CERAMIC SCULPTURES IN GROUP-DISPLAY TO NARRATE PASSAGE OF TIME AND EMOTION

by

Lillian Min-En Ding

Bachelor of Fine Arts (Arts Institute of Boston) 2013

THESIS

Submitted in partial satisfaction of the requirements

for the degree of

MASTER OF FINE ARTS in CERAMIC ARTS

in the

GRAUDUATE SCHOOL

of

HOOD COLLEGE

August 12, 2020

Accepted:

Joyce Michaud, M. F. A. Committee Member	Jennifer Ross, Ph.D. Dept. Head of Art and Archeology
Taylor Pasquale, M. F. A. Committee Member	April Boulton, Ph.D. Dean of the Graduate School
Jenna Gianni, M. F. A. Thesis Adviser	

Authorization

I authorize Hood College to lend this thesis, or reproduction of it, in total or in part, at the request of other institutions or individuals for the purpose of scholarly research.

Copyright © 2020 by Lillian M. Ding

All rights reserved.

Table of Contents

Title Page

Authorization 2

Table of Contents 3

List of Figures 5

Abstract 9

Thesis Statement 10

Chapter 1. New Direction of My Narrative Sculpting in Ceramics 11

Chapter 2. My First Attempts at Group-displayed Sculptures 16

Chapter 3. Requirements and Countermeasures 21

3.1 Existing Sculpting Process Based on Muscle Anatomy 22

3.2 Requirements of Group-displayed Sculptures 23

3.3 Countermeasures for Group-displayed Sculptures 26

Chapter 4. Age-Progressive Appearances Cohere to Bone Anatomy 29

4.1 Inspiration from "*Age Progression Simulation*" Project 30

4.2 Facial Bone Anatomy 36

4.3 Age-appearances Corresponding to Bone Growth and Aging 40

Chapter 5. Enhanced Process of Narrative Sculpting in Ceramics 43

5.1 Integrate Bone Anatomy and Muscle Anatomy in Ceramic Sculpting 44

5.2 When to Apply the Enhanced Sculpting Process 46

5.3 Prototyping of Skull-like Face Mold Application 51

Chapter 6. Thesis Project: *Good Will, Ill Will* 55

Thesis Project Set I : Group-displayed Sculptures of Emotive Narrations 57

Thesis Project Set II: Group-displayed Sculptures of Age Progression 75

Thesis Project Set III: Group-displayed Sculptures of Time and Motion 86

Chapter 7. Thesis Implications and Conclusions 93

Bibliography 95

List of Figures

Photos were taken and diagrams drawn by Lillian Ding unless otherwise indicated.

Figure (Page)

1. *Creepy Face Sculptures* by Samuel Salcedo (13)
2. *Lucid Dream Series* by Johnson Tsang (13)
3. *Evolution of Man* by Unknown Artist(14)
4. *Three No Evils* by Lillian Ding (17)
5. *Life Does Not Have To Be Perfect To Be Joyful* by Lillian Ding (18)
6. Simulated age-appearances of lifetime by UW Age-progression Simulation (30)
7. Simulated age-appearances of females by UW Age-progression Simulation (32)
8. Simulated age-appearances of males by UW Age-progressing Simulation (32)
9. Compare simulated images against actual persons' photographs (33)
10. Eight Cranial Bones (36)
11. Fourteen Facial Bones (36)
12. Position of Facial Sutures (38)
13. Existing Process to build one individual's Solo-displayed sculpture (46)
14. Existing Process to build different individuals' Group-displayed sculptures (47)
15. Enhanced Process to build one individual's Group-displayed sculptures without Age-progression (48)

16. Enhanced Process to build one individual's Group-displayed sculptures with Age-progression (49)

17. Prototype of Skull-like Mold with Suture Markups (51)

18. Face Foundations Replicated from the Skull-like Mold (52)

19. Face Foundations Tailored to Reflect Age-appropriated Bone Anatomy (52)

20. Foundation Tailoring by Incremental Expansion of Suture Lines (53)

21. Result of Age-progression Prototype via Skull-like Mold (54)

22. Wall Pieces with Age-progression built upon the prototyping outputs (54)

Thesis Project Set I:

23. Group display of 12 ceramic busts with Emotive Narrations (58)

24. The original realistic clay bust (58)

25. The two-part pressed mold (58)

26. Clay busts cast from the realistic mold (59)

27. Clay busts manipulated with Emotive Narration (60)

28. Soleil's Narrative Busts amid Dreams (61)

29. *Dream of Nostalgic Singing* by Lillian Ding (62)

30. *Caterpillar-Me-Not* by Lillian Ding (63)

31. *Let Me Love* by Lillian Ding (64)

32. *Dream of Sunny Play Days* by Lillian Ding (65)

33. *Dream of Pride* by Lillian Ding (66)

34. *Dream to Wish Best to All* by Lillian Ding (67)

35. *Luna"s Narrative Busts amid Dreams* by Lillian Ding(68)

36. *Bullied in Dream* by Lillian Ding (69)

37. *Lonesome even in Dream* by Lillian Ding (70)

38. *Painful in Dream* by Lillian Ding (71)

39. *Horrified in Dream* by Lillian Ding (72)

40. *Hateful in Dream* by Lillian Ding (73)

41. *Suffocated in Dream* by Lillian Ding (74)

Thesis Project Set II

42. Seven Wall Pieces with Age-progressive Appearances (76)

43. Human Adult Skull Model purchased online (77)

44. Skull-like Hump Mold with Key Suture Markups (77)

45. Soleil's Age-Progressive Looks (78)

46. Luna's Age-Progressive Looks (78)

47. *Childhood Soleil and Luna with Playmates* by Lillian Ding (79)

48. *Teenage Soleil* by Lillian Ding (80)

49. *Adult Soleil* by Lillian Ding (81)

50. *Old Soleil* by Lillian Ding (82)

51. *Teenage Luna* by Lillian Ding (83)

52. *Adult Luna* by Lillian Ding (84)

53. *Old Luna* by Lillian Ding (85)

Thesis Project Set III

54. *Soleil and Luna: Passage of Time and Emotion* by Lillian Ding (87)

55. *Childhood Soleil and Luna with Their Mom* by Lillian Ding (88)

56. *Teenage Soleil and Luna* by Lillian Ding (89)

57. *Adulthood Soleil and Luna* by Lillian Ding (90)

58. *Old Soleil and Old Luna* by Lillian Ding (91)

59. *Soleil's Progression of Age-appearances and Emotion* by Lillian Ding (92)

60. *Luna's Progression of Age-appearances and Emotion* by Lillian Ding (92)

Abstract

The thesis project, "*Good Will, Ill Will,*" builds multiple sets of sculptures telling the story of two sisters and their unusual birthmarks. To narrate their progressing sentiments and appearances from childhood to teenage to adulthood to old age, these sculptures are group-displayed to present their intertwined facial features in three aspects: emotive expressions, age-appropriated appearances and personal traits. Every sculpture is recognizable as the corresponding sister and distinguishable from the other sister.

My existing sculpting process is enhanced to build two face molds designed to replicate facial foundations for added guidance in the sculpting process. A skull mold with suture markups tailorable to reflect bone growth anatomy is used to guide sculpting narrations with age-progression. A realistic mold is used to minimize involuntary alterations when sculpting. This enhanced process integrating facial bone anatomy and muscle anatomy aims to protect facial recognition across group-displayed sculptures.

Thesis Statement

This thesis project implements age progressive sculpting processes covering not only the muscle anatomy beneath the face surface but also the bone anatomy respective to bone growth and aging beneath the muscle, in order to more comprehensively and consistently illustrate my conceptual narrative, the life- long story of two sisters' varied reactions to their unusual birthmarks. The age progressive sculpting process originated by this thesis has increased my ability to keep the appearances of a single sculpted individual recognizable over multiple sculptures that reflect the passage of time.

Chapter 1

New Direction of My Narrative Sculpting in Ceramics

The ultimate goal of my art is to use clay to tell stories and give a voice to my thoughts on the human spirit and the inherited strength we possess. I started learning about clay sculpting in high school. Narrative sculpting has become my passion and artistic focus beginning in my BFA career with my goal as a sculptural artist to "make clay narrative and emotive." For many years, I have sculpted stories – one sculpture for one story.

There has always been a challenge in sculpting stories or events dealing with a time sequence, or a cause-and-effect consequence. I attempted to overcome these challenges by incorporating symbolism and surrealism in sculpting my stories – still, one (solo-displayed) sculpture for one story. Not until my MFA years did I start to see the narrative power of multiple sculptures being displayed together as a set – using one set of group-displayed sculptures for one story.

Solo-displayed sculptures versus group-displayed sculpture, each shows its beauty and emotion in its own unique way. Some sculptures are more powerful displayed solo to fully express the beauty in solitude. In this case, less is more, meaning, less surrounding sculptures yields more concentration to the voice of the individiual work. But on the other hand, some sculptures are more appealing displayed as a set. In those cases, more is more, meaning, more sculptures yield more narrative strength. Some artists' group-displayed facial sculptures shown below demonstrate this concept:

Fig. 1. Samuel Salcedo's "*Creepy Face*" sculptures[1]

Fig. 2. Johnson Tsang's "*Lucid Dream Series*[2]" (4 out of the 23 sculptures)

I found great inspiration from these group-displayed sets of sculptures and came to realize that group-displaying could enrich my narrative sculpting. Sets are not only

1 "Samuel Salcedo creepy face sculptures," ILOBOYOU, accessed on July 28, 2020 https://www.iloboyou.com/samuel-salcedo-creepy-face-sculptures/

2 Johnson Tsang, "My Latest Work – Lucid Dream series." Artworks of Johnson Tsang, April 10, 2016, https://johnsontsang.wordpress.com/2016/10/04/my-latest-work-lucid-dream-series/

more fun, more exciting and more distinctive, but they are also more conducive to telling a story and can be more interactive. Some person-oriented themes, such as family or relationships, are not true to the meaning if presented with one solo figurative sculpture. My narrative sculpting perspective, is most greatly influenced by the notion that, group-displayed sculptures illustrate a progression of time and changes of sentiment across a set. This functionality can be achieved by presenting on each sculpture a distinctive age-appropriate appearance and emotional expression corresponding to a life-stage, so together the collection narrates one's behavior and sentiments of his/her entire lifespan.

Fig. 3. Five sculptures together narrate the evolution of man in millions years[3]

3 Image is free downloaded on July 28, 2020. from https://www.needpix.com/photo/1831971/evolution-development-forward-monkey-human-changes-change .

Group-displayed sculptures have become a new direction in my narrative sculpting initiative that works well when I need to narrate a person's story in multiple life stages where his/her appearance changes due from age progression or changes of emotion. Inevitably, this new direction comes with new challenges. This thesis documents my understanding of the challenges of group-displayed sculptures and my research for a solution to present my narrative in the best possible way.

Chapter 2

My First Attempts at Group-displayed Sculptures

Fig. 4. *Three No Evils* by Lillian Ding

My first set of figurative group-displayed sculptures is *Three No Evils* shown in the above photographs. This set of three sculptures present three different fictional characters created to narrate a Confucian verse teaching the etiquette of a perfect gentlemen. The verse is translated into English as follows:

See No Evil (not to look at things which do not conform to the rites)

Hear No Evil (not to listen to things which do not conform to the rites)

Say No Evil[4] (not to say things which do not conform to the rites)

Each sculpture narrates one line of the verse. Correspondingly, one sculpture has eyes covered; the second one, ears covered, and the third one, mouth covered. I had the

4 There is the fourth line in the original Chinese verse being excluded from the translation, "*Act No Evil*".

freedom to sculpt the three faces arbitrary because they presented three distinctively separate fictional individuals. I repeated the process of building one solo-displayed sculpture three times in a unanimous artistic style and genre. My first experience of group-displayed sculptures of different individuals was, in my opinion, very successful.

My next set of group-displayed sculptures presenting my late grandmother, created for my MA exhibition, shown in pictures below, faced real challenges.

Fig. 5. *Life Does Not Have to Be Perfect to Be Joyful* by Lillian Ding

I built this set of sculptures to narrate my late grandmother's attitude toward her poor health condition during her last two decades of life. The exhibition was titled *Life Does Not Have To Be Perfect To Be Joyful*. This set included five group-displayed figurative sculptures, each narrating a joy my Grandma found in doing her enjoyable

daily routines which inevitabley altered as her capabilities declined. When she was capable of cooking, she enjoyed preparing meals for family. After her right arm became disabled, she switched her cooking time to play chess and board games with my late Grandpa she always won. After Grandpa passed away, she increased her routine time of watching Chinese court dramas and her favorite TV game shows. She was devoted to her daily entertainment and had so much fun that she never missed a show. Toward the end of her life, when incapable of sitting up due to her back pain, her favorite thing to do was to look at family picture albums in bed. She organized all family photos into palm-size albums and stacked them next to her pillow for easy access. Even though her condition continually worsened, her life went on with every attempt to live as joyfully as possible.

Grandma's sculptures were mainly built from my memory of her and some modeling from her old photos taken years apart. These five sculptures were titled, *Grandma's Memory* (GM#1), *Grandma's Game Station* (GM#2), *Grandma's Joy with Chinese Court Drama* (GM#3), *Grandma's Joy with Food* (GM#4) and *Grandma's Joy with Her Favorite TV Shows* (GM#5). Together, these sculptures narrate Grandma's self-entertaining abilites exhibited during her twenty years of graceful aging.

On every sculpture I captured Grandma's cheerful smiles and physical traits such as double eye lids, big nose, high cheekbones and missing upper teeth, she disliked wearing her dentures). Each sculpture resembles my Grandma to some extent but in different degrees. Regrettably, the sculptures do not look recognizable as the same individual. They look like five different elder ladies instead.

It was quite a disappointing experience from *Three No Evils* of different individuals' group-displayed sculptures being built with the conventional process without any intervention. The set of Grandma's sculptures presented new challenges in creating a cohesive individual over multiple sculptures. The first challenge was that I no longer had the freedom to sculpt arbitrarily because the narrative dictates that the sculptures resemble my Grandma, but her presence for me to model for sculpting was no longer possible. Further challenges were to make the sculptures look like the same person. I was able to achieve the one-to-one resemblance between Grandma and each of her sculptures by keeping her physical traits intact while manipulating her expressions and age-appropriated appearances. Yet, even when repeating this strategy on every sculpture, I still lost the resemblance among them when their gestures and countenances changed to reflect various sentiments and different emotions. Why didn't the sculptures look recognizable as the same person despite all physical traits remaining intact on each sculpture? What else besides physical traits must I include to warrant the same-person-recognizance? I felt I owed Grandma the answers to these questions, and started to analyze the requirements and seek possible countermeasures described as Chapter 3.

Chapter 3

Requirements and Countermeasures

This chapter begins with a review of my existing ceramic figurative sculpting processes for solo-displayed sculptures. It then examines the operation in light of the new requirements associated with the group-displayed facial features in three aspects: emotive expressions (e.g. smile, frown, cry, etc.), age-appropriate appearances (e.g. teenage, middle-age, elderly, etc.) and personal physical traits (e. g. big eyes, flat nose, high cheekbone, etc.). The goal is to develop countermeasures to address these new requirements in order to keep facial recognition between the associated sculptures..

3.1 Existing Sculpting Process Based on Muscle Anatomy

For the past decade, I sculpted ceramic faces coherent to the facial anatomy as per the conventional clay sculpting methodology that I learned in my previous sculpting classes. The ceramic facial sculpting starts from the muscle formed beneath the skin and built outward to the skin surface. I was taught to begin by building a flat face foundation in clay with only a facial contour – without eyes, nose, lips, etc. I then gradually added clay, little by little, mimicking real facial muscles, and manipulating the clay into the forehead, cheeks, jaws, chin, eye brows, eye lids, eye bags, nose, philtrum, lips, and so forth. It is a repetitive process of additive and subtractive manipulation of clay, modeling from a 3D real human face, a 2D photographic image, or in many cases, a fictional character created by my imagination.

The technique to sculpt emotive facial expressions, such as frowning eyebrows, a winking eye, kissing lips, etc., is a clay manipulation reflecting the corresponding

muscle anatomy. Likewise, sculpting age-appropriate appearances (young or old) also follows the muscle-anatomical manipulation. To make a clay face look old, I use to add nasolabial folds (nose side), tear troughs (below eyes), marionette lines (around the mouth), and wrinkles at the forehead, around eyes and lips, etc. Regarding personal traits, manipulation relies heavily on modeling. I repeatedly compare my clay figure against its model and fine-tune it repetitively until it looks like the model.

Therefore, precisely speaking, I have sculpted clay faces reflecting the underlying muscle anatomy, which is only a top layer of the facial anatomy. Bone anatomy, the deeper layer of the facial anatomy, never occurred to me in my consideration during my sculpting process. In my experience, sculpting with sole muscle anatomy remains sufficient and effective to produce all facial features needed for my narrative sculptures, as long as it is one sculpture for one narration, or multiple sculptures as long they do not represent the same individual.

3.2 Requirements of Group-displayed Sculptures of Same Individual

New challenges surfaced when I transitioned my ceramic sculpting projects from solo-displayed to group-displayed formats, where every sculpture within a set is mutually relatable in the same narration of the set. When multiple sculptures present the same individual in a narrative, facial features become comparative among each other within the same group-displayed set. Encouragingly, such relative characteristics offer a way of narrating the passage of time and changes in emotion within a set of sculptures.

Handling Age Appropriate Appearances

The narration of the passage of time in the sculpture a, *Tale of Growing Old,* for example, can be presented by age-appearances sculpted in varying iterations of getting older across multiple sculptures. As opposed to solo-displayed sculptures which show only one snap-shot giving an age-appearance, group-displayed sculptures illustrate multiple snap-shots presenting changing age-appearances to show the age-progression of a specific person. Regrettably, the granularity of being old cannot be expressed simply by surface manipulations such as wrinkles, nasolabial folds, tear troughs, marionette, etc. because these facial features cannot be made scalable or comparative. That is, three wrinkle lines does not necessarily mean "older" than two wrinkle lines. How can one depict a person's appearances so that age 30 looks older than age 15 while neither have any wrinkle lines? Muscle-anatomical sculpting can present impressions of looking old or young, but not looking older or younger between two sculptures showing the same individual at two different ages.

Sculpting multiple ceramic sculptures in age-progression is a distinct challenge. Yet, sculpting all of them to be recognized at a particular age is also challenging, as it involves the narration of one person's multiple life events occurring in a short interval requiring unchanged age-appearances but various emotive expressions. For example, to narrate the sculptures *Laughs and Cries of My Freshman Year*, varying emotive

expressions (laughs and cries) are sculpted corresponding to different events that occurred in my first year of college. All face-appearances of this set must be recognized as not only "me" but must be explicitly – the me of age 18, not age 8, not age 2, otherwise the set does not tell my story of my freshman year.

The requirements to present age-appropriate-appearances in a group-displayed set are two-fold. For a narration lasting a short interval (not long enough to notice changes of face traits), it presents sculptures a lookalike appearance; for an extended interval (face traits changed), a resembled appearance is sufficient. In either case, it requires a way of scalability to be able adjust the granularity of age-appearances to satisfy the comparative attribute. In other words, group-displayed sculptures are age-granularity-sensitive due to their comparative aspect when dealing with a narration of an individual over a long interval (long enough to notice changes of face traits). Yet, how long does it take to notice changes of face traits? My research found that the younger the age the shorter interval to notice the changes. This character will be explained in facial bone growth anatomy described in Chapter 4.

Handling Personal Traits

One of the most important requirements for the group-displayed sculptures is that every sculpture presenting an individual must be recognized as that individual despite numerous alterations to create variance in emotive expressions and age appearances. Otherwise, the narration will lose its continuity because of its unrecognizable protagonist and/or antagonist. The personal traits of the individual must remain recognizable, but

not identical, across the set despite being altered by varying emotive expressions or age-appearances.

The essential personal physical traits include not only the size (length & width) and shape of eyes, nose and lips, but also the pairwise distances of eye-to-eye, eyes-to-nose-tip, eyes-to-mouth, etc. However, these traits change on a person as his/her age advances. Further, they are unavoidably altered due to clay manipulation for varying facial expression. A minimal percentage of these essential traits must remain unchanged to preserve some essential parts of facial recognition. For example, while a wide-opened mouth (for laughing) changes the shape and size of the lips, the facial recognition relies on the unchanged eyes and noses and some pairwise distances.

What governs the changes due to age-appearances as time progresses is a topic of this thesis research documented in Chapter 4. The later chapter covers my study in facial bone anatomy regarding how facial features are shaped by facial bone growth and aging.

Handling Emotive Expressions

Group-displayed sculptures of an individual can successfully present not only a person's emotion but also the changes from one emotion to another. Emotional displays are achieved by sculpting varying expressions across the set to show the differences. The designs of expressions reflect the plots of the narration as an existing requirement for all facial sculptures. The new condition for group-displayed expressions is to protect facial recognition across the set. By retaining a ratio of essential facial characteristics, facial

recognition is achieved in each illustration. In a way, this requirement controls the unwanted alterations so they do not distort the facial recognition.

3.3 Countermeasures for Group-displayed Sculptures

Group-displayed sculpting has facial features of all emotive expressions, age progression and personal traits intertwined together in a complex manner, which dramatically increases the chance of involuntary alterations to each sculpture, which may, in turn, jeopardize the facial recognition across the set. A realistic mold is built to include maximal facial features as specific as possible so that the face foundations produced by such mold will require minimal manipulation and thus minimize the unwanted alterations.

The research outcome, as described in Chapter 4, concludes that age-appearances and personal-traits are altered corresponding to the growth and the aging of facial bones. As a result, my existing sculpting process which is based on facial muscle anatomy, now needs to incorporate facial bone anatomy. Integrating bone anatomy with muscle anatomy in my sculpting is a new idea that will require prototyping to prove the concept. One possibility is to embed the age-appropriate bone-anatomy into the face foundation. I therefore designed a special skull mold with bone suture markups for this purpose. Each skull-like foundation produced from this mold can be further tailored to include an age-appropriate bone structure by cutting and expanding on a particular suture line

accordingly. This way the clay manipulation on top of the foundation with the embedded age-appropriate bone structures can proceed based on muscle anatomy as the existing sculpting process virtually free of additional work to integrate the bone anatomy.

In conclusion, two different kinds of molds were built to support the thesis project. When the narration intends to shows a passage of time, a skull-like hump mold with bone suture-markups was used to cast multiple face foundations that guide the sculpting of facial features showing the age-progression. Otherwise, when the narration is not involved with a time progression, a realistic facial two-part pressed mold was used to produce foundations that minimize manipulation and unwanted alterations for the sake of preserving the facial recognition across a set. Chapter 5 documents my enhanced ceramic sculpting process which describes these two kinds of molds including the prototyping and its results. The actual implementation of these molds to build group-displayed sculptures for my thesis project is documented in Chapter 6.

Chapter 4

Age-Progressive Appearances Cohere to Bone Anatomy

4.1 Inspiration from the "*Age-Progression Simulation*" Project Findings

My investigation of age-progressing appearances starts from discovering "Age-Progression Simulation[5]," a research project of the University of Washington (UW). One of its most notable outcomes excerpted from the University News Online[6] is shown as follows:

Fig. 6. Simulated age-appearances of lifetime by of UW Age-Progression Simulation

The age-progressing images above are not photographed from a real person, but rather, a set of simulated outputs produced by a computer software taking a photo of a three-year-old boy, the first image on the left, as the single input. The remaining photos are simulated images showing how the child's facial appearance will change age through a lifetime.

The image processing software was developed by the UW research team. Professor Ira Kemelmacher-Shlizerman from the team explained that the first step of their strategy is to take photos of children in "completely unrestrained conditions" and as

5 Michelle Ma, "Automated age-progression software lets you see how a child will age," UW News, 19 April 2014. https://www.washington.edu/news/2014/04/09/see-what-a-child-will-look-like-using-automated-age-progression software/.

6 Ma, "Automated age-progression software lets you see how a child will age."

many as possible, followed by a numerical analysis technique to leverage the average of thousands of faces of the same age and gender, then calculate the visual changes between groups (per age and gender) as they age, then finally apply those average changes, in a form of numerical calculations, also termed "image processing algorithms", to a new person's face to simulate the new person's age progressing images[7]. Every image includes all facial components such as eyes, nose, lips, forehead, chin, cheeks, the face's contour, and even the skin fixtures of birthmarks, wrinkles etc. The age and gender specific simulating calculations are the growth patterns covering all elements of a facial appearance including not only the shape and size of every facial component but also their "displacements" corresponding to the age-progression facial changes. The simulating calculations are programed into the software which could then apply to any new child's photo to predict his/her future appearances for any subsequent age up to 85, as the limit set by the software[8].

Below are more simulated images that the software produced in two separated groups of females and males – the images of younger-looking are input, next to them are the simulated outputs in older looking[9]:

7 Ma, "Automated age-progression software lets you see how a child will age."
8 Ibid.
9 Ibid.

Females

Fig. 7. Simulated age-appearances of females by UW Age-Progression Simulation

Males

Fig. 8. Simulated age-appearances of males by UW Age-Progression Simulation

The researchers validated their simulated outputs by comparing them with images of the real person photographed at the corresponding age. The results are convincing as shown below as I can hardly tell which are actual people and which are, simulated.

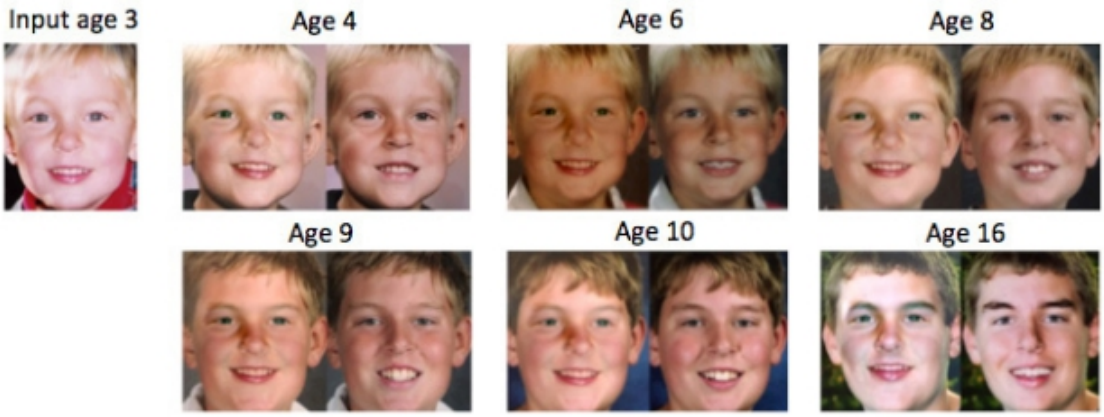


Fig. 9. Validation by comparing simulated images against actual persons' photographs

In another validation exercise, the researchers further tested their simulated images against those of 82 actual people photographed over multiple years. They then asked random viewers to identify the true aged photo against the simulated for each example, and viewers picked the simulated photos about as often as the real-life ones.

The project's simulated images as well as the validation results are indeed impressive to me. But the most interesting to my sculpting perspective is not the simulating software but the findings from their analysis of the collected growth patterns as summarized below:

1. The Face grows vertically as the age progresses.
2. The nose continues to grow longer as the face stretches vertically.
3. The nose continues to grow virtually until death, while eyes, mouth, and others stop growing at much earlier ages.
4. The younger the age, the more rapid the growth rate.
5. The growth patterns vary between genders and between ages. I later found from another research that "races" is another factor of growth patterns [10].

These are additional findings drawn statistically by a numerical analysis from the data of average growth without an attempt to explain the rationale behind the data. Nevertheless, it is not the project goal to tell why faces grow vertically and how noses can keep growing until death, etc. The purpose of the project is to develop a mechanism capable of producing images of projected age-appearances associated with a given younger image. This function aims to generate photos applicable to people-search programs such as FBI posters for Missing-Children and Most-Wanted fugitives. Surprisingly, this function aligns with a need in my narrative sculpting process, which, often requires the ability to sculpt fictional characters for narrating stories. When a story

10 Stephen Richmond et al., "*Facial Genetics: A Brief Overview,*" 2019.

or narration covers a long duration such as lifetime, I cannot sculpt by modeling a real person for decades since I do not have access to the images of the person at each stage. My imagination hits its limit to form age-appropriated appearances corresponding to a person's every life-stage. Now, I realize that a methodical simulation is more concrete than my own unconfined imagination in the absence of real modeling.

The UW research findings above are a wake-up call to me that my existing sculpting process based on muscle anatomy does not adequately reflect facial growth in a time-progressing fashion. The interdisciplinary implication from this research ignites my curiosity to find out the rationale behind the facial growth and aging, particularly, about the role of facial bone anatomy in age-progressive appearances.

4.2 Facial Bone Anatomy

The leading research of this thesis starts with the following hypothesis: Age progressive facial features on ceramic sculptures are built to accurately reflect both the muscle anatomy beneath the face surface and the bone anatomy respective to bone growth and aging beneath the muscle.

My study of human skull bones and facial bones focuses on the bone growth and aging relevant to altering facial appearances.

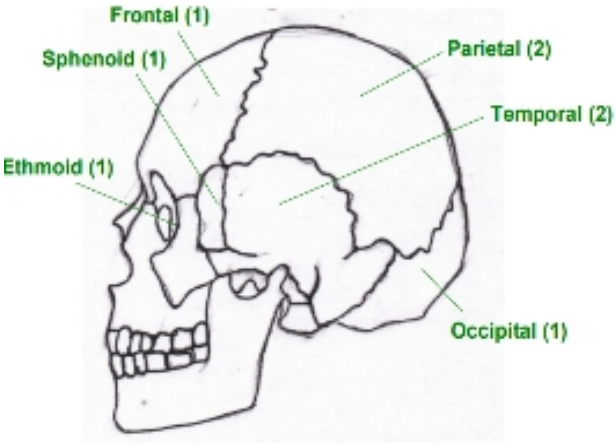


Fig. 10. Eight Cranial Bones

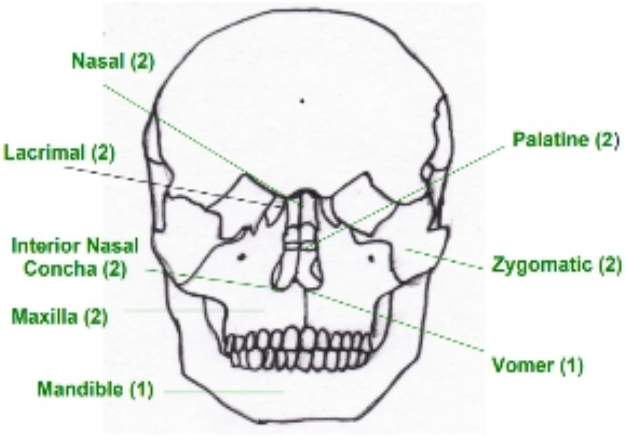


Fig. 11. Fourteen Facial Bones

The human skull is comprised of 8 cranial bones and 14 facial bones[11]. The cranial bones are connected by five cranial sutures – *metopic suture, coronal suture, sagittal suture, squamosal suture and lamdoid suture*. Sutures are bone tissues where bone growth occurs. Generally, the most rapid growth of a skull occurs during the first

11 "Bones of the Skull – Structures – Fractures – Teachmeanatomy," Teachmeanatomy Info, 2019, https://teachmeanatomy.info/head/osteology/skull/.

two years after birth[12]. A two-year-old toddler's skull doubles in size following birth. After two years, the skull continues to grow but the growth rate slows down. It reaches 90% development at age 5, and full development size for males at age 16 and for females at age 20.[13]

Facial bones, on the other hand, are connected by additional sutures running across the face in different directions. These sutures continue to expand slowly at different rates and different times and last different durations. Some stop at certain age-stages, but others continue growing until death. As these facial sutures expand, the adjacent facial bones grow to the same direction of the expansion. The bone growth, in turn, alters the nearby facial components (eyes, nose, cheek, etc.) not only the shapes and sizes but also the displacements. In other words, the growth of facial sutures is the crucial factor to transfigure age-appearances. To understand the changes of facial appearances as the age progresses, it is essential to first understand the role of every facial suture regarding its expansion patterns attributed by its position on the face, its expansion rates and active duration.

The diagram below shows the position of facial sutures and the bones they are connecting, as well as the adjacent facial components that may be displaced when a suture expands. Subsequent reading of this document may require a look-up on this

12 "Development of Skull," Development of Human Skeletal System, 2019, https://skeletalsystemdev.weebly.com/deveopment-of-skull.html.
13 "Development of Skull".

diagram to locate specific sutures which expansion cause displacements of certain facial components

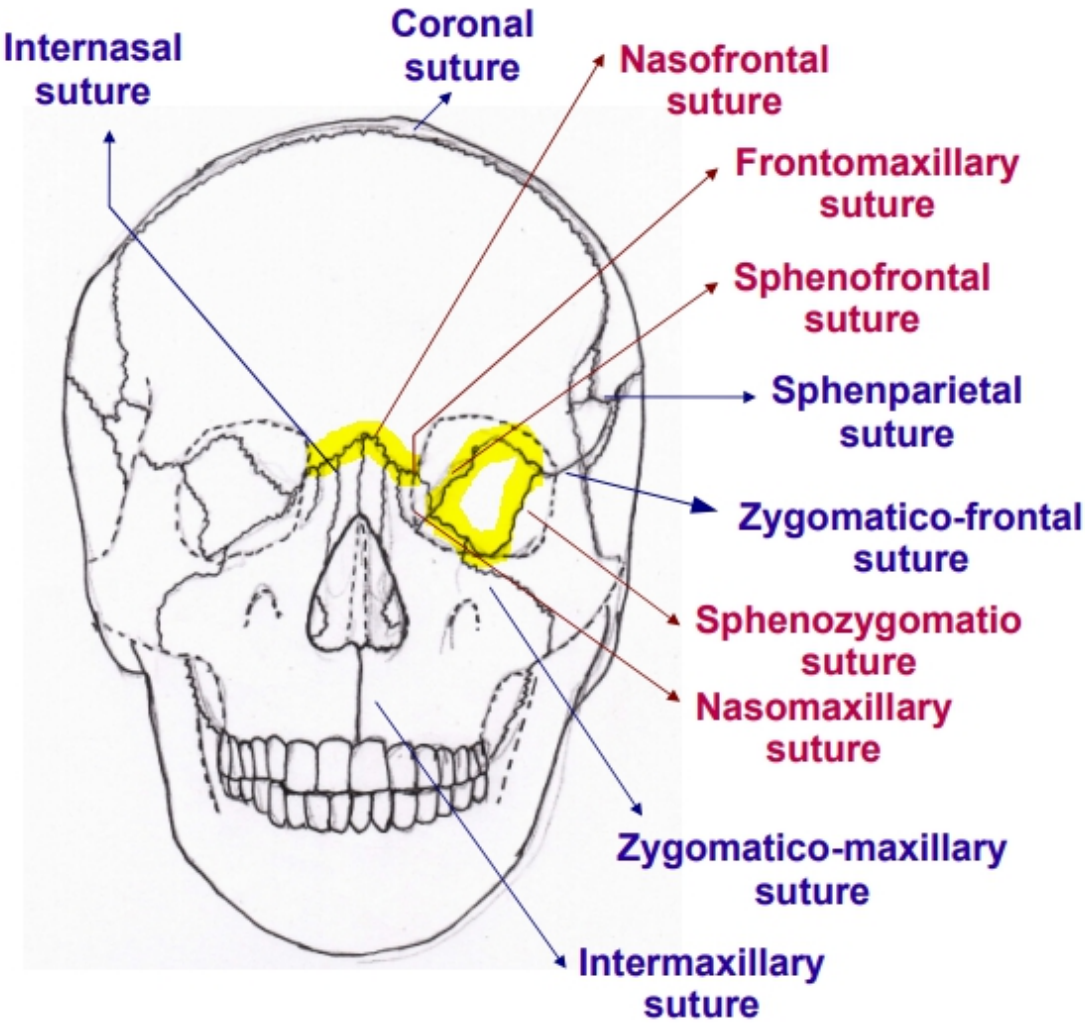


Fig. 12. Position of Facial Sutures

The position of sutures determines which facial component(s) will be changed or displaced accordingly. Accordingly, a long nose is the byproduct of the expansion of the *nasofrontal sutures* (also called *frontalnaso*– marked yellow on the diagram on the right) continuously throughout one's life time. As shown on the diagram, the two short contiguous *nasofrontal* sutures, one on the right and one on the left of the center line, lay horizontally below the *frontal bone* (forehead) and above the *nasal bones* (nose bones). When the *nasofrontal* sutures expand wider (vertically), the nasal bone grows longer vertically. Thus, faces stretch vertically as the age advances. The nasofrontal sutures are one of those growths with the longest life expectancy among all sutures, virtually until death. Thus, the older the age, the longer the nose, the longer the face.

How the eyes age depends on how the bones grow in the *eye sockets* (also called *bony orbits*). This occurs at the sutures joining the three bones of the orbital rim – the *maxilla* (jaw-bone), *zygomatic* (cheek-bone) and *frontal (forehead).* The bones are connected by *sphenofrontal* suture, *zygomatico-frontal* suture and *sphenozygomatic* suture**.** These short curvy sutures lay on the inner wall of an eye socket – some parts horizontal other parts curving up (or down) to vertical. As these sutures expand wider, they push the eye sockets outward respectively – more downward than sideways. The sockets become larger, more in depth, and transfigured from a round shape to a vertical oval. The eye balls remain same size and will sink deeper into the of the eye sockets amid aging. This explains why the elderly have eyes that appear deeper and smaller under the eye-lids.

4.3 Age-appearances Corresponding to Bone Growth and Aging

The growth of skull bones and facial bones is a reflection of the corresponding suture expansion. All sutures, cranial or facial, expand differentially, meaning, they expand at different times to a different amount at different rates[14]. Yet, this differential fashion is not random. The growth still follows age-related patterns resulting in age-wide facial appearances accordingly as summarized[15] in the table below:

Bone Growth (causes)	Facial Appearances (effects)
Childhood	
• The neurocranium grows earlier, faster and to a much greater extent than facial complex. (cranial sutures expand faster and more significant than facial sutures') • Cranial cavity completes 90% of its growth by the age of 5.	• Broad tall forehead and small face. • High intellectual-like forehead, upright and bulbous, without coarse eyebrow ridges. • Prominent cheekbones • Large and wide-set eyes • Flat face, vertically short • Short nose, low and little concave nasal bridge, nasal floor lies close to the inferior orbital rim Note: • Lips' length increase most rapidly during ages 1-3, lower lip more quickly than upper lip, female lips more quickly than male lips. Lip growth does not result from bone growth, but from soft tissue growth (muscle) instead.
Adolescence	

14 W. R. Proffit, H. W. Fields, and D. M. Sarver, "Contemporary Orthodontics", Mosby, 5th edition, 2013.
15 "Age Changes of Jaw and Soft Tissue Profile". https://www.hindawi.com/journals/tswj/2014/301501/

Bone Growth (causes)	Facial Appearances (effects)
• Starting earlier teenage years, the growth of the mandible exceeds that of the maxilla resulting in straightening of the profile and retroclination of the lower incisors. • Overall mandibular growth is twice that of overall maxillary growth. • Females during late adolescence show significant maxillary and mandibular facial growth comparing with males.	• The face is less flat, becomes a little convex. • Small jaw length increases, chin less retruded position • Longer nose, nasal floor lies further away from the orbital rim, the shape of the nasal bridge changes from concave to convex.
Adulthood	
• Increase in anterior face height most rapidly during ages 30-35. • Males have posterior facial height increases as much as the anterior face height. • Females posterior facial heights do not increase significantly • Cranial suture expansions stop, facial sutures continue but slow down except nasofrontal across nose bridge.	• Longer face • Longer nose • all face components reach full development except the nose continues to grow downward. • Facial changes during this state are on skin/muscle level including changes in nose shape and lips shape.
Aging	
• Facial bones lose volume • Angle of lower jaw bone drops • Angle of brow reduced • Nasal bones continue to grow while most others stop growing • Eye sockets grow broader and deeper into a vertical oval	• A long nose often out of proportion to other facials components • Deepen eyes, smaller eyes • Concave mouth • Aging skin condition – e.g.,wrinkles, etc.

This information explains the vital role of bone anatomy in presenting age-progressive facial features in sculptures. Not only that it shows the one-to-one correspondence between bone growth and the aftereffects on facial appearances, it also shows the age-appropriate order. That is, which parts of bones grows in which life stage, and which parts of the face changes correspondingly. This table also points out many of the mistakes I made in my sculpting in the past because I did not consider such life-stage-oriented changes. However, those mistakes went unnoticed when I sculpted solo-displayed sculptures for different individuals because the changes could be viewed as personal traits rather than growth traits. For example, a long nose could be a genetic trait or a growth trait; a pair of deep eyes could be a personal trait instead of an aging sign. Nevertheless, for group-displayed sculptures of the same person, the changes of facial appearances in proper age-appropriated ordering is essential for the sake of their age-progression presentation.

One way to incorporate bone anatomy into my existing sculpting process is to encapsulate the bone growth anatomy into the face foundation, so that my existing muscle-anatomical manipulation on such foundation will automatically incorporate the bone anatomy. This modified process can be achieved by building a skull mold that produces skull-like face foundations tailorable to cohere proper bone growth structures. Chapter 5 documents the details of the prototyping and the enhanced sculpting process via the skull mold.

Chapter 5

The Enhanced Process of Narrative Sculpting in Ceramics

This chapter documents the enhanced process of ceramic sculpting incorporating facial muscle anatomy and facial bone anatomy into the existing conventional sculpting process, also specifying how, when and where to include the bone anatomy structure.

5.1 How to Integrate Bone Anatomy and Muscle Anatomy in Ceramic Sculpting

The existing sculpting process starts with building a flat face consisting of the desired contours but without any facial components (eyes, nose, etc.), followed by a manipulation to form facial components and expressions all based on facial muscle anatomy. The manipulation continues by repetitive modeling and fine-tuning until it looks like the model. This process is suitable to build sculptures presenting different individuals. Each of them allows a distinctive face contour, regardless of whether they are solo-displayed or group-displayed as a set.

The enhanced sculpting process, on the other hand, builds a facial mold instead of a flat face contour. The face mold includes hidden features that will guide the manipulation later on. The face mold could be used to replicate multiple face foundations each with the embedded guidance, so that, the manipulation further constructs the sculptures accordingly to minimize involuntary alterations which could disrupt the facial recognitional traits. The face mold is individual-specific. This enhanced process is suitable to build sculptures presenting the same individual being displayed together to narrate a story. Hidden features to be embedded on a face mold for that individual depends on the contents of the narration. Because the thesis projects aim

to narrate a passage of time and changes in emotions on facial sculptures**,** two kinds of face molds are built and used respective to the length of the duration covered by the narration. If the duration covers one life-stage without significant changes of the facial bone anatomy, a facial pressed mold is built to include realistic facial components (eyes, nose, etc.) so that the manipulation will mainly add emotive expressions. Otherwise, if the duration covers multiple life-stages with significant bone growth or aging[16], a skull mold is built without facial components but with bone suture-markups instead. Not all facial sutures are included. Only symbolic two sutures mimicking *nasofrontal Suture* and f*rontal maxillary suture* are added to guide the expansion of the nose length and the depth of eye sockets, respectively. The face foundations replicated from such skull molds could be tailored incrementally to reflect age-progressive bone anatomy guided by the suture-markups. The manipulation on the tailored face foundations will add facial-components then emotive expressions. This enhanced process lightens the dependency of modeling, yet enables sculpting progressive (or retrogressive) age-appearances even with the absence of a real model. After all, waiting for an individual to age to sculpt his/her appearance in subsequent life-stages is an impractical process.

Encapsulating facial bone anatomy in the face foundation is considered a pre-sculpting subordinated procedure to allow muscle-base manipulation to continue using the same existing techniques. This way the two layers of facial anatomy are incorporated to mimic real facial bones and muscles sequentially and cohesively.

16 The impact of bone growth on age-appearances for each life stage is discussed in Chapter 4.

5.2 When to Apply the Enhanced Sculpting Process

In summary, the existing sculpting process is suitable to build one solo-displayed facial sculpture presenting any individual, or group-displayed sculptures showing different individuals. The enhanced sculpting process, on the other hand, is appropriate to construct group-displayed sculptures showing the same individual for a narration in the same life-stage or across multiple life-stages (childhood, teenage, adulthood, aging). That is, a realistic face mold is used to sculpt facial appearances in a single life-stage; otherwise a skull face mold is used to sculpt for multiple life-stages. The following flow charts show the process for every case:

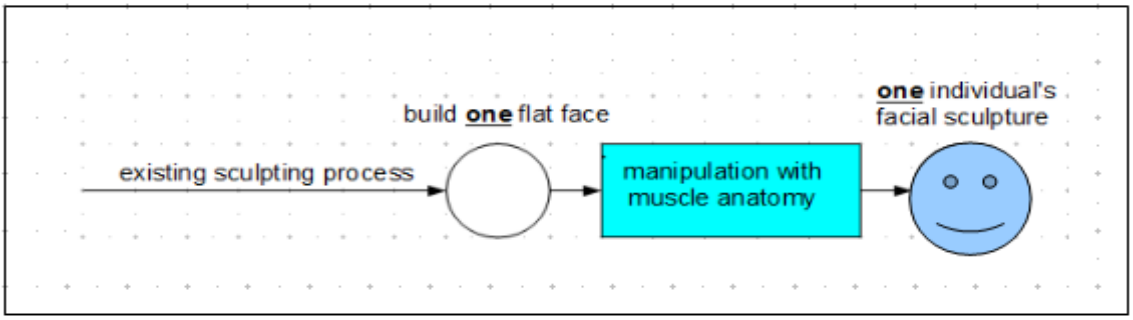


Fig. 13. Existing Process to build one individual's Solo-displayed sculpture

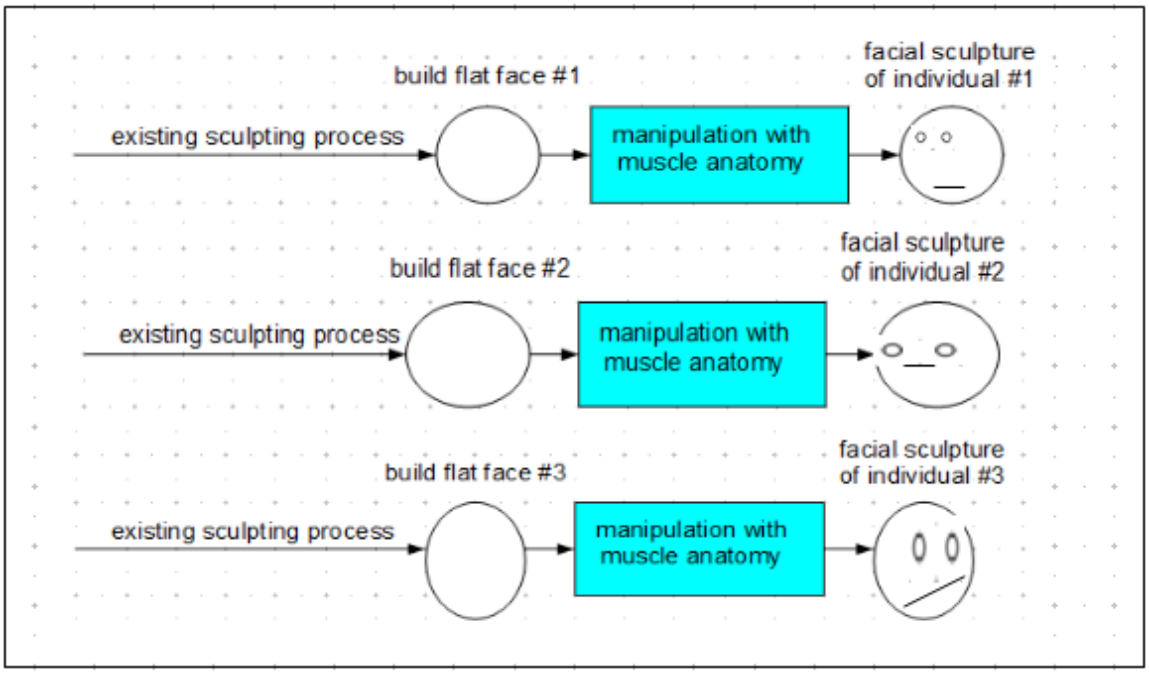


Fig. 14. Existing Process to build (3) different individuals' group-displayed sculptures (apply the existing sculpting process 3 times)

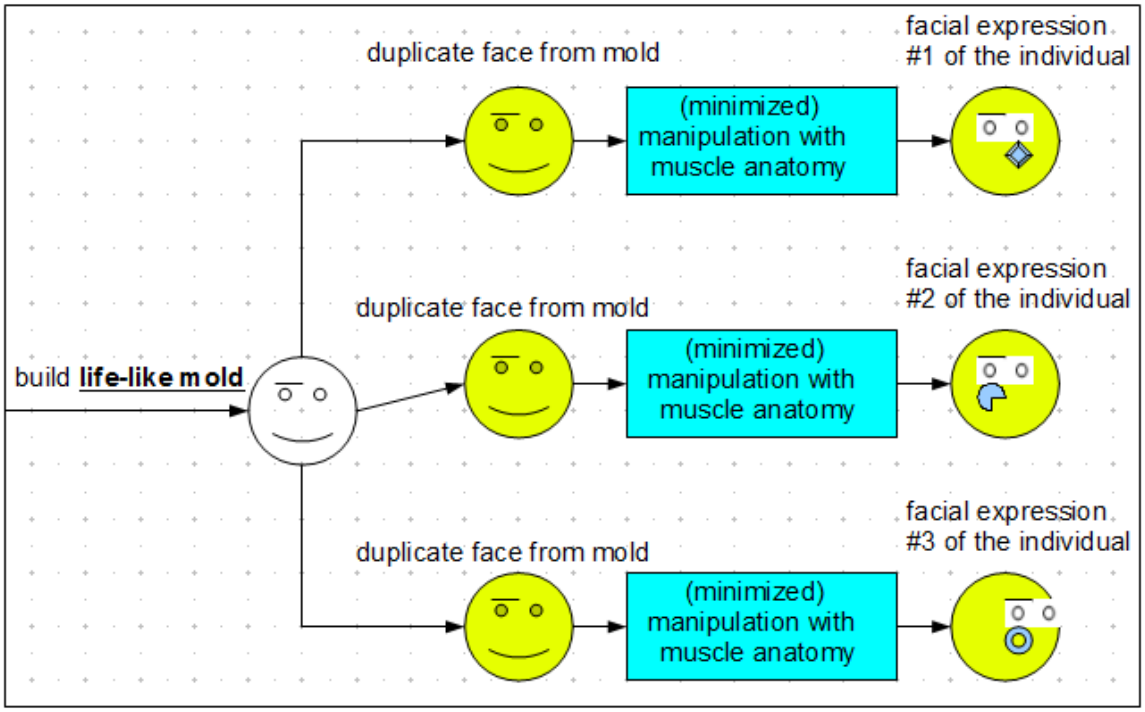


Fig. 15. Enhanced Process to build one individual's group-displayed sculptures without Age-progression (same individual, same life stage)

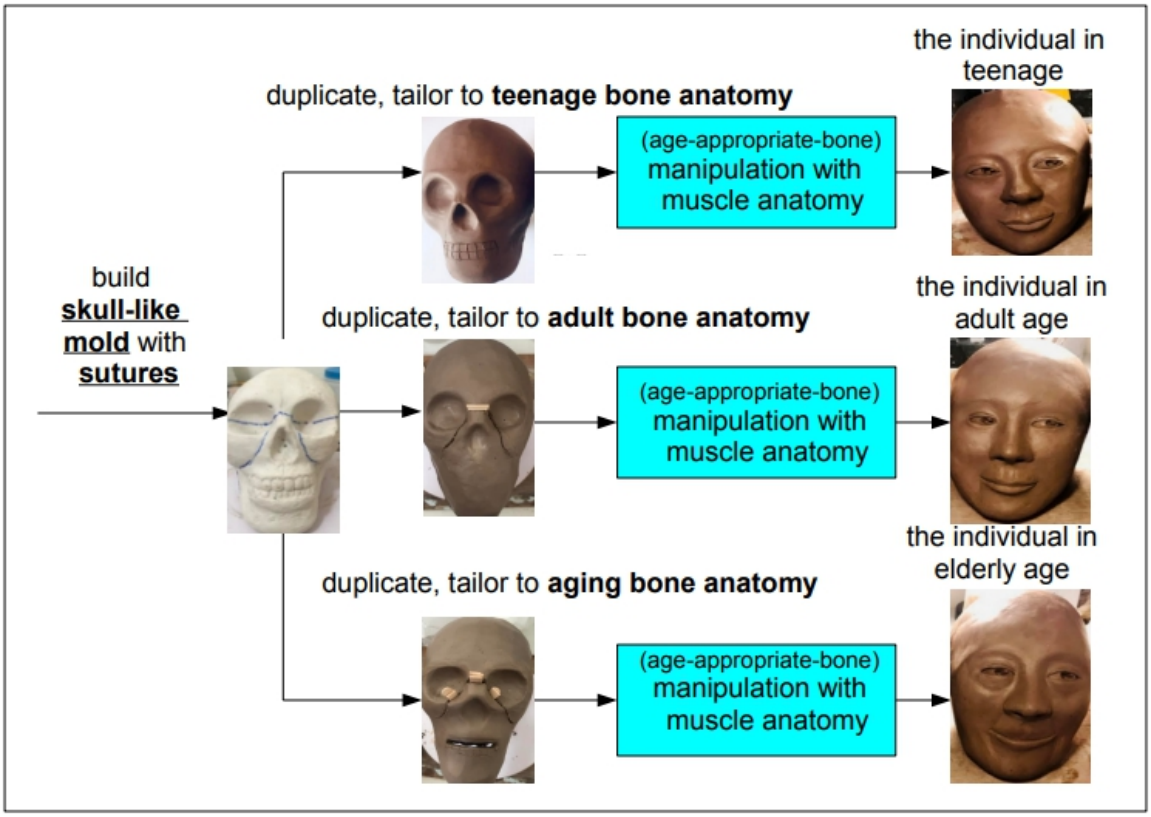


Fig. 16. Enhanced Process to build one individual's group-displayed sculptures with Age-progression (Same Individual, Different Life Stages)

My existing sculpting process supports (one individual's) solo-displayed sculpture and different individuals' group-displayed sculptures without concern of facial recognition across a set. My enhanced narrative sculpting process adds two new mechanisms to the existing process to warrant facial recognition across group-displayed sculptures presenting one individual's age-progressive appearances and/or changing emotional expressions.

5.3 Prototyping of Skull-like Face Mold Application

Phase I – Pre-sculpting Subordinated Procedure:

Step 1:

With the knowledge of bone anatomy, build a skull head mold (in plaster) with suture markups corresponding to age 16 for males, or age 20 for females.

Fig. 17. Prototype of Skull-like Mold with Suture-markups

The skull mold shows the position of eye sockets, nose, top & bottom gums, upper and bottom teeth, forehead, temples, cheeks, chin and jaw, as well as the respective distances among these positions. The suture lines are where bones grow. They are located where one can selectively cut and tailor a face foundation to reflect an age stage according to bone anatomy, before carving out the facial features.

Step 2:

Use the plaster mold to replicate multiple head bases (in clay) as many as need be, one base for one sculpture within a set.

Fig. 18. Face Foundations Replicated from the Skull Mold

Step 3:

Tailor each head base by cutting and expanding at suture line(s) to reflect an older age correspondent to bone anatomy of that age.

Fig. 19. Face Foundations Tailored to Reflect Age-appropriated Bone Anatomy

<u>Tailor face #2 to adult bone anatomy</u> by cutting nasofrontal suture, expand it 2mm to increase the nose length.	
<u>Tailor face #3 to an elderly bone anatomy</u> Cutting nasofrontal suture and expanding 3mm to increase even longer nose length Cutting frontalmaxillary sutures and expanding 2mm to enlarge eye sockets for deepening eyes Removing upper teeth, pressing in the upper gum, pushing up to close the mouth with bottom teeth touching upper gum.	

Fig. 20. Foundation Tailoring by Incremental Expansion of Suture Lines

Phase II – Conventional Sculpting based on muscle anatomy

Sculpt each tailored base to develop facial features (eyes, nose, etc.), then add age-appropriated features and narrative expressions[17].

17 The sculpting techniques follow the old-school conventional sculpting process and have been documented countless times in existing literature at length. Thus they will not be repeated here in the scope of this thesis.

Fig. 21. Result of Age-progression Prototype via the Skull Mold

The result of the prototyping is satisfactory as seen in the outputs shown above. I even further decorated the outputs to make three pieces of wall sculptures with age-appearances as parts of the thesis project, shown below:

Fig. 22. Wall Pieces with Age-progression built upon the prototyping outputs.

Chapter 6

Thesis Project: *Good Will, Ill Will*

All research on facial anatomy and of the enhanced sculpting process were done to help narrate the story of two sisters named Soleil and Luna who were both born with unusual birthmarks. Several sets of ceramic sculptures of the two sisters are built to narrate their contrasting attitudes toward their birth conditions, resulting in different quality of life. Soleil accepts her birth abnormality with good will and cheerfully lives her down-to-earth life to the fullest. Luna denies her birthmark with ill will and ends up living a withdrawn life in resentment.

The conventional sculpting process as well as the enhanced process originated by this thesis are implemented in these thesis sculptures to show the two sisters' lifespan from childhood to teenage to adulthood and elder years, as well as their sentiment changes from the ignorance of birthmarks, to awareness of them, then progressing to contrasting behaviors and quality of life as a result.

There are three sets of group-displayed sculptures presented in this thesis project with different emphasis on each set. The first set emphasizes on “emotive narrations”; the second set on “age-progression”; and the third set on “the passage of both time and sentiments”. There are two goals within this project. The first goal is to narrate the two sisters' story; the second goal is to demonstrate the ceramic narrative sculpting based on muscle-anatomy versus bone-anatomy.

Thesis Project Set I

Group-displayed Sculptures of Emotive Narrations

The first set includes 6 life-size ceramic busts of Soleil and 6 busts of Luna presenting their various emotive expressions amid dreams. Soleil's dreams reflect her good will while Luna's, ill will. Below is a snapshot of the 12 life-size busts of the two sisters group-displayed in a row.

Fig. 23. Group display of 12 ceramic busts showing Emotive Narrations

These 12 ceramic busts are built from a two-part plaster press mold which is built from the sisters' realistic leather-hard clay bust as shown in the pictures below:

Fig. 24. The original realistic clay bust

Fig. 25. The two-part realistic pressed mold

The casts before manipulation look like the following:

Fig. 26. Multiple clay busts cast from the realistic face mold

Each duplication cast from the mold is manipulated individually to narrate a dream. All busts have their eyes shut to mimic a dreaming gesture. Hair and ears are purposely omitted to make room for narrative decorations. All busts have an adult face of the same age-appearance unanimously. That means, there is no presentation of age-progression features in this set. Thus, the narrative manipulation solely follows the conventional sculpting process based on muscle anatomy[18]. For a narrative effect, every bust is decorated with a unique design with elements of symbolism and surrealism relatable to the sisters' ever changing feelings and emotions.

18 See Chapter 3 for more details of discussion about sculpting with muscle anatomy versus bone anatomy.

Some work-in-progress are shown below.

Fig. 27. Clay busts manipulated with Emotive Narration

Below is a closer look at the set of Soleil's dreams reflecting her good will upon the completion:

Fig. 28. Soleil's Narrative Busts amid Dreams

These sculptures narrate Soleil's acceptance of her birthmark through her willingness to love, to participate in activities with peers, to establish her strong self-confidence and to wish the best for all. She does not let her abnormality get in the way of linving a fullfilled life. Below are the individual snap shots of each sculpture showing the corresponding design for emotive narrations.

Fig. 29. *Dream of Nostalgic Singing*[19] by Lillian Ding. 15” x 12” x 6”. Stoneware clay, engobe slip, peach under-glaze, Duncan clear glaze, tinted polycrylic. 2020.

19 Soleil cherishes her fond time singing together with her chorus buddies during her adolescence years and dreams about it often.

Fig. 30. *Caterpillar-Me-Not*[20] by Lillian Ding. 15”x 12” x 6”. Stoneware, engobe slip, under-glaze, Duncan clear glaze, tinted clear polycrylic. 2020.

20 Soleil is happy with her progress in life and impliedly she often dreams about herself an ugly caterpillar grown into a beautiful butterfly.

Fig. 31. *Let Me Love*[21] by Lillian Ding. 15” x 12” x 6”. Stoneware clay, pink under-glaze, blue decal, Duncan clear glaze, tinted polycrylic. 2020.

21 Soleil does not let her birthmark stop her from loving people and doing what she loves to do. The *I-love* quotes written all over this sculpture of hers narrate her love as her principle attitude toward life.

Fig. 32. *Dream of Sunny Play Days*[22] by Lillian Ding. 16” x 12” x 6”. Stoneware clay, sky-blue under-glaze. Drawing via black needle drawing pen, clouds painted with milk paint, seal via clear polycrylic. 2020.

22 Soleil does not let her birthmark void her from outdoor playtime with playmates. This sculpture narrates a dream of her sunny play days – roller-skating and flying kite with friends under a blue sky. Her birthmark above her right eye magically becomes an angel looking down from a cloud with a blessing.

Fig. 33. *Dream of Pride*[23] by Lillian Ding. 13" x 12" x 6". Stoneware clay, black under-glaze. Graffito carved words "*Life is 10% of what happens to you and 90% of how you react to it*." 2020.

23 Soleil reacts positively to her birthmark resulting a life of success that she is proud of.

Fig. 34. *Dream to Wish Best to All*[24] by Lillian Ding. 18” x 12” x 6”. Stoneware clay, bust: Amaco Crackle over-glaze. Cone 6. Incense cup: wood fired cone 10. 2020.

24 Soleil has a kind heart and a great sense of solidarity constantly wishing everyone success and well even in her dreams. She earns a blessing from others in return.

A closer look of the set of Luna's sculptures showing her dreams with ill will is shown as follows:

Fig. 35. Luna's Narrative Busts amid Dreams

As opposed to Soleil's acceptance to her birthmark, Luna fails to compromise to live with her birth defect. She thus is withdrawn and has low self-esteem. She thinks that everyone treats her ill. She isolates herself from others and becomes lonely, pained, horrified, frustrated,and hateful to everyone, so severe that she often feels suffocated amid her nightmares. Each sculpture of this set narrates one of Luna's emotive expressions as shown as follows.

Fig. 36. *Bullied in Dream*[25] by Lillian Ding. 14” x 12” x 6”. Stoneware clay, brown oxide wash. Polished with shoe wax. Wood-fired cup 2020.

25 Luna feels that she is constantly being bullied by others. This sculpture shows she is thrown with a cup of dirt as a symbolic bullying.

Fig. 37. *Lonesome even in Dream* by Lillian Ding[26]. 14” x 12” x 6”. Stoneware clay, blue oxide wash. Small figurine of lonely girl in blue acrylic. Seal with tinted polycrylic. 2020.

26 Luna often dreams that she is sitting alone in the middle of nowhere because she thinks her birthmark differentiates her from others and she tries to stay away from everyone.

Fig. 38. *Painful in Dream*[27] by Lillian Ding. 13” x 12” x 6”. Stoneware clay, Amoco crackle glaze, cone 04. Scorpions in metal glaze Cone 6. 2020.

27 Luna often feels an agony toward her life, so severe that she dreams of pain as if scorpions crawling in and out her body.

Fig. 39. *Horrified in Dream*[28] by Lillian Ding. 12” x 12” x 6”. Stoneware clay, gray under-glaze, drawing via needle-paint pen, seal with clear polycrylic. 2020.

28 Luna often feels scared of her future, so severe that she dreams being horrified in a scary night, a ghost tree branch turns into a giant hand grasping her head, a black tear drops out of her eye, her birthmark turns into a demon haunting her.

Fig. 40. *Hateful in Dream*[29] by Lillian Ding. 12” x 12” x 6”. Stoneware clay, red oxide wash, drawn with needle-paint-pen, seal with tinted polycrylic. 2020.

29 Luna hates everyone and everything but tries to hold it in her mind during daytime. But in her dream, all suppression bursts. She turns red, round evil faces surface to her skin uttering out all her I-hate words to tell the world what and whom she hates sadly including herself and her life.

Fig. 41. *Suffocated in Dream*[30] by Lillian Ding. 12” x 12” x 6”. Stoneware clay, brown oxide wash,. Tied via a burlap rope. 2020.

30 Luna is distress in her life so severe that she dreams being suffocated. She feels like she is being tied by a rope. She sticks out her tongue. She can not breath.

Thesis Project Set II

Group-displayed Sculptures of Age-Progression

Fig. 42. Seven Wall Pieces with Age-progressive Appearances

This set includes 7 wall pieces emphasizing facial features of age progression. Strategically, the narrative sculpting needed to integrate the facial bone anatomy in building the clay face foundations, followed by a reconfiguration of the foundations to age-appropriated bone anatomy, and then a manipulation based on the facial muscle anatomy.

For this purpose, a life-size skull mold with suture markups was built to replicate 6 clay head foundations, each for teenage Soleil, adult Soleil, elderly Soleil, teenage Luna, adult Luna and elderly Luna. This hump mold is a clay sculpture built to mimic a human adult skull anatomical model. Only the selected suture lines from my facial sculpting perspective are included on the mold to serve the purpose of reconfiguring longer nose, deeper eyes and teeth-less mouth reflecting the age-progression features.

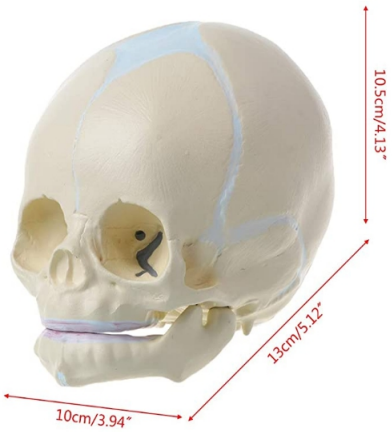
The actual model, the strategic skull mold modeled from it, and the 6 wall pieces built from the mold, are shown below.

Fig. 43. Human Adult Skull Model purchased online

Fig. 44. Skull-like Hump Mold with Key Suture Markups

Fig. 45. Soleil's Age-Progressive Looks

Fig. 46. Luna's Age-Progression Looks



As of the looks of Soleil and Luna in their childhood, because the growth of human skull bone is dramatic during the first two years after birth, the head foundations replicated from the same mold hits its limit for the bone-anatomical reconfiguration. An infant version of skull anatomical skeleton model is used instead to replicate the foundations for childhood Soleil, Luna and their playmates. There is no need to include any suture markup because the reconfiguration is not necessary. The child version skull model is used directly to replicate foundations for childhood Soleil, Luna and their playmates instead of building a child face mold.

A close look of each wall piece upon the completion is shown individually in the pictures below.

Fig. 47. *Childhood Soleil and Luna with Playmates*[31] by Lillian Ding. 13”x12”x5”. Stoneware, underglaze. 2020.

31 Soleil and Luna have a happy childhood. Thanks to their ignorance of the birthmarks.

Fig. 48. *Teenage Soleil*[32] by Lillian Ding. 19”x13”x6”. Stoneware, underglaze. 2020.

32 Teenager Soleil starts to be aware of her birthmark and accepts it. “*So what*?” She says to herself. She decides not to be bothered with it to live her normal life in peace and happiness symbolized by blue birds surrounding her.

Fig. 49. *Adult Soleil*[33] by Lillian Ding. 21”x13”x6”. Stoneware, underglaze. 2020.

33 By adult age, Soleil has achieved many success in life including education, career and marriage. Adult Soleil looks self-confident despite her birthmark is still on her face.

Fig. 50. *Old Soleil*[34] by Lillian Ding. 20”x17”x6”. Stoneware, underglaze. 2020.

34 Soleil is getting old. Her birthmark is still there, but never gets in her way of a productive and rewarding life. She is thankful for all the blessing she receives in life.

Fig. 51. *Teenage Luna*[35] by Lillian Ding. 22”x10”x6”. Stoneware, underglaze. 2020.

35 Teenager Luna is aware of her birthmark and starts to doubt her life. “Why me?” she asks. The haunting faces surrounding her sculpture symbolize the ill wills gradually occupy her mind.

Fig. 52 *Adult Luna*[36] by Lillian Ding. 14”x7”x7”. Stoneware, underglaze. 2020.

36 Adult Luna still lives under the shadow of her birthmark. She isolates herself from others. She drops out of school, no diploma, no jobs, no friends, no marriage,.. she gradually loses her self-esteem. All she has is loneliness and hates.

Fig. 53 . *Old Luna*[37] ***b***y Lillian Ding. 18”x14”x6”. Stoneware, glaze. 2020.

37 Old Luna becomes desperate and resentful. She is horrified of her future.

Thesis Project Set III

Group-displayed Sculptures of Time and Emotion

The set includes 4 groups of sculptures of Soleil and Luna emphasizing a combination of age progression and emotive expressions of each age. The group-displayed presentation of all sculptures is shown below:

Fig. 54. *Soleil and Luna: Passage of Time and Emotion*

The individual groups are shown in the subsequent pages.

Fig. 55. *Childhood Soleil and Luna with Their Mom*[38] by Lillian Ding. 19”x12”x9”. Stoneware, underglaze, glaze. 2020.

38 Happy childhood of Soleil and Luna.

Fig. 56. *Teenage Soleil and Teenage Luna*[39] by Lillian Ding. 14”x10”x6”Stoneware, underglaze, glaze. 2020.

39 Teenage Soleil and Luna are aware of their abnormality, but Soleil continues to look cheerful while Luna starts to feel down.

Fig. 57. *Adult Soleil and Adult Luna*[40] by Lillian Ding. 19”x9”'x11”. Stoneware, underglaze, glaze. 2020.

40 Adult Soleil continues to look happy because she has achieved many success in life. Adult Luna's emotion changes to anxious, frustrated and scared because she thinks her life is hopeless.

Fig. 58. *Old Soleil and Old Luna*[41] by Lillian Ding. 17”x 10”x 9”. Stoneware, underglaze, glaze. 2020.

41 Old Soleil is thankful for her blessed life and she wishes everyone with the same blessing. Old Luna's emotion becomes chaotic as she has lived her life in resentment.

Fig. 59. Soleil's Progression of Age-appearance and Sentiment

Fig. 60. Luna's Progression of Age-appearance and Sentiments

Chapter 7

Thesis Implications and Conclusions

This thesis conducts research and creates a prototype to develop countermeasures in order to tackle the new challenges relating to group-displayed sculptures that narrate a passage of time. Facial recognition across sculptures is the most essential requirement to maintain the continuity of the story that the set is telling. Face molds are used to reinforce a character's facial recognition to a maximum consistency across a set. Two kinds of molds were developed to address the different needs of the thesis project. The realistic slump mold aims to replicate face foundations that require minimum effort to manipulate and thus reduce unwanted alterations. The skull hump mold produces face foundations with built-in reconfigurable bone-anatomical structure corresponding to age-progression. With the implementation of these molds, I can now sculpt facial appearances of, not only young and old but also the "progression" from young to old, as well as, the "changes" in emotion from one emotions to another. Its implication, in turn, enables my sculpting process to narrate stories of multiple plots instead of being limited to one plot. That is, I can sculpt stories of a lifetime versus just a life event. This is a new milestone in my narrative sculpting career.

Bibliography

Barjansky, Catherine. 1964. "*Sculpting Made Easy: The Barjansky Method Of Figure And Portrait Sculpture By Outline*." Garden City, N.Y.: Doubleday.

Basion, Sphenoidal. 2019. "*Functional Anatomy Of Skull.*" *Slideplayer.Com*. https://slideplayer.com/slide/3468030/.

"*Bones Of The Skull - Structure - Fractures – Teachmeanatomy*". 2019. Teachmeanatomy.Info. https://teachmeanatomy.info/head/osteology/skull/.

"*Development Of Skull*". 2019. Development of Human Skeletal System. https://skeletalsystemdev.weebly.com/development-of-skull.html.

Ekman, Paul and Wallace W. Friesen. 2003. "*Unmasking The Face: A guide to recognizing emotions from facial clues.*" Cambridge, MA: Malor Books.

Faigin, Gary. 2013. "*The Artist's Complete Guide To Facial Expression*." New York: Watson-Guptill.

Farkas LG, et al. 2019. "*Growth Patterns Of The Face: A Morphometric Study.*" Ncbi.Nlm.Nih.Gov. https://www.ncbi.nlm.nih.gov/pubmed/1643058.

Garcia, Edith. 2012. "*Ceramics And The Human Figure*." London: A & C Black Publishers Limited.

Goldfinger, Eliot. 1991. "*Human Anatomy For Artists: The Elements Of Form*." New York: Oxford University Press.

Leach, Bernard. 1975. "*The Potter's Challenge*." New York: Dutton.

Ma, Michelle. 2019. "*Automated Age-Progression Software Lets You See How A Child Will Age*". UW News. https://www.washington.edu/news/2014/04/09/see-what-a-child-will-look-like-using-automated-age-progression-software/.

"*Making Your Own Gelatin/Glycerin Plate*". 2019. Sharon Giles Art. http://sharongiles.artdfw.com/making-your-own-gelatinglycerin-plate/.

Medlej, Joumana. 2019. "*Human Anatomy Fundamentals: Mastering Facial Expressions.*" Design & Illustration Envato Tuts. https://www.design.tutsplus.com/tutorials/human-anatomy-fundamentals-mastering-facial-expressions--cms-21140.

Richmond, Stephen, Laurence J. Howe, Sarah Lewis, Evie Stergiakouli, and Alexei Zhurov. 2019. "*Facial Genetics: A Brief Overview.*"

Sharma, Padmaja, Ankit Arouse, and Ashima Valiathan. 2019. "*Age Changes Of Jaws And Soft Tissue Profile.*"

Staff, Live. 2019. "*Our Face Bones Change Shape As We Age.*" Live Science. https://www.livescience.com/35332-face-bones-aging-110104.html.

Zarins, Uldis, and Sandis Kondrats. 2018. "*Anatomy For Sculptors*." Tacoma, WA: Exonicus, LLC.

"*How Does Facial Recognition Work?*". 2019. Us.Norton.Com. https://us.norton.com/internetsecurity-iot-how-facial-recognition-software-works.html.

"*Human Male And Female Skulls: African, Asian, And European - Bone Clones, Inc. - Osteological Reproductions*". 2019. Boneclones.Com. https://boneclones.com/product/human-male-and-female-skulls-african-asian-and-european-COMP-120-SET.

Smith, Brad (Microsoft President). "Facial Recognition: It's Time for Action". 2018. https://blogs.microsoft.com/on-the-issues/2018/12/06/facial-recognition-its-time-for-action/