NORTHERN ILLINOIS UNIVERSITY

Comparison of Healthy Shoulder Joints/Rotator Cuff Muscles to Pathological Shoulder Joints/Rotator Cuff Muscles

A Capstone Submitted to the

University Honors Program

In Partial Fulfillment of the

Requirements of the Baccalaureate Degree

With Honors

Department Of

Biological Sciences

By

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May 11th, 2019
University Honors Program
Capstone Approval Page

Capstone Title (print or type)
Comparison of Healthy Shoulder Joints/Rotator Cuff Muscles to Pathological Shoulder Joints/Rotator Cuff Muscles

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Date of Approval (print or type) 5/8/2019

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Abstract

The purpose of this dissection of the human shoulder is to gain an in-depth knowledge of the structures located inside, to identify if there is any pattern in which parts of the shoulder joint begin to degenerate first, and if certain pathologies in the shoulder can lead to the development of new ones. The expected results of this project are to successfully complete a full dissection of the shoulder region so that each structure remains intact and identifiable and without causing destruction to pathologies that already exist. A variety of unique dissection techniques will be used in order to produce the most precise views of the shoulder region.
Introduction

The shoulder, or pectoral girdle, is a part of the upper extremity. The shoulder allows us to move our arm, allows bearing of heavy loads, and provides stabilization. The pectoral girdle is made up of three main bones which are the scapula, clavicle, and humerus. Surrounding these bones are six main muscles which are the deltoid, supraspinatus, infraspinatus, teres major, teres minor, and subscapularis. Four of these muscles make up what is commonly referred to as the rotator cuff. These muscles are supraspinatus, infraspinatus, teres minor, and subscapularis. These muscles and bones articulate via tendons and cartilage.

Because there are so many structures in this region that rely on one another, the shoulder is very prone to injury and is very likely to deteriorate with age. Some of the most common issues within the shoulder are bursitis, rotator cuff tears, labral tears, bone spurs, degeneration of cartilage, and loss of joint space. When there is a lot of friction at the shoulder joint due to degeneration of cartilage, a sac of fluid can become inflamed with excess fluid and will cause increased pressure in the shoulder. Rotator cuff tears can be partial or complete tears. In a partial tear, the tendon becomes weak and damaged. In a complete tear, the tendon is completely separated from the bone and will always require surgical intervention to repair. Small tears in any single one of the four muscles listed under the rotator cuff can lead to a great amount of pain. The labrum is an area of cartilage in the ball and socket joint of the shoulder. This joint is comprised of the glenoid and the head of the humerus. When this cartilage tears or is worn away, it causes friction in the joint due to the loss of joint space. This can cause it to be very painful to move the arm and shoulder and can also cause frequent shoulder dislocations. Bone spurs are characterized by the overgrowth of a bone. These are painful and problematic because they lead to other issues in the shoulder such as muscle degeneration, grinding of bones, and decreased stabilization of the shoulder. Depending on the severity of each of these issues, physicians determine if conservative methods are a viable option or if the patient must have surgery in order to correct the issue.
Methods

Tools

There were several dissection tools that were used in order to precisely dissect and identify the muscles, bones, and tendons of the shoulder. The tools include surgical scalpels, forceps, dissecting scissors, probes, and dissection trays.

Dissection

The dissection began on the posterior side of the cadaver. The superficial skin and fascia was removed from the shoulder down to the elbow and near the superior back region. The trapezius was initially identified and pulled back to reveal the major shoulder muscles. The deltoid muscle was then exposed and the fat was removed. The deltoid muscle was then detached from the scapula and acromion process. The next muscles to be cleaned of fat and identified were the rotator cuff muscles, beginning with teres minor and teres major. Teres minor and teres major make up two of the borders of the triangular space, which is medial to the quadrangular space. The long head of the triceps brachii makes up the third part of the border. Next, supraspinatus and infraspinatus were identified, cleaned, and transected to reveal the suprascapular nerve and artery. Then, infraspinatus was transected in order to reveal subscapularis. After all of the muscles of the shoulder had been cleaned and identified, the tendons were observed. The main tendon identified in the shoulder was the infraspinatus tendon. This tendon was cut in order to reveal the ball and socket joint. This allowed for observation of the acromion, the head of the humerus, and the glenoid cavity.

Results

By looking at both shoulder regions on the cadaver, I was able compare and contrast the structures of each one and study healthy versus pathological shoulder joints and muscles. Through the use of visuals from literature and models in the lab, I was able to identify all of the different structures of the shoulder region. Since no cadaver will have identical shoulder regions, I had to manipulate the structures in order to properly identify them. Both shoulders of the same cadaver were useful in my comparison and contrast process. The right shoulder of the cadaver even had 4 screws placed laterally around the superior part of the humerus, which
indicates that he had some type of shoulder surgery. You can also see what appears to be some formation of bone spurs on the superolateral part of the humerus.
Triceps Brachii (Long head)
Infraspinatus
Teres Minor
Teres Major
Deltoid
Trapezius
Possible pathology

Humerus (Greater Tubercle)
Impact

This research can have an impact on the way that shoulder injuries and pathologies of the shoulders are treated, in order to prevent further degeneration of the joint and surrounding muscles. Many of the resources that I referenced were studies that looked at multiple shoulder regions. This research will also have a significant impact on my education and future career as a physician. Although the anatomy is generally the same in cadavers, there can sometimes be certain abnormalities or slight differences. Constantly exposing myself to as many different regions of anatomy will lead to a better understanding and identification of these structures. For example, orthopedic surgeons must master the anatomy of regions like the shoulder. They do surgery on so many different patients, but no shoulder will look completely identical. If they are exposed to many different diagrams and many different examples of these regions, they are better equipped during surgery to identify anatomical structures, locate problems within the anatomical structures, and make the proper decisions on how to treat these problems.

Acknowledgements

The author would like to acknowledge and thank the Department of Biological Sciences, Dr. Daniel Olson, and Dr. Mary McGinn for the endless support and guidance throughout this project.
References


