

SYSTEMS in MOTION

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Exemplar

Second Semester ANCHOR Two Report

Sixteen year old Mattie was at her state championship gymnastics meet with her high school team. Her team was doing excellent and they were tied with the other leading team. In order for Mattie's team to win the gold medal she would have to add a back tuck to her beam routine. She was incredibly uneasy about this because she was fairly new at gymnastics and did not know if she would be able to land it. When she went for the back tuck she fell off the beam and landed on her elbow. Mattie developed an injury common to gymnasts known as medial epicondylitis ("pitcher's elbow"). This is when the radius and the ulna bang into each other causing dead bone to chip off and float around (Dubin). Also, because of the way she landed, she ruptured her biceps brachii and triceps brachii.

The chart below explains the origin, insertion, and action of the muscles that Mattie injured.

<u>Name</u>	<u>Origin</u>	<u>Insertion</u>	<u>Action</u>
<i>Triceps brachii</i>	Shoulder girdle and proximal humerus	Olecranon process of ulna	Extends elbow
<i>Biceps brachii</i>	Scapula of shoulder girdle	Proximal radius	Flexes elbow and supinates forearm

"Pitcher's elbow" can cause severe pain and can restrict the motion of the elbow. It may feel like your elbow is stuck in one position for a long period of time which makes it extremely hard and painful to move the elbow. "Pitcher's elbow" can also cause inflammation to the muscles. On the outside this may cause the elbow to look swollen and larger than before.

Rupturing the triceps brachii and biceps brachii can result in elbow pain during rest and exercise.

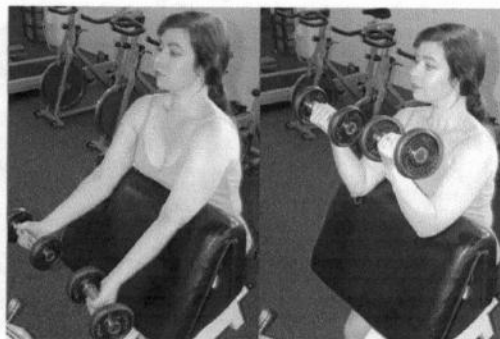
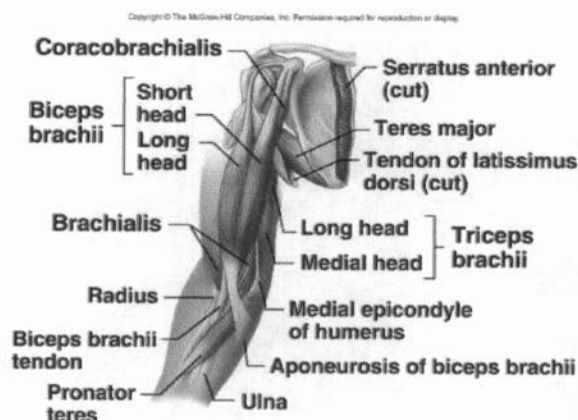
Many have limited elbow mobility and have swelling on the back of the elbow (Inflammation).

Rupturing the biceps brachii can cause abrupt pain in the upper arm.

Surgery is only used when the bones are incapable of healing themselves. In Mattie's case, her bones might never fully heal without gymnastics, which means she would have to give up gymnastics. Refusing surgery can be extremely dangerous. "The long-term complications of the untreated condition include chronic pain, loss of function, and possible elbow contracture" (Alfonso). Mattie loves gymnastics and is not ready to let it go, so she decided she would get the surgery. The surgery will remove the floating bone chips in her elbow and has a very high success rate. Before and after the surgery Mattie will need to use icepacks for around 20 minutes each time (Inflammation). She keeps track of how long she ices her elbow each day because using this method for less than 20 minutes may not help at all. After surgery it is necessary that she waits until she is fully healed. Physical therapy is recommended to be started as soon as possible to help the movement of the elbow. The exercises Mattie will be learning and practicing daily are presented below. Once Mattie gets out of surgery she will need to start physical therapy. She should avoid any weight lifting until her muscles regain some strength. This can be checked by muscle fitness testing. Once her score improves on the test, she will know that she can start using weights. In order to repair the ruptured triceps and biceps brachii, Mattie will need to practice her exercises given by her physical therapist daily (Biceps). Mattie's recovery is expected to take about six months.

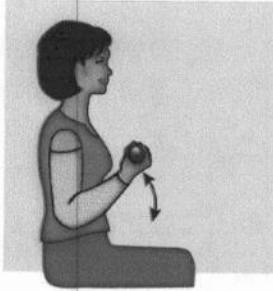
The exercise recommended is simple to do and should help increase muscle strength. Mattie will need to sit up against a board and lay her arms flat against it. Then, with or without weights, she will need to bend her elbows and bring her arms up towards her chest. See the picture below. This exercise needs to be practiced at least three times a day with twenty five

repetitions each time. Once Mattie improves on her muscle testing, she will be able to use two pound weights, and should do 50 repetitions. Each week she should increase the weights by two to three pounds. If Mattie is feeling too much pain, then she should not increase the weight that week. The images below will help show the target areas of muscles that are being worked with this exercise and show how to do it.

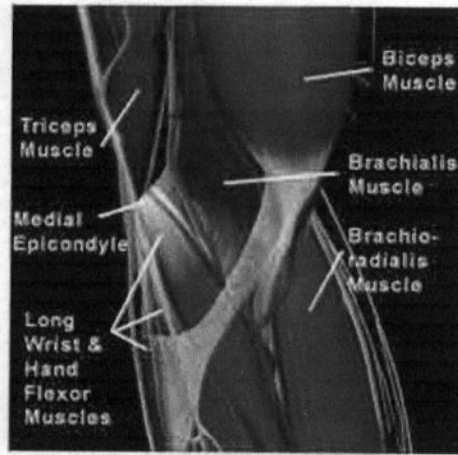


A different type of exercise that Mattie can do to help herself heal is called flexion and extension. Flexion is bending the joint resulting in a decrease of angle. This should be done at least three times each day and she should do twenty five of them each time. Next she will need to do the extension which involves straightening the joint resulting in an increase of angle. In both exercises she will be bringing her forearm to her upper arm and away from her upper arm (Griffing). This should be done at least three times each day and she should do twenty five of them each time. Once her arm gets strong enough and less painful she may do fifty each time to help regain and muscle loss. Doing these exercises daily will help Mattie regain her muscle strength. At first she should start these exercises using no weights and then gradually add one or two pounds at a time after her muscle tests prove that she is ready and when there is enough strength in her elbow to do so. The images on the following page are examples of the exercises.

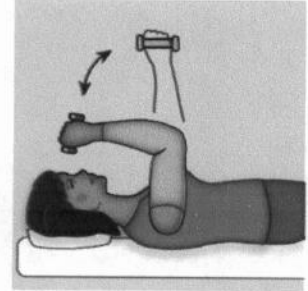
Flexion:



Left Elbow (Anterior View)



Extension



Although the surgery and physical therapy might result in some pain, Mattie is expected to make a full recovery in six months to a year. Over time, things will start getting easier for her week by week. She will be able to return to gymnastics without any problems. Until she is able to return, she should look into the option of staying active in a lighter way. It is recommended that she takes up running and eat plenty of foods with protein and calcium. This will help her stay healthy and in shape, and make it easier for her to return to competitive gymnastics.

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