

7 Reasons Baseball Pitchers Shouldn't Do Year-Round Throwing Programs

Eric Cressey, Cressey Performance

When Thanksgiving rolls around, many of our professional baseball players at Cressey Performance will start up their winter throwing programs after a full 10-12 week break from throwing. They're always a bit rusty in the first week of tossing after the layoff, but every single one of them always "figures it out" in a matter of a few weeks - and still has plenty of time to get in a solid throwing program prior to heading off to spring training. And, because they've been working hard in the gym on their strength, mobility, and soft tissue quality, they're always better off in the end.

Still, there are those who insist that baseball pitchers don't need time off from throwing.

I couldn't disagree more.

I'm sure this will rub some folks the wrong way, but I can't say that I really care, as most of those individuals can't rationalize their perspectives outside of "guys need to work on stuff." I, on the other hand, have seven reasons why baseball pitchers need time off from throwing:

1. They need to lose external rotation to gain anterior stability.

Having external rotation - or "lay back" - is important for throwing hard, and research has demonstrated that simply throwing will increase shoulder external rotation range of motion over the course of a season. This does not mean, however, that it's a good idea to just have someone stretch your shoulder into external rotation.

You see, when you externally rotate the humerus (ball) on the glenoid (socket), the humeral head has a tendency to also translate anteriorly (forward). In a well-functioning shoulder girdle, the rotator cuff musculature should help prevent anterior instability, and it's assisted by adequate function of the scapular stabilizers, which offer the dynamic stability to reposition the scapula in the right place to "accommodate" the humeral head's positioning. For the athletic trainers and physical therapists out there, this is really what you're testing with an apprehension/relocation test.

The apprehension comes about because of either anterior instability or actual structural pathology (SLAP tear, rotator cuff impingement, or biceps tendinosis). The relocation component is just the clinician posteriorly directing the humeral head to create the stability that should otherwise be created by the rotator cuff and scapular stabilizers.

The take-home message is that while just going on year-round throwing programs in hopes of increasing external rotation seems like a good idea on paper, it's actually a terrible idea in the context of injury prevention. Pitchers should actually lose a few degrees of external rotation each off-season intentionally, as it affords them an opportunity to improve their stability.

This leads us to...

2. They need a chance to get their cuff strength and scapular stability up.

Baseball pitching is the single-fastest motion in all of sports, as the humerus internally rotates at velocities in excess of 7,000°/second. So, it should come as no surprise that at the end of a season, the strength of the rotator cuff and scapular stabilizers is significantly reduced. Having dealt with many of our players for up to five off-seasons now, I have a unique appreciation for how they each respond differently to not only the stress of the season, but also to arm care programs that we initiate at season's end.

It's important to remember that improving rotator cuff strength is no different in terms of adaptation than improving a bench press or squat. Adding 10% to a guy's bench press might take three months in an intermediate population, or 12 months in a high-level lifter! Adaptation of the rotator cuff and scapular stabilizers is comparable. I need every minute of those three months without throwing to get guys back to at least baseline, and hopefully a bit above it.

Can you imagine if some clown trying to improve his bench press went out and benched an additional 4-5 times a week on top of his regular strength and conditioning program? His progress would be minimal, at best, and he'd be at a dramatically increased risk of injury. Throwing during a dedicated, appropriate structured early off-season arm care program is no different.

3. They need an opportunity to do dedicated manual resistance rotator cuff exercises.

Ask anyone who has worked with throwers for any length of time, and they'll always tell you that manual resistance exercises are the single-best option for improving rotator cuff strength. This rotator cuff exercise approach allows you to emphasize eccentric strength better than bands, cables, and dumbbells allow. It also keeps athletes more strict, as the one providing the resistance can ensure that the athlete isn't just powering through the exercise with scapular stabilizers or lower back.

The only downside to manual resistance rotator cuff exercises, though, is that because they generally prioritize eccentric strength, they will create more soreness. With that in mind, we use them much more in the off-season than in the in-season, as we don't want a pitcher throwing with added soreness. They're a great initiative in a comprehensive off-season baseball strength and conditioning program, but guys just don't seem to like them as much

in-season, presumably because both throwing and manual resistance rotator cuff exercises can be too much eccentric stress when combined. As such, we used them a lot during the September-November periods, and then hold back in this area the rest of the year.

Of course, if you throw year-round, then you can forget about getting these benefits, as the last thing you want is to be sore while you're "working on stuff" in the off-season. That was sarcasm, in case you weren't picking up on it.

4. They need to get their shoulder and elbow range of motion back.

As I noted in Part 1, throwing a baseball is the single-fastest motion in sports. With the crazy arm speeds one encounters, you have to keep in mind not only the muscles trying to accelerate the arm, but also the ones trying to slow it down. This “braking” challenge is called eccentric stress – and I’ll talk more about it in a second.

What you need to know now, though, is that when left unchecked, significant eccentric stress can lead to tissue shortening. If you need further proof, **Reinold et al.** reported that immediately after a pitching outing, pitchers lose an average of 9.5° of shoulder internal rotation and 3.2° of elbow extension – and that these losses persisted at 24 hours post-throwing.

Now, imagine these acute range of motion losses being left unchecked for an entire season – or a season that simply never ends because pitchers are always throwing.

Fortunately, we can prevent losses in range of motion during the season with appropriate mobility exercises, manual therapy, and breathing exercises – but the truth is that not everyone has access to these initiatives in terms of expertise, finances, or convenience. So, while we work to educate the masses on arm care, emphasizing time off from throwing programs is also a key component of an overall strategy to reduce injury risk.

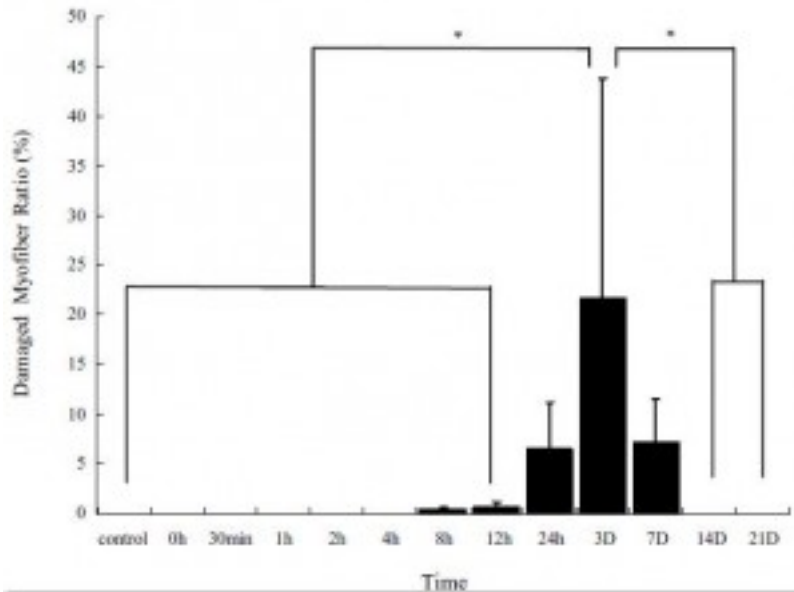
One last thing on this topic: it is a nightmare to try to improve shoulder or elbow range of motion in a pitcher during a season, as the very nature of throwing works against everything you’re trying to achieve. The off-season is “where it’s at” in terms of optimizing range of motion in throwers.

5. They need to “dissipate” eccentric stress.

Okay, here’s where I take #4 and geek out a bit. I apologize in advance.

Sometimes, you have to get away from the baseball world in order to learn about the baseball world. To that end, I need to thank Mike Reinold for bringing **this great 2004 study from Tomiya et al** to my attention.

These researchers created eccentric stress in muscle tissue of mice using an electrical stimulation model, and monitored blood markers of muscle damage for a period of time thereafter. What you'll see in the graph below is that myofiber disruption really peaks at three-days post-exercise, then start to return down to baseline, yet they still aren't even there at seven days post-intervention.



Source: Tomiya A, et al. Myofibers express IL-6 after eccentric exercise. Am J Sports Med. 2004 Mar;32(2):503-8.

Now, let's apply this to the world of pitching. Every single pitcher who throws more than once every 7-10 days is surely pitching with some degree of muscle damage. And, I can tell you that the two toughest challenges pitchers have reported to me are:

- a) moving from starting to relieving
- b) going from a 7-day high school or college rotation to a 5-day professional rotation

I firmly believe that pitchers need to throw in-season to stay strong, but I also know that we can't trump physiology. Sure, we need to have optimal nutrition and regeneration strategies in place, as we can't just baby guys and expect them to get better. However, make no mistake about it: high-level pitchers simply have to get good at pitching at 90% capacity (at best) if they are going to succeed.

If I already have a guy whose arm is working at a deficit for 8-9 months of throwing, the last thing I want to do is beat him up for the other three months with the same kind of volume and stress.

6. They need to allow any undetected low-grade injuries to heal.

As I discussed in an old blog, **Pitching Injuries: It's Not Just What You're Doing; It's What You've Already Done**, most injuries (especially ulnar collateral ligament tears) come from the accumulation of chronic, low-level stress. Maybe you get some calcification on your ulnar collateral ligament or a low-level rotator cuff tendinosis, and it takes a few years and hundreds of innings before something finally “goes.”

Old, low-level injuries are less likely to reach threshold if you give them some downtime and work on redistributing training stress. By strengthening the rest of your body in the off-season, you're dramatically reducing the demands on your rotator cuff with throwing.

You can't teach other joints to share the burden if the burden is never removed temporarily.

7. They need a chance to prioritize other competing demands.

Throwing is a good 20-30 minute endeavor each time you do it – and possibly even more. When I think about all the things that pitchers can be doing to get better in the off-season from a strength and conditioning standpoint, I have a really hard time justifying giving away that much time and recovery capability. There are other things that need to be prioritized at this time – and year-round throwing is an especially tough pill to swallow when you know that throwing is working against many of the very qualities – rotator cuff strength, scapular stability, mobility, and tissue quality – that you're trying to establish.

Closing Thoughts

The lack of downtime from throwing is especially problematic in younger populations, as they are skeletally immature and weaker. I'd argue that a really weak 15-year-old kid throwing 74-76 mph does far more damage to his body on each throw than a moderately strong professional player throwing 90-92 mph, especially given that the pro pitcher's mechanics are more optimized to protect the arm. This underscores the importance of “syncing up” mechanics, throwing programs, and the overall baseball strength and conditioning program.

Last, but certainly not least, remember that two weeks doesn't constitute “time off.” Rather, I firmly believe that pitchers need the ball completely out of their hands for at least two months per year, preferably continuously. In other words, eight one-week breaks throughout the year are far from ideal, as it doesn't really allow for positive adaptations to occur.

Also Note:

Cumulative effect of distance running in baseball: Noncompatibility of power & endurance training among college baseball players. (2008)

These researchers divided a collegiate pitching staff into two groups of eight pitchers over the course of a season, and each group did everything identically – except the running portion of their strength and conditioning programs. Three days per week, the “sprint” group did 10-30 sprints of 15-60m with 10-60s rest between bouts. The endurance group performed moderate-to-high intensity jogging or cycling 3-4 days per week for anywhere from 20-60 minutes.

Over the course of the season, the endurance group’s peak power output **dropped** by an average of 39.5 watts while the sprinting group **increased** by an average of 210.6 watts. You still want to distance run?

Of course, there are still the tired old arguments of "it flushes out my arm" (much better ways to do that), it clears my head (go see a psychologist), "it keeps my weight down" (eat less crap, and do more lifting and sprinting), and "it helps me bounce back better between starts" (then why are so many players in MLB living on anti-inflammatories?). The system is broke, but instead of fixing it based on logic, many pitching coaches continue to change the oil on a car with no wheels.