

# ***MOMENTUM PITCHING***

**A Scientific Technique for  
All Levels of Pitching**

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**An e-book**

**Sports Science Associates**

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## PREFACE

It is hoped that *Momentum Pitching* will introduce a radical and major step forward in baseball pitching. It requires a change in thinking amongst baseball aficionados and in particular, pitching specialists. It is difficult to change the beliefs of those who have adopted opinions of others without any independent verification of their validity. This book attempts to establish, as much as possible, the independent scientific confirmation of how humans should act in a high-velocity throwing action. It is expected that controversy will swirl around the content of this volume, but that reaction will not be based on science, but belief/faith.

It is a surety that some will criticize this author for not being a "*baseball man*". In one sense, that is a strength. Unfortunately, since the first computerized research involving baseball pitching and cricket bowling (Pyke & Rushall, 1969), baseball pitching has become polluted with myths, fictions, and panchrestons that serve no valuable purpose for those who participate as pitchers. The continued escalation in injuries at all levels of the sport is one form of evidence about the "*bad*" instruction, coaching, and knowledge that permeates this endeavor. *Momentum Pitching* has the intended motivation to right a considerable number of wrongs. Those in modern pitching have little to be proud of and those who participate little to be thankful for.

The development of *Momentum Pitching* has been a rapid transformation of much fuzzy thinking about baseball pitching. In 2004, Dick Mills hired my services as a consultant. Previously, he had purchased several of my books. It became obvious that most details and the general orientation of baseball pitching instruction and coaching were based on false or misunderstood premises. Dick Mills was enthusiastic about the possibilities of new directions in pitching. In late 2004, Dick asked if I wanted to write a book on scientific pitching. I agreed. The scientific topics of the ensuing book (*The Science and Art of Baseball Pitching* – Mills & Rushall, 2006) were mostly adaptations of my previous writings along with the integration of research findings associated with baseball, throwing, and throwing-related activities. Those topics were completed in 2005. In the first half of 2006, I edited and rewrote Dick Mill's contributions on the "*Art*" of baseball pitching. The book was published in the latter half of 2006. While the association between the two authors flourished, Dick Mills adapted two major elements of human movement to pitching. Those elements were moving fast and using the large body masses to generate momentum that would be transferred to the baseball at the release. I believe that Dick marketed this adaptation as *Explosive Pitching*. Many young pitchers have benefited from the suggested elements of that pitching approach. Around Christmas of 2006, a single event required the bounds of *Explosive Pitching* to be changed. A *YouTube* posting of Daisuke Matsuzaka showed him performing a small and slow ineffective backstep before launching into a too-controlled pitching action. It dawned upon me that the extra step before the throwing action, if performed correctly, could contribute to greater pitching velocity. Dick Mills agreed. Since then, the backstep has become part of Dick's descriptions of pitching. It did not take long for Dick to realize that great pitchers of the past performed a backstep. Apparently, it was a movement element that had ceased to be used by the majority of pitching coaches and instructors. The readily available clips of pitching greats, several of whom are presented in this book, confirmed the forgotten element but showed that even then it was not exploited maximally. The research and teachings of cricket, javelin-throwing, and other high-velocity throwing and striking sports contained principles that needed to be incorporated into pitching mechanics to properly use the backstep and to alter the manner in which the actual pitching throw was executed.

Independently of Dick Mills and myself, Brian Conger of *Youth Baseball Coaching* (<http://www.youthbaseballcoaching.com/pitching.html>) also was teaching a step before the throwing step. The term he uses is the "*rocker step*". However, it seemed that the rocker step still was not

performed as dynamically as possible nor in the manner it should be if it was to conform to the principles of high-velocity throwing.

In this book, there is frequent reference to "*natural*" throwing actions. In sports, there are few natural throwing actions that are measured. Natural actions are deemed to be those that conform to good throwing mechanics as well as produce desired outcomes. Examples of natural throwing actions would be an Australian aborigine throwing a rock at a target in the subsistence hunting that has been part of that culture for eons. Another would be an outfielder throwing from near the warning track to either a relay player or a particular baseman in the fastest and most direct manner possible. Yet another example would be a cricket fielder on the playing surface boundary throwing to one end of the pitch in an attempt to effect a run-out or prevent more runs. Those actions are uninhibited by any throwing area boundaries or "*specialist techniques*".

In pitching, bowling in cricket, and throwing a javelin, the throwing actions are compromised by performance area restrictions. In pitching, it is throwing at a very limited target while presumably keeping one foot in contact with the pitching rubber. In cricket, it is bowling from behind a line (the "*bowling crease*") and maintaining the throwing arm straight at the elbow, although recently up to a 15° elbow bend has been tolerated, and landing the ball in a space where hitting it is possible. In javelin throwing, the length of the run-up is restricted and the implement must be released from behind a line and between side-lines and land in a target area. Those restrictions compromise the natural qualities of effective throwing to varying degrees. However, the point that should be understood is that in any throwing action the retention of as many natural movement segments as possible is most desirable. The insertion of avoidable unnatural actions will cause throwing efficiency to decrease and heighten the likelihood of injury. That is a foundational understanding of this book.

It is this author's opinion that high-velocity throwing sports can be ordered in their stress on an athlete's body structures. Considering only baseball pitching, cricket fast-bowling, and javelin throwing, javelin throwing is deemed to be the most stressful action. It employs momentum derived from an extensive run-up, uses an implement that is very much heavier than the balls used in the other two sports, and has a requirement to flight the javelin which places restrictions on the trajectory of the release. All those factors are supported by the attempt to create as much acceleration/force as possible so that the release momentum of the implement is maximal. Those factors result in the highest levels of stress on the joints involved in the preparatory and throwing actions. The second most stressful throwing action is cricket fast-bowling. It employs a maximum run-up, restricts the use of the elbow joint, requires a very specific area as a target, and aims for the greatest possible release momentum. The third most stressful throwing action is pitching. The lack of a run-up reduces the force that is finally transmitted to the ball but still requires very restricted movements to generate the greatest release velocity possible. It should be possible to pitch a baseball in a near-natural manner so that injuries will be unlikely but performance will be high. The commonalities among these three sports are interchangeable. One use of such commonalities is to compare the activities to determine why one sport, baseball pitching, yields injuries in a disproportionate manner to the other two sports. The question must be asked: "*What occurs in baseball pitching training and games that does not occur in the less-injury prone, but more stressful, throwing sports?*" It is against that background and assumption that some of the qualified recommendations in this book are made.

Considerable reliance is placed on the superb pitchers of several decades ago (e.g., Sandy Koufax, Whitey Ford, Nolan Ryan). Older pitchers did a lot of things well. But still, not one of them did everything right. So much more is correct in them than in the vast majority of modern day pitchers.

The proof for that statement? They threw just as fast (despite being only of average stature and therefore lacked the leverage of today's tall, muscular, and heavy pitchers), had equal or better control, and pitched many more games and innings in a season without injuries. The winning argument is they did so many things that were natural for throwing when compared to today's almost totally and erroneously contrived-movement pitchers.

Throughout this book, factors will be repeated. That occurs because some important considerations are caused by more than one element. To understand those factors, all elements should be deliberated upon so that correct decisions can be made when instructing or analyzing baseball pitching. It would be wrong to take one element of this book out of context and assume that is the definitive statement on the matter. In all likelihood, topics will rise in one or more other discussions to eventually produce as close as possible the "*full-picture concept*" of the element in question.

Modern pitchers are taught so many disruptive and negative actions (e.g., deliberately slow actions, delays, suppressed movements, exaggerations) that the elements of natural movement are stifled, leading to performance degradation and an increase in the likelihood of injury. From the outset, improvement in a pitcher is simple. Replace the erroneous movement segments with correct natural movement segments. With the reintroduction of the basic elements of movement such as weight shift, timing, and economical movement (e.g., reduction in lateral and vertical movements), performance is guaranteed to improve. For most athletes, there may be no need to go any further than getting them back to performing natural actions because pitch velocity will be so much greater. Thus, the long term effect of *Momentum Pitching* instruction should be that peak velocity will be improved greatly and more time will be available to develop other pitches that exploit ball movement rather than peak velocity.

For correct movements to be executed, they have to conform to certain known principles derived from scientific (both pure and applied) studies. When some persons advocate movements contrary to those principles, there is reason for alarm. When movements are advocated and conform to those principles, there is justification for supporting such advocacies.

Because there are inter-individual variations in movement magnitudes and extents, understanding movement principles and applying them to accommodate individual capacities and structural differences is important. That differs greatly from trying to have a 15 year-old who is 5'7" pitch like Randy Johnson. The need to apply verified movement principles to each individual to achieve their best levels of performance is covered in the introduction of the late Jim Hay's book, *The biomechanics of sports techniques* (1993).

There is a need to verify the outcomes of applied research but that involves a process that is different to the verification of pure (e.g., drug) research. Hopefully, some academics and students will take the package advocated and "*test*" it in acceptable settings. However, as an author and service provider, it is unethical for this writer to drop the names of those with whom he has worked. One can only wait for those adherents to provide their own testimonies about successes (and possibly failures).

There comes a time when no more research is needed to support the adoption of principles. For example, no one attempts to verify evidence of Newton's Laws in baseball pitching or lawn bowling. There are now many principles of human movement that are worthy of general application. That someone is not aware of those many principles is not the fault of exercise science but of the individual. This book attempts to make readers aware of those principles and describe how they are used in *Momentum Pitching*.

This book is based on recommendations/interpretations/applications of verified research studies limited to science-based publications. Thus, their formulation is derived from science. In no case are

there "*invented*" statements used as premises for arguments that lead to false/dangerous coaching or performance behaviors (the "*belief-based*" approach to sporting knowledge). The content is limited to applying known scientific principles and rejecting invented beliefs that have no parallel in scientific journals or are contrary to published articles that have been subjected to refereed scrutiny. There is too much in baseball pitching that is derived from the development of fictions.

Throughout this book, specific references are made to web sites and individuals who have written arguable statements. Those comments are not intended to be personal attacks. They are intended to be part of a pseudo-Socratic dialog where both sides of an argument are presented to allow the reader to decide which content is worthy of attention.

As much as possible, this book is based on research evidence ("*evidence-based*") as opposed to faith ("*belief-based*"). Thus, the term "*scientific*" is an apt descriptor for the content, process, and documentation involved in this work. At times where opinions/beliefs are presented, they will be recognized as such.

The term *Momentum Pitching* entered the baseball lexicon in 2007. Mostly fathers of young pitchers who were trying *Momentum Pitching* began to post videos of their sons on *YouTube*. Those admirable efforts and their implied willingness to share information were much appreciated. However, because of the extensive variation among the *YouTube* exhibits, it seemed obvious to me that insufficient information was available about the beneficial and correct execution of the complete movement sequence of *Momentum Pitching*. Hence, this book was written to fill that void. Its title, *Momentum Pitching*, was taken from the general classification of videos contributed to *YouTube*.

This book is provided in electronic form. There are advantages to that format. Since the contents are not locked into the static media forms of print, compact disks, or DVD's, they are changed as new information, corrections, and clarifications become available. Two book owners should not expect their copies to be identical. The book will evolve because that is possible in e-book format.

*Momentum Pitching* is a new venture and pitching alternative for parents, their children, athletes, and professional pitchers to adopt and adapt to produce individual pitching excellence. It is hoped that this opportunity will be accepted by many to establish its social validity.



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