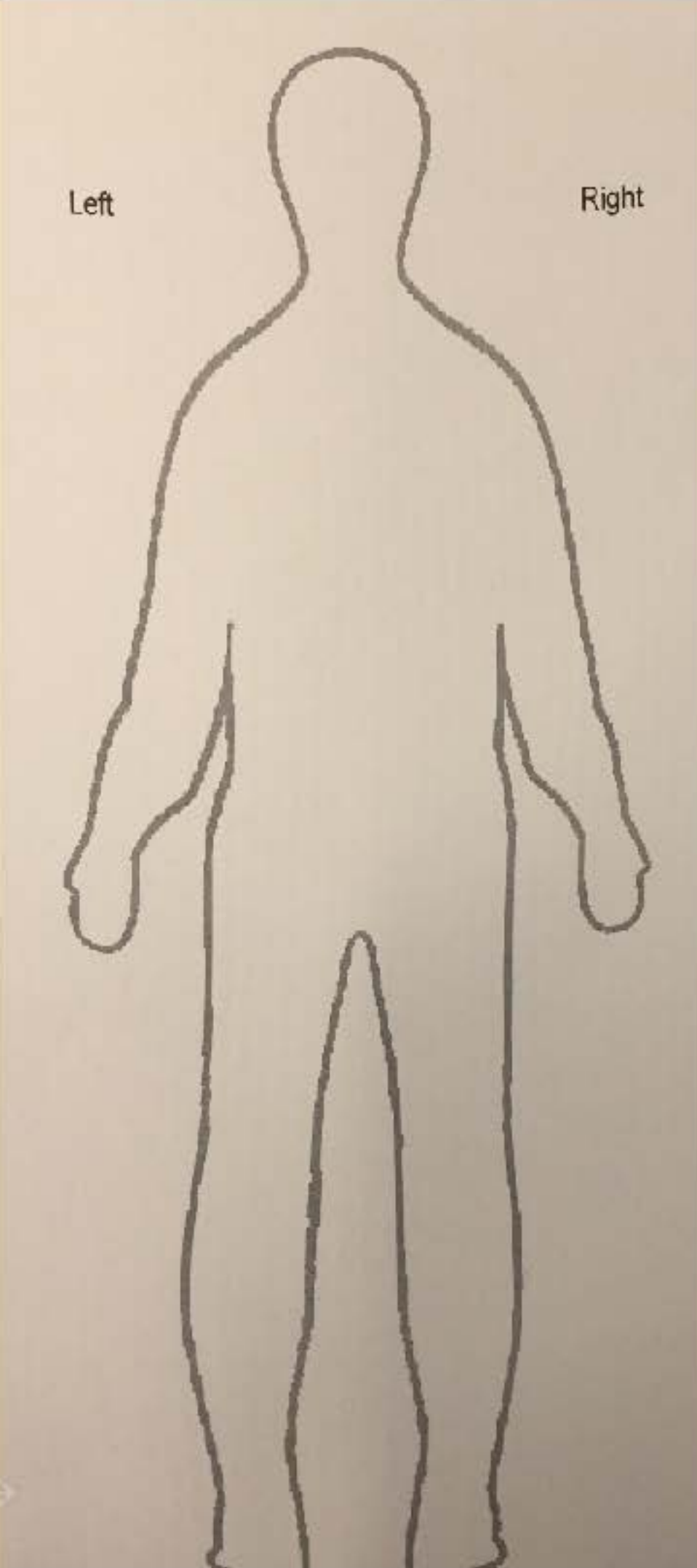
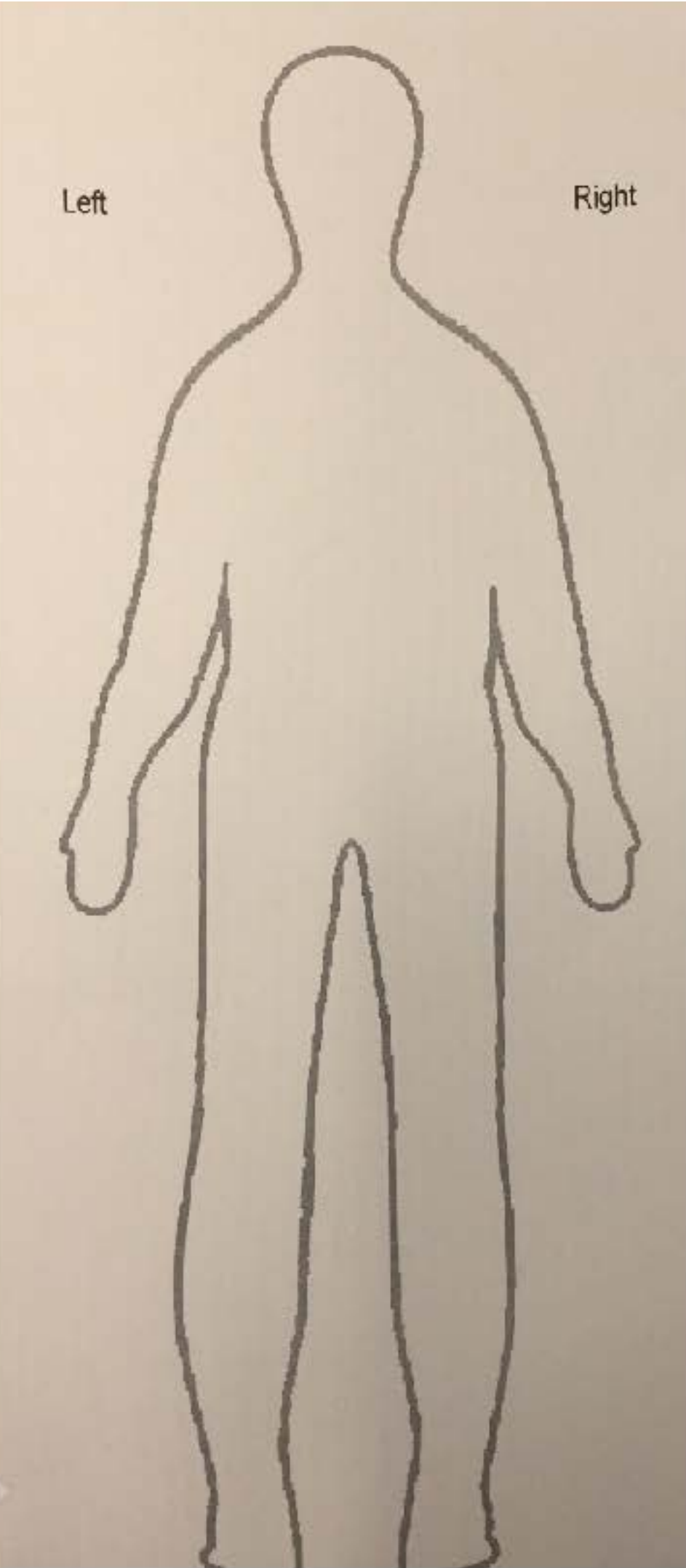
**MILD TO MINOR DIFFERENCE**



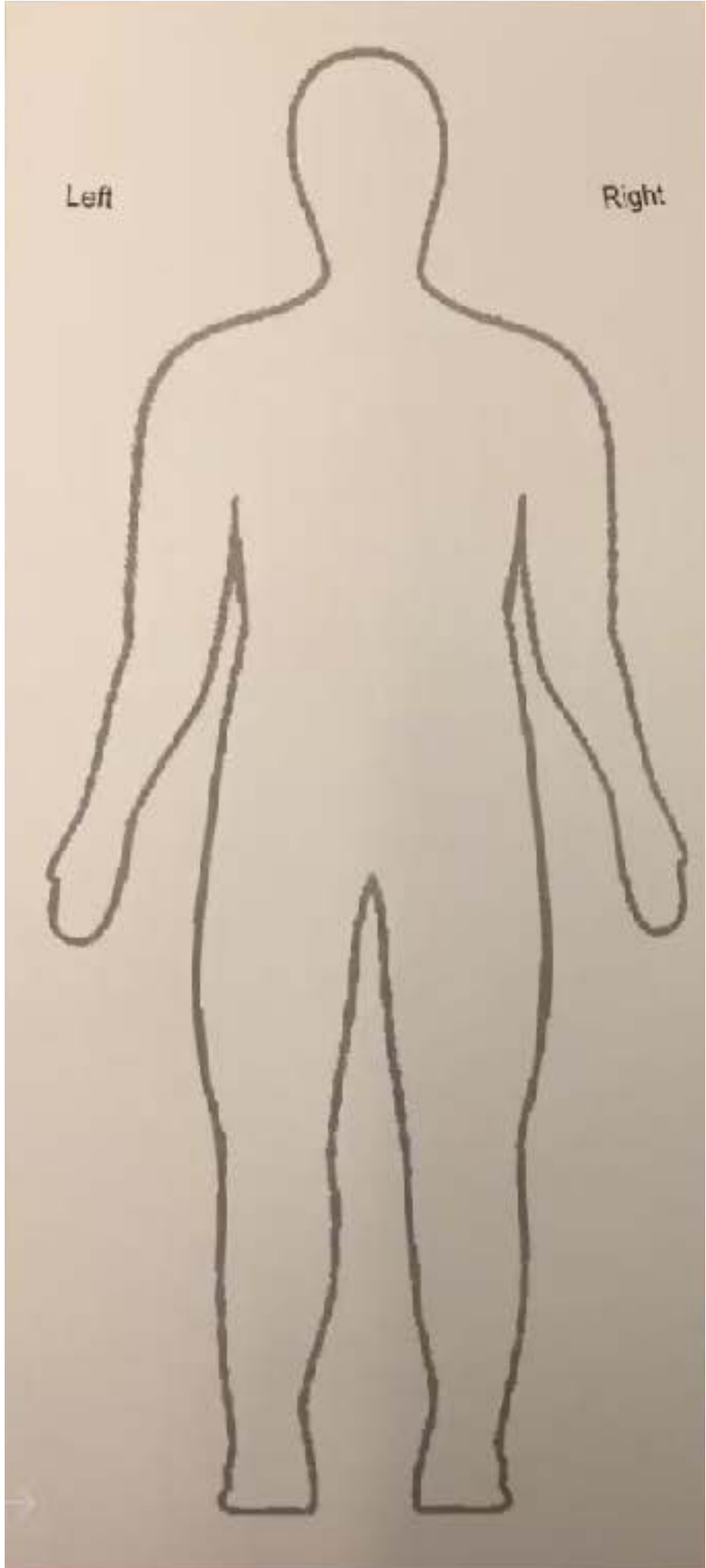
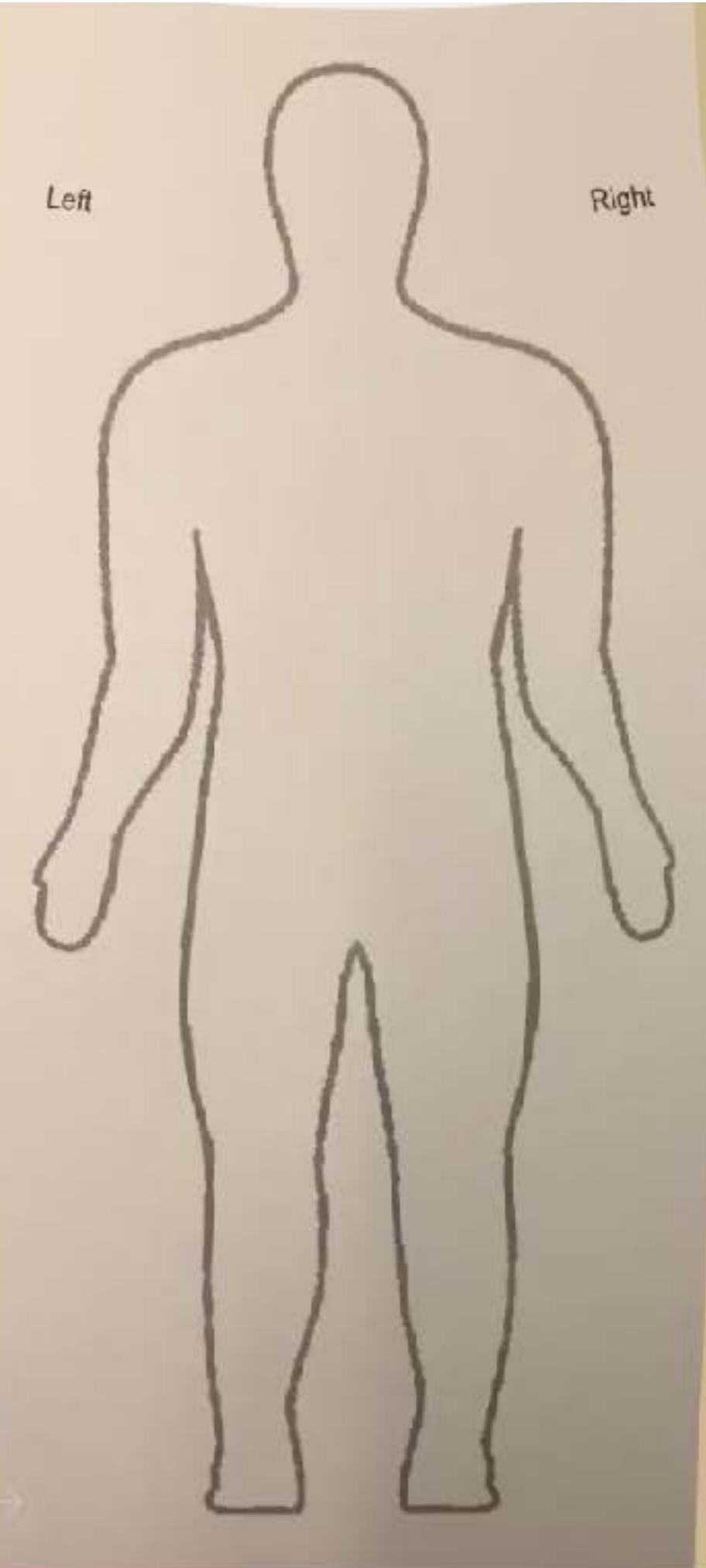
**MILD TO MINOR DIFFERENCE**



**MILD TO MINOR DIFFERENCE**

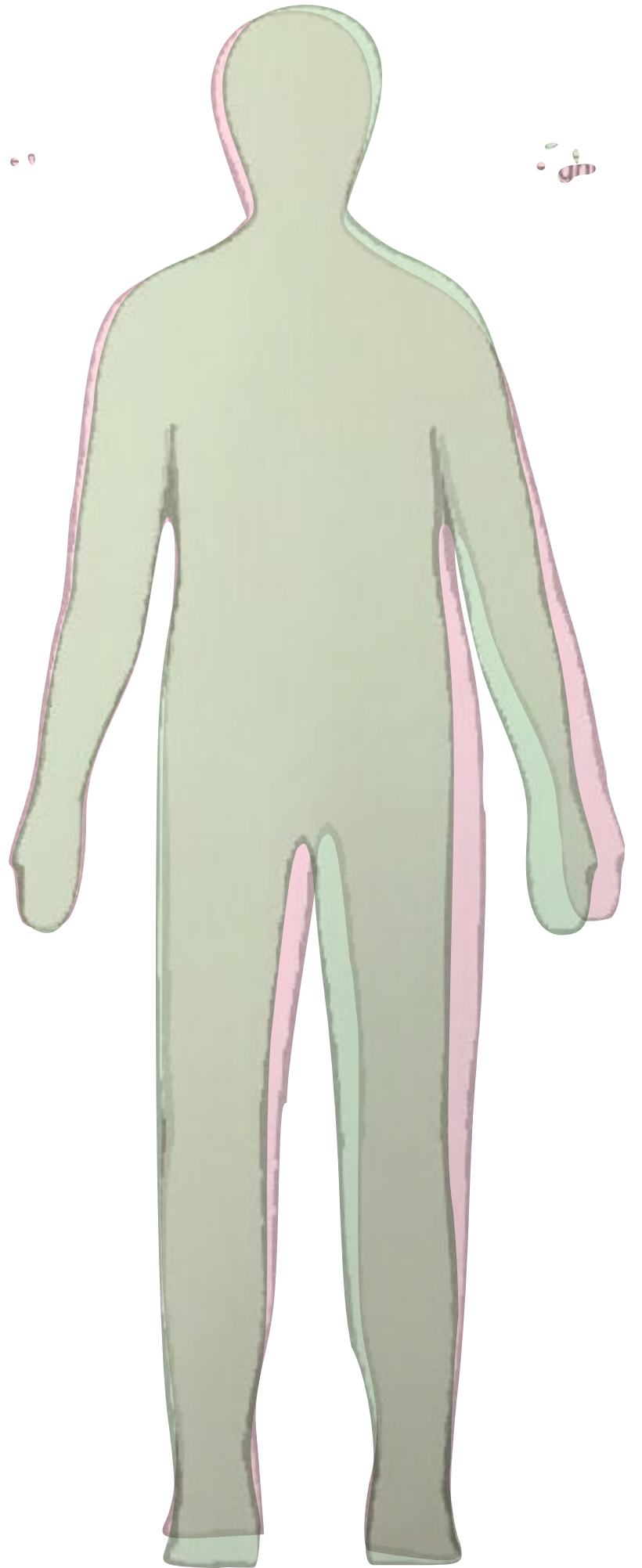
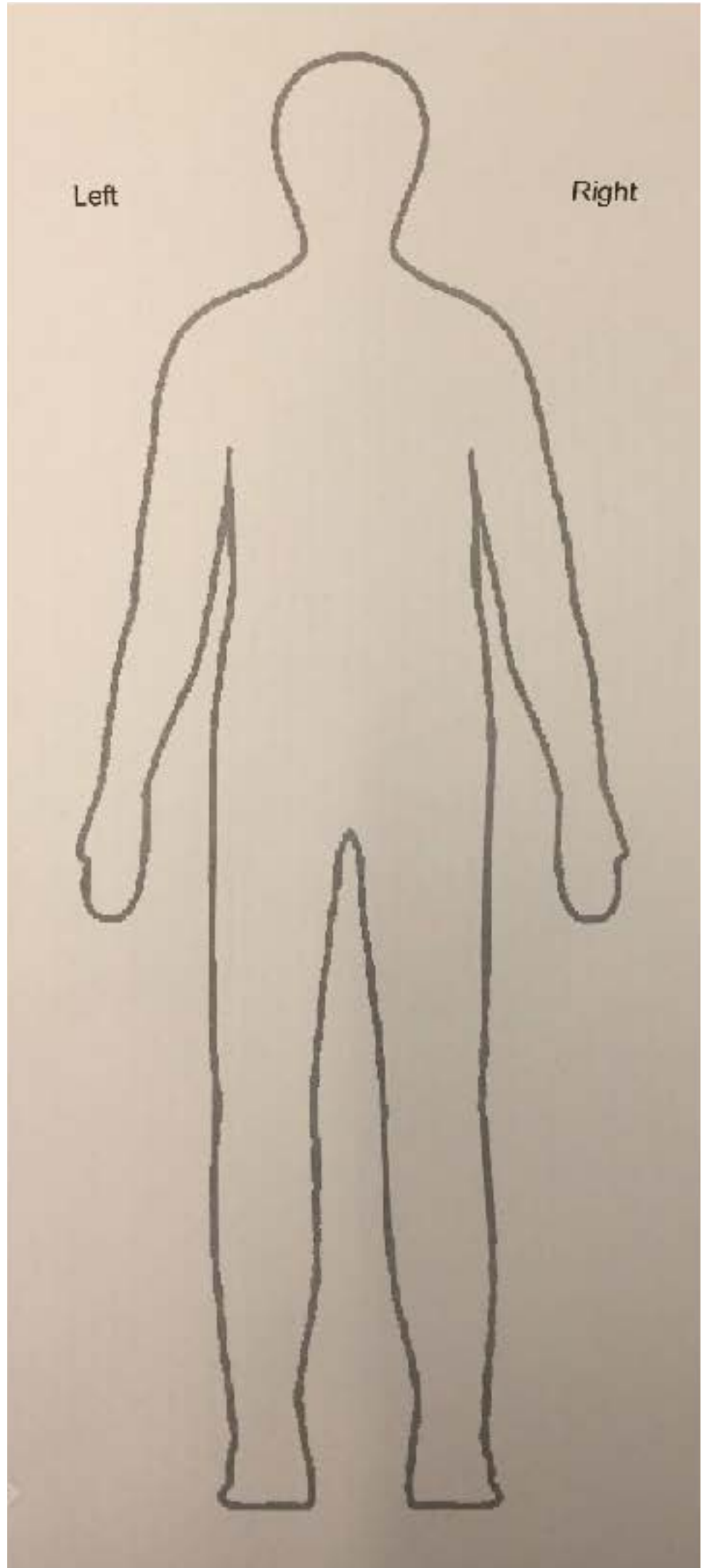
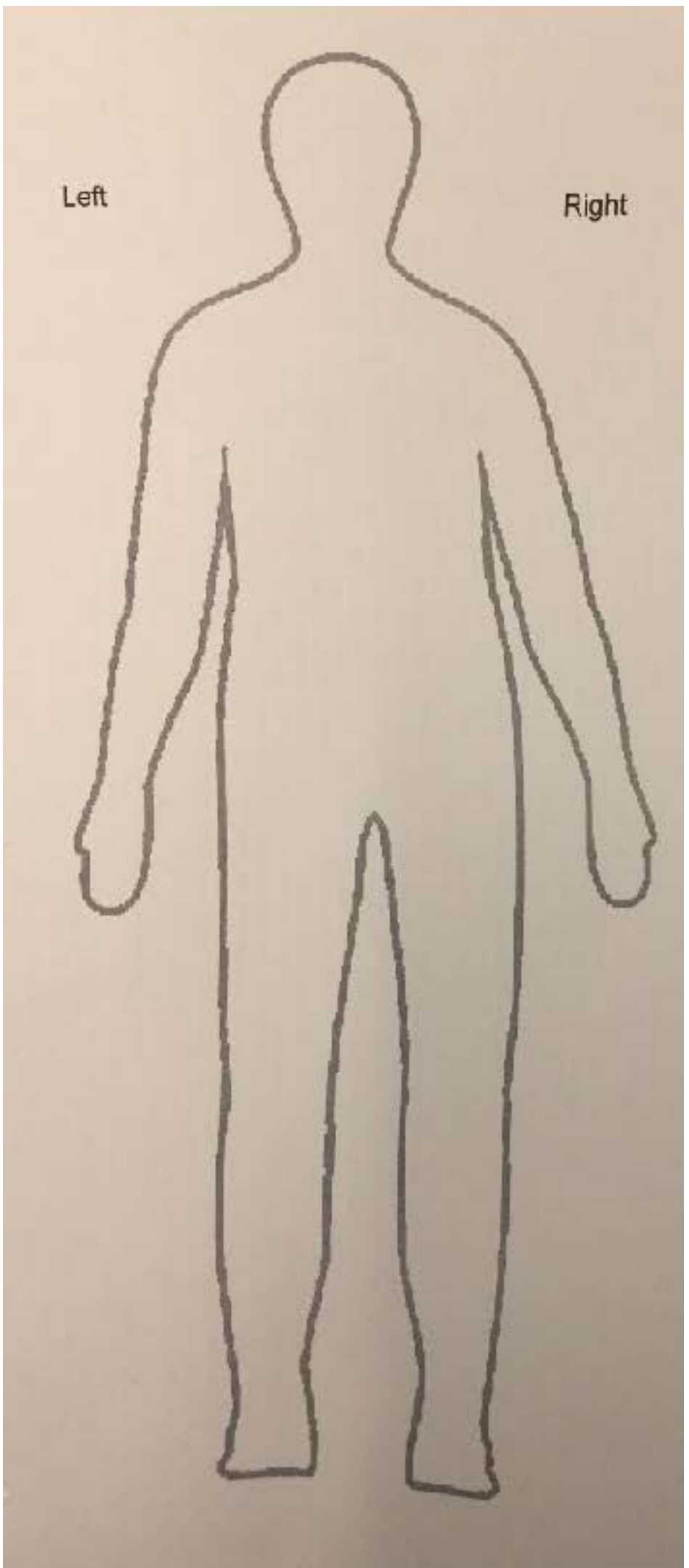


**MILD TO MINOR DIFFERENCE**

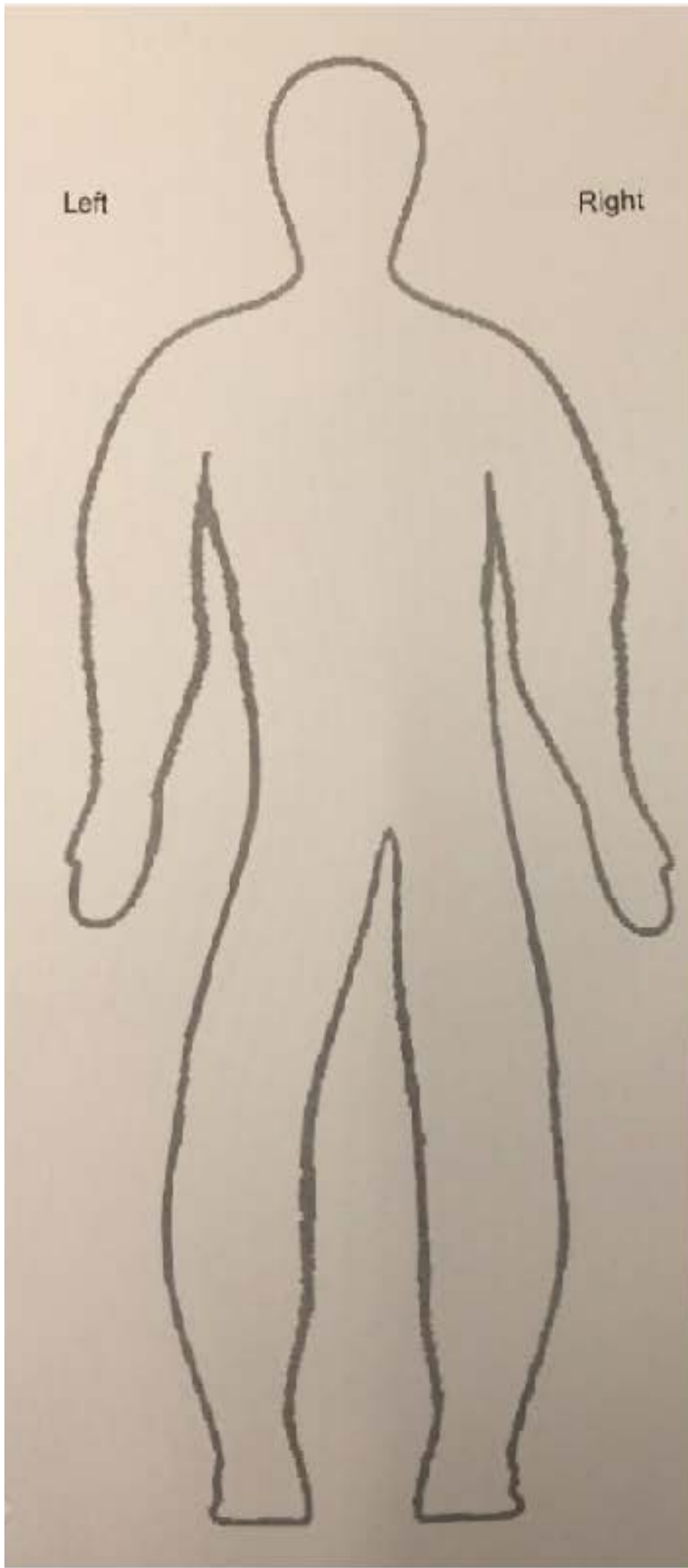
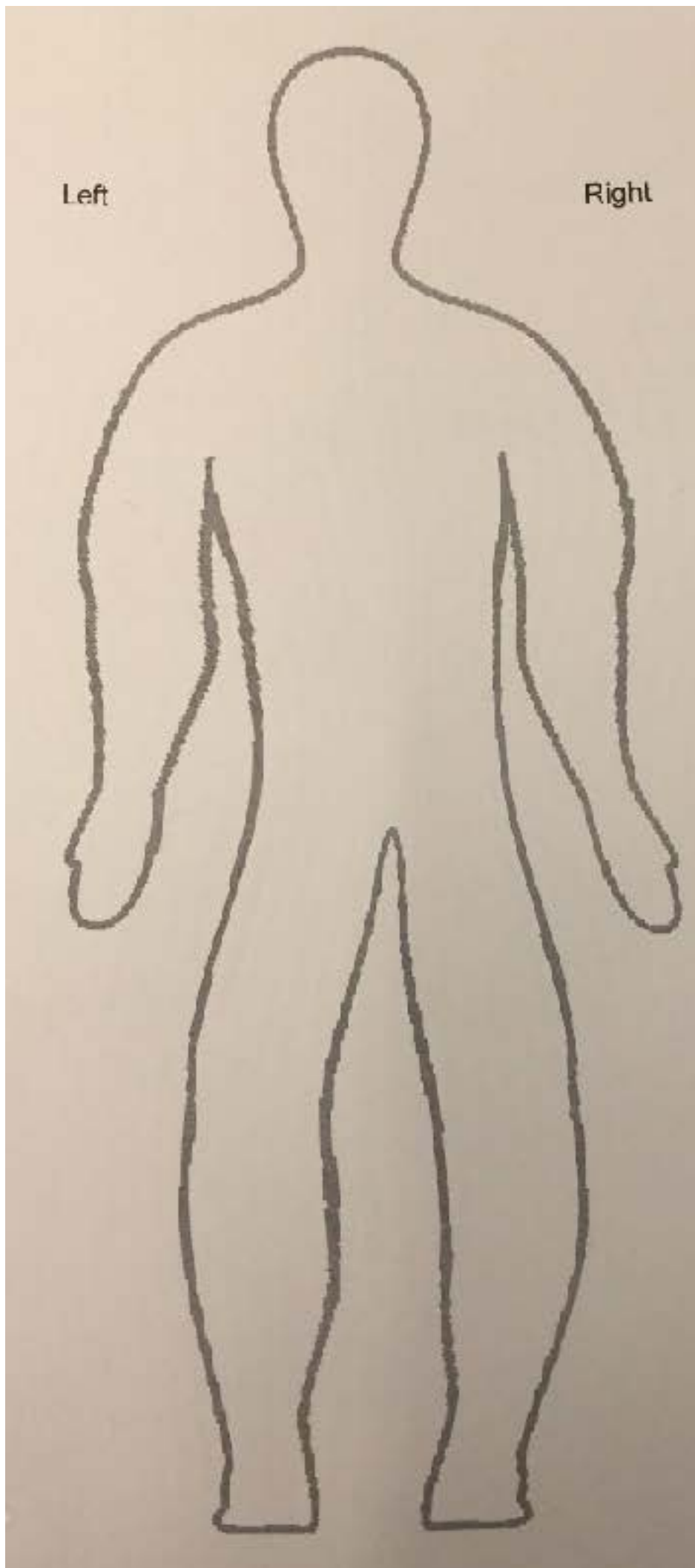




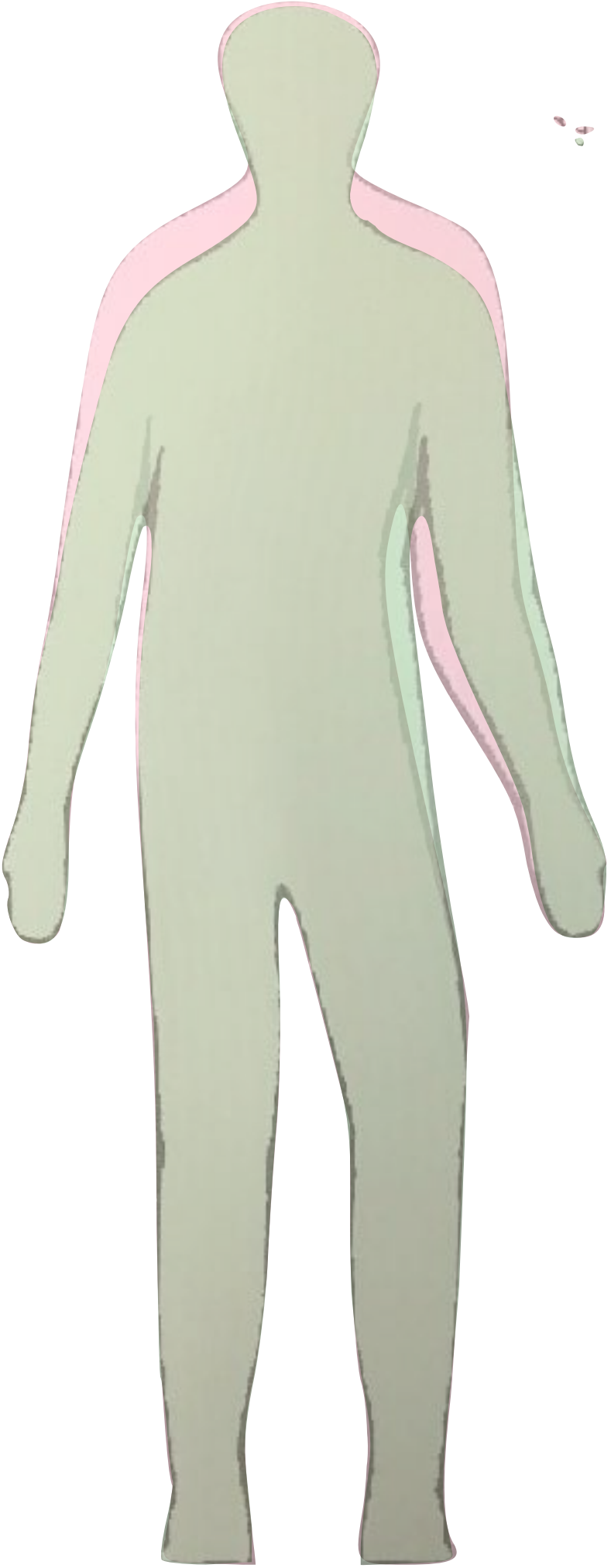
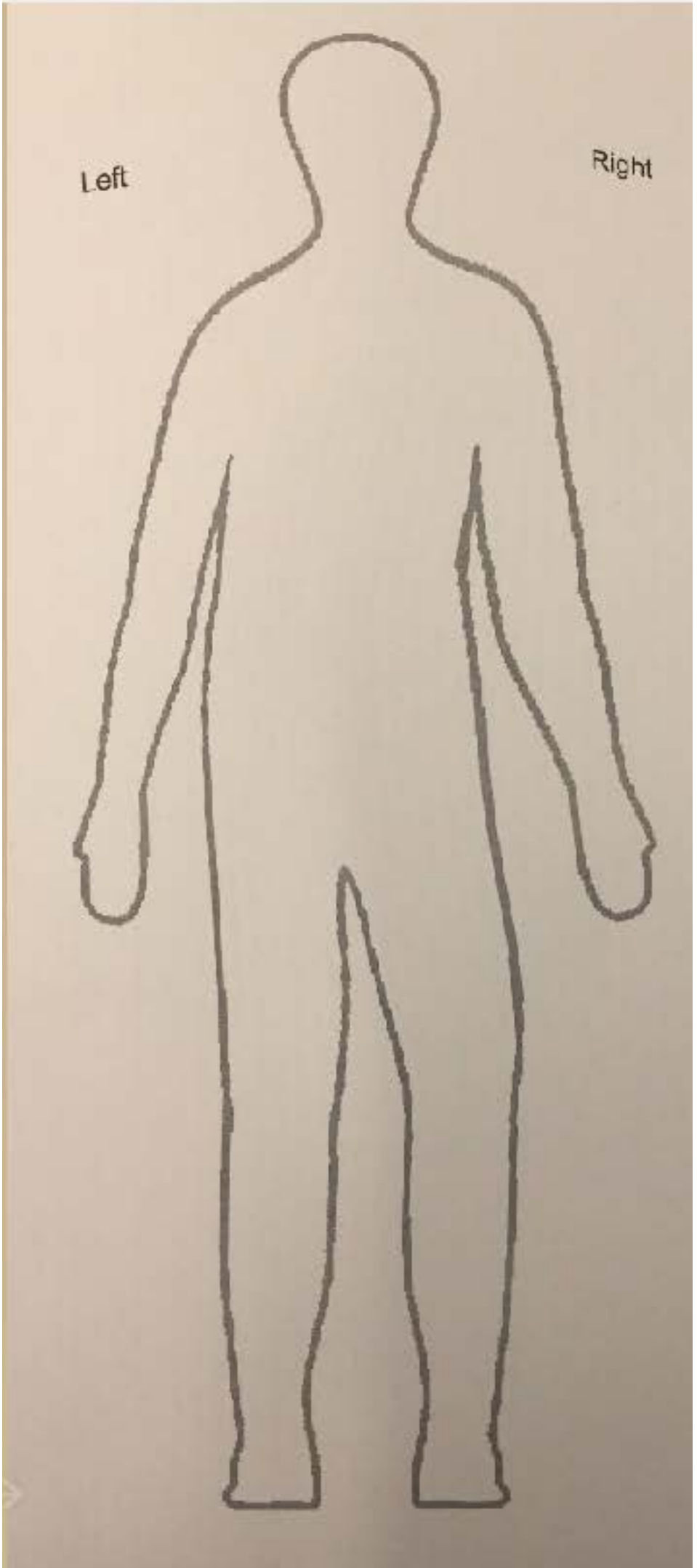
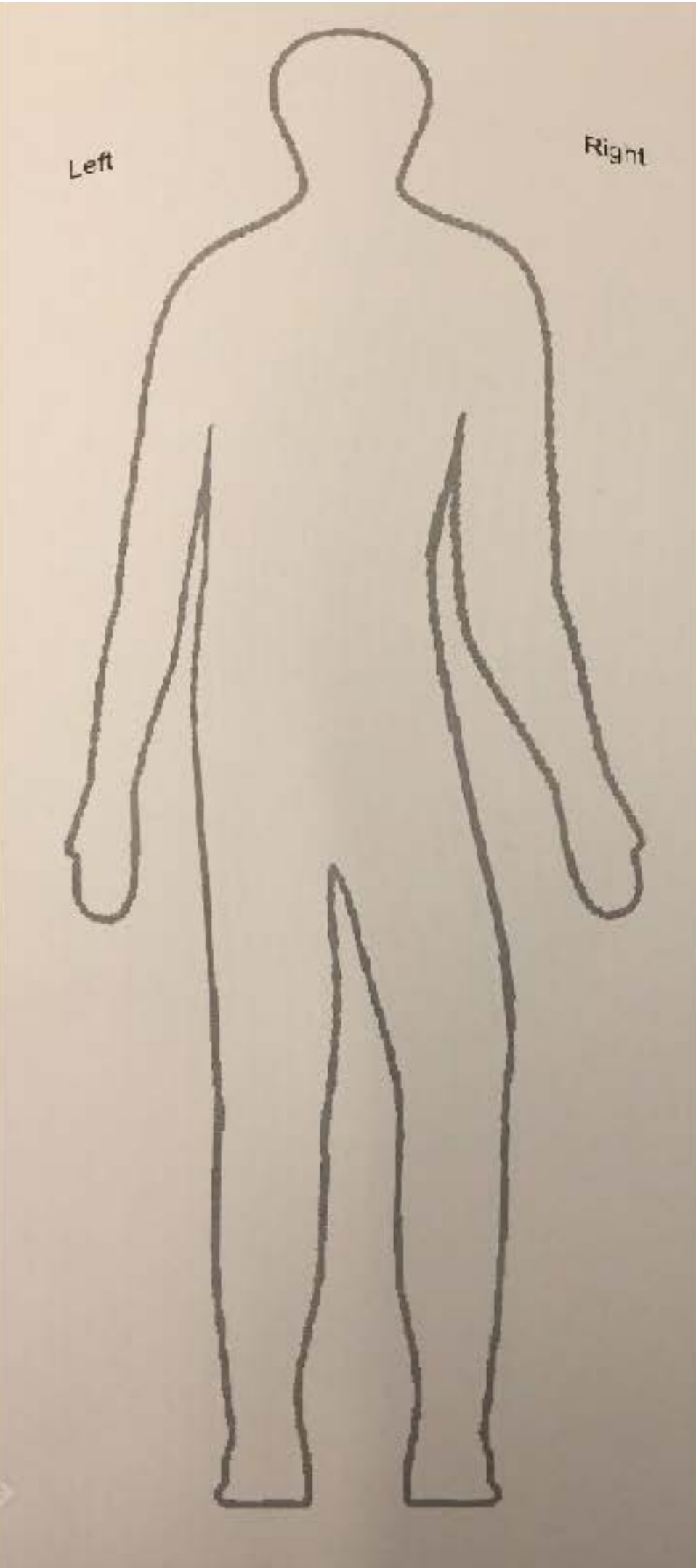
**MILD TO MINOR DIFFERENCE**



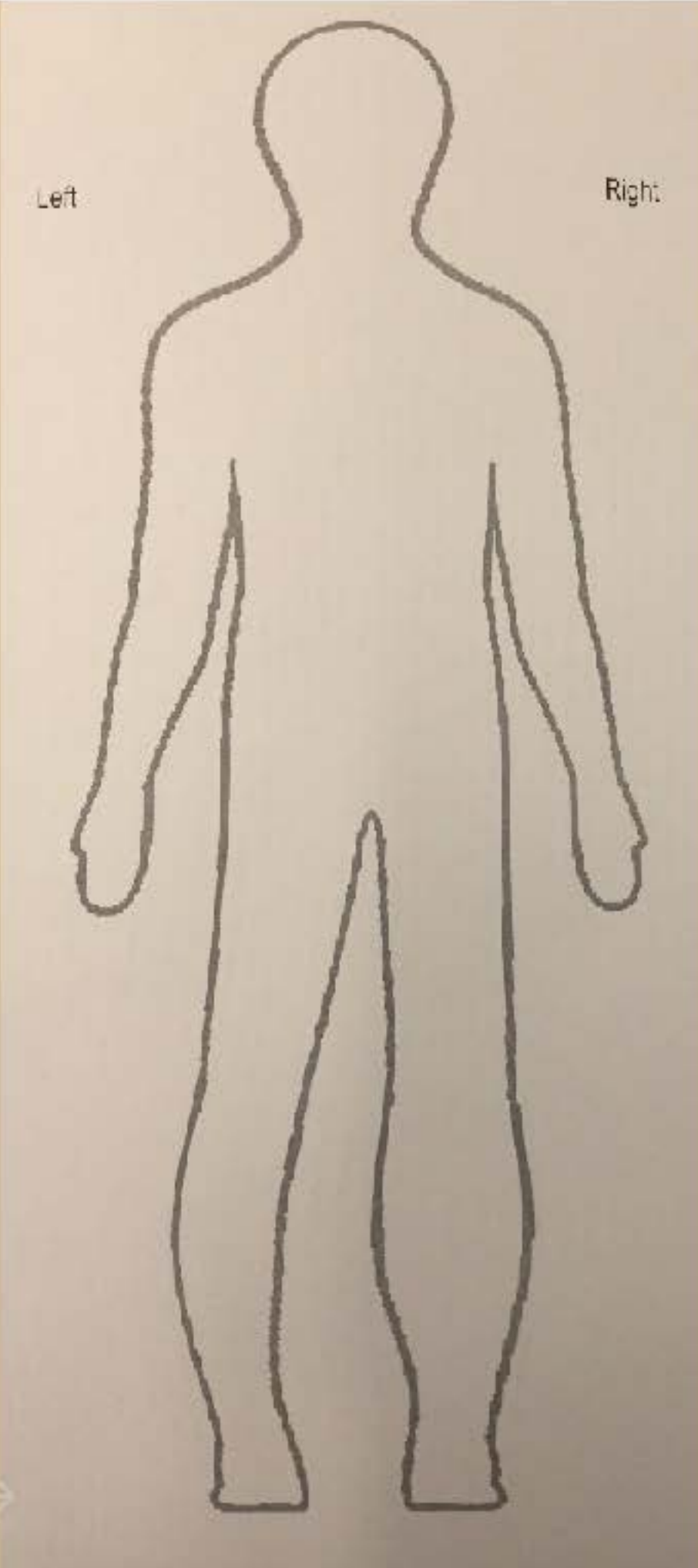
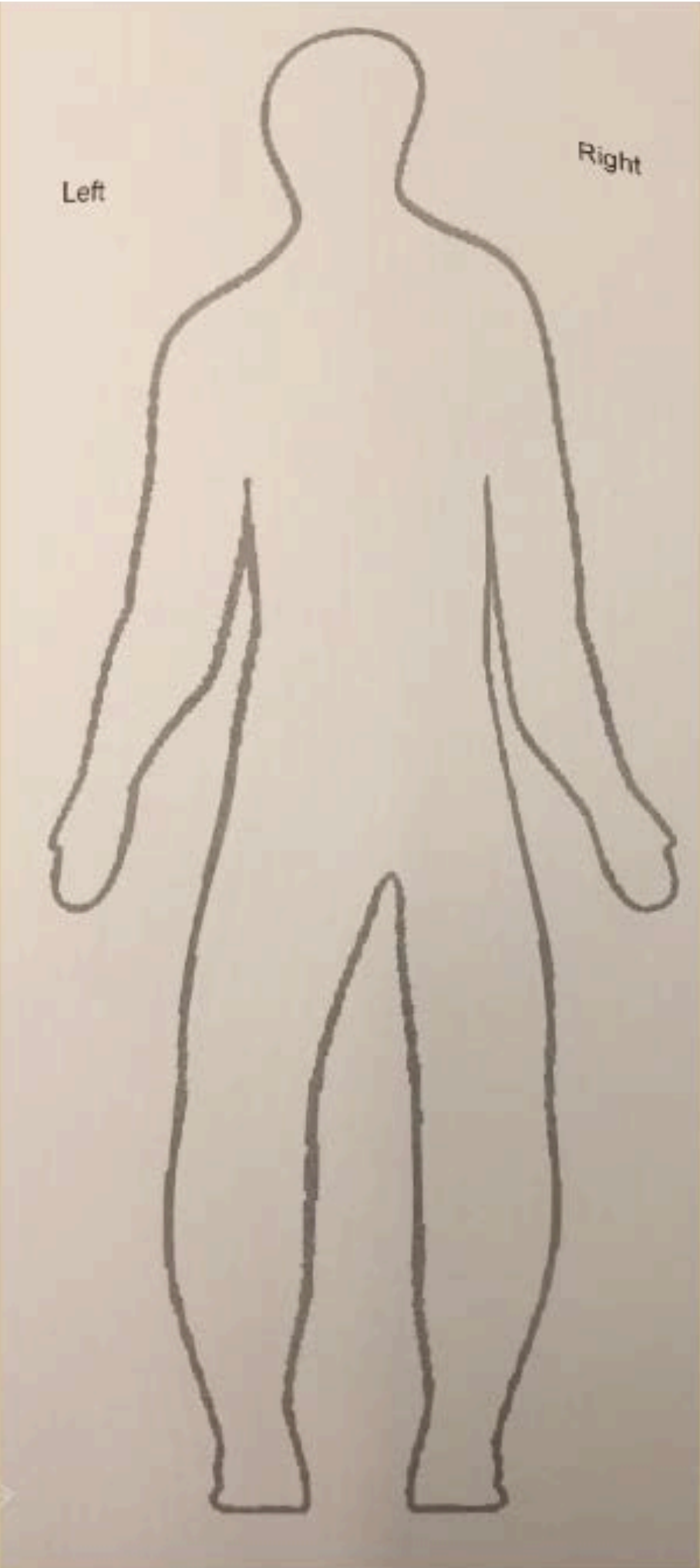
**MILD TO MINOR DIFFERENCE**



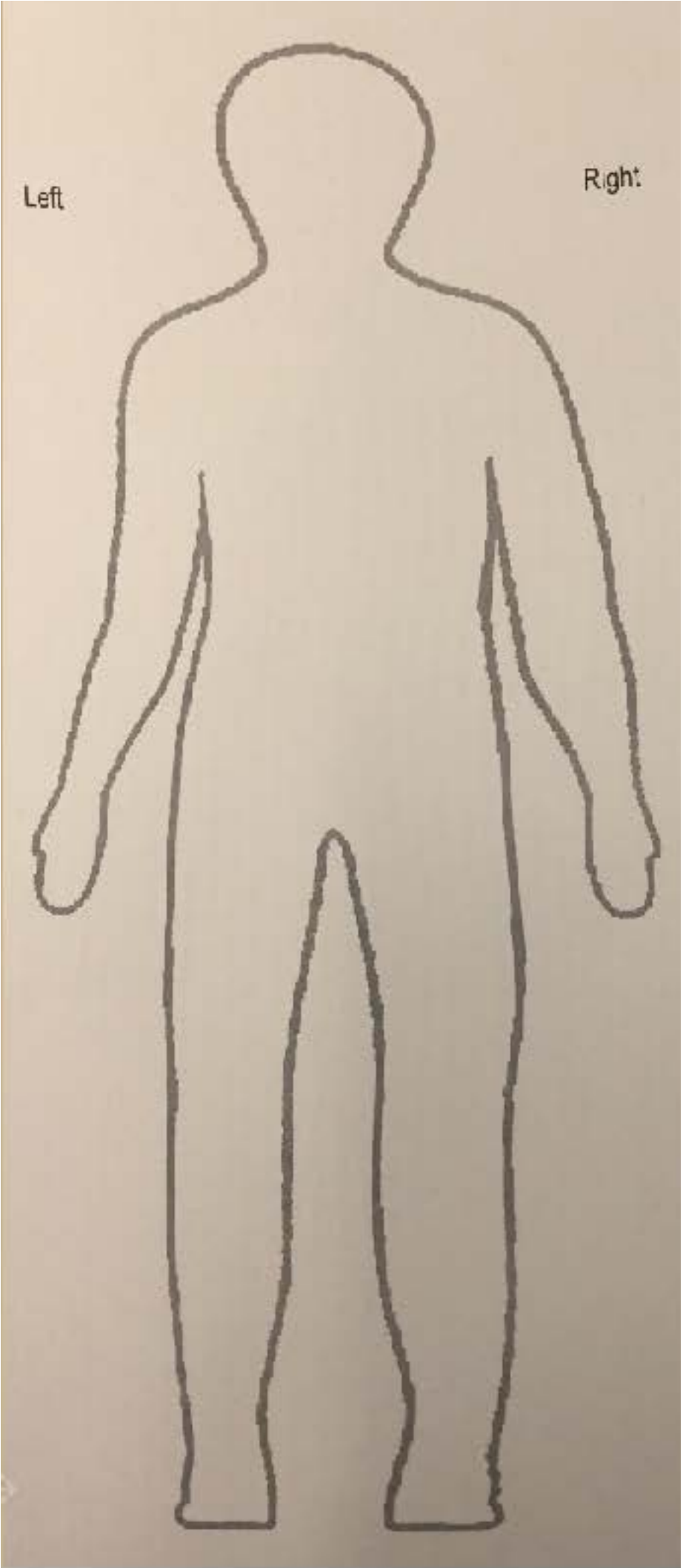
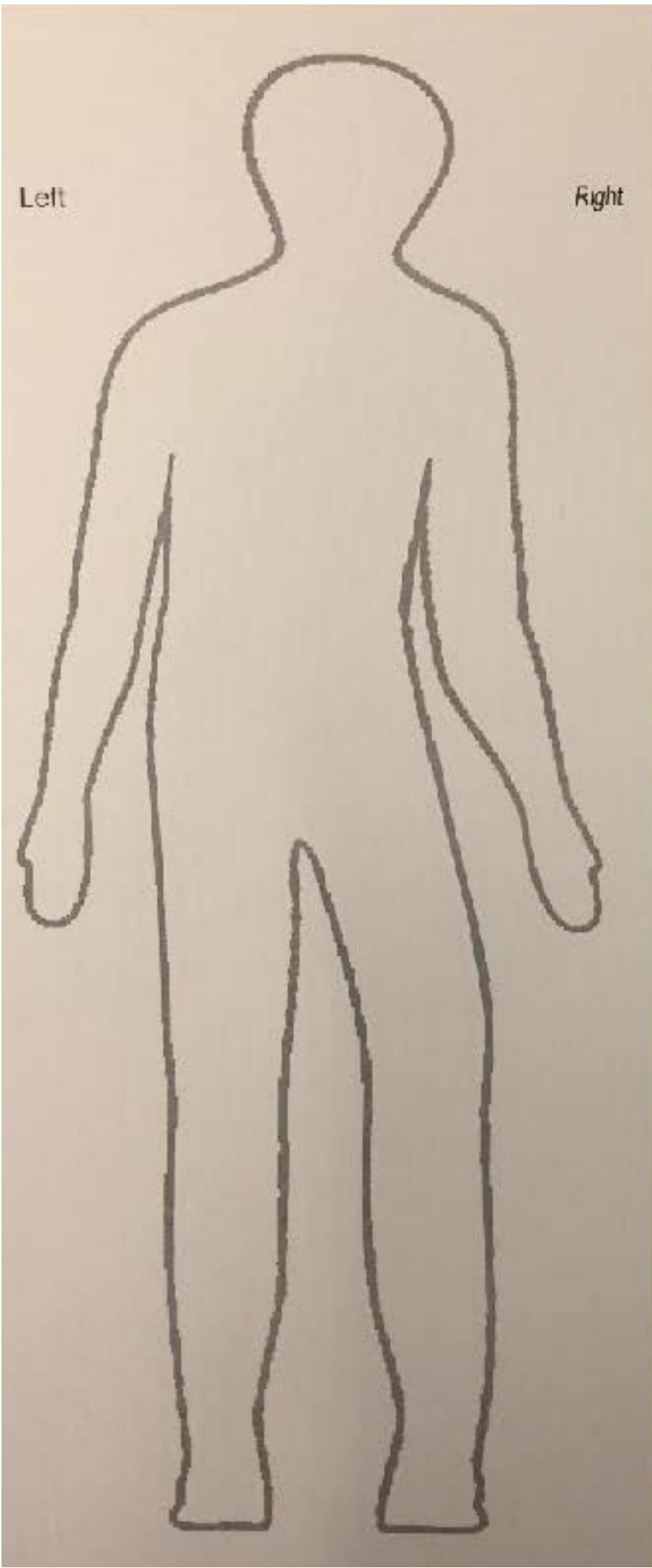
**MILD TO MINOR DIFFERENCE**



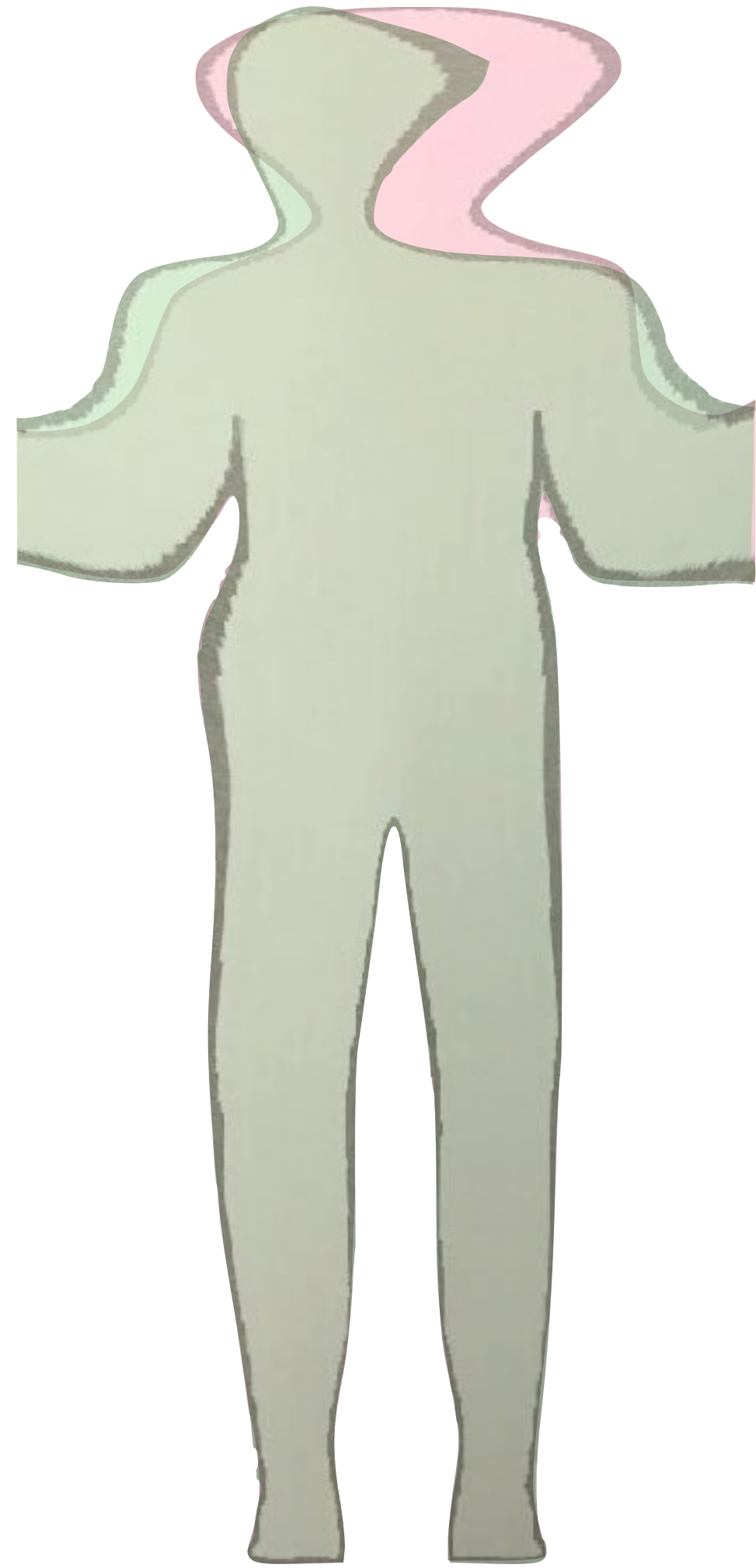
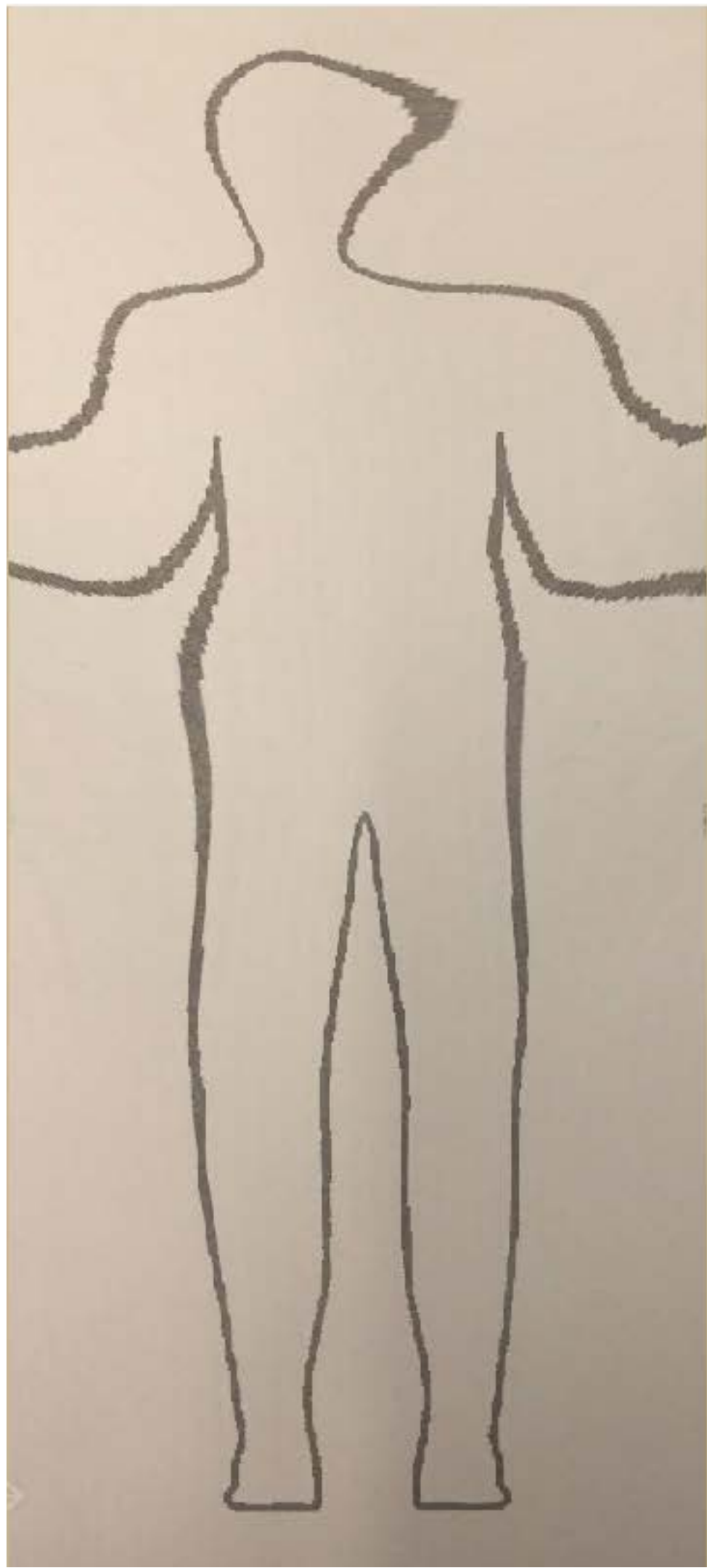
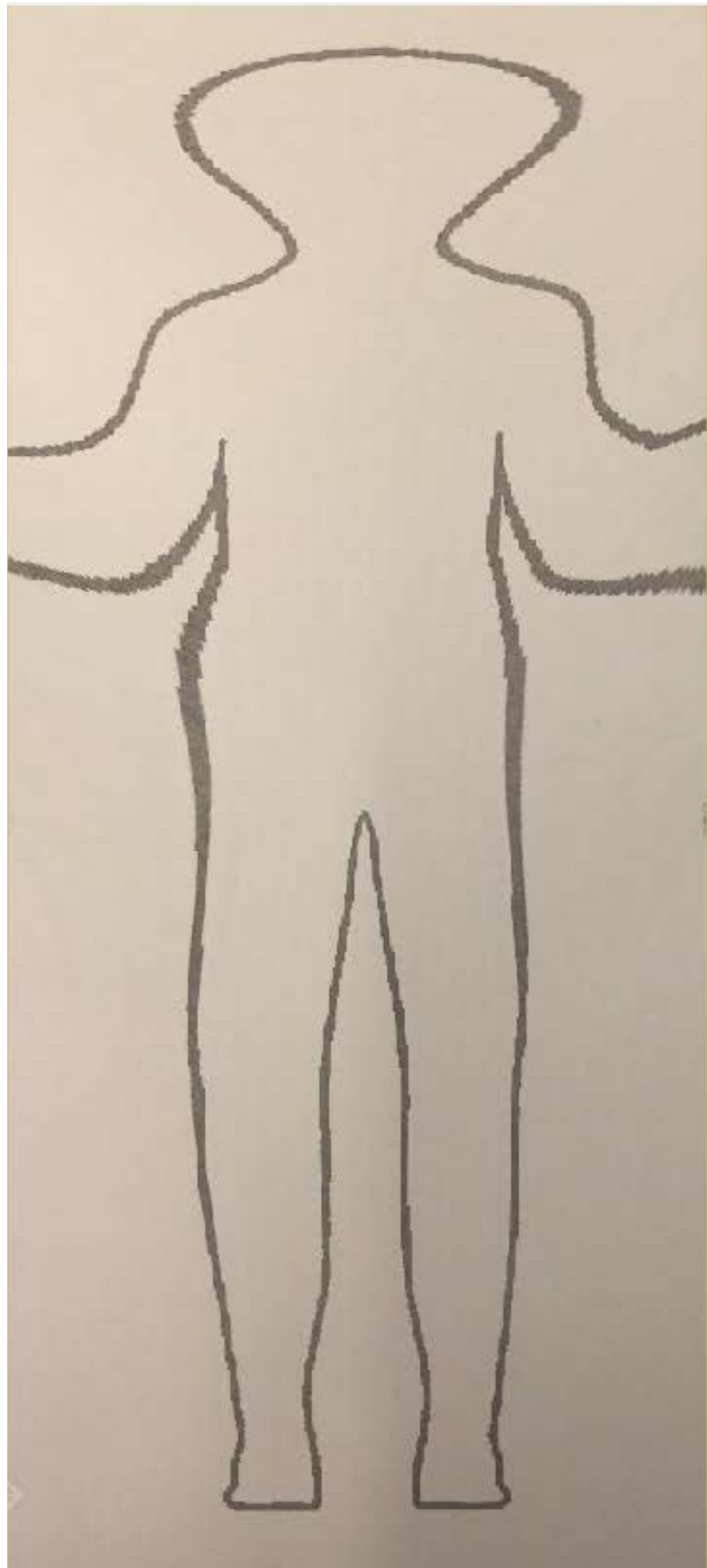
**NOTICEABLE DIFFERENCE IN PERCEPTION OF SYMMETRY**



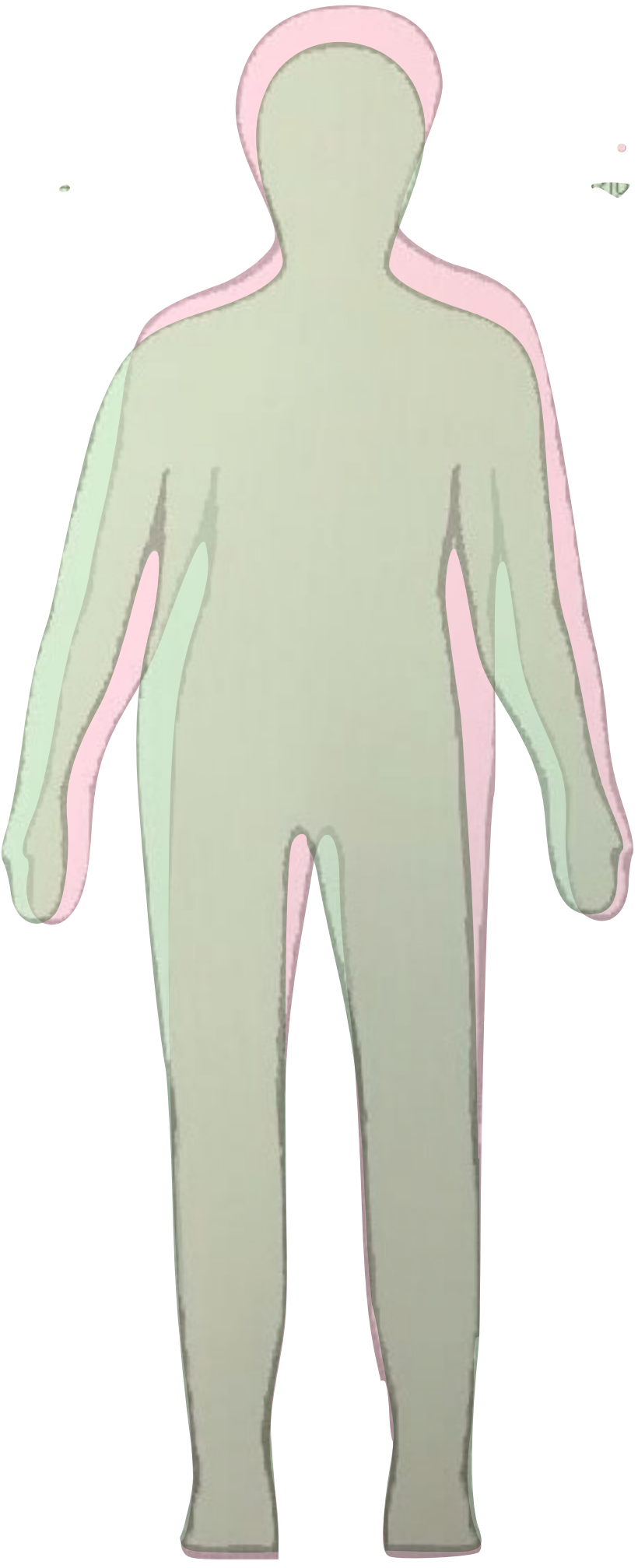
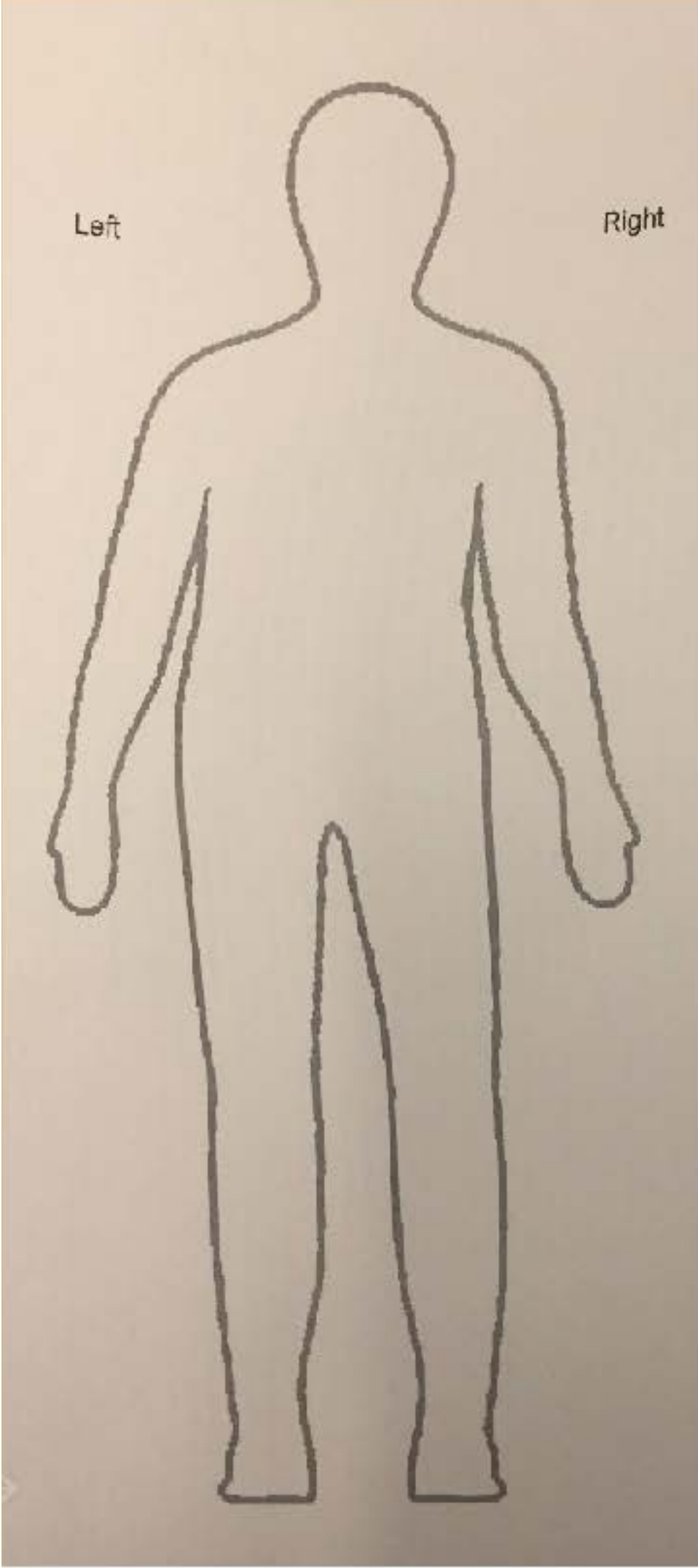
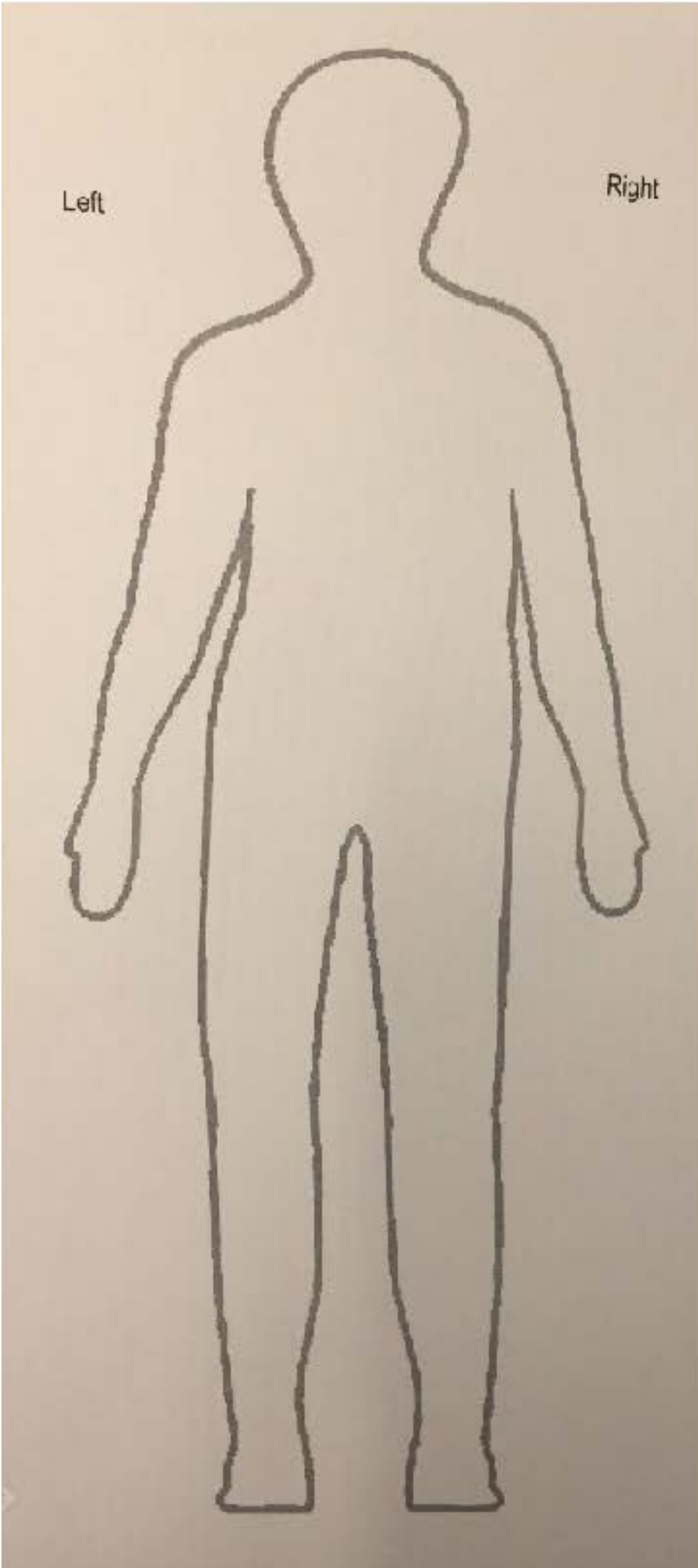
**NOTICEABLE DIFFERENCE IN PERCEPTION OF SYMMETRY**



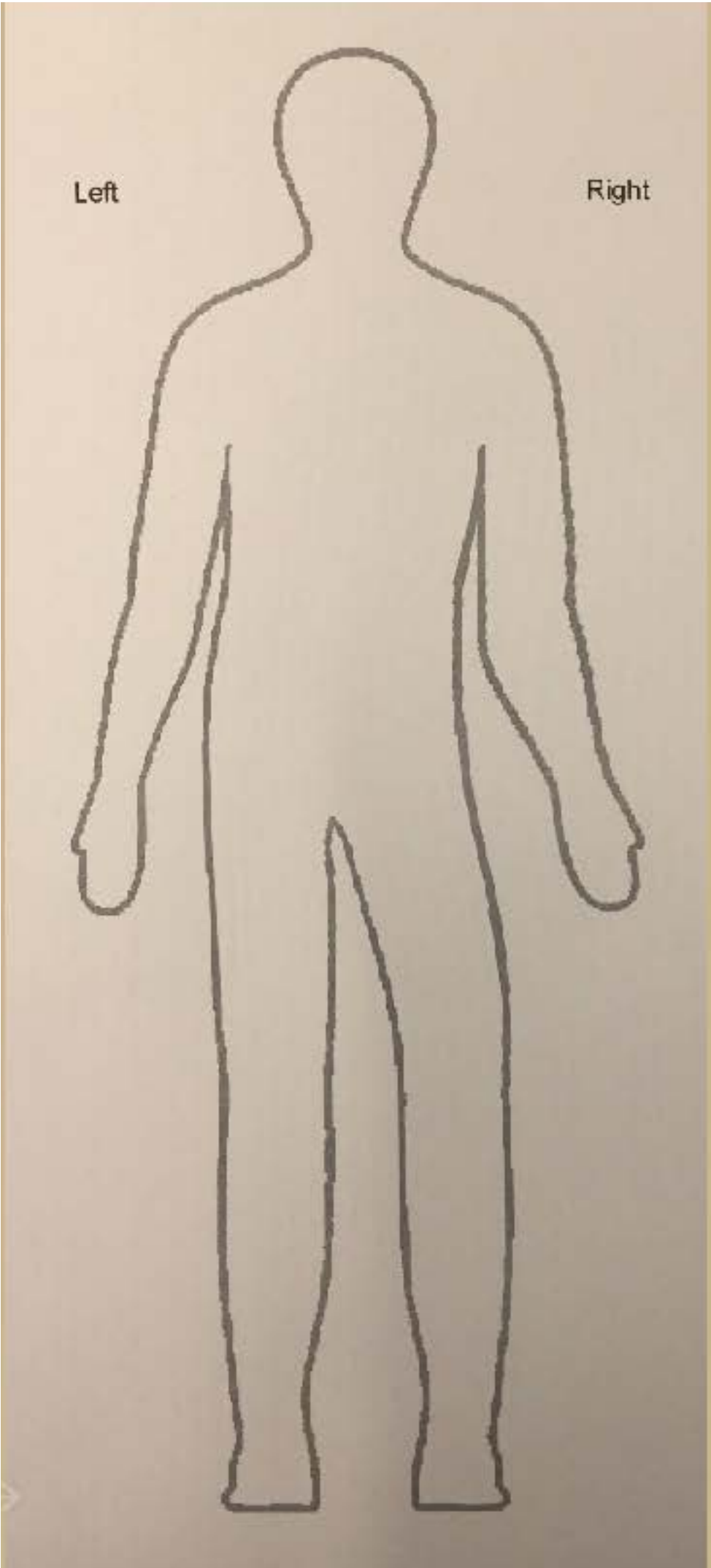
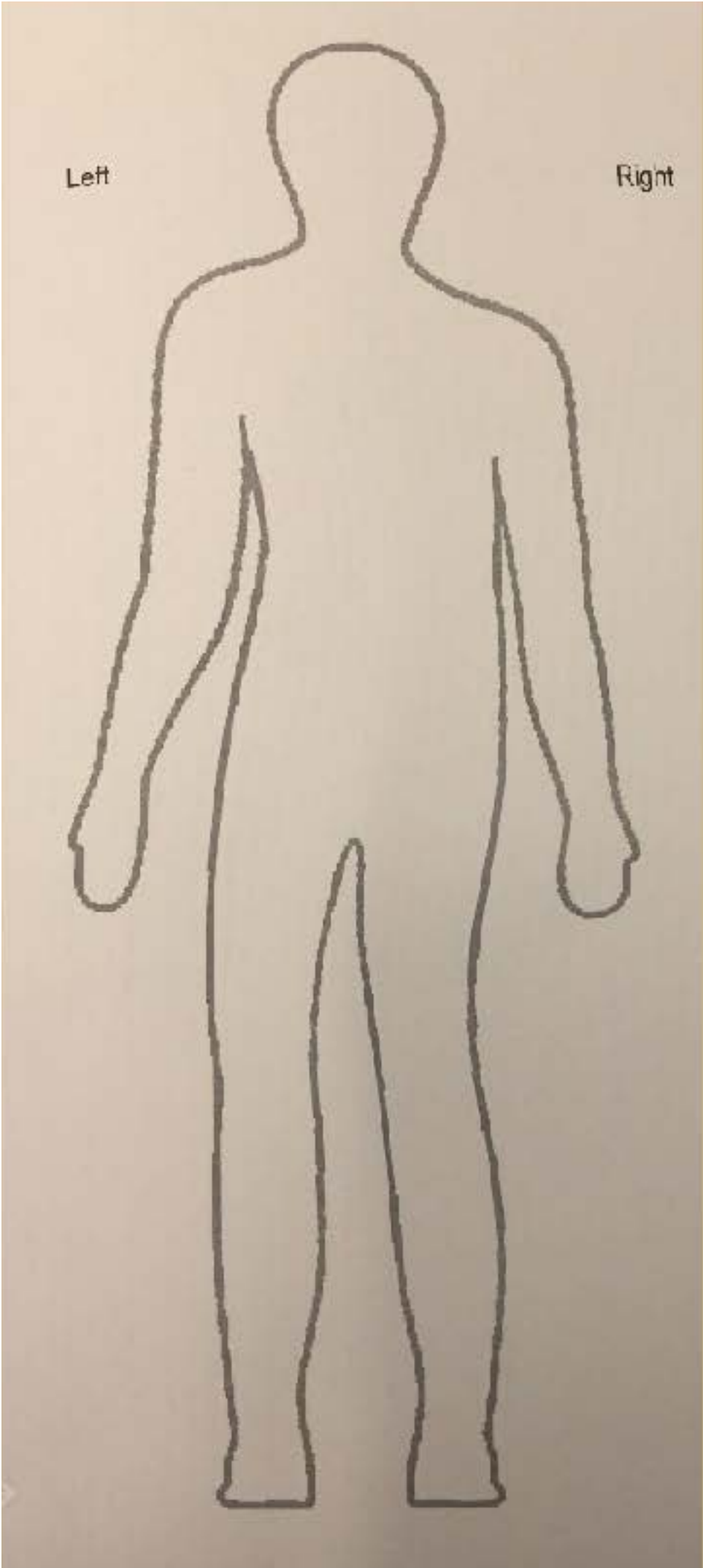
**NOTICEABLE DIFFERENCE IN PERCEPTION OF SYMMETRY**



**NOTICEABLE DIFFERENCE IN PERCEPTION OF SYMMETRY**

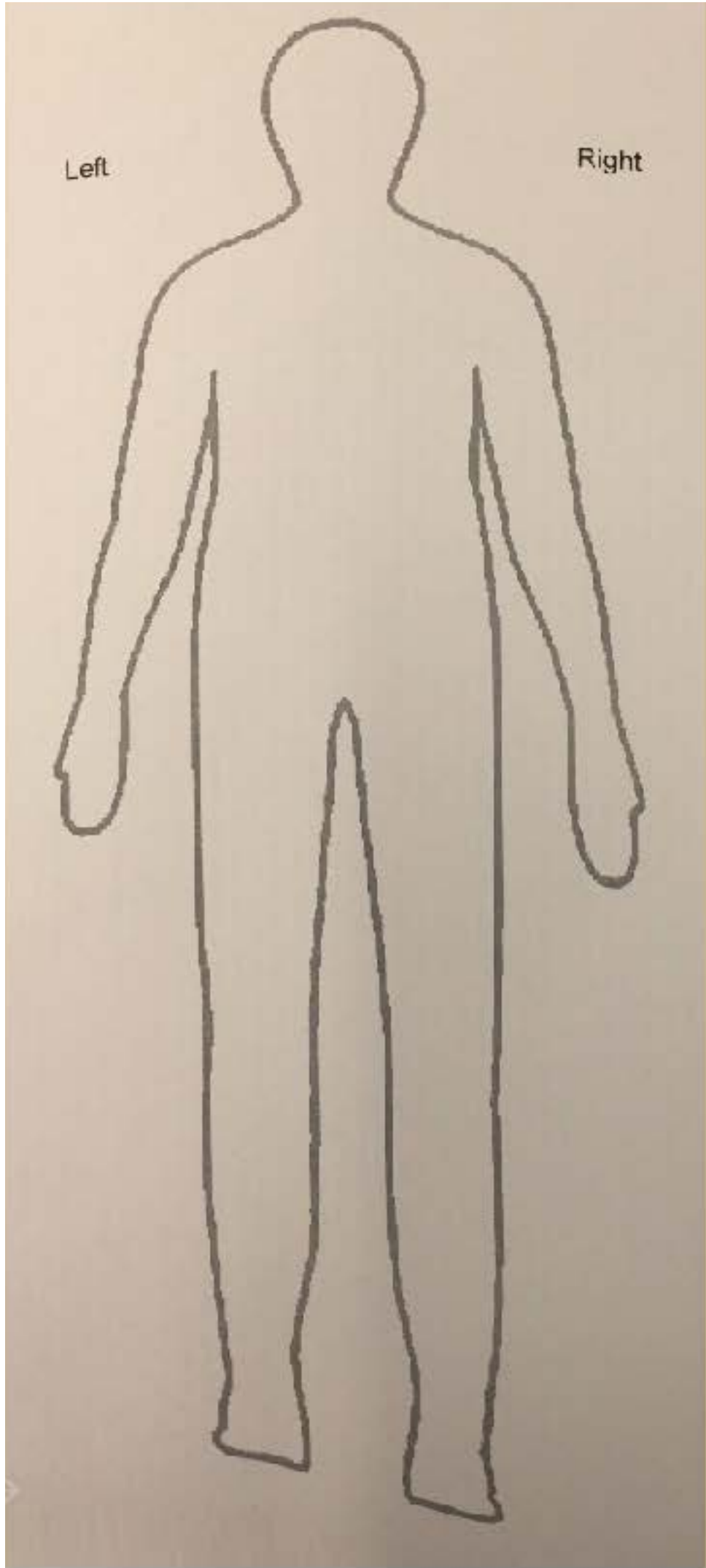
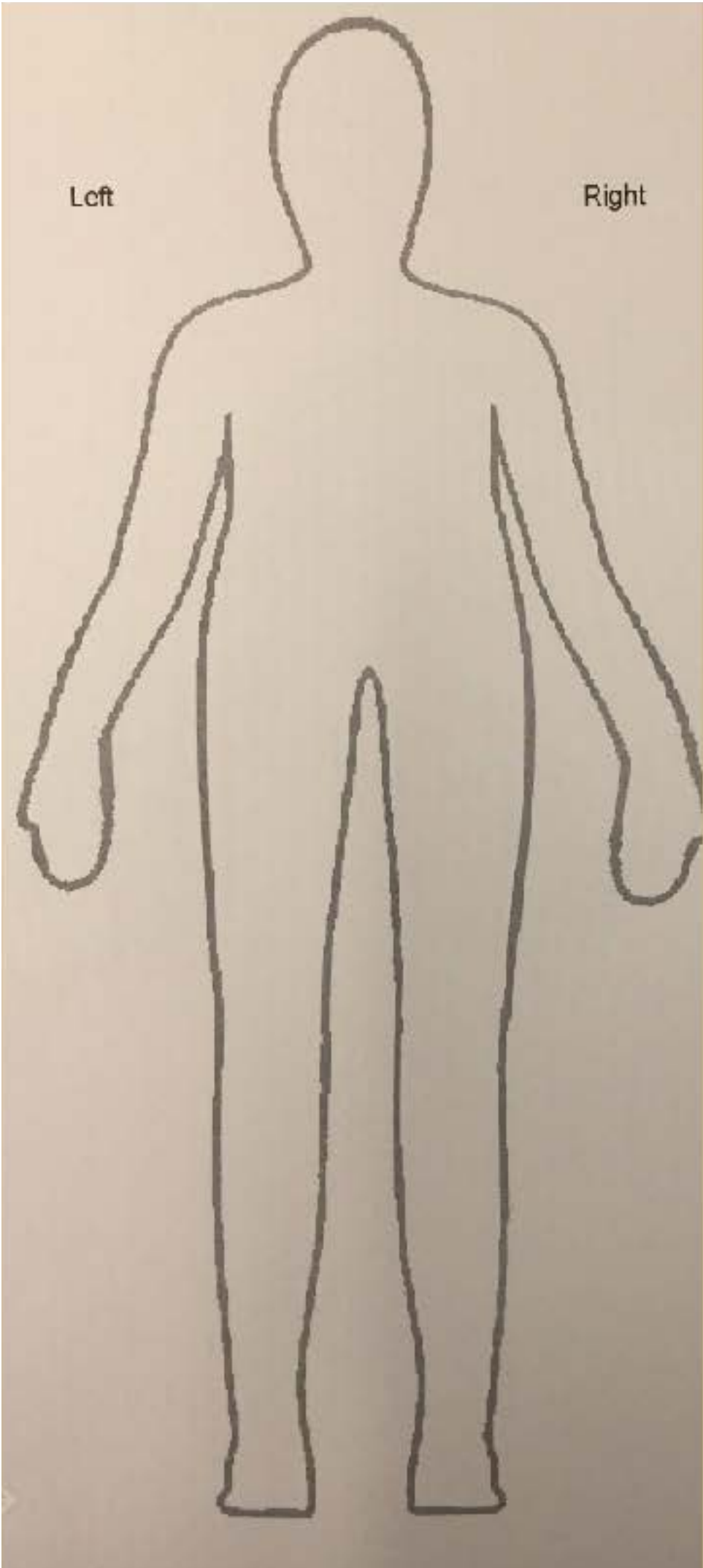


**NOTICEABLE DIFFERENCE IN PERCEPTION OF SYMMETRY**

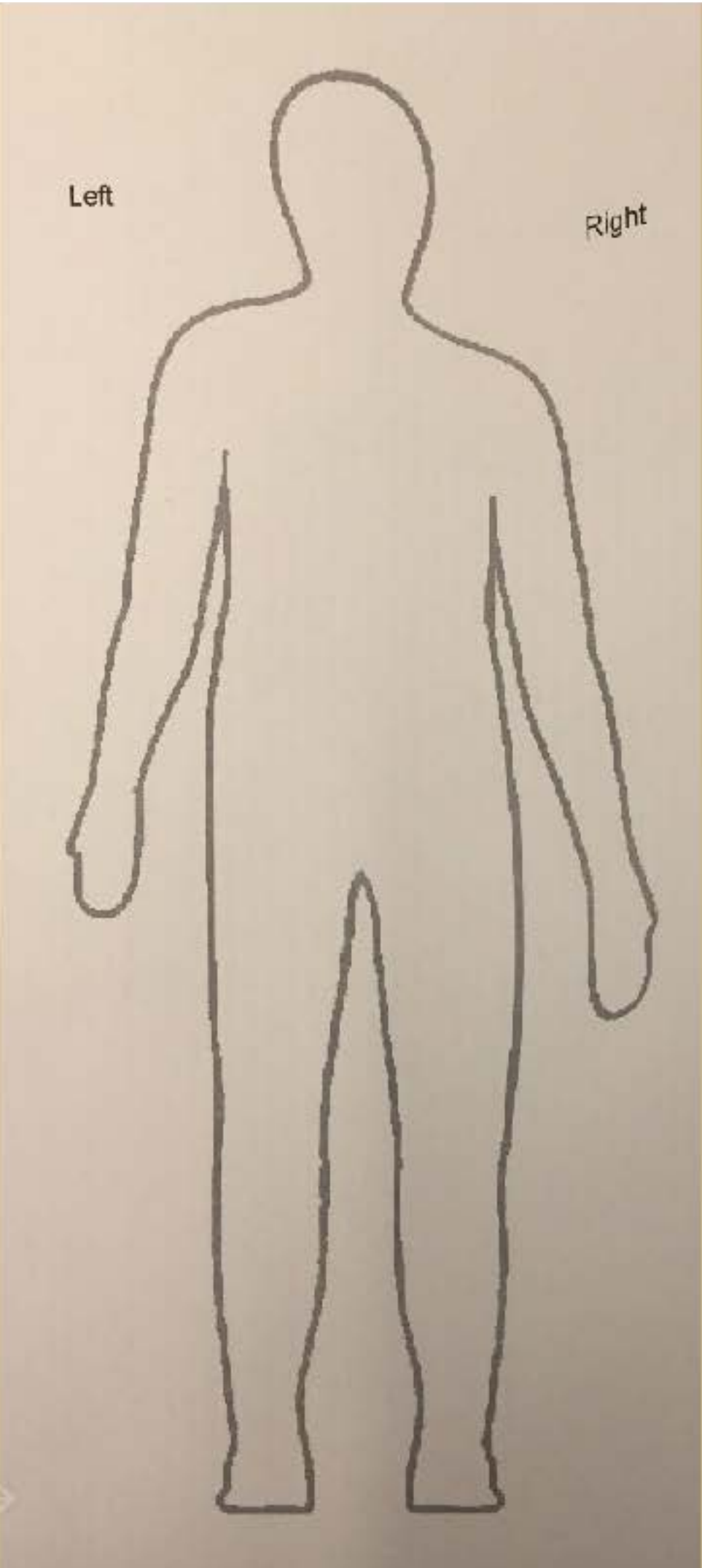
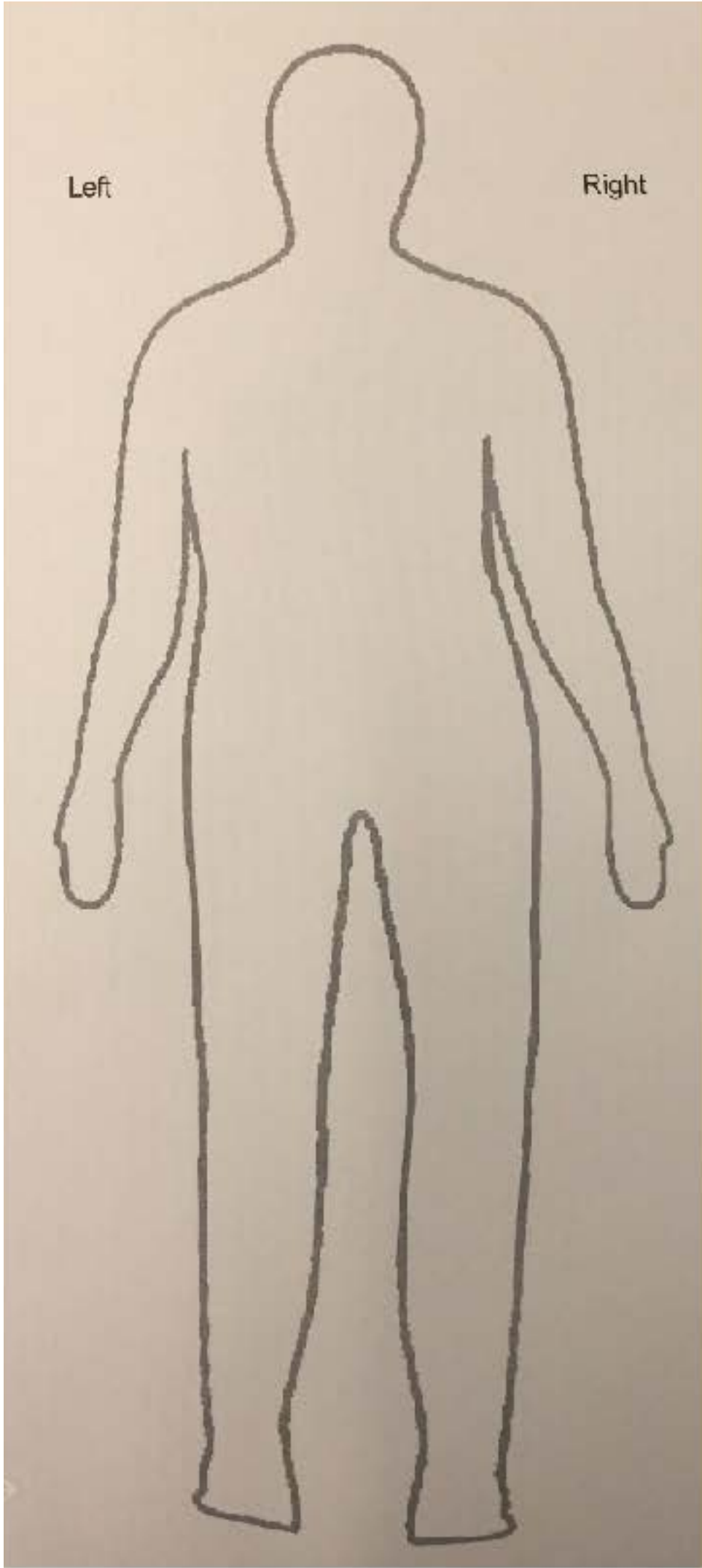




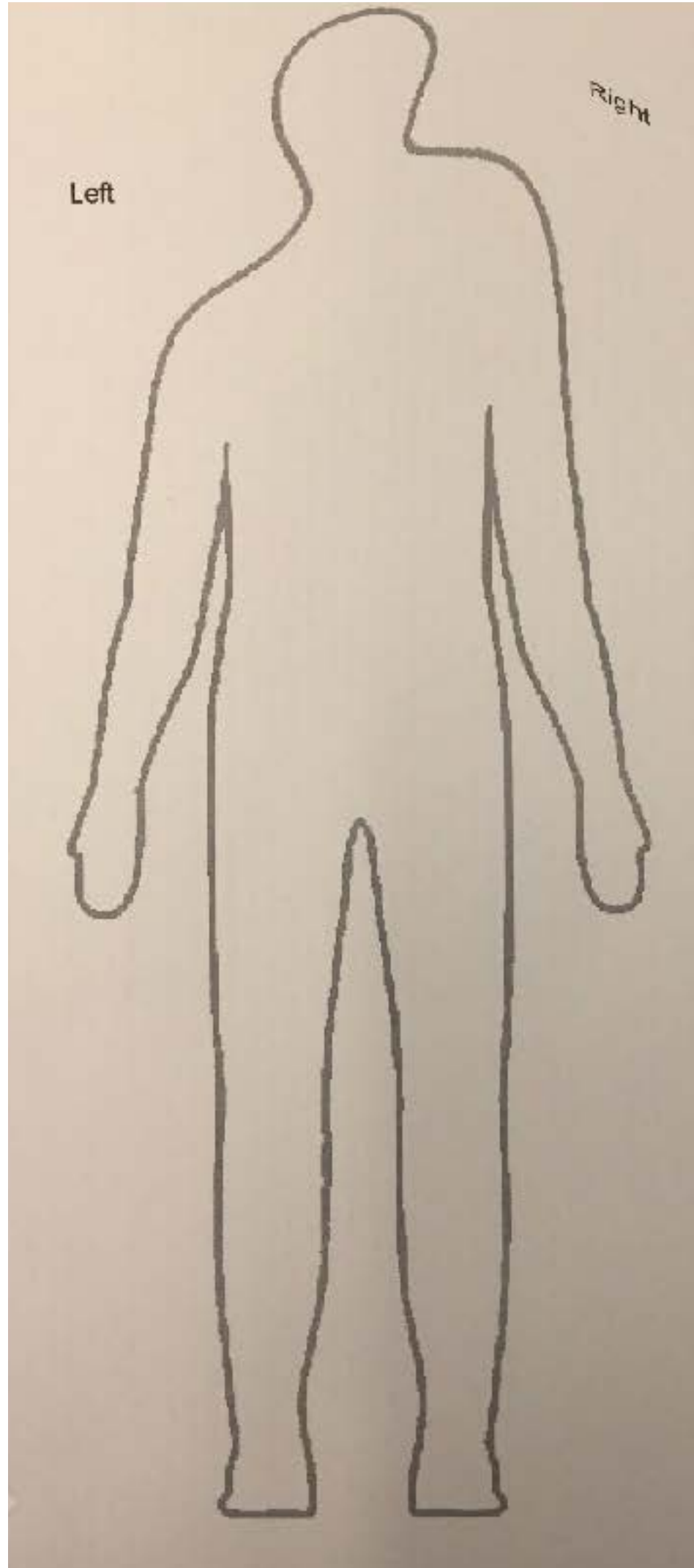
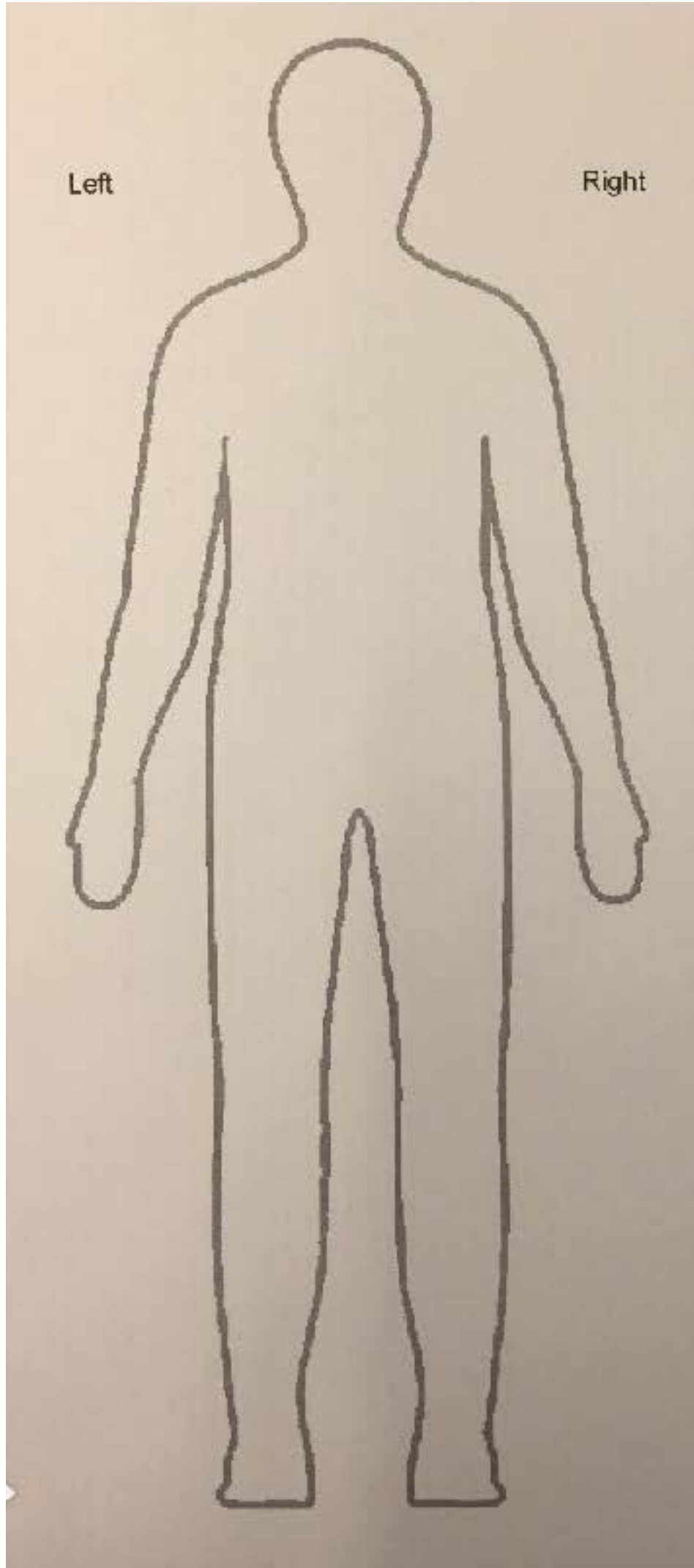
**NOTICEABLE DIFFERENCE IN PERCEPTION OF SYMMETRY**



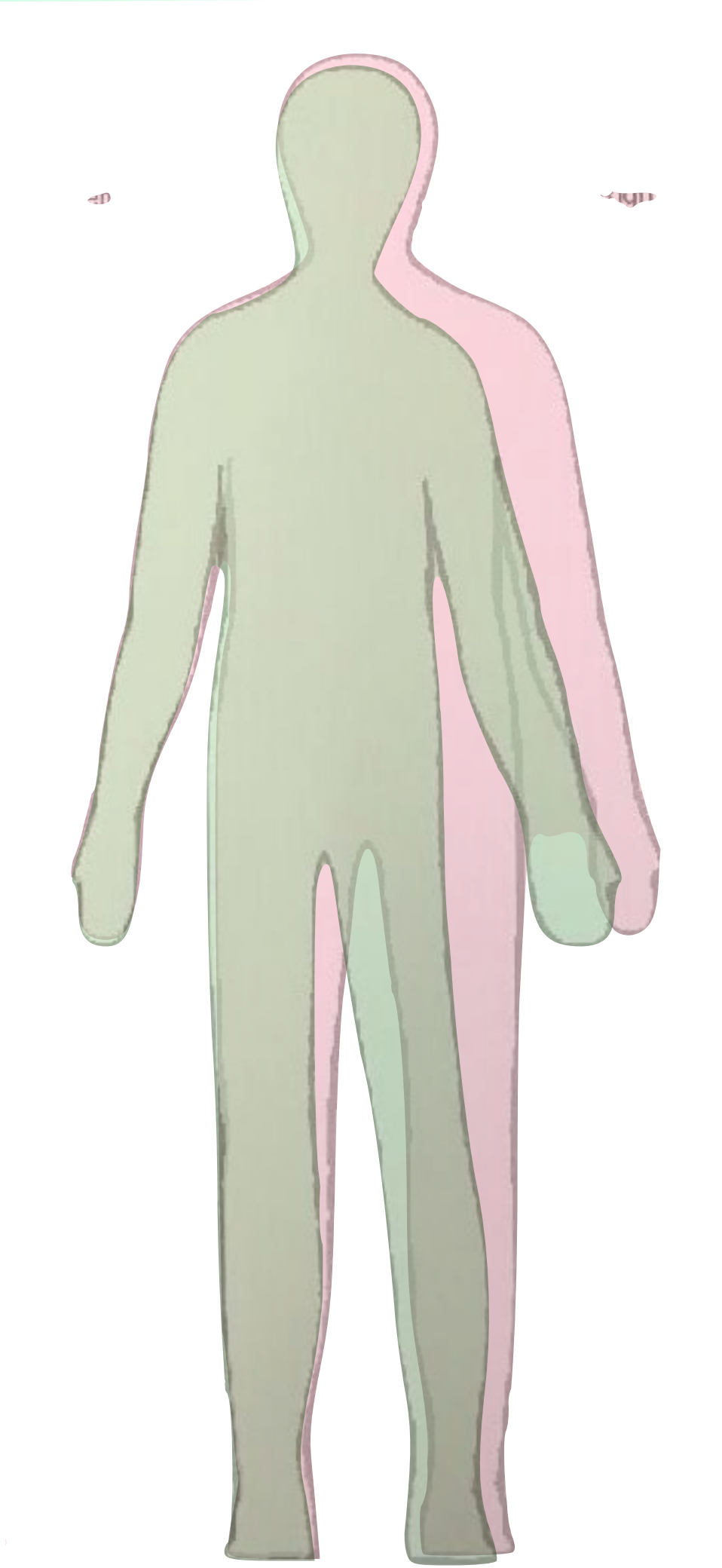
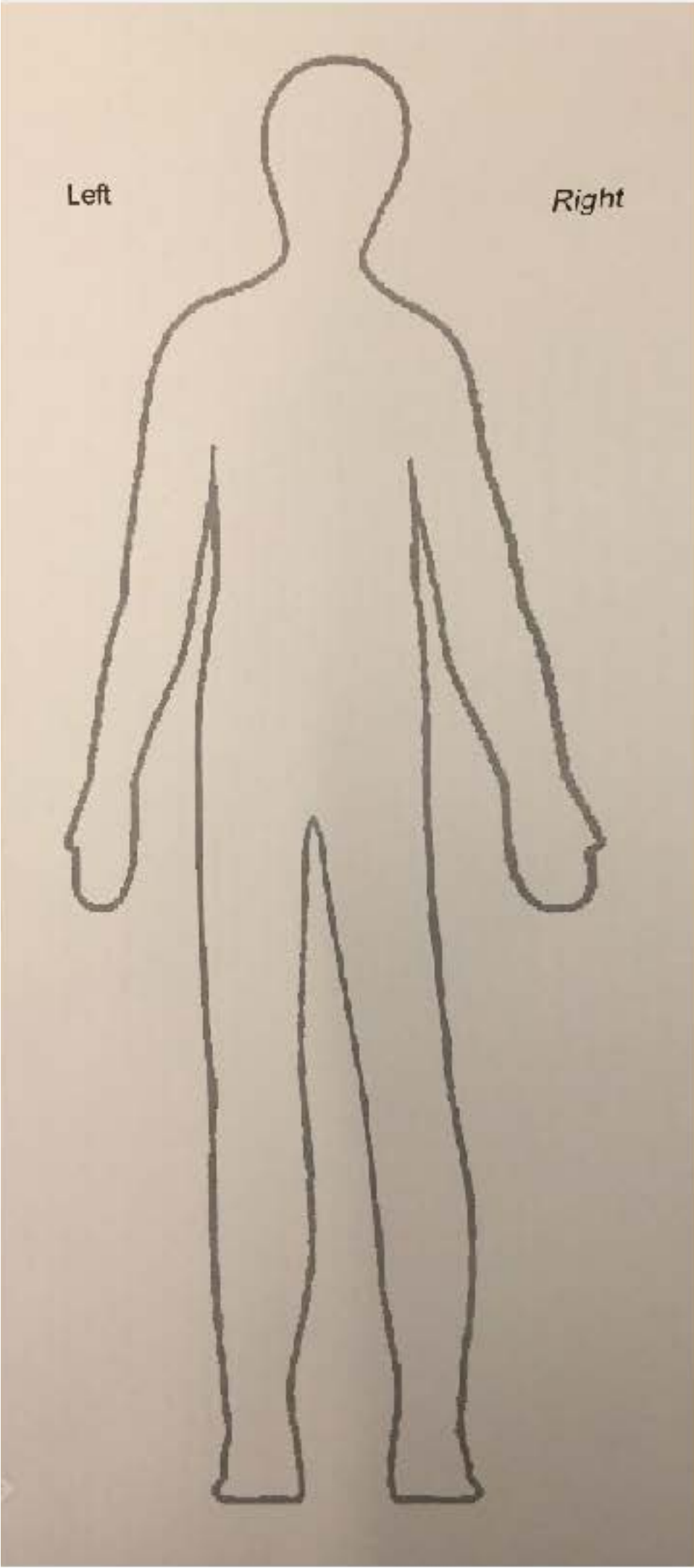
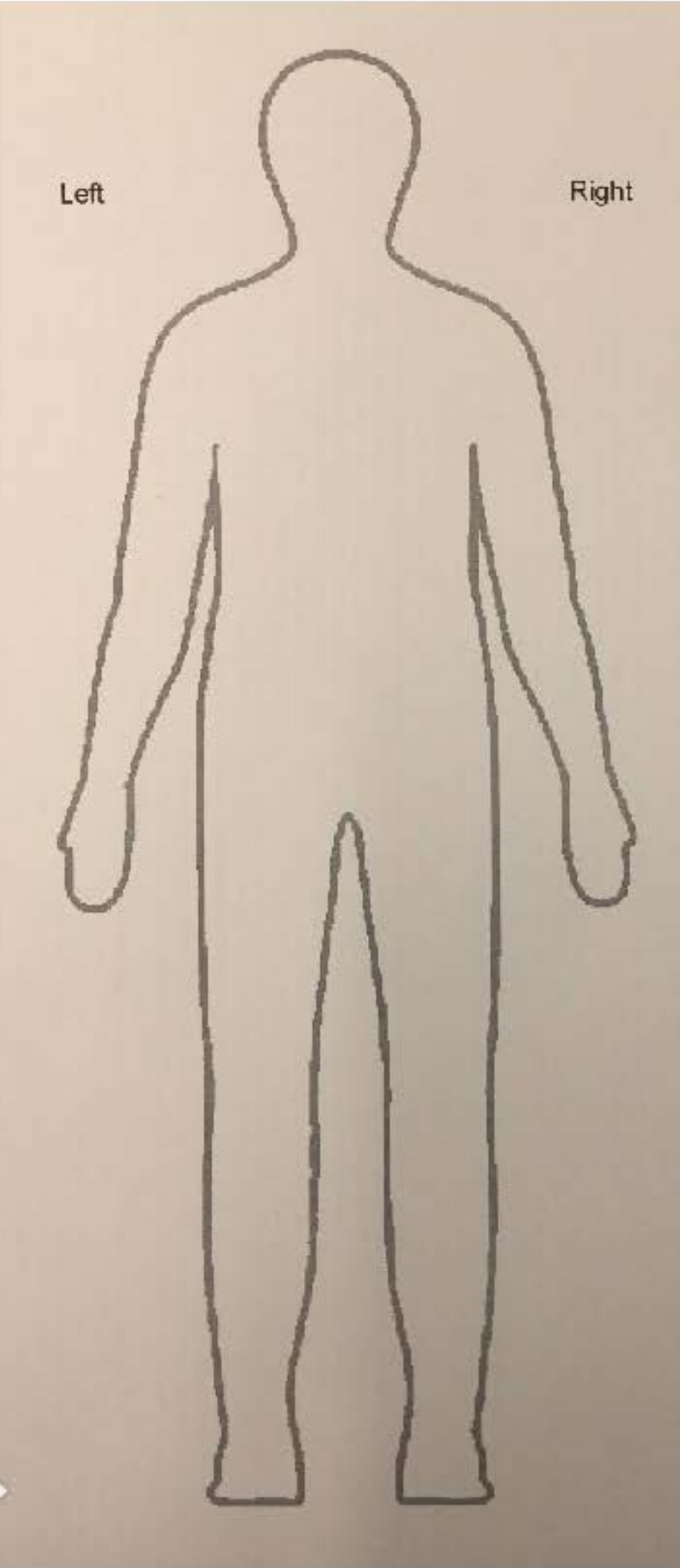
**NOTICEABLE DIFFERENCE IN PERCEPTION OF SYMMETRY**



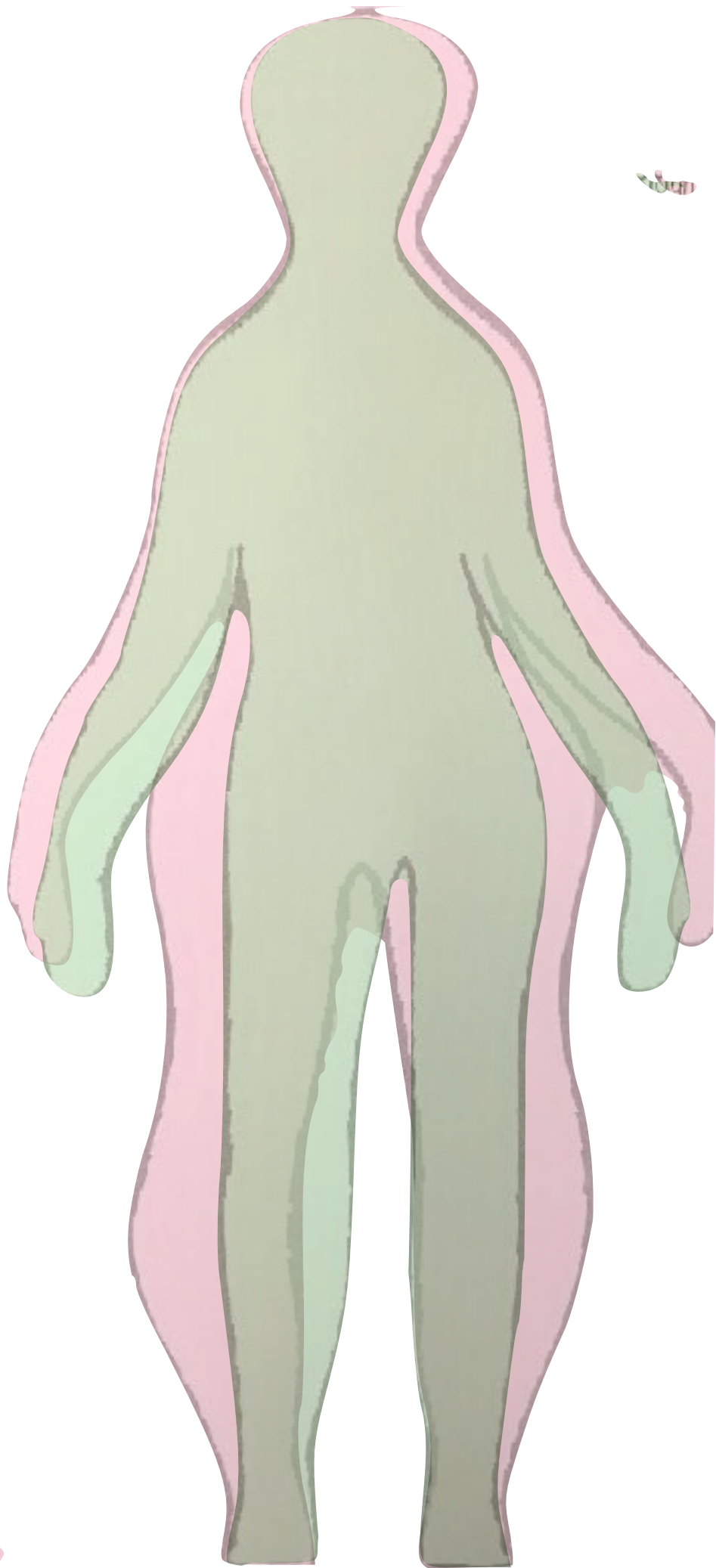
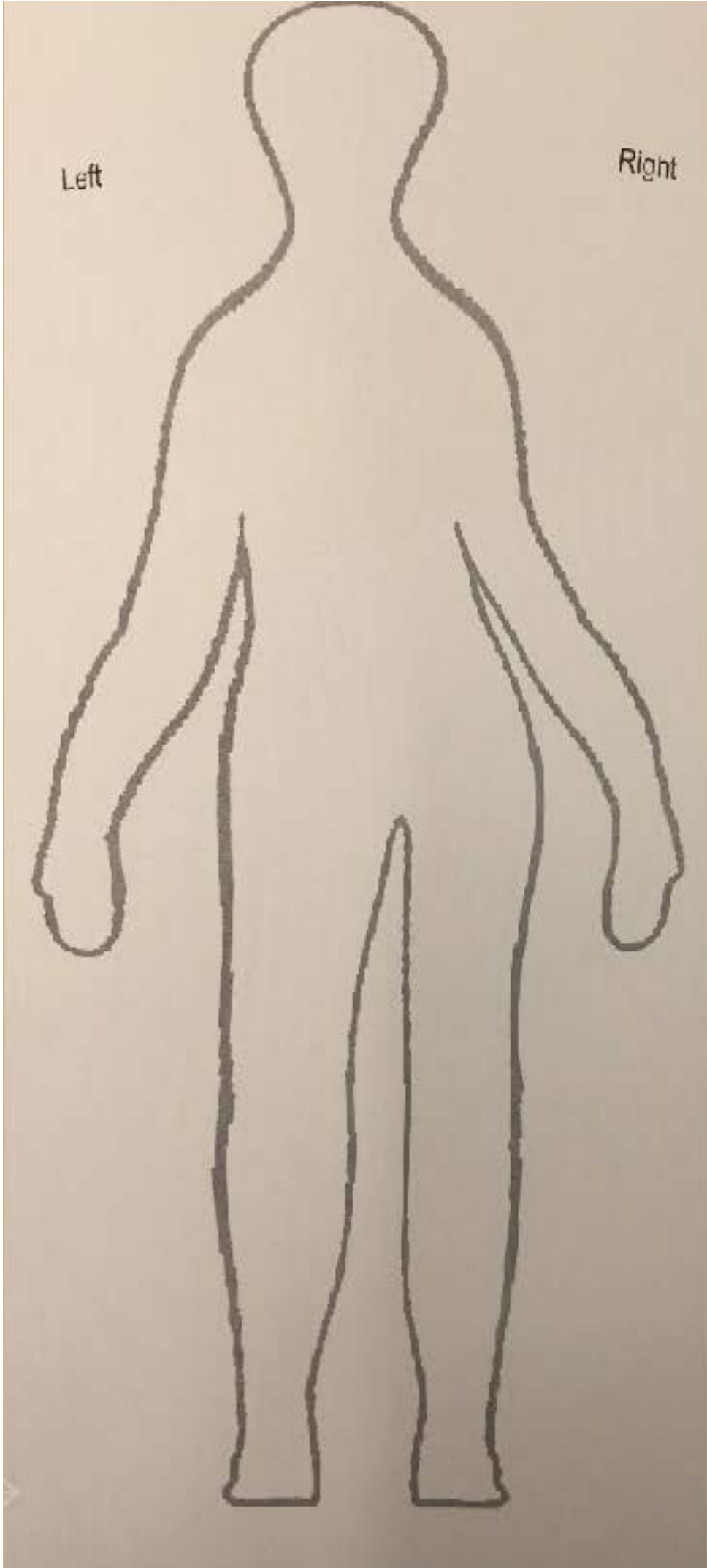
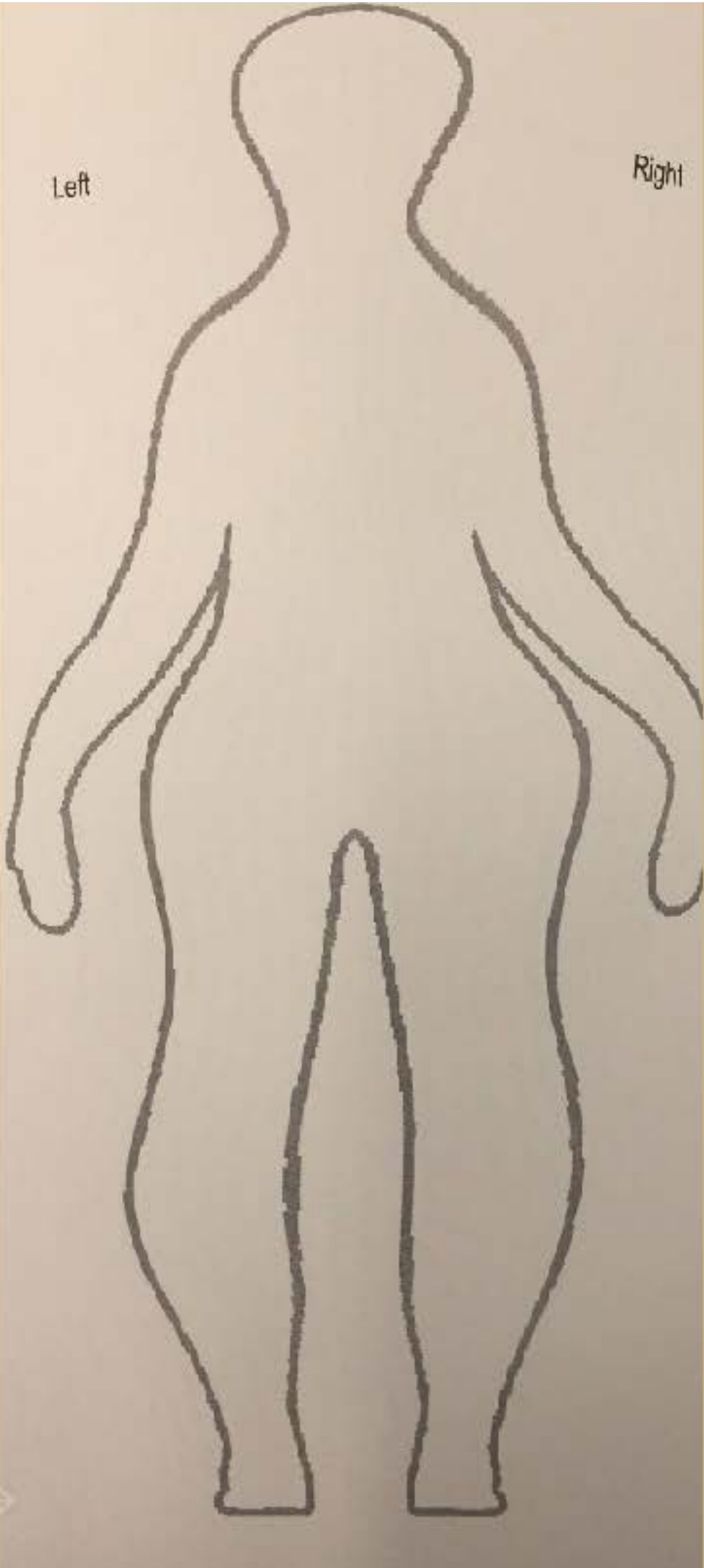
**NOTICEABLE DIFFERENCE IN PERCEPTION OF SYMMETRY**



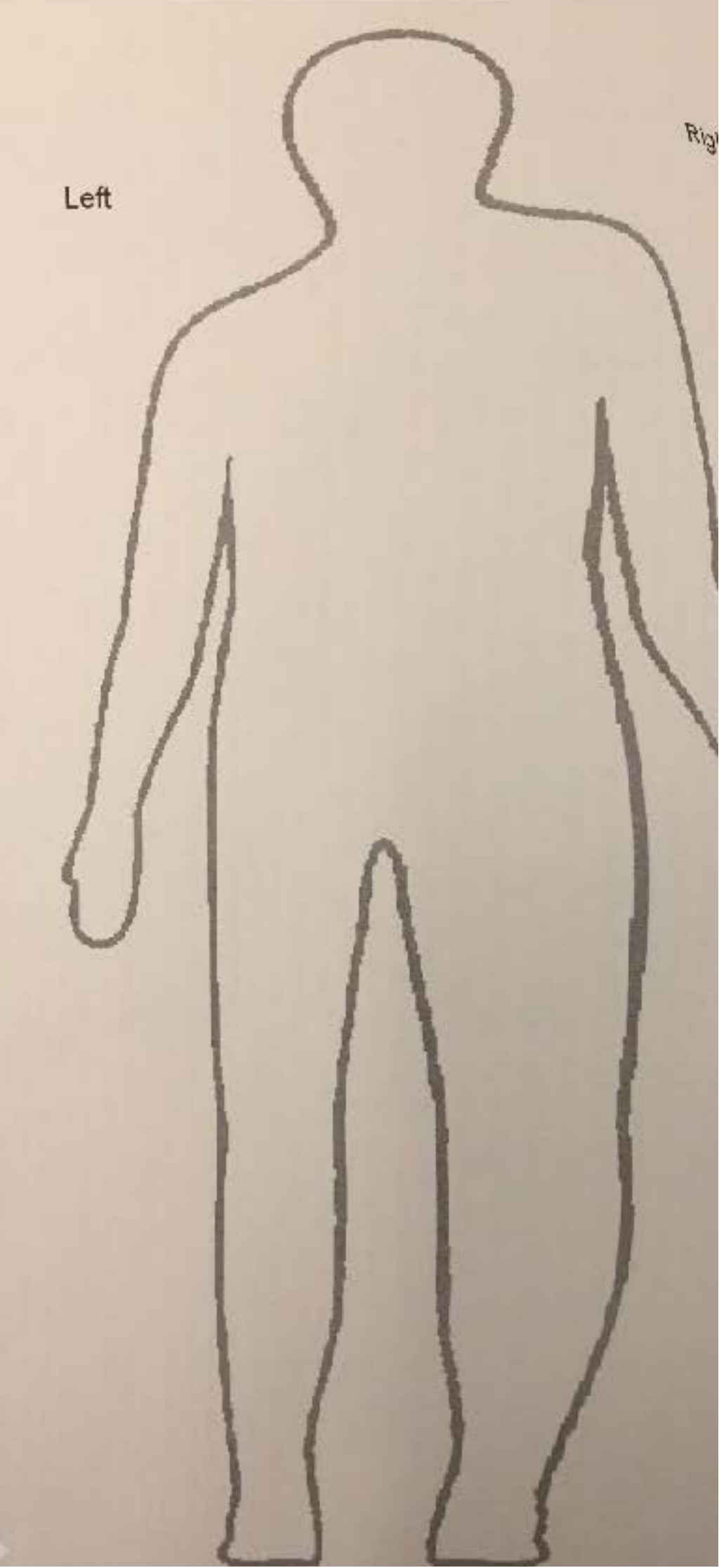
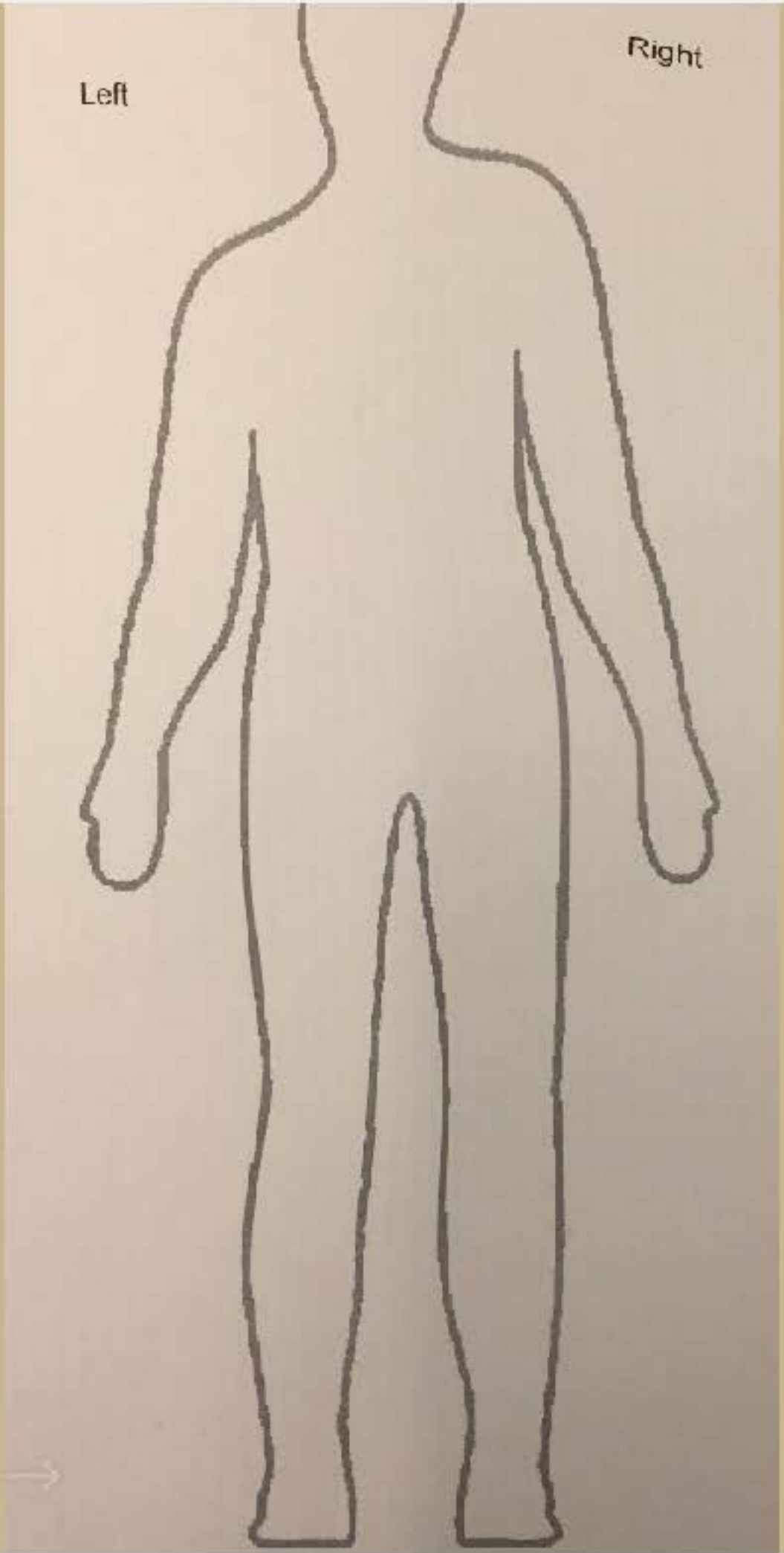
**NOTICEABLE DIFFERENCE IN PERCEPTION OF SYMMETRY**



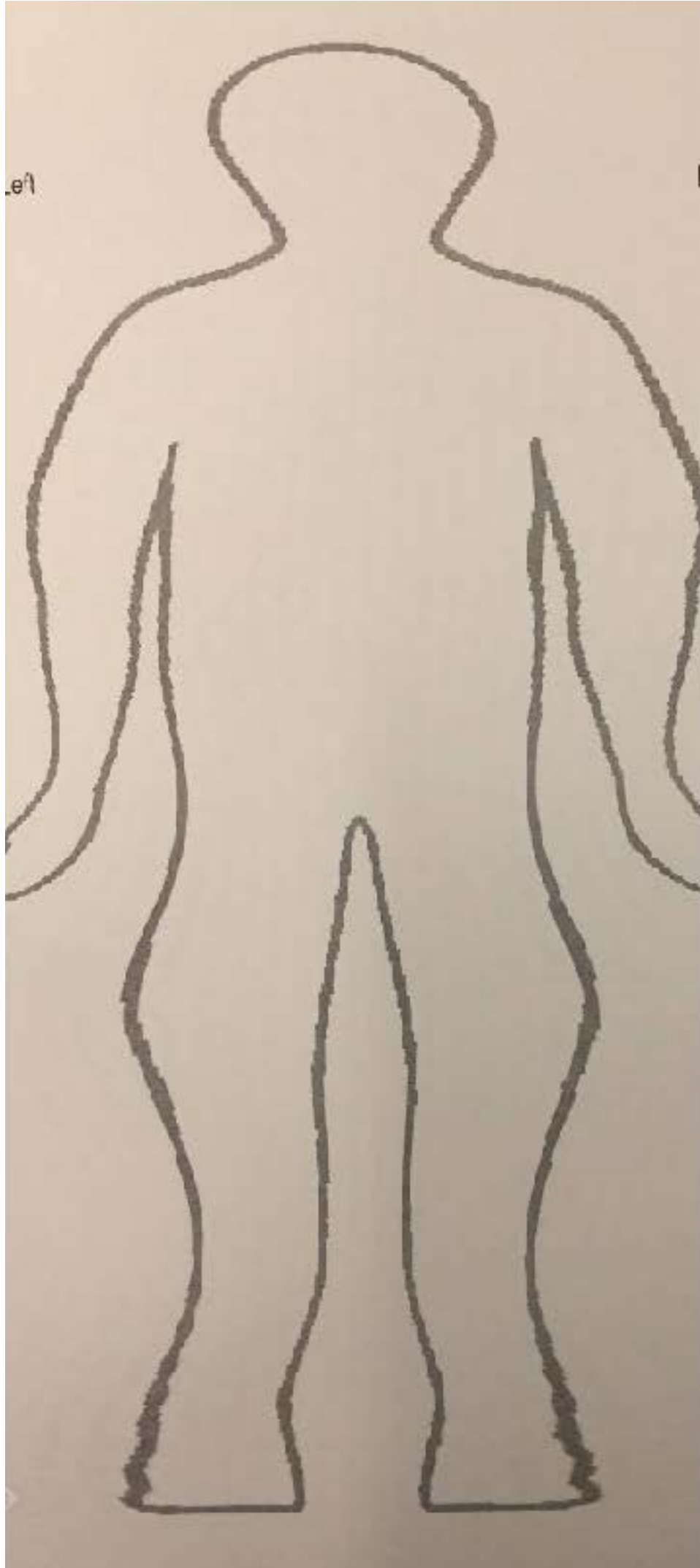
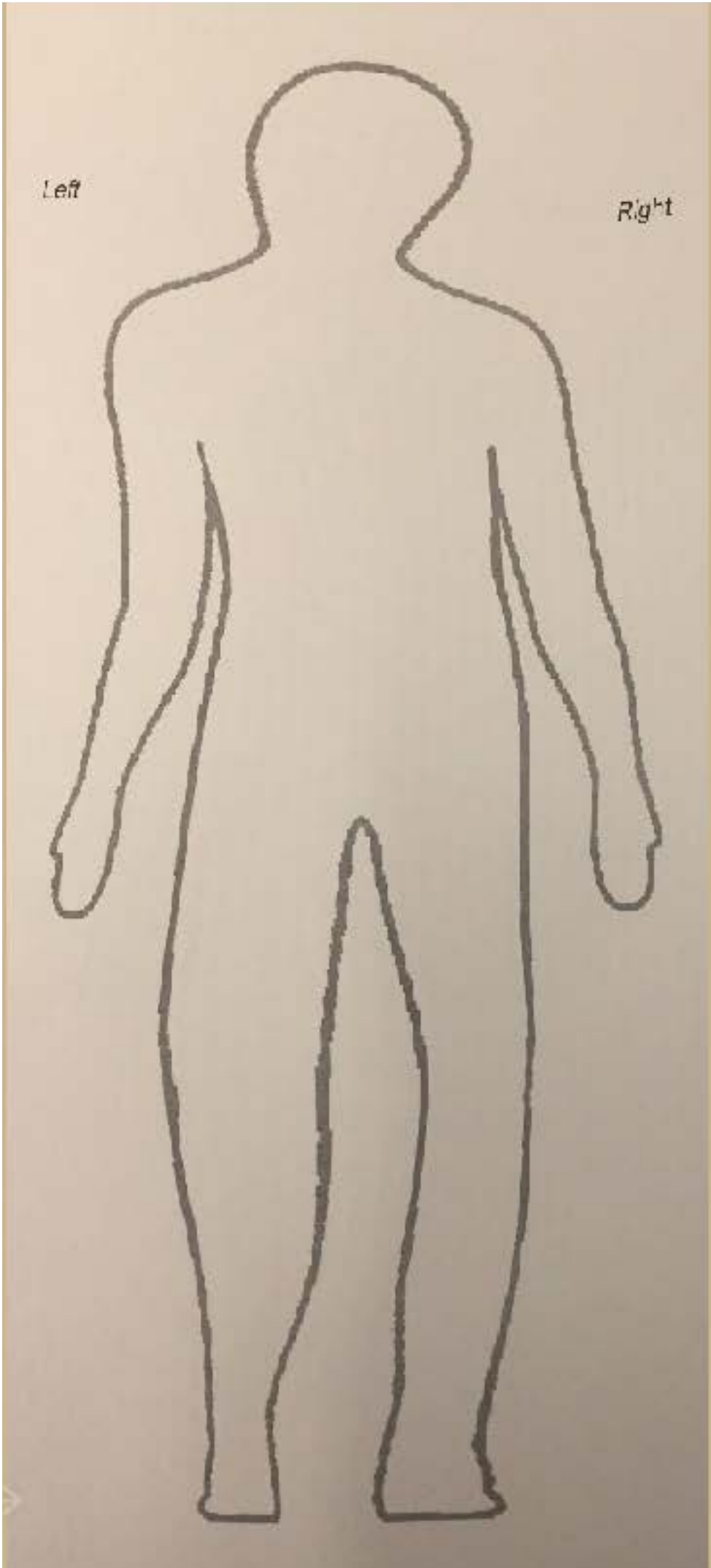
**NOTICEABLE DIFFERENCE IN PERCEPTION OF SYMMETRY**



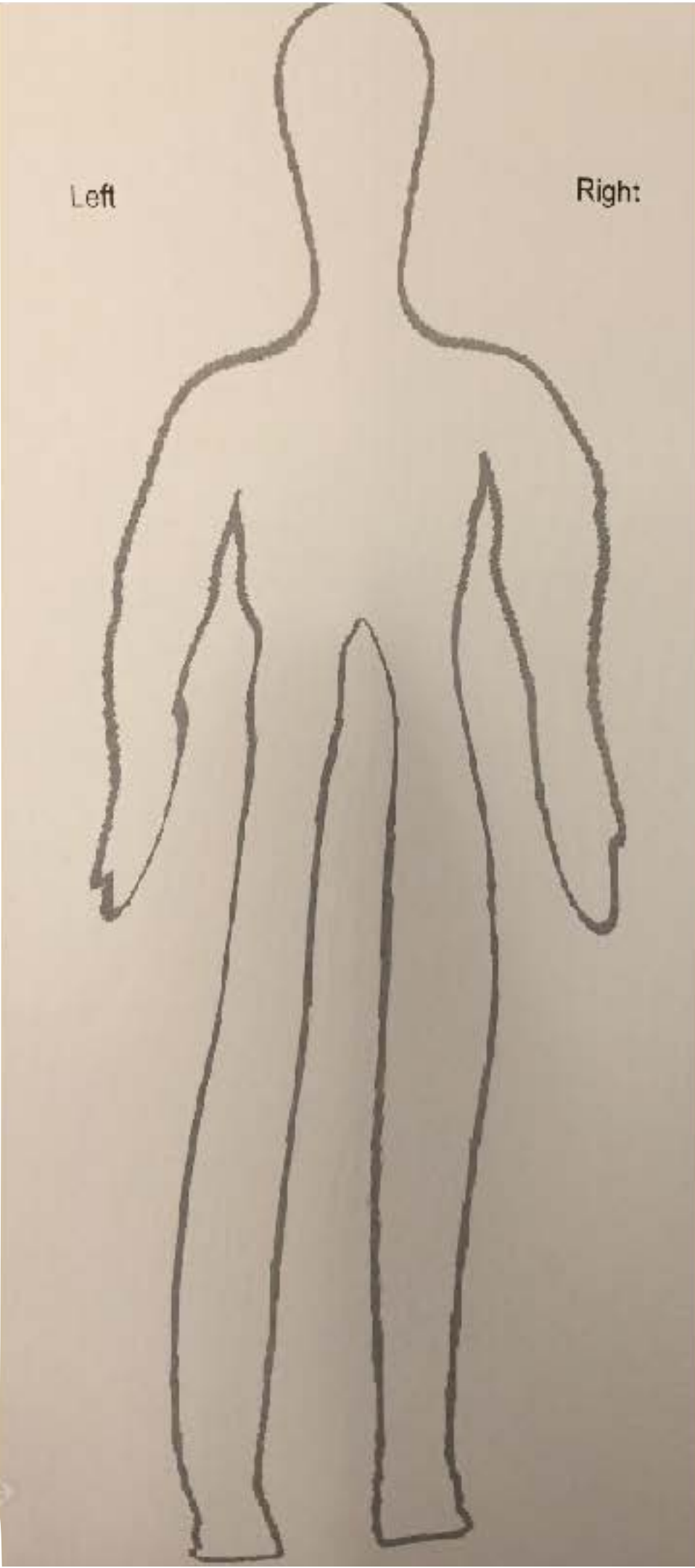
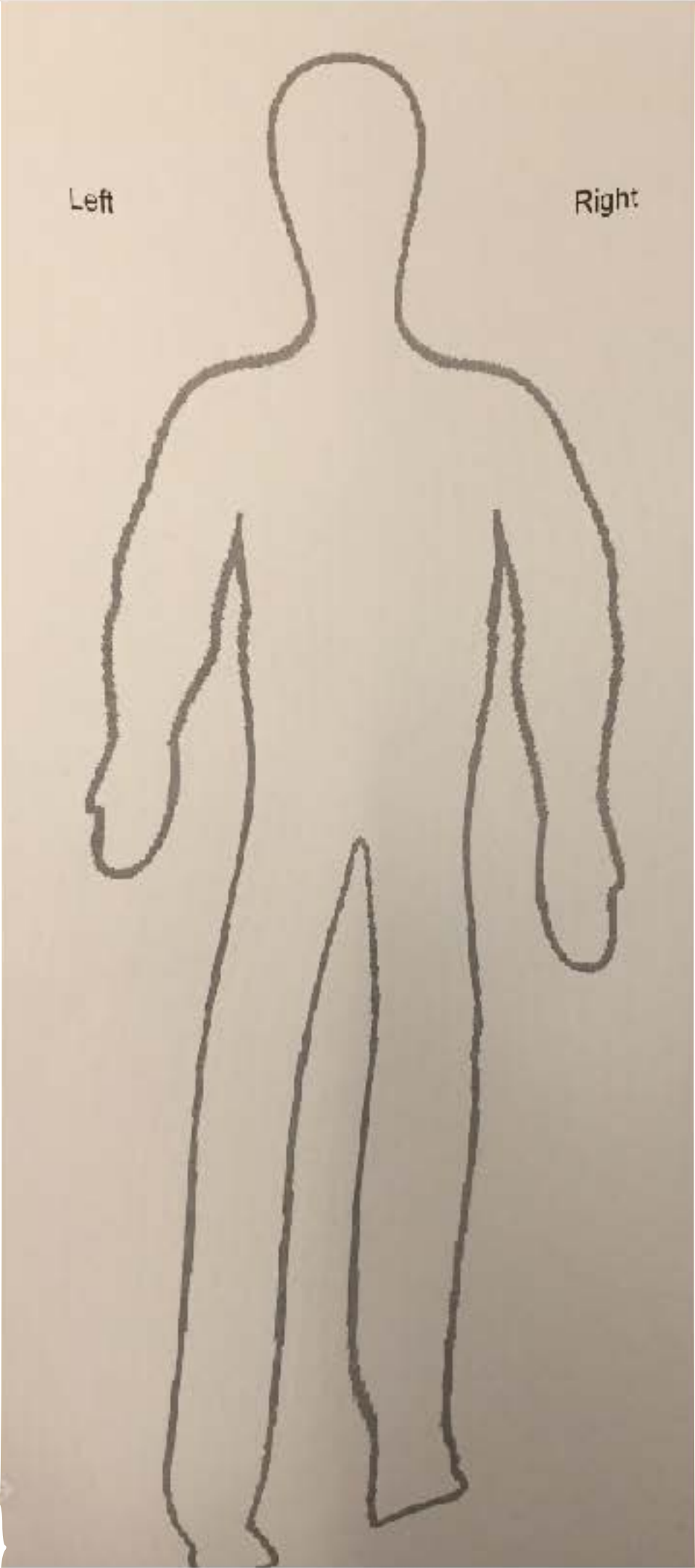
**NOTICEABLE DIFFERENCE IN PERCEPTION OF SYMMETRY**



**RADICALLY NOTICEABLE (THOUGH SOMETIMES MOSTLY SYMMETRICAL) DIFFERENCES**

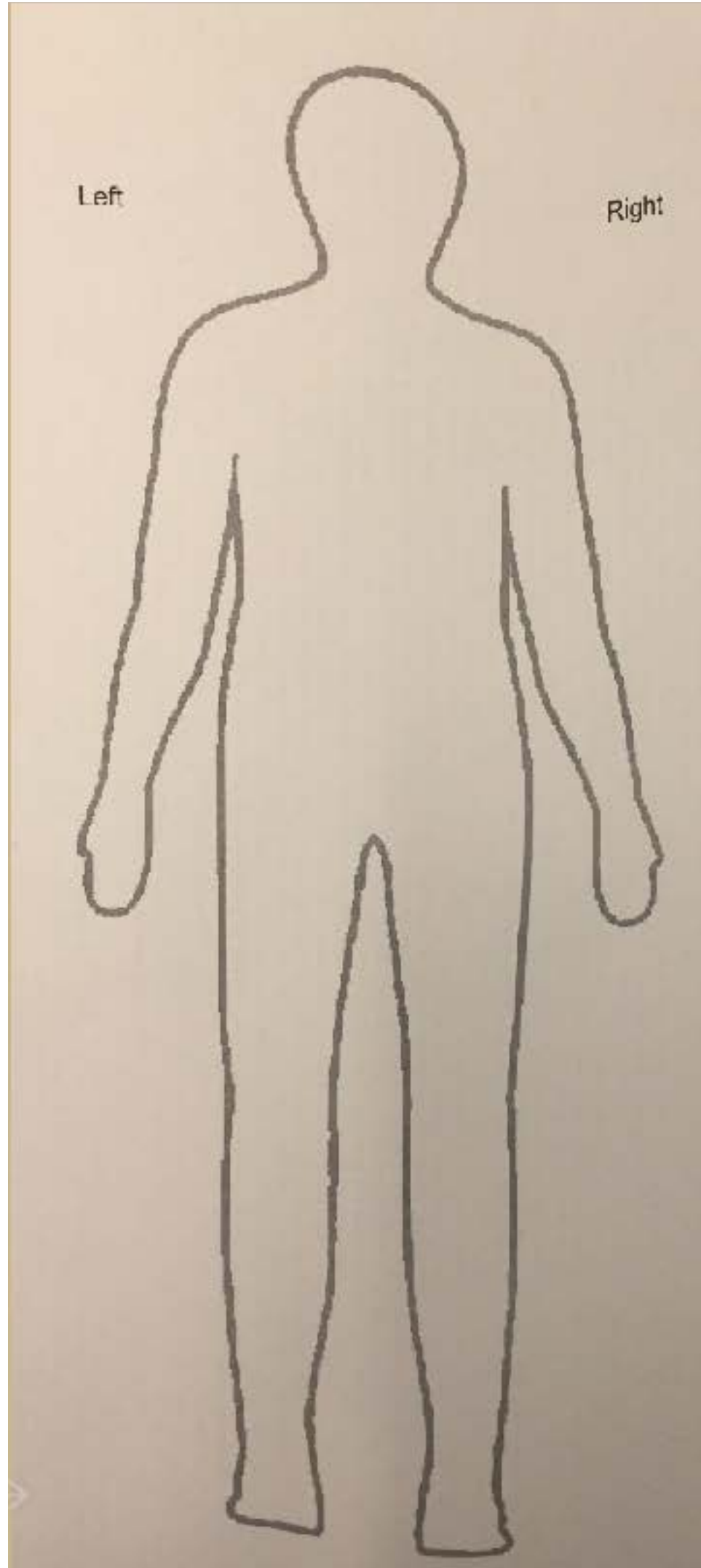
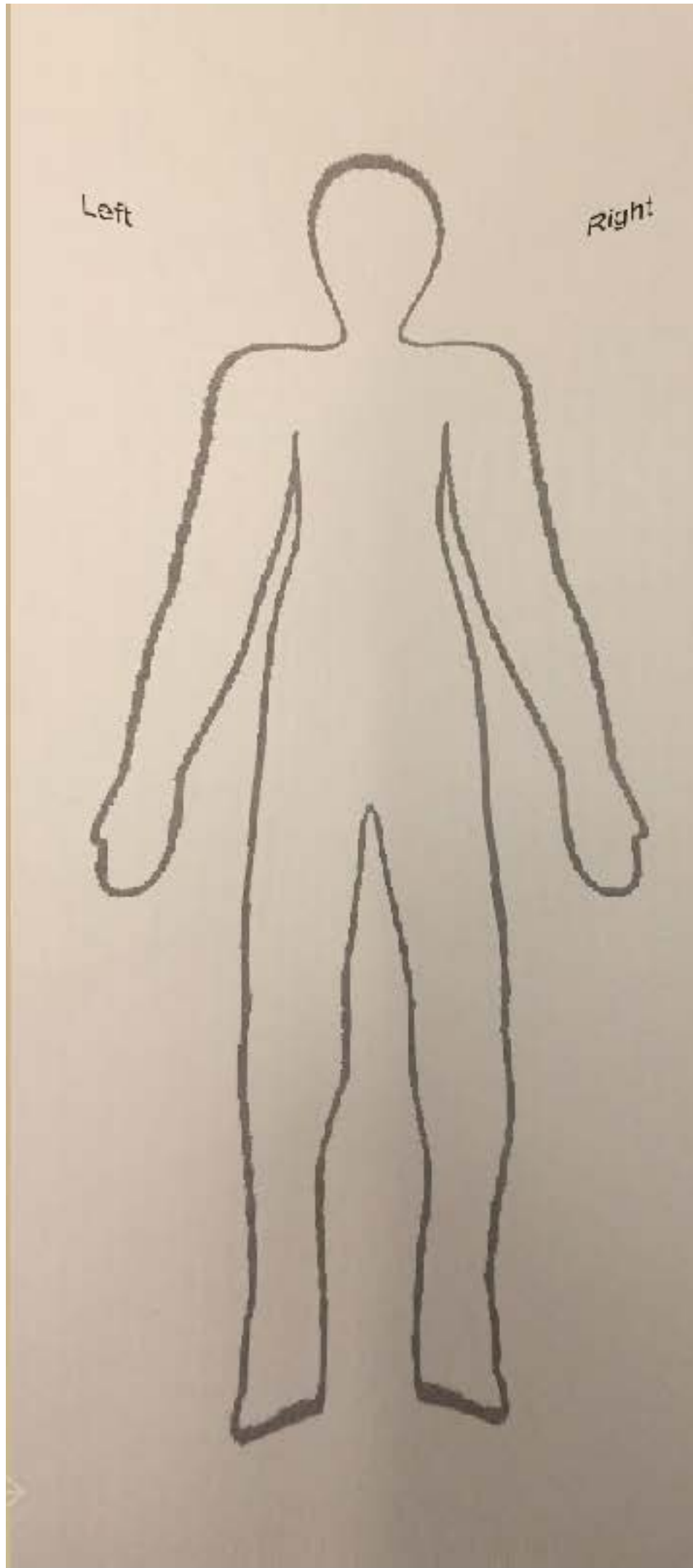


**RADICALLY NOTICEABLE (THOUGH SOMETIMES MOSTLY SYMMETRICAL) DIFFERENCES**

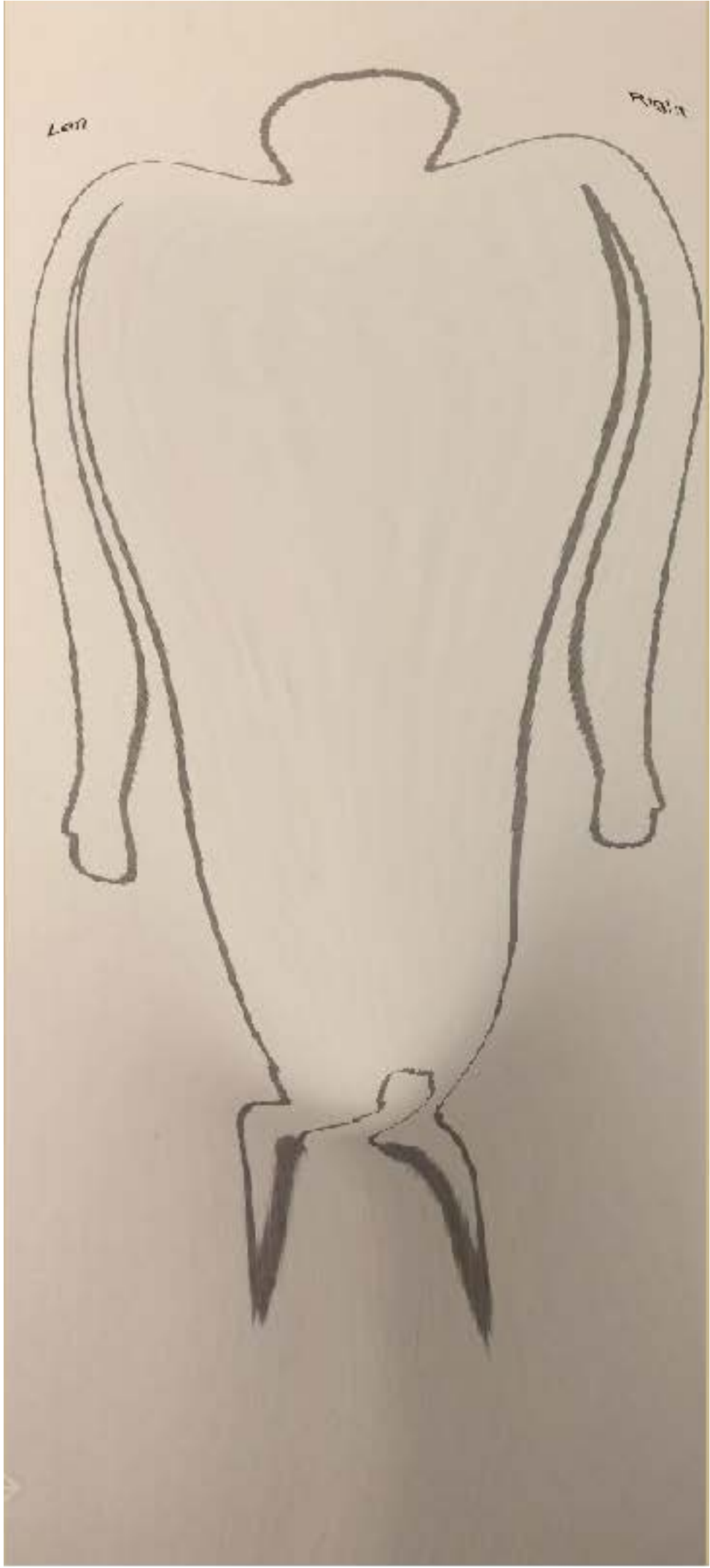
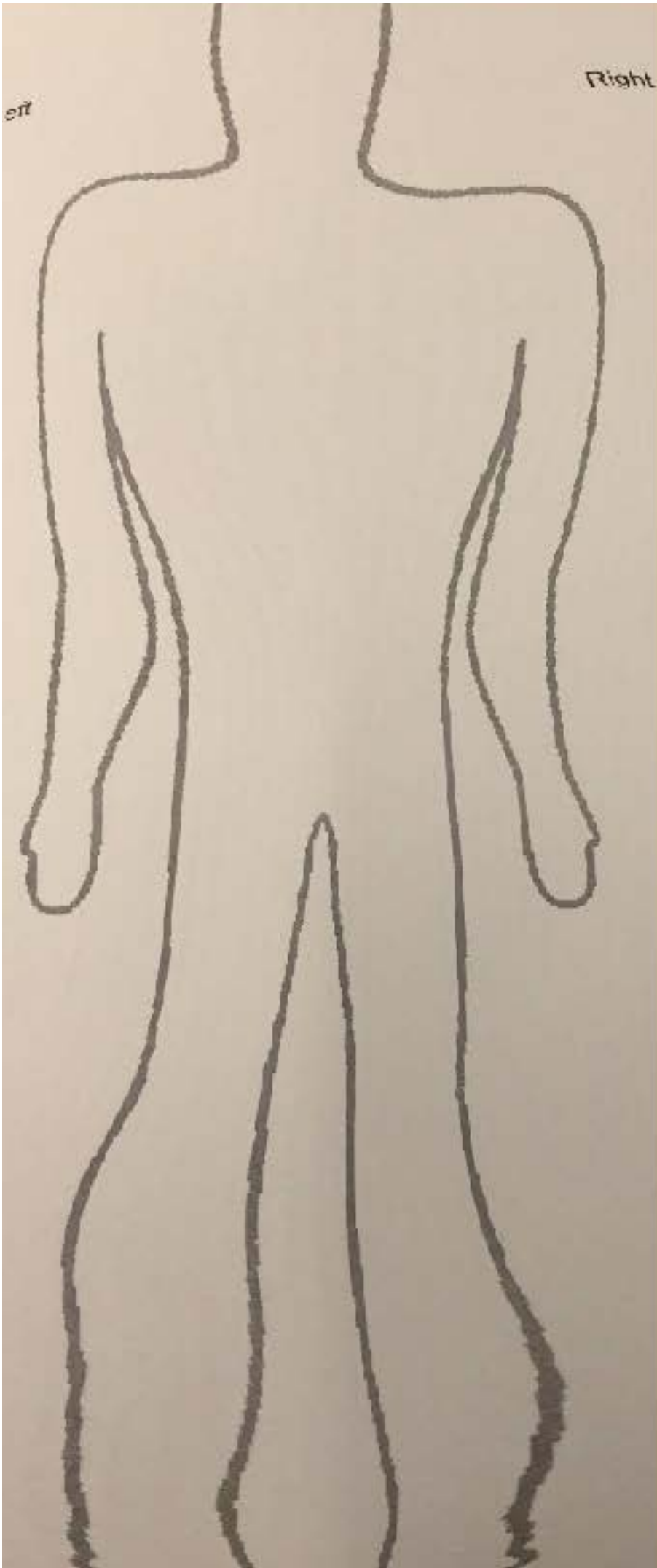




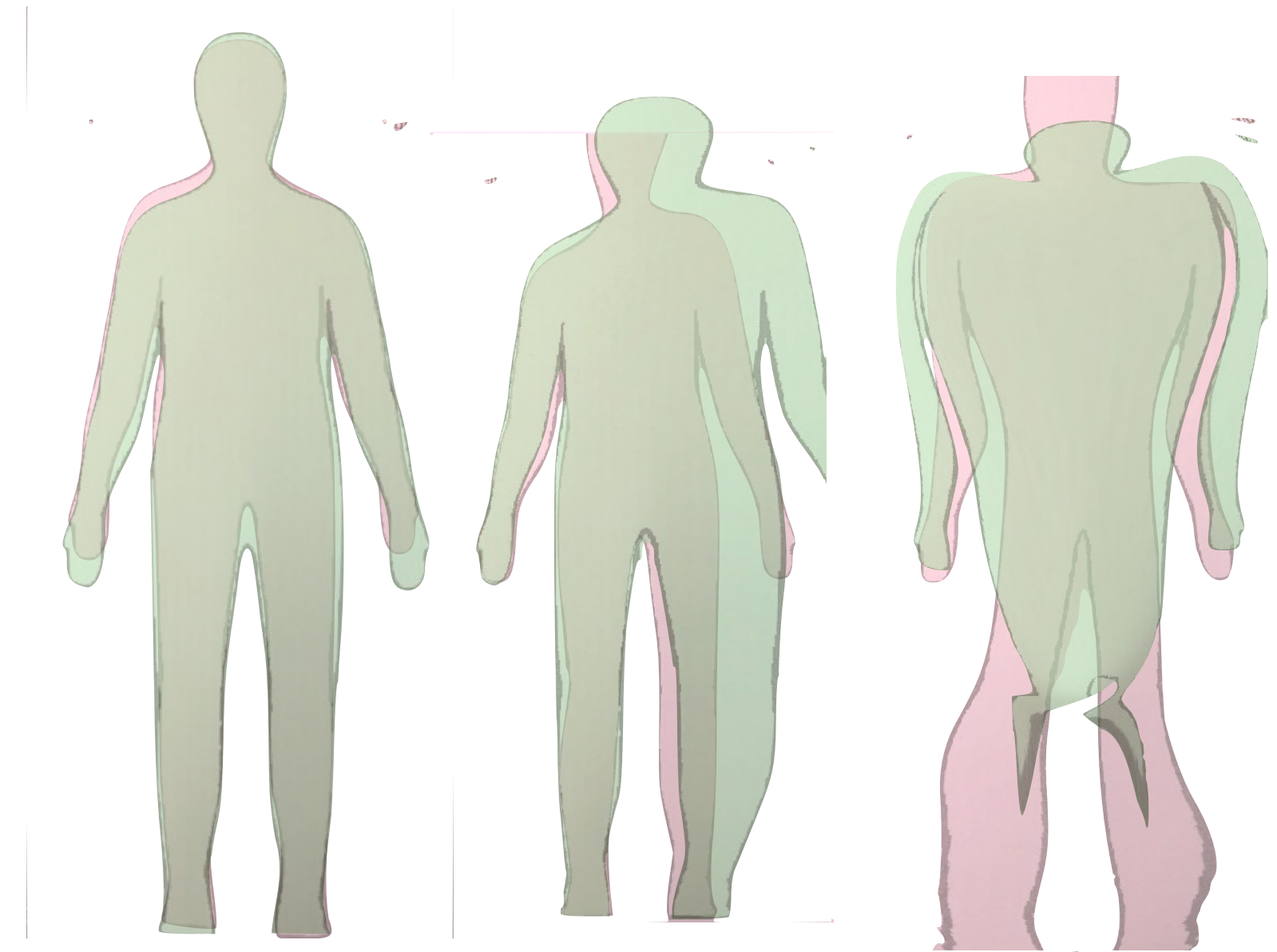
**RADICALLY NOTICEABLE (THOUGH SOMETIMES MOSTLY SYMMETRICAL) DIFFERENCES**

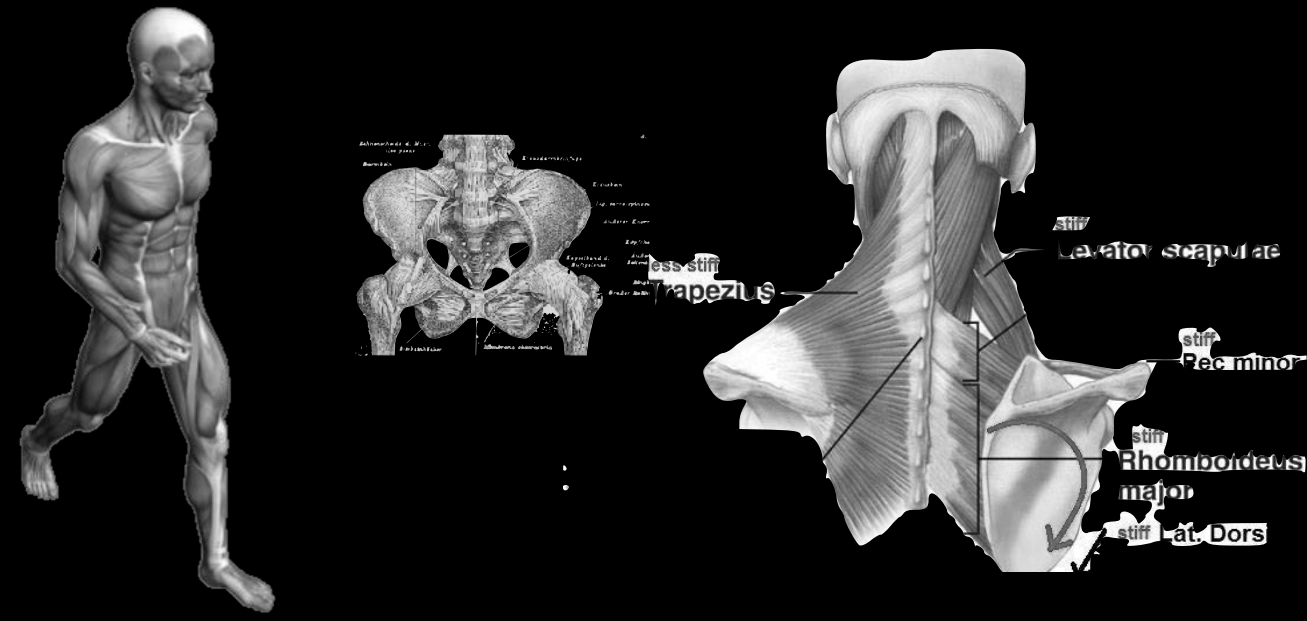


**RADICALLY NOTICEABLE (THOUGH SOMETIMES MOSTLY SYMMETRICAL) DIFFERENCES**

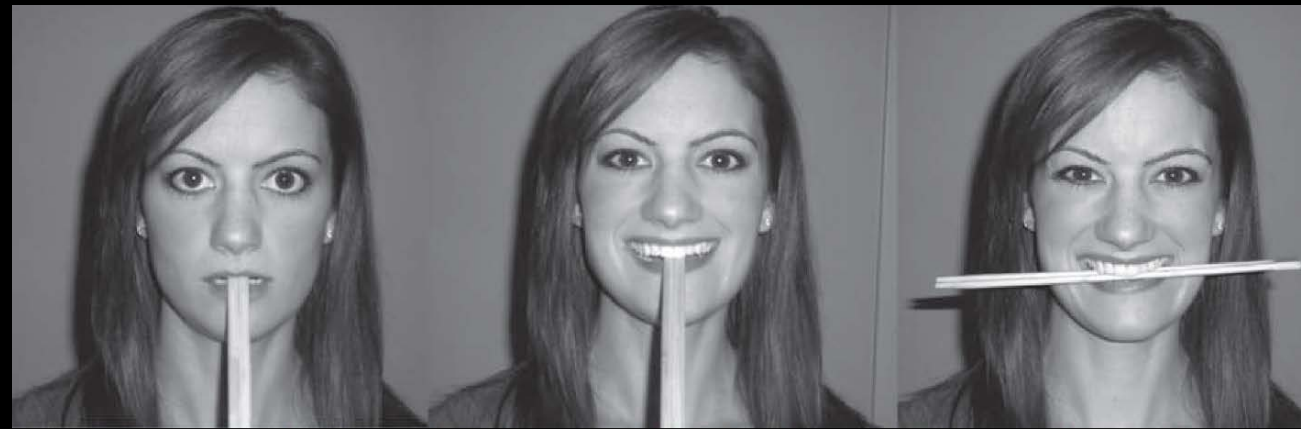


- Wide variation in visual representations of body self-image of before and after experiences, but with common patterns
- Similarly wide variation in other data, but still to be analyzed and triangulated. (Statistically significant differences in typing speed...)
- What happens if experienced repeatedly over a period of time?
- Chiropractor tried to buy the installation! (Therapeutic/clinical benefits? Research proposals with health researchers currently being developed...)





**(BODY) AWARENESS CAN AFFORD NEW (EMBODIED) CHOICES**



**EMBODIED COGNITION: BRAIN  $\neq$  MIND | THE BODY SHAPES THE MIND**



**TOOLS & TECHNOLOGIES CAN FACILITATE EMBODIED AWARENESS AND CREATIVITY**



# Diego Maranan

diego@sead.network

www.sead.network



**Angelo Vermeulen**

Regenerative synthetic ecosystems  
and evolving asteroid starships  
angelo@sead.network



**Pieter Steyaert**

Excavating abandoned artificial life  
pieter@sead.network

