

2017 In Review

Michael Zweifel – Building Better Athletes

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Books

Here is a list of the books I read during 2017. My bookmark when I read is a notecard so I can jot down some notes during the book – the bullet points are the notes I wrote while reading each book. I also rated each book out of 5 – just a personal rating of each book and what I gained out of it.

If you click on the book title, it will link you link to it's amazon page.

[Contagious – Jonah Berger - \(4/5\)](#)

- We need to make our info particularly useful
- Tell stories – tell stories about our athletes, tell stories to our athletes
- Name things after people

[Legacy – James Kerr - \(4/5\)](#)

- Everybody has a role
- Vision without action is a dream, action without vision is a nightmare
- You either adapt or lose
- Do more things, a little bit better
- To build physical strength, you go to the weight room 3xweek for months -> years – Wouldn't you think the same rules would apply to mental strength? Yet we think we can increase mental strength from a speech or a single hard workout
- Mental toughness is the result of long-term discipline, conditioning, dealing with pressure, intensity in practice/training/life
- Random practice/unexpected challenges/randomized situations = increase tolerance to high pressure situations
- Pressure is expectation, scrutiny, consequences
- Choking – thinking internally about movements/actions – think about if a centipede had to think about coordinating it's leg actions and movements – it would freeze – that task is far to complex and daunting. The same applies to humans who try to think about every piece of their race, pitching action, basketball shooting action, route running, etc. The whole task is far to complex and trying to think about all it's parts and action creates a paralysis by analysis – Gabriel Wulf calls it
- Where we direct our mind/thoughts will take us; our thoughts create an emotion; the emotion defines our behavior; our behavior defines our performance
- During pressure situations – take a deep breath, say your key words/mantra, and focus on something external – something you can practice regularly – an anchor. Scrunch your nose, squeeze your toes, make a fist, circling your arms – something to

pull yourself back to the present – something you’ve done in practice and previous pressure situations.

- Mantra – design to bring you to the moment, designed to bring your focus to a specific task/idea
 - Mantra – rule of 3 – Assess, Adjust, Act
 - They take you from chaos to clarity into action
- To know how to win/succeed – you first have to fail/lose
- True North – Bill George – a great leader is about being genuine and true to who you are
- Admission of mistakes, fears, failures
- How to be successful
 - 1. Every morning write a list of things that need to be done that day
 - 2. Do them
- The make of a true leader begins with honesty and integrity
- Ask yourself
 - 1. What do I have to offer the team
 - 2. What am I prepared to sacrifice
- Champions do extra – extra sleep, recovery, stretching, meditation, nutrition
- There are no crowds on the extra mile – There are no crowds lining the extra mile. On the extra mile, we are on our own; just us and the road, just us and the blank sheet of paper, just us and the challenge we’ve set ourselves. It’s the work we do behind the closed doors that makes the difference out on the field of play, in whichever field we compete, whether we’re in a team, leading a business or just leading our life
- Marksman – Karoly Takacs – was denied 1936 Olympics due to rules of the war (shooter). The 1940 and 1944 Olympics were canceled due to the war. In 1938, at 28-years old he had a grenade shatter in his shooting hand – so he practiced to be a lefty. In 1948 he won the gold medal in shooting, 12-years after he first wanted to compete, now as a lefty.
- Hell is described as laying on your death bed and the person you’ve become meets the person you could have been
- Do the right thing, the right way, at the right time, for the right reasons
- Metaphors – Some would argue metaphors are the basis of understanding
 - The way we recognize ourselves in stories
 - It has been said, metaphors are the language of genius
- Rituals – All Blacks Frank Bunce never let his jersey hit the ground, baseball player that ate chicken
 - Ritualize to Actualize – James Kerr
 - Rituals capture calmness and comfort. – it roots us back to task/present
- Why the Haka – while seen as a form of intimidation or brand – the All Blacks use it to connect with their fundamental purpose – to connect with their core principles, to respect the ones that came before them – it’s a ritual to ground them

Peak – Brad Stulberg and Steve Magness – (4.5/5)

- How we view stress changes how our body responds to it
 - If we view stress as good – we’ll produce hormones that benefit us. If we view stress as bad – we’ll produce stress that deters us.
- Higher performers frame stress is a positive way
- Feeling connected to others has profound effects on stress physiology
- Greater periods of rest and recovery, allow great periods of productivity
- We should strive to get our athletes to “feel good”
 - Feeling good increases testosterone, which is highly linked to performance
- The attitude/motivation of one person can spread through a whole team
- Be mindful of your social circles – they influence you beyond your knowledge
- Ego is the #1 things that holds back development and growth

Extreme Ownership – Jocko Willink and Leif Babin – (3.5/5)

- On any team, in any organization, all responsibility for success and failure rests with the leader
- Leadership is the single greatest factor in any team’s performance. Whether a team succeeds or fails is all up to the leader. The leader’s attitude sets the tone for the entire team. The leader drives performance – or doesn’t. And this applies not just to the most senior leader of an overall team, but to the junior leaders of teams within the team
- Every morning that we wake up we are faced with the choice of whether or not we are going to be disciplined

Outliers – Malcolm Gladwell - (3.5/5)

- Who we are cannot be separated from where we're from
- It is those who are successful, in other words, who are most likely to be given the kinds of special opportunities that lead to further success. It’s the rich who get the biggest tax breaks. It’s the best students who get the best teaching and most attention. And it’s the biggest nine- and ten-year-olds who get the most coaching and practice. Success is the result of what sociologists like to call “accumulative advantage
- Achievement is talent plus preparation
- Success is not a random act. It arises out of a predictable and powerful set of circumstances and opportunities
- No one-not rock stars, not professional athletes, not software billionaires, and not even geniuses-ever makes it alone – I see HS and College athletes that struggle with this. They come from bad background and don’t trust people, but getting them to buy-in that you are there to help and can be a key piece in their success is a great challenge.

- Gladwell claims it's those with greater opportunities – money, environment, age, etc that are most likely to succeed. Other research claims that talents needs trauma, or adversity is key for success. Being exposed to adverse situations, traumatic events, poor circumstances makes people stronger, more resilient, more gritty which leads to long-term drive/success. Now these aren't necessarily polar opposites, but they seem to contradict each other slightly
- Gladwell says it takes extreme amounts of hard-work, but it also takes an incredible lucky series of events. Does this hard-work lead to this "luck"? Luck, by itself, doesn't necessarily occur because of hard-work.

Generation Y: Secrets To Connecting With Today's Teen's In A Digital Age – Tim Elmore – (4.5/5)

- ½ of the world's population is under 25 years old
- The issue is that kids have well developed filters because they digest so much information on any given day
- Prepare the child for the path, not the path for the child
- Teachers must remember that a lecture isn't enough anymore-or at least we cannot begin with a lecture. If we want to be heard, we must engage their interest with an experience that captures their imagination
- Teach practical life skills, such as budgeting, planning a trip, maintain a vehicle, cooking, or preparing for a job interview
- Peter Pan Syndrome" - Males in this generation are constantly delaying their entrance into adulthood
- This generation is either going to be the cause of a lot of pain in suffering in the future, or will be able to work together and do some amazing things for the world. It is just too large and unique to have a "normal" lifetime. We need to foster this generation into building a vision and setting priorities. They need to lead economically, socially, and spiritually.
- When people fail to determine their values before they pursue their vision, they may compromise the person they want to become
- A title can give you authority, but it cannot give you influence or make you a leader
- This generation has been taught – S.C.E.N.E
 - S – Speed – Slow is Bad
 - C – Convenience – Hard is bad
 - E – Entertainment – Boring is bad
 - N – Nurture – Risk is bad
 - E – Entitlement – Labor is bad
- Artificial Maturity: over-exposed to information far earlier than they are ready, but under-exposed to real-life experiences far later than they're ready. Which can make them over-confident, even arrogant.
- They want to belong before they believe
 - If you hope to get them to embrace an idea – embrace them first.
- They want an experience before an explanation

- If you want to be heard, we must engage their interest with an experience. They want to do or see something. They want action and interaction.
- They want a cause before they want a course
 - Need to give them a reason for why they need to listen to your words.
- They want a guide on the side before they want a sage on the stage
 - They hunger more for a relationship than for information – Like to be on a need to know basis, but will be willing to learn more if info comes from someone who they trust.
- They want to play before they pay
 - Want results quickly – need to grab their attention quickly
- They want to use but not be used by others
 - Want to be in control and will use all resources to get what they want
- They want a transformation, not merely a touch
 - Want experiences that literally transform them in the process

Stillpower – Garret Kramer – (2/5)

- A person's state of mind will determine his/her outlook
- It's not our words, but the feelings behind our words that make a difference
- Teams/Coaches/Organizations are creating rules dictating how their athletes should behave – this leads to non-creative, zero individuality, within their athletes
- The most innovative teams/organizations allow it's members to express their views respectfully
- True leadership involves showing your players that the ability to be motivated rests within each of them individually
- Thank inward – control the controllable – make the best of every situation
- By stressing routine, we may be creating robotic and obsessive traits in our athletes who fail to use the power of their own insight and intuition to overcome challenges

Every Time I Find The Meaning of Life, They Change It – Daniel Klein – (4/5)

- The secret of the greatest fruitfulness and greatest enjoyment of existence is: to live dangerously
- The goods of the mind are at least as important as the goods of the body
- It is one of the blessings of old friends that you can afford to be stupid with them
- Life oscillates like a pendulum, back and forth, between pain and boredom
- The life of a man is of no greater importance to the universe than that of an oyster
- Religion is the once endeavor in which us/them thinking achieves a transcendent significance. If you really believe that calling God by the right name can spell the difference between eternal happiness and eternal suffering, then it becomes quite reasonable to treat heretics and unbelievers rather badly. The stakes of our

religious differences are immeasurably higher than those born of mere tribalism, racism, or politics.

- You are made of stuff that is as old as the planet, one third as old as the universe, though this is the first time that those atoms have been gathered together such that they think that they are you
- If you believe that feeling bad or worrying long enough will change a past or future event, then you are residing on another planet with a different reality system

Conscious Coaching – Brett Bartholomew – (4.5/5)

- We strive to improve our athletes physically – but ignore physiologically and emotionally
- We are all apprentices in a craft in which no one ever becomes a master
- Don't coach to athletes – coach with athletes
- You can stimulate connectedness by just acknowledging someone
- Information is more power when it's personal
- Authenticity, not mimicry, establishes connection with athletes
- Personality Tests – Perhaps have every athlete undergo one to help individualize coaching preferences earlier
- Becoming a better communicator requires self-reflection
- Draw upon the advantageous aspects of both your dark and bright-sided traits
- A trait that helps you become successful in one task may be counterproductive in another
- Survival of the fittest = the one best able to adapt
- Coach the person first – the athlete second
- 4 Drives
 - Learn
 - Bond
 - Acquire
 - Defend
- Having a purpose is a performance enhancer - help connect athletes with a/their purpose
- See yourself in your athletes eyes
- Give ground to gain ground
- Commitment is not convenient

The Happiness Advantage – Shawn Achor – (4.5/5)

- Success First – Happiness Second is a broken system
- Happiness is the pre-cursor to success
- If we study what is average, we will remain average
- As late a 1998, the ratio of positive to negative psychology research was 17:1
- Companies are still using incentive programs proven ineffective long-ago

- Positive emotions expand our lines of vision
- Prime the brain with positive thoughts
- Everybody has signature strengths – Different tests to find yours Page 55
- There are so many benefits to a business that uses/encourages fitness
- Job -> Career -> Calling
 - Calling is about a mindset not the actual work being done
 - Being a janitor can be a calling for someone
- Write a calling description – write a description of your job in such a way that it would entice others to apply for your job. Highlight the meaning of your work
- Pygmalion Effort – When our belief in another person’s potential brings that potential to life
- Start every meeting by re-stating the power and meaningfulness of our work.
- Start every meeting with a compliment
- Start everyday by making a list of good things in your job, career, life
- If we are able to conceive failure as an opportunity for growth, we are likely to experience growth
- Do not see adversity as a stumbling block, but as a stepping-stone to greatness
- Internal Locus – We are in control of our fates
- Don’t write a book – write a page
- We have a limited amount of willpower
 - Lower the “activation” of habits you want to create – make them easier thus using less willpower
 - Increase the “activation” of habit you want to break – make them harder thus using more willpower – Take batteries out of the remote, remove email from phone

[Rookie Smarts – Liz Wiseman – \(4/5\)](#)

- The best jobs are the ones we were not fully prepared for
- Sometimes not knowing is more valuable than knowing
- Seek learning
- Greater experience leads to great power of intuition
- As we get more experience/higher levels of mastery, we tend to stop seeking feedback – why?
- So many things are possible, just as long as you don’t know their impossible
- People don’t ask enough questions or for help
- I’d love to learn from you – great question for a mentor
- Ask and you shall receive, see and you shall find, knock and it shall be opened
- Never be afraid to say I don’t know
- Want to accelerate learning? Show humility and let others coach you
- Millennial’s want/need constant feedback and specific directions
- Seek mentorship
- When you don’t have the resources you get resourceful and creative

- Those new to a task are twice as likely to believe they didn't have the resources or skills they needed so they got scrappy, creative with the resources they had
- You grow on the fringes where comfort meets discomfort
- After climbing a great hill, one only finds that there are many more to be climbed – Nelson Mandela
- What makes a great leaders – lifelong learner and curiosity

Rework – Jason Fried and David Heinemeier Hansson – (3/5)

- Scratch your own itch
- Limited resources force you to make do with what you've got
- Trim the fat – don't have 30 menu items, have 10
- Ask yourself - What problems need to be solved? What can be better?
- Momentum fuels Motivation – keep momentum going – small wins, smaller/easier tasks
- If you're successful, people will try to copy what you do
- Don't out spend, out teach

Strength Training and Coordination - Frans Bosch - (5/5)

- The idea of basic motor properties (strength, agility, hand-eye coordination) is questionable and looking at training like this is wrong as many of these are specific (hand-eye coordination is hitting a baseball doesn't equal hand-eye coordination in hitting a tennis ball). There is also crossover between these properties and when we separate them out we end up with leaks in training transfer.
- Maximum force depends on the brain
- Strength training is coordination against resistance
- Create adaptable athletes, NOT adapted athlete
- Whenever possible, keep things together (Whole)
- Co-Contraction is a skill the athlete must possess
- Muscle coordination is key to power output and force production
- Power output is more than just adding up the output of all of the contributing muscles
- Strength training must satisfy the laws of motor learning for optimal transfer to sport
- Strength training can make you slower if it is applied improperly or hinders sport specific coordination
- Adaptation of tendons only happens when you train high intensities (high jumps/landings). This means higher risk but higher reward – plan accordingly
- Coordination is critical to performance. You need to re-think your training methods and ask yourself why it is important to make muscles stronger if the athlete never needs to display all that strength in the field of play. Make the athlete strong enough for their sport and then develop methods that allow them to improve muscle

- coordination and rhythm
- Everything has a cost
 - Intrinsic knowledge of results is the holy grail for coaching
 - Power output is rarely an issue of power production >> It is more an issue of coordination

Make The Big Time Where You Are - Frosty Westerning - (3/5)

Radical Condor - Kim Scott - (2/5)

You Are A Writer - Jeff Goins - (2.5/5)

Meditations - Marcus Aurelius - (3.5/5)

Time's Arrow - Martin Amis - (2.5/5)

Favorite Notes

Here's a LOONNGG list of things I jotted down after hearing them, reading them from various places. I tried to source the person I heard it from, but didn't always write it down.

I've categorized them into broad subjects for ease

Coaching/Communication/Feedback

- If you have a heavy session of learning and feedback – the way that information is moved from the neo-cortex to the dorsal areas of the brain is through sleep – Nick Winkleman
- Communication is dictated by 3 things – culture, generation, region – Nick Winkleman
- The best drills introduce sensory information about the error so the athlete can self-correct ie arms OH sprinting, mini band around knees during squat
- Only through sleep is true motor consolidation/downloading occur – Nick Winkleman
- Don't judge your success as a coach when the athlete is with you – judge the athlete by how they perform without you
- Implicit learning, is the preferred method to teach – but the athlete needs the context to gather from the environment
- The brain learns through metaphor and story telling
- Your program should be written with PEOPLE and individual personalities in mind – Brett Bartholomew
- People are generally driven by learning, bonding, acquiring, and defending – Brett Bartholomew
- It's our job as coaches to connect people and purpose – Brett Bartholomew

- People are the ultimate performance principle- how we interact and motivate is critical
- Don't underestimate the session feedback form to debrief and inform future practice
- Humility parallels maturity
- Desire is not the same as talent, and talent is not the same as accomplishment
- Humility isn't thinking less of yourself, **but thinking of yourself less**
- Every athlete has a coach in their head that is competing with you
- Expertise is knowing when NOT to do something
- When performers are given control over when to receive demonstrations they show better retention & skill
- Communicate that there is meaning even in the small, mundane tasks
- Be careful how much emphasis you place on drill perfection – doesn't always translate to actual performance
- Start and finish every session with a message
- Be honest, don't give un-deserving praise
- Ask athletes for feedback, if you blindly praise them, and they didn't feel they didn't something well or at full effort - you further cement the trait of under working
- I hear it a lot, a coach telling his or her athletes – “you guys worked hard” - well did they? Did they really work hard or are you just giving generic praise
- Kids aren't as fragile as we think
- Competition vs threat – tell them they are excited not nervous, this increases the competition state of the athletes
- Interpret anxiety = excitement not nervous
- Know your athletes, what motivates them, angers, anxiousness, threatens, etc
- If you do not convey a message in a way that makes sense to the athlete, the best advice will not have an effect – Brett Bartholomew

- Know your athlete, know your coaching style, and find unique ways to get the best out of them
- Coaching is cooking
- Cherish the person over the athlete. Brilliant coaches know that being an athlete is just a small part of being a human, brilliant coaches never do anything to advance the athlete at the risk of the person
- Connect before they direct
- Create, instead of finding, talent
- Practice begins after the athletes learn
- Fun is an essential element in training, no matter how elite an athlete becomes
- "One must draw a line in the sand" in explaining a point or situation we may encounter in which we have to make someone choose their level of commitment – Kyle Holland and Matt Gifford
- Athletes must believe in the strategy and system in order for it to be most beneficial to them
- Analogies are the core of cognition
- When a coach puts effort into the athlete, trust is developed and motivation is higher
- Set intent of every drill/exercise
- Keep in mind also that variability does not always mean a modification of the exercise. Our ever-changing dynamic nature means we have built-in variability; we are literally working with a slightly different operating system every day – Stuart McMillian
- One of the most important measures of athlete growth/success is self-reflection
- Ask yourself the following questions every 2-weeks
 - What do I want to do
 - Who do I need there to help make sure it gets done?
- How big is your knowledge budget compared to your equipment budget

- If you want better self-reflection and insights from your athletes then you need to learn how to ask better questions.
- Try to see the training/practice/game through the lens of your athletes – Henk Kraaijenof
- It's not what you look at, it's what you see. It's not what you listen to, it's what you hear.
- Everyday is an interview
- Know your crowd
- In business/sport the people on the frontline never have as good of an understanding of why they are doing something as those higher up. Communicating this why is important and increases buy-in
- A leader must explain, not just what to do, but why
- When coaching youth athletes, use fun names for drills/games - Don't call it a broad jump, call it a frog jump and you have to jump from lily pad to lily pad.
- In order for an athlete to have success, they need to have trust and belief in their coach/program
- Speak the language of the people you are communicating with. You'll speak differently to your athletes than you do administration than you do sport coaches than you do sports medicine

Skill Acquisition/Motor Learning

- Give the athlete tools to help self correct their errors >> You can't really coach an athlete out of their errors, they need to learn to "solve" them on their own
- Coaches and teachers should remember that their clients are self-organizing systems, that good movement will tend to just emerge under the right conditions, and that athletes will be attracted to the right movement patterns if they get the right kind of practice. They don't need specific information about exactly how to move, only the right conditions to learn:
- There are two basic methods of providing feedback to assist learning: Knowledge of results (KR) and knowledge of performance (KP). KR means letting the athlete know whether they accomplished their goal by showing them, for example, how fast they ran, how far they jumped, or whether they hit a target. Knowledge of

performance is feedback about the specific techniques used to accomplish the result. For example: telling a sprinter to raise the knees higher, a thrower to turn the shoulders more, or a squatter to get the thighs to parallel.

- Substantial research indicates that knowledge of results is a far more effective and leads to faster motor learning. For example, one study showed that discus throwers perform better after being told how far they threw, compared to getting technical feedback from a highly qualified coach.
- The superiority of KR versus KP is analogous to the superiority of external over internal cues. An external cue asks the athlete to focus their attention on something external to the body during performance - such as a target when throwing, or touching an object when jumping. An internal cue has the athlete focus on the movement of the body during performance, such as the position of the arms during a throw, or powerful hip extension in a jump. Here again, there is significant research by Gabriel Wulff and others showing that external cues lead to far greater motor learning, and that internal cues may even be detrimental in some circumstances.
- Perhaps the most important of these is that the predictability of what happens in training (monotony) may act as a brake on the intended training results. Variation and alternation in the types of training may keep the brain interested in adapting control yield better results.
- Motivation is thus a state of the entire organism, can be seen as a thermostat in the learning process.
- Repetition and practice is necessary to get better, but if it leads to monotony and reduces motivation, learning will suffer. Variation in training increases motivation and avoids monotony.
- We often view variability in the weight room as a negative. We see dis-coordination, balance issues, pelvic drop, ankle instability, suboptimal biomechanics; and we instantly try to correct by cueing and micro managing joint angles or body positions. We decrease variability and paint the athlete into one movement signature. Instead, giving the athlete an incubation period to learn, make mistakes, self-correct and develop much more organically is vital for them in order to solve problems and progress.
- Progress towards increasingly skilled performance consists of the acquisition and stabilization of more effective movement solutions (Vereijken). Many researchers are now exploring the role variability has in skill acquisition and adaptation, and showing that contrary to what was once thought, fluctuations in movement coordination actually play a necessary role in refining movement solutions -

essentially allowing beginners and experts alike more 'system exploration' as they learn a specific task. – Stuart McMillian

- If your idea of coaching is identifying errors in the execution of a skill, and then communicating these errors to the athlete(s), you're doing it wrong. Understanding the technical model, and how and where the athlete(s) sits within that model is the beginning of the coaching process - not the end – Stu McMillian
- As an industry, we have done a great job of trying to understand the manipulation and organization of load, and how this relates to concomitant adaptation. However, I feel we have not paid enough attention to the understanding of - and how to best organize - skill acquisition principles
- People want to make things simple all the time and there are certainly instances where using simple descriptions or models can be helpful in getting a point across; however, when we are constantly distilling things down to such simplicity we lose sight of the fact that the human body is truly complex and there are many interactions that we need to think about.
- By looking at skill acquisition as a creative endeavor we force ourselves to design challenges that will challenge players to come up with ways of performing that will be original, meaningful and surprising.
- The very concept of a 'drill' that involves repeating a movement pattern again and again can only be used to create players that will behave in predictable ways.
- The most talented person does not always win – person who responds to pressure, stress, and is mentally present does
- Doing things/techniques that are comfortable to the athletes is more important than trying to force specific techniques. Like holding breathing during a start, certain stance, arm action, etc
- Youth athlete development is contingent on an individually unique and constantly changing base of normal physical growth, biological maturation and behavioral development, and therefore it must be considered individually. – Mark O'Sullivan
- For the purpose of retention and transfer, training should be representative of the performance environment – Mark O'Sullivan
- Development is non-linear, learning is non-linear. Therefore talent is non-linear
- Miss out on identifying other factors that are associated with talent (soft skills such as decision making, communication, awareness)

Strength/Power/Weight Room Type Stuff

- Having glutes that can generate a lot of power is useless if you can't apply it to the ground
- There is really no such thing as "strength" or "power" as a universal generalized ability. Both qualities depend on coordination for their expression, and coordination is a specific skill. Thus, a person can be strong in one area, but weak in another.
- Strength/Power is specific – you can be strong in the back squat but weak on the field – specificity matters
- Optimal performance exists in the ideal marriage of fluidity and force. The best performers are rarely the ones who produce the most force - they are the ones who move the most forcefully with the most fluidity (think Jordan, Kobe, LeBron, Usain, etc.). Force (and all its related constructs) is relatively easy to improve - this is why as an industry, we have become so enamored with its development: easy to improve - easy to measure - easy to justify – Stu McMillian
- Fluidity (aka coordination, or - at its zenith - flow) is a totally different story. Difficult to quantify, difficult to objectively measure, and difficult to justify. But it is undoubtedly the primary limiting factor at elite levels. Therefore, coaches who work with athletes at these levels need to better understand how to organize their training around the development of it. – Stu McMillian
- Especially as an athlete gets closer to their genetic ceiling (reaching greater rates of diminishing returns), it is important that coaches don't continue to hammer away at loading only through increased volume and intensity – Stu McMillian
- We need to ensure that a) exercises are selected based on their transference, and b) we respect the fact that intelligent variation in exercise selection improves skill acquisition. These two principles are not as dichotomous as we may think. The variability in exercise selection should still serve a strategic technical objective - adding either context to position or strategy, or providing contextual interference to the specific technical objective of the session – Stu McMillian
- According to Zatsiorsky, there are two primary means to which to induce an adaptation: 1) an increase in load, through volume, intensity, or both; and 2) variation in the training (change the program, element, or exercise). As the athlete matures, increases in volume and intensity becomes less and less sustainable, as our ability to handle further increases are finite. It is often here where coaches get it

wrong - continuing to push volume or intensity, they either end up with injured athletes, or mal-adaptation, and concomitant regression in abilities. In more desperate camps, they may even feel the need to continue driving volume and intensity through the use of performance-enhancing drugs.

Skilled coaches, however, understand that the ability to continue adapting to ever-increasing volumes and intensities is not possible; and instead build their training programs around smaller, more frequent, and more transferable loads - while also respecting the importance of maximizing skill acquisition and motor learning through sub-maximal and variable methods – Stu McMillian

- Variability and specificity in load are perhaps more salient principles in elite sport than 'overloading' volume and intensity – Stuart McMillian
- Garkavi's research aligns with the the dose-response relationships described by the Arndt-Schulz law (for every substance, small doses stimulate, moderate doses inhibit, large doses kill) and the concept of hormesis (beneficial effect results from exposure to low doses of an agent that is otherwise toxic or lethal when given at higher doses.) Low-dose stimulation and high-dose inhibition can be seen quite easily, and often, in sport - with the recent example at The University of Oregon showing the potential results when dosage exceeds adaptive capabilities. More commonly though, we see examples of either true over-training (inappropriate loading and excessive density of volume and-or intensity, that leads to a chronic - long-term - reduction in abilities), or excessive over-reaching (whereby excessive load leads to a short-term reduction in abilities that require non-planned adjustment in programming to recover from). Conversely, if we study some of the more successful programs throughout sport, we can see examples of the benefits of hormetic loading. Perhaps most strikingly, the methodology of Anatoliy Bondurchuk is rooted in hormesis: frequent, relatively small, sub-maximal loads, with no manipulation of loading parameters until a positive response plateaus, whereby a new 'program' is introduced – Stu McMillian
- The application of Bondarchuk's philosophy into sports other than shot-put and hammer is, I think, something that coaches should explore – Stuart McMillian
- RFD, coordination with loads is not the same as without loads
- Specificity is more than just looking alike (two movement looking like) its about ground forces/times, joint angle, muscle actions, intent, hormonal/cellular adaptations

Random

- If I ran you through an FMS & scored an 8 - In 15min of therapy, you could re-test & score a 15. How is that a viable test?
- We tend to focus on only positive transfer, but ignore negative transfers – Frans Bosch
- There is only one corner of the universe you can be certain of improving, and that is your own self." Emerson
- Athletes: Is competition easy? Does the guy you're going against give you a pass when you're tired? Why expect training to be any different?
- Quality programs are athlete-specific before they are sport-specific. Good movement is good movement, regardless of sport.
- You have to coach sleep! It's one of the most important tools athletes have for injury prevention, improved performance, health & well being
- No amount of supplements, training, stretching, will replace sleep and sunshine when it comes to performance
- Train as much as necessary, not as much as possible" Henk Kraaijenhof
- Don't chase the money, chase the dream and the money will follow.
- The actual evidence about mental toughness and grit is that they have little to no scientific validity. The importance of context is ignored (most significantly, psychophysiology) and, when used as blunt tools or terms (which they often are, such as an athlete/individual being blamed for not being "tough" or "gritty" enough), we are ignoring the point that performance is comprised of many factors.
- Mental toughness and grit have the illusion of validity, and people have belief bias concerning the terms because they seem to make sense. However, in actuality, they are overstated concepts that lack validity. The scientific truth is that the brain is wired to survive—so performance and survival are not about toughness or grit, and instead are the result of training, which allows for adaption, and eventual evolution.
- The reality is that high performance is a complex multifactorial process that includes the brain every step of the way
- Sleep is any organization's No. 1 performance enhancer because of its protective factors for the brain and, ultimately, its impact on optimal performance and brain health

- Establishing mental toughness is not working your athletes into the ground. Mental toughness is establishing the ability to maintain one's composure throughout high pressure situations. Mental toughness is not jumping offside when your opponent has the ball and it's third down and two, not hitting a player when he's out of bounds, not roughing the passer, and performing your assignment optimally when it's fourth down and the football is on your opponent's one yard line on the last play of the game and you need a touchdown to win
- The development of mental toughness is achieved with the appropriate structure of high tempo practices under high-pressure game-day type situations. To respond optimally in this stressful environment the athlete must be alert and able to perform with appropriate neuromuscular and musculoskeletal system function, not through exhaustion and nausea.
- It was a high counsel that I once heard given to a young person, "Always do what you are afraid to do." – Ralph Waldo Emerson
- Men's best successes come after their disappointments. – Henry Ward Beecher.
- Chronotypes – some train better in the morning, some better in the evening – try to make this specific to each athlete
- Even though certain individual training specifics – training in morning vs night, specific sets and reps, rest periods, internal vs external vs neutral cueing, left and right brain types, building a learning environment, etc – might only lead to a 1% increase in performance each day – but over time this adds up
- Every artist was first an amateur. – Ralph Waldo Emerson
- An Isometric RDL is the best way to improve hamstring flexibility/function
- 76% of people think they're above average drivers
- Injury ≠ Weakness
- As a coach, what you do/program on a Monday WILL effect the quality of Friday's training. This is truly something that isn't always appreciated. If you wreck someone on Monday, you are essentially throwing away the rest of the week
- Don't treat the image, treat the individual – Jas Randhawa
- Tendons that are NOT loaded, are NOT happy – Jas Randhawa

Speed/Movement

- Without context of a task, movement patterns may exist but they will be devoid of strategies – Stuart McMillian
- So the more we try to use methods that encourage players to behave alike and in predictable ways the more we are likely to produce players that cannot adapt to changes in the game effectively and yet it is precisely this adaptation that is at the heart of the creative process.
- What's unique about Altis, is we view the weight room as a compliment to what we do on the track, the weight room is often 3rd or 4th in line of importance – Dan Pfaff
- If you see someone running zig-zig out of the gate/blocks – it means they are coming out too low
- If you see an athlete zig-zag later in acceleration (after 3-5 steps) they aren't rising and trying to stay low
- Athletes should rise 6-8 degrees each step
- Shin, pelvis, and torso angles should match and be parallel
- Don't try to have the arms work in opposition of the legs during acceleration – drive back – DO NOT TRY AND THROW FORWARD!
- Front knee angle (in blocks) should be 90-degrees – ONLY IF STRONG. Weaker can be 100-110
- Back knee (in blocks) is 120-130 degrees
- Flexibility DOES NOT EQUAL speed – Almost zero correlation
- Arms vertical – don't lean – reduce weight on arms
- Shin NEEDS to be vertical at GCT during Max Velocity
- Too much strength/stiffness isn't good. Also need joint compliance
- One toe off and backside flight – foot/sole should NOT be parallel to ground
- Teach your athletes dorsiflexion – educate them what it is and why it's important

- Sprinting – Arm angle is not at 90 degrees, Upper arm should be parallel to ground during back swing = shoulder extension flexibility is important
- To sprint faster, you don't try more.
- As speed increases, the gastrocnemius and soleus act isometrically to transfer force
- Often shoulder dysfunction is related to contralateral hip dysfunction – Dan Pfaff
- College FB players reach top speed at 20m
- 90% and 68% of sprint all sprints in soccer and rugby are 20m or less
- 58% of sprints in rugby proceeded by locomotion, only 24% by standing start
- It doesn't matter what level of speed an athlete can maintain or hold or repeat if that speed is slow!
- A false step is not actually the act of moving backward. Watch it closely – it's actually just a re-positioning of the foot while the COM moves forward for better projection angles. The hip/COM doesn't move backwards – Lee Taft
- "Performance during stretch-shortening cycle exercise is influenced by the visco-elastic properties of the muscle-tendon units. During stretching of an activated muscle, mechanical energy is absorbed in the tendon structures (tendon and aponeurosis) and this energy can subsequently be re-utilized if shortening of the muscle immediately follows the stretching. According to Biscotti (2000), 72% of the elastic energy restitution action comes from tendons, 28% - from contractile elements of muscles.

Research

In no particular order, here is a short list of research I found useful during this past year. The following isn't necessarily research published this past year, but literature I reviewed and used in some writings.

Sheppard, J. M., & Young, W. B. (2006). Agility literature review: classifications, training and testing. Journal of sports sciences, 24(9), 919-932.

- The authors present an updated definition of agility – a rapid whole-body movement with change of velocity or direction in response to a stimulus – and clearly distinguish agility as a separate quality from COD. The need to include perceptual, cognitive, visual scanning, anticipation to movement training is emphasized.

Davids, K., Glazier, P., Araujo, D., & Bartlett, R. (2003). Movement systems as dynamical systems. Sports medicine, 33(4), 245-260.

- It is apparent that variability in movement systems is omnipresent and unavoidable due to the distinct constraints that shape each individual's behavior. The authors argue that trial-to-trial movement variations within individuals and performance differences observed between individuals may be best interpreted as attempts to exploit the variability that is inherent within and between biological systems. The dynamical systems theory provides an appropriate multidisciplinary theoretical framework to explain their interaction in supporting physical performance.

Williams, A. M., & Davids, K. (1998). Visual search strategy, selective attention, and expertise in soccer. Research quarterly for exercise and sport, 69(2), 111-128.

- Experienced (n = 12) and less experienced (n = 12) soccer players moved in response to filmed offensive sequences. Experienced (n = 12) and less experienced (n = 12) soccer players moved in response to filmed offensive sequences. Findings highlight the advantages of integrating eye movements with more direct measures of selective attention.

Sides, D. L. (2015). Kinematics and kinetics of maximal velocity sprinting and specificity of training in elite athletes (Doctoral dissertation, University of Salford).

- Maximal velocity sprinting has been studied extensively from a biomechanical standpoint, however little is known of the biomechanics characteristics at sprint

velocities that typify elite athletic performance. Investigations of ten international level sprinters in a competition environment revealed the kinematic variables which characterize sprint velocities exceeding 10.0m/s. Elite sprinters minimized the touchdown distance and knee flexion during ground contact, and terminated stance prior to full extension of the hip and knee. An additional kinetic analysis on six elite male sprinters revealed a greater hip angle at touchdown and higher maximum and average hip velocities in swing were associated with lower peak braking forces. Reduced hip and knee extension at toe-off along with a greater degree of maximum hip flexion were associated with a higher vertical impulse. A movement specificity framework was developed to quantify the holistic specificity of training methods based on biomechanical movement principles. The Bulgarian split squat drop had a high specificity to maximal velocity sprinting with respect to the loading principles. Running drills were highly specific based on coordination principles, in particular the leg extension velocities in the late phases of stance.

Haugen, T., Danielsen, J., Alnes, L. O., McGhie, D., Sandbakk, Ø., & Ettema, G. (2017). On the importance of “front-side mechanics” in athletics sprinting. *International journal of sports physiology and performance*, 1-24.

- This study aimed to investigate if variables related to front- and back-side mechanics can be distinguished from other previously highlighted kinematic variables (spatiotemporal variables and variables related to segment configuration and velocities at touchdown) in 24 competitive sprinters (avg PB of 10.86 in the 100m Dash). Kinematics were recorded in 3D using a motion tracking system with 21 cameras at a 250 Hz sampling rate. Several front- and back-side variables, including thigh- ($r = 0.64$) and knee angle ($r = 0.51$) at lift-off, and maximal thigh extension ($r = 0.66$), were largely correlated ($p < 0.05$) with accelerated running performance (ARP), and these variables displayed significantly higher correlations ($p < 0.05$) to ARP than nearly all the other analysed variables. However, the relationship directions for most front- and back-side variables during accelerated running were opposite compared to how the theoretical concept has been described. Horizontal ankle velocity, contact time and step rate displayed significantly higher correlation values to maximal velocity sprinting (MVS) than the other variables ($p < 0.05$), and neither of the included front- and back-side variables were significantly associated with MVS. Overall, the present findings did not support that front-side mechanics were crucial for sprint performance among the investigated sprinters.

Young, W., & Farrow, D. (2013). The importance of a sport-specific stimulus for training agility. *Strength & Conditioning Journal*, 35(2), 39-43.

- Higher performers are better able to identify specific kinematic stimuli over lower performers. Generic stimuli, such as flashing lights or colored cones, are NOT able to differentiate level of performers. Training for agility should include specific

perceptual and decision-making components involving reacting to movements of others.

Nimmerichter, A., Weber, N. J., Wirth, K., & Haller, A. (2015). Effects of video-based visual training on decision-making and reactive agility in adolescent football players. *Sports*, 4(1), 1.

- This study investigated the trainability of decision-making and reactive agility via video-based visual training in young athletes. Thirty-four members of a national football academy (age: 14.4 ± 0.1 years). In addition to the football training, the VIS completed a video-based visual training twice a week over a period of six weeks during the competition phase. Using the temporal occlusion technique, the players were instructed to react on one-on-one situations shown in 40 videos. The number of successful decisions and the response time were measured with a video-based test. In addition, the reactive-agility sprint test was used. VIS significantly improved the number of successful decisions (22.2 ± 3.6 vs. 29.8 ± 4.5 s; $p < 0.001$), response time (0.41 ± 0.10 s vs. 0.31 ± 0.10 s; $p = 0.006$) and reactive agility (2.22 ± 0.33 s vs. 1.94 ± 0.11 s; $p = 0.001$) pre- vs. post-training. No significant differences were found for CON. The results have shown that video-based visual training improves the time to make decisions as well as reactive agility sprint-time, accompanied by an increase in successful decisions. It remains to be shown whether or not such training can improve simulated or actual game performance.

Slawinski, J., Bonnefoy, A., Ontanon, G., Leveque, J. M., Miller, C., Riquet, A., ... & Dumas, R. (2010). Segment-interaction in sprint start: Analysis of 3D angular velocity and kinetic energy in elite sprinters. *Journal of biomechanics*, 43(8), 1494-1502.

- The aim of the present study was to measure during a sprint start the joint angular velocity and the kinetic energy of the different segments in elite sprinters. This was performed using a 3D kinematic analysis of the whole body. Eight elite sprinters (10.30 ± 0.14 s 100 m time), equipped with 63 passive reflective markers, realised four maximal 10 m sprints start on an indoor track. An opto-electronic Motion Analysis® system consisting of 12 digital cameras (250 Hz) was used to collect the 3D marker trajectories. During the pushing phase on the blocks, the 3D angular velocity vector and its norm were calculated for each joint. The kinetic energy of 16 segments of the lower and upper limbs and of the total body was calculated. The 3D kinematic analysis of the whole body demonstrated that joints such as shoulders, thoracic or hips did not reach their maximal angular velocity with a movement of flexion-extension, but with a combination of flexion-extension, abduction-adduction and internal-external rotation. The maximal kinetic energy of the total body was reached before clearing block (respectively, 537 ± 59.3 J vs. 514.9 ± 66.0 J; $p \leq 0.01$). These results suggested that a better synchronization between the upper and lower limbs could increase the efficiency of pushing phase on the blocks.

Scanlan, A., Humphries, B., Tucker, P. S., & Dalbo, V. (2014). The influence of physical and cognitive factors on reactive agility performance in men basketball players. *Journal of sports sciences*, 32(4), 367-374.

- This study explored the influence of physical and cognitive measures on reactive agility performance in basketball players. Twelve men basketball players performed multiple sprint, Change of Direction Speed Test, and Reactive Agility Test trials. Pearson's correlation analyses were used to determine relationships between the predictor variables (stature, mass, body composition, 5-m, 10-m and 20-m sprint times, peak speed, closed-skill agility time, response time and decision-making time) and reactive agility time (response variable). Response time ($r = 0.76$, $P = 0.004$) and decision-making time ($r = 0.58$, $P = 0.049$) had large to very large relationships with reactive agility time. Response time was identified as the sole predictor variable for reactive agility time in the stepwise model ($R^2 = 0.58$, $P = 0.004$). In conclusion, cognitive measures had the greatest influence on reactive agility performance in men basketball players. These findings suggest reaction and decision-making drills should be incorporated in basketball training programs.

Williams, A. M., Ward, P., Bell-Walker, J., & Ford, P. R. (2012). Perceptual-cognitive expertise, practice history profiles and recall performance in soccer. *British Journal of Psychology*, 103(3), 393-411.

- The researchers measured perceptual-cognitive expertise in elite ($n = 48$) youth soccer players using empirical tests of perceptual-cognitive skill. Within those 48 athletes, they then used a quartile split to stratify elite players into either high-performing ($n = 12$) or low-performing ($n = 12$) groups based on their test scores. The high-performing group had accumulated more hours in soccer-specific play activity over the last 6 years of engagement in the sport compared to their low-performing counterparts and the non-elite controls. No differences were reported for hours accumulated in soccer-specific practice or competition between the high- and low-performing groups. In Study 3, a novel test was developed to examine episodic memory recall in soccer. Although this test successfully differentiated elite from non-elite players, no differences were evident between high- and low-performing groups, implying that episodic memory recall may not be a crucial component of perceptual-cognitive expertise in soccer.

Spiteri, T., Hart, N. H., & Nimphius, S. (2014). Offensive and defensive agility: a sex comparison of lower body kinematics and ground reaction forces. *Journal of Applied Biomechanics*, 30(4), 514-520.

- The aim of this study was to compare biomechanical and perceptual-cognitive variables between sexes during an offensive and defensive agility protocol. Twelve male and female ($n = 24$) recreational team sport athletes participated in this study, each performing 12 offensive and defensive agility trials (6 left, 6 right) changing direction in response to movements of a human stimulus. Three-dimensional

motion, ground reaction force (GRF), and impulse data were recorded across plant phase for dominant leg change of direction (COD) movements, while timing gates and high-speed video captured decision time, total running time, and post COD stride velocity. Subjects also performed a unilateral isometric squat to determine lower body strength and limb dominance. Group (sex) by condition (2×2) MANOVAs with follow-up ANOVAs were conducted to examine differences between groups ($P \leq .05$). Male athletes demonstrated significantly greater lower body strength, vertical braking force and impulse application, knee and spine flexion, and hip abduction, as well as faster decision time and post COD stride velocity during both agility conditions compared with females. Differences between offensive and defensive movements appear to be attributed to differences in decision time between sexes. This study demonstrates that biomechanical and perceptual-cognitive differences exist between sexes and within offensive and defensive agility movements.

Haugen, T., Danielsen, J., McGhie, D., Sandbakk, Ø., & Ettema, G. (2017). Kinematic stride cycle asymmetry is not associated with sprint performance and injury prevalence in athletic sprinters. *Scandinavian journal of medicine & science in sports*.

- The aims of this study were to (a) quantify the magnitude of kinematic stride cycle asymmetry (b) explore the association between kinematic asymmetry and maximal sprint running performance, and (c) investigate possible associations between kinematic asymmetry and injury prevalence in 22 competitive sprinters (avg PB of 10.86 in the 100m Dash). The results showed that ≥ 11 of the 22 participating athletes displayed large or very large asymmetry for at least 11 of 14 variables, and all athletes displayed large or very large asymmetry for at least three variables. No correlations between individual magnitudes of asymmetry and sprint performance were significant (trivial to moderate). No significant changes in asymmetry between best and worst trial were observed for any of the analyzed variables. In addition, injured and non-injured athletes did not differ in asymmetry, neither for the time period 1 year prior to nor after the test. In conclusion, kinematic asymmetries in the stride cycle were not associated with neither maximal sprint running performance nor the prevalence of injury among high-level athletic sprinters.

Farrow, D., & Robertson, S. (2017). Development of a skill acquisition periodisation framework for high-performance sport. *Sports Medicine*, 47(6), 1043-1054.

- The periodization of physical training has been studied thoroughly, but the same scrutiny hasn't been applied to skill acquisition training. The authors aim to present ideas of periodizing skill acquisition and provide support for SPORT acronym – Specificity, Progression, Overload, Reversibility, and Tedium.

Exell, T., Irwin, G., Gittoes, M., & Kerwin, D. (2017). Strength and performance asymmetry during maximal velocity sprint running. *Scandinavian journal of medicine & science in sports*, 27(11), 1273-1282.

- Bilateral ground reaction force and kinematic data were collected during maximal velocity (mean = 9.05 m/s) sprinting for eight athletes. Bilateral ground reaction force data were also collected while the same athletes performed maximal effort squat jumps. Using novel composite asymmetry scores, interactions between kinematic and kinetic asymmetry were compared for the group of sprinters. Asymmetry was greater for kinematic variables than step characteristics, with largest respective values of 6.68% and 1.68%. Kinetic variables contained the largest asymmetry values, peaking at >90%. Asymmetry was present in all kinematic and kinetic variables analyzed during sprint trials. However, individual athlete asymmetry profiles were reported for sprint and jump trials. Athletes' sprint performance was not related to their overall asymmetry. Positive relationships were found between asymmetry in ankle work during sprint running and peak vertical force ($r = 0.895$) and power ($r = 0.761$) during jump trials, suggesting that the ankle joint may be key in regulating asymmetry in sprinting and highlighting the individual nature of asymmetry. The individual athlete asymmetry profiles and lack of relationship between asymmetry of limb strength and sprint performance suggest that athletes are not "limb dominant" and that strength imbalances are joint and task specific. Compensatory kinetic mechanisms may serve to reduce the effects of strength or biological asymmetry on the performance outcome of step velocity.

Araujo, D., Davids, K., & Hristovski, R. (2006). The ecological dynamics of decision making in sport. Psychology of sport and exercise, 7(6), 653-676.

- The aim of this position paper is to consider the decision-making process as an integral part of goal-directed behavior influenced by functional constraints at the scale of the environment-athlete relationship. Decision-making behavior is best considered at the level of the performer-environment relationship and viewed as emerging from the interactions of individuals with environmental constraints over time towards specific functional goals.

Spiteri, T., McIntyre, F., Specos, C., & Myszka, S. (2017). Cognitive Training for Agility: The Integration Between Perception and Action. Strength & Conditioning Journal.

- Authors suggest taking a constraints led approach to movement training and suggest ways to enhance movement perception-action coupling and always involving information-movement to enhance overall agility performance.

Nimphius, S., Callaghan, S. J., Bezodis, N. E., & Lockie, R. G. (2017). Change of direction and agility tests: Challenging our current measures of performance. Strength & Conditioning Journal.

- A thorough overview of all the agility and COD tests that have been performed in the literature and some of the shortcoming, benefits, and future trends of these tests.

Bruce, L., Farrow, D., Raynor, A., & Mann, D. (2012). *But I can't pass that far! The influence of motor skill on decision making. Psychology of Sport and Exercise, 13(2), 152-161.*

- Decisions requiring movements (perceptual-motor) elicited more accurate decision-making than simple verbal responses (perceptual-cognitive), irrespective of participant skill. Although motor skill was found to be related to the successful execution of a most appropriate movement in a game situation, it was not found to limit the nature of the decision made by participants. No evidence was found to support the supposition that lesser-skilled participants bias their perceptual-cognitive decisions towards ones supported by their motor ability. Motor skill influenced the performance of the required action, but not necessarily the decision made. Performance is superior on a coupled perceptual-motor task relative to a de-coupled perceptual-cognitive task. Motor skill performance was commensurate with expertise.

Sheppard, J. M., Young, W. B., Doyle, T. L. A., Sheppard, T. A., & Newton, R. U. (2006). *An evaluation of a new test of reactive agility and its relationship to sprint speed and change of direction speed. Journal of science and medicine in sport, 9(4), 342-349.*

- The purpose of this study was to evaluate the reliability and validity of a new test of agility, the reactive agility test (RAT), which included anticipation and decision-making components in response to the movements of a tester. The result suggests that traditional closed skill sprint and sprint with direction change tests may not adequately distinguish between players of different levels of competition in Australian football.

Bartlett, R., Wheat, J., & Robins, M. (2007). *Is movement variability important for sports biomechanists?. Sports biomechanics, 6(2), 224-243.*

- Even elite athletes cannot reproduce identical movement patterns after many years of training, contradicting the ideas of motor invariance and “representative” trials. We contend that movement variability, far from being solely due to neuromuscular system or measurement “noise” – as sports biomechanists may have previously supposed – is, or could be, functional. Such functionality could allow environmental adaptations, reduce injury risk, and facilitate changes in coordination patterns. We conclude by recommending that sports biomechanists should focus more of their research on movement variability and on important related topics, such as control and coordination of movement, and implications for practice and skill learning.

Harris, N. K., Cronin, J. B., Hopkins, W. G., & Hansen, K. T. (2010). *Inter-relationships between machine squat-jump strength, force, power and 10 m sprint times in trained sportsmen. Journal of Sports Medicine and Physical Fitness, 50(1), 37.*

- Although correlations do not imply cause and effect, we speculate that the common practice of focusing on high levels of maximal strength in a machine squat to improve power output may be misguided. Our results also cast doubt on the efficacy

of increasing explosive force and power in a machine squat-jump with the intention of improving sprint ability in well-trained athletes.

Harris, N. K., Cronin, J. B., Hopkins, W. G., & Hansen, K. T. (2008). Squat jump training at maximal power loads vs. heavy loads: effect on sprint ability. *The Journal of Strength & Conditioning Research*, 22(6), 1742-1749.

- Small-moderate negative correlations between change in 1RM and change in sprint time ($r \approx -0.30$) in the combined groups provided the only evidence of adaptive associations between strength and power outputs, and sprint performance. In conclusion, it seems that training at the load that maximizes individual peak power output for this exercise with a sample of professional team sport athletes was no more effective for improving sprint ability than training at heavy loads, and the changes in power output were not usefully related to changes in sprint ability.

Fuelscher, I. T., Ball, K., & MacMahon, C. (2012). Perspectives on learning styles in motor and sport skills. *Frontiers in psychology*, 3.

- Learning styles is a learner's preferred mode (e.g., visual, verbal) of taking in and processing new information. Although it is a relevant topic for the learning of motor and sport skills, few studies have used an appropriate methodology to test the effectiveness of learning style-based instruction. We highlight the need for a learning style assessment tool specific to motor skills and call for a test of the learning style hypothesis, the claim that learners will benefit from instruction that is tailored to their individual learning style.

Rauner, R. R., Walters, R. W., Avery, M., & Wanser, T. J. (2013). Evidence that aerobic fitness is more salient than weight status in predicting standardized math and reading outcomes in fourth-through eighth-grade students. *The Journal of Pediatrics*, 163(2), 344-348.

- Aerobic fitness was a significant predictor of academic performance; weight status was not. Although decreasing BMI for an overweight or obese child undoubtedly improves overall health, results indicated all students benefit academically from being aerobically fit regardless of weight or free/reduced lunch status. Therefore, to improve academic performance, school systems should focus on the aerobic fitness of every student.

Vanrenterghem, J., Nedergaard, N.J., Robinson, M.A. et al. *Sports Med* (2017). doi:10.1007/s40279-017-0714-2

- We propose a new theoretical framework in which physiological and biomechanical load-adaptation pathways are considered separately, shedding new light on some of the previously published evidence.

Zweifel, M. (2017). Importance of Horizontally Loaded Movements to Sports Performance. *Strength & Conditioning Journal*, 39(1), 21-26.

- The effectiveness of vertically loaded exercise to enhance sprinting speed and change of direction (COD) speed is equivocal in advanced athletes, and the use of horizontally loaded movements may have better transfer for sprinting speed and COD speed.

Zweifel, M. (2015). Effects of 6-week Squat, Deadlift, and Hip Thrust Training Programs on Speed, Power, Agility, and Strength in Experienced Lifters.

- It was, therefore concluded that each major exercise may influence performance test differently, and more experimental research needs to be done to find these relationships.

Rhea, M. R., Kenn, J. G., Peterson, M. D., Massey, D., Simão, R., Marin, P. J., ... & Krein, D. (2016). Joint-Angle Specific Strength Adaptations Influence Improvements in Power in Highly Trained Athletes. *Human Movement*, 17(1), 43-49.

- Individuals in the quarter and full squat training groups improved significantly more at the specific depth at which they trained when compared to the other two groups ($p < 0.05$). Jump height and sprint speed improved in all groups ($p < 0.05$); however, the quarter squat had the greatest transfer to both outcomes. Conclusions. Consistently including quarter squats in workouts aimed at maximizing speed and jumping power can result in greater improvements.

Dan Fransson, Peter Krstrup & Magni Mohr. Running intensity fluctuations indicate temporary performance decrement in top-class football. *Science and Medicine in Football*, November 2016 DOI:

- Today's top-class football is characterized by more short sprints than in the past. In English Premier League, high-intensity running has increased by 50% in the last 10 years, presenting new challenges to the players in terms of fatigue resistance and ability to recover quickly. The change has also resulted in greater variation in the tempo of matches, and this new pattern calls for revised training routines, concludes new research.

Young, W. B., Dawson, B., & Henry, G. J. (2015). Agility and change-of-direction speed are independent skills: Implications for training for agility in invasion sports. *International Journal of Sports Science & Coaching*, 10(1), 159-169.

- There appears to be no research evidence for the benefits of strength and power training for improvement of agility. Change of direction and agility are separate qualities with agility being more important for sporting success and evaluation. Higher performing athletes are better in agility tests, while showing no difference in

COD performance compared to lower level athletes. Future research, testing, and athlete evaluation should use agility NOT COD.

Schreurs, M. J., Benjaminse, A., & Lemmink, K. A. (2017). *Sharper angle, higher risk? The effect of cutting angle on knee mechanics in invasion sport athletes. Journal of biomechanics, 63, 144-150.*

- Different cutting angles demand different knee kinematics and kinetics. Thus success in one cut does not mean one will also be successful in another angled cut. Also, females and males handle angled cuts differently, which has implication for injury prevention.

Jarvis, P., Turner, A., Chavda, S., & Bishop, C. (2017). *The acute effects of heavy sled towing on subsequent sprint acceleration performance. Journal of Trainology, 6(1).*

- Eight healthy male varsity team sport athletes (age: 21.8 ± 1.8 years, height: 185.5 ± 5.0 cm, weight: 88.8 ± 15.7 kg, 8 15m sprint time: 2.66 ± 0.13 s) performed sprints under three separate weighted sled towing conditions in a 9 randomised order. Each condition consisted of one baseline unweighted sprint (4-min pre), the sled towing 10 sprint protocol: (1) 1x50% body mass, (2) 2x50% body mass, (3) 3x50% body mass (multiple sprints 11 interspersed with 90s recovery), and 3 post-testing unweighted sprints thereafter (4, 8, 12-min post). All 12 sprints were conducted over a 15m distance. Significantly faster sprint times for the 3x sled towing protocol were identified following 8-min of rest 16 ($p=0.025$, $d=0.46$, 2.64 ± 0.15 s to 2.57 ± 0.17 s). When individual best sprint times were analysed against baseline 17 data, significantly faster sprint times were identified following both 1x ($p=0.007$, $d=0.69$, 2.69 ± 0.07 s to 2.64 ± 0.07 s) and 3x ($p=0.001$, $d=0.62$, 2.64 ± 0.15 s to 2.55 ± 0.14 s) sled towing protocols. Within the 3x condition, 19 all athletes achieved fastest sprint times following 8–12 min of rest.

Young, W. B., Miller, I. R., & Talpey, S. W. (2015). *Physical qualities predict change-of-direction speed but not defensive agility in Australian rules football. The Journal of Strength & Conditioning Research, 29(1), 206-212.*

- While measures of strength and power – 3RM squat and vertical jump – correlated to COD performance – they did not predict defensive agility in Australian rules football. Reactive strength and sprint acceleration also were NOT associated with defensive agility performance leaving the authors to emphasize sport-specific technique and cognitive training.

American Psychological Association. (2017, August 4). *New mindfulness method helps coaches, athletes score: Sessions can help athletes at all levels develop mental edge*

- The program itself consists of six group-based sessions that contain educational, discussion and experiential components, as well as recommendations for daily

home practice. The training begins with sedentary mindfulness practice, where participants are instructed to focus on experiences like eating and breathing, but gradually more and more movement is incorporated, culminating in a sport-specific meditation in which athletes or coaches apply a mindful style of attention to their actual sport performance. In addition to formal exercises, the program emphasizes informal mindfulness practice, which involves engaging in daily activities with mindful intention, helping participants to integrate mindfulness into their workouts, practices and competitions, as well as everyday life.

Articles

Here is a list of articles I wrote recently. Hope you enjoy

- [The Myth of the FMS](#)
- [High Speed Hammies](#) – Just Fly Performance
- [Get More Out Of Med Ball Training](#) – Just Fly Performance
- [Squat Science: Why We All Squat Differently](#)
- [The Myth of Triple Extension?](#)
- [3 Areas To Attack To Improve Speed](#) - Stack
- [Stop Running Low](#) - Stack
- [Improving Top-End Speed](#) - Stack
- [Elevated Your Agility](#) – SimpliFaster
- [Owning A Gym – Things You Should Know](#)
- [Teaching the Hip Hinge](#)
- [The Weight Belt – Should You Where One?](#)

Programs

Here are snap shots of single training sessions from athlete's programs over the past year. A little insight into how I program for my athletes

Day 1 – Speed Phase

Date:	Day 1		Sets	Reps	Weight	Tempo	Rest
	1a	Jammer Sprint	3	5ea	On Clap		
	1b	Band "T-Y"	2	12			
BW:	1c	Sprinter's Hip Flexor	2	15ea			
	2a	Band 1/4 Rack Back Squat	3	2			
	2b	Wall Quad Mobility	3	10ea			
Score:	2c	Split Stance Push-Pull	3	8ea			
	2d	Hollow Hold	3	1m			
	3a	S/L Ft. Elevated Foot Fires	3	10ea		0-1-0	
	3b	Front Plank w/ Leg Lifts	3	10ea			
Notes:							
What Are You Going To Work On For Your Next Training Session?							

Vertical Force Production

Date:	Day 4		Sets	Reps	Weight	Tempo	Rest
	1a	Low Box Step-Up	3	2ea			
	1b	Sprinter's Step-Up	3	2ea			
BW:	1c	Bench Hip Mobility	2	20s			
	1d	Prone Wall Slide	2	12			
	1e	Prone Hip Flexor	2	12ea			
Score:	2a	Drop Hex Bar Jump Squat	2	5			
	2b	S/L Side Plank	2	15s			
	2c	Wall Leg Lower	2	8ea			
	ESD	Sleds	12	5y			30s
Notes:							
What Are You Going To Work On For Your Next Training Session?							

Day 1, Week 4 – NFL Pro Day Athlete

Date:	Monday		Sets	Reps	Weight	Tempo	Rest
	1a	10y Work					
	2a	Vertical Jump Work					
BW:	2a	Hex Bar Jump Squat	2	4	45lbs & 55lbs - Measure		20s
	2b	Bench Hip Mobility	2	20s			1m
	3a	Iso RDL	3	4		0-3-0	20s
Score:	3b	Iso Hex Bar Jump Squat	3	3		0-3-0	20s
	3c	Iso Band Asst. Squat Jump	3	4		0-3-0	20s
	3d	Knee Tuck CARS	2	6ea			
	3e	X-Band T & Y	2	15ea			1m
	4a	Sled Load, Explode, Punch	3	20y			
	4b	Speed Inverted Row	3	5s			
Notes:							
What Are You Going To Work On For Your Next Training Session?							

Ascending Strength

Date:	Day 1		Sets	Reps	Weight	Tempo	Rest
	1a	MB Granny	2	6			
	1b	Wall Quad Mobility	2	10			
BW:	2a	Hex Bar Jump Squat	4	5			
	2b	S/A DB Bench	4	8ea			
	3a	S/A DB Row	3	10ea			
Score:	3b	Glute Ham Raise	2	10			
	4a	Front Squat	3	6			
	4b	Ankle Mobility	2	15ea			
	4c	DB Push-Up to Row	2	10			
Notes:							
What Are You Going To Work On For Your Next Training Session?							

Power Day – For Velocity Lacking Athlete

Date:	Day 1		Sets	Reps	Weight	Tempo	Rest
	1a	Band KB Swings	3	8/8			
	1b	Wall Quad Mob	2	12ea			30s
BW:	2a	Lateral Sled Pulls	4	15y			30s
	2b	Heidens	4	3ea			20s
	2c	Deadbug	4	8ea			20s
Score:	3a	BB Bent Over Row	3	6/6			
	3b	Push-Ups	3	5/5	wgt		30s
	4a	S/L Hip Extension	2	10ea	wgt		20s
	4b	BB S/L Snatch	2	5ea			1m
Notes:							
What Are You Going To Work On For Your Next Training Session?							

3-Weeks From Basketball Season – Basketball Athlete

Date:	Day 1		Sets	Reps	Weight	Tempo	Rest
	1a	Hex Bar RDL	4	6			20s
	1b	Euro Step to Box Jump	4	2ea			
BW:	1c	Wall Quad Moiblity	3	12ea			30s
	2a	Iso Suspension Row	3	8		0-2-0	20s
	2b	Band Lateral Lunge	3	8ea			20s
Score:	2c	Fat Grip S/A DB Bench	3	8ea			
	3b	Bamboo Iso OH Lunge	3	12s			
	3c	TGU	3	2ea			
	ESD	Shuffle to Rebound Met. Conditioning	12	10s			15s
Notes:							
What Are You Going To Work On For Your Next Training Session?							

Speed Day – NFL Combine – Acceleration Ladder

Date:	Day 1		Sets	Reps	Weight	Tempo	Rest
	1	3-Step Bursts		6			1m
	2	Alternating Bound	2	20y			90s
BW:	3	S/L Bounds	2	20y			90s
	4a	Sleds	2	10y			90s

	4b	Drop-In 20y	1	20y			5m
Score:	5a	Sleds	2	20y			90s
	5b	Drop-In 20y	1	20y			8m
	6a	Sleds	1	40y			5m
	6b	Drop in 40y	1	40y			
Notes:							
What Are You Going To Work On For Your Next Training Session?							

Volleyball Athlete

Date:	Day 1		Sets	Reps	Weight	Tempo	Rest
	1a	Band VJ Pull-Downs	2	10			
	1b	OH MB Slam w/Stick	2	10			
BW:	1c	1-Step Approach Box Jump	2	4ea			
	2a	Hip Thrust	4	10		0-1-0	
	2b	DB Chest Supported Row	4	8		0-1-0	
Score:	2c	Ankle Mobility	3	20ea			
	3a	Swiss Bar Bench	3	4/4			
	3b	Dowel OH Lateral Lunge w/Distracton	3	10s	each side		1m
	ESD	Slideboard	10	10s			15s
Notes:							
What Are You Going To Work On For Your Next Training Session?							

Speed Potentiation

Date:	Day 1		Sets	Reps	Weight	Tempo	Rest
	1a	Hip Thrust	4	8			
	1b	Band Depth Jump to SLJ	4	4			
BW:	1c	Box Hip Mobility	3	20s			
	1d	X-Band T & Y	3	12ea			2m
	2a	Flywheel Split Squat	5	5ea			
Score:	2b	S/L Hurdle Hops w/ Cycle	5	4ea			
	2c	Pull-Ups	5	3	add wgt		
	2d	Side Glute/Ham Abs w/Plate Punch	5	6ea			

	2e	Heel Walks	4	50y			30s
Notes:							
What Are You Going To Work On For Your Next Training Session?							

Baseball – Strength Phase – Day 2

Date:	Day 1	Sets	Reps	Weight	Tempo	Rest	
	1a	X-Band T & A	2	15ea			
	1b	Foam Roller Prone Wall Slide	2	15			
BW:	1c	Suspension Pitcher Stretch	2	8ea		30s	
	2a	SS Bar FRWD Step Lunge	5	4ea			
	2b	Skip to OH Med Ball Throw	5	3ea			
Score:	2c	Suspension Row	5	10	add vest		
	3a	DB Lateral Lunge (off mound)	3	6ea			
	3b	Pitcher Med Ball Punch	3	5ea			
	ESD	Sleds	15	5y		30s	
Notes:							
What Are You Going To Work On For Your Next Training Session?							

Post Season Oxidative for a Sprinter

Date:	Day 1	Sets	Reps	Weight	Tempo	Rest
	1a	Sprinter's Clean	4	6ea		
	1c	Pull-Aparts	3	30		
BW:	2a	BB Split Jerk	4	3ea		20s
	2b	Platform 1-2 Punch	4	4ea		20s
	2c	Inverted Row	4	5/5	wgt	20s
Score:	3a	BFR Flywheel RDL	4	10		30s
	4a	BFR DB Bench	4	10		30s
	5a	BFR Flywheel 1/4 Squat to Calf Raise	4	20		20s
	ESD	Dowel Speed Drills				
Notes:						
What Are You Going To Work On For Your Next Training Session?						

Post Tommy John Surgery – 16-Weeks

Date:	Day 1		Sets	Reps	Weight	Tempo	Rest
	1a	DB Lateral Lunge w/Hanging KB	3	8ea			
	1b	Off-Set Bar Pitch	2	8ea			
BW:	1c	Foam Roller Extension	2	8			
	2a	S/L Straight Leg Bridge	4	15ea			
	2b	Eccentric Suspension Row	4	6		7-0-0	
Score:	2c	Prone Wall Slide	3	12			45s
	3b	X-Band T & Bat Wings	2	10ea			
	3c	Fat Bar Wrist Rotations	2	12ea			
	ESD	Slideboard	10	10s			15s
Notes:							
What Are You Going To Work On For Your Next Training Session?							

Post Lisfranc Surgery – 6-weeks

Date:	Day 1		Sets	Reps	Weight	Tempo	Rest
	1a	Band Deadbug	2	12ea			
	1b	H-Sit	2	20s			
BW:	1c	P-Sling Hold	2	20s			
	2a	Band Suspension Row	5	6			
	2b	Band DB Bench	5	4			
Score:	2c	Psoas Lifts	4	12ea	w/ 2.5lb plate		
	3a	Reverse Hypers	3	20			
	3b	Pull-Ups	3	5/5			20s
	ESD	Bike Sprints	10	10s	EMOM		50s
Notes:							
What Are You Going To Work On For Your Next Training Session?							