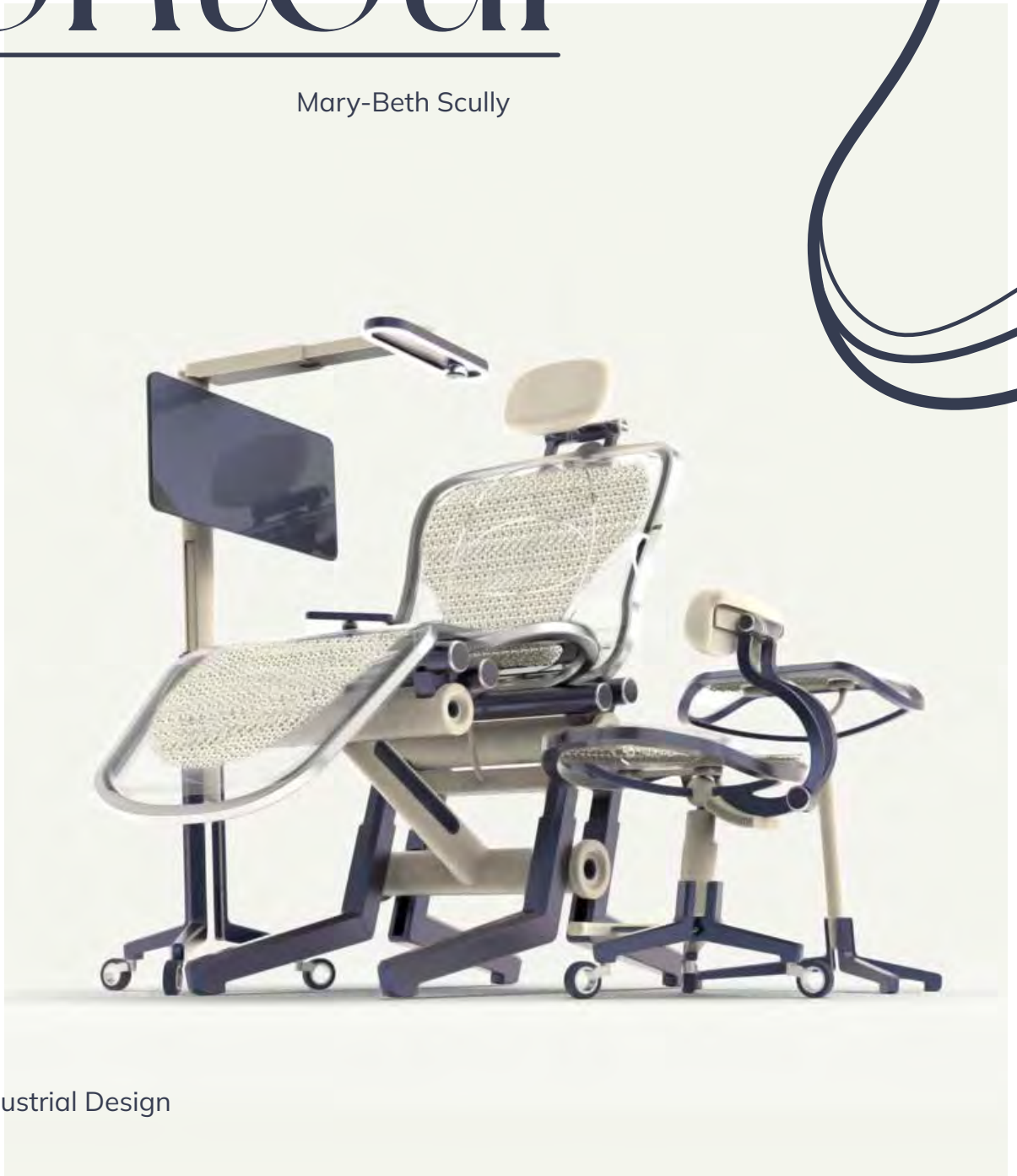


Tattoo Workstation Workflow & Comfort

contour

Mary-Beth Scully



Bachelor of Industrial Design

Tattoo Workstation Workflow & Comfort

Mary-Beth Scully

Submitted in partial fulfillment of the requirements for the degree of

Bachelor of Industrial Design

Faculty of Applied Sciences & Technology
Humber Institute of Technology & Advanced Learning

Supervisors: Catherine Chong & Frederic Matovu

April 19, 2023



© Copyright of Mary-Beth Scully 2023

Consent for Publication in the Humber Digital Library (Open Access)


Consent for Publication: Add a (X) mark in one of the columns for each activity

Activity		Yes	No
Publication	I give consent for publication in the Humber Library Digital Repository which is an open access portal available to the public	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Review	I give consent for review by the Professor	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Copyright © 2023 Mary-Beth Scully

The author grants Humber College of Technology and Advanced Learning the nonexclusive right to make this work available for noncommercial, educational purposes, provided that this copyright statement appears on the reproduced materials and notice is given that the copying is by permission of the author. To disseminate otherwise or to republish requires written permission from the author.

I warrant that the posting of the work does not infringe any copyright, nor violate ant proprietary rights, nor contain any libelous matter nor invade the privacy of any person or third party, nor otherwise violate the Humber Library Digital Repository Terms of Use.

Student Signature : 

Student Name : Mary-Beth Scully

Abstract

Tattoo artists are professional artists that work in niche environments where ergonomic sacrifices and adaptations are made to perform their practice. This group of understudied workers suffer from ergonomic health concerns similar to those of dental hygienists, but less time and resources are put into understanding where their pain points and challenges lie. Current studies in the tattoo industry disregard the experience of tattoo artists, focusing on other factors of tattooing that are void of relevance to the workflow and comfort of tattoo artists. In the market, few products are specifically catered to the well-being of tattoo artists, while many designs are still driven by neglect and lack the ability to accommodate their ever-changing duties at work.

This thesis topic will evaluate the ways that tattoo artists are hindered in their workflow and comfort by various factors, some predicted to be their environment/surroundings, their furniture, and available equipment for them on the market. Due to the absence of research on tattoo artists' experiences in the workforce, this project will conduct various primary research methods including semi-structured interviews, qualitative surveys on discussion forums, and on-site visits/observational studies to truly capture and understand the problems in this area. Through these findings, a full-bodied design solution will be created and tested with 1:1 and/or scaled prototypes. The goal of this design will be to counteract some of the challenges that tattoo artists face in terms of their workflow and comfort, creating a more ergonomic and pleasant place to work with a design that is catered to adapt to the user.

Keywords: tattoo artist, tattoo client, tattoo workstation, ergonomics



Acknowledgements

This project was made possible through the support I received from my professors, advisor, classmates, and friends. The knowledge, willingness to share, and experiences from these groups of people were critical to ensuring the final design was a success and help was given when needed. For this thesis, I would like to acknowledge the following people:

I would like to thank Catherine Chong and Frederic Matovu who were my thesis advisors during this project. Their experience and support helped challenge me to continue exploring my design and understanding the details. Their advice was crucial to aiding me in design decisions and discovering the styling aesthetic. I would also like to thank Michael Vander Velde as our teaching assistant throughout the project. His insight into manufacturing, sketching, and 3D printing has been an asset in refining my design and creating my final model.

I would also like to thank my advisor who provided detailed information and feedback for my designs. They were very giving with their time to share their experience and experiences of tattoo artists in the industry, along with their thoughts and feelings about certain design elements and how they can be improved during our meetings.

Additionally, I would like to thank my classmates and friends in our program. We have endured a challenging four years in which we have learned to be adaptable, where learning from each other and taking the initiative to share feedback was a huge help throughout this project.

Finally, I would like to thank my roommates that have supported me and given me feedback throughout this journey, especially Nicole, who was a great help in looking over my work and printing things for me. Finally, I would like to thank my partner, Thomas Purchase. Getting to work together through all the hardship and the joys of this project with another Industrial Designer was a huge support for all the times I needed understanding and advice.

Table of Contents

6	Abstract	46
7	Acknowledgements	48
7	Table of Contents	50
10	Chapter 1 Introduction	52
12	1.1 Problem Definition	54
12	1.2 Rationale & Significance	56
14	1.3 Background, History, & Social Context	56
16	Chapter 2 Research	56
18	2.1 User Research	57
18	2.1.1 User Profile Persona	58
20	Example User Personas	58
22	2.1.2 Current User Practice	59
23	2.1.3 User Observation Activity Mapping	60
24	2.1.4 User Observation Human Factors of Existing Products	62
24	2.1.5 User Observation Safety & Health of Existing Products	62
25	2.2 Product Research	66
25	2.2.1 Benchmarking Benefits and Features of Existing Products	69
27	2.2.2 Benchmarking Functionality of Existing Products	69
28	2.2.3 Benchmarking Aesthetics and Semantic Profile of Existing Products	70
30	2.2.4 Benchmarking Materials & Manufacturing of Existing Products	72
30	2.2.5 Benchmarking Sustainability of Existing Products	74
31	2.3 Summary of Chapter 2	76
32	Chapter 3: Analysis	78
34	3.1 Analysis Needs	80
34	3.1.1 Needs & Benefits Not Met by Current Products	80
35	3.1.2 Latent Needs	81
36	3.1.3 Categorization of Needs	82
36	3.2 Analysis Usability	86
36	3.2.1 Journey Mapping	90
36	3.2.2 User Experience	95
38	3.3 Analysis Human Factors	96
39	3.3.1 Product Schematic Configuration Diagram	101
39	3.3.2 Ergonomic: 1:1 Human Scale Study	101
42	3.4 Analysis Aesthetics & Semantic Profile	101
43	3.5 Analysis Sustainability Safety, Health, & Environment	101
45	3.6 Analysis Innovation Opportunity	102
45	3.6.1 Needs Analysis Diagram	106
45	3.6.2 Desirability, Feasibility, & Viability	110
	Chapter 4: Design Development	112
	4.1 Initial Idea Generation	116
	4.1.1 Aesthetics Approach and Semantic Profile	117
	4.1.2 Mind Mapping	120
	4.1.3 Ideation Sketches	127
	4.2 Concepts Exploration	130
	4.2.1 Concept One	132
	Concept Exploration for Concept One	
	Concept Development for Concept One	
	4.2.2 Concept Two	
	Concept Exploration for Concept Two	
	Concept Development for Concept Two	
	Further Concept Exploration	
	4.3 Concept Strategy	
	4.3.1 Concept Direction and Product Schematic	
	4.4 Concept Refinement and Validation	
	4.5 Concept Realization	
	4.5.1 Design Finalization	
	4.5.2 Physical Study Models	
	4.6 Design Resolution	
	4.7 CAD Development	
	4.8 Physical Model Fabrication	
	Chapter 5: Final Design	
	5.1 Design Summary	
	5.2 Design Criteria Met	
	5.2.1 Full-Bodied Interaction Design	
	5.2.2 Materials, Processes, and Technology	
	5.2.3 Design Implementation	
	5.3 Final CAD Rendering	
	5.4 Physical Model	
	5.5 Technical Drawings	
	5.6 Sustainability	
	Health	
	Safety	
	Sustainability Statement for Final Design	
	Chapter 6: Conclusion	
	References	
	Appendix A	
	Appendix B	
	Appendix C	
	Appendix D	
	Appendix E	
	Appendix F	
	Appendix G	
	Appendix H	

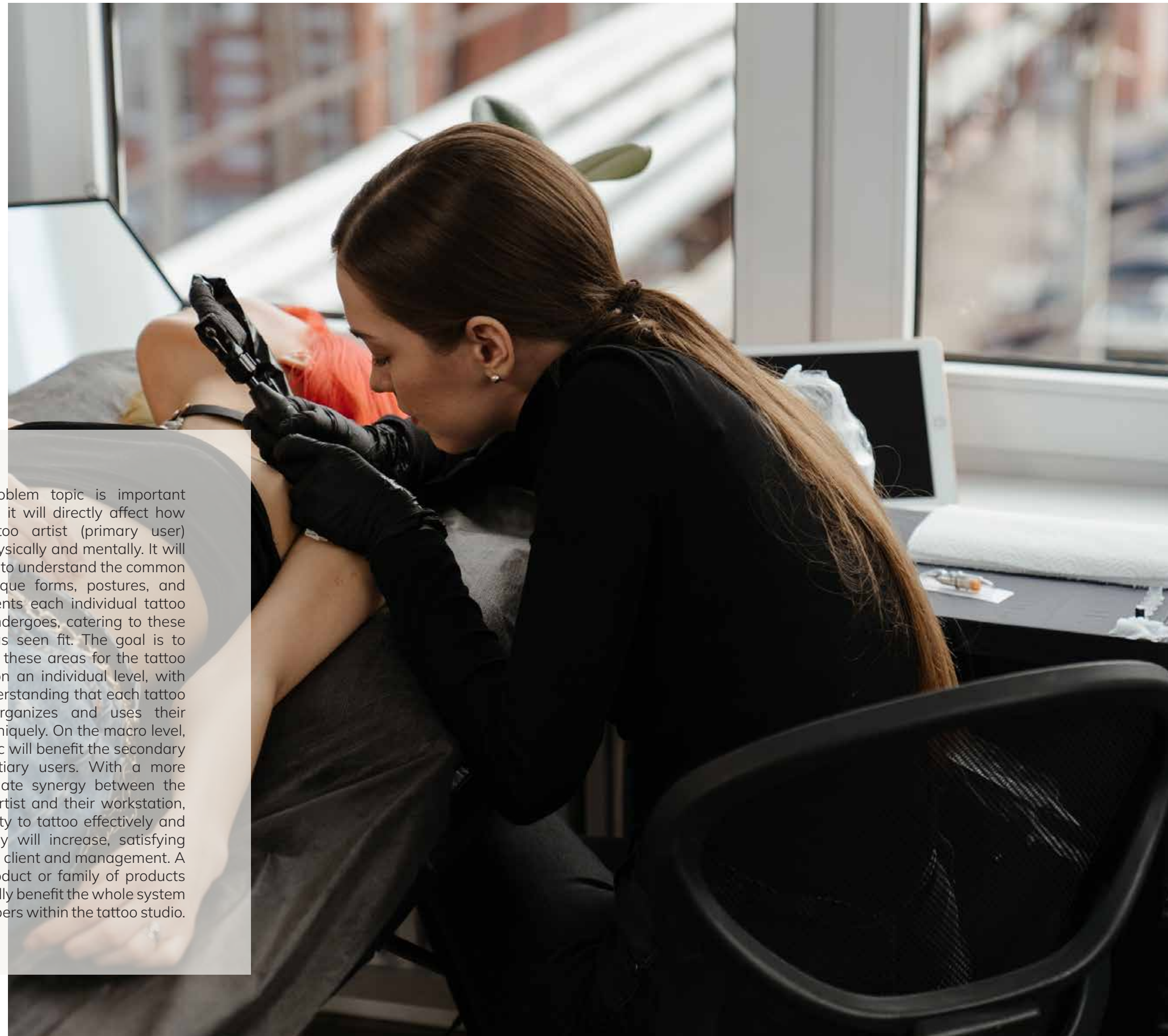
The background of the slide features several thick, light-colored wavy lines that flow from the top left towards the bottom right, creating a sense of movement and depth.

chapter 1

Introduction

- 1.1 Problem Definition
- 1.2 Rationale & Significance
- 1.3 Background, History, & Social Context

This chapter will discuss the importance of understanding the topic area, including contextual, historical, and social information that illustrates the need for a new product design in the tattooing industry.



This problem topic is important because it will directly affect how the tattoo artist (primary user) feels physically and mentally. It will attempt to understand the common and unique forms, postures, and movements each individual tattoo artist undergoes, catering to these needs as seen fit. The goal is to improve these areas for the tattoo artists on an individual level, with the understanding that each tattoo artist organizes and uses their space uniquely. On the macro level, this topic will benefit the secondary and tertiary users. With a more appropriate synergy between the tattoo artist and their workstation, the ability to tattoo effectively and efficiently will increase, satisfying both the client and management. A new product or family of products will ideally benefit the whole system of members within the tattoo studio.

1.1 Problem Definition

Tattooing is a precise and permanent procedure that is made possible by the effectiveness of tattoo artists' ability to work in their environment. Tattooing has been a practice for thousands of years (Lineberry, 2007) but has become more mainstream in the 1970s (Custom Tattoo Design, 2022). Still, as the growth in this industry continues to rise, ergonomic considerations, tattoo furniture, technology, and equipment have had considerably less evolution to keep in pace with their users (The Editorial Unit, n.d.). To this day, studies surrounding tattoo artists and their work-related problems were noted as "understudied" and "inexistent" as the first statement of importance (Keester & Sommerich, 2016; Kluger, 2017; Ohio State University, 2017). Currently, tattoo artists suffer from poor ergonomic conditions as a result of adapting to furniture and equipment that are not officially suited for long hours of precise work in varying tattooing positions (Keester & Sommerich, 2016). Furthermore, tattoo clients are often found lying uncomfortably on hard-foamed tattoo beds in awkward positions enduring a painful procedure. Some problems in this area include tattoo artists suffering ergonomic pain specifically in their back and neck from constantly leaning into their detailed work (Keester & Sommerich, 2016), poor/improper lighting for their working conditions (Keester & Sommerich, 2016), sitting for long periods of time (Ohio State University, 2017), and tattoo clients experiencing pain while sitting in uncomfortable positions.

1.2 Rationale & Significance

The research in the tattoo industry is primarily pictured around negative implications for the client, the same cluster of articles referencing each other, and studies that need to pull from research in different industries (dental) to achieve relevant information. Within these studies, and after conducting preliminary qualitative research, it is prominent that tattoo professionals are an understudied worker population that suffer from serious ergonomic-related problems. This topic will focus on dignifying and understanding the problems this under-represented group of people experience.

1.3 Background & Social Context

The oldest signs of tattooing were found in 1991 known as the “Iceman”; a “5200-year-old frozen mummy” (Lineberry, 2007) with a series of tattoos lining his spine, knee, and ankle joints. Their placements suggested that the dedication of these tattoos were believed to be therapeutic in nature to alleviate joint pain (Lineberry, 2007). Tattoos have been known as ways to represent “amulets, status symbols, declarations of love, signs of religious beliefs, adornments, and even forms of punishment” (Lineberry, 2007). Today, tattoos are accredited more closely to bodily art that stands for self-expression, self-identity, and self-acceptance (Strübel & Jones, 2017).



With a continual market growth of 8.4% annually in the US (IBISWorld, 2021), this large, \$1.4 billion worth industry (IBISWorld, 2021) encompasses tattoo artists at its core, which is why the lack of industry research and ergonomic regulations is shocking. Tattoo artists spend thousands of dollars on their workstations and sanitization measures that are often not catered directly to their industry. Poor design decisions in current market products and having to borrow workstation setups from other industries are large hindering factors of workflow and comfort for these hardworking people.



chapter 2

Research

2.1 User Research

2.1.1 User Profile - Persona

User Demographics: Tattoo Artists

Example User Personas

2.1.2 Current User Practice

2.1.3 User Observation: Activity Mapping

2.1.4 User Observation: Human Factors of Existing Products

2.1.5 User Observation: Safety & Health of Existing Products

2.2 Product Research

2.2.1 Benchmarking: Benefits and Features of Existing Products

2.2.2 Benchmarking: Functionality of Existing Products

2.2.3 Benchmarking: Aesthetics and Semantic Profile of Existing Products

2.2.4 Benchmarking: Materials & Manufacturing of Existing Products

2.2.5 Benchmarking: Sustainability of Existing Products

2.3 Summary of Chapter 2

This chapter will discuss the various methods used to understand the users involved with this problem definition, benchmarking, and the findings in both primary and secondary research. This information is crucial to creating informed design decisions and becoming familiar with this under-researched topic.

2.1 User Research

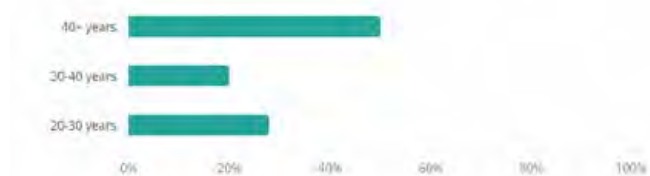
To further understand the challenges that tattoo artists experience, primary and secondary research was conducted through five 1:1 interviews, user observations, user video observations, and literature reviews. This information was documented and coded to understand the various challenges that the user experiences to guide the design decisions needing to be made in the final human-centric design solution.

2.1.1 User Profile | Persona

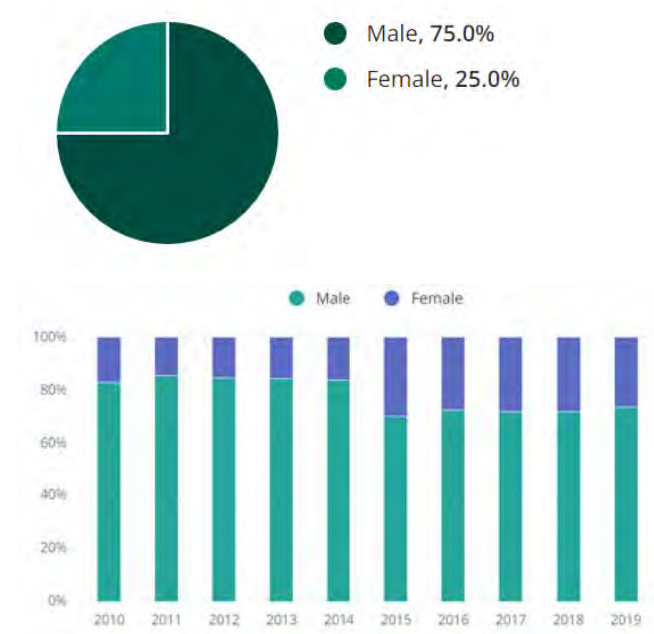
Primary User	Tattoo Artist
Secondary User	Tattoo Client
Tertiary User	Tattoo Studio Owner

These users will be taken into account when designing the final holistic solution for this thesis project. The primary user is the tattoo artist, where the majority of user research has been conducted to understand this user's pain points, needs, and wants. As a result, the tattoo client becomes the secondary user because they are directly impacted by the tattoo artist's ability to tattoo effectively in their space, and will be sitting/lying in the tattoo artist's tattoo booth for prolonged periods of time. The tattoo studio owner as the tertiary user will be considered for design solutions to be catered to all types of studio spaces, whether permanent or modular/removable tattoo booths depending on the space.

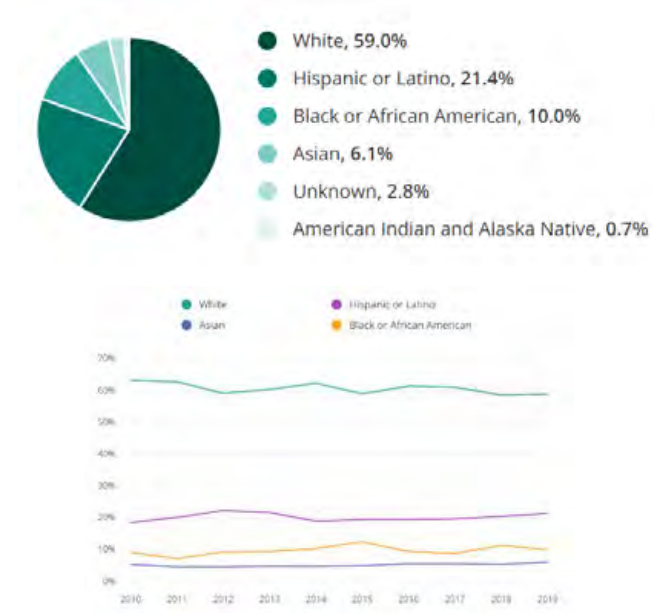
User Demographics



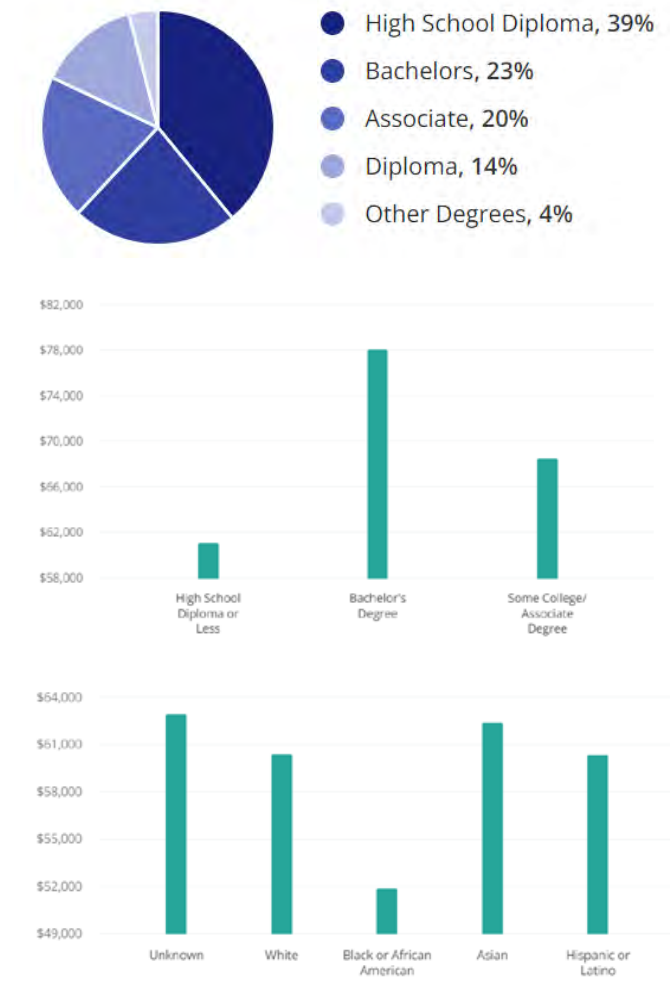
Age | The majority of tattoo artists (50%) in the United States are 40-years-old or older, with the second age group being 20-30 years old taking up about 30% of the tattoo population (Zippia, 2019).



Gender | Tattoo artists are predominantly male, making up about 75% of the tattoo artist population in the United States as of 2019. This percentage has decreased by about 10% since 2014 as more female tattoo artists are joining the industry (Zippia, 2019)



Race | As of 2019 in the U.S., the tattoo industry has predominantly White tattoo artists. The race of tattoo artists has varied since 2010 (Zippia, 2019).

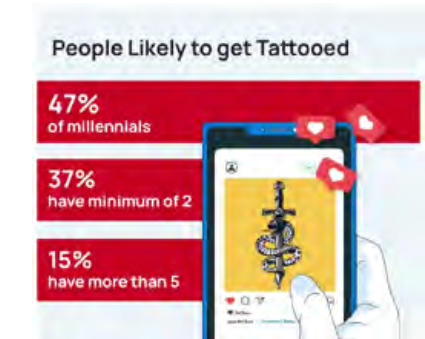
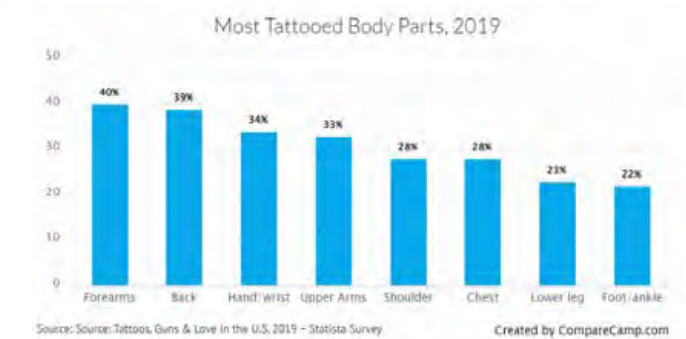


Income | Tattoo artists in the U.S. with Bachelor's Degrees earn the highest income of about \$78,000 annually. This is compared to tattoo artists with only a High School Diploma, which earn about \$61,000 annually. Unknown or Asian tattoo artists receive the highest average salary of about \$62,000 and Black or African American tattoo artists receive the lowest salary of about \$52,000.

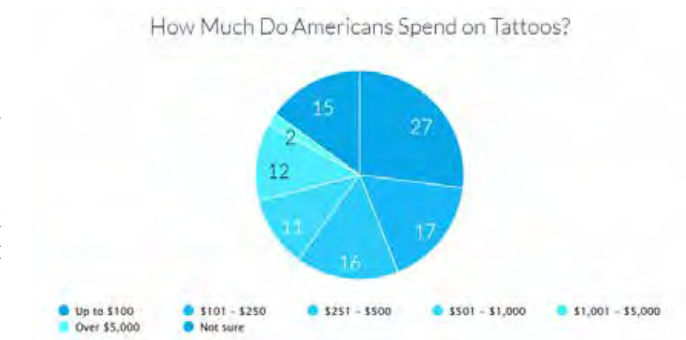
Summary of Demographics

Age	40+
Gender	Mostly male (75%)
Race	White
Income	Bi-Modal High School Diploma: \$61,000 Bachelor's Degree: \$78,000
Education	High School Diploma

User Behaviour



Frequency | The most frequently tattooed body parts in the U.S. in 2019 are the forearms and back (Zuckerman, 2020). Nearly 50% of Generation Z and millennials (18-35) have at least one tattoo in the U.S. This percentage continues to decrease as the number of tattoos increases (Tattoo Pro Admin, 2021).



Purchasing Behaviour | Americans typically spend about \$100 USD on their tattoos, followed by \$101-\$250 USD (Zuckerman, 2020). This amount of expenditure usually qualifies for smaller tattoos, about 2" x 2" maximum (Tattoo Pro Admin, 2021), meaning the majority of people in the U.S. are purchasing smaller tattoos, possibly as their only tattoo.

Example User Persona | Tattoo Artist

Name	Tanya Miller
Age	29
Job	Full-Time Tattoo Artist
Income	\$78,000
Education	BFA
Relationships	Boyfriend
Location	New York, US
Frequency	Tuesday-Sunday, Admin on Mondays
Duration	Up to 8-hour long sessions w/ breaks
Social/Solitary	Solitary
Other Tasks	Client communication, administrative work, technology

Profile | Tanya Miller is a 29-year-old Full-Time Tattoo Artist with a BFA. She has 3 years of experience in the tattoo industry with an income of about \$78,000. After completing her tattoo apprenticeship, she has continued to build her experience as an artist and develop her personal style. Currently, she is looking to upgrade her tattoo workstation to find products that work with her workflow and provide more comfort.

User Behaviour | Tanya primarily works from Tuesdays-Sundays and takes Mondays to catch up on emails, communicate with clients, sketch custom tattoos, and rest from the long working days. She is a creative and skilled tattoo artist that is building a great reputation and is starting to build quite a reliable, self-sustaining clientele. She is motivated by the ability to create and is hoping to improve the usability of her workstation, with possibly integrated technology as a new interest for her recently.

Tanya's Relationship with Her Workstation | Tanya has been using the same setup since she was a tattoo apprentice and is looking for a change that is more cohesive; a workstation system that works together well with her workflow, provides more comfort, and beats the current solutions in the market. She is looking for something new but familiar, something she can use comfortably right away without large learning curves, but also something that is modern and an improvement compared to her current workstation.

Since Tanya uses her station nearly every day, often multiple times a day, she wants it to be easy to clean, comfortable to work at, and reduce pain from sitting in awkward positions for multiple hours - for both her and her client. She is hoping to purchase a holistic system that she can adapt her workflow to effectively. This station should become her home away from home, since she will be spending long periods of time at this place with her clients.



Example User Persona | Tattoo Client

Name	Joanne Lee
Age	26
Job	Marketing Coordinator
Income	\$57,000
Education	Diploma in Commerce
Relationships	Girlfriend
Location	New York, US
Frequency	3-5 tattoos/year
Duration	3-5 hour sessions
Social/Solitary	Solitary
Other Tasks	Enjoys art, creative hobbies, self-expression

Profile | Joanne Lee is a 26-year-old Marketing Coordinator with a BCom. She has recently started getting tattoos and has found she starts to get 1-2 tattoos a year. She is eventually looking to start going more frequently and build a tattoo sleeve when she has the appropriate savings from her average salary of \$57,000. She has found a tattoo artist, Tanya, and appreciates her style and has had a few successful tattoo sessions from her. She would like to continue to go to Tanya as her dedicated tattoo artist as she has a personal passion for art and enjoys Tanya's creative tattoo designs.

User Behaviour | Joanne enjoys saving up her money when she can to visit Tanya and have tattoos done, often 1-2 per year. Most of her tattoos are smaller in size and complexity, taking 1-3 hours to complete, but she wants to increase this to having longer, larger tattoo sessions. She usually books on the weekends when she is not working her Marketing Coordinator office job. She is happy with Tanya's ability to respond quickly to her tattoo requests, but she finds herself a bit uncomfortable sitting at her workstation for prolonged periods of time.

Joanne's Relationship with Tanya's Workstation | Joanne greatly appreciates Tanya's technical skill and artistic ability, which is why she puts up with the less-desirable client bed that Tanya has. This bed is hard and thin, making her muscles hurt after lying on the bed for one hour. After longer sessions, she finds some of her body parts fall asleep. While she loves Tanya's work, she is hoping for an improvement in her workstation's comfort and usability if she chooses to continue collaborating with Tanya.





2.1.2 Current User Practice

The majority of tattoo artists are able to pick their own days and hours that they are in the shop after they are officially a tattoo artist. This allows the user profile to work Tuesday-Sunday, knowing that this would be the days most of her clients would be getting tattoos, and take Monday off to work on custom tattoo pieces, admin work, and rest. This user is motivated by creativity and art, likely with an artistic background, and enjoys having her art become permanent on her clients' bodies. Although money is a large factor, this artist is more inspired by her work than the money she makes. She appreciates the ability to create a schedule that aligns with her lifestyle, and

enjoys engaging in her other creative hobbies outside of work. Her shop location would be in New York, where there is a large population of tattooed people (31%) (Campanile et al, 2019).

It is important to note that user personas for this thesis vary from the average demographic statistics. For example, this thesis will focus on a female tattoo artist with a Bachelor's degree education, which will likely result in a higher income and ability to purchase more expensive, designed equipment for their tattoo workstation (Zippia, 2019).

2.1.3 User Observation | Activity Mapping

A user observation was conducted during the research phase to understand the processes that the tattoo artist and tattoo client experience. These photos below were taken during the average tattooing time from before the client enters the studio to when the client leaves the studio.



The artist set up a dental bib, distilled water, cleansing solution/alcohol, compostable plastic wrap, tongue depressor, compostable ink cups, gloves, and paper towels. They put down a plastic film to cover the wooden station. After this, they wrapped their tattoo machine and prepared their ink and water.



Here the tattoo artist first printed a few different sizes on paper to test the right size and placement on the client in front of the mirror. After the size was chosen, the artist printed the stencil again with ink to stick to the client's skin.



The tattoo artist then found the correct inks to mix together to receive the right colours for the tattoo. They began the tattooing process after the client was laid down on the bed on their stomach to tattoo the back of the upper arm.



2.1.4 User Observation | Human Factors of Existing Products

Majority of the products used in the tattoo industry are dedicated to other industries such as the dental industry, for massage therapists, for salons, for mechanical workshops, etc. (Keester & Sommerich, 2016). With client beds, these products are usually adjustable in angle to allow the user to sit up, sometimes adjustable in length, and have a headrest and armrest. Although, tattoo artists from the 1:1 interviews have mentioned that any armrests attached to the client bed are “useless” and are usually “taken off the bed immediately” due to their ineffective nature and how it gets in the way of access to the client. The tattoo chair for the tattoo artist is nearly always a backless stool with wheels for the artist to move freely. From interviews and literature reviews, tattoo artists have mentioned how backrests can be ineffective sometimes for their workflow because they are leaning forward constantly, although a small backrest would be preferable (Keester & Sommerich, 2016). Tattoo artists have mentioned how the cushions for these products can sometimes be hard and uncomfortable to lie on or sit on for long periods of time.

Some tattoo artists from interviews have mentioned how the Husky Mobile Workbench is the most common tattoo storage and work surface bought for use. This chest has been notably heavy to maneuver (220 lbs) and while this is a staple for most artists, downgrading in size or purchasing an additional work surface is necessary for easier usability.

2.1.5 User Observation | Safety & Health of Existing Products

Due to the sterility necessary in this environment, non-porous materials and work surfaces are the most common in this industry. This includes primarily synthetic leather for tattoo beds and stools and metal or glass for work surfaces. Other materials must also be single-use and disposed of after use to ensure the limitation of cross-contamination. For this thesis project, the main goal was to ensure this level of sterility is kept for the health and safety of the users while using familiar materials. All surfaces must be smooth so that they are easy to clean and disinfect.

2.2 Product Research

A series of benchmarking efforts and analysis of the benefits and features of current products on the market was an integral part of the research phase. This research allowed a thorough understanding of how current products are helping users as well as what these products are missing or what could be improved.

2.2.1 Benchmarking | Benefits & Features of Existing Products

Benefits



1	2	3	4	5	6	7	8
InkBed™	Rolling Tattoo Workstation	Massage Table Bed	Portable Desk Tray	Fully Electric Client Bed	Sierra Comfort Low-Level Massage Table	Tattoo Armrest	Mobile Workbench Tool Chest
<ul style="list-style-type: none"> - Out of the way - Unobstructed access - Sit upright for back work - Comfort foam - Low-Profile - Non-slip 	<ul style="list-style-type: none"> - Great for your power supply cables through - Easily wind up - Easy access - Holds your gloves - Quick and easy access - Place any large liquids 	<ul style="list-style-type: none"> - Soft and comfortable - Superior strength - Does not require any tools - Legs automatically fall into place - Quick installation - Saves valuable time - Convenient - Easy to move - Travelling - Durable - Holds oils and supplies - Luxurious - Soft - Easy to clean - No offensive smell - Ensures safe and convenient carrying 	<ul style="list-style-type: none"> - Closest to it, easy to work and package - Flexible placement - Preservative and long service life - Clean and easy to clean - Durable - Easy to adjust - Convenient 	<ul style="list-style-type: none"> - Whisper quiet movement - Extreme comfort - Massage Table conversion - Quickly and easily removed - Durable cushion - Maximum comfort - Easy cleaning and portability 	<ul style="list-style-type: none"> - Portable - Closer to the ground - Lightweight, yet durable - Stable frame - Safe - Reliable - Practical - Affordable 	<ul style="list-style-type: none"> - Your back will be less tired - Holding weight - More hand comfort - Lifetime warranty - Longlasting - Adjustable 	<ul style="list-style-type: none"> - More storage capacity - Large work surface - Easy access to power outlets - Plenty of storage options - Works with heavier items - Protecting tools and drawers - Easily move around - Prevents slamming - Minimal assembly required

Features



1	2	3	4	5	6	7	8
InkBed™	Rolling Tattoo Workstation	Massage Table Bed	Portable Desk Tray	Fully Electric Client Bed	Sierra Comfort Low-Level Massage Table	Tattoo Armrest	Mobile Workbench Tool Chest
<ul style="list-style-type: none"> - Swing-out - Cobra-style - High-density - Removable, extendable - 360-degree rotation - Steel welded construction - Heavy duty - Additional length - Length extendable - 144 lbs - Weight capacity: 400 lbs - 21" x 15" seat - 69" length extendable to 83.5" - 24"-30" height range on wheels 	<ul style="list-style-type: none"> - Steel - Black matte paint finish - Large counter - Additional side table - Removable and cleanable - Pull out drawers - Double door storage - 29.25" x 38" x 13" - 58 lbs 	<ul style="list-style-type: none"> - High-density sponge - Reinforced beech frame - Support cables - Reinforced hardwood - Portable - Sturdy feet - Height adjustable - Carrying case - Adjustable shoulder strap - Side pocket - PU leather - Secure lock - 34 lbs - 24"-33" height adjustable - Weight capacity: 450 lbs 	<ul style="list-style-type: none"> - Match with technical chair - Magnetic - International size - Stainless steel plate - Spray plastic cover - Fixed position - Rotate 360 degrees - 70cm x 68 cm x 12 cm 	<ul style="list-style-type: none"> - Digital touch-sensor remote - Independent electric controls - High-density foam - 26"-31" height adjustable - 72"-78" length adjustable - Padded and sturdy - Welded Steel - Steel 	<ul style="list-style-type: none"> - PU leather - 73" x 33.5" x 16.5" x 24.5" height adjustable - 38 lbs - Weight capacity: 400 lbs - 9 point adjustments 	<ul style="list-style-type: none"> - Height and tilt adjustment - Metal frame - Powder painting - 26.4" - 43.3" height adjustment - Angle adjustment - Quality equipment 	<ul style="list-style-type: none"> - 9-drawers - 50.5" x 28.8" x 34.3" - Solid wood - 220.7 lbs - Drawers support up to 100 lbs - Soft-closing drawers - Welded steel - Rust-resistant powder - Ergonomic tubular side handle

2.2.2 Benchmarking | Functionality of Existing Products

Based on the benefits and features listed from these benchmarked products, the main points were coded (Appendix D) to achieve the top functionality aspects of existing products on the market.

Features	Benefits
Extra Surfaces <ul style="list-style-type: none"> - Storage space - Holding spaces - Magnetic - Removable 	Accessible <ul style="list-style-type: none"> - Easy to maneuver - Easy to work with - Easy access to client - Adjustable
Adjustable <ul style="list-style-type: none"> - Length-extendable - 360° rotation - Height-adjustable - Swing-out - Sturdy feet 	Efficient <ul style="list-style-type: none"> - Reduces time - Easy to open/close/move - Easy to carry - Quick installation
Materials <ul style="list-style-type: none"> - Steel/stainless steel - PU leather - Black matte paint finishes - High-density sponge - Wood 	Durable <ul style="list-style-type: none"> - Makes the client feel safe - Preserves quality of materials - Strong, can withstand different weights - Long service life
Security <ul style="list-style-type: none"> - Carrying cases - Secure locks - Shoulder straps 	Comfortable <ul style="list-style-type: none"> - Luxurious feeling - Easy to relax/sit on for long periods of time

It is clear that most products found at tattoo workstations have a wide range of adjustability. Some products have many adjustable functions, while others are stationary and non-adjustable. As well, some products have multiple functions such as a work surface and a light combined or can be folded into a carrying case.

When looking at tattoo beds, the more convenient beds have a hydraulic height adjustment that can be used to raise and lower the bed. These beds can also usually be swivelled in 360°. Other beds have to be manually adjusted which includes flipping the bed over and using tools to do so. Although, the less bulk on these beds tend to be more aesthetic and have a cleaner appearance because of the less technology involved.

Overall, almost all products in this market are made of painted steel and cushions are high-density to provide perceived support, although these cushions are usually flat and rectangular to function as a bed and a seat with less hassle.

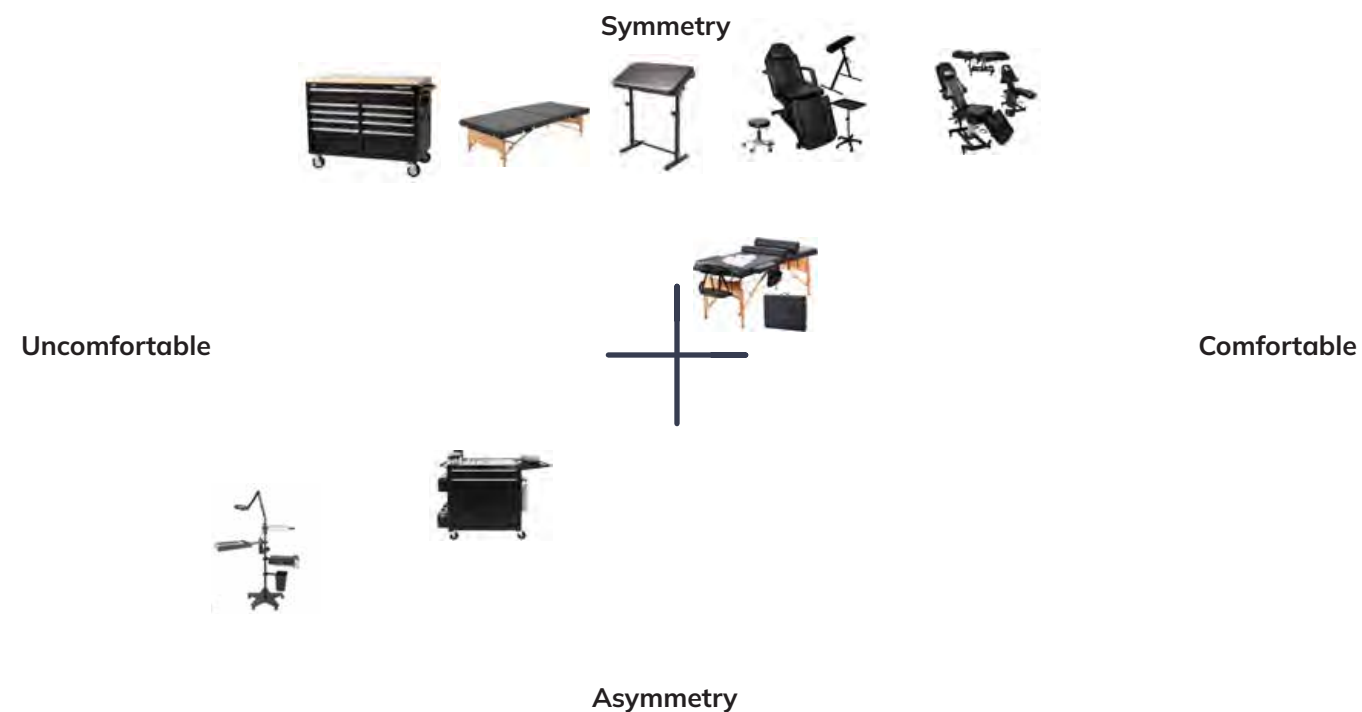


2.2.3 Benchmarking | Aesthetics & Semantic Profile of Existing Products

Aesthetics

	1	2	3	4	5	6	7	8
Shape	Rectilinear	Rectilinear	Rectilinear	Rectilinear	Recilinear	Rectilinear	Rectilinear	Rectilinear
Balance/Symmetry	Symmetrical	Asymmetrical, appears balanced	Asymmetrical	Asymmetrical, appears somewhat unbalanced	Symmetrical	Symmetrical	Symmetrical	Symmetrical, appears very sturdy
Colour/Material	Black, PU leather, steel	Black, steel	Black, PU leather, steel, wood	Black, steel	Black, PU leather, steel	Black, PU leather, steel, wood	Black, PU leather, steel	Black, steel
Apperances from Client	Appears comfortable, caters to human body	Appears useful, sleek and minimal	Appears relaxing, comfortable	Appears a bit uncomfortable, unsteady	Appears comfortable	Plain, unremarkable	Large, comfortable, plain	Appears useful, large compartments, utility focused

Visualization Chart



Further analysis of tattoo beds shows that a more “bubbly” and soft form of tattoo furniture aesthetic has been more common, likely to appear more friendly to tattoo clients during their painful procedure. Aesthetics in tattoo worksurfaces continue to be multi-functional with primarily black-painted metal and hard, square, sharp edges.

In general, an industrial and functional approach to worksurfaces has been proven as a common theme. Understanding the need for drawers, height adjustability, wheels, and surfaces is popular in this industry, which are usually executed with rectangular shapes imitating tables and other common worksurfaces that may or may not be useful.

From this aesthetic analysis, it is clear that black and metal are the most common colours and materials used at tattoo workstations, likely because the most common colour of ink is black which may spill onto surfaces at the workstation. This association of the colour black is a semantic that tattoo clients and artists may have with what they expect to see or purchase. Although, recent trends in tattoo beds show that exploration in other colours and a more “friendly” approach to the design language, especially for the client, is possible. Although, most client beds/massage beds are primarily rectangular in form, with some exploring more ergonomic and comfort-appealing forms for the client.

2.2.4 Benchmarking | Materials & Manufacturing of Existing Products

Majority of the materials in the tattoo industry currently are made of matte black painted steel, stainless steel, PU leather and sponge, and/or occasionally plastic. The processes primarily used to make these workstation furniture pieces include die-cast, stamped, injection molded, and wrapped PU leather around cushions.



2.2.5 Benchmarking | Sustainability of Existing Products

The tattoo industry currently has few initiatives in sustainable design, primarily because of the need for sterility and mass production (Canadian Tattoo and Piercing Regulations, 2018). Although some options are available primarily in tattoo supplies, such as biodegradable ink cups/plastic wrap or the use of autoclaves instead of single-use needles, minimal attention is focused on making the furniture sustainable to populate the tattoo artist's workstation.

Unfortunately, because of the lack of sustainable furniture options in the industry, the need for a more eco-conscious tattoo workstation design is indisputable. Currently, some of the only ways that the tattoo industry is pushing towards a more sustainable future is seen in the example of the "META Workstation". Initiatives are made here to create an all-in-one drawer workstation unit that is customizable to the user, reducing the need for the user to buy multiple different storage options for different needs. All-in-one solutions are starting to become more popular in the tattoo industry, becoming smarter with material usage and cost as a progression towards less consumption. This makes the initiatives that this thesis design is taking a large step in providing more eco-conscious and long-lasting designs in studios.



2.3 Summary of Chapter 2

After conducting various primary research and secondary research, the primary user of this thesis is the Tattoo Artist, with the Tattoo Client as the secondary user and the Tattoo Studio Owner as the tertiary user. This thesis focuses heavily on both the Tattoo Artist and Tattoo Client as important members of the final design solution as one cannot exist without the other and cohesion and a designed relationship between the two is necessary.

The user profile is looking at primarily men and women tattoo artists between the ages 20-45 that work at professional tattoo studios with a Bachelor's Degree. Statistics have shown that having a Bachelor's Degree makes the artist more likely to have a greater income (Zippia, 2019), resulting in more savings to spend on tech-integrated equipment for their tattoo booth.

Overall, a tattoo artist's job is different from a typical 9-5 work week. Similar to being self-employed, tattoo artists usually get to pick their own hours and days of work, which can be dependent on their clients. Their clients must also cater to their work week, and some clients may need to book days off of their work to have their tattoo(s) during the weekdays. As well, tattoo artists have many jobs even before the tattoo client is in the studio. This includes designing the tattoo, administrative work, and bookkeeping.

Current products in the market vary in functionality but stay relatively within the same aesthetic. Usually, a higher price tag means more functional and durable equipment for the tattoo artist's workstation, but there are little to no entire system or families of products that work together in one entire tattoo booth. From this research, the data can be analyzed to illustrate what the user needs and wants for their workstation.



The background of the slide features several thick, light-colored wavy lines that flow from the top left towards the bottom right, creating a sense of movement and depth.

chapter 3

Analysis

- 3.1 Analysis: Needs
 - 3.1.1 Needs & Benefits Not Met by Current Products
 - 3.1.2 Latent Needs
 - 3.1.3 Categorization of Needs
- 3.2 Analysis: Usability
 - 3.2.1 Journey Mapping
 - 3.2.2 User Experience
- 3.3 Analysis: Human Factors
 - 3.3.1 Product Schematic: Configuration Diagram
 - 3.3.2 Ergonomic: 1:1 Human Scale Study
- 3.4 Analysis: Aesthetics & Semantic Profile
- 3.5 Analysis: Sustainability: Safety, Health, & Environment
- 3.6 Analysis: Innovation Opportunity
 - 3.6.1 Needs Analysis Diagram
 - 3.6.2 Desirability, Feasibility, & Viability

This chapter will take the information from primary and secondary user research and more deeply understand the needs of the users through rich analysis.



3.1 Analysis | Needs

After the research process, user needs were analyzed by understanding the benefits and features of current products in the tattoo industry and the improvements needed based on the users' experiences.

3.1.1 Needs & Benefits Not Met by Current Products

By looking at a variety of products along different cost spectrums, it is apparent that many products in the tattoo industry are a similar version of each other. While some products differ in functionality, general design decisions and aesthetics stay within the same range on the market.

Tattooing is a precise and painful procedure where a product can minimize unwanted effects and take precautions to ensure a safe, comfortable, and efficient place to work. The tattoo artist's workstation must work seamlessly with the tattoo artist, providing an inviting and inspiring space to work in and alleviating the stress tattoo clients may experience. The tattoo artist must remain in control at all times, as they are performing a permanent procedure. To obtain this control, the environment and its products must be predictable, accurate, and organized. Furthermore, the artist must feel a sense of belonging and respect in their tattoo shop, which they can then reflect proudly in their work with clients. An adjustable, maneuverable product that caters to the artist's intention would allow the user flexibility with their workstation as every tattoo they do is different from one another. Overall, the client needs a place to work precisely, feel inspired and respected, and have the freedom to be creative - in their work and with the arrangement of their space. Current products on the market lack a familial product approach, where designing products individually guarantees miscommunication and a lack of relationship when put into the same tattoo workstation.



3.1.2 Latent Needs

To understand the users' latent needs is a challenging but worthwhile assignment as it allows the design to go beyond just what the users say they would like, but further proves the understanding of the situation and what would benefit the users the most.

The immediate needs of the user primarily include relieving back pain and neck pain. While this was understood, the relief of pain could also be pushed further into creating intentional comfort, one of the main focuses of this thesis project. While comfort is hoped for in most cases, for tattoo artists, it is something they often must overlook or ignore until the tattoo session is over and their body is in pain - a situation a few tattoo artists have mentioned during the interview process. Understanding that they not only need pain relief but the ability to control their comfort is important.

Another main goal of this thesis is to elevate the workflow experience for the tattoo artist. The term "workflow" itself can often not be tangibly measured, and may not even be noticed unless there are significant hindrances to the artist's workflow. While some interviewed tattoo artists did not specifically mention "workflow" as an issue, likely because of their ability to adapt to challenging situations, the commentary they provided, along with secondary research insights, display the different ways that their workflow could be improved for career longevity. This could include improving reach between the artist and their tools, preventing the need to twist the spine constantly, reducing the ergonomic strain within the workstation environment, introducing new ways to approach tattooing with visible aid, and hands-free design where possible for sterility and ease of use.

These thoughts and examples were heavily considered when designing for the latent needs of the users by digging deeper into their known and unknown experiences.

3.1.3 Analysis | Needs

A summarization of the tattoo artist's immediate and latent needs as well as their wants/wishes can be derived from the research. This tabulation, particularly the latent needs, provides an opportunity to design in a place that is unexpected but needed for tattoo artists.

Immediate Needs	Latent Needs	Wants/Wishes
<ul style="list-style-type: none"> - The need for having their station set up with the correct tools to being tattooing - The ability to clean their tools and surfaces to ensure a safe space to work and tattoo - Accessibility to the tattoo client - Adjustability of the different parts of their workstation (height, length, angle, etc.) - Durable and long-lasting products - To ensure both themselves and their clients feel comfortable/safe with the equipment/space 	<ul style="list-style-type: none"> - To feel inspired by their creative space - To reduce the bulk and increase space in their small tattoo booths - To feel proud of their work and accomplishments with a unique way to display them - To have the products in their space work together intentionally to reduce redundant features and incompatible functionality 	<ul style="list-style-type: none"> - To alleviate their ergonomic pain (back, neck, wrist) - To reduce symptoms of carpal tunnel - To find ways to ensure they are pricing their tattoos appropriately per hour



3.2 Analysis | Usability

To fully understand the nature and workflow that is necessary to tattoo artists, user journey and user experience maps were created from user interviews and user observation as an example "day-in-the-life". These illustrate how tattoo artists use their workstations, their struggles, and their areas of improvement.

3.2.1 Journey Mapping

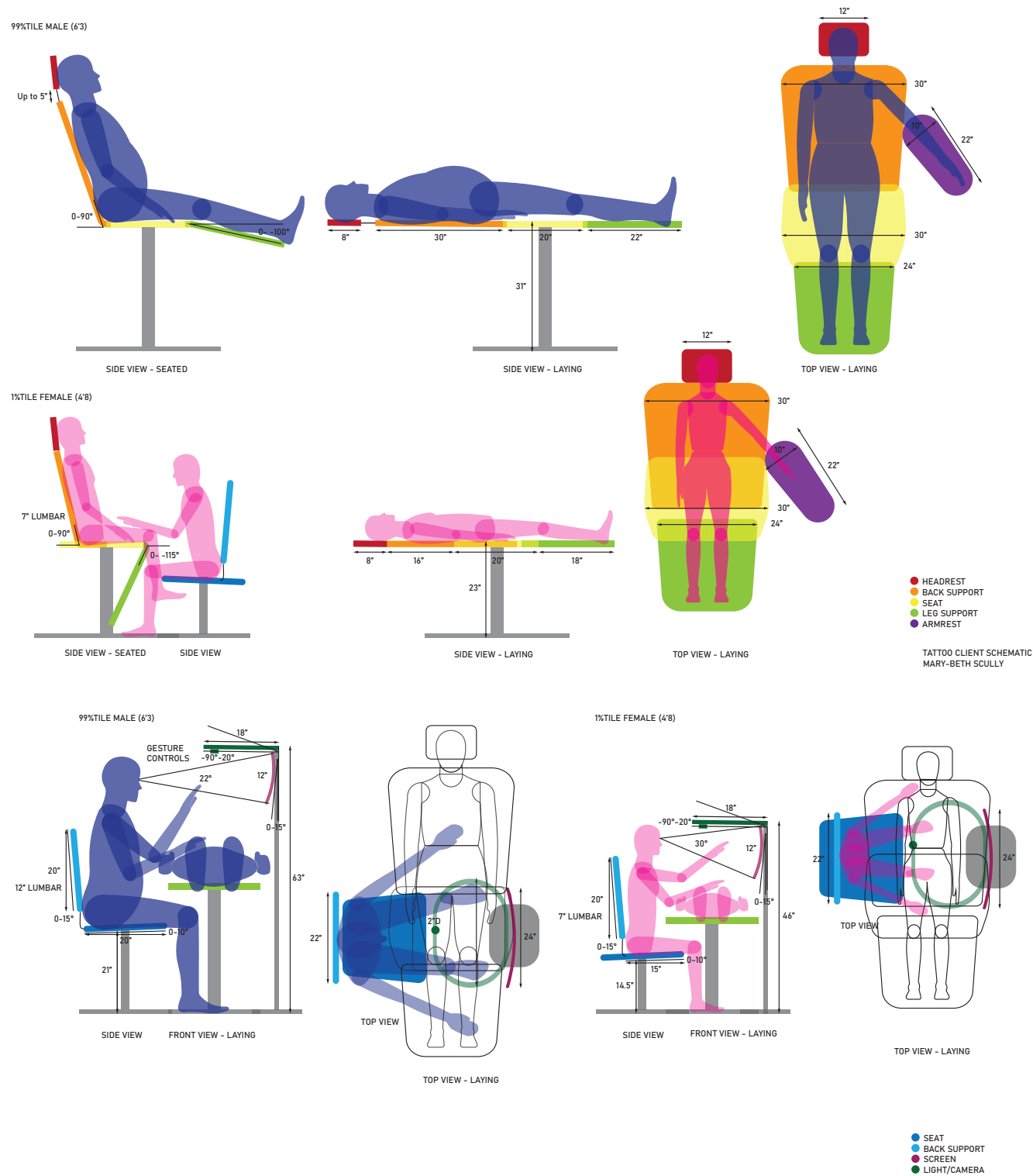
The following journey map shows the actions of the tattoo artist user along with how they are thinking and feeling. This map gives insight into empathizing with the user as they are using their workstation in their dedicated environment.

3.2.2 User Experience

A user experience map was created in conjunction with the user journey map. This map highlights the problem areas that the tattoo artist user is experiencing as they are using their workstation, with additional takeaways on opportunity areas.

	Planning	Preparation	Stencil	Tattooing	Photographing	Aftercare	Goal	Finish Up
User Goals	Designing successful custom tattoo for client	Creating a sanitary, effective workstation with proper supplies	Find the appropriate size for the client's tattoo	Tattoo a clean and safe tattoo providing a safe environment	Capture accurate photo representations of tattoo for social media content	Securely wrap tattoo	Tattoo a successful, clean tattoo and ensuring the client feels comfortable	Tears down and sets up for next client
User Actions	Client communication through emails, 1-2 hours of creating concept using iPad, sitting + drawing on couch	Cleaning all surfaces, wrapping items to be sanitary, preparing ink cups and inks, preparing needles	Printing out paper versions of custom drawing to test size, printing out ink stencil of final tattoo size, finding right placement on arm	Checking reference photos for accuracy constantly, changing ink colours using distilled water, sitting close to tattooed body part/uncomfortable	Waiting for swelling to go own, taking 15-20 photos at different angles, using natural lighting if possible, ring light otherwise, using iPhone	Describing aftercare procedure with client, explaining when they can remove the wrapping	Stretches after tattoo, ensures client feels comfortable and all questions answered, checks to ensure all supplies are ready for next tattoo	Solidifies and throws out water, discards all items into garbage, cleans station/sprays down everything, set up for next client
User Thoughts	I hope they like this tattoo. What if they don't like it? This is taking me longer than I thought	I wish I didn't have to waste so much plastic. Did I spray this table down already? I'll do it again just in case	I think this size would look best, I hope they genuinely like what I made!	I should do this detail first because it's less painful. Should I go over that line again?	I hope these don't turn out shiny, I probably have to edit these. I wish it was still daylight outside	I hope this tattoo heals well, I hope they listen to these instructions	I hope the client feels comfortable, I hope they are as excited as I am! I hope I don't mess up!	My back really hurts from that tattoo, I hope my next client is just as nice
User Feelings	Focused, nervous, prepared	Nervous, calculated, aware	Nervous, excited	Excited, focused, calm	Calm, relieved, satisfied	Calm, satisfied, proud	Happy, satisfied, proud	Nervous, tired, focused
Storyboard/Photos								

	Planning	Preparation	Stencil	Tattooing	Photographing	Aftercare	Short term	Long term
User Goals	Designing successful custom tattoo for client	Creating a sanitary, effective workstation with proper supplies	Find the appropriate size for the client's tattoo	Tattoo a clean and safe tattoo providing a safe environment	Capture accurate photo representations of tattoo for social media content	Securely wrap tattoo	Tattoo a successful, clean tattoo and ensuring the client feels comfortable	Create a self-sufficient clientele and a successful occupation out of tattooing
Problems/Challenges	Hard to find inspiration, difficult to know if the client will like the design	Many things to remember to prepare, messy items, many disposable items / waste	Finding the right size, reapplying stencil constantly	Back/neck pain, lack of lighting, constantly turning spine	Lack of natural daylight lighting, shiny tattoos	Ensure client will follow instructions	Trying to find style, build portfolio, consistent client communication / customer service	Fighting Instagram algorithm, feedback from clients, severe back pain / carpal tunnel
Ideas/Takeaways	Inspiration apps, flash ideas	Organized cleaning supplies by steps, sustainable materials (biodegradable / compostable)	Pre-viewing stencil on body	Organizing station, easier access to clients, better lighting during session	Better lighting options / natural lighting, mitigation, clean backgrounds	Better way to relay message to clients	Having a better system to filter clients / deal with emails / consultations	Content creation abilities, documenting tattoos successfully and attractively to clientele



3.3 Analysis | Human Factors

This next section will further analyze all necessary anthropometric measurements needed for the final design solution. These human factors are integral to designing an accurate human-centric design, with previous research and an ergonomic human scale study used as a guide (Appendix G). These dimensions will further prove the feasibility and viability of the design, particularly with a workstation that demands multi-adjustable components for the tattoo artist and tattoo client.

3.3.1 Product Schematic | Configuration Diagram

This product schematic was produced as a result of the Ergonomic 1:1 Human Scale Study (Section 3.3.2). After correcting the dimensions from this study, a more accurate design visualization could be made. These dimensions were used to begin developing the thesis design and eventually to be used for the CAD model. For updated schematics, view Section 4.5.2.

3.3.2 Ergonomic 1:1 Human Scale Study

For this study, a 1:1 scale model was made and tested with the goal of documenting improvements needed in the ergonomics of the developing design solution. By evaluating and understanding the necessary interaction points both the tattoo artist and tattoo client must endure, the ergonomic design of these human interaction points can be improved to promote better physical and mental wellness. As a result of this observation, ergonomic dimensions were proven and disproven after having the users interact with the product and understand the environment.

Methodology

To visualize human interaction with the developing design solution based on theorized ergonomic dimensions, a 1:1 scale mock-up was constructed using foam core and cardboard. This mock-up was made by first listing all necessary, predicted dimensions for the study using various reports (Herman Miller, n.d.; Tilley, 1993; WOOD Magazine Staff, 2020; USAPHC, n.d.) (Appendix G). Afterwards, various tests were conducted to analyze the interactability, usability, and comfort of the seven major touchpoints: For the tattoo artist, the seat, worksurface, reference screen, and light/camera ring; for the tattoo client, the client bed and armrest. The users tested in this study were a 98%tile Female (5'8.75), 50%tile Male (5'9), and a 60%tile Female (5'4.5). For signed consent forms see Appendix E.

Results

As a result of the study, the ergonomic analysis schematics were updated to reflect the changes made from observing the user's interactions with the 1:1 scale model and the environment. Various improvements were noted throughout the process based on the user's feedback. Each user commented on how the heights, reach, support, and comfort felt for each touchpoint, as well as what they were able to see and what felt natural to them.

Analysis

One of the major overlooked areas of the developing design was the reference screen and light/camera ring. While most of the challenges with the other touchpoints were ergonomic-based, the main difficulties with this part of the design was having the screen not be blocked by the tattoo client while they are on the bed as well as maneuverability, which were components not originally considered when creating the 1:1 buck.

The intention of this reference screen uses a camera, and possibly digital tablet stencil data, to send to the screen. This screen projects a top-down view of what the artist is tattooing, similar to using a tablet with a screen. This idea would act as an aid to avoid staring down/close to the tattoo client constantly, and would intentionally alleviate neck and back pain with the option to look up/straight occasionally instead.

After testing out the screen with each user, 98%tile F noticed that the screen would be too low if a person were to be lying in front of the tattoo artist. This was not originally considered for the dimensions, which were pulled from aligning the screen to eye height as suggested by Tilley (1993). Both 50%tile M and 60%tile F agreed that the screen height would need to be raised. Although this now is slightly less ergonomic, users found that aligning the top of the screen approximately with the top of the tattoo artist's head instead was more appropriate. This small ergonomic sacrifice would be a necessity for visibility.

All users also thought the screen was slightly too long, where you would likely see parts of the tattoo client's body on the screen that would not be necessary for the tattooed area.

Analysis (Cont.)

Another insight would be moving this screen around when seated. It was noted that the screen could only be moved before the tattoo artist sat down for the session, not during, unless they walked around the bed. Perhaps a motorized option could be considered here. The light/camera ring is key to providing an appropriate amount of dimmable and colour-tunable light, with the ability to be angled and moved to light different areas of the body. The camera is magnetically attached to this ring and can be angled, rotated/adjusted to get the right view of the tattoo. This concept could possibly have a camera-tracking feature for the artist to avoid having to adjust or touch the camera while tattooing.

All users immediately noticed a flaw in the light system, which could not be opened while the tattoo client was on the bed. 50%tile M suggested decreasing the width of the light, but 98%tile F said the width was necessary to light all parts of the client's body, including using the armrest. Although reachability and the idea of adjustability were good, improvements needed to be made to ensure seamless opening/closing, perhaps a rethinking of the design. As well, because it is attached to the screen system, the same challenge that the system could not be moved unless manually done on the other side of the bed was unfavourable.



The client bed is made of four parts: the headrest, the backrest, the seat, and the leg rest. These are all adjustable components to accommodate all sizes of people in laying and seated positions. One major issue with the design that all users pointed out was that the bed was not wide enough. Although the shoulders were 26", the seat was set to 22", as suggested in seating design data by multiple sources (WOOD Magazine Staff, 2020; Tilley, 1993). The users said that their hands would fall off the sides. This means that the side of the back, which was the widest, should match or be similar to the width of the seat. All users said that the width of the leg rest is a comfortable size.

This study was an excellent observation of the different user's interactions with the developing design. This process has identified key areas where the pre-determined schematic using textbook dimensions formed challenges when actually being used in a tattooing context, such as the screen being blocked or the seat width not considering a lying down position. These findings illustrated the necessity of testing the proposed design as major challenges and improvement decisions were made by visually understanding these problem areas for all seven touchpoints. Overall, this study provided confirmation and refinement of ergonomic dimensions that were used towards an updated schematic and will help inform the final ergonomic design language for human interaction areas moving forward.

3.4 Analysis | Aesthetics & Semantic Profile

To find inspiration, various possible technologies, motivations in form, and preliminary material search was conducted and an aesthetics profile was made. This profile provides new and familiar ideas that are integrated into the design language and various functionality of the design. For example, the combination of tree branches and finger joint movement were a major inspiration for the beginning design stages in both aesthetic form and mechanical adjustment of the tattoo bed length. This visualization will aid in bringing together a cohesive design solution. Some keywords here include organic mechanical design, nature inspiration, transparent materials, chainmail fabric, and moving technology. For a more detailed description of the chosen semantic profiles, see Section 4.1.1.



3.5 Analysis | Sustainability | Safety, Health, & Environment

The initial thoughts for this thesis is that all materials need to be non-porous, medical-grade, easy to clean, and sterile. Current materials on the market, such as PU leather wrapped over cushions, is very common practice for tattoo beds. Still, this material is not recyclable and after its lifespan, would end up in landfill. The goal for this project was to ensure that the health of the users is not jeopardized while maintaining as sustainable materials as possible that will improve the longevity and lifecycle of the design solution. More information on what materials were selected for the final design can be referenced in Section 5.2.2.

Needs	Benefits & Underlying Needs	Level of Importance
Basic Needs		
Food, water, shelter	A place for the tattoo artist and tattoo client to reside (professional, public tattoo shop, private studio, home studio, etc.) Some artists provide food/water at their station to prevent passing out or combating other symptoms while undergoing the tattooing process	High
Pleasure, comfort	Tattoo Artist: A place to comfortably work, many artist suffer from physical pain from working long hours in unergonomic conditions Tattoo Client: A place to feel calm and reassured, especially while undergoing a painful experience during the tattooing process	High
Security		
Safety	Medical-cleanliness and responsibility is a major concern for both the Tattoo Artist and Tattoo Client to ensure a clean, safe, and good recovery process	High
Securing Resources	Large quantity of items needed to purchase	Medium
	Expenses	High
	Reliability on products	High
Control Over Environment	Ease of use	High
	Accessibility/reach to products	Medium
	Limited movements from both Tattoo Artist and Tattoo Client while tattooing	High
	Maneuverability/adjustability of products	High
Financial Security	Ability to produce self-sufficient tattoo clientele	Medium
	Making efficient amount of money from clients/shop, not underselling themselves for their artwork	High
Social Belonging		
Family in Tattoo Shop	Sense of community within tattoo shop	Medium
	Growing/learning within shop from apprentice to professional tattoo artist	Medium
Art/Tattoo Community	Connecting with other professionals in the field	Medium
	Expressing/sharing tips and ideas with other artists	Low
Social Media Presence	Ensuring a display of successful artwork, clean workstation, and inviting presence; drives bookings for many tattoo artists	High
Esteem		
Acceptance & Appreciation of Preferred Art Style	Avoiding imposter syndrome, appreciated for work they do, trust from client to complete their work	High
Respect within Tattoo Shop	Treated fairly, respectfully	High
	Paid fairly	High
Aesthetics	Tattoo Artists are creative people which are inspired by and appreciate aesthetic yet functional products that match their tattoo booth	Medium
Self-Actualization		
Feeling Inspired	Having the space to create new designs	Medium
	Creating their own space to feel comfortable and creating an inviting space to entice clients to return	High
Creavity	Finding creative outlets other than tattooing to express themselves in other ways	Medium
Creative Breaks	Taking time to complete other activities other than creative work to reduce burnout	Medium

3.6 Analysis | Innovation Opportunity

Since the growth of the tattoo industry, technology, current products on the market, and ideologies surrounding the nature of tattooing have seen minimal improvement over the years. Particularly because there is little to no technology involved in current market products, including technology that can adapt and grow with the user is relevant and applicable to these tattoo artists.

Many design solutions on the market today are not considering the entire tattoo workstation that the tattoo artists and tattoo clients will find a home in. By disregarding this key point, tattoo equipment and furniture are made as individual components that do not work together seamlessly and hinder the tattoo artist's workflow. There is an opportunity here to innovate a solution that ties together various products as a family of products that are catered to the tattoo artist's workflow and meant to work together.

3.6.1 Needs Analysis Diagram

The Needs Analysis Diagram to the left is dedicated to understanding the benefits and underlying needs in tattoo workstations, primarily focusing on client beds, artist's chairs, and work surfaces.



3.6.2 Desirability, Feasibility, & Viability

The desirability behind this thesis project is primarily because designs for the tattoo industry are limited, due to this topic being understudied. This project has the potential to create a family of products that can work in unison to fill tattoo workstations in professional studios. This solution is catered directly for tattoo artists, without generic furniture pieces such as what is currently in the industry that does not work for all artists and all client's body types and can make tattooing in different positions challenging.

This design is predicted to be made feasible in the year 2030, with a combination of existing and anticipated technologies that can elevate the tattooing experience. This design will use materials that are recycled or recyclable with common manufacturing practices and growing processes, such as additive manufacturing using 3D printing.

With the ability to create a new dynamic within a tattoo workstation and tattoo studio, this design solution is predicted to be a well-rounded design that can cater to any tattoo artist or tattoo client's needs. The viability of this design is predicted to be successful due to the need for change and improvement in this niche industry, as well as creating a solution that goes beyond immediate needs and targets the users' latent needs as well. This investment would provide a long-lasting, career-changing experience for tattoo artists who are currently sacrificing their physical and mental well-being for insufficient workstation furniture.



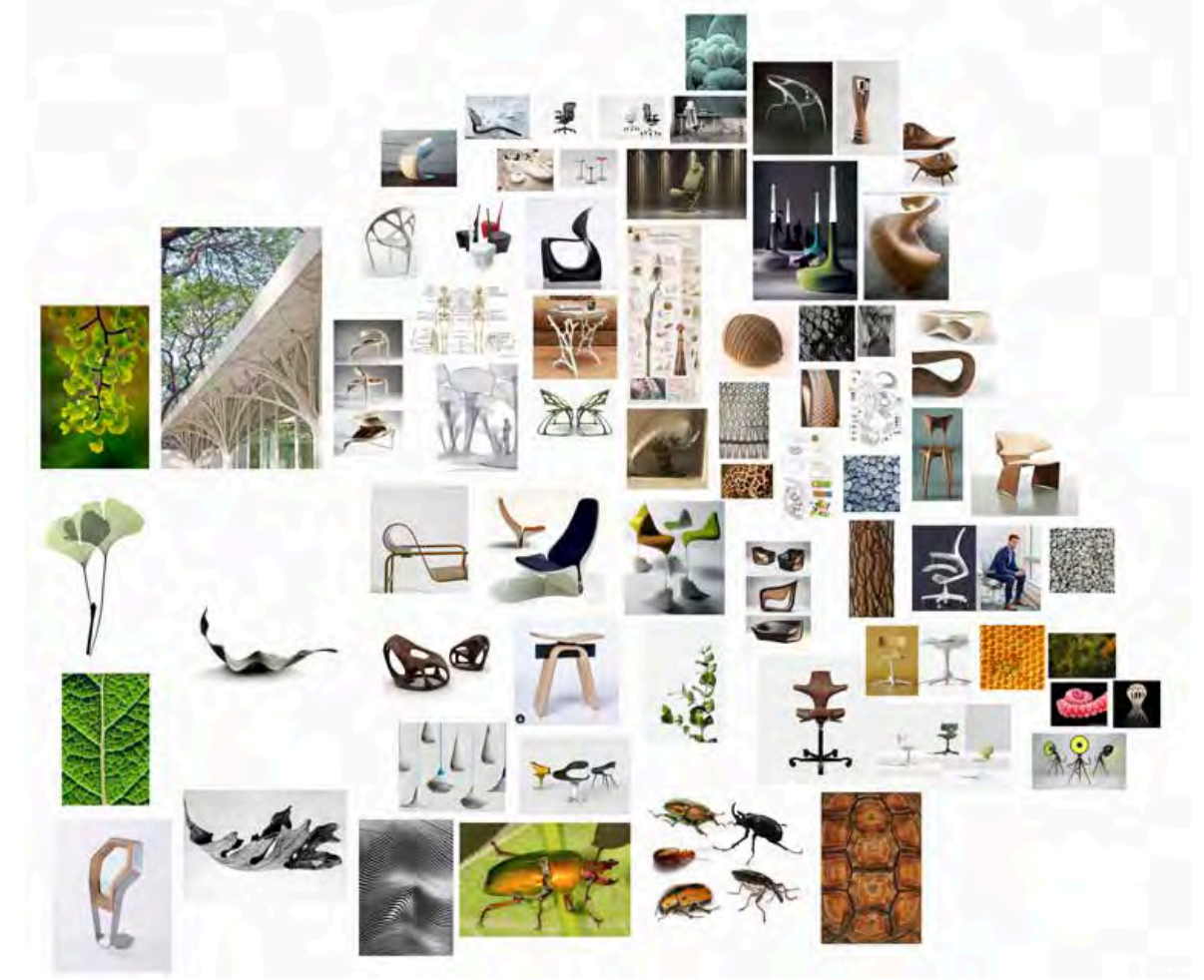
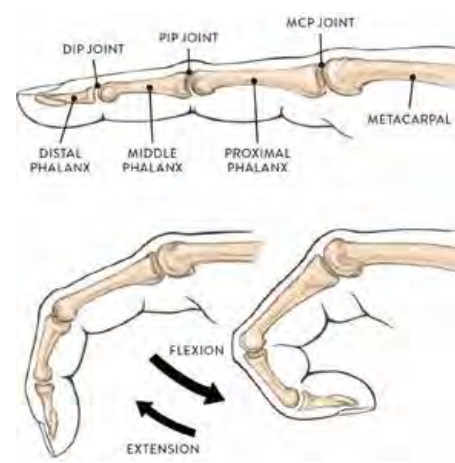


chapter 4

Design Development

- 4.1 Initial Idea Generation
 - 4.1.1 Aesthetics Approach and Semantic Profile
 - 4.1.2 Mind Mapping
 - 4.1.3 Ideation Sketches
- 4.2 Concepts Exploration
 - 4.2.1 Concept One
 - Concept Exploration for Concept One
 - Concept Development for Concept One
 - 4.2.2 Concept Two
 - Concept Exploration for Concept Two
 - Concept Development for Concept Two
- 4.3 Concept Strategy
 - 4.3.1 Concept Direction and Product Schematic
- 4.4 Concept Refinement and Validation
- 4.5 Concept Realization
 - 4.5.1 Design Finalization
 - 4.5.2 Physical Study Models
- 4.6 Design Resolution
- 4.7 CAD Development
- 4.8 Physical Model Fabrication

This chapter will display the sketches, ideas, design decisions, and aesthetic detailing that was made throughout this product development. This process began with a simpler concept that continued to be pushed and formed into a more robust, all-around solution. This section will show an in-depth look into the design process using the research points as an anchor.



4.1.1 Aesthetics Approach & Semantic Profile

As the design solution began to develop, the design language, aesthetics, and semantics became more clear. The initial proposed aesthetic design language follows the form of nature and is inspired by the movement of tree branches and the flow of water. These movements were honed into a realistic approach by developing a mechanical version of organic movements. This “mechanical organic” aesthetic also leans into the tech-inspired industry and pays homage to the human body form that is heavily involved with the tattoo process - a central framework and support system that gives humans movement so long as the musculoskeletal system allows it (Cleveland Clinic Medical Professional, 2019).

The adjustability of the bed itself is inspired by the branches in trees and their ability to hold the weight of themselves. Furthermore, the finger-joint movement in its flexion and extension states was an opportunity to

use a similar movement for extending and shortening the length of the bed.

One of the primary aesthetics was the use of chainmail-inspired smart fabric to bridge the gap between flexible fabric and rigid support. This technology was discovered by “engineers at Caltech and JPL” (Perkins, 2021). These interlocking, chainmail-like, 3D-printed pieces create a smart fabric that is used to create fluid-like movement within plastic sections on the client bed that fully cater to various human body sizes and heights using vacuum technology.

Another semantic that many tattoo artists and artists are familiar with is the act of digital drawing. Using a similar approach, a digital screen that is wirelessly connected with the tattoo artist's phone is used in combination with a camera to follow the tattoo artist's movement and aid as a top-down visual of the tattoo artist's work. This technology integration is a step towards improving back and neck strain from constantly leaning forward, a main concern for many tattoo artists. This action is familiar to most artists that have used a tablet before and can be used as a guide as much or as little as the artist would like.

4.1.2 Mind Mapping

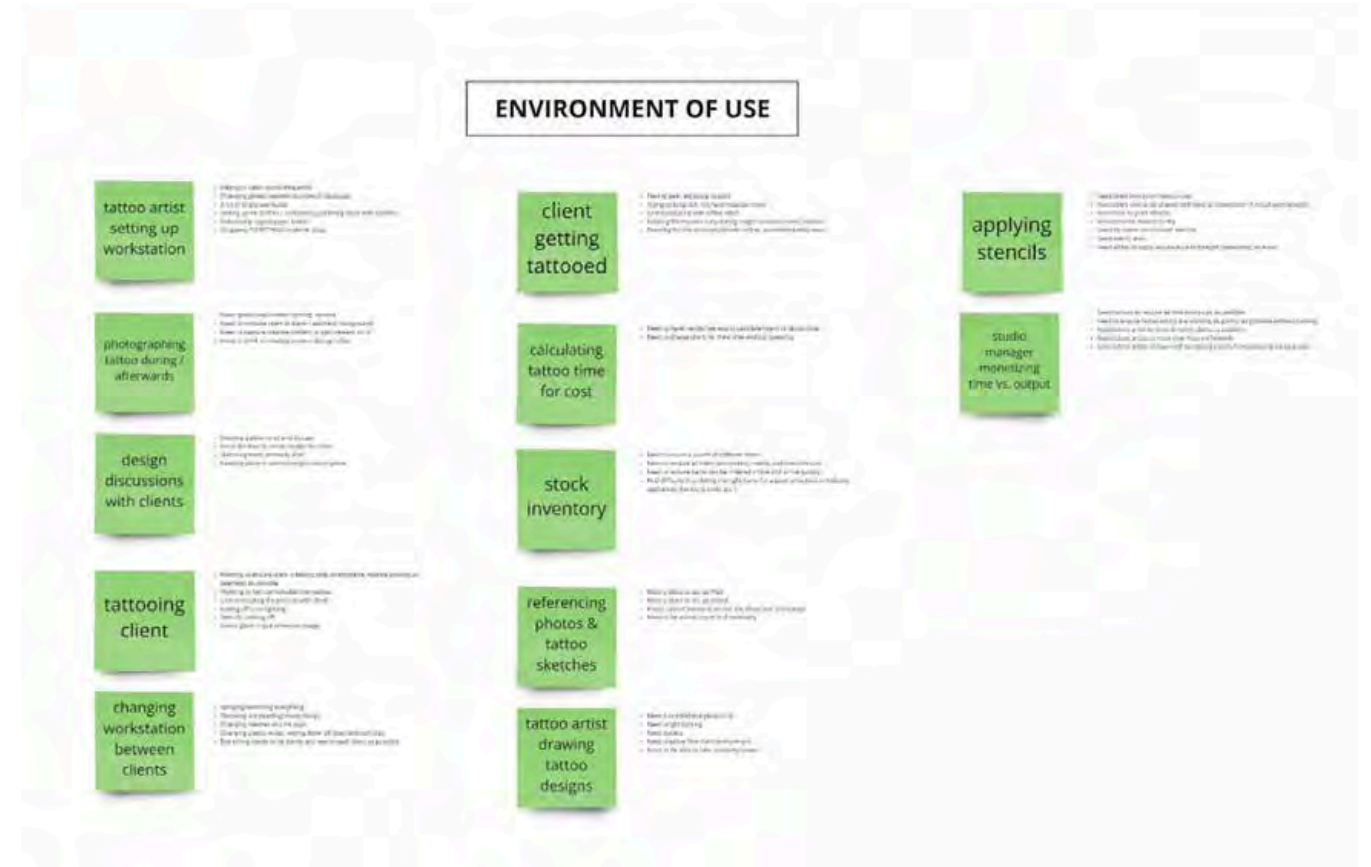
To understand the tattoo industry, where problem areas lie, initial ideas, and what to consider, a mind map was created to visually document these thoughts. The topics considered in this mind mapping phase were who the users were at the primary, secondary, and tertiary levels, the environment of use and products in these environments, initial benchmarking, and visual studies including tattoo artist postures, their work environments, and "day-in-the-life" videos.

Studio Tattoo Artists

- Generally ages 25-45
- Setting up / tearing down station
- Back, neck, shoulder, eye pain
- Carpal tunnel tendencies from fine motor skills and repetitive movements
- Flexing of fingers and wrists
- Rotating constantly to reach tattoo client
- Awkward positioning while sitting, leaning forward
- Overworking their body physically
- Adopting equipment from other industries to meet their needs (dentistry, medical)
- Communicating with clients
- Clients moving while tattooing

Tattoo Clients

- Having to lay/sit in uncomfortable positions
- Undergoing pain from tattooing procedure
- Hunger/need to take breaks/stretch
- Lack of lumbar/head support
- Communicating with tattoo artist
- Expensive tattoos



PRIMARY

- Studio Tattoo Artists**
 - Skin care (SPF)
 - Sanitization (gloves, paper towel, etc.)
 - Back, neck, shoulder, eye pain
 - Carpal tunnel tendencies from fine motor skills and repetitive movements
 - Flexing of fingers and wrists
 - Rotating constantly to reach tattoo client
 - Awkward positioning while sitting, leaning forward
 - Overworking their body physically
 - Adopting equipment from other industries to meet their needs (dentistry, medical)
 - Communicating with clients
 - Clients moving while tattooing
- Tattoo Clients**
 - Having to lay/sit in uncomfortable positions
 - Undergoing pain from tattooing procedure
 - Hunger/need to take breaks/stretch
 - Lack of lumbar/head support
 - Communicating with tattoo artist
 - Expensive tattoos
- Travelling Tattoo Artists**
 - Limited space for workstation
 - Limited space for client bed
 - Limited space for supplies
 - Limited space for storage
 - Limited space for sanitation
 - Limited space for communication
- Tattoo Apprentice**
 - Learning from the master
 - Learning from the master
 - Learning from the master
 - Learning from the master
 - Learning from the master
- Tattoo apprentice teacher**
 - Teaching the apprentice
 - Teaching the apprentice
 - Teaching the apprentice
 - Teaching the apprentice
 - Teaching the apprentice
- First Time Clients**
 - Learning from the master
 - Learning from the master
 - Learning from the master
 - Learning from the master
 - Learning from the master

SECONDARY

- Receptionist**
- Studio Manager**
- In-Home Tattoo Artists**
- Stick and Poke Tattoo Artists**

TERTIARY

- Studio Landlord**
- Tattoo Workstation Suppliers**
- Tattoo Artist Researchers**

MANY POSTURES



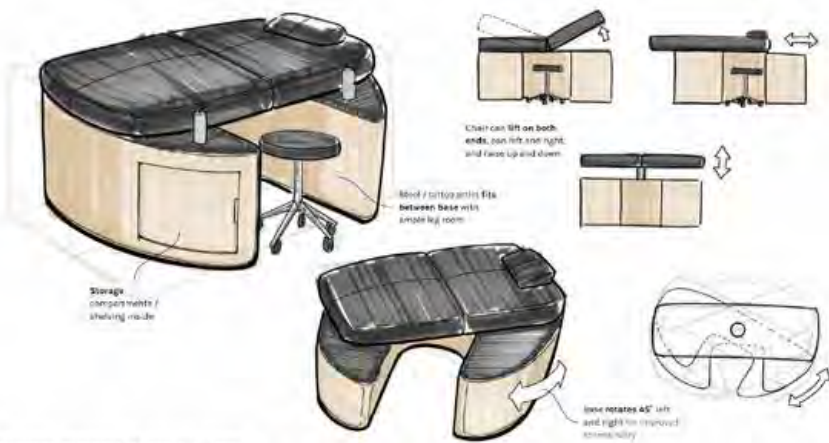
TATTOO STUDIO



DAY-IN-THE-LIFE VIDEOS

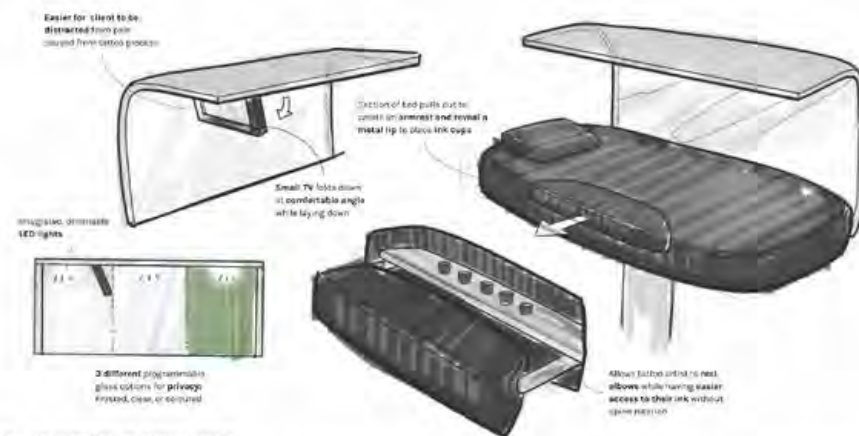
DAY-IN-THE-LIFE VIDEOS

- 1. Studio Landlord**
 - Managing the studio
 - Managing the studio
 - Managing the studio
 - Managing the studio
 - Managing the studio
- 2. Tattoo Workstation Suppliers**
 - Supplying the studio
 - Supplying the studio
 - Supplying the studio
 - Supplying the studio
 - Supplying the studio
- 3. Tattoo Artist Researchers**
 - Researching the industry
 - Researching the industry
 - Researching the industry
 - Researching the industry
 - Researching the industry
- 4. Studio Manager**
 - Managing the studio
 - Managing the studio
 - Managing the studio
 - Managing the studio
 - Managing the studio
- 5. Receptionist**
 - Managing the studio
 - Managing the studio
 - Managing the studio
 - Managing the studio
 - Managing the studio
- 6. In-Home Tattoo Artists**
 - Working from home
 - Working from home
 - Working from home
 - Working from home
 - Working from home
- 7. Stick and Poke Tattoo Artists**
 - Working from home
 - Working from home
 - Working from home
 - Working from home
 - Working from home



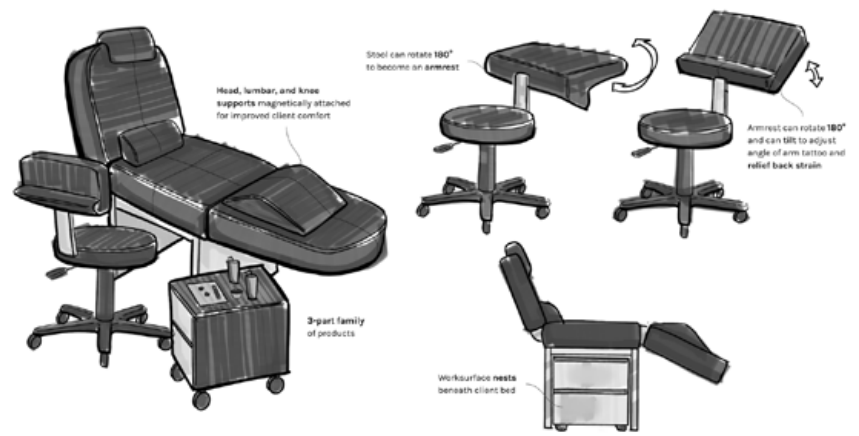
CONCEPT 1: CRESCENT | M. SCULLY | STEEPV

- **Social:** Allows an appropriate, non-intruding light for the client to see specifications, less scattered equipment, makes space feel cleaner and more organized to client. Further development could include privacy considerations.
- **Technology:** Seamless hydraulic pump and possible motorized movement of base. Further development could include lighting and fluid considerations.
- **Economy:** Less purchases needed in multiple different furniture equipment, alternative features. Further development could include customization.
- **Political:** Metal working surfaces and easy-to-clean surfaces ensure a sanitary station. Further development could improve high-touch areas / handle-free design.
- **Value:** Organized, all-in-one product that fits into artist's workflow efficiency and efficiency. Motorized movement rather than physical adjustments in regards to accommodate stationary tattoo bed placement.
- **Environment:** Recycled metal and sustainably-sourced wood (or other) with less overall furniture needed to purchase. Further development could include appropriate waste bins.



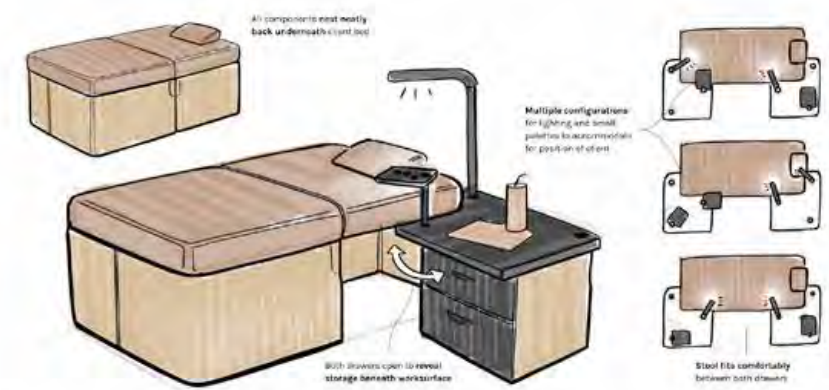
CONCEPT 2: MIRAGE | M. SCULLY | STEEPV

- **Social:** Creates a more comfortable and private space for tattoo artist while capturing the use of entertainment while working during the tattoo session.
- **Technology:** Integrating hi-tech screen protectors that can change between tinted, clear, or mirrored to cater to the artist's needs of privacy or protection. Integration of the screen to move a physical light around.
- **Economy:** Prevents the need to buy separate floor dividers for privacy. Further development could include customization and power-saving light options.
- **Political:** Metal working surfaces and easy-to-clean surfaces ensure a sanitary station. Encouraging a safe and private space to accommodate for invisible tattooing experiences.
- **Value:** Comfort focused design ensures the client's privacy and relaxation in a safe tattoo setting. Tattoo artist benefits from less spine rotation and a place to rest their elbows during the tattooing process.
- **Environment:** Recycled metal and glass could be used. Further development could consider power-saving light options.



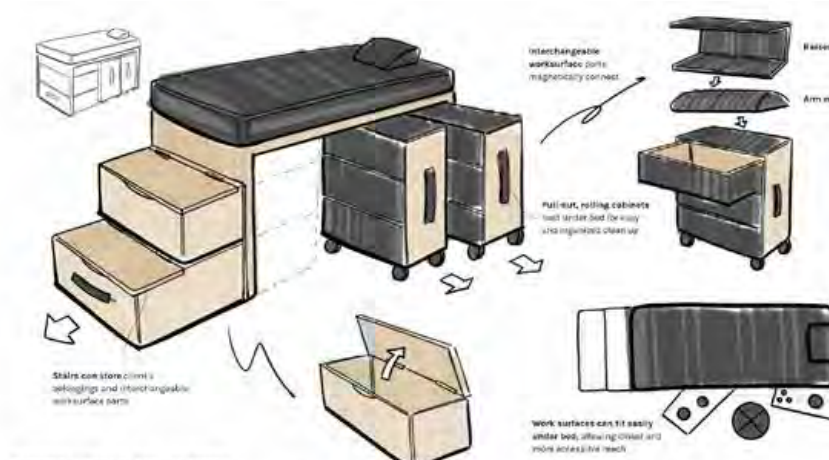
CONCEPT 3: FLIP | M. SCULLY | STEEPV

- **Social:** Less "medical" feeling, ability to sit perceived to be less procedural / less operational. Ergonomic additions allow a more comfortable experience for the client.
- **Technology:** Magnetically attached ergonomic additions can be removed and reattached for easy cleaning/adjusting.
- **Economy:** Nesting equipment takes up less space when artist is away, allowing more beds/stations to fit into rental location. Further development could test nesting chair also.
- **Political:** Metal working surfaces and easy-to-clean surfaces ensure a sanitary station. Ergonomic additions help reduce pain in client while sitting for long periods of time.
- **Value:** Nesting work surface with adjustable ergonomic additions for the client bed. Tattoo artist stool includes reversible, rotatable backrest that can be used as an armrest or prop client's arm up at a tilted angle to ease angle of leaning forward.
- **Environment:** Recycled metal with compact workstation to reduce unnecessary materials. Further development could improve processes of manufacturing.



CONCEPT 4: AJAR | M. SCULLY | STEEPV

- **Social:** Relaxed and natural feeling color palette could be more inviting to customers. Further development could improve color palette and material choices.
- **Technology:** Light integration and automatic / pre-set locations for bases / accessories could be included in future iterations.
- **Economy:** Compact / nesting design allows the room to set up in studio, allowing more stations.
- **Political:** Metal working surfaces and easy-to-clean surfaces ensure a sanitary station. Appropriate color and material organized to improve trust factor from client.
- **Value:** Organized, customizable workstation with multiple options for the artist to setup their space. Small "pocket" stool to utilize allows for ink caps to be within reach and reduce space taken.
- **Environment:** Recycled metal and sustainably-sourced wood (or other) with less overall furniture needed to purchase. Further development could include sustainable manufacturing methods.



CONCEPT 5: RISE | M. SCULLY | STEEPV

- **Social:** Unique take on tattoo bed system with additional integrated design improves trust factor of professional tattooists more comfortable getting set up alone and with their clients.
- **Technology:** Seamless hydraulic pump to raise and lower bed, magnetic connections to tattoo workspace for interchangeable items.
- **Economy:** Less purchases needed in multiple different furniture equipment, alternative features. Equipment neatly nests under raised bed, allowing more space for other tattoo beds in the surrounding area.
- **Political:** Metal working surfaces and easy-to-clean surfaces ensure a sanitary station. Further development could improve high-touch areas / handle-free design.
- **Value:** Organized, systemic product system with interchangeable parts. Ability to store work surface under bed allows station to be closer to artist while tattooing. Multiple storage options and ways of organizing advice.
- **Environment:** Recycled metal and sustainably-sourced wood with less overall furniture needed to purchase. Further development could include appropriate waste bins.



CONCEPT 6: KUBUS | M. SCULLY | STEEPV

- **Social:** Provides a private environment for tattoo clients with comfortable lighting and a feeling of safety. Unique design feels inviting and personal for clients.
- **Technology:** System is equipped with lighting and glass barriers that could change intensity of visibility in future iterations. Further development could also make barriers act as photo backgrounds. Self-locking system when closed.
- **Economy:** Self-locking system prevents theft, with more space available in the workstation compact system to pack away.
- **Political:** Metal working surfaces and easy-to-clean surfaces ensure a sanitary station. Glass barriers help provide privacy without blocking light, personal comfort without being obstructive.
- **Value:** Movable shelving, nesting design, and integrated lighting can be used to create a feel different station of the tattoo studio open and close. Glass elements set back to work together in cohesion, unlike current market trends.
- **Environment:** Recycled metal and sustainably-sourced wood (or other) with less overall furniture needed to purchase. Further development could improve low-power LEDs.

4.1.3 Ideation Sketches

To begin discussing the benefits of various functions and the needs and wants of the user made real in the design, ideation sketches were first developed to be later developed into more detailed concepts. At first, the goal was to develop a solution that truly benefitted the workflow of the tattoo artist and understanding the different states of the tattoo process. As the designs developed, a focus on improving comfort and understanding the tattoo client's (secondary user) needs as well was integral to the solution.

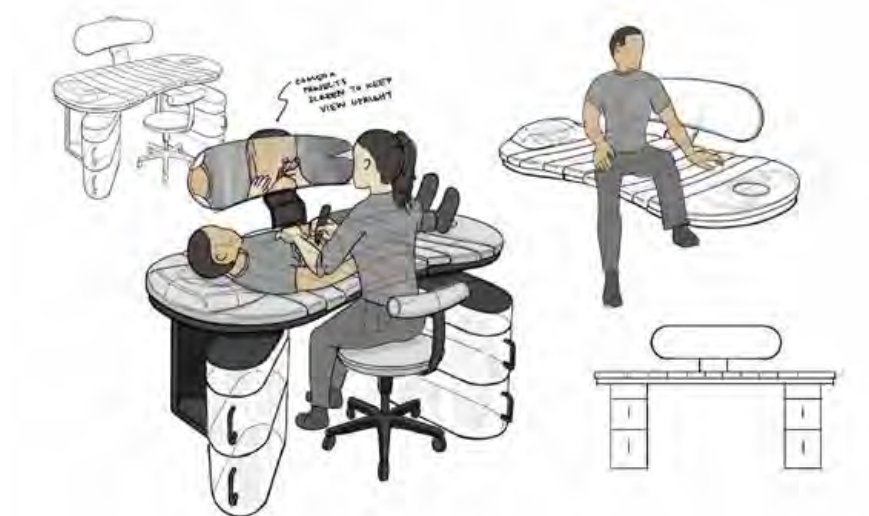
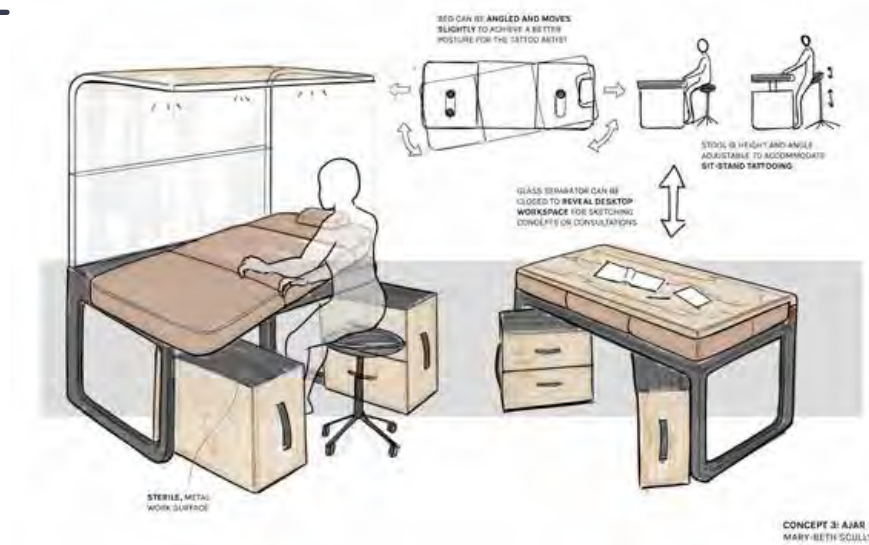
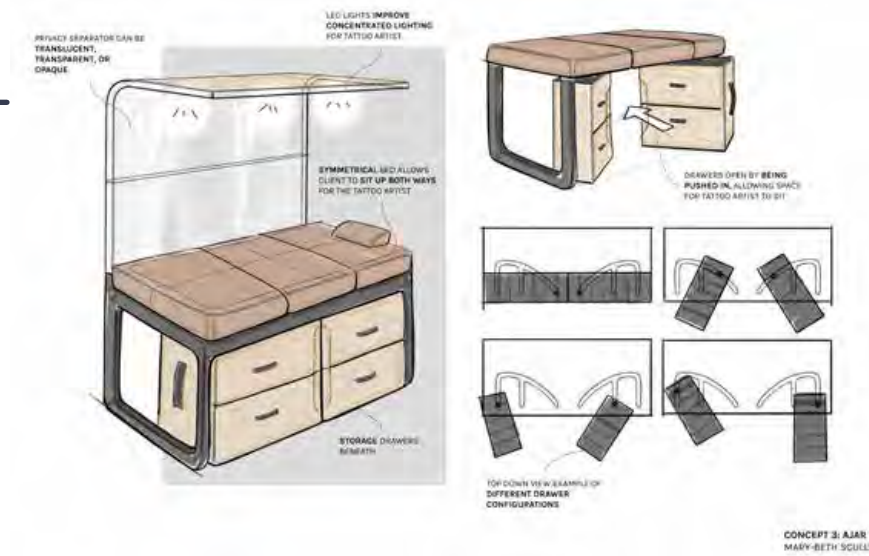
4.2 Concepts Exploration

After various discussions with mentors and peers, a few selected concepts were chosen to continue with, along with new ideas to create more distinct concepts. The environment of use was localized to professional tattoo shops primarily, but could also be integrated into private studios or home studios. With this intention, progress was made in developing the tattoo workstation solution.

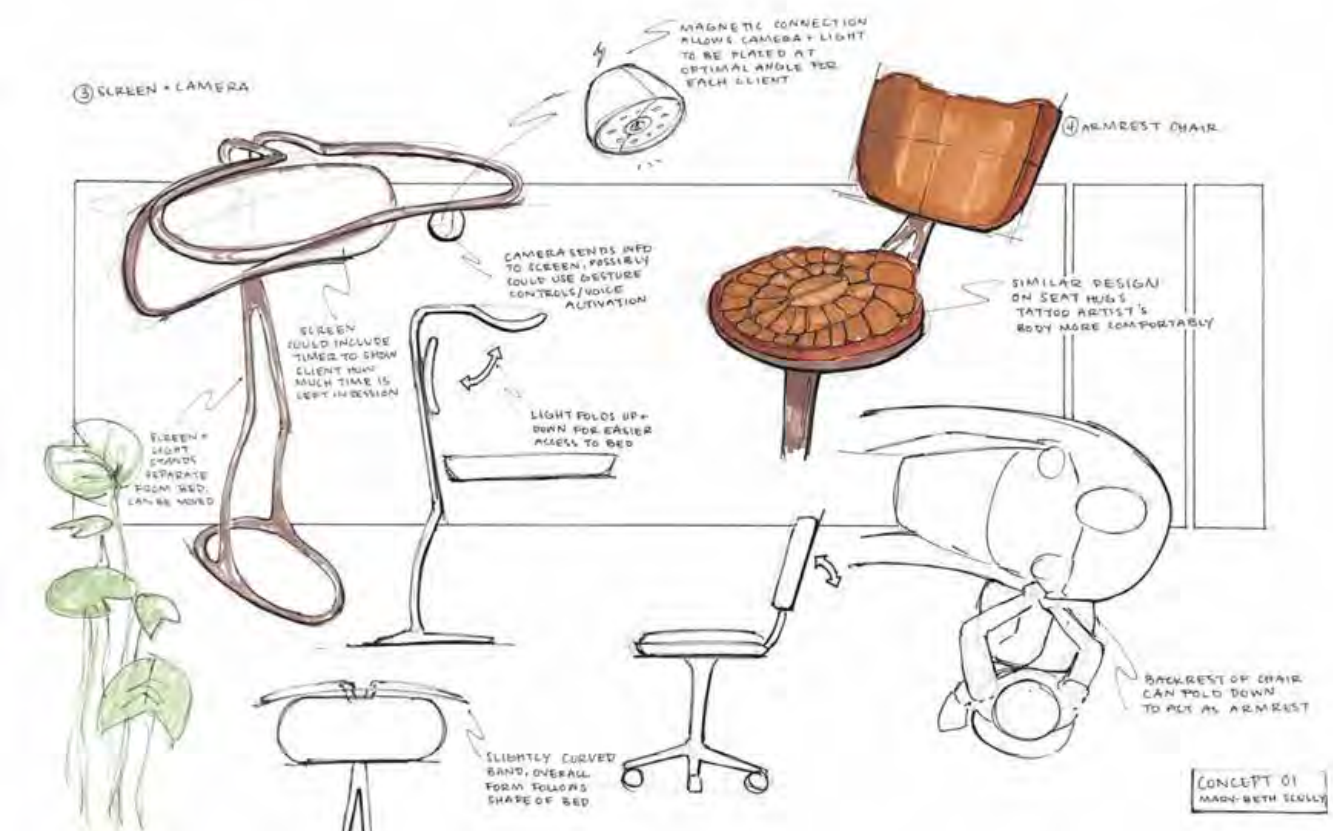
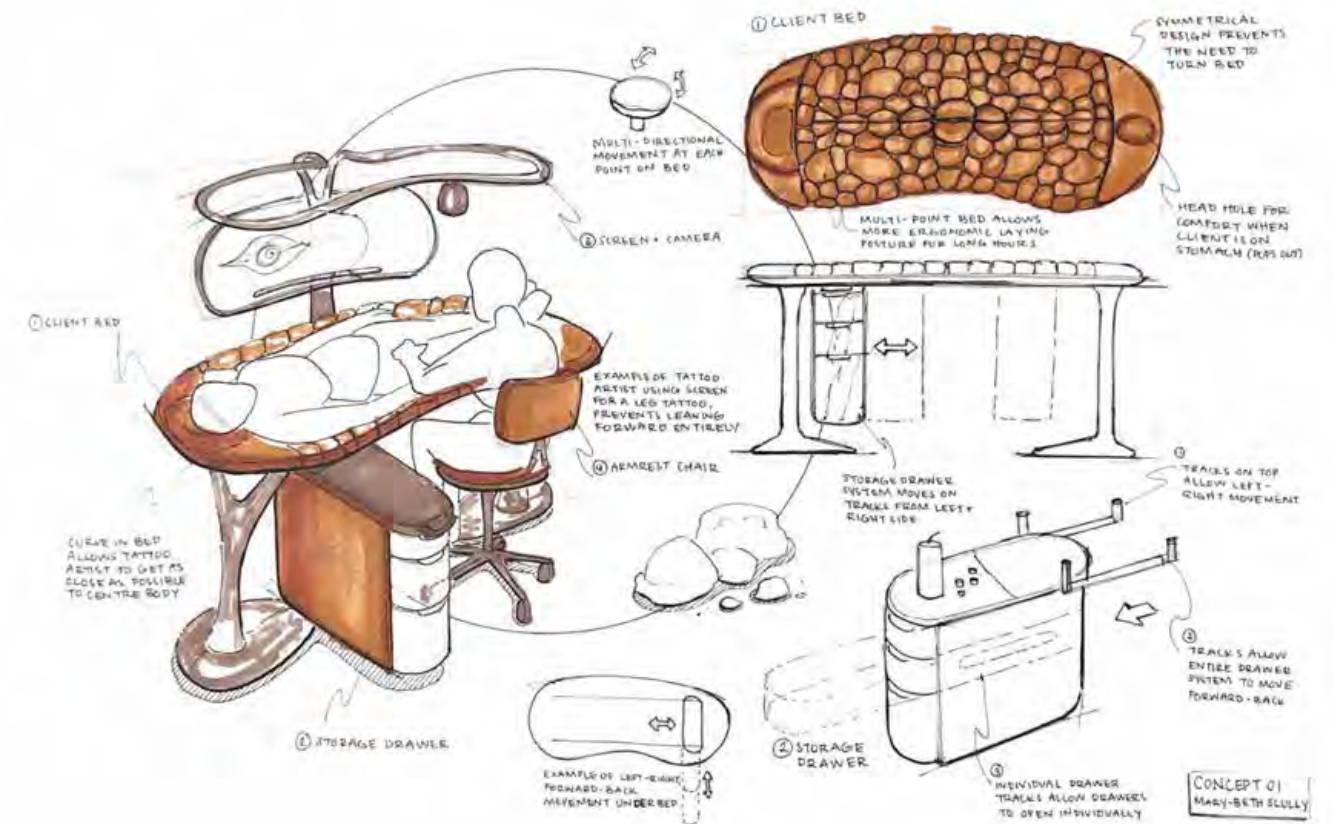
4.2.1 Concept One

Concept One explored a workstation with movable drawer storage and a privacy screen/light. This idea later improved to having moving compartments on the bed that could form to the human body when lied or sat on. These rectangular compartments were later explored into an omni-directional pedestal-like cushion that could move in all directions to fully form to the body.

Concept Exploration for Concept One



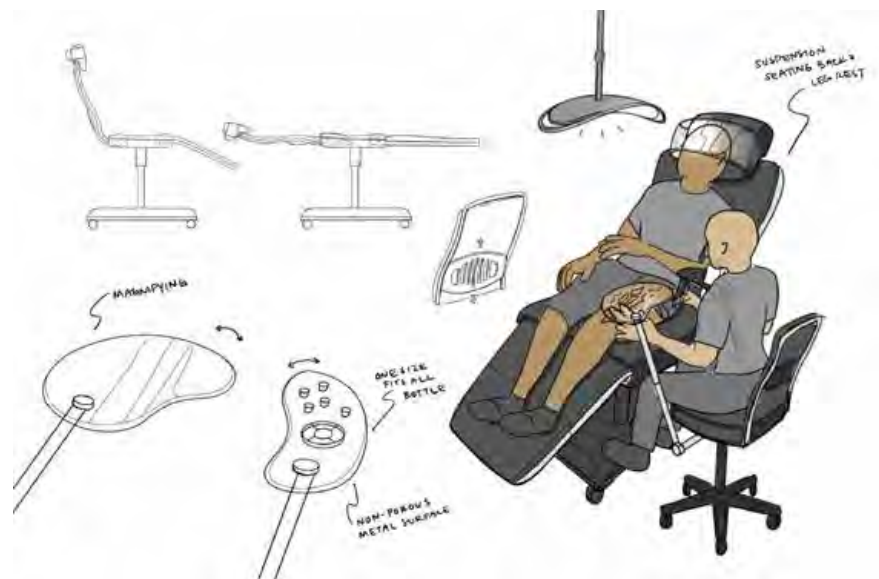
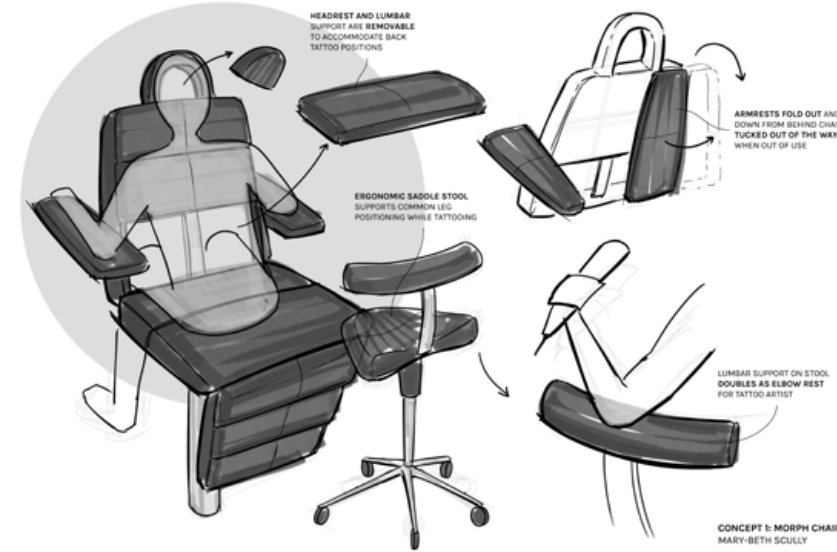
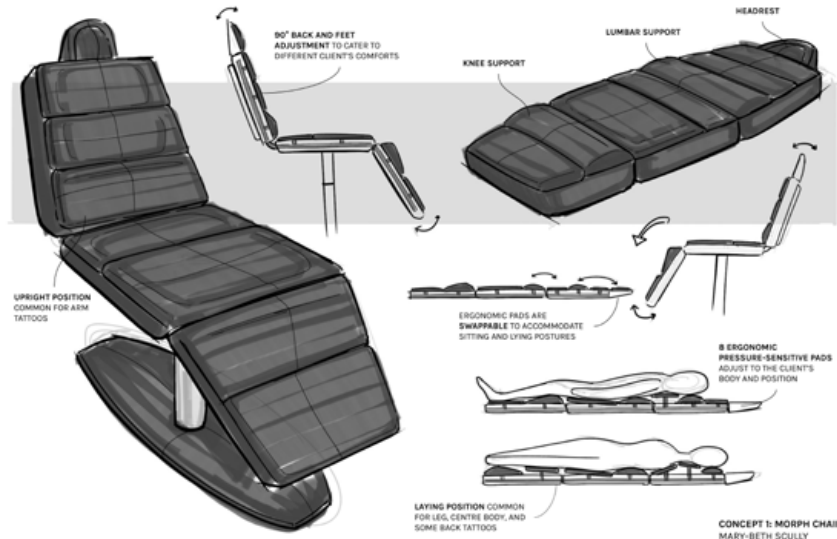
Concept Development for Concept One



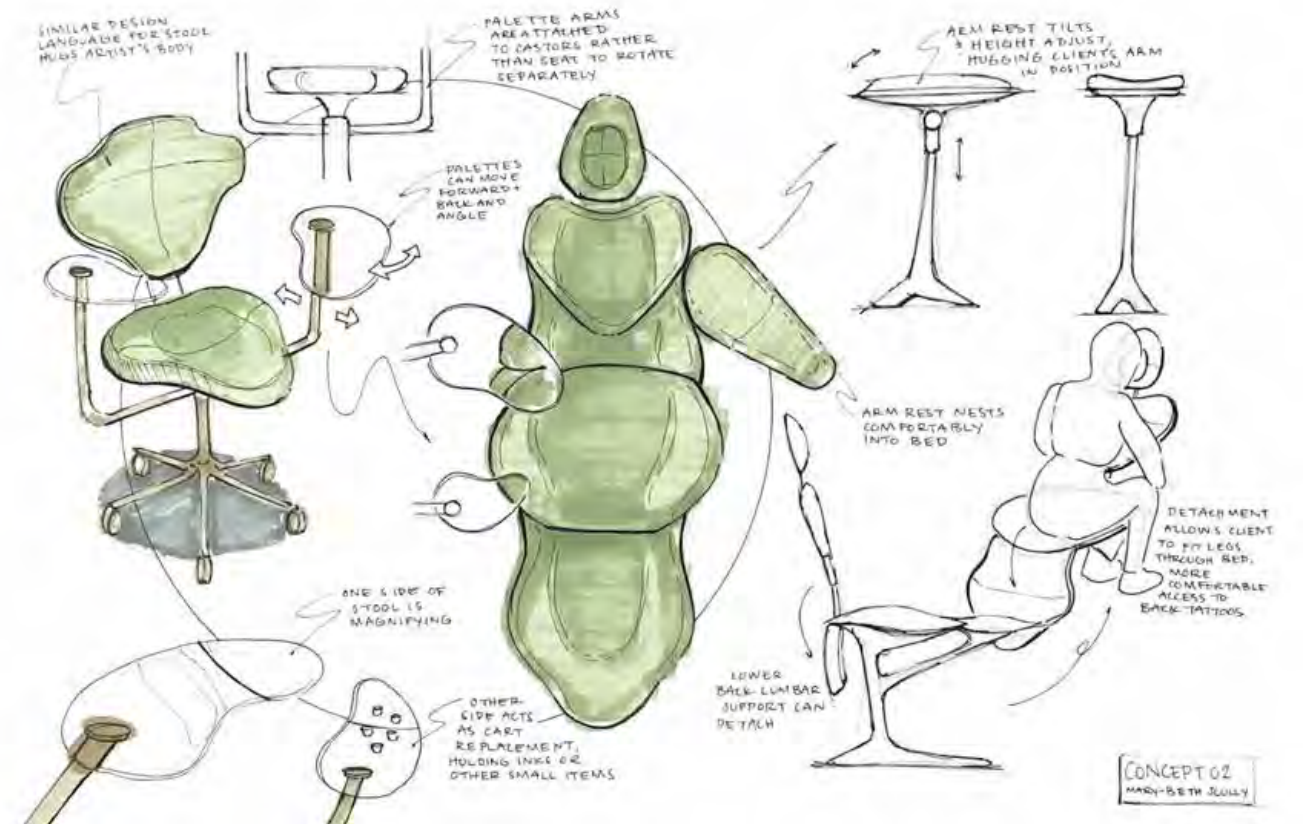
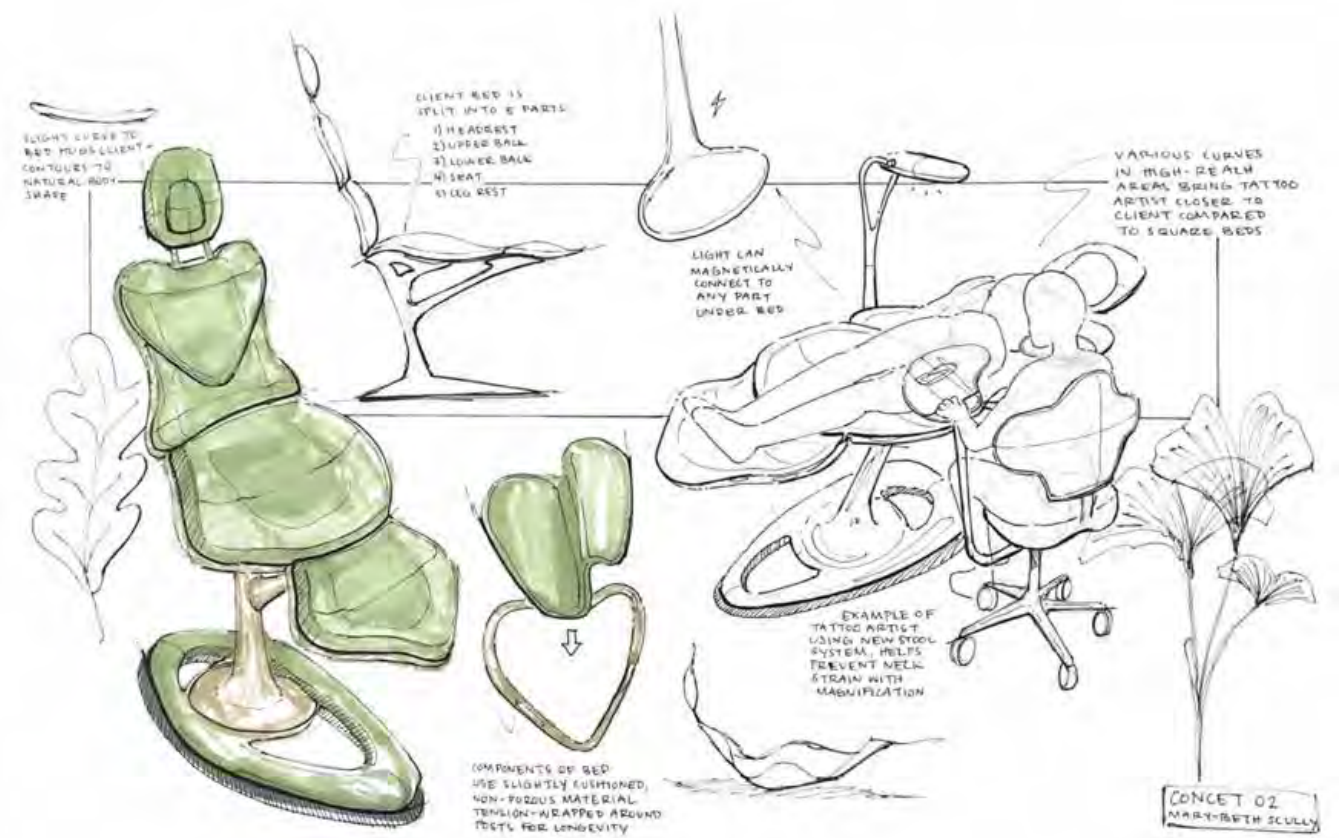
4.2.2 Concept Two

Concept Two continued exploration of the bed with the idea of a magnifying "palette" to accompany the artist. Thoughts were dedicated to understanding how the ergonomics of the bed could be made, along with catering to various tattoo positions.

Concept Exploration for Concept Two

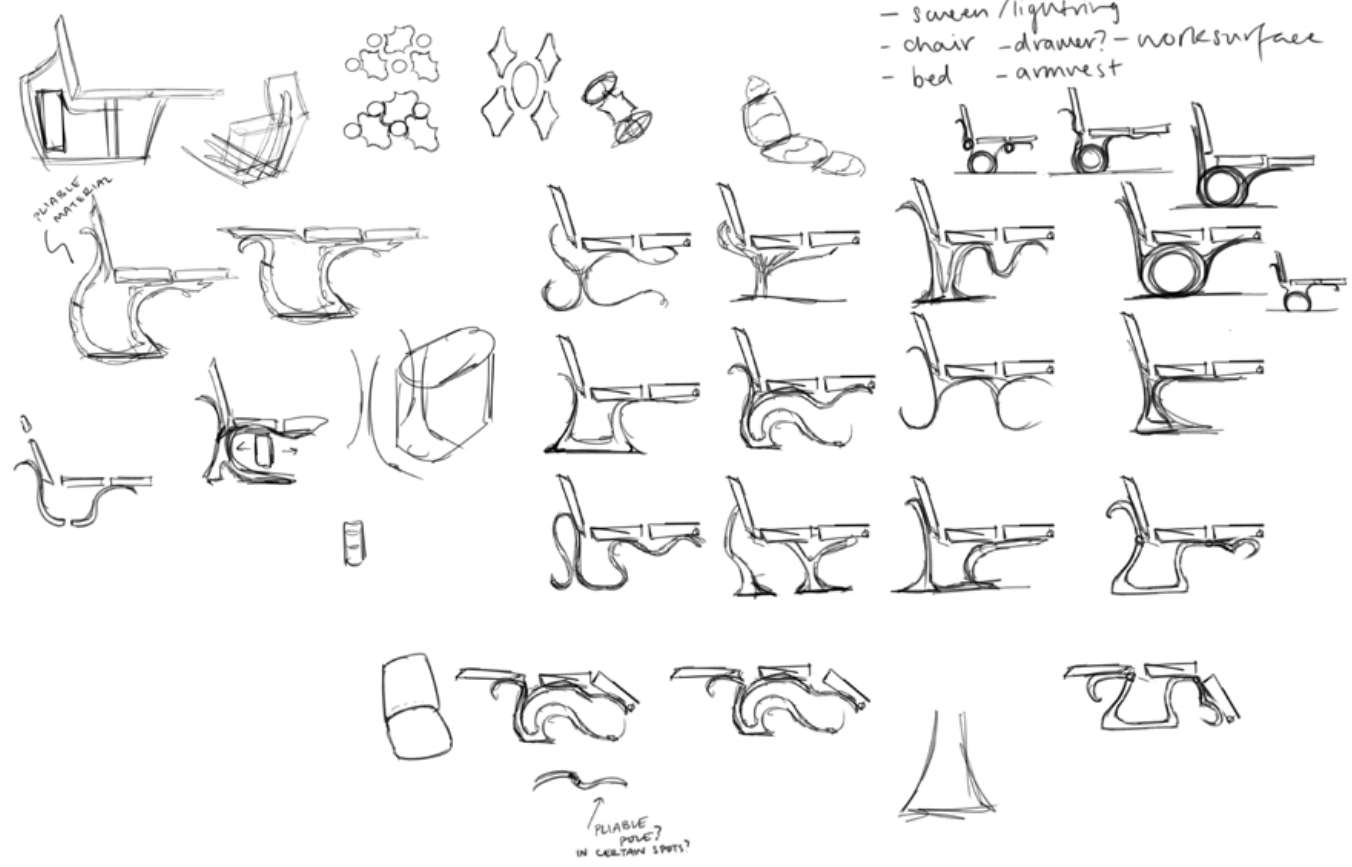
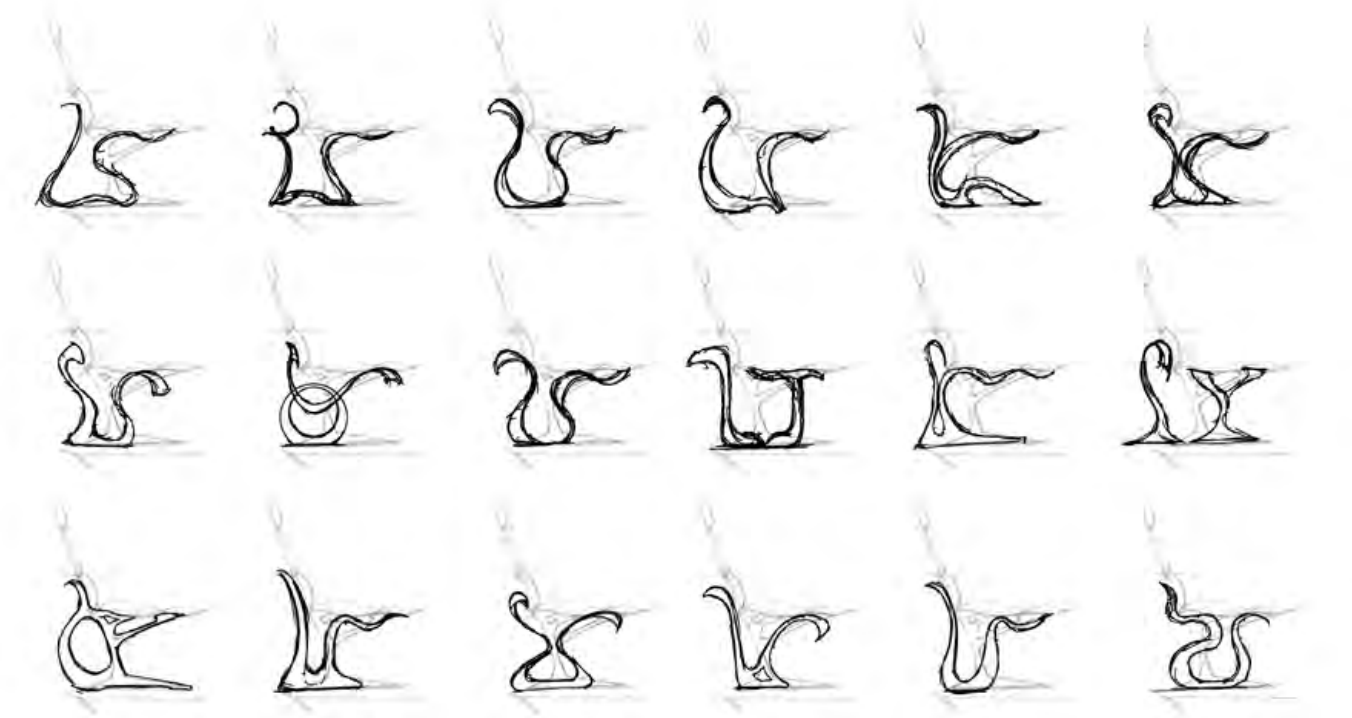
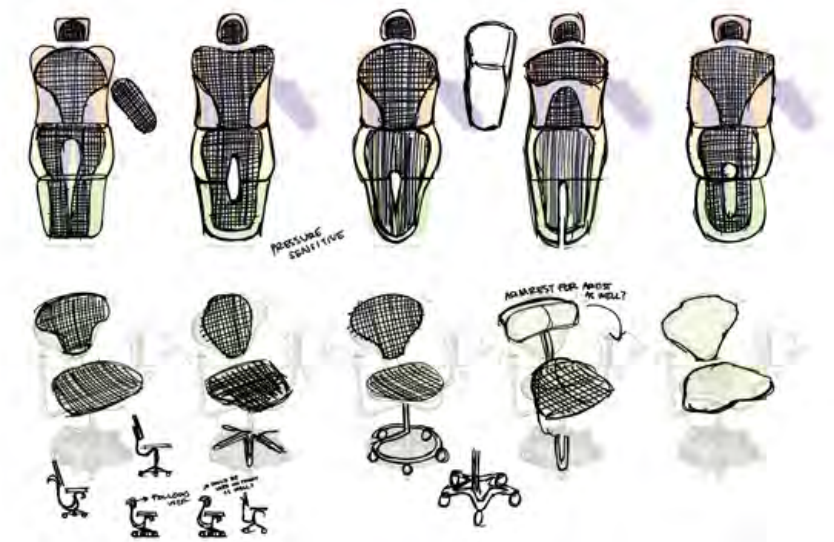
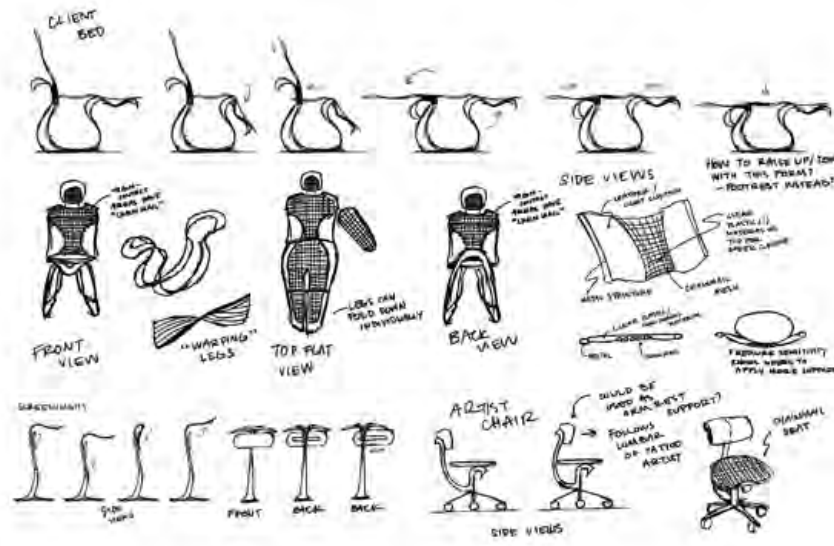
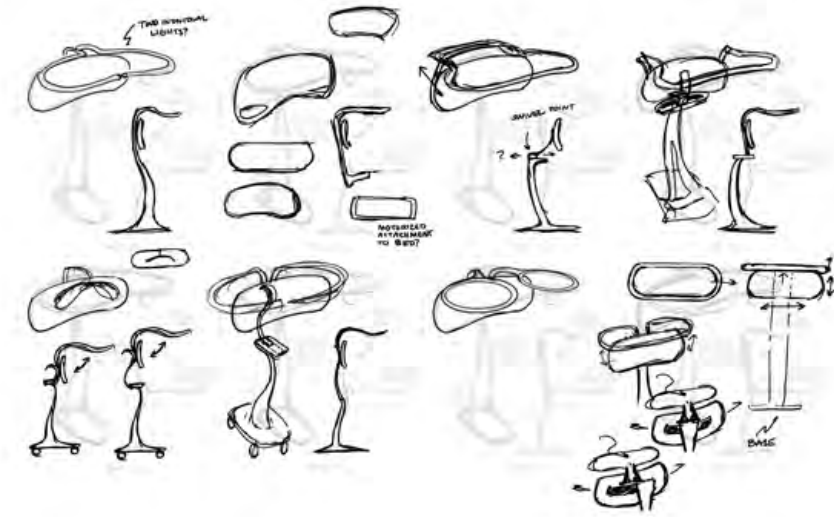


Concept Development for Concept Two



Further Concept Exploration

Once the functionality was primarily ironed out, form explorations were continued. This originally started with a more organic approach to the family of products, but was later grounded in a more "mechanical organic" style.



Concept Strategy



Concept Strategy

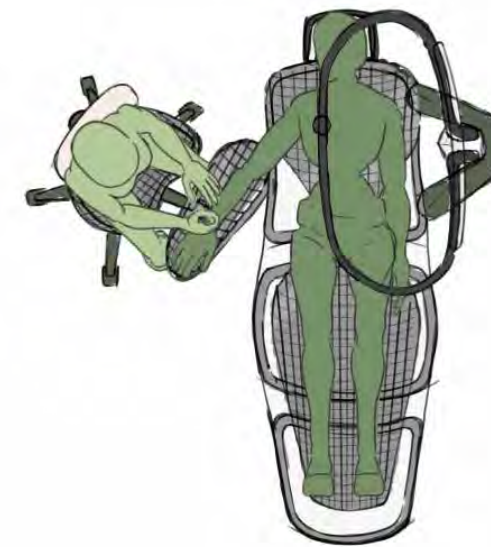
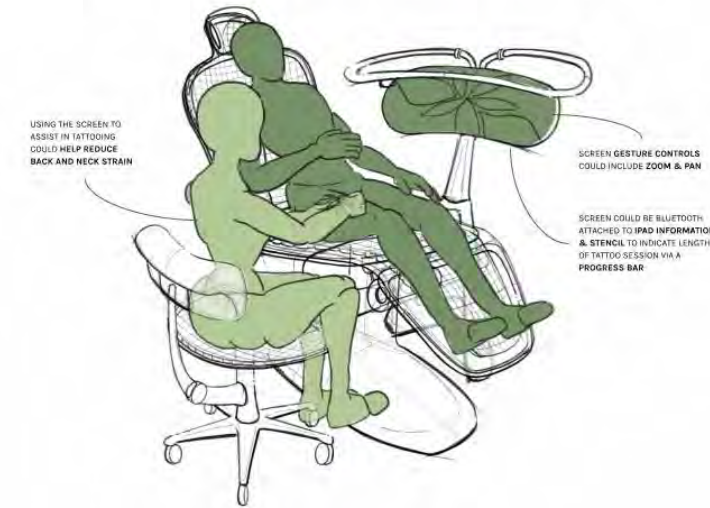


4.3 Concept Strategy

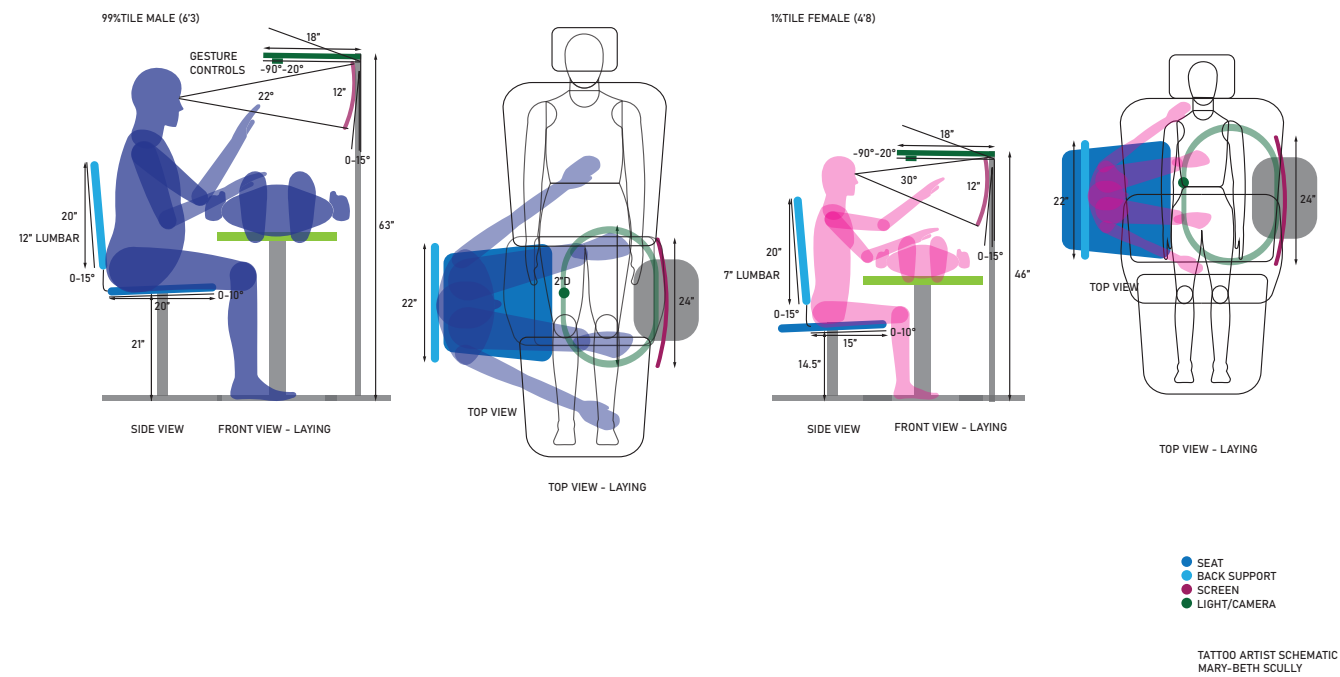
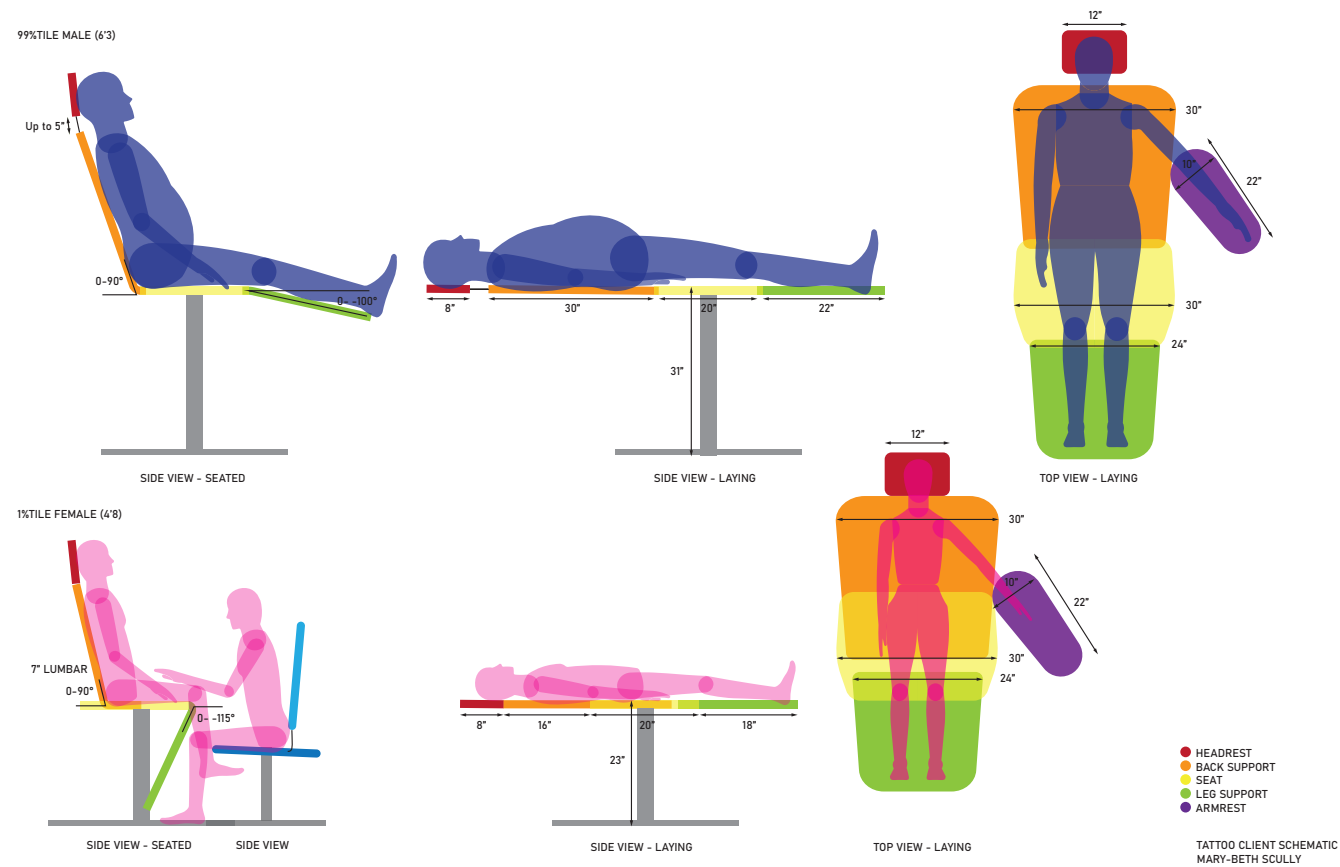
After an ergonomic study and understanding that the design solution would be optimal as a combination of the two proposed concepts, the concept could continue with one primary direction and the development of a product schematic. This family of products began to utilize the smart fabric chainmail technology as discovered by engineers at Caltech and JPL (Perkins, 2021) to be integrated into a customizable support client bed and artist's chair. The development for other areas, such as the adjustability mechanisms and reference screen/light/camera were also considered. Styling efforts and finding the appropriate aesthetic became more prominent in this phase.

4.3.1 Concept Direction

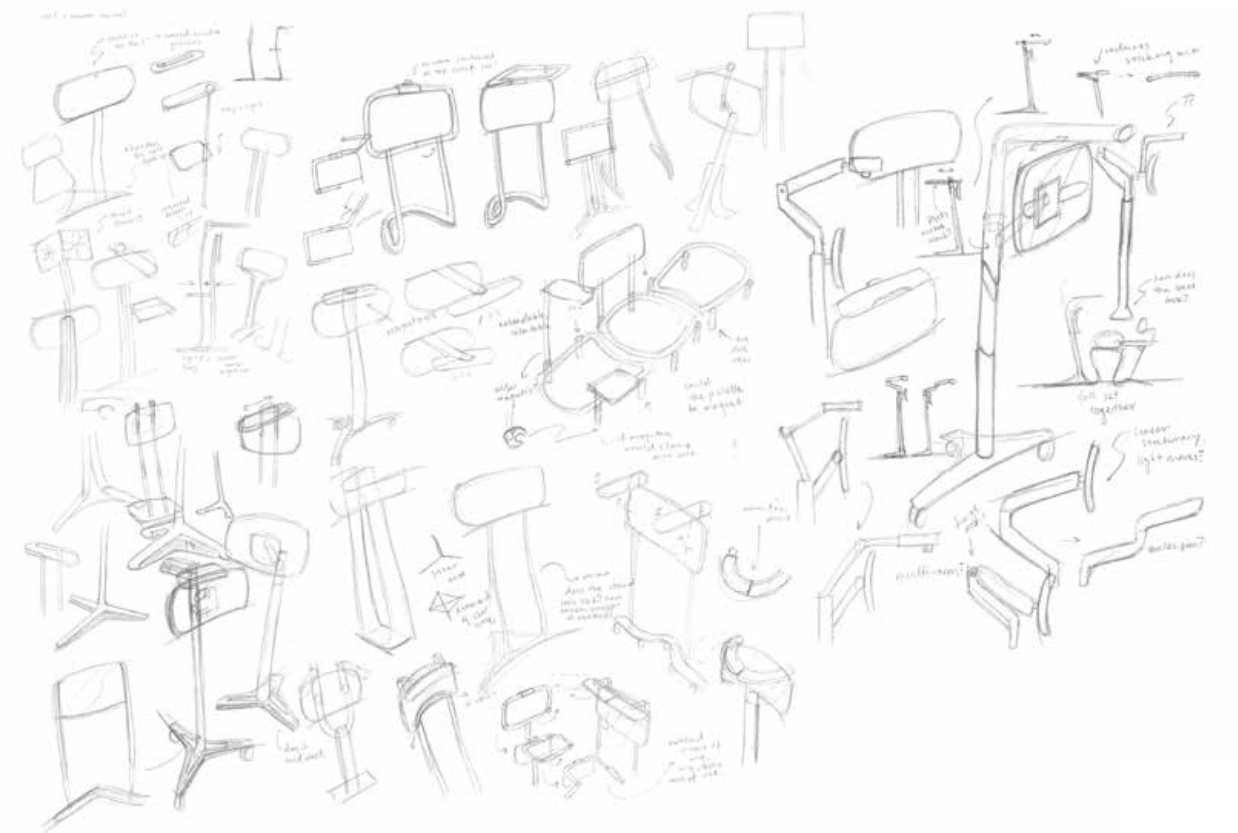
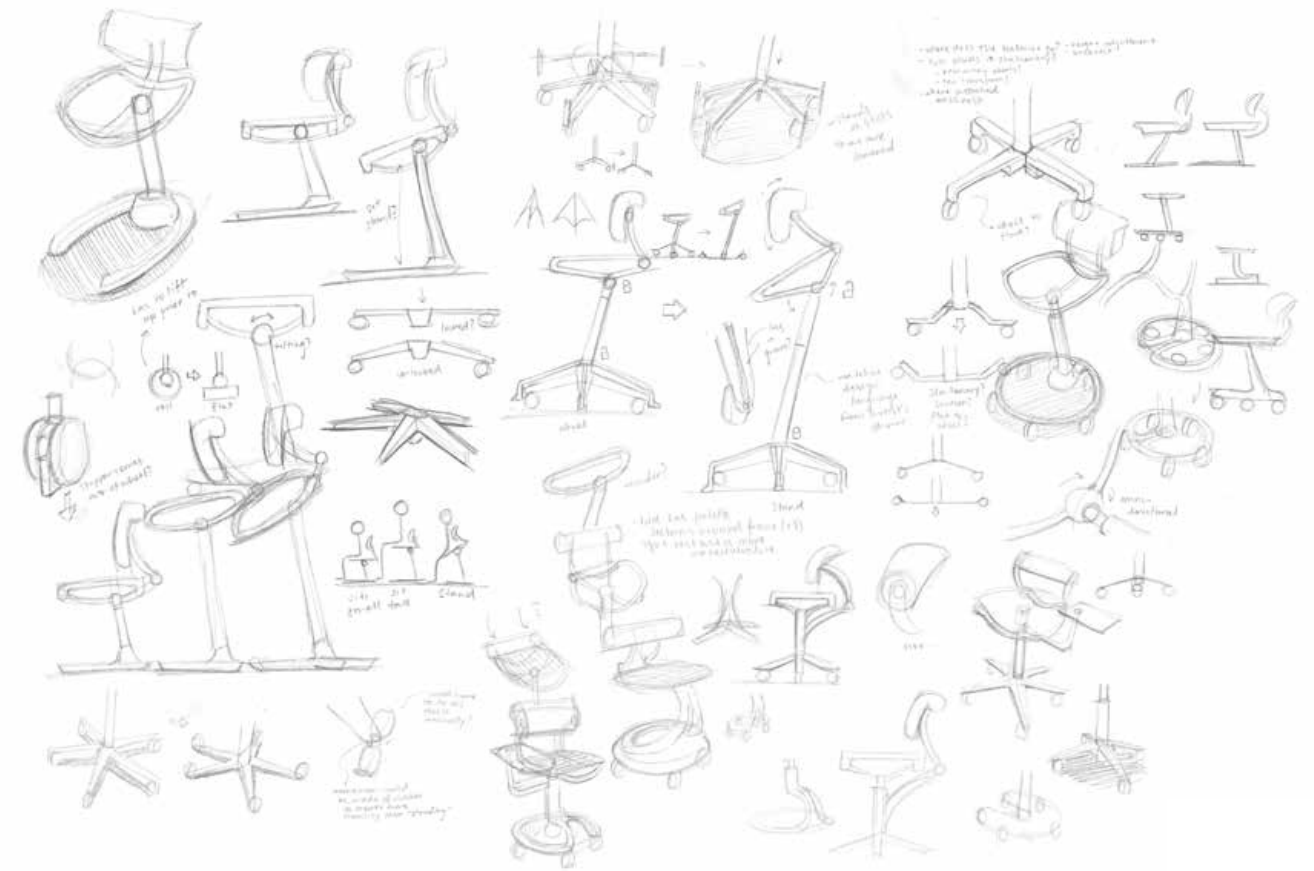
The concept direction begin to be more defined and solidified in functionality. As this process continued, understanding aesthetic expression was also considered.



Product Schematic



Aesthetic Exploration



**TATTOO WORKSTATION
WORKFLOW & COMFORT**

2) REFERENCE SCREEN

1) CLIENT BED

3) ARTIST'S CHAIR



1.1: CLIENT BED

HOLE IN HEADREST FOR HANDS WHEN LAYING ON STOMACH

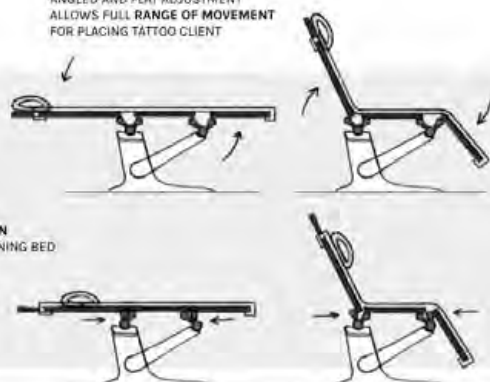
CUSHIONED HEADREST

CHAINMAIL IN SECTIONS LINING BED

FRAME/CHAINMAIL

BASE/ADJUSTING MECHANISMS

ANGLED AND FLAT ADJUSTMENT
ALLOWS FULL RANGE OF MOVEMENT
FOR PLACING TATTOO CLIENT



SCREEN ON EITHER SIDE OF BED ALLOWS
CONTROL OF BED ADJUSTMENTS,
SIMILAR TO STANDING DESKS

3 SEPARATE METAL FRAMES
FOR BED STRUCTURE



CONCEPT REFINEMENT
MARY-BETH SCULLY

1.2: CLIENT BED

10 INDIVIDUAL PLASTIC SECTIONS CONNECTED TO HEADREST AND SEPARATE FRAME

USER'S HEIGHT IS INPUTTED ON PHONE APP



ARM ADJUSTS TO SEPARATE CHAINMAIL COMPONENTS BASED ON USER'S HEIGHT AND TATTOO SUPPORT

CHAINMAIL IS CONTAINED BETWEEN CLEAR PLASTIC

HEADREST CAN VACUUM SEAL AND INCREASE AIR WITHIN HEADREST SECTION

INCLUDING AIR + LOOSE CHAINMAIL

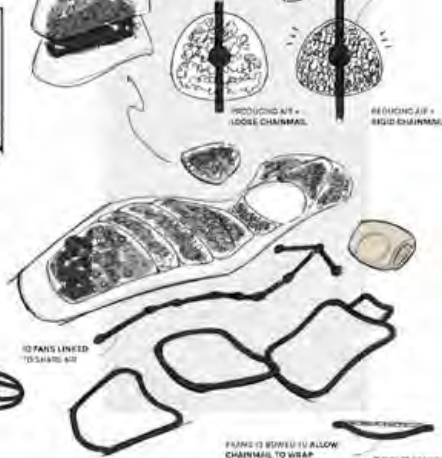
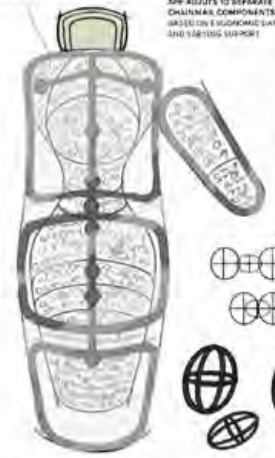
HEADREST IS RIGID EQUIPMENT

CHAINMAILS IN INFLATED AND SHAPED STATES

10 PANS LINKED TO SHARE AIR

PANS IS DESIGNED TO ALLOW CHAINMAIL TO WRAP AROUND CLIENT'S BODY

CONCEPT REFINEMENT MARY-BETH SCULLY



2: REFERENCE SCREEN

ARM CAN BE ANGLED TO PROVIDE LIGHT AND INSURE CAMERA IS IN PLACE

TRACKING CAMERA FOLLOWS ARTIST'S MOVEMENT TO ENSURE INFORMATION IS ON THE SCREEN AT ALL TIMES

WITH ZOOM INPUT

GESTURE CONTROLS TRACK FINGER SWIPE PAN

PROGRESS BAR BASED ON DESIGN INFORMATION FROM APP

APP DRAWING CAN BE SENT VIA BLUETOOTH TO SCREEN TO UNDERSTAND VISUAL AND PROGRESS

SCREEN CAN BE ADJUSTED LEFT AND RIGHT TO AVOID MOVING ENTIRE SYSTEM

VARIOUS ADJUSTMENTS FOR SCREEN HEIGHT AND ANGLE

CONCEPT REFINEMENT MARY-BETH SCULLY



3: ARTIST'S CHAIR

CHAINMAIL SYSTEM HUNG ON CEILING

HEIGHT-ADJUSTABLE OTTOMAN ARTIST'S CHAIR WITH WHEELS TO FREELY MOVE AROUND

CHAIN PALETTE CAN BE ADJUSTED IN HEIGHT, ANGLE, AND WHICH SIDE

SPRING-LOADED LUMBAR ADJUSTMENT ADJUSTS TO VARIOUS USER'S HEIGHTS AND POSTURES

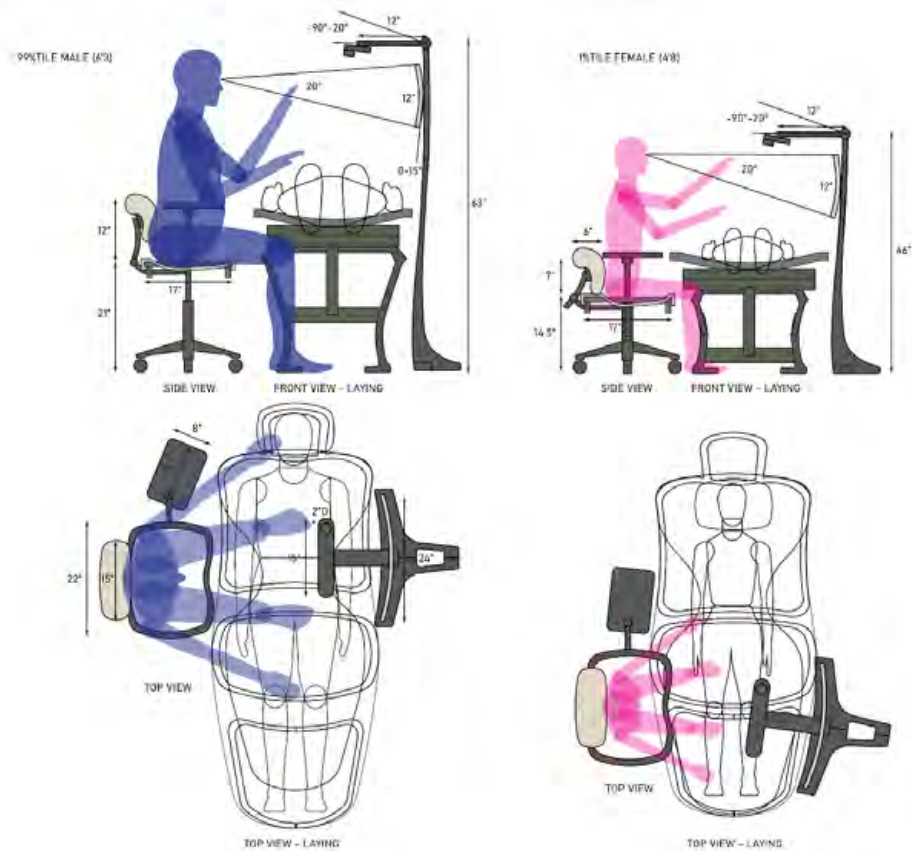
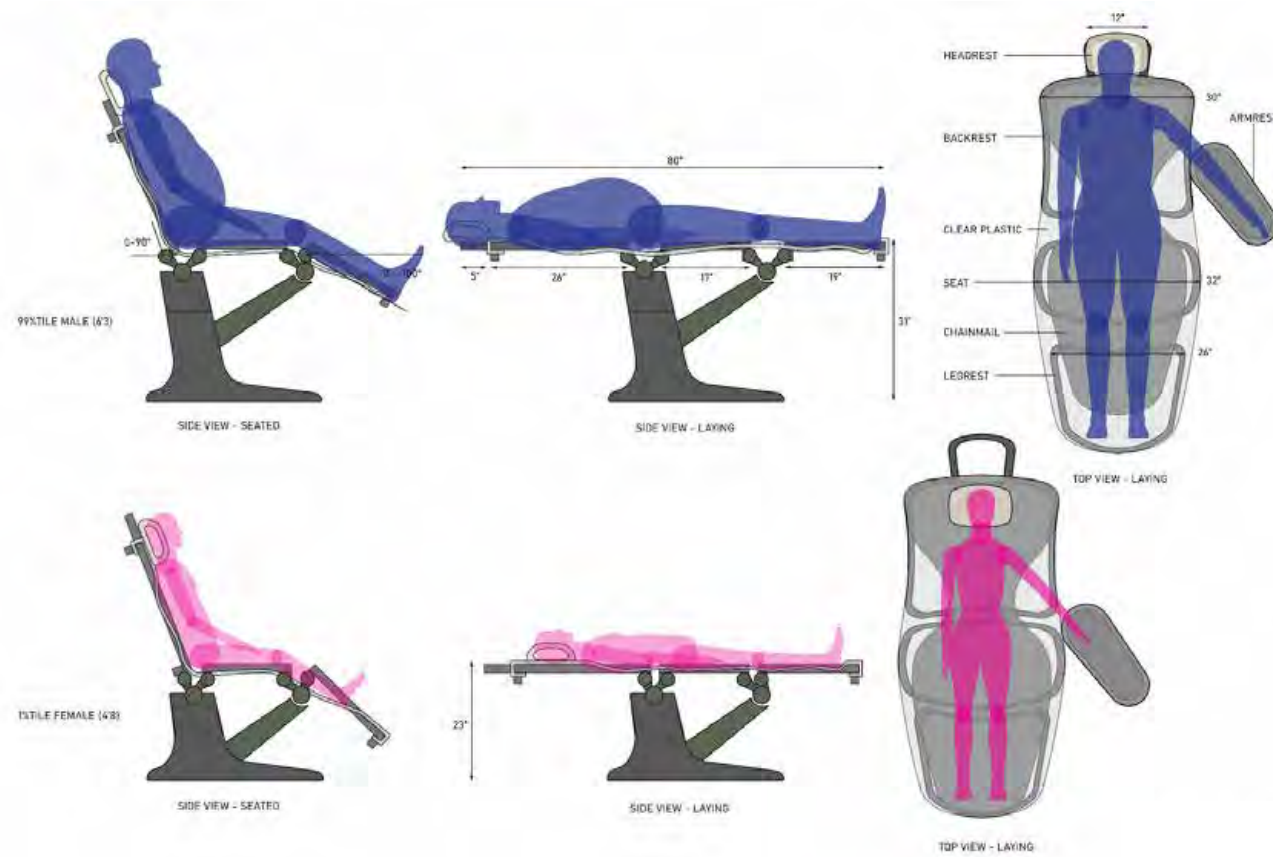
CONCEPT REFINEMENT MARY-BETH SCULLY



4.4 Concept Refinement & Validation

This concept direction continued to be refined to understand the details of the design, how mechanisms worked, and possible material and manufacturing decisions to prove a feasible and ergonomic design. The intention of this phase was to ensure that the product worked as expected in all parts of the design, particularly in the way the chainmail behaved and how the various adjustability points could be moved.

Refined Product Schematic

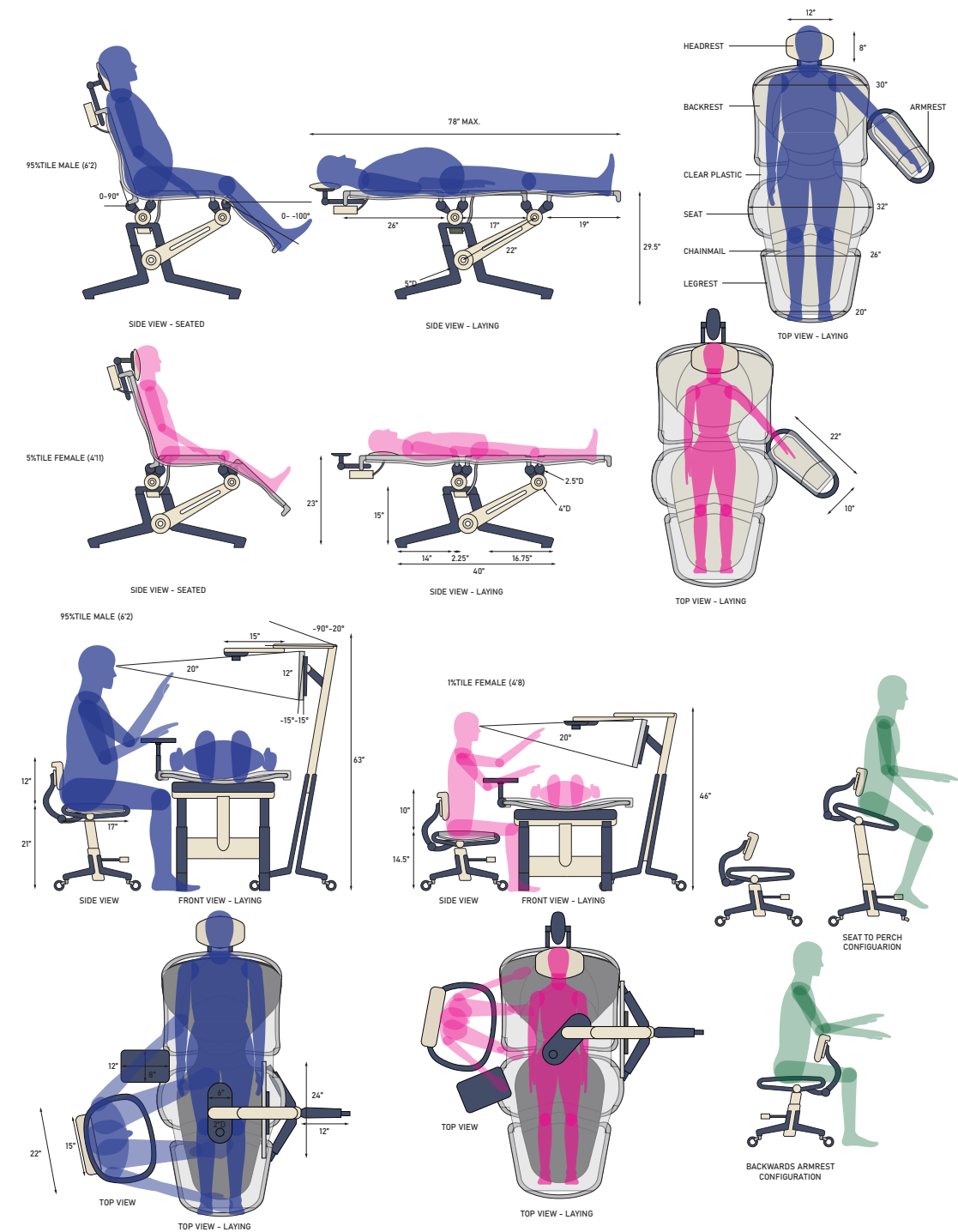


4.5 Concept Realization

After continual refinement of the details of the design, final conclusions about the design were made including shape refinement, aesthetic decisions, and exploration of colourways. At this point, nearly all decisions were made about the design that proved their functionality and ensured a purposeful design.

4.5.1 Design Finalization

The finalization of the design resulted in a family of products that made up the thesis design: Contour. This included (1) the tattoo client bed, (2) the tattoo artist chair, (3) the reference screen/light, and (4) the armrest. These design decisions were nearly flushed out in function, aesthetic, and details, allowing a study model to be produced to understand the design in a physical, three-dimensional form.



4.5.2 Physical Study Models

As the design phase began to finalize, the ergonomic schematics were updated and physical study models were also conducted to prove the concept in 1:5 scale using sketch model materials such as foam core, white foam, and plastic to imitate the shape and materials of the design. This model helped to visualize the final model and to iron out any remaining details in the concept.

4.6 Design Resolution

After discovering some small areas of improvement from the physical study model and through detailed feedback, the discovery of the near-final design was concluded

Contour includes a family of four products: (1) the tattoo client bed, (2) the tattoo artist chair, (3) the reference screen/light, and (4) the armrest. These four products work together in cohesion to populate tattoo workstations in professional studios. The client bed uses similar “fabric chainmail” technology discovered by Engineers at Caltech and JPL (Perkins, 2021). This chainmail mesh is split into 10 pockets along the bed in areas that come into most contact with the tattoo client. These pockets are attached to a set of fans that are combined with rubber tubes along the spine of the bed for flexibility while lengthening and shortening the bed. These fans control the amount of air that is within the pockets, where a vacuum-formed pocket creates stiff, high support, and a release of air provides loose support. These support areas can be customized among the 10 pockets, using the phone app. This is an ideal system that can be catered to any user’s size as well as multiple tattoo positions. For example, if the client is on their back, the tattoo artist can provide more firm lumbar support. If the client is on their stomach, the tattoo artist can provide less lumbar support and perhaps more chest and seat support.

The tattoo artist chair uses a similar chainmail mesh on the seat split into two sections, near the rear of the seat and near the front of the seat. This chair has a spring-loaded lumbar support backrest which can adjust and hold in position,



following the tattoo artist even when they lean forward or backward more. This chair can also be used in reverse, with the top of the backrest as a place to rest elbows or forearms. Finally, this chair has the option to be raised into a perch stance, allowing artists a flexible range of seated and “standing” workflows. The artist can use the footrest to “lock in” the chair, which engages foot stops to hold the wheels in place when sitting perched.

The reference screen is used as a tattoo aid to allow the tattoo artist to look up. This will alleviate the back and neck pain caused from leaning forward and straining the body. This screen is used similarly to digital tablets, with a top-down view provided by the tracking camera. This screen can also be used to provide colour-tunable light, preview stencils, record for social media, and provide an estimated time of the tattoo session.

The last product is the armrest, which also has the chainmail mesh in two pockets - front and back. This can be adjusted to accommodate users with different arm lengths and support the arm or hand more accurately.

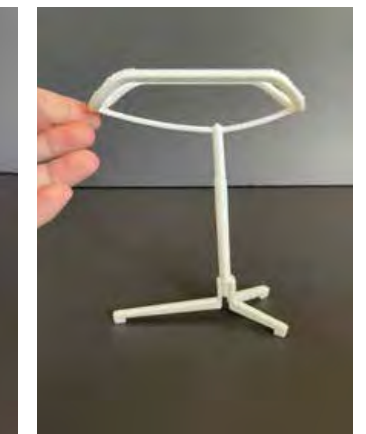
In this process, all ergonomic and functional designs have been ironed out, but a few details were further explored aesthetically which continued to unfold in CAD development. At this point, the original colourways were to be a charcoal, dark green, and a cream colour, but this was later changed to a dark blue, off-white/cream, and aluminum/silver colour to match the tattoo industry aesthetic.



4.8 Physical Model Fabrication

The physical model consisted of primarily 3D printed parts. These parts were printed, sanded, and then treated with Bondo® and filler primer. These parts were also sanded before and in between coats of primer to ensure as smooth a surface as possible. Due to the detailed nature of the design and the number of parts needing specific colours, the decision was made to hand-paint all the surfaces. Once prepped, acrylic paint was mixed and used to achieve the correct colours for the design. Parts were sanded with a high grit in between coats and wiped for dust. They were also wet-brushed painted to smooth paint lines as much as possible. Hand-painting also allowed details such as the decal and other metal elements to be painted intricately. These parts were then assembled once dry.

For the chainmail portion of the design, a decal was made using a drawing from the chainmail model CAD file in Illustrator. This was then printed on clear vinyl sticker paper and cut to size. Although they did not entirely show the colour in the final model, the decision was made to still use the stickers to infer the different pockets on the model. These were placed on thin, 0.02" plexiglass that was then heat bent to take the shape of the plastic on the bed. This created the appearance of clear plastic with chainmail mesh in between suitable for a display model.





chapter 5

Final Design

- 5.1 Design Summary
- 5.2 Design Criteria Met
 - 5.2.1 Full-Bodied Interaction Design
 - 5.2.2 Materials, Processes, and Technology
 - 5.2.3 Design Implementation
- 5.3 Final CAD Rendering
- 5.4 Physical Model
- 5.5 Technical Drawings
- 5.6 Sustainability
 - Health
 - Safety
 - Sustainability Statement for Final Design

This chapter will discuss the final design solution and product result for the thesis problem of improving workflow and comfort in tattoo workstations.

ERGONOMIC ADJUSTMENT

Length, height, and angle adjustable products



VERSATILE CHAIR

Sit forward, reverse, or perch



5.1 Design Summary

The design process took a total of approximately 20 weeks from start to finish. This process began with ideating 6 different concepts for tattoo workstations, which developed into one cohesive design solution with a family of products. Throughout this journey, many decisions were made and features were included that would elevate the workflow and comfort experience for tattoo artists and tattoo clients. These notions were decided and designed because of the immediate and latent needs presented in the primary and secondary research, such as finding a solution to elevating back and neck pain, but going beyond this and finding new ways the tattooing experience can be improved.

The final concept is Contour, a family of four products that work together in cohesion to populate tattoo workstations in professional studios. This concept takes note of the challenges that tattoo artists currently face including physical and mental strain, difficulty reaching all parts of the client's body, and sitting in the same position for multiple hours a day. Contour also increases the benefits of this design through fully customizable products that can all be used multiple ways to work with the tattoo artist's needs seamlessly.

5.2 Design Criteria Met

This section will discuss how Contour successfully meets all design criteria for this thesis project, including being a full-bodied interaction design and meeting all four essential pillars. This section will also discuss the feasibility of the design through its materials and manufacturing methods

5.2.1 Full-Bodied Interaction Design

Contour is a design that accommodates, engages, and is designed for the full body of both users. There are at least three touch point areas for each user, and supporting their body to be as comfortable as possible is one of the main goals of this thesis project.

The client bed is height, length, and angle adjustable with customizable chainmail mesh supports. The artist's chair is height and angle adjustable with three different modes of sitting: forward, backward, and perch. This is ideal to ensure blood flow in the lower body when switching up the sitting position, along with allowing variety and options for how the artist would like to tattoo. These positions are common, including leaning forward but with more support now due to the spring-loaded chair, as well as perching if necessary to reach down the centre of the body. The chair also has customizable chainmail mesh supports. The reference screen is height, length, and angle adjustable and can be wheeled into position wherever necessary. Using this screen, the artist can also prevent the need to stand over the body and use live, top-down feedback instead. Finally, the armrest is height adjustable with customizable chainmail mesh supports.

All components provide a wide range of adjustability and customization to accommodate between the 5th percentile woman and 95th percentile man. Overall reach, positioning, and view of all the products are also considered, with a dedicated system of products that speak to each other in design and work together harmoniously.

5.2.2 Materials, Processes, & Technology

Materials

The majority of all metals used in the tattoo industry are composed of steel, often with a matte black paint finish. Other materials common in the industry are acrylic, foam, and PVC leather. These choices of materials fit the standard set of tattoo regulations to ensure a clean space: non-porous and smooth materials that can be easily cleaned and disinfected.

For this thesis design, the amount of foam needed for the client bed is greatly reduced entirely. Because of the inability to recycle foam (Granger, 2022), the elimination of this necessity by 100% in the design creates a more environmentally-conscious product by considering how it can be discarded after its lifespan.

The look and feel of PVC leather is appreciated by most tattoo artists and clients, but proves to be unsuitable for recycling (Is Leather Environmentally Friendly?, n.d.). To combat this, the proposed material to cover the chainmail links is medical-grade silicone, which can be recycled after its life span and can provide a pliable, form-fitting comfort on the tattoo bed without compromising sterility. The chainmail links within the medical-grade silicone are also made from silicone to provide a more cushioned support.

All metals in this design would be composed of recycled aluminum, which is "100% recyclable and can maintain its properties indefinitely" (Bach, 2021), as well as being more easily recycled and more resistant to corrosion compared to steel (Bach, 2021). The expected lifespan of this thesis family of products when maintained properly is approximately 20 years.

The bases of the client bed and artist chair and other plastic areas are primarily high-density polyethylene (HDPE), which is recyclable plastic. Other components include rubber tubes to provide flexibility where needed, along with rubber wheels.

Finally, the cushions will be made with densely packed coir (coconut fibre) wrapped in medical-grade silicone. This will be for the tattoo artist's lumbar support and tattoo bed headrest.



Processes

The symmetrical design of this thesis project allows for materials and time to be saved when molding and manufacturing the various parts. The legs of the client bed would be die-cast recycled aluminum that is anodized to achieve its deep blue colour. Because the cylinders are similar in size (one 5" diameter, two 4" diameter, and four 2-1/2" diameter) these components can be extruded and cut to size in repeated mass manufacturing processes.

The PLA bioplastic would be laser cut into the two appropriate "front" and "back" flat patterns, and heat sealed with the chainmail link in between the designated sections. The chainmail link itself would be made of 3D-printed silicone, with meltable supports that allow for the chainmail to be fully functional.

All other components, primarily in the tattoo artist's chair and screen stand/light would be made of die-cast recycled aluminum and injection-molded HDPE. As well, the legs of the artist's chair and the reference screen are identical. Other than the extension needed for the height of the screen, this allows the same mold to be used for both products with an additional extruded recycled aluminum to be welded to the legs of the screen to achieve the appropriate height.

Technology

The technology components in this thesis design include wireless connections, rotating motors, hydraulic lifts, a tracking camera and OLED screen, AR, and vacuum air supplies that controls the rigidity/support of the chainmail mesh.

Wireless Connections | This concept is adjusted using the wireless connection between the phone and the bed, chair, or armrest. These wireless connections would be in the air supply and fan areas of the products to be discreet. The wireless connection can control the programmed rotating motors within the bed frame, along with communicate with the fans to notify when to "inhale" or "exhale" certain pockets of the bed.

Rotating Motors | The rotating motors are within the backrest frame and legrest frame on the bed. These motors are controlled with wireless connections using the phone app that will allow the tattoo artist to control the angle the backrest and legrest are set to.

Hydraulic Lift | In order to adjust the bed height, hydraulics are used within the bed legs that can be operated wirelessly to lift and lower the bed. Similar hydraulics are also used in the artist's chair, but this can be manually lowered and raised by using the footrest and a locking system to lock the height in place.



Technology (Cont.)

Tracking Camera & OLED Screen | The tracking camera can follow the tattoo artist's movements in its top-down situation while relaying the information onto the OLED screen. The screen also has its own camera to view the tattoo artist's gestural movements. The tracking camera can also be programmed to record the session whether through the camera or on the OLED screen which can be used for social media.

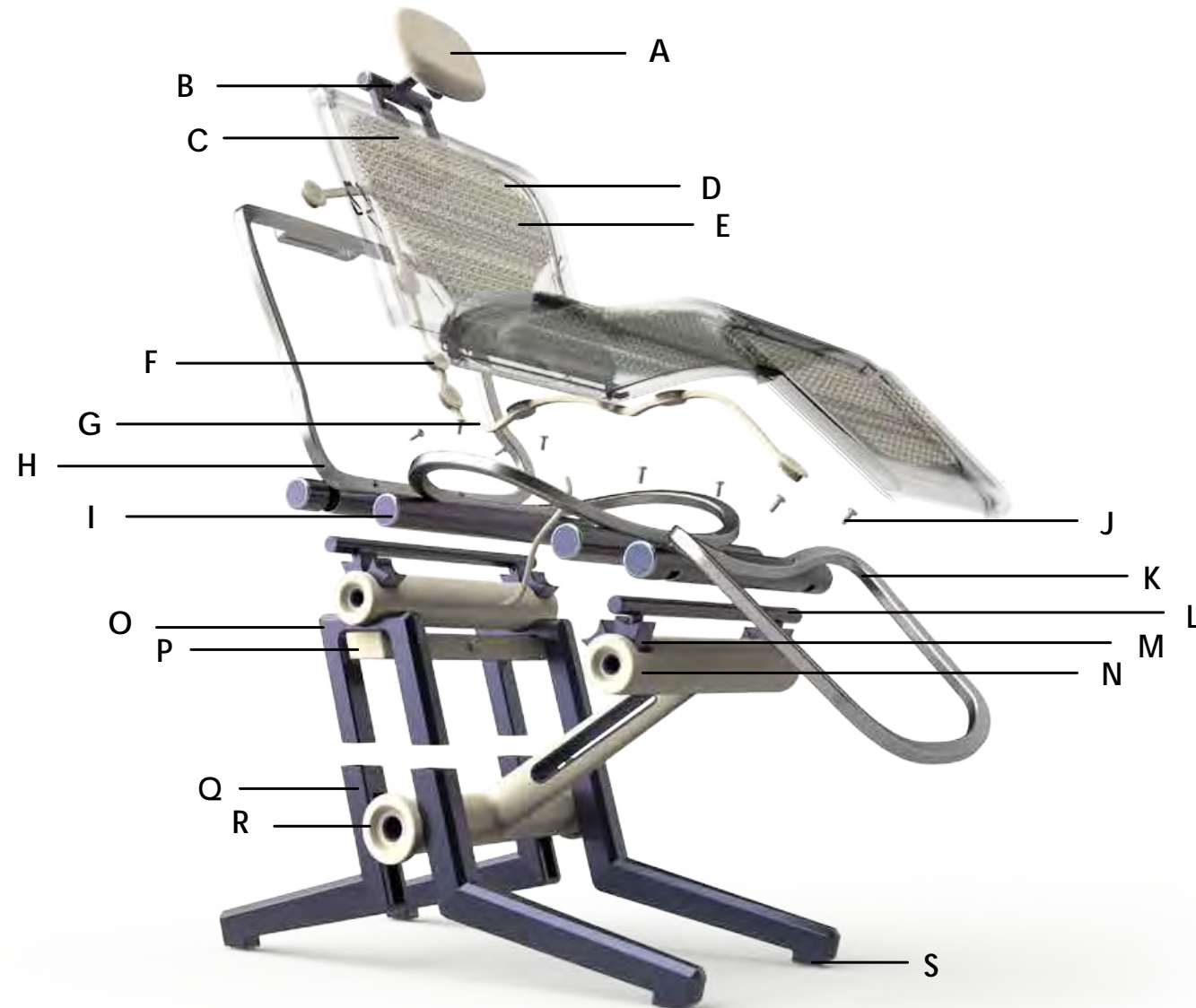
AR (Artificial Reality) | Using the camera and the screen, the tattoo artist can upload the virtual stencil from their digital tablet to the screen and have it be projected in artificial reality onto the tattoo client's body. The client also does not have to be sitting on the bed for this process, as the screen/camera can be maneuvered into various positions. This will save the need for reapplying stencils and have a more realistic approach to what the stencil may look like with accurate colours and wrapping around the body. They can also view the tattoo or stencil on the screen, acting as a mirror.

Vacuum Air Supply | The vacuum air supply is wirelessly connected to the phone app which controls the intensity of support within the ten pockets on the client bed, two pockets on the artist chair, and two pockets on the armrest. Suction power provided by the air supply and fans can be used to push the chainmail links together, providing maximum support. Adding a bit more air would slightly release the chainmail links from each other, creating slightly less support. And a complete release of air will make the chainmail fabric-like with the least amount of support and completely hug the body. This controlled air is made possible with the reversible suction and releasing fans and air supply.



5.2.3 Design Implementation

The following tables show the components of Contour and their predicted material, manufacturing process, and quantity.



Tattoo Client Bed BOM

Letter	Part	Material	Manufacturing	Quantity
A	Head Cushion	Coir, wrapped in medical-grade silicone	Spun & wrapped	1
B	Headrest Frame	Anodized recycled aluminum	Die-cast	1
C	Upper Air Supply	HDPE	Injection molded	1
D	Chainmail Cover	Clear, medical-grade silicone	Laser cut & heat-sealed	2
E	Chainmail	PLA bioplastic	3D-printed	Approx. 1000
F	Vents	HDPE	Injection molded	10
G	Vent Tubes	Rubber	Vulcanized and lathe cut	9+2
H	Backrest Frame	Anodized recycled aluminum	Die-cast	1
I	Seat Frame	Anodized recycled aluminum	Die-cast	1
J	Screws	Recycled aluminum	Thread rolled	8
K	Legrest Frame	Anodized recycled aluminum	Die-cast	1
L	Length & Angle Poles	Anodized recycled aluminum	Die-cast	2
M	Movement Supports	Anodized recycled aluminum	Die-cast	8
N	Movement Cylinder	HDPE	Injection molded	2
O	Upper Legs	Anodized recycled aluminum	Die-cast	2
P	Mid Air Supply	HDPE	Injection molded	1
Q	Lower Legs	Anodized recycled aluminum	Die-cast	2 pair
R	Height Cylinder	HDPE	Injection molded	1
S	Feet	Rubber	Vulcanized & laser cut	4

Tattoo Artist Chair BOM

Letter	Part	Material	Manufacturing	v
A	Backrest Cushion	Coir, wrapped in medical-grade silicone	Spun & wrapped	1
B	Backrest Frame	Anodized recycled aluminum	Die-cast	1
C	Air Supply	HDPE	Injection molded	1
D	Chair Frame	Anodized recycled aluminum	Die-cast	1
E	Chainmail Cover	Clear, medical-grade silicone	Laser cut & heat-sealed	2
F	Chainmail	PLA bioplastic	3D-printed	Approx. 400
G	Vents	HDPE	Injection molded	2
H	Vent Tubes	Rubber	Vulcanized & lathe cut	1+1
I	Height Cylinders	HDPE	Injection molded	4
J	Legs	Anodized recycled aluminum	Die-cast	3
K	Wheels	Rubber & recycled aluminum	Extruded & cut & die-cast	3

Reference Screen BOM

Letter	Part	Material	Manufacturing	Quantity
A	Tracking Camera	HDPE & glass	Injection molded	1
B	Light	Anodized recycled aluminum & LED tube	Die-cast	1
C	Light Extension Arm	HDPE & aluminum	Injection molded & die-cast	1
D	Post	HDPE	Injection molded	1
E	Screen Movement	HDPE & aluminum	Injection molded & die-cast	1
F	Screen	OLED & aluminum	Laser cut	1
G	Legs	Anodized recycled aluminum	Die-cut	3
H	Wheels	Rubber & recycled aluminum	Extruded & cut & die-cast	3

Armrest BOM

Letter	Part	Material	Manufacturing	Quantity
A	Armrest Frame	Anodized recycled aluminum	Die-cast	1
B	Chainmail Cover	Clear, medical-grade silicone	Laser cut & heat-sealed	2
C	Chainmail	PLA bioplastic	3D-printed	Approx. 100
D	Vents	HDPE	Injection molded	2
E	Vent Tubes	Rubber	Vulcanized & lathe cut	1+1
F	Post	HDPE	Injection molded	1
G	Legs	Anodized recycled aluminum	Die-cast	3
H	Feet	Rubber	Vulcanized & laser cut	3

contour

Tattoo Workstation Workflow & Comfort

5.3 Final CAD Renderings

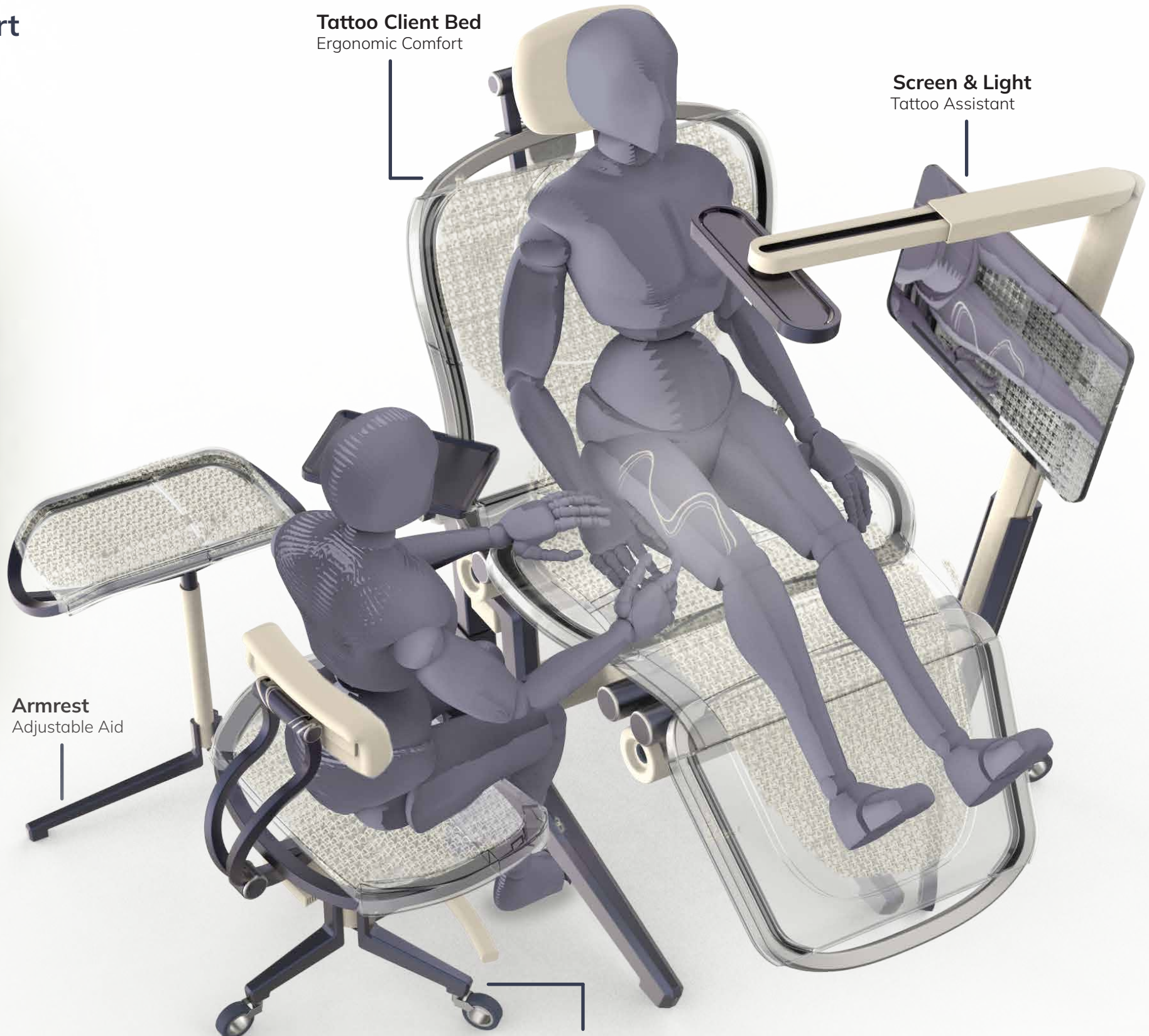
Adaptable
Products can cater to
any tattoo placement
on the client's body



Versatile
Sit forward, reverse,
or in perch

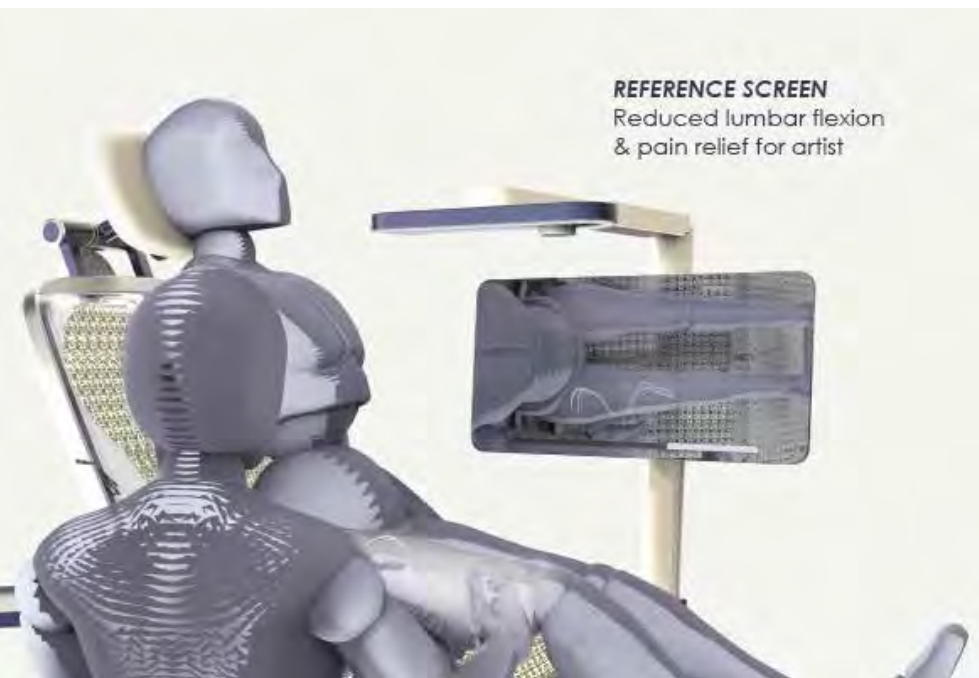
Tattoo Client Bed
Ergonomic Comfort

Screen & Light
Tattoo Assistant



Armrest
Adjustable Aid

Tattoo Artist Chair
Custom Workflow



Reference Screen

The reference screen can be used for various tasks:

- Assisted tattooing
- Providing light
- Displaying session length
- Previewing stencils
- Recording for social media

Phone App

The phone app is used for various adjustments of the products:

- Automatic and manual bed length adjustment at various points
- Bed angle adjustment
- Bed chainmail support calibration
- Light colour/intensity
- Screen information & recording



Chainmail Calibration

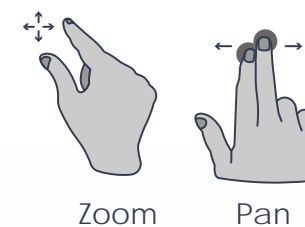
Chainmail can be adjusted in a range between high support and low support using the phone app. This support intensity is dependant on how close the chainmail links are squeezed together.



Gesture Control

The camera on the screen allows the users to use gesture controls to navigate the screen and keep their hands clean & sterile.

Screen Gesture Controls

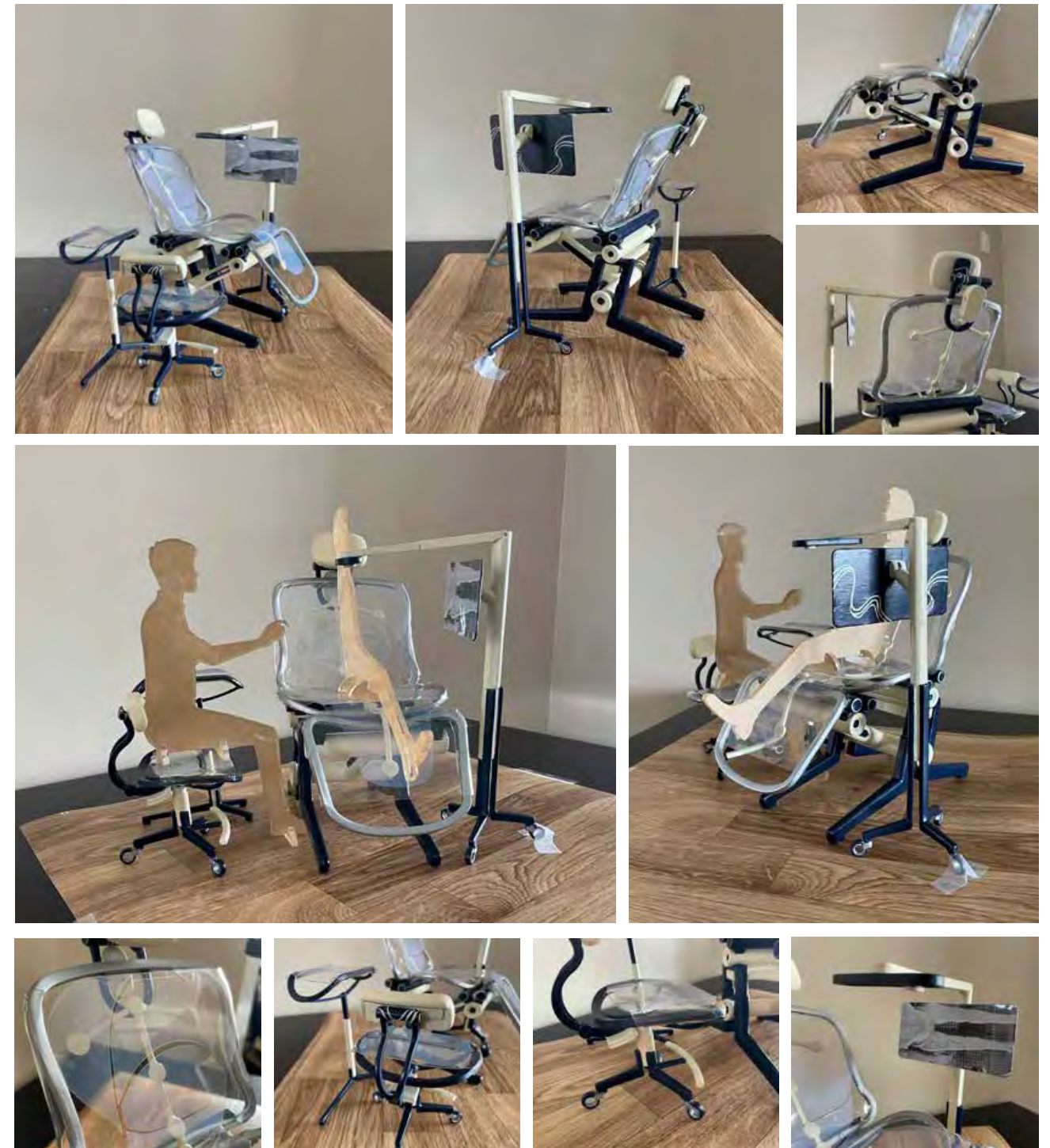




Sustainability
 Contour is a long-lasting design that uses recycled and recyclable materials where applicable while keeping the products sterile. The symmetrical design allows the same molds to be used in design manufacturing.



Tracking Camera
 The tracking camera allows the tattoo artist to view their tattoo session and progress on the screen. The camera follows the stencil and tattoo information provided by the artist's drawing tablet to understand where it should focus.

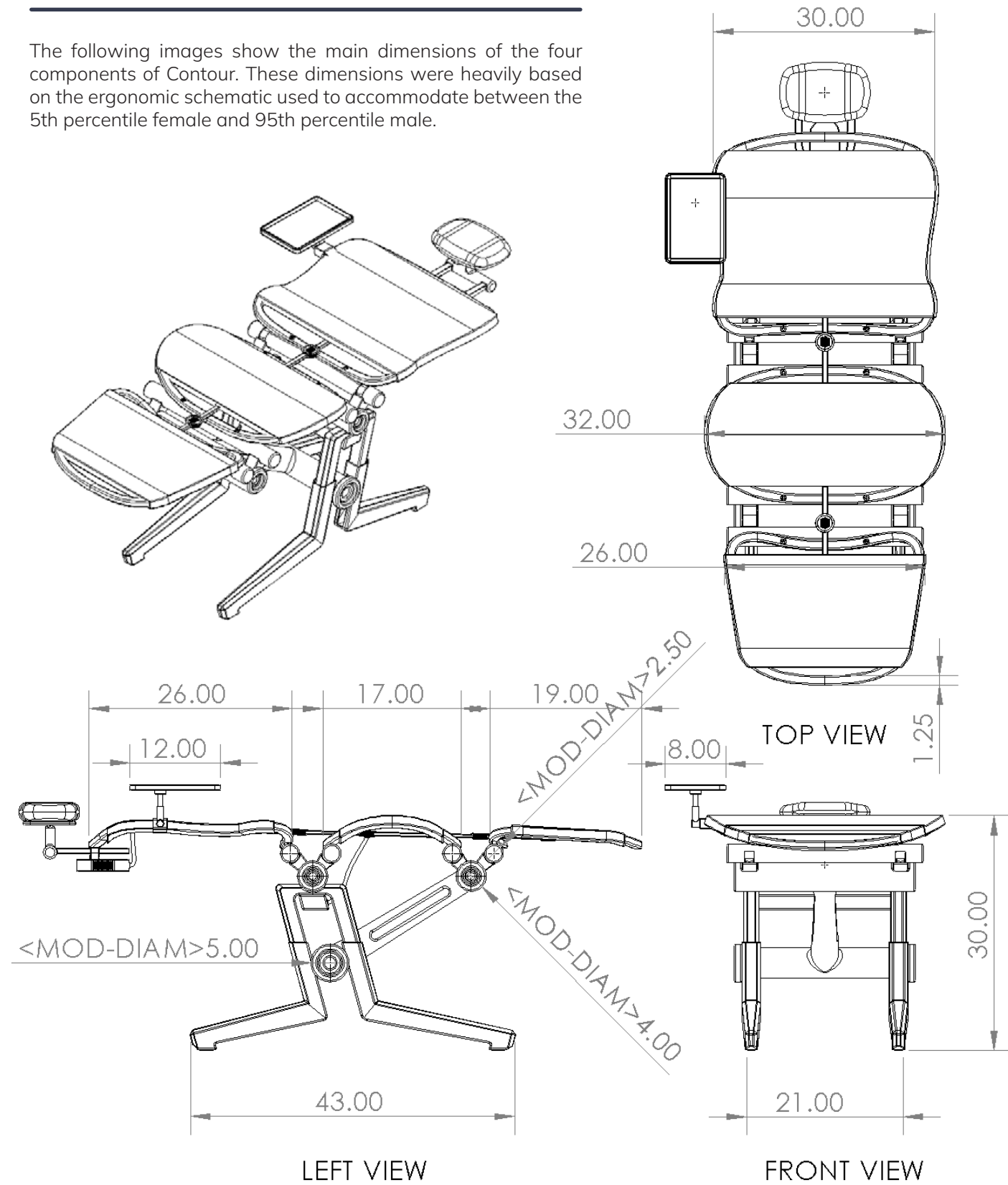


5.4 Physical Model

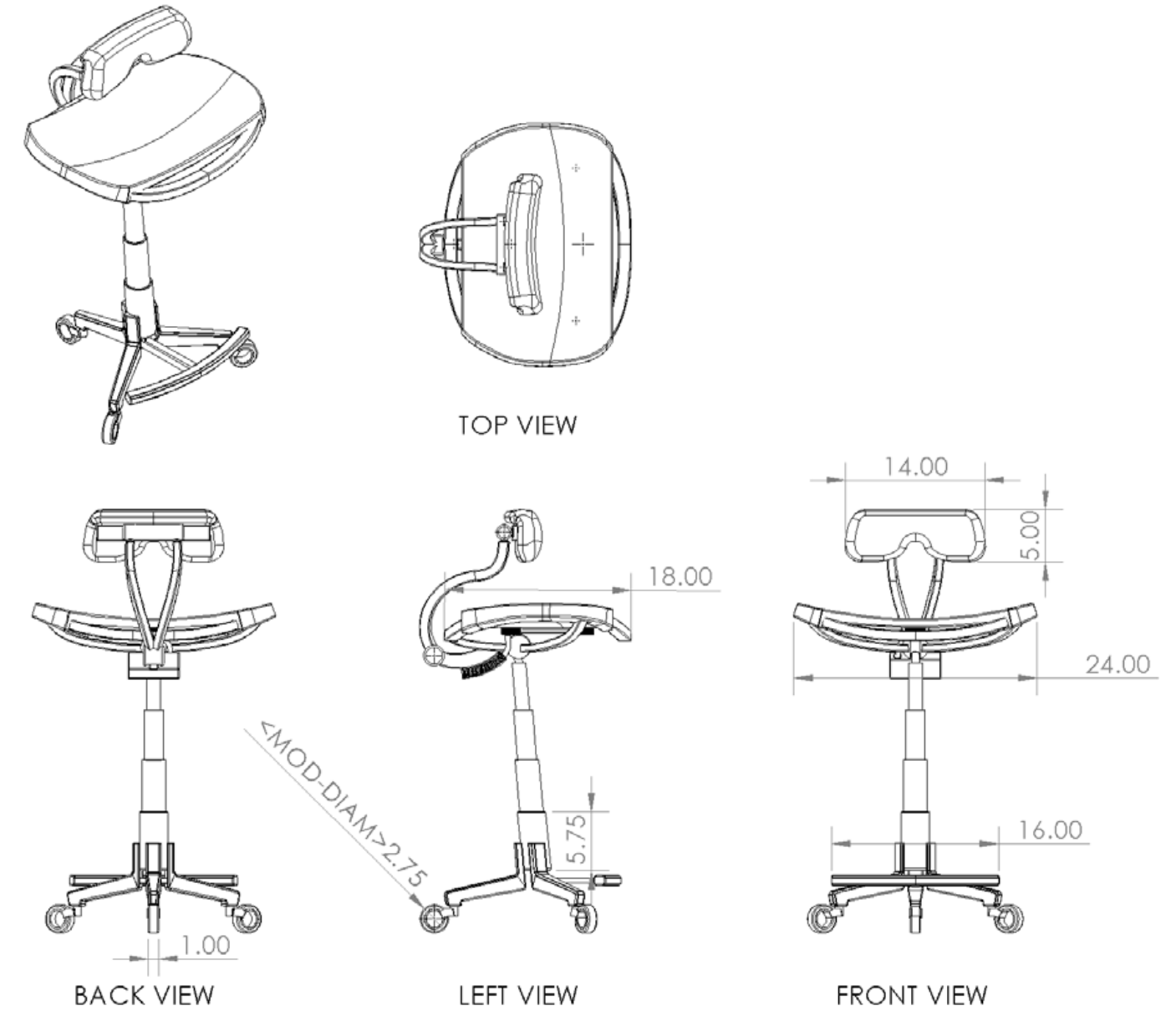
These images show the final near-completed physical model made of 3D-printed PLA and heat-bended plexiglass. The physical model is comprised of four parts: the tattoo client bed, the tattoo artist chair, the reference screen/light, and the armrest. These components all come together to imitate a real tattoo studio placement of tattooing someone's thigh. After these photos, the addition of the air vents on the chair and armrest as well as their respective supply tubes were added. The base was also cut to the correct size and finalized.

5.5 Technical Drawings

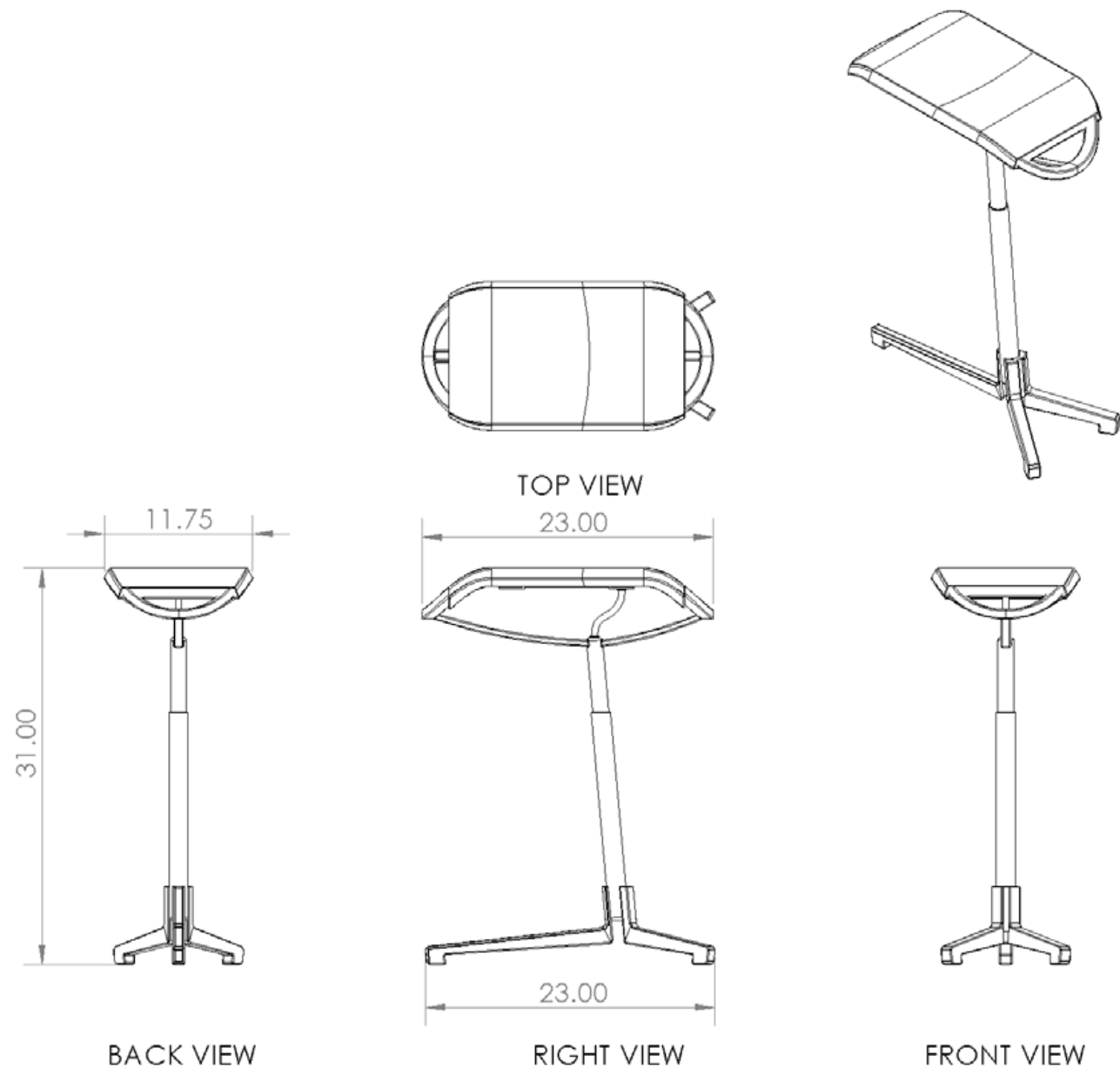
The following images show the main dimensions of the four components of Contour. These dimensions were heavily based on the ergonomic schematic used to accommodate between the 5th percentile female and 95th percentile male.



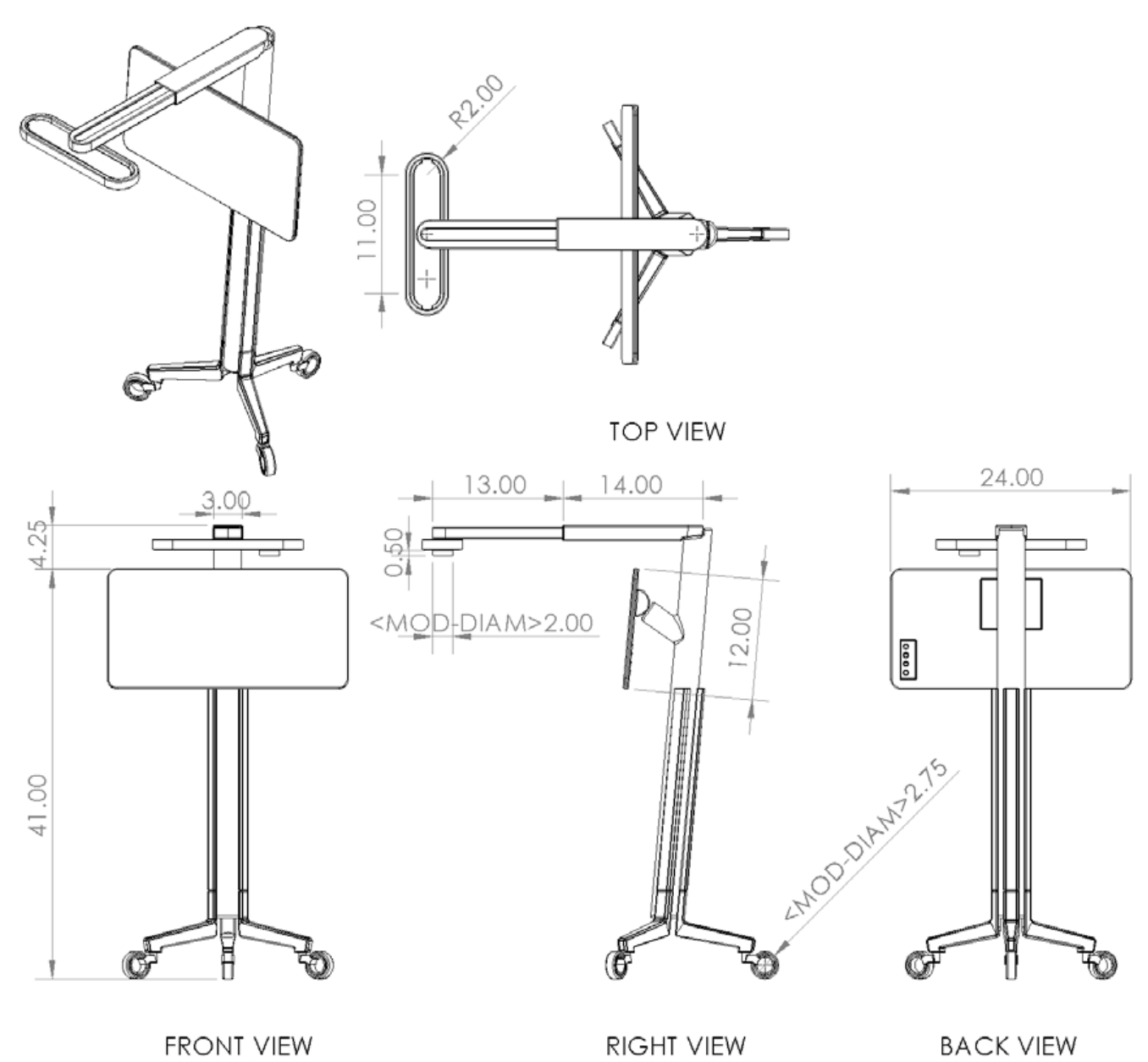
CONTOUR: CLIENT BED
99%TILE MALE
1:20 SCALE



CONTOUR: ARTIST CHAIR
PERCH STANCE
1:14 SCALE



CONTOUR: ARMREST
99%TILE MALE
1:12 SCALE



CONTOUR: REF SCREEN
5%TILE FEMALE
1:14 SCALE

5.6 Sustainability

Health

The health of artists and clients is crucial in the tattoo workstation environment, and all necessary steps must be followed to reduce the risk of blood-borne illness and cross-contamination. These regulations were also considered when creating the thesis design. All surfaces of the products are smooth, non-porous, and easy to disinfect, primarily the tattoo bed which the medical-grade silicone covering the chainmail mesh allows effortless cleaning and sterilization.

The thought of using gesture controls for the reference screen was primarily introduced because of the consideration for a hands-free design; the less the tattoo artist has to touch throughout the session the better. These thoughts were also intentional when designing the camera, which follows the tattoo artist's movements instead of having to constantly be re-adjusted by the tattoo artist.

Safety

Along with providing easy-to-clean surfaces, the safety of the tattoo artist and tattoo client is largely focused on ergonomics in this thesis design. With the ability to raise, lower, and angle the client bed, along with full adjustments of the rigidity of the chainmail for the tattoo client, this user can comfortably lie on the bed for multiple hour-long sessions.

In regards to the tattoo artist, having the ability to raise and lower the tattoo bed, the artist's chair, and the reference screen creates customizable options for users of various heights. As well, if the tattoo artist chooses, they are able to extend the chair into a "perch" position, primarily used for tattoos down the centre of the body (i.e. sternum). This allows increased blood flow with the aid of a seat to take off some of the load of their weight whenever they choose.

Using the reference screen from the seated position, the tattoo artist has the option to have a "bird's eye view" of their tattooing progress, using this to tattoo instead of leaning forward in awkward positions. The intention of this is to save the neck and back of the tattoo artist from strain by an estimated 50%. As well, the ability to tune the lighting intensity and colour reduces eye strain for the user. These adjustments make tattooing a less tiresome process for the tattoo artist, allowing them to be more sustainable in their practice.

Sustainability Statement

This thesis design considers sustainability in all aspects of the design. This design has a careful selection of materials and manufacturing methods to swap out existing materials in the market. This design uses 3D-printed silicone chainmail, laser-cut PLA bioplastic, densely packed coir (coconut fibre), and die-cast recycled aluminum along with minimal molds for mass production based on repetitive design features. These eco-conscious materials also align with health and safety guidelines, ensuring smooth surfaces to allow easy clean-up and minimal-touch surfaces while tattooing.

The use of innovative products such as the reference screen allows sustainability in the user's work methods, easing their neck and back pain with the option to sit or perch while they work. Finally, the fully ergonomically-adjustable tattoo bed ensures comfort and safe and neutral spine positions for the tattoo client regardless of the position they are because of its adjustable pliability.



The page features a dark blue background with several thick, light-colored wavy lines on the left side, creating a sense of movement and depth. These lines start from the top left and curve downwards and to the right, ending near the bottom center of the page.

chapter 6

Conclusion

This chapter will conclude this dossier and the design of Contour.

contour



Conclusion

Contour is a family of four products that work together seamlessly to aid tattoo artists' workflow and improve comfort for the client and themselves. The four products in this system are: (1) the tattoo client bed, (2) the tattoo artist chair, (3) the reference screen/light, and (4) the armrest. Through the primary and secondary research of this thesis design, it was discovered that some of the main challenge areas that tattoo artists experience are: (1) inaccessible equipment that is borrowed from other industries, (2) a physically and mentally tiresome process that causes musculoskeletal pain, and (3) ergonomic sacrifices that are the result of poorly catered workstation furniture and sitting for 8+ hours daily. This thesis design is fully equipped to reduce all these immediate pain point areas with a unique solution that further benefits the users and targets their latent needs.

Contour offers fully customizable products that are length, height, and/or angle adjustable as needed and can be integrated into the tattoo artist's workflow, whether they choose to tattoo using the screen, with the front chair support, while perched, and more. A full range of custom support pockets on the client bed, artist's chair, and armrest ensure that each and every body that steps into the tattoo workstation has a comfort level that is ergonomically suitable for them. Contour is a design solution that immediately improves the workflow experience and comfort level for the users while utilizing unique technologies to ensure career longevity for the tattoo artist.

References

- Abelman, K. (2020). The Secret, Chronic Pain of Tattoo Artists. Retrieved from allure: <https://www.allure.com/story/tattoo-artist-chronic-back-pain>
- Bach, B. (2021, October 26). Benefits of aluminum vs. steel: from environmental impacts to meeting consumer needs. Retrieved from Food Engineering: <https://www.foodengineeringmag.com/articles/99764-benefits-of-aluminum-vs-steel-from-environmental-impacts-to-meeting-consumer-needs#:~:text=Unlike%20steel%2C%20the%20process%20of,and%20retains%20its%20properties%20indefinitely.>
- Canadian Tattoo and Piercing Regulations. (2018, November 20). Retrieved from Trinity: <https://www.trinitybj.com/blog/articles/canadian-tattoo-and-piercing-regulations>
- Campanile et al. (2019). Nearly one in three New Yorkers has a tattoo: survey. Retrieved from New York Post: <https://nypost.com/2019/12/29/nearly-one-in-three-new-yorkers-has-a-tattoo-survey/>
- Cleveland Clinic Medical Professional. (2019, November 19). Skeletal System. Retrieved from Cleveland Clinic: <https://my.clevelandclinic.org/health/body/21048-skeletal-system>
- Chong, C. & Matovu, F. (2022). IDSN 4002/4502 Senior Level Thesis 1&2 - Project Requirements. Retrieved from Senior Level Thesis Project 1: https://learn.humber.ca/ultra/courses/_216230_1/outline/file/_14550632_1
- Granger, T. (2022, January 12). Recycling Mystery: Memory Foam. Retrieved from Earth 911: <https://earth911.com/home-garden/recycling-mystery-memory-foam/>
- Georgiev, G. (n.d.). Height Percentile Calculator. Retrieved from GIGACalculator: <https://www.gigacalculator.com/calculators/height-percentile-calculator.php>
- Herman Miller. (n.d.). The Evolution of Anthropometrics and User Control: The Science and Research Behind the Mirra 2 Chair. Retrieved from Herman Miller: <https://www.hermanmiller.com/research/categories/white-papers/the-evolution-of-anthropometrics-and-user-control/>
- Keester, D. L., & Sommerich, C. M. (2017). Investigation of musculoskeletal discomfort, work postures, and muscle activation among practicing tattoo artists. *Applied Ergonomics*, 58, 137–143. <https://doi.org/10.1016/j.apergo.2016.06.006>
- Kluger, N. (2017). National survey of health in the tattoo industry : Observational study of 448 French tattooists. *Department of Dermatology, Allergology and Venereology*, 111-120. DOI: <https://doi.org/10.13075/ijomeh.1896.00634>
- Lineberry, C. (2007, January 1). Tattoos: The Ancient and Mysterious History. Retrieved from Smithsonian Magazine: <https://www.smithsonianmag.com/history/tattoos-144038580/>
- McLeod, S. (2022, April 04). Maslow's Hierarchy of Needs. Retrieved December 03, 2022, from SimplyPsychology: <https://www.simplypsychology.org/maslow.html>
- Ohio State University. (2017, February 16). Being a tattoo artist is a pain in the neck, study finds. Retrieved from Science Daily: <https://www.sciencedaily.com/releases/2017/02/170216103833.htm>
- Perkins, R. (2021, August 11). Material Inspired by Chain Mail Transforms from Flexible to Rigid on Command. Retrieved from Caltech: <https://www.caltech.edu/about/news/material-inspired-by-chain-mail-transforms-from-flexible-to-rigid-on-command>
- Strübel, J., & Jones, D. (2017, December 17). Painted Bodies: Representing the Self and Reclaiming the Body through Tattoos. *The Journal of Popular Culture*, 1230-1253. doi:<https://doi-org.ezproxy.humber.ca/10.1111/jpcu.12626>
- Tattoo Pro Admin. (2021, April 13). 21 Tattoo Statistics & Trends in 2021: A Primer Into the Tattoo Industry. Retrieved November 11, 2022, from Tattoo Pro: <https://www.tattoopro.io/blog/tattoo-industry-statistics/>
- The Editorial Unit. (n.d.). The evolution of the tattoo machine. Retrieved from The Up Coming: <https://www.theupcoming.co.uk/2021/10/25/the-evolution-of-the-tattoo-machine/>
- Tilley, A. R. (1993). *The Measure of Man and Woman: Human Factors in Design*. Henry Dreyfuss Associates. New York: Whitney Library of Design.
- WOOD Magazine Staff. (2020, January 28). Must-have measurements for comfortable seating. Retrieved from WOOD: <https://www.woodmagazine.com/must-have-measurements-for-comfortable-seating>
- USAPHC. (n.d.). Know What to Look for in an Ergonomic Chair. Retrieved from <https://phc.amedd.army.mil/PHC%20Resource%20Library/Ergo%20Chair%20FS%2088-004-0311.pdf>
- Zippia. (2019). Tattoo Artist Demographics and Statistics in the US. Retrieved November 10, 2022, from Zippia The Career Expert: <https://www.zippia.com/tattoo-artist-jobs/demographics/>
- Zuckerman, A. (2020, May 13). 38 Tattoo Statistics: 2020/2021 Industry, Trends & Demographics. Retrieved November 11, 2022, from CompareCamp: <https://comparecamp.com/tattoo-statistics/>

Image References

Page 6 | Abstract

<https://www.pexels.com/photo/a-person-wearing-a-black-glove-holding-a-tattoo-machine-7005661/>

Page 12-13 | Problem Definition

<https://www.pexels.com/photo/woman-in-black-long-sleeve-shirt-and-blue-denim-shorts-sitting-on-black-chair-4123834/>

Page 14-15 | Background & Social Context

<https://www.wallpaperflare.com/monochrome-photo-of-man-raising-his-hands-adult-back-view-black-and-white-wallpaper-gjnjd>

<https://www.pexels.com/photo/a-man-inside-a-tattoo-studio-6593369/>

Page 18-19 | User Profile | Persona

<https://www.zippia.com/tattoo-artist-jobs/demographics/>
<https://comparecamp.com/tattoo-statistics/>
<https://www.tattoopro.io/blog/tattoo-industry-statistics/>

Page 20-21 | Example User Persona

<https://www.pexels.com/photo/woman-in-black-long-sleeve-shirt-and-blue-denim-shorts-sitting-on-brown-wooden-chair-4123895/>
<https://www.pexels.com/photo/woman-in-black-tube-top-4123902/>

Page 22 | Current User Practice

<https://www.wayfair.ca/Ebern-Designs--Tattoo-Spa-Salon-Facial-Reclining-2-Piece-Massage-Chair-Set-X114180961-L505-K~C003035248.html>
<https://www.pexels.com/photo/a-hand-holding-a-tattoo-machine-6593487/>

Page 24 | User Observation | Human Factors of Existing Products

<https://www.wayfair.ca/Ebern-Designs--Tattoo-Spa-Salon-Facial-Reclining-2-Piece-Massage-Chair-Set-X114180961-L505-K~C003035248.html>
<https://www.homedepot.com/p/Husky-46-in-W-x-24-5-in-D-Standard-Duty-9-Drawer-Mobile-Workbench-Cabinet-with-Solid-Wood-Top-in-Gloss-Black-H46MWC9V2/313615421>

Page 25-26 & 28 | Benchmarking | Benefits & Features of Existing Products

<https://www.worldwidetattoo.ca/english/product/rolling-tattoo-workstation-1>
<https://dpbeauty.en.made-in-china.com/product/KyQmobsfvcpl/China-Portable-Desk-Tray-Tattoo-Furniture-Portable-Tattoo-Workstation.html>
<https://www.google.com/url?q=https://www.inkbed.com/brand-new-model-inkbed-patented-fully-adjustable-tattoo-table-bed-free-station-with-purchase/&sa=D&source=docs&ust=1681755813979983&usg=AOvVaw1WhwE3Z88-27eK801bplAI>
https://www.amazon.ca/Gizmo-Supply-Portable-Massage-Bolster/dp/B00GO7IY0Q/ref=sr_1_8

<https://www.pexels.com/search/tattoo%20artist/?orientation=portrait>

<https://www.homedepot.com/p/Husky-46-in-W-x-24-5-in-D-Standard-Duty-9-Drawer-Mobile-Workbench-Cabinet-with-Solid-Wood-Top-in-Gloss-Black-H46MWC9V2/313615421>
<https://www.amazon.ca/InkBed-Tattoo-Bed-Package-Compact/dp/B07FSVVVRX>
<https://fytsupplies.ca/products/massage-table>
<https://tattoo-armrest-uk.com/products/tattoo-arm-rest-ta-large>

Page 29 | Benchmarking | Aesthetics & Semantic Profile of Existing Products

<https://www.ubuy.hu/en/product/C18MMB4-tatartist-electric-beauty-bed-massage-chair-aesthetic-facial-beds-portable-medical-stool-tattoo-dent>
<https://www.amazon.com/Medical-Aesthetic-Procedure-Electrical-Adjustments/dp/B08KRK368Q>
https://www.you-buy.ca/en/search/index/view/product/B07GC3FSCY/s/facial-beauty-bed-medical-aesthetic-tattoo-procedure-bed-with-2-motor-electrical-adjustments-ink-white/store/store/kk/dp?ref_p=dp-rp
<https://www.shopsalocity.com/products/tattoo-workstation-ta4701>
<https://www.wayfair.ca/organization-storage/pdp/k-salon-professional-hair-salon-trolley-utility-cart-with-wheels-jalo1018.html>
<https://www.amazon.ca/TFCFL-Workstation-Adjustable-Instrument-workbench/dp/B07JGRK21K>
<https://www.amazon.ca/Workstation-Portable-Detachable-Rolling-Adjustable/dp/B07Y4SY212>

Page 30 | Benchmarking | Materials & Manufacturing of Existing Products

<https://www.salonfurnishing.ca/product/3321-black-esthetic-tattoo-bed/?v=e4b09f3f8402>
<https://www.wayfair.ca/organization-storage/pdp/dermalogic-ryder-all-purpose-beauty-salon-utility-trolley-push-cart-ddma1000.html>
<https://forgedbymeta.com/>

Page 31 | Summary of Chapter 2

<https://www.pexels.com/photo/man-holding-tattoo-machine-2928342/>

Page 34-35 | Analysis | Needs

<https://www.pexels.com/photo/a-tattoo-artist-working-on-a-client-7005729/>
<https://www.pexels.com/photo/a-man-wearing-hat-doing-tattoo-7005795/>
<https://www.pexels.com/photo/man-in-blue-shirt-sitting-beside-woman-lying-on-bed-6593434/>

Page 37 | Journey Mapping

<https://unsplash.com/photos/6TQmOn8p8RM>

<https://www.pexels.com/photo/two-white-and-black-bottles-on-black-table-4123825/>

<https://www.pexels.com/photo/woman-in-black-tube-top-holding-smartphone-4123911/>
<https://www.pexels.com/photo/woman-in-black-leather-boots-lying-on-floor-4123898/>
<https://www.pexels.com/photo/woman-in-black-shirt-sitting-on-black-office-rolling-chair-4123704/>
<https://www.pexels.com/photo/woman-in-black-tube-dress-4123823/>

Page 43 | Analysis | Sustainability | Safety, Health, & Environment

<https://www.caltech.edu/about/news/material-inspired-by-chain-mail-transforms-from-flexible-to-rigid-on-command>
<https://www.wired.com/story/nasa-fabric-chain-mail-from-the-future/>
<https://www.wayfair.ca/keyword.php?keyword=esthetician+bed>
<https://www.archdaily.com/43090/the-tote-serie-architects>

Page 44 | Analysis | Innovation Opportunity

<https://unsplash.com/photos/52Kf36w124Y>
<https://unsplash.com/photos/RF6NLFcWsxk>

Page 50 | Aesthetics Approach & Semantic Profile

<https://www.caltech.edu/about/news/material-inspired-by-chain-mail-transforms-from-flexible-to-rigid-on-command>
<https://www.wired.com/story/nasa-fabric-chain-mail-from-the-future/>
<https://www.wayfair.ca/keyword.php?keyword=esthetician+bed>
<https://www.archdaily.com/43090/the-tote-serie-architects>
<https://www.caltech.edu/about/news/material-inspired-by-chain-mail-transforms-from-flexible-to-rigid-on-command>

Page 69 | Concept Realization

<https://www.pexels.com/photo/man-and-woman-sitting-on-chair-4125587/>

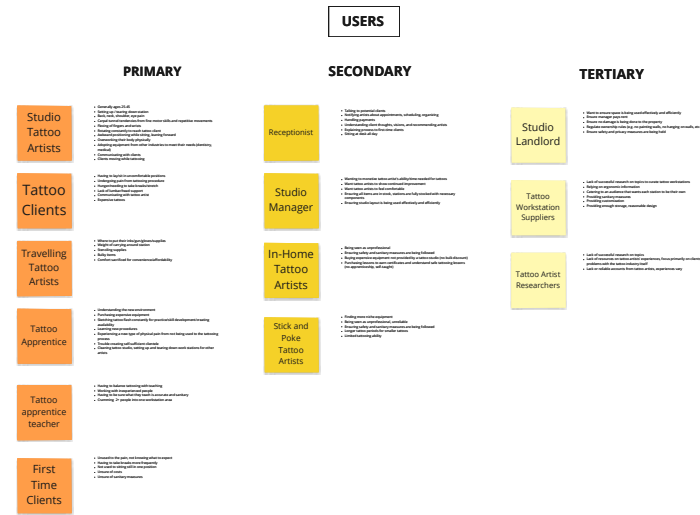
Page 82 | Materials, Processes, & Technology

<https://www.beamlr.com/is-3d-printing-with-silicone-possible/>
<https://www.amazon.ca/InkBed-Tattoo-Bed-Package-Compact/dp/B07FSVVVRX>
<https://www.worldwidetattoo.ca/french/product/rolling-tattoo-workstation-1>

Page 84-85 | Technology (Cont.)

<https://www.pexels.com/photo/female-portrait-tattoo-2865412/>

Appendix A | Discovery



HMW IMPROVE WORKFLOW AND COMFORT FOR TATTOO ARTISTS?

PRODUCT BENCHMARKING

Product	PROS	CONS
Tattoo Armrest	• Adjustable padding • Breathable • Removable heavy base matting • Removable cover for cleaning	• Not for use with • Not for use with • Not for use with
InkBed Adjustable Client Bed Decline	• Removable padding for neck and • Adjustable angle range • Basic	• Not for use with • Not for use with • Not for use with
InkBed	• Multiple customization options for angle • Adjustable • Removable padding • Removable cover for cleaning	• Not for use with • Not for use with • Not for use with
Portable Desk Tray	• Removable padding for neck and • Adjustable angle range • Basic	• Not for use with • Not for use with • Not for use with
InkStool	• Fully adjustable ergonomic seat • Removable padding for neck and • Removable cover for cleaning	• Not for use with • Not for use with • Not for use with

ENVIRONMENT OF USE

- tattoo artist setting up workstation**
 - Time taken to set up workstation
 - Space required for workstation
 - Noise level during setup
 - Lighting requirements
- photographing tattoo during afterwards**
 - Time taken to photograph tattoo
 - Space required for photography
 - Lighting requirements
- design discussions with clients**
 - Time taken for design discussions
 - Space required for design discussions
 - Noise level during discussions
- tattooing client**
 - Time taken to tattoo client
 - Space required for tattooing
 - Noise level during tattooing
 - Lighting requirements
- changing workstation between clients**
 - Time taken to change workstation
 - Space required for changing workstation
 - Noise level during changing workstation
- client getting tattooed**
 - Time taken for client to get tattooed
 - Space required for client to get tattooed
 - Noise level during client getting tattooed
- calculating tattoo time for cost**
 - Time taken to calculate tattoo time
 - Space required for calculating tattoo time
- stock inventory**
 - Time taken to manage stock inventory
 - Space required for stock inventory
- referencing photos & tattoo sketches**
 - Time taken to reference photos and sketches
 - Space required for referencing photos and sketches
- tattoo artist drawing tattoo designs**
 - Time taken to draw tattoo designs
 - Space required for drawing tattoo designs

PRODUCTS IN THE AREA

- client bed
- tattoo workstation
- tattoo stool
- common tables to sketch on
- chairs
- receptionist desk
- bulletin boards
- tattoo guns
- trays
- stencil printer
- iPads
- clients bed attachments (arm, leg)
- ring lights
- head lights
- masks
- decorations
- privacy dividers
- concentrated lighting
- waiting areas (chairs, tables, etc.)
- rows of inks
- sanitation measures (gloves, paper towel, etc.)
- cleaning supplies
- aftercare products
- jewelry

PERSONAL EXPERIENCE

- Tattoo artists hunched over my arm, to the point I'm touching their torso with my hand
- Immediately taking a big stretch after the session, complaining of back pain
- Taping tattoo references to my skin for close reach
- Tattoo artist wearing head lights
- Tattoo artist maneuvering ring lights around client bed
- Tattoo artist wearing mask to prevent constant inhalation of inks
- I'm sweating from the close contact / undergoing tattooing procedure

BACKGROUND & RESEARCH

Research 1: L. & S. (2018). A study of musculoskeletal disorders in the tattoo industry. Occupational Ergonomics, 1(1), 1-10.

Research 2: J. (2017). National Survey of Health in the Tattoo Industry. Occupational Ergonomics, 1(1), 1-10.

Research 3: S. (2015). Tattooing: A study of the health and safety of tattoo artists. Occupational Ergonomics, 1(1), 1-10.

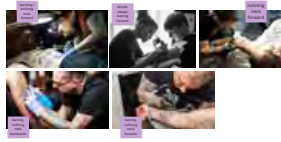
Summary Statements:

1. Tattoo artists are at risk of musculoskeletal disorders due to their work environment.
2. The most common musculoskeletal disorders among tattoo artists are neck pain, shoulder pain, and back pain.
3. The most common risk factors for musculoskeletal disorders among tattoo artists are long hours of work, repetitive motions, and awkward postures.
4. The most common symptoms of musculoskeletal disorders among tattoo artists are pain, stiffness, and numbness.
5. The most common treatments for musculoskeletal disorders among tattoo artists are rest, physical therapy, and pain medication.

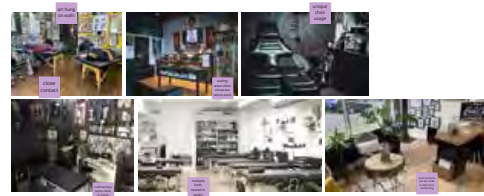
Appendix B | Contextual Research (User)

SEARCH PHOTO ANALYSIS

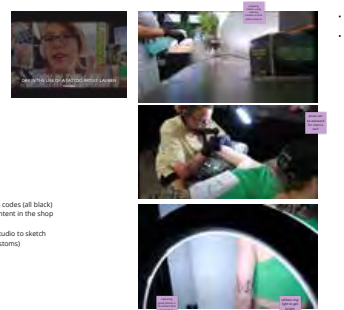
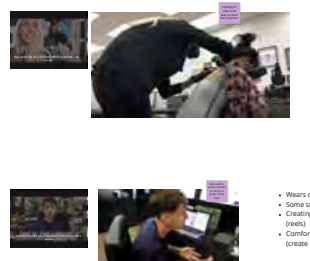
MANY POSTURES



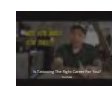
TATTOO STUDIO



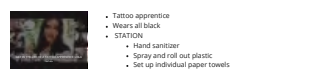
DAY-IN-THE-LIFE VIDEOS



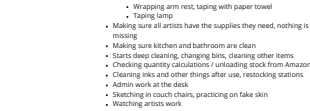
- Doesn't like having to wear black all the time because of tattoo ink
- SET UP PROCEDURE
 - Plugging in power supply for gun
 - Hanging down station and using plastic wrap to stick to it (with gloves on)
 - Setting up individually-ripped paper towels (with gloves on)
 - Setting up garbage bags
 - Puts on new pair of gloves to set up ink & needles
 - Setting up tattoo gun with right needles
 - Spraying down and wrapping chairs and client bed and head rest (not all artists do this)



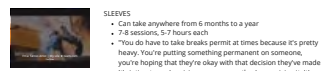
- REASONS WHY TATTOOING MIGHT NOT BE FOR YOU:
 - If you are choosing a tattoo career because you think it's going to be an easy job
 - You have to practice a lot, you have to draw a lot, it's hard on your body
 - Your hands hurt, your back hurts, your eyes hurt
 - You have to make a lot of sacrifices for this job, and you make a lot of other money doing in the beginning
 - Even though it's fun, it's really difficult, and you make a lot of other money doing in the beginning
 - If you think you'll be making a lot of money
 - A lot of hours into other things: consultations with clients, drawing designs for clients, answering emails, buying art supplies, setting up / breaking down station - a lot of it outside of physical tattooing
 - Tattoo artists don't start out with tattooing all the time, "zero days"
 - Need self-sustaining clientele / skill level to be consistently making money



- Wears dark clothes
- Some studios have dress codes (all black)
- Creating social media content in the shop (feeds)
- Comfortable seating in studio to sketch (create flash, drawing customs)



- Tattoo apprentice
- Wears all black
- STATION
 - Hand sanitizer
 - Spray and roll out plastic
 - Set up individual paper towels
 - Wrap station table
 - Set up paper towel with tape, apply ink bottles with needles
 - Wear: arm rest, taping with paper towel
 - Taping lamp
- Making sure all artists have the supplies they need, nothing is missing
- Making sure kitchen and bathroom are clean
- Starts deep cleaning, changing bins, cleaning other items
- Checking quantity calculations / restocking stock from Amazon
- Cleaning ink and other things after use, restocking stations
- Admin work at the desk
- Switching in touch chairs, practicing on fake skin
- Watching artists work



- SLEEVES
 - Can take anywhere from 6 months to a year
 - 7-8 sessions, 5-7 hours each
 - "You do have to take breaks permit at times because it's pretty heavy. You're putting something permanent on someone, you're hoping that they're okay with that decision they've made. It's intense you're giving your energy, they're receiving it, it's intense."
 - Compares yoga to getting tattoos

Interview Transcript | M = Mary-Beth P = Participant

M: So, this one question is kind of general like in general, what tools or equipment do you use? Or do you have in front of you? Usually.

P: There's definitely a lot. And I will say that. At the shop, I forget how much of this I've already gone over or not going over. So far. Most shops operate as a commission split. So artists keeps whatever a lot of shops are 50/50. So I'll use that example. If an artist gets paid 100 bucks, 50 bucks goes to the artist 50 bucks goes to the shop. And the shop supplies most of the supplies. Usually an artist will buy like their own machine, maybe their own needles, depending on what their preference is kind of thing. We have just made a change in our shop. So now instead of doing a commission split, where paying rent, and we're buying all of our own supplies, but we keep all the money we make. Okay, okay. It works out much better in my favor, as far as like, like, in the long run after you like everything. Yeah, in the long definitely, like shakes out to meet earning more money. And it also gave me a better understanding of all the equipment that we need, because I am buying every single thing that I need. I actually I'm a little like, type a kind of person. So Sam, I have a full excel list of every item that I needed to buy. And asked like, where to buy it from, just because I'm slightly crazy, but no tattoo artist do this stuff, normal thing. So but yeah, roughly. It's okay, yeah, so it's a long list, but it gets into some, like, I've got the list up here somewhere. Like a lot of stuff is like, like we need, like, you know, tongue depressors that like doctors use, because we use that to scoop out. Like the moisturizers that we use. We're not like putting our finger in there was like, like that, or we buy those little tiny rinse cups, like those like, like, I'll take a swig of this at the dentist office kind of thing. Sure. And those come in like packages of like 1000 cups, and it's going to take me my entire career 2000 little cups, so I don't know, this is like a ton of weird stuff like this. But yeah, don't map that here. So this is my crazy inventory list, coded. So it's I haven't divided by disposables. So that would be stuff like paper towels, gloves. We use barrier film on almost everything. So I have like a bag over my wash bottle, bed sheets over the tattoo bed. The tongue depressors, like I was saying, razors, that kind of stuff. And then tattooing supplies is stuff like stencil paper stencil cream, the ink that we use ink caps. Yeah, the cartridges and needles. And then there's a bunch of cleaning supplies we need to buy. And then there's aftercare supply that we have to buy. Those are my groups. And definitely like disposables. And tattooing supplies. I think there's a bit of overlap there. But like disposables is like the biggest thing that we're buying. At our shop, we all use all disposable items, some shops will have an autoclave room. So they will reuse things like steel tubes. So they have to go through a whole package to like, scrub it, clean it, put it through an autoclave and sanitize it to reuse it again. That's a whole time waster thing. So no one at our shop does that you need a special room for it, you need a special clean room dedicated to autoclaving. So we just use disposables so much easier and quicker. So that would be a whole different set of things, they would buy a way less disposable things, but they would have way more time into like cleaning and sanitizing products again. So what I use is definitely not what everybody use, but it's an idea. Some people do this. So I also have a separate category for I call it client experience, because I stock things like juice boxes and snacks. And like stickers at the end. So I have like, you know, it's still an expense. It's just not. When I was pricing this stuff out. I put it into how much it would cost per month for each thing. So I broke it down. Like if those like 1000 cups, lasted me, whatever, four years, and I paid like \$20 for those cups or whatever. I broke it down to how much it was per month over those four years. Yeah, so it wasn't like how much I'd be spending exactly. But anyways, I did that broken down. And I looked at how much it would cost me to set up for four months of tattooing what that like upfront cost would be. And that is, well I have it broken down by category, but I did total them together. It cost about 2500 to buy everything for me to set up for four months. Oh, and this is not including furniture. Yeah, this is just all the little stuff. Okay, so this is not including like the tattoo bed, the armrest, like kind of any of my furniture, any decor stuff. And then it's not too bad. After that I worked out about my monthly cost after that is like 50 bucks a month to keep topping up everything. Okay, about once every six months, I'd need to do another \$1000 cause that's stuff that I like, every month, there's stuff I'm gonna go through every single month that I'll need to buy again. And there's some stuff that I wouldn't need to buy every time. Like the, like a clip, a clip cord sleeve is like the sleeve that goes over your cord, blood on it and stuff. Those come in boxes of like 100. So I'm not going to be buying those like, every month top up, but about every like six months or so I'd probably

M: Okay, I have another question that if you were to describe like while you're tattooing like what your setup is like, your table on the right person in front of you. Let's say they're getting there. Are tattooed or something like more can you like picture or describe to me what it looks like.

P: So, I just mentioned that we did that switch at our shop. So we're, we're doing that pay change. With that I have also moved into a separate private room. So I have a spot for like all my stuff, and I'm still moving into that room. So this is actually something that's very much a work in progress for me, like right now. So I can kind of tell you how I used to operate in my like little booth, and how I'm planning to operate. Like I say, like 90% of tattooers have a like a husky tool chest. Like I remember I mentioned that meant for garage. And it's like, it's got wheels, but it's not easy to move around by any chance. So I'm right handed, so I kept it on my right, I sat next to it. And then my client sat on my left. So I was like turn like dip into my inks and stuff. And then above that I had shelves that had stuff I needed to touch every day. So stuff like my paper towel, my moisturizer cream. Like my stencil cream, stuff that I'm like using. Well, I'm working with fine. Then like under my booth, I would have other things like like the clip cord sleeves, or anything I need for setup that I'm just using, like once before the clients there. And then yeah, an armrest set up. Usually all depending on where they are. And I'm usually they're sitting like in front of them and tattooing like this way. Or I'm sitting like behind their arm and tattooing like this way. So I'm either touching this or this. So the reach is always

M: it depends on which arm and stuff like that, right?

Codes

Upfront costs

Equipment needs

Buying in bulk

Equipment needs

Disposable products

Equipment needs

Time-demanding job

Disposable products

Customer service

Upfront costs

Non-dedicated equipment use

Ergonomic considerations

Equipment needs

Ergonomic considerations

Interview Transcript | M = Mary-Beth P = Participant

P: Yeah, and if, if I'm tattooing like, the way that the bed sets, if it's sitting in it's like normal position, I will be tattooing their right side. But my bed rotates so I can face them to the wall, then I can tattoo their other side. And same with like, if I'm tattooing like the back of someone's arm, I'll have them lay down on their front. And like, hang their arm back. There is sometimes I have people in like weird positions, so it's easier for me to reach. I get people to do like the back of your arm there is like lifted reach. So I get people to sit on the bed with their hand like behind their lower back like they're being arrested. But you do what you got to do. And then in my new room, I have ditched the tool chest, the big, clunky giant guy. And I just have a salon tray. So it's like a tray on wheels. Okay, but it like stands up high. So I can it's really light and I can move it around wherever I can roll it around. So that one really helps. So if I'm sitting like behind a client tattoo in this way, I just put the trolley around to the side and then I can reach right in front of me. From the side, I roll around to the side and I always reach where I am. One of the only reasons that works though, is that I have a wireless machine. So I don't don't have if I would like tethered to that thing with a power supply. That'd be different story.

M: Okay, interesting about the shelves that you're talking about that you have they like in arm's reach, or did you have to stand up to a bit of both?

P: I think I had to stand up. I think I mostly had to stand up to get my shelves because they were like mounted on the wall. Okay.

M: Okay, so if you can name three, what are your top three challenges you experienced as a tattoo artist?

P: Pain, back pain, shoulder pain, neck pain, all the pains, all the body pain. I think like, I don't know if this has to do anything with what you're going to look at. But like in postures, impostor syndrome. Like, okay, it's even when I'm tattooing people, I'll do something at all, like, you know, shade a little darker, a little light or something. And I'm like, I hope they don't think I'm not going to fix that. I was like, I hope they are not like mad at me, because I did something. No one's ever thinking that no one's even, like barely paying attention to what I'm actually doing. But there's a lot of like, mental stuff goes on, you talk to somebody. Okay, so there's a lot of just like, I don't know, that that I'm like, fighting the whole time. I'm tattooing sometimes I'm just in it. And I'm like, really focused. But lots of times, I'm like, Oh, they think I'm going too fast. They think I'm going too slow. They're dying, and they hate me. Because then it's like, I just worry about my clients a lot. I think, which I think other artists probably do this in some semblance. Probably some, probably some more. But that's definitely a challenge. And I think for me right now, having a spot for everything I use is definitely a big challenge because I don't have a spot for everything that I use. What I wish I had a picture of my trolley because it is chock full of stuff. And I don't know where everything is. So I keep like, looking for something and I'll like, look for it. And then I look back and I'm like, Oh yeah, I put that over here. And I you know, there's just a lot of products, I don't have a good spot for everything. So just because I don't have like a system in place. Like I don't have a spot for everything, I don't necessarily put things back in the same spot I got it from because it's not like home for everything. When I had my shelves up, I could only keep like two or three things per shelf like they're just like little floating shelves. Sure. And so that was really easy for me to like pick and grab up. I would like to put shelves up where I am now. I just don't have any so I have done that. I also got a new phone recently and I don't have any of my old pictures on it. So I carry around my old phone just for the pictures. I got the iPhone 14.

M: Oh, nice. Was it nice?

P: Yeah, the cameras awesome on it. Lovely. I was gonna see if I had a picture of my old booth. It's been nice to set up my own room too.

M: Can your bed? Does it have wheels to move? Or is it like stationary?

P: It is stationary.

M: Is that a problem at all?

P: Um, it's okay. Like it especially where I had it before. Like I had it like a well oiled machine. I had just enough room to spin the bed around. And I didn't really need to move it at all. Where it is now I kind of wish I could move it a little bit. Who are the people in our shop have beds like I do? And two of them have massage beds, like those ones that are just like, flatten it like the wooden legs. Yeah. And then they don't like bend up. So no matter where you're working, your clients gonna lay down. They are comfy. And there's so much easier to move around. Like it's so light, but there's no like hydraulic lift. So you can't raise and lower the bed. If you wanted to raise or lower the bed. You have to flip the bed over. And like undo a screw and like move up like a peg and screw it back in. So you have to like know the height before, and you're not going to change it when the clients there, so you're just gonna like slouch if you need to.

Codes

Workstation components

Ergonomic considerations

Personal decisions

Imposter syndrome

Busy lifestyle/constantly working

Frustrating clients

Physical pain

Injury prevention

Lack of dedicated brands/equipment

Sustainable initiatives

Expensive equipment

Category

Workstation components

Ergonomic considerations

Personal decisions

Lack of dedicated brands/equipment

Sustainable initiatives

Expensive equipment

Physical pain

Injury prevention

Imposter syndrome

Busy lifestyle/constantly working

Frustrating clients

Themes

Wide variety of necessary and customizable equipment and specific placements for these equipments

Inaccessible equipment by price, environmental impact, and dedicated design

Physical suffering by accommodating for current situation

Added stressors by surrounding environment and personal deterioration

Appendix B | Contextual Research (User) (Cont.)

Interview Transcript M = Mary-Beth P = Participant	Codes
<p>M: Do you have a system to how you lay out like the client bed and then you're like, little thing that you've workstation area?</p> <p>P: I mean, it's always like they're like bed, and then like a prep station? Where you can like set up and where everything is, yeah, it kind of separated from the bed, but that's pretty much it with like, and I guess like you have armrest and like this iPad holder, thing. And like all that stuff, but I personally usually don't use it. I use the iPad sometimes, like when I do colors, so that I can like, see the colors very well. But like, since my bed, like the bit that we use is like a little bit wide. And like it's not one of those like black ones that you can like fold up like we can fold ours up, but it's more like it doesn't rotate or anything is known. Yeah, like it does go up and down but like we have to manually do it. Right. Okay. So, so just like let it lay out on the on the bed.</p> <p>M: Yeah. Also, you mentioned the iPad older. Where where is that? Usually.</p> <p>P: Just like, if this is the bed [centre]. And my prep station is here [right]. I usually put it here on my other side [left]. So that when I'm tattooing, I like dip on my right side. And then I look at my left side. And then I do it when I don't have iPad [closer left]. And like I'm just doing, like, black ink tattoo. Sure. Or like, if it's like a something simple. I don't need an iPad. I just like print out like, like, print. Yeah, just like have it beside.</p> <p>M: Okay, yeah. Do you prefer having like here rather than like your iPad?</p> <p>P: It's pretty much the same.</p> <p>M: Alright, what are your top three challenges as a tattoo artist?</p> <p>P: I think at least one of them would be like, a little bit of a fear that if I, especially custom, if I like draw something, because I don't have to show until the day of. Because it's just, like, easier to communicate. And like over the email, like, if she said, or he said something, and then I change it. It's not the one that they wanted to change. So like, there's just like, a lot of like, tweaking happening, right. And like, already, I don't have a lot of time. Because even after work or before work, like I have to draw all the time. So like, even when I'm not at work, like I have to draw like other clients tattoos and like flash.</p> <p>M: So you're like always working?</p> <p>P: Yeah, like, there's no time like off. Even if when I'm like just relaxing, I'm like, okay, like, what should I do? Like, and like, I'm like thinking about custom design. I'm like, okay, like just thinking about in my head? Like, what can I do to make it better? Whatever. So, like, it's a little bit of fear when I like meet them. They don't like it. Okay, which, obviously, you know, like, not, it's never like too major. And sometimes, a lot of times when it is like, stressful is when the client also don't fully know what they're looking for. Yeah. So like, they asked me to just figure it out. And I say, I don't know. So tell me a little bit for me to like, start, like starting point. But then they don't know. So I have to be like, oh, like, if you want to, we can reschedule? Like, I won't take your deposit. Like, we can just reschedule because like, it's like on their body forever. Yeah. So they don't want to like feel pressured. Totally. But it also depends if they're like being mean. If they're being like, super, honestly, though, like, 98% of all my clients are so sweet and nice. And like, so understanding it's the 2% that like, makes me sad. Because they're just kind of, because there's like, clients that like respect my art. And then there's, like, respect me as artist. And then there's plenty that like, kind of have that mindset of like, I'm paying you, you're working for me. So like, they don't have that like appreciation. Yeah, as like with my art and stuff. Okay. That sucks. Yeah. But like, they're very small percentage. Like most of my, like, clients are so so nice.</p> <p>M: Is there anything like physically, are you in pain at all?</p> <p>P: Yeah. Always. I feel like whenever I'm tattooing, if I tattoo like for a bit of time, like I get like bruising on my knuckle on my thumb. Like, I don't know, if it happens to everyone. But like, since I'm like, grabbing [so hard].</p> <p>M: Is it in like one even in one session? You will get that?</p> <p>P: Yeah, like, pretty much almost each session on this like, it's like, really, really short. Yeah. And then like, it like cramps up a little bit. I have to go like [lean in] like really in there. So that like I can see the thin line because I don't want to like go off or anything. And also because like the inks blob down on the skin, so you kind of have to, like, know where you're going. And also when you're like putting it down, you have to know.</p> <p>M: Usually like, how many hours would you say? Would you start feeling like the bruising? If you know?</p> <p>P: I don't know. Maybe like 40 minutes? Like, I don't know if it happens to everyone, but it definitely like, hurts. I'm scared I might get carpal tunnel. So I like tried to like, rotate wrist. And like stretch. Like during the session?</p> <p>M: Do you get back and neck pain at all?</p> <p>P: Yeah, I feel like a lot of people think it's like, super easy. But it's like the drawing. And like, you know, because it's also like customer service as well. And then doing the tattoo. Like it's like, very physical. And also emotionally. I love doing it.</p> <p>M: It's like, it's worth it.</p> <p>P: Yeah. Like, I still choose this.</p> <p>M: Have you ever traveled to do your tattoos?</p>	<p>Workstation components Ergonomic considerations</p> <p>Personal decisions Ergonomic considerations Personal decisions</p> <p>Ergonomic considerations</p> <p>Imposter syndrome Busy lifestyle/constantly working</p> <p>Busy lifestyle/constantly working Frustrating clients</p> <p>Physical pain</p> <p>Physical pain Ergonomic considerations</p> <p>Physical pain Injury prevention</p> <p>Frustrating clients Physical pain Busy lifestyle/constantly working</p>

Interview Transcript M = Mary-Beth P = Participant	Codes
<p>P: Basically, I bring I mean, every shop is different on like, what they provide. Usually like, and I've only ever been to two shops in Vancouver like I've been to two. So I don't know how like everything, like everywhere else works different, but they always like provide like the main stuff like, but like dental bib, like you know, just like basic prep station stuff. So I just bring my machine and I bring my bandage and my needles. And so like sometimes I bring my ink, but usually like coloring, because a lot of times they do like provide like ink. Sure. And some places do provide like bandage as well. But like, I just bring mine, just in case.</p> <p>M: How do you take these things with you?</p> <p>P: I have this big pouch? When I open it, it's just like two compartments. Okay, and then like a little pouch. So I just like, put all my machine stuff here [big pouch]. But I do put like, because before I use like a machine that needed it's like a wire. But now I have wireless. So I just charge it. So I would just bring that but before I had like a whole cord and like power supply and then machine. But like no just putting by nice wireless. And then I guess like a charger?</p> <p>M: Do you prefer the wireless one a lot better.</p> <p>P: I like both. Wireless is definitely more convenient, right? Because there's no wire and but it is like a little bit more heavier. Like the battery and everything. Yeah, but honestly, like there's coil machines, which is heavier than older machines, which I started with. Broader rotary weight coil machine. I started with coil and then I switched to rotary, which is like more quiet.</p> <p>M: I kind of remember actually how you capture tattoos, but do you want to describe to me again like after you get the tattoo? Like what is your setup to like, take a picture of it and everything.</p> <p>P: I usually, like simple background. But a lot of artists like have their own, personalized style. Like a lot of people put like their art behind too, which is really cute and like magical stuff. But I use like simple and like, ring. And then I just take photo.</p> <p>M: You have a camera right?</p> <p>P: I do have I have like a Fujifilm camera, which like because it gives like a more vintage vibe. Because I like vintage, like magical. Sure feeling so I do even after like all my photos. I add like purple like, tones. But I still like tried to keep like the original as possible. You know? Because I don't want it to look to be changed. But it doesn't look changed. My camera already captures it very like pinky purple. Yeah, so I don't have to do like too much.</p> <p>M: Did you buy a camera? Just for tattoos.</p> <p>P: Yeah. But a lot of people just take it with a phone, their phone. My phone is very old and not good. [iPhone 8]</p> <p>M: Okay, I'm interested in like, what brands you usually buy things from if you if there are any brands.</p> <p>P: Honestly, there's many different places. With our beds, we actually go to Costco.</p> <p>M: Are they massage beds?</p> <p>P: They are massage beds, and they're really comfortable. Honestly, like the most comfortable one that I've like, sat and laid on. Because it's like squishy. And we usually like we tried to buy like all eco friendly stuff. I mean, like furnitures it's like, a different story. But like, with our certain wrap, to like, there's like a, like a bottle, bags, and stuff. Those are usually like all plastic. But we buy like a biodegradable compostable ones. With like, bed sheets too and dental bed. We try to buy like all eco friendly, but sometimes they're not always available. And they're like sold out or like, they're just, you know, really hard to find. Honestly, it's way better than when we first started. Like when we first opened. Yeah, but it is still like because a lot of people want to switch. So I feel like it would be nice if there was more sustainable, sustainable options nice with like, reasonable pricing.</p>	<p>Workstation components</p> <p>Workstation components</p> <p>Ergonomic considerations</p> <p>Personal decisions Workstation components</p> <p>Workstation components Personal decisions</p> <p>Physical pain</p> <p>Lack of dedicated brands/equipment</p> <p>Sustainable initiative Expensive equipment</p>

Codes	Category	Themes
<p>Upfront costs Equipment needs Ergonomic considerations Buying in bulk Disposable products Time-demanding job Customer service Non-dedicated equipment use Physical pain Imposter syndrome</p>	<p>Upfront costs Equipment needs Buying in bulk Disposable products</p> <p>Non-dedicated equipment use Ergonomic considerations Physical pain</p> <p>Time-demanding job Customer service Imposter syndrome</p>	<p>Wide variety of necessary equipment and disposable products</p> <p>+</p> <p>Ineffective furniture design & consistent pain everywhere</p> <p>=</p> <p>Constantly working with physical and mental toll</p>

Interview Transcript P = Participant N = Narrator	Codes
<p>P: hi my name is haruka i'm tattoo artist here in tokyo japan and this is how i spend my day</p> <p>N: haruka's day begins with some yoga and meditation since her studio is inside her house she doesn't need to rush to go outside or catch a train or a bus mostly she sets her appointments with her clients from 10 in the morning and today she told me that there is only one client coming at 11 so she will start setting up her studio around 10:30.</p> <p>N: once haruka is done eating it is time for her to get ready for her job even though she doesn't go out for work she does get ready almost if she's going out in japan it is considered rude if you are not wearing your makeup especially when you're into some kind of service industry and dealing with your clients it is a way of showing respect to your customers and that you are ready for the job and not just woke up i was also told by many of my female japanese co-workers and friends that japanese girls never go out without wearing their makeup which i feel like is kind of changing now</p> <p>clips showing haruka's inks, putting on gloves, testing gun/putting on needle, shaking inks, prepping ink cups, prepping cream, mixing inks, tightening gun components</p> <p>sits in stool while tattooing, workstation is about 45 degrees behind right shoulder, reaches to dip gun in</p> <p>N: you want to get a tattoo well looks like some action is about to begin today her client wants to get a whale tattoo right below her shoulder she told me that it will take around two hours to get the job done however the process of getting a tattoo begins a long time before her clients come in, that is why when haruka is not literally drawing a tattoo on her customer's body she's constantly working with her clients who wish to get a tattoo since the ink stays on your body forever as a tattoo artist haruka makes sure that what her customers really want because imagine you allow someone to poke needles in your body millions or maybe more times and then that experience lives with you forever physically mentally and even spiritually</p> <p>N: this customer came here today for a cover tattoo and i could see that she was so satisfied and kept saying that i can't see my old tattoo anymore</p> <p>N: how was it?</p> <p>P: it was fun</p> <p>N: oh really what was the longest tattoo that you ever worked on</p> <p>P: um, almost 7 hours</p> <p>N: what wow and did you take breaks or</p> <p>P: yeah, like uh every two hours</p> <p>N: whenever possible haruka takes her dog out for a walk she told me when she has no time and there's a lot on her plate her boyfriend who lives in this apartment with her takes that responsibility the nature of her job doesn't require a lot of physical activity and on top of that she works from home therefore going out with her dog is a great way to refresh plus your dog also needs some play time</p> <p>N: once haruka is done feeding her pets and eating her own lunch and completing other chores and errands she gets back to work even though she works from home and has the flexibility to do things at her own pace and time she still needs to keep up with the schedules and appointments she made with her customers for example she told me that she needs to finish this design by the end of the day and share it with her client but things do not end there sometimes they want to make changes in the design she made upon which she has to redo things until and unless they are satisfied</p>	<p>Time-consuming work Cultural prep</p> <p>Station prep Ergonomic considerations Time-consuming work Mental responsibility</p> <p>Ergonomic considerations</p> <p>Time-consuming work</p>

Codes	Category	Themes
<p>Time-consuming work Cultural prep Station prep Ergonomic considerations Mental responsibility</p>	<p>Station prep Time-consuming work Cultural prep</p> <p>Ergonomic considerations</p> <p>Mental responsibility</p>	<p>Time-demanding, ever-working artists are "always on the clock"</p> <p>+</p> <p>Working in specific, intimate postures with the need to access multiple things</p> <p>=</p> <p>Physical and mental preparedness to tattoo with responsibility given all circumstances</p>

Appendix C | Field Research (Product)

Appendix D | Result Analysis

PRODUCT BENCHMARKING

Product Name	PROS	CONS	Product Name	PROS	CONS
Tattoo Armrest	<ul style="list-style-type: none"> Comfortable padding Adjustable Supports heavy base (won't tip) Removable cover for cleaning 	<ul style="list-style-type: none"> \$132.89 CAD May not connect with current products in the studio / tattoo bed Hard to maneuver (heavy bottom) 	MEFA Tattoo Workstation	<ul style="list-style-type: none"> Built-in, retractable power plug 20 different layout possibilities in drawers Unique side drawer 	<ul style="list-style-type: none"> \$1058 CAD (not including add-ons) Add-on accessories are additional cost for necessary items (glove/bottle station, etc.) "Customization" options are only in the drawers Practical, but might be considered bulky or predictable by some
Fully Electric Adjustable Client Bed Package	<ul style="list-style-type: none"> Reasonable price for entire kit Cohesive design language Electric 	<ul style="list-style-type: none"> Still pricey, \$1236.28 CAD Elements do not talk to each other in a cohesive/modular sense (separate products sold together) Other products (workstation, stool) seem generic or cheap quality 	Tat Tech Workstation	<ul style="list-style-type: none"> Multi-shelf Handle to maneuver around like a cart Paper towel holder 	<ul style="list-style-type: none"> \$400 CAD Acrylic top (NOT stainless steel / medical grade) Compartments seem "glued on" without design cohesion No upper shelf/place to put iPad/reference Might be considered bulky or predictable by some
InkBed	<ul style="list-style-type: none"> Multiple customization options for angle, rotation, etc. Appears comfortable Comes with free tattoo station Wheels for maneuverability 	<ul style="list-style-type: none"> "Obvious" design, looks a bit silly \$2,037.26 Might be bulky, takes up more space through rotating components Sturdy but heavy (450 lbs) 	Tat Tech Portable & Collapsible Tattoo Workstation	<ul style="list-style-type: none"> \$110 CAD Lightweight (9 lbs), portable 	<ul style="list-style-type: none"> Very little surface/storage area No shelves May be easily bumped if top-heavy Predictable design language
Portable Desk Tray	<ul style="list-style-type: none"> Wheel base makes it easy to maneuver Arms can be rotated Includes light 	<ul style="list-style-type: none"> \$503.03 CAD May be topy if top heavy Design decisions just attach necessary components to a pole, is this the most efficient? 	Husky Mobile Workbench	<ul style="list-style-type: none"> Ample of storage room Multiple drawers of different lengths Handle for maneuvering Integrated power cord 	<ul style="list-style-type: none"> \$498 CAD Wooden top (NOT stainless steel / medical grade) No shelving units Might be considered bulky or predictable by some Not specifically designed for tattoo artists Heavy, hard to maneuver (220 lbs)
InkStool	<ul style="list-style-type: none"> Fully adjustable ergonomic stool Improved support for arms, neck, and back 5-wheel maneuverability 	<ul style="list-style-type: none"> \$1086.53 Wheels make the footrest larger Very functional-looking A bit heavy (42 lbs) 	Tattoo Armrest TA - LARGE	<ul style="list-style-type: none"> Helps ease back stress Comfortable padding, black Adjustable, can sit flat 	<ul style="list-style-type: none"> \$377.42 Might be bulky / not fit with their current set up

Features

360-degree rotation	360-degree rotation	BED: 14
according to the international size	according to the international size	360-degree rotation
additional length	additional length	additional length
additional side table	additional side table	cleanable
adjustable shoulder strap	adjustable shoulder strap	cobra-style
black matte paint finish	black matte paint finish	extendable
carrying case	carrying case	fixed position
cleanable	cleanable	heavy duty
cobra-style	cobra-style	high-adjustable
extendable	extendable	length extendable
fixed position	fixed position	portable
heavy duty	heavy duty	rotated 360°
high-adjustable	high-adjustable	sturdy feet
high-density	high-density	support cables
high-dentisty sponge	high-dentisty sponge	swing-out
hole	hole	MATERIALS: 10
large counter	large counter	black matte paint finish
length extendable	length extendable	PU leather
magnetic	magnetic	reinforced beech fram
match with technical chair	match with technical chair	reinforced hardwood
portable	portable	spray plastic cover
PU leather	PU leather	stainless steel plate
pull out drawers	pull out drawers	steel
reinforced beech fram	reinforced beech fram	steel welded construction
reinforced hardwood	reinforced hardwood	high-density
removable (x3)	removable (x3)	high-dentisty sponge
removable (x6)	removable (x6)	EXTRA SURFACES: 10
rotated 360°	rotated 360°	according to the international size
secure lock	secure lock	additional side table
side pocket	side pocket	hole
spray plastic cover	spray plastic cover	large counter
stainless steel plate	stainless steel plate	magnetic
steel	steel	match with technical chair
steel welded construction	steel welded construction	pull out drawers
sturdy feet	sturdy feet	removable (x3)
support cables	support cables	removable (x6)
swing-out	swing-out	side pocket
		SECURITY: 3
		adjustable shoulder strap
		carrying case
		secure lock

Features & Benefits Report
Product 1: Tat Tech Workstation
 Blue + Pastel, Red + Beige

Promotional Piece
 The Tat Tech Workstation is the perfect set up for any tattoo artist. This modular work station is made from steel with a black matte paint finish. This workstation has a large counter to work, and additional side table.

Product Description

Dimensions with wheels	24" D x 18" W x 30" H (28" H)
Dimensions Blue with wheels and extension	24" D x 18" W x 30" H (28" H)
Black Matte Design	Steel
Counter Top	1/2" thick, 18" wide, 18" depth
Drawer	18" wide, 18" deep, 18" high, 18" depth
Shelf	18" wide, 18" deep, 18" high, 18" depth
Side Table (optional)	18" wide, 18" deep, 18" high, 18" depth
Welding Bech (optional)	18" wide, 18" deep, 18" high, 18" depth
Stainless Steel (optional)	18" wide, 18" deep, 18" high, 18" depth
Black Matte (optional)	18" wide, 18" deep, 18" high, 18" depth

Workstation ships in 1 large box, and you only need to attach on the Wheels, Handle & Tray. This set up is done by hand and with a screw driver.

Product 2: Husky Mobile Workbench
 Blue + Pastel, Red + Beige

Promotional Piece
 Husky Mobile Workbench is the perfect set up for any tattoo artist. This modular work station is made from steel with a black matte paint finish. This workstation has a large counter to work, and additional side table.

Product Description

Dimensions with wheels	24" D x 18" W x 30" H (28" H)
Dimensions Blue with wheels and extension	24" D x 18" W x 30" H (28" H)
Black Matte Design	Steel
Counter Top	1/2" thick, 18" wide, 18" depth
Drawer	18" wide, 18" deep, 18" high, 18" depth
Shelf	18" wide, 18" deep, 18" high, 18" depth
Side Table (optional)	18" wide, 18" deep, 18" high, 18" depth
Welding Bech (optional)	18" wide, 18" deep, 18" high, 18" depth
Stainless Steel (optional)	18" wide, 18" deep, 18" high, 18" depth
Black Matte (optional)	18" wide, 18" deep, 18" high, 18" depth

Workstation ships in 1 large box, and you only need to attach on the Wheels, Handle & Tray. This set up is done by hand and with a screw driver.

Product 3: InkBed
 Blue + Pastel, Red + Beige

Promotional Piece
 The InkBed is the perfect set up for any tattoo artist. This modular work station is made from steel with a black matte paint finish. This workstation has a large counter to work, and additional side table.

Product Description

Dimensions with wheels	24" D x 18" W x 30" H (28" H)
Dimensions Blue with wheels and extension	24" D x 18" W x 30" H (28" H)
Black Matte Design	Steel
Counter Top	1/2" thick, 18" wide, 18" depth
Drawer	18" wide, 18" deep, 18" high, 18" depth
Shelf	18" wide, 18" deep, 18" high, 18" depth
Side Table (optional)	18" wide, 18" deep, 18" high, 18" depth
Welding Bech (optional)	18" wide, 18" deep, 18" high, 18" depth
Stainless Steel (optional)	18" wide, 18" deep, 18" high, 18" depth
Black Matte (optional)	18" wide, 18" deep, 18" high, 18" depth

Workstation ships in 1 large box, and you only need to attach on the Wheels, Handle & Tray. This set up is done by hand and with a screw driver.

Product 4: Massage Table Bed
 Blue + Pastel, Red + Beige

Promotional Piece
 Comfortable and Exceptionally Strong. The message table has high-density sponge, give you a soft and comfortable experience. The message table made of reinforced beech frame with support cables, reinforced horizontal corner blocks for superior strength to enable up to 450lbs on the spa table message table message bed spa table.

Simple Installation
 The message bed does not require any tools, all we had to do was operational message bed from the middle and the top adjustment, all you need. Message table quick installation method is easy, reliable time. Spa bed message bed portable message table.

Human Height Adjustable
 The every sturdy feet of the message bed are equipped with height-adjustable device. The message table height adjusted from 24" to 33". The simple height adjustment method is convenient for the massage to work better with spa bed. Fold message table message bed portable message table.

Portable and Light Weight
 The message table easy to move around if you're a traveling aesthetician or massage professional! This message table about 38lbs. Portable message table includes a durable

Product 5: Tattoo Armrest
 Blue + Pastel, Red + Beige

Promotional Piece
 The tattoo armrest is the perfect set up for any tattoo artist. This modular work station is made from steel with a black matte paint finish. This workstation has a large counter to work, and additional side table.

Product Description

Dimensions with wheels	24" D x 18" W x 30" H (28" H)
Dimensions Blue with wheels and extension	24" D x 18" W x 30" H (28" H)
Black Matte Design	Steel
Counter Top	1/2" thick, 18" wide, 18" depth
Drawer	18" wide, 18" deep, 18" high, 18" depth
Shelf	18" wide, 18" deep, 18" high, 18" depth
Side Table (optional)	18" wide, 18" deep, 18" high, 18" depth
Welding Bech (optional)	18" wide, 18" deep, 18" high, 18" depth
Stainless Steel (optional)	18" wide, 18" deep, 18" high, 18" depth
Black Matte (optional)	18" wide, 18" deep, 18" high, 18" depth

Workstation ships in 1 large box, and you only need to attach on the Wheels, Handle & Tray. This set up is done by hand and with a screw driver.

Product 6: Tattoo Armrest TA - LARGE
 Blue + Pastel, Red + Beige

Promotional Piece
 The tattoo armrest TA - LARGE is the perfect set up for any tattoo artist. This modular work station is made from steel with a black matte paint finish. This workstation has a large counter to work, and additional side table.

Product Description

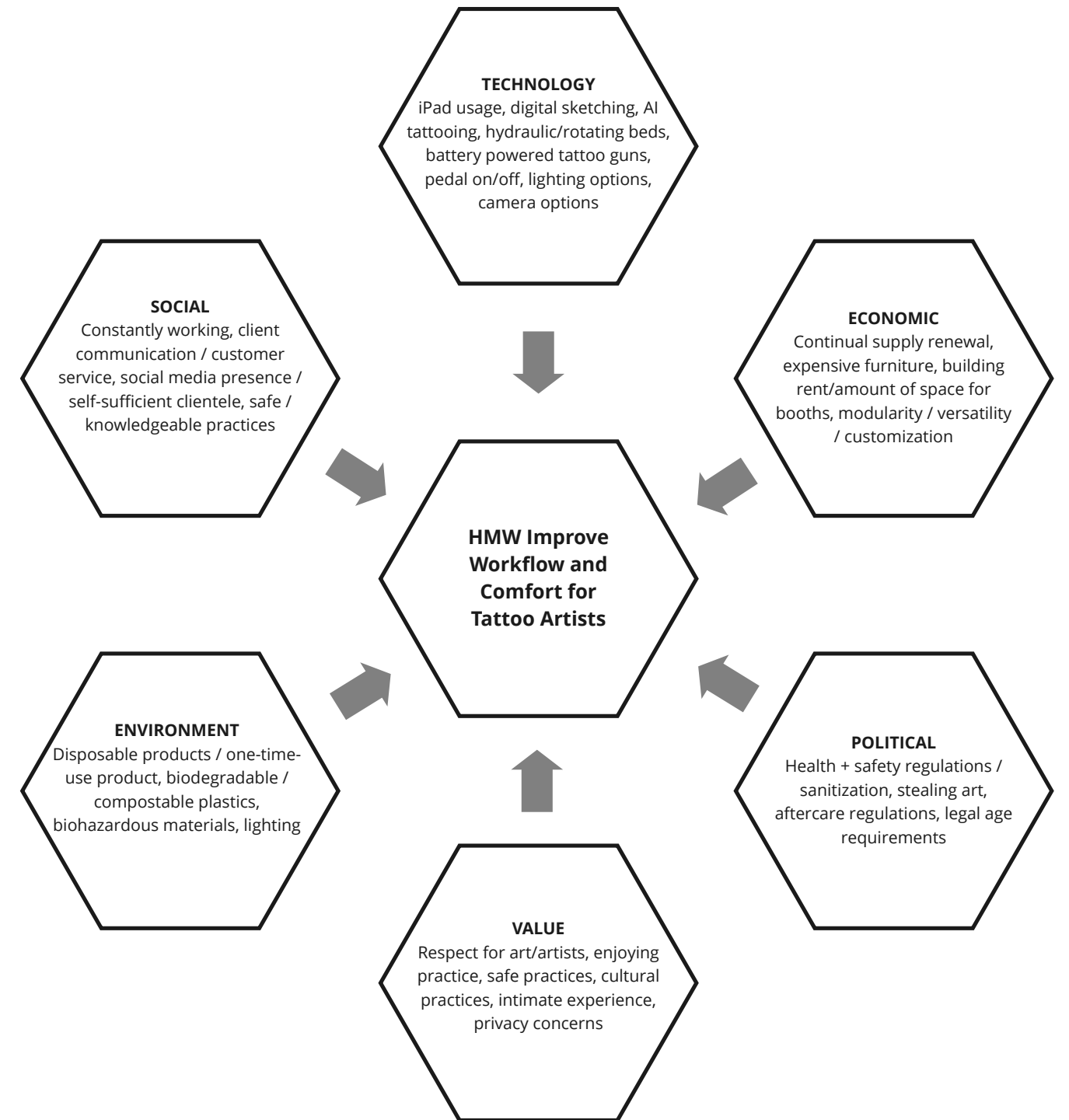
Dimensions with wheels	24" D x 18" W x 30" H (28" H)
Dimensions Blue with wheels and extension	24" D x 18" W x 30" H (28" H)
Black Matte Design	Steel
Counter Top	1/2" thick, 18" wide, 18" depth
Drawer	18" wide, 18" deep, 18" high, 18" depth
Shelf	18" wide, 18" deep, 18" high, 18" depth
Side Table (optional)	18" wide, 18" deep, 18" high, 18" depth
Welding Bech (optional)	18" wide, 18" deep, 18" high, 18" depth
Stainless Steel (optional)	18" wide, 18" deep, 18" high, 18" depth
Black Matte (optional)	18" wide, 18" deep, 18" high, 18" depth

Workstation ships in 1 large box, and you only need to attach on the Wheels, Handle & Tray. This set up is done by hand and with a screw driver.

Appendix D | Result Analysis (Cont.)

Benefits

1 large box	1 large box	ACCESSIBILITY: 16
back-work conversion	back-work conversion	back-work conversion
can be done by hand	can be done by hand	can be done by hand
clean and easy to clean	clean and easy to clean	closer to it
closer to it	closer to it	does not require any tools
comfort foam	comfort foam	flexible choice
convenient carrying	convenient carrying	flexible placement (x2)
convenient	convenient	great for your power supply
for the masseur	convenient for the masseur	holds oils and supplies
does not require any tools	does not require any tools	holds your gloves
durable	durable	out of the way
durable	durable	place any large liquids
durable	durable	quick and easy access
easily wind up	easily wind up	sit upright for back work
easy access	easy access	to run your machine
easy to adjust	easy to adjust	travelling
easy to carry and package	easy to carry and package	unobstructed access
easy to clean	easy to clean	EFFICIENCY: 15
easy to move	easy to move	1 large box
easy to work	easy to work	clean and easy to clean
ensures safety	ensures safety	convenient carrying
flexible choice	flexible choice	convenient
flexible placement (x2)	flexible placement (x2)	convenient for the masseur
great for your power supply	great for your power supply	easily wind up
holds oils and supplies	holds oils and supplies	easy access
holds your gloves	holds your gloves	easy to adjust
legs automatically fell into place	legs automatically fell into place	easy to carry and package
long service life	long service life	easy to clean
low-profile	low-profile	easy to move
luxurious	luxurious	easy to work
no offensive smell	no offensive smell	legs automatically fell into place
non-slip	non-slip	quick installation
out of the way	out of the way	saves valuable time
perfect set up	perfect set up	DURABILITY: 8
place any large liquids	place any large liquids	durable
preservative	preservative	durable
preservative	preservative	durable
quick and easy access	quick and easy access	ensures safety
quick installation	quick installation	long service life
saves valuable time	saves valuable time	preservative
sit upright for back work	sit upright for back work	preservative
soft and comfortable	soft and comfortable	superior strength
soft and comfortable	soft and comfortable	COMFORT: 8
superior strength	superior strength	comfort foam
to run your machine	to run your machine	low-profile
travelling	travelling	luxurious
unobstructed access	unobstructed access	no offensive smell
		non-slip
		perfect set up
		soft and comfortable
		soft and comfortable



Appendix E | Approval Forms & Plans

Student Name: Mary-Beth Scully


Topic Title: How may we improve workflow and comfort for tattoo artists?

Abstract

Tattoo artists are professional artists that work in niche environments where ergonomic sacrifices and adaptations are made to perform their practice. This group of understudied workers suffer from ergonomic health concerns similar to those of dental hygienists, but less time and resources are put into understanding where their pain points and challenges lie. Current studies in the tattoo industry disregard the experience of the tattoo artist, focusing on other factors of tattooing that are void of relevance to the workflow and comfort of tattoo artists. In the market, few products are specifically catered to the well-being of tattoo artists, while many designs are still driven by neglect that lacks the ability to accommodate their ever-changing duties at work.

This thesis topic will attempt to evaluate the ways that tattoo artists are hindered in their workflow and comfort by various factors, some predicted to be their environment/surroundings, their furniture, and available equipment for them on the market. Due to the absence of research on tattoo artists' experiences in the workforce, this project will conduct various primary research methods including semi-structured interviews, qualitative surveys on discussion forums, and on-site visits/observational studies to truly capture and understand the problems in this area. Through these findings, a full-bodied design solution will be created and tested with 1:1 and/or scaled prototypes. The goal of this design will be to counteract some of the challenges that tattoo artists face in terms of their workflow and comfort, creating a more ergonomic and pleasant place to work with a design that is catered to adapt to the user.

Student Signature: 
Date: 09/25/22

Instructors Signatures: 
Date: 29 September 2022

IDSN 4502 SENIOR LEVEL THESIS TWO

Humber ITAL / Faculty of Applied Sciences & Technology
 Bachelor of Industrial Design / WINTER 2023
 Catherine Chong / Fredric Matovu

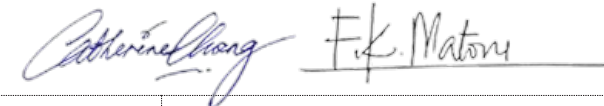
CRITICAL MILESTONES: APPROVAL FOR CAD DEVELOPMENT & MODEL FABRICATION

Student Name:	Mary-Beth Scully
Approved Thesis Title:	Tattoo Workstation Workflow & Comfort

THESIS PROJECT – DESIGN APPROVAL FORM

Design is reviewed and approved to proceed for the following:	<input checked="" type="checkbox"/> CAD Design and Development Phase
Comment: Continue design refinement in CAD development, need to iron out detailing and product's features, pay attention to surfacing, components and assembly methods for design feasibility. Viable holistic design thinking in conjunction with considerations into sustainability aspects. CAD development must be at least 75% complete for review before approval for fabrication.	

Design is reviewed and approved to proceed for the following:	<input checked="" type="checkbox"/> Model Fabrication Including Rapid Prototyping / 3D Printing and Model Building Phase
Comment: Waiting for CAD development review (as of Feb-21). Good progress with CAD, design completed, continue detail refinement, once refined, fabrication of model can begin.	

Instructor Signature(s): 	
Date:	07 March 2023

PANEL ON RESEARCH ETHICS
Navigating the ethics of human research

TCPS 2: CORE 2022

Certificate of Completion

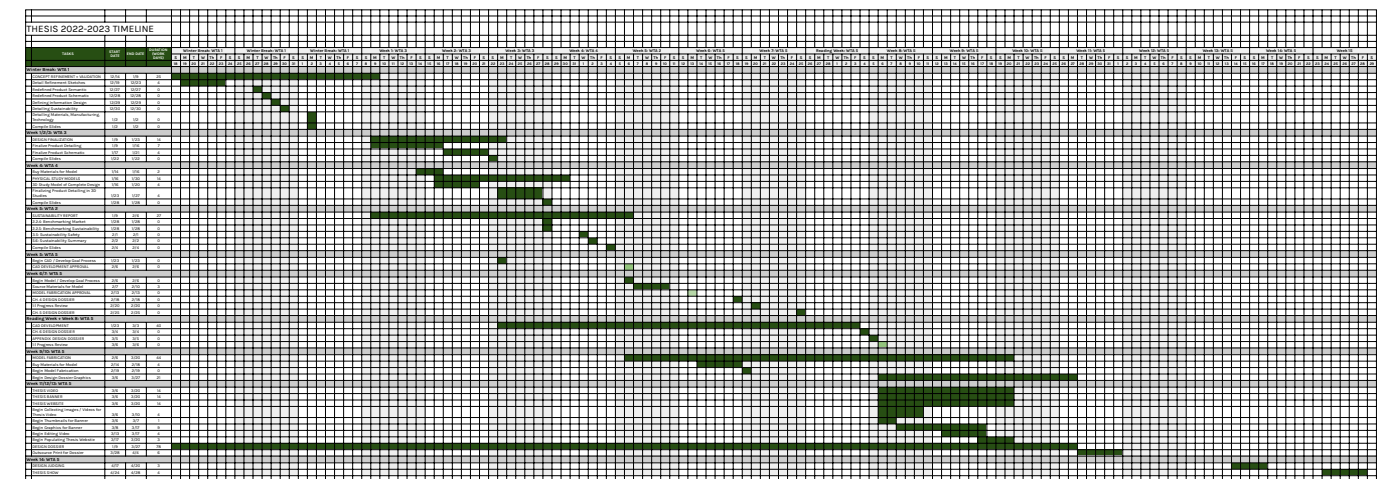
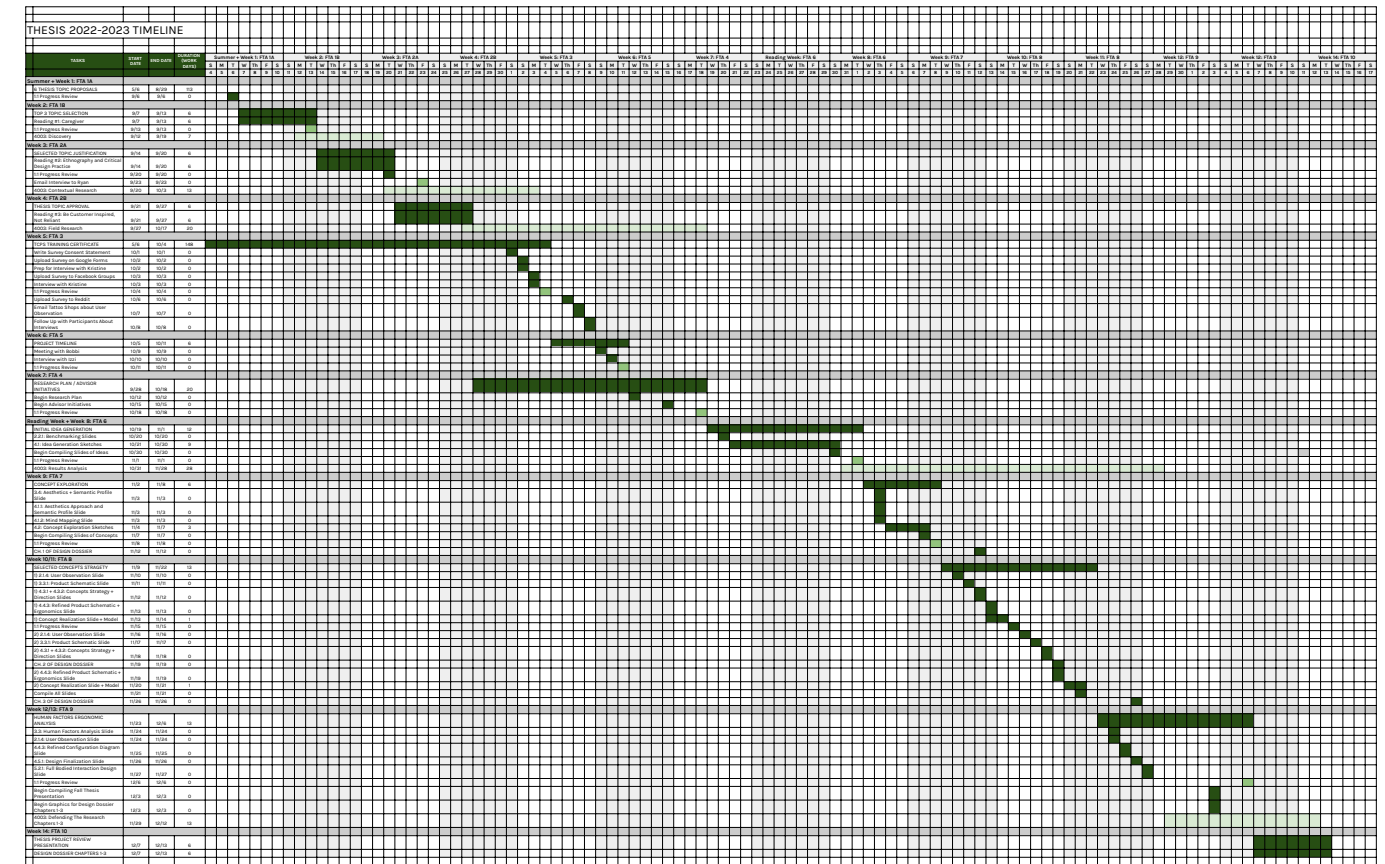
This document certifies that

Mary-Beth Scully

successfully completed the Course on Research Ethics based on the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2: CORE 2022)

Certificate # 0000857912

25 September, 2022



Appendix E | Approval Forms & Plans (Cont.)

IDSN 4002 / 4502
SENIOR LEVEL THESIS ONE & THESIS TWO



INFORMATION LETTER

Research Study Topic: Improving Workflow and Comfort for Tattoo Artists
Investigator: Mary-Beth Scully | 226.234.0145 | scullymarybeth@gmail.com
Sponsor: Humber ITAL, Faculty of Applied Sciences & Technology (IDSN 4002 & IDSN 4502)

Introduction

My name is [Mary-Beth Scully](#), I am an industrial design student at Humber ITAL, and I am inviting your participation in a research study on various problems that tattoo artists experience. These problems include ergonomic sacrifices, vibrating tools, space considerations, and more. The results will be contributed to my Senior Level Thesis project.

Purpose of the Study

This study is being conducted as an aid in designing a product or set of products for tattoo artists that is capable of improving the workflow and comfort for the user. The product to be designed is inspired by the lack of informed design decisions made in current market products as well as hearing the experiences of this understudied group of professional workers. This study is primarily based on understanding ergonomics, human interaction design activities, and user experience aspects of the research area.

Procedures

Your participation in this study is completely voluntary and you may choose to not answer any questions or complete any task should you wish. If you volunteer to participate in this study, your answers may result in the use of anonymous quotations and observations that are documented.

Confidentiality

Every effort will be made to ensure confidentiality of any identifying information that is obtained during the study. In the case of being recorded visually, your face will be masked /blurred or hidden. The information and documentations (photographs) gathered are all subject to being used in the final presentation of the study.

Participation and Withdrawal

Your participation in this study is completely voluntary and you may interrupt or end the study and the session at any time without giving a reason or fear of being penalized.

If at any point during the session, you feel uncomfortable and wish to end your participation, please let the moderator know and they will end your participation immediately.

Humber Research Ethics Board

This research project/course has been approved by the Humber Research Ethics Board. If you have any questions about your rights as a research participant, please contact Dr. Lydia Boyko, REB Chair, 416-675-6622 ext. 79322, Lydia.Boyko@humber.ca

Mary-Beth Scully <scullymarybeth@gmail.com>
to ryan.cincinnati
Thu, Sep 22, 2022, 3:17 PM

Hi Ryan!

Thank you for wanting to help out with my research! Here is the interview below:

This interview is to collect data about Tattoo Artists and their experiences for a senior-level thesis project being completed at Humber College.

Completion of this interview is voluntary. Given your permission, the interview data will be recorded and may be used for product and business development for this thesis project. Your participation in this interview will only be accessible by the researcher and may result in the use of anonymous quotations. You have no anticipated risks should you choose to participate in this interview.

If you have any questions about this research, please feel free to contact me: scullymarybeth@gmail.com

Thank you for your time, your participation is much appreciated.

1. Do you consent to participate in this interview?
2. What is your age?
3. What is your gender?
4. How long have you been a tattoo artist?
5. What are the tools/equipment/furniture/etc. that you use?
6. What are the top 3 challenges you experience as a tattoo artist?
7. What are the pros and cons of your current tattoo workstation/workflow?
8. What do you find uncomfortable while tattooing?

As well, apologies for the short notice on this. When I'm able to give you more notice and as I develop more research and knowledge on this topic, perhaps we could connect again to discuss opportunities and challenges in the tattoo industry in your experience!

Thank you again for all your help.

Ryan Cincinnati <ryan.cincinnati@gmail.com>
to me
Fri, Sep 23, 2022, 5:52 PM

Hey Mary-Beth!

Please see below for my answers. Hope they help!

1. Do you consent to participate in this interview? Yes

An official consent form was not created at this time during this E-mail information interview. Consent to participation and use of provided information was provided in writing.

INFORMATION LETTER

Research Study Topic: Improving Workflow and Comfort for Tattoo Artists
Investigator: Mary Beth Scully | 226.234.0145 | scullymarybeth@gmail.com
Course: IDSN 4002 & IDSN 4502 Senior Level Thesis One & Two

Conditions of Participation

- I understand that I am free to withdraw from this study at any time without any consequences.
- I understand that my participation in this study is confidential, i.e. the researcher will know but will not disclose my identity.
- My identity will be masked.
- I understand that the data from this study may be published.

I have read the information presented above and I understand this agreement. I voluntarily agree to take part in this study.

Click or tap here to enter text: Isadora Marince Participant's Name
 Participant's Signature
 Date: Oct 27/22

Project Information

Thank you very much for your time and help in making this study possible. If you have any questions or wish to know more about this Senior Level Thesis project, please contact me at the following:
 Phone: 226.234.0145
 Email: scullymarybeth@gmail.com

My supervisor is:
 Prof. Catherine Chong, catherine.chong@humber.ca

INFORMATION LETTER

Research Study Topic: Improving Workflow and Comfort for Tattoo Artists
Investigator: Mary Beth Scully | 226.234.0145 | scullymarybeth@gmail.com
Course: IDSN 4002 & IDSN 4502 Senior Level Thesis One & Two

Isadora Marince (Participant Name), have carefully read the information letter for the project Improving Workflow and Comfort for Tattoo Artists, led by Mary Beth Scully. A member of the research team has explained the project to me and has answered all of my questions about it. I understand that if I have additional questions about the project, I can contact Mary Beth Scully at any time during the project.

I understand that my participation is voluntary and give my consent freely in using recording, photography and/or videography; with the proviso that my identity will be masked in reports and publications.

Consent for Publication: Add (X) mark in one of the columns for each activity

ACTIVITY	YES	NO
Publication	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Review	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Privacy

All data gathered is stored electronically and kept confidential. Only the principle investigator (researcher), a research student named Ryan C. and Prof. Catherine Chong or Prof. Frederick Malow may access and analyze the data. All published data will be redacted so that actual data is not identifiable. Photographs will be used to show a participant (outfit) and data will be appropriate.

I also understand that I may decline to withdraw from participation at any time without negative consequences.

I understand that I can verify the ethical approval of this work, or raise any concerns I may have by contacting the Humber Research Ethics Board, Dr. Lydia Boyko, REB Chair, 416-675-6622 ext. 79322, Lydia.Boyko@humber.ca or a post student name @phone Humber Email Address.

Verification of having read the Informed Consent Form:

I have read the Informed Consent Form.

My signature below verifies that I have read this document and give consent to the use of the data from questionnaires and interviews in research report, publications (if any) and presentations with the proviso that my identity will not be disclosed. I have received a copy of the information letter and that I agree to participate in the research project as it has been described in the information letter.

Click or tap here to enter text: Isadora Marince Participant's Name
 Participant's Signature
 Date: Oct 27/22

INFORMATION LETTER

- Conditions of Participation**
- I understand that I am free to withdraw from the study at any time without any consequences.
 - I understand that my participation in this study is confidential. (i.e. the researcher will know but will not disclose my identity)
 - My identity will be masked.
 - I understand that the data from this study may be published.

I have read the information presented above and I understand this agreement. I voluntarily agree to take part in this study.

Click or tap here to enter text.
Kristine Vodon
Participant's Name

[Signature]
Participant's Signature

Click to enter a date
Dec 4, 2022
Date

Project Information

Thank you very much for your time and help in making this study possible. If you have any queries or wish to know more about this Senior Level Thesis project, please contact me at the following:

Phone: 226.234.0145
Email: scullymarybeth@gmail.com

My supervisor is:
Prof. Catherine Chong, catherine.chong@humber.ca

PARTICIPANT INFORMED CONSENT FORM

Research Study Topic: Improving Workflow and Comfort for Tattoo Artists
Investigator: Mary-Beth Scully | 226.234.0145 | scullymarybeth@gmail.com
Courses: IDSN 4002 & IDSN 4502 Senior Level Thesis One & Two

I, Kristine Vodon (First Name/Last Name), have carefully read the Information Letter for the project Improving Workflow and Comfort for Tattoo Artists, led by Mary-Beth Scully. A member of the research team has explained the project to me and has answered all of my questions about it. I understand that if I have additional questions about the project, I can contact Mary-Beth Scully at any time during the project.

I understand that my participation is voluntary and give my consent freely in voice recording, photography and/or videotaping; with the proviso that my identity will be blurred in reports and publications.

Consent for Publication: Add a (X) mark in one of the columns for each activity

ACTIVITY		YES	NO
Publication	I give consent for publication in the Humber Library Digital Repository which is an open access portal available to the public	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Review	I give consent for review by the Professor	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Privacy
All data gathered is stored anonymously and kept confidential. Only the principle investigator /researcher, « insert student Name here » and Prof. Catherine Chong or Prof. Frederick Matovu may access and analyze the data. All published data will be coded, so that visual data is not identifiable. Pseudonyms will be used to quote a participant (subject) and data would be aggregated.

I also understand that I may decline or withdraw from participation at any time, without negative consequences.

I understand that I can verify the ethical approval of this study, or raise any concerns I may have by contacting the Humber Research Ethics Board, Dr. Lydia Boyko, REB Chair, 416-675-6622 ext. 79322, Lydia.Boyko@humber.ca or « insert student Name /Phone Number /Email Address ».

Verification of having read the Informed Consent Form:
 I have read the Informed Consent Form.

My signature below verifies that I have read this document and give consent to the use of the data from questionnaires and interviews in research report, publications (if any) and presentations with the proviso that my identity will not be disclosed. I have received a copy of the Information Letter, and that I agree to participate in the research project as it has been described in the Information Letter.

Click or tap here to enter text.
Kristine Vodon
Participant's Name

[Signature]
Participant's Signature

Click to enter a date
Dec 4, 2022
Date

INFORMATION LETTER

- Conditions of Participation**
- I understand that I am free to withdraw from the study at any time without any consequences.
 - I understand that my participation in this study is confidential. (i.e. the researcher will know but will not disclose my identity)
 - My identity will be masked.
 - I understand that the data from this study may be published.

I have read the information presented above and I understand this agreement. I voluntarily agree to take part in this study.

Click or tap here to enter text.
Nicole Anstis
Participant's Name

[Signature]
Participant's Signature

Click to enter a date
December 4, 2022
Date

Project Information

Thank you very much for your time and help in making this study possible. If you have any queries or wish to know more about this Senior Level Thesis project, please contact me at the following:

Phone: 226.234.0145
Email: scullymarybeth@gmail.com

My supervisor is:
Prof. Catherine Chong, catherine.chong@humber.ca

PARTICIPANT INFORMED CONSENT FORM

Research Study Topic: Improving Workflow and Comfort for Tattoo Artists
Investigator: Mary-Beth Scully | 226.234.0145 | scullymarybeth@gmail.com
Courses: IDSN 4002 & IDSN 4502 Senior Level Thesis One & Two

I, Nicole Anstis (First Name/Last Name), have carefully read the Information Letter for the project Improving Workflow and Comfort for Tattoo Artists, led by Mary-Beth Scully. A member of the research team has explained the project to me and has answered all of my questions about it. I understand that if I have additional questions about the project, I can contact Mary-Beth Scully at any time during the project.

I understand that my participation is voluntary and give my consent freely in voice recording, photography and/or videotaping; with the proviso that my identity will be blurred in reports and publications.

Consent for Publication: Add a (X) mark in one of the columns for each activity

ACTIVITY		YES	NO
Publication	I give consent for publication in the Humber Library Digital Repository which is an open access portal available to the public	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Review	I give consent for review by the Professor	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Privacy
All data gathered is stored anonymously and kept confidential. Only the principle investigator /researcher, « insert student Name here » and Prof. Catherine Chong or Prof. Frederick Matovu may access and analyze the data. All published data will be coded, so that visual data is not identifiable. Pseudonyms will be used to quote a participant (subject) and data would be aggregated.

I also understand that I may decline or withdraw from participation at any time, without negative consequences.

I understand that I can verify the ethical approval of this study, or raise any concerns I may have by contacting the Humber Research Ethics Board, Dr. Lydia Boyko, REB Chair, 416-675-6622 ext. 79322, Lydia.Boyko@humber.ca or « insert student Name /Phone Number /Email Address ».

Verification of having read the Informed Consent Form:
 I have read the Informed Consent Form.

My signature below verifies that I have read this document and give consent to the use of the data from questionnaires and interviews in research report, publications (if any) and presentations with the proviso that my identity will not be disclosed. I have received a copy of the Information Letter, and that I agree to participate in the research project as it has been described in the Information Letter.

Click or tap here to enter text.
Nicole Anstis
Participant's Name

[Signature]
Participant's Signature

Click to enter a date
December 4, 2022
Date

INFORMATION LETTER

- Conditions of Participation**
- I understand that I am free to withdraw from the study at any time without any consequences.
 - I understand that my participation in this study is confidential. (i.e. the researcher will know but will not disclose my identity)
 - My identity will be masked.
 - I understand that the data from this study may be published.

I have read the information presented above and I understand this agreement. I voluntarily agree to take part in this study.

Click or tap here to enter text.
Heebeen Park
Participant's Name

[Signature]
Participant's Signature

Click to enter a date
Oct 9, 2022
Date

Project Information

Thank you very much for your time and help in making this study possible. If you have any queries or wish to know more about this Senior Level Thesis project, please contact me at the following:

Phone: 226.234.0145
Email: scullymarybeth@gmail.com

My supervisor is:
Prof. Catherine Chong, catherine.chong@humber.ca

PARTICIPANT INFORMED CONSENT FORM

Research Study Topic: Improving Workflow and Comfort for Tattoo Artists
Investigator: Mary-Beth Scully | 226.234.0145 | scullymarybeth@gmail.com
Courses: IDSN 4002 & IDSN 4502 Senior Level Thesis One & Two

I, Heebeen Park (First Name/Last Name), have carefully read the Information Letter for the project Improving Workflow and Comfort for Tattoo Artists, led by Mary-Beth Scully. A member of the research team has explained the project to me and has answered all of my questions about it. I understand that if I have additional questions about the project, I can contact Mary-Beth Scully at any time during the project.

I understand that my participation is voluntary and give my consent freely in voice recording, photography and/or videotaping; with the proviso that my identity will be blurred in reports and publications.

Consent for Publication: Add a (X) mark in one of the columns for each activity

ACTIVITY		YES	NO
Publication	I give consent for publication in the Humber Library Digital Repository which is an open access portal available to the public	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Review	I give consent for review by the Professor	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Privacy
All data gathered is stored anonymously and kept confidential. Only the principle investigator /researcher, « insert student Name here » and Prof. Catherine Chong or Prof. Frederick Matovu may access and analyze the data. All published data will be coded, so that visual data is not identifiable. Pseudonyms will be used to quote a participant (subject) and data would be aggregated.

I also understand that I may decline or withdraw from participation at any time, without negative consequences.

I understand that I can verify the ethical approval of this study, or raise any concerns I may have by contacting the Humber Research Ethics Board, Dr. Lydia Boyko, REB Chair, 416-675-6622 ext. 79322, Lydia.Boyko@humber.ca or « insert student Name /Phone Number /Email Address ».

Verification of having read the Informed Consent Form:
 I have read the Informed Consent Form.

My signature below verifies that I have read this document and give consent to the use of the data from questionnaires and interviews in research report, publications (if any) and presentations with the proviso that my identity will not be disclosed. I have received a copy of the Information Letter, and that I agree to participate in the research project as it has been described in the Information Letter.

Click or tap here to enter text.
Heebeen Park
Participant's Name

[Signature]
Participant's Signature

Click to enter a date
Nov 9th 2022
Date

INFORMATION LETTER

- Conditions of Participation**
- I understand that I am free to withdraw from the study at any time without any consequences.
 - I understand that my participation in this study is confidential. (i.e. the researcher will know but will not disclose my identity)
 - My identity will be masked.
 - I understand that the data from this study may be published.

I have read the information presented above and I understand this agreement. I voluntarily agree to take part in this study.

Click or tap here to enter text.
Thomas Purchase
Participant's Name

[Signature]
Participant's Signature

Click to enter a date
Dec 5, 2022
Date

Project Information

Thank you very much for your time and help in making this study possible. If you have any queries or wish to know more about this Senior Level Thesis project, please contact me at the following:

Phone: 226.234.0145
Email: scullymarybeth@gmail.com

My supervisor is:
Prof. Catherine Chong, catherine.chong@humber.ca

PARTICIPANT INFORMED CONSENT FORM

Research Study Topic: Improving Workflow and Comfort for Tattoo Artists
Investigator: Mary-Beth Scully | 226.234.0145 | scullymarybeth@gmail.com
Courses: IDSN 4002 & IDSN 4502 Senior Level Thesis One & Two

I, Thomas Purchase (First Name/Last Name), have carefully read the Information Letter for the project Improving Workflow and Comfort for Tattoo Artists, led by Mary-Beth Scully. A member of the research team has explained the project to me and has answered all of my questions about it. I understand that if I have additional questions about the project, I can contact Mary-Beth Scully at any time during the project.

I understand that my participation is voluntary and give my consent freely in voice recording, photography and/or videotaping; with the proviso that my identity will be blurred in reports and publications.

Consent for Publication: Add a (X) mark in one of the columns for each activity

ACTIVITY		YES	NO
Publication	I give consent for publication in the Humber Library Digital Repository which is an open access portal available to the public	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Review	I give consent for review by the Professor	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Privacy
All data gathered is stored anonymously and kept confidential. Only the principle investigator /researcher, « insert student Name here » and Prof. Catherine Chong or Prof. Frederick Matovu may access and analyze the data. All published data will be coded, so that visual data is not identifiable. Pseudonyms will be used to quote a participant (subject) and data would be aggregated.

I also understand that I may decline or withdraw from participation at any time, without negative consequences.

I understand that I can verify the ethical approval of this study, or raise any concerns I may have by contacting the Humber Research Ethics Board, Dr. Lydia Boyko, REB Chair, 416-675-6622 ext. 79322, Lydia.Boyko@humber.ca or « insert student Name /Phone Number /Email Address ».

Verification of having read the Informed Consent Form:
 I have read the Informed Consent Form.

My signature below verifies that I have read this document and give consent to the use of the data from questionnaires and interviews in research report, publications (if any) and presentations with the proviso that my identity will not be disclosed. I have received a copy of the Information Letter, and that I agree to participate in the research project as it has been described in the Information Letter.

Click or tap here to enter text.
Thomas Purchase
Participant's Name

[Signature]
Participant's Signature

Click to enter a date
Dec 5, 22
Date

Appendix F | Advisor Meetings & Agreement Forms

ISDN 4002 /4502
SENIOR LEVEL THESIS ONE & THESIS TWO

HUMBER
Faculty of Applied Sciences & Technology
Bachelor of Industrial Design / FALL 2022 & WINTER 2023

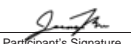
INFORMATION LETTER

Conditions of Participation

- I understand that I am free to withdraw from the study at any time without any consequences.
- I understand that my participation in this study is confidential. (i.e. the researcher will know but will not disclose my identity)
- My identity will be masked.
- I understand that the data from this study may be published.

I have read the information presented above and I understand this agreement. I voluntarily agree to take part in this study.

Click or tap here to enter text.
Jeesoo Kim
Participant's Name


Participant's Signature

Click to enter a date
October 19, 2022
Date

Project Information
Thank you very much for your time and help in making this study possible. If you have any queries or wish to know more about this Senior Level Thesis project, please contact me at the followings:
Phone: 226.234.0145
Email: scullymarybeth@gmail.com

My supervisor is:
Prof. Catherine Chong, catherine.chong@humber.ca

2

Mary-Beth

Could you describe your tattoo workstation so that I could have a picture in mind?

Advisor

The station is quite adjustable like it has adjustable you can take off and you can adjust the legs to bend or like the straight so it's very functional um we also have armrests or like, you know just to have a surface to tap to live and we have a bed or tray for all types of aid and supplies. A chair I guess that's all that takes the tattoo. It's like a stool but with a tiny bit of a backing. Yeah it feels comfortable as it can be because I tend to artists I find myself like bending over and sometimes like that and forgo comfort to get the right angle.

Mary-Beth

Yeah, I see. I've heard that's common. Have you ever used like a massage bed?

Advisor

So I've never used like just a masu spit. I find like some artists do that. And I've gotten tattooed online and I do find it's comfortable for like the client because like there's a lot more space on the adjustable chairs. Like especially with clients who are bigger like I find the adjustable points don't have enough space to accommodate them. But yeah, like if you can bend the clients there it's very important for tattoo artists who get the skin to stretch the right way and sometimes you can make the clients in the positions so it stretches the skin for us a little bit more.

Mary-Beth

So what kind of bed do you use now then?

Advisor

So I have my own and it changes whenever like I have to tattoo certain body parts like if I can rotate your chair to make sure like I have the angle but it changes like sometimes I'm not even sitting like I have to stand to get that position. We make sure like we adjust the chair in the first place so we are comfortable but yeah but sometimes you have to stand.

Mary-Beth

Where do you usually put your work surface?

ISDN 4002 /4502
SENIOR LEVEL THESIS ONE & THESIS TWO

HUMBER
Faculty of Applied Sciences & Technology
Bachelor of Industrial Design / FALL 2022 & WINTER 2023

PARTICIPANT INFORMED CONSENT FORM

Research Study Topic: Improving Workflow and Comfort for Tattoo Artists
Investigator: Mary-Beth Scully | 226.234.0145 | scullymarybeth@gmail.com
Courses: ISDN 4002 & ISDN 4502 Senior Level Thesis One & Two

I, **Jeesoo Kim** (First Name/Last Name), have carefully read the Information Letter for the project Improving Workflow and Comfort for Tattoo Artists, led by Mary-Beth Scully. A member of the research team has explained the project to me and has answered all of my questions about it. I understand that if I have additional questions about the project, I can contact Mary-Beth Scully at any time during the project.

I understand that my participation is voluntary and give my consent freely in voice recording, photography and/or videotaping; with the proviso that my identity will be blurred in reports and publications.

Consent for Publication: Add a (X) mark in one of the columns for each activity

ACTIVITY		YES	NO
Publication	I give consent for publication in the Humber Library Digital Repository which is an open access portal available to the public	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Review	I give consent for review by the Professor	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Privacy
All data gathered is stored anonymously and kept confidential. Only the principle investigator/researcher, « insert student Name here » and Prof. Catherine Chong or Prof. Frederick Matovu may access and analyze the data. All published data will be coded, so that visual data is not identifiable. Pseudonyms will be used to quote a participant (subject) and data would be aggregated.

I also understand that I may decline or withdraw from participation at any time, without negative consequences.

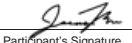
I understand that I can verify the ethical approval of this study, or raise any concerns I may have by contacting the Humber Research Ethics Board, Dr. Lydia Boyko, REB Chair, 416-675-6622 ext. 79322, Lydia.Boyko@humber.ca or « insert student Name /Phone Number /Email Address ».

Verification of having read the Informed Consent Form:

I have read the Informed Consent Form.

My signature below verifies that I have read this document and give consent to the use of the data from questionnaires and interviews in research report, publications (if any) and presentations with the proviso that my identity will not be disclosed. I have received a copy of the Information Letter, and that I agree to participate in the research project as it has been described in the Information Letter.

Click or tap here to enter text.
Jeesoo Kim
Participant's Name


Participant's Signature

Click to enter a date.
October 19, 2022
Date

3

Advisor

So I'm right handed so I guess it was on my right here.

Mary-Beth

Do you find any pain from your current setup?

Advisor

Yeah, sometimes I have to go to physio, just like on turning so much that it hurts my spine. It's definitely the issue with getting comfortable, that's a challenge. So I'm still getting to what I'm comfortable with. Sometimes I forget, and I keep going and after the session, my body's just broken. So I just have to figure that out. I'm also getting the client in a position where they can stand the longer sessions like sometimes like I put them in a position that I find comfortable, but they aren't and their body like just twitches sometimes. So I have to make sure they can just stay still

Mary-Beth

What challenges do you experience as a tattoo artist?

Advisor

On of them is that I am still mastering my craft. So challenges such as like being a good tattoo artist. I learned from my boss has his own setup, and I've been trying to get my own style into it. Like his it's more like very realistic dark elements. So he likes to lightest seems a little darker than I would like it. So I've been playing around with just like a blank background with some plant element and getting some nice reports in there. But I've got very bad photography like that. Actually, like the last question photography that would be one of my biggest challenges. Sometimes I take it with my phone but a DSLR my boss provides.

Mary-Beth

How do you find the lighting when taking photos?

Advisor

We do have like a lighting attachment for the camera. We have like a light bulb, my boss like actually changed the ceiling light. So it's very bright and critical. So sometimes we don't need the lamp on our size. But yeah it has its challenges because the wires can get knocked off and you have to keep adjusting it and to make sure you have a sanitary room you have to make sure it's clean and stuff.

Mary-Beth

Have you heard of the Husky tool chest? Do you use them in your shop?

Advisor

Oh yeah I'm pretty sure, it's metal like it's industrial like it. Oh yeah yeah, mine has less compartments but that's that's what it is.

Mary-Beth

Do you have your own space or are you tattooing next to others?

Advisor

so I have luckily I have my own so I can just close the door here for privacy if neither it's decently sized like the curve so I can just rotate the chair. In the adjustable chair it's very uncomfortable the issue I have sometimes like some of these things are built for like male average so I find that I'm a little bit short for certain things and I need the chairs adjusted a little bit higher if needed. So like I would like that that better or the chairs the chairs if it goes as low as possible. I find that to be the most comfortable position for me to have my feet on the ground.

Advisor

Oh, I remember when I first started my wrist was really exhausted from trying to hope that but I didn't get adjusted to it and my like, I think it takes a lot more for us to get adjusted to artists. We had the cordless ones. I don't have any experience with the older ones but they're very loud and funky like, intuitively I don't even know how to use them.

Mary-Beth

What part of the body do you like to tattoo the most? Why?

Advisor

I think the arm because it's just very easy like you put them on the armrest and usually like the pain tolerance for it. It's tolerable for most people. The skin itself is easier to tattoo you've learned that like, different body parts have different skin, like the stomach is super stretchy, and it takes a lot for you to stretch the skin and tattoo on it. Like it kind of bounces off on you if you don't stretch the skin. And the age doesn't go. Yeah. Like the forearm is like a little bit muscle area where it's naturally stretched. And you can get into clients in a comfortable position with a chair.

Mary-Beth

Yeah, true. What would you say is your ideal session length?

Advisor

I think it's like a four hour session. I think you can get a lot more details. And it's just a lot more interesting for me is when you first start out, you do like Chinese tattoos. And you learn quickly that like I find those don't feel as well. And I know a lot of clients look for it, but I try to advise clients to get bigger than what they want. Like, longevity wise that looks the nicest for tattoos. And yeah, I just find it interesting.

Mary-Beth

Speaking of which, what program do you use to create your tattoos?

Advisor

I use a program called Clip Studio. So my tablet. Yeah, that's where I usually sketch sometimes they sketch on paper and they transfer it over. But like I love the functionality of the template. I think that's where it's headed. But boss still uses that laptop. He's kind of old school. He's like for photoshopping like photographs together in order to create the design. So he doesn't necessarily need to like draw out a design.

Mary-Beth

Where are you usually designing your tattoo?

Advisor

I'm on my bed or like at the studio. We have I have one of those angled desk drafting tables but like, I like the when the tablet is at an angle and I strained my back too much.

Mary-Beth

Are there any technologies that stand out to you in the tattoo industry?

Advisor

I'm not sure like. Oh, yes. I mean, it's already existing technology, but I wish I had access to it. Like, I kind of want the foot pedal that turns off your machine. Because I find that sometimes rotating machine dangerous you might stab yourself so like when I was practicing on silicone like accidentally stabbed myself. I have some on my knuckles so like I would like I know the wireless ones as a wireless foot pedal that you can have an attachment for like so that must be on my wish list.

Mary-Beth

Oh no! That sucks...I can see why you would want that. Hahaha! How would you describe how you promote yourself to gain clientele?

Advisor

I use Instagram. I should play around with the algorithm. Yeah, but it's the best platform out there. There's other apps you can sign up for. There's Takuto which is like conducting touch orders to clients but it's like big fee that I don't really want to pay and I don't think it's as effective as Instagram. I know a lot of artists just like don't do DMs, and they just send out work. Obviously choose specific number of appointments but I still hustling and trying to get as much as much business as possible. It's like when they open up their booking say accepted DMS like that's when they're trying to fill their schedule I guess. Was it think just tattoo artists have different ways to fill their days my boss generally doesn't communicate at all our shop manager just deals with the communication but basically they just book him for a day and he designs and tattoos in that span of time. Like other tattoo artists may like ought to have consultations and said before the actual tattoo day.

Appendix G | Other Supportive Raw Data

Touchpoints: Tattoo Artist**A: Seat**

	95%tile M (6'2)	5%tile F (4'11)	Median
Seat Depth*	Max. 20" (21.6" Popliteal)	Min. 15" (16.5" Popliteal)	17"
Seat Width	22" (16.9" Hips)	22" (11.2" Hips)	22"
Seat Height*	Max. 21"	Min. 14.5"	Adjustable
Seat Tilt*	0-10°	0-10°	Adjustable
Back Support Length	20"	20"	8"
Back Support Width	22" (20.6" Shoulder)	22" (13.5" Shoulder)	15"
Lumbar Support Height*	Max. 12" (11.8" Lumbar)	Min. 7" (7" Lumbar)	Adjustable
Back Support Angle	0-15°	0-15°	Adjustable

B: Drawer/Table/Worksurface

	95%tile M (6'2)	5%tile F (4'11)	Median
Height of Drawer	21"	21"	Adjustable
Width of Drawer	10"	10"	8"
Depth of Drawer	18"	18"	12"
Length of Drawer Handles	5" (4.8" Hand)	5" (3.3" Hand)	N/A
Width / Diameter of Drawer Handles	1-1.5" (.9" Index Finger/Grip Diameter)	1-1.5" (.6" Index Finger/Grip Diameter)	N/A
Arm reach to Worksurface*	Max. 26" (31.5" Arm)	Max. 26" (29.5" Arm)	N/A

C: Reference Screen

	95%tile M (6'2)	5%tile F (4'11)	Median
Length of Screen	24"	24"	24"
Width of Screen	12"	12"	12"
Height of Screen*	Max. 65" (19" Seat + 34.6" Sitting Height)	Min. 45" (14.5" Seat + 25.3" Sitting Height)	Adjustable
Angle of Screen*	0 - 15°	0 - 15°	Adjustable

D: Light/Camera Ring

	95%tile M (6'2)	5%tile F (4'11)	Median
Length of Ring	15"	15"	15"
Width of Ring	6"	6"	6"
Angle of Ring	-90° - 20°	-90° - 20°	Adjustable
Arm Reach to Ring	Max. 26" (31.5" Arm)	Max. 26" (29.5" Arm)	Max. 26" (29.5" Arm)
Camera Diameter	2"	2"	2"

Touchpoints: Tattoo Client

A: Client Bed

	95%tile M (6'2)	5%tile F (4'11)	Median
Seat Depth*	Max. 20" (21.6" Popliteal)	Min. 15" (16.5" Popliteal)	17"
Seat Width	30" (16.9" Hips)	30" (11.2" Hips)	30"
Seat Height*	Max. 29.5"	Min. 23"	Adjustable
Back Support Length*	Max. 30" (28.6 Shoulder)	Min. 22" (20.8" Shoulder)	26"
Back Support Width	30" (20.6" Shoulder)	30" (13.5" Shoulder)	30"
Lumbar Support Height*	Max. 12" (11.8" Lumbar)	Min. 7" (7" Lumbar)	Adjustable
Back Support Angle*	0 - 90°	0 - 90°	Adjustable
Headrest Length	8" (8.9" Head)	8" (7.6" Head)	8"
Headrest Width	12" (6.7" Head)	12" (5.2" Head)	12"
Headrest Height*	Max. 5" (From Back Support)	Min. -5" (From Back Support)	Adjustable
Leg Support Length*	Max. 22"	Min. 16"	19"
Leg Support Width	24" (16.9" Hips)	24" (11.2" Hips)	26"
Leg Support Angle*	0 - -115°	0 - -115°	Adjustable

B: Armrest

	95%tile M (6'2)	5%tile F (4'11)	Median
Arm Rest Length*	22" (31.5" Arm)	22" (29.5" Arm)	22" (29.5" Arm)
Arm Rest Width	10"	10"	10"
Arm Rest Height*	Max. 45"	Min. 23"	Adjustable

Search #1: Secular Review Article (Non-Peer Reviewed)

Search Engine: Google

Keywords Used in Search: Best tattoo workstations review

APA Citation: Team Spiritus. (2022, July 8). Best Tattoo Workstations: Reviews and Buying Guide 2022. Retrieved September 11, 2022, from Spiritus Tattoo: <https://www.spiritustattoo.com/furniture/best-tattoo-workstations/>

1. Loyaleardy Tattoo Workstation - Convention Ready
Price: Unknown

- Small enough to fit anywhere you need it.
- Adjustable tripod base allows you to work quickly and comfortably while sitting or standing in any position.
- Provided with an ink bottle tray, spots for a wash bottle and water cup, a paper towel holder, and a glove caddy.
- Easy to disassemble, making travel simple and convenient.



A tattoo workstation needs to be clean and simple in terms of design. This is a way to maintain cleanliness in the room. This one has that, which is perfect if you want to invest in a workstation instead of using an ordinary table. There are a few things you should know about this product. Firstly, it comes with an adjustable height stand. You can change the height to your heart's content. There is also a back tray specially designed to organize inks. By the way, this part is removable. You can also find other components although they're basically attached to the main structure, such as a glove box holder, a paper holder, and a cup holder made of high-quality steel. Take a look at the slightly hidden part under the tray; it's a container for your power supply. This product's overall quality is good and it makes a perfect addition to any tattoo shop. In terms of design, it has an industrial look, which is simple yet elegant. It's also highly functional as it can accommodate common tattoo supplies. And then, the size is perfect. It won't feel too big in your tattoo room.

2. Zoterren Portable Tattoo Workstation, Adjustable Height Stand Salon Instrument Tattoo Table Price: \$78.89

- Tattoo workstation height can be adjusted from 24 to 42 inches using the knob in the middle.
- The top tray on the salon instrument tray can provide ample space to store all types of tattoo tools, making your tattoo work easier and more convenient.
- The adjustable tripod stand tattoo table is made of premium steel for long life; the rubber feet pad adds stability and slip resistance.
- Detachable design for easy storage and transport; light enough to position anywhere. Ideal for beauty salons, tattoo studios, medical shops and dentists.



This looks just as practical as the previous product. The first you should think of before purchasing a workstation is the placement. Since this station is very light, placement shouldn't be an issue. Whether the room is narrow or spacious, you can position it anywhere. In the meantime, the tripod base provides good support to the tray. It's imperative for a workstation to have a strong base because it will affect the amount of supplies you can arrange on its top. This one is robust because it's composed of iron. The top also looks so simple. Apart from the two areas for

5. Saloniture Premium Aluminum Instrument Tray with Accessory Caddy - Black Price: \$64.99

- Spacious tray: Easy to organize tools, accessories, and other supplies with an 18 x 13 tray. 1 lip around tray prevents spills and secures contents. Removable tool holder keeps tools handy.
- High-quality aluminum to resist stains, warping and high temperatures. The salon tray is easily detachable for cleaning and sanitizing after each use.
- Adjustable height: Ideal for sitting or standing.
- Strong pedestal base has 2 powder-coated aluminum rear and five composite legs for a 21 diameter. Heavy-duty swivel casters roll smoothly over carpeting and floors. The weighted base is stable on all surfaces.
- Multi-purpose: A perfect addition to beauty salons, barber shops, spas, tattoo parlors, nail salons, dental offices, groomers and other professional shops.



It's important to choose an adjustable workstation, so that you can set the height to your liking. Apart from adjustable height, this product also has 5-star wheel base for easy mobility. Durability isn't a concern because the tray is made of aluminum. A workstation is an integral part of a tattoo parlor. But looking at the versatile design, this product also works for other commercial establishments. Heck, you can even use it in your office room because it looks professional. Regarding the specs, the workstation has a maximum height of 44 inches. You can lower it through the tension knob. Another prominent part of this station is the thick base; it's thicker than many products in its price range. As for the tray, it has a pretty broad surface. And the best part is you can remove it for cleaning purpose.

6. TAT TECH Portable Collapsible Tray Work Station Table Desk Price: \$111.89

- Spacious tray: Easy to organize tools, accessories, and other supplies with an 18 x 13 tray. 1 lip around tray prevents spills and secures contents. Removable tool holder keeps tools handy.
- Made with Steel & Aluminum
- Ink Pen Holder Dimension - 17.5 inch x 2.5 inch x 18.5 inch (Detachable)
- Table Top Dimension - 13 inch x 18.5 inch
- Adjustable Height - 24 inch to 42 inch.



Aluminum and steel are combined to create this tough and durable workstation. Design-wise, it looks solid and well-crafted. It may not have the thick base of the previous product, but it's not necessary as long as the material is sturdy, which is the case with this product. There is an ink pen holder, which can be detached from the main structure. The top is also pretty spacious, allowing you to display ink bottles as well as other supplies. As with other workstations, the height is adjustable from 24 to 42 inches. Just fold it down if you want to transport it to another place. This mechanism is also made for easy storage.

How to choose the best tattoo workstations

L. Height adjustment

Adjustable height has become the norm for tattoo workstations. However, it's still possible to find products with fixed height. Why does it matter? Well, you may have to change position numerous times during a tattoo session. Like when you have been sitting for long, you may need to stand up and stretch out a little bit if the workstation is adjustable in height, you can change it to your comfort level.

placing a water cup and a wash bottle, it looks pretty uncluttered. The back tray can be removed, too. Speaking of functionality, this is where you display all the pigments you use for tattooing. Can the whole thing be dismantled? Yes, and it makes storage easier as you can easily take the components apart.

3. GDAE10 Tattoo Workstation, Large Tattoo Mobile Work Station Stand, Adjustable Pro Tattoo Desk Table for Tattoo Salon Price: \$58.00

- This section table has double counter-top, multi-angle adjustment, and can be adjusted up and down and rotate 360 degrees.
- Adjustable knob, 65-80cm from ground
- Workbench wheels make it mobile. Comes with a pen holder to keep supplies.
- Easy to clean, 360-degree rotation, and adjustable level to meet tattooists' needs.



The most prominent feature of this workstation is the double-counter-top design. When you open it up, it will transform into a large piece where you can organize many of your essentials, probably more than the average workstation can support. Unlike other products, this has two legs to hold both sides of the top. The height is also adjustable from 65 to 80 cm. Don't worry about portability because the station has wheels that allow it to move around effortlessly. There is also a small pen holder that you can use to keep other supplies. This is easily one of the best products you can find in this niche because it provides a high level of flexibility. The biggest appeal is undoubtedly the sleek and spacious top which can rotate up to 360 degrees. Judging by the appearance, this is designed to be a multipurpose item. If you no longer need it to help with your tattoo job, you can turn it into a regular workbench.

4. Premium Aluminum Salon Tray, Tattoo Rolling Station Price: \$65.47

- Hair color service tray adjustable height from 30" to 42"
- Heat-resistant mat withstands 572°F
- Resistant to corrosion and isn't easily deformed
- Sturdy 5-star base wheel, smooth, anti-winding, ultra-quiet
- Easy to assemble/disassemble for easy clean



The strong leg of this workstation is distracting but in a good way. That sort of sturdy base isn't necessary because the tray looks pretty light, but the company decided to make it that way, anyway. The adjustable height isn't one, but it's good to see this feature on this item. You can adjust the height from 30" to 42". The heat-resistant mat is what we consider special. It has the ability to handle extreme temperatures of up to 572°F. The thick leg is quite telling of its sturdiness. Well, you're not wrong if you assumed that it's a tough metal because it is. It is not only resistant to oxidative stress but also doesn't break easily. Furthermore, the 5-star base configuration gives the workstation stability and balance. You can move it around without fear that it may tip over.

2. Sturdy construction

Opt for a workstation that has a metal frame. Steel is not the only metal commonly used to create tools. Any metal should be good as long as it has strength and resistance to corrosion. Metal is absolutely a fascinating material, no wonder it's widely used in medical applications. It is durable and able to withstand high temperatures.

3. Design

Tattoo workstations are available in various designs. Some don't look like the typical tray over a metal base. Some are more sophisticated than that. Instead of looking like simple workbenches, they look more like drawers complete with shelves for storing all kinds of supplies. It's all up to you to decide which one works best for your shop.

Conclusion

That's a review of some of the best tattoo workstations. Hygiene is a must for any setting where cross-contamination is likely to occur and it's high up for debate if you're concerned about your clients' safety, then you must set up the workstation in the correct manner. Know what you should and should not do around the area. Everything that doesn't have to do with the tattoo process needs to be done outside the area, like creating designs, talking to clients, etc. The workstation should strictly be a place for you to do tattoos. This is to reduce the risk of contamination and other potential health issues. The area should also be free of clutter. Only keep the most important essentials close by. Things you rarely use need to be kept somewhere else. Besides, the workstation should also be made of nonporous materials. Fortunately, many products intended for this purpose are made of metal because it's known to be non-porous. And then, don't forget to clean the area before starting on a new tattoo because this practice can maintain hygiene.

Summary Statements

- Some key features to look for in tattoo workstations are:
 - Height adjustment: Allows for sitting and standing posture, giving the opportunity to stretch
 - Sturdy Construction: Withstand small bumps, constant moving, interaction, the weight of materials
 - Design: Multi-purpose, functionality, ease of access, convenience, portability, ability to be cleaned
- Materials used in the design of these workstations are crucial for hygiene and preventing cross-contamination. This includes using nonporous and corrosive-resistant materials, such as metals.
- Many artists will choose what is best for them for their workstations. This can include whether or not there are drawers/shelves, what the space looks like/how it is arranged, whether or not there are wheels, etc.
- Built-in, detail-orientated functionalities such as cup holders, power supply holders, bottle shelves, etc. can make or break the decision of purchasing one unit over the other.
- Lightweight yet durable workstations that hold their materials but can be packed away easily appear the most cost-efficient and optimal benefit purchase for the user

Investigation of musculoskeletal discomfort, work postures, and muscle activation among practicing tattoo artists

Keester, D. L., & Sommerich, C. M. (2017). Investigation of musculoskeletal discomfort, work postures, and muscle activation among practicing tattoo artists. *Applied Ergonomics*, 58, 137–143. <https://doi.org/10.1016/j.apergo.2016.06.006>



Investigation of musculoskeletal discomfort, work postures, and muscle activation among practicing tattoo artists

Dana L. Keester, Carolyn M. Sommerich*

Department of Integrated Systems Engineering, The Ohio State University, USA



ARTICLE INFO

Article history:
Received 16 September 2015
Received in revised form
22 February 2016
Accepted 13 June 2016

Keywords:
Musculoskeletal discomfort
Sustained awkward posture
Unsupported seated work

ABSTRACT

Tattoo artists are an understudied worker population with respect to investigation of work-related musculoskeletal (MSK) discomfort and associated risk factors. Results from one discomfort survey has been published; no analysis of worker biomechanics has been published. As such, a study was conducted to begin exposure assessment of tattoo artists to work factors that could result in MSK discomfort. Twelve month discomfort prevalence exceeded 50% in the neck, shoulders, hands/wrists, and upper and lower back (range: 53–94%). Seventy-one percent of postures evaluated during 16 h of observation had total RULA scores of 5, 6, or 7 (investigation and changes are required soon or immediately). Static muscle activity levels in the left, right, or both upper trapezius muscles in each study participant exceeded the 2–5% MVE limit recommended in the literature. Intervention concepts are also discussed.
© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

According to polls conducted in the United States, about 40% of millennials (people reaching adulthood around the year 2000) have one or more tattoos, while percentages of tattooed adults in other age groups range from 5 to 30% (Harris Interactive; Harris Polls, 2012; Pew Research Center, 2010). The growth in popularity and acceptability of tattooing has led to increasing numbers of people working in the body modification industry in general and specifically as tattoo artists. There were estimated to be about 55,000 people employed in the tattoo industry in the US in 2015, and that number is expected to increase to about 77,500 by 2020 (BISWorld, 2015). As reported by Grieshaber et al. (2012) it is difficult to ascertain the exact number of tattoo artists in the US because there is no centralized licensing body and each state handles its own regulation of the industry. State regulation of tattoo facilities is focused primarily on blood borne pathogens as both a risk to clients and as an occupational risk to the tattoo artists. While it is important to continue to enforce training and regulations relating to blood borne pathogens, as tattooing grows in popularity and the population employed in the industry continues to grow and age, it

is important to consider other occupational hazards to which tattoo artists are exposed, including risk factors for musculoskeletal disorders (MSD). As discussed by Grieshaber et al. (2012), from casual observation it would appear that tattoo artists may be exposed to MSD risk factors that are similar to dentists and dental hygienists. Both dental professionals and tattoo artists appear to sit for prolonged periods of time in awkward postures while grasping small vibrating tools that they use to perform fine, detailed visually-guided work on a client who is often in a recumbent position (Fig. 1).

The length of time that it takes to apply a tattoo can vary widely depending on the size, location, and complexity of the design. A small piece can take half an hour or less to complete, whereas a larger tattoo, such as a sleeve (a tattoo that covers the arm) or back piece, can take many hours over multiple sessions. Grieshaber et al. (2012) reported prevalence of MSK discomfort exceeding 50% in several regions of the body, including low back, neck, shoulder, and hand-wrist, based on their survey results from 79 tattoo artists attending a tattoo convention in Toronto. This survey appears to still be the only published, formal ergonomics-related assessment made in this population of workers prior to the current study described herein. By contrast, work-related MSD risks associated with dentistry have been extensively studied (Åkesson et al., 2012; Books and Klemm, 2012; Droze and Jonsson, 2005; Finsen et al., 1998; Hayes et al., 2009; Rafemaneh et al., 2013; Sakzewski and Naseer-Ug-Din, 2014; Thornton et al., 2004; Valachi and Valachi,

Best Tattoo Workstations: Reviews and Buying Guide 2022

Team Spiritus (2022). Best Tattoo Workstations: Reviews and Buying Guide 2022. Retrieved from Spiritus Tattoo: <https://www.spiritustattoo.com/furniture/best-tattoo-workstations/>

Home / Tattoo Studio Furniture / Best Tattoo Workstations: Reviews and Buying Guide 2022

Best Tattoo Workstations: Reviews and Buying Guide 2022

By Team Spiritus • July 8, 2022

Setting up a tattoo workstation is an important step in providing tattoo service. It's not a must to buy a special workstation.

You can use a regular desk or table to organize tattoo supplies, but there are several drawbacks of using such furniture items because they are not designed for tattoo purposes.

After providing service for quite some time, you will figure out what supplies you use the most. Please keep them within reach in the workstation. This way, you don't have to move a lot during a tattoo session.

Another important thing is to avoid clutter in the room. It should be clean and sterile to prevent cross contamination. Remember that hygiene is the utmost importance. It's a prerequisite for any business where the risk of infection is high.

So, how you do ensure high standards of hygiene? You can do that by choosing a quality workstation. Of all the best tattoo workstations, the following ones might interest you.

Spiritus Tattoo is reader-supported, and as an Amazon Associate, we earn commissions from qualifying purchases (at no extra cost to you). See our disclaimer page for more information.

Symptoms of Musculoskeletal Disorders among Tattoo Artists

Grieshaber et. al. (2012). Symptoms of Musculoskeletal Disorders among Tattoo Artists. *Proceedings of the Human Factors and Ergonomics Society*, 1158-1162. <https://journals.sagepub.com/doi/abs/10.1177/10711181312561252>

PROCEEDINGS OF THE HUMAN FACTORS AND ERGONOMICS SOCIETY 56th ANNUAL MEETING - 2012

1158

Symptoms of Musculoskeletal Disorders among Tattoo Artists

D. Christian Grieshaber¹, Matthew M. Marshall², Thomas J. Fuller¹

¹Illinois State University, Normal, IL

²Rochester Institute of Technology, Rochester, NY

Despite the widespread popularity of tattoos in the U.S. and worldwide, little consideration has been given to the occupational risk factors that tattoo artists face. Tattoo artists are exposed to many of the same risk factors faced by occupations such as dentistry and cosmetology, including prolonged static work postures and sustained gripping of hand held tools. However, no research has evaluated the extent to which the tattooing profession is adversely affected by its occupational demands. Utilizing a survey of tattoo artists, this research sought to benchmark the prevalence of symptoms commonly associated with the development of musculoskeletal disorders. The survey results revealed that tattoo artists experience high levels of discomfort in the lower back, neck, shoulders, and upper extremities and that these levels significantly exceed discomfort reported in professions that expose workers to similar ergonomic risk factors.

INTRODUCTION

The popularity of tattooing has increased significantly in recent years. Laumann and Derick (2006) surveyed 500 adults and found that 36% of people between the ages of 18-29 and 24% of people between the ages of 30-39 have at least one tattoo. Similar results have been reported in Australia (Heywood, Patrick, Smith, Simpson, Pits, Richters, and Shelley, 2012), so the trend is not isolated to the U.S. The prevalence of tattoos has raised interesting social and psychological questions concerning what motivates individuals to receive a tattoo (e.g., Elzweig and Peoples, 2011), but very little attention has been given to the occupational risks of tattoo artistry, particularly the ergonomic risks.

It is difficult to estimate the number of tattoo artists and piercing technicians who practice in the U.S. due to the fact that regulation of the industry is handled at the state level and there is no centralized licensing body.

The National Tattoo Association (NTA) is an organization that exists to raise awareness of issues within the profession and to advance quality and safety standards, but participation in the NTA is elective. The organization consists of nearly 2,000 members, but according to the organization it is likely that the actual number of artists is ten to twenty times the current membership (B.

Saxe, personal communication, March 6, 2012). Likewise, it is difficult to estimate the number of tattoo establishments in the U.S. According to Armstrong (2005), Texas has nearly 900 tattoo studios registered with the state. At the time these data were collected, Texas had a population of approximately 21 million people. Assuming that the number of establishments per capita across the U.S. is consistent with the state of Texas, we can estimate conservatively that there are over 9,000 tattoo establishments in the U.S. (based on a population assumption of 310 million people in the U.S.).

Research on occupational risks for tattoo artists is sparse. Because tattooing uses needles to puncture the skin, there are some obvious safety concerns not only for the artist, but also the client. Minimizing the likelihood that blood-borne pathogens (BBP) can infect either the artist or the client is a major concern. The extent to which states regulate the industry to protect against infection varies widely (Armstrong, 2005). Lehman et al (2010) conducted a study of tattoo establishments in Texas and Pennsylvania to assess compliance with BPP-related regulation. They found that shops demonstrated high compliance with infection control standards, but tended to be much more lax on compliance with administrative standards. Other researchers in the medical and

National survey of health in the tattoo industry : Observational study of 448 French tattooists

Kluger, N. (2017). National survey of health in the tattoo industry : Observational study of 448 French tattooists. *Department of Dermatology, Allergology and Venereology*, 111-120. DOI: <https://doi.org/10.13075/ijomeh.1896.00634>



ORIGINAL PAPER

International Journal of Occupational Medicine and Environmental Health 2017;30(1):111-120
<https://doi.org/10.13075/ijomeh.1896.00634>

NATIONAL SURVEY OF HEALTH IN THE TATTOO INDUSTRY: OBSERVATIONAL STUDY OF 448 FRENCH TATTOOISTS

NICOLAS KLUGER^{1,2}

¹ University of Helsinki, Helsinki, Finland

Departments of Dermatology, Allergology and Venereology

² Helsinki University Central Hospital, Helsinki, Finland

Department of Skin and Allergic Diseases

Abstract

Objectives: The data regarding the health of professional tattooists is nonexistent. Tattooists are usually heavily tattooed and exposed daily to body fluids and skin-to-skin contacts with customers; tattoo ink, solvents, allergens, irritants, and work for hours often in inadequate positions using vibrating tattoo machines. We analyzed the health status of active French professional tattooists. **Material and Methods:** An observational self-reported Internet survey was performed among 448 tattooists who were members of the French Tattoo Union in November 2013. **Results:** The main physical complaints were musculoskeletal: back pain (65%), finger pain (41.5%) and muscular pain (28.8%). Finger pain, back pain, muscular pain and carpal tunnel symptoms/tingling sensations on the fingers occurred among 88%, 61.5%, 68% and 84% of the cases after having started their activity ($p < 0.001$). Other chronic diseases, autoimmune diseases and cancers remained at a low level here. **Conclusions:** Professional tattooists have a high prevalence of musculoskeletal complaints about back pain due to repetitive movements, awkward postures and use of a vibrating tattoo machine. Tattooists have a unique environment that imply developing intervention and preventive strategies for them. *Int J Occup Med Environ Health* 2017;30(1):111-120

Key words:

Occupational diseases, Tattooing, Musculoskeletal diseases, Ink, Carpal tunnel syndrome, Raynaud phenomenon

INTRODUCTION

Permanent tattooing, i.e., the introduction of pigments and dyes in the dermis by puncturing the skin to obtain a design, has gained a tremendous popularity for the past 20–25 years. The prevalence of tattooed individuals in Europe, North America and Australia fluctuates

to local cutaneous infections, potential sepsis and viral blood borne infections if performed with lack of hygiene.

Furthermore, hypersensitivity reactions to tattoo color and chronic dermatoses of the tattoo area are also possible [6]. Besides, for the past years, concerns have been raised by the obscure market of ink manufacturing as

* Corresponding author, Department of Integrated Systems Engineering, The Ohio State University, 371 Neil Ave., Columbus, OH, 43210, USA
E-mail address: sommerich.1@osu.edu (C.M. Sommerich).

<http://dx.doi.org/10.1016/j.apergo.2016.06.006>
0003-6870/© 2016 Elsevier Ltd. All rights reserved.

The Secret, Chronic Pain of Tattoo Artists

Abelman, K. (2020). The Secret, Chronic Pain of Tattoo Artists. Retrieved from allure: <https://www.allure.com/story/tattoo-artist-chronic-back-pain>

Only one study exists on the prevalence of chronic pain among tattoo artists, she notes. Researchers at The Ohio State University found tattoo artists exceed the maximum levels of muscle exertions recommended to avoid injury by up to 25 percent, especially in the neck and upper back.

The biggest problem isn't always the way tattoo artists are sitting — not moving at all is what creates problems for their bodies. "They're in a static, singular position that doesn't move," Andreys continues, "so nutrients can't get in, waste product can't get out. The muscle is basically screaming for blood flow and oxygen — that's where the pain signals come from."

Most people who get tattoos — even if you get them regularly — aren't aware of these occupational hazards of being a tattoo artist. Personally, I didn't know about what my favorite tattoo artist Young aka @92percentof02 went through on a daily basis until she slipped on wrist braces before tattooing my arm earlier this year. Now, the level of appreciation I have for tattoo artists and the body art I have has raised.

Working Through the Pain

Since she was 19, Yarian has had a tattoo machine in her hand. Now 60, Yarian says she didn't feel any pain for the first 10 years of her nearly 42-year-long career.

The second decade brought Yarian neck and lower back pain. However, she trivialized it and powered through, thinking it was just part of the job and would soon go away. "Because I was young — I'm not saying I was foolish — but I just don't think I had the presence of mind to realize the repercussions of working long, long hours without discomfort," Yarian admits.

Painted Bodies: Representing the Self and Reclaiming the Body through Tattoos

Strübel, J., & Jones, D. (2017, December 17). Painted Bodies: Representing the Self and Reclaiming the Body through Tattoos. *The Journal of Popular Culture*, 1230-1253. doi:<https://doi-org.ezproxy.humber.ca/10.1111/jpcu.12626>

Painted Bodies: Representing the Self and Reclaiming the Body through Tattoos

JESSICA STRÜBEL, AND DOMENIQUE JONES

My body is my journal, and my tattoos are my story. —Johnny Depp (qtd. in Stephenson-Laws)

TATTOOING HAS A LONG HISTORY DATING BACK TO ANTIQUITY AND has historically been associated with social deviance and rebellion (Gustafson 17). However, contemporary associations with tattoos have shifted away from a subversive act to a socially acceptable form of expression (Atkinson, "Tattooed" 4; Kang and Jones 42; Kosut 1035–46). Personal experiences and social conceptualizations of tattoos are in a continual state of development, thereby removing the historical stigma attached to them. With an annual revenue of roughly \$722 million and powered by highly trained and skilled artists, the tattoo industry is a growing segment of the art and fashion industry ("America's Booming").

The popular image of the tattooed individual as a young, working class male is outdated as more people, especially women, choose to be permanently inked (Kang and Jones 42). Women's interest in tattoos has also been increasing since the 1960s (Kang and Jones 43). In fact, according to Braverman, women are slightly more likely than men to get tattoos (23% versus 19%). According to a 2012 Harris Poll, the majority of people who are tattooed are between the ages of 30 and 39 ("One in Five"). However, tattoos are most popular among

The Journal of Popular Culture, Vol. 50, No. 6, 2017
© 2017 Wiley Periodicals, Inc.

How May We Improve Workflow & Comfort in Tattoo Workstations?

