

## Doc Gooden's Shoulder

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Dwight Gooden, the star pitcher for the New York Mets, will be a questionable starter in 1992. On September 7, 1991 he had arthroscopic surgery on a partial tear of his rotator cuff and a tear of the glenoid labrum. He missed much of the 1989 season because of a "tear in the shoulder caused by an imbalance of the musculature."<sup>1</sup>

The question for Gooden is whether he will have the velocity he used to and how fast his shoulder/arm will fatigue. Pitchers with similar problems, like Mark Gubicza, Pascual Perez, and Mike Scott, never came back to their previous potential.

It is essential that there be a balance between the dynamic and static shoulder stabilizers in repetitive throwing estimated at 7,000 degrees of motion per second performed by professional pitchers. Eventual overuse will occur if the throwing mechanics, conditioning for endurance and strength, and orderly synchrony of firing of the cuff muscles does not happen. There must also be a synchrony of the shoulder with the trunk and lower extremities. It is no wonder that individuals who are active in overhead exercises, such as throwing, tennis, and swimming, suffer with shoulder problems.

Recent EMG studies by Bradley and Tibone<sup>2</sup> have shown that the shoulder muscles are sport specific. In other words, if you casually elevate your arm into abduction, external rotation and extension, your muscles will not perform the same way a pitcher or possibly a tennis player's shoulder muscles will perform. Inman, in 1943, described a force couple in which the supraspinatus and deltoid acted in synergy together throughout abduction and forward flexion during normal arm elevation, while the subscapularis, infraspinatus, and teres minor acted as shoulder depressors. When a pitcher brings the arm up into what is known as early cocking at 90 degrees abduction and finally to late cocking, there is maximum stretch at the shoulder and the muscles no longer work together; instead there is a selective sequential pattern of muscular activity rather than a synergistic pattern. In early cocking, the anterior, middle, and posterior deltoid reach their peak EMG and at late cocking the deltoid decreases as the rotator cuff becomes dominant. Peak activity for the cuff muscles occurs not in initiating abduction along with the deltoid but at the late cocking point where the arm is most prone to anterior subluxation. The supraspinatus helps to stabilize by drawing the head of the humerus towards the glenoid. The amateur tends to overuse the supraspinatus and cuff muscles at this point, more than the professional.

During the acceleration phase of throwing, the professional makes more use of the subscapularis over the cuff muscles and biceps than the amateur. During the acceleration phase the subscapularis also acts as a steering muscle to position the humeral head precisely in the glenoid to protect the head from levering out of the joint.<sup>2</sup>

Since Doc Gooden had a torn glenoid he probably had shoulder instability. EMG studies have shown that in a throwing shoulder with instability, in the late cocking phase, the supraspinatus shows increased activity to compensate for the loss of stability. The internal rotators (subscapularis

pectoralis major, and latissimus dorsi) show a decrease in activity which permits excessive lateral rotation and therefore even more stress on the anterior shoulder capsuloligamentous stabilizers. Excessive supraspinatus activity results in fatigue and overuse. The cycle of overuse, to instability, to subluxation, to impingement, makes a cuff tear inevitable.

According to Silliman and Hawkins,<sup>4</sup> "The athlete who has a full range of motion with no limitation of internal rotation, normal scapular kinetics with no scapular winging, and a rotator cuff that is fatigue resistant, particularly relating to eccentric overload, is best suited to maximize performance and lessen the chance of injury."

The problem Goodin faces is that the demand he is forced to place on his shoulder must, at times, exceed physiologic limits. Unless his last operation has created a bionic shoulder, he is bound not to be as successful as Met fans desire.

*Reference:*

1. Sexton J: Can Gooden Work Off the Cuff. NY Times, 8:12-13, 1-19-92.
2. Bradley JP, Tibone JE: Electromyographic Analysis of Muscle Action about the Shoulder. Clinic Sports Med., 10:789-805, October 1991.
3. Inman VT, Saunders JBde CM, Abbott LC: Observations on the function of the shoulder. J Bone Joint Surg, 26:1-30, 1944.
4. Silliman JF, Hawkins RJ: Current concepts and recent advances in the athlete's shoulder. Clin in Sports Med., 10:693-705, October 1991.

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Editor's Note:

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