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CASE REPORT

Perceptions and Reflections of a Professional Pianist: A Case Report on Learning Human Anatomy through Cadaveric Dissection

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Abstract

Anatomical knowledge of the human body is a prerequisite for effortless and expressive movement for musicians. A 35-year-old professional pianist, with no prior experience in the medical field, voluntarily completed a cadaveric dissection module of the upper extremity and spine. The pianist was able to explore the intricate connections between human anatomy and the performance of piano music, gaining knowledge to enhance music quality and to manage and prevent injuries. This case describes the pianist's perceptions and reflections and highlights the potential value of anatomical education for individuals in non-medical fields. This is, to our knowledge, the first documented case of a musician learning anatomy through cadaveric dissection.

Key Words: *Cadaveric dissection; Anatomy education; Professional pianist; Case report*

Introduction

Anatomy is the science that studies the structure of the body and the relationships of each part to each other. Autopsy is one learning method. Identification of the different parts of the body can help in understanding their functioning and avoiding errors in performing this function [1,2]. Most musicians, at some point in their careers, will experience musculoskeletal pain and dysfunction [3]. Pain and dysfunction from playing-related musculoskeletal disorders (PRMD) can reduce the enjoyment from playing an instrument and may even decrease career longevity. This was the case for a professional pianist (Figure 1) who had noticed pain in his right forearm when practicing piano technique exercises. This pain led the pianist to consult a licensed Andover Educator, a specialist in the anatomy and movement of musicians. The Andover Educator posed the question, "Where do your fingers begin?" The pianist answered, "phalanx", and the Andover Educator corrected the pianist, "Your fingers begin at the metacarpal bones near the wrist." This inspired the pianist to learn more about anatomy (Figure 2).

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Figure 1) *Professional pianist performing.*

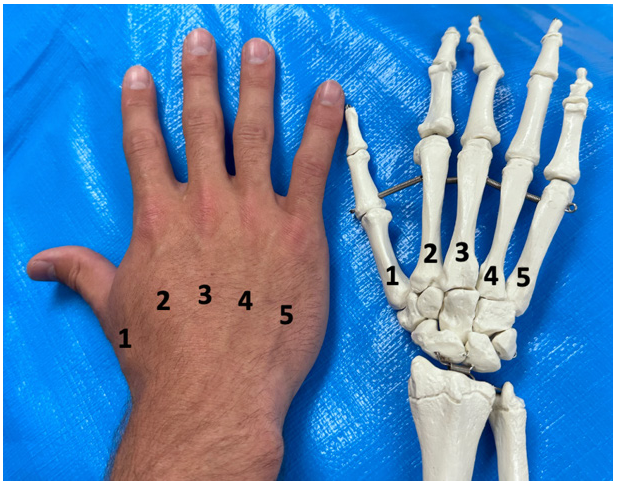

Figure 2) *Image depicting fingers starting at the metacarpal bones near the wrist. Metacarpal bones 1 thru 5 in the right hand are numbered in the figure.*

Anatomically accurate knowledge of the human body helps allow effortless and expressive movement, a prerequisite for any musician to have a long and sustainable career. Anatomical knowledge also helps musicians better understand how to manage and prevent musculoskeletal pain and dysfunction [4-7]. Since the spine and upper body play a large role in music performance, knowledge of this anatomical region is a prerequisite of an accurate understanding of a musician's motion in performing [8]. Therefore, a foundational understanding of anatomy allows a musician to self-evaluate, avoid inefficient movements, and prevent strains and overuse [4-7]. Knowing that a comprehensive understanding of anatomy would help his career, the pianist contacted the anatomist at Samford University and inquired about ways to better understand human anatomy. Cadaveric dissection continues to remain a cornerstone of anatomy curriculum [9], which encouraged the pianist to complete the upper extremity and spine cadaver dissection module in a gross anatomy course for graduate physician assistant students. The purpose of this case report is to describe the perceptions and reflections of a professional pianist after completing a cadaveric dissection module.

Case Description

The professional pianist was a 35-year-old male. He started playing the piano at the age of 6 years and has 13 years of experience as a professional pianist. He has given performances throughout North America, Asia, and Europe. He has performed as many as 100 concerts annually, including prestigious venues such as Carnegie Hall, the Peabody Institute, and Steinway Hall. His PRMD was unremarkable, except for this recent right forearm pain. His forearm pain would only occur when he played the piano, specifically with technique exercises including scales and arpeggios. The posterior forearm musculature was tender during palpation and had signs and symptoms consistent with myofascial overuse syndrome of the wrist extensor musculature.

PRMDs in musicians commonly go unreported, as admitting to having pain is often interpreted that the musician has inadequate technique when playing their instrument. However, the forearm pain of this professional pianist reached a threshold that led him to consult an Andover Educator. The Andover Educator was a pianist herself, with a thriving 40+ year career, and acknowledged that her awareness of anatomy had allowed her to play the piano for multiple hours a day even into the sixth decade of her life. The professional pianist's desire for a long

and healthy piano career, his lack of anatomical knowledge, and his desire to learn from experts in a structured format led him to complete a cadaveric dissection module.

Cadaveric dissection offers unique opportunities for individuals from diverse backgrounds to deepen their understanding of human anatomy. The professional pianist, with no prior experience in the medical field, voluntarily completed a four-week upper extremity and spine cadaveric dissection module in a gross anatomy course for physician assistant students. This module required the pianist to complete 15-hours of a combination of dissection and prosection with the physician assistant students and the anatomy course instructors. There were ten cadavers for dissection by 36 physician assistant studies students, three anatomy instructors, and the professional pianist. The physician assistant students were divided into groups of four to five students dissecting the same cadaver for the entire semester. The professional pianist joined one group, and after only two sessions, he was fully involved in the dissection with his group. He was as active in the dissection as the other students in the class. This module included dissection of the superficial back musculature, pectoral region, brachial plexus, arm, forearm, hand, and disarticulation of the shoulder, elbow, and wrist joints.

After completing a four-week upper extremity and spine cadaveric dissection module, the professional pianist learned the structures of the human body with emphasis on the relationships between the musculoskeletal, nervous, and vascular systems. Specifically, he was able to recognize, identify, and compare and contrast specific anatomic structures of the upper extremity and spine. In addition to the knowledge, skills, and abilities he gained in anatomy and cadaveric dissection, he also helped create an eclectic dissection group consisting of physician assistant students and a musician, worked as a team to complete the dissection tasks, and gained a newfound respect for the donors who gave their bodies so that others could learn.

Discussion

The perceptions and reflections of the professional pianist on the experience of cadaveric dissection were both complex and profound. Although he felt out of place in the cadaver lab, as the only non-medical person in the lab, he was excited about the idea of cutting into a cadaver to see how the human body is organized. As a musician, he had never been exposed to that type of scientific inquiry, and never knew knowledge of anatomy could improve the quality and length of his playing career. When cutting into human flesh for the first time, the professional pianist thought, “This is so cool!” His feeling of being out of place in the lab soon disappeared, which he attributed to the hospitality of the physician assistant students and anatomy instructors. As he progressed through the module, he became more comfortable in the cadaver lab and motivated to learn anatomy [10]. He saw the human body as a marvel of intricate design and functionality.

The pianist gained a deeper understanding of the intricate connections and interdependence between different parts of the body. Due to his career as a pianist and his right forearm pain, he was particularly fascinated by the forearm musculature. He learned that many of the forearm muscles cross the elbow, wrist, and some even travel into the fingers. He would pull on the muscles of the forearm to replicate the muscle actions (Figure 3). Sometimes people wonder why or how a relatively non-intense

activity, such as playing the piano, can cause pain. It now made anatomical sense to the professional pianist why certain elbow, wrist, and finger movements while playing the piano caused him forearm pain. He found it incredible to visualize and palpate the muscles of the upper extremity, and understand how they are all interconnected, and must work in harmony to accomplish even simple tasks.

Figure 3) *Professional pianist pulling on the wrist extensor musculature on a cadaver to replicate the muscle actions.*

He also discovered the robustness of the human body, as he was able to aggressively tug on muscles and tendons, to replicate the muscular actions, without damaging them. This gave him confidence that his forearm would recover. This newfound anatomical understanding of how the body is organized also provided him with the insight to make minor postural and performance changes that were able to relieve stress at his forearm [4-7]. Throughout the four-week cadaveric dissection module, the professional pianist would share his positive experiences with his spouse, who is also performs as a musical artist, and this inspired his spouse to enroll herself in a cadaveric dissection course. The professional pianists' positive perceptions and experience with cadaveric dissection is consistent with those of medical students [11].

Conclusion

This case report describes the perceptions and reflections of a professional pianist after completing a cadaveric dissection module. Cadaveric dissection can be an eye-opening experience, especially for those in non-healthcare related fields. The pianist deepened his understanding of the human body and how anatomy plays a role in PMRDs and in his career as a musician. This is, to our knowledge, the first documented case of a musician learning anatomy through cadaveric dissection. This case report highlights the potential value of anatomical education for individuals in non-medical fields and underscores the transformative impact anatomical knowledge may have on musicians.

Statement of Human and Animal Rights

This report was performed in accordance with ethical standards.

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Authors' contribution

DDB and JT were responsible for idea conceptualization. DDB, JT, RMC, and NBW were responsible for writing and approving manuscripts prior to submitting.

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