

3 essential tactics for program design.

Careful attention needs to be given to collect the most information about the sport and all requirements, in order to shape the athlete around the foundations and all the complex interactions between the different elements.

You can't look at the movement and simply try and add some resistance to it. For example, let's take a hockey slap shot. I've seen some crazy invented set up, which one of those was a guy attaching a high pulley to the end of a hockey stick and mimic the movement.

This is just a poor comprehension of what lies behind any sports related movement as a whole.

I always say that "the core" starts from the extremities.

Enter the rotational force.

What better way to explain rotational forces than a hockey slap shot. In this case, as soon as you lift up the stick to wind up, the left shoulder and arm extends, stretching up the torso and especially the left shoulder away from the right hip. All this energy is loading up the stretch reflex needed to pull down the arm and initiate the downward line for the slap.

First off the stick weighs almost nothing at this point, so even if you attach the pulley at the top of the swing, it would be useless. The rotational force won't come from the weight you have to push down, it will come from many muscles firing up at the same time. You must see different parts of the movement, add them all as a whole, which is the major mistakes of some strength coaches who try to « innovate ».

So no matter how you try to add resistance to a slapshot, velocity is key, which in this case is speed-strength, moving at very high speed with a given load. For Speed-strength, here the load never changes.

The stick actually bends a little as it hits the ice, giving the stick some power to sling shot the puck as the player pushes it on top of that. Think internal rotator, pec, shoulder and back, where the right arm pulls back to lift the stick when the left arm presses/pushes upwards.

All the antagonist muscles are at work to slow down the swing, low back, internal and external obliques, abs and lats. Legs do some stabilization work along the way and posterior chain holding on and hamstring controlling knee stability.

Now, a slap shot is not the only thing to look at for a hockey player's performance. If he doesn't get to the puck, it's useless. However, the same muscles that are important for a powerful slap shot are about the same as those for power skating.

Now, what to do with all this information. I look for 3 elements.

+Position

In what position is the athlete the strongest and weakest? How can I make him faster/stronger? What are his main tasks?

In this case, think core, back, posterior chain, scapular chain.

+Performance

How can I make the athlete stronger/faster/powerful? Which exercise will give him the most bang for his bucks and the best performance?

In this case, think Speed-strength, explosive strength, reactive strength and starting power.

+Progression

Where do I want to bring him/her? What qualities does he need to gain in order to compete at optimal capacities?

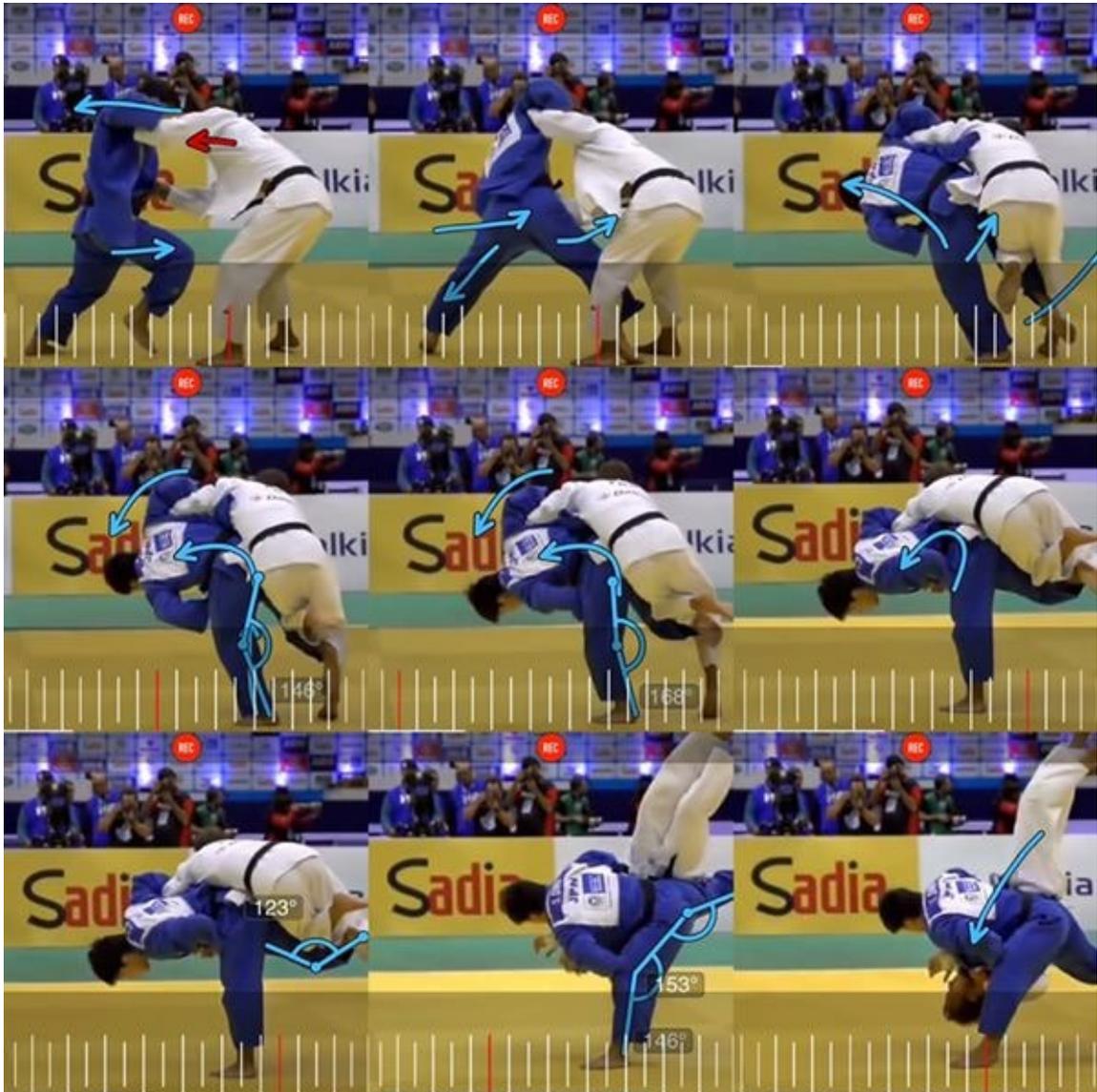
Think outside the box. Besides building a great posterior chain and back muscles for optimal sprinting performance, one could also think about gaining lean muscle mass in order to minimize injuries, especially in hockey, football and combat sports. Alternate phases of hypertrophy, functional hypertrophy and strength. Every strength quality will feed from each other making the athlete strong, powerful and less prone to injuries. Building muscle is like covering the joints with a protective layer. The same goes for all other high impact, sports.

Strength training is not only good for power and getting stronger, it also has a major impact in diminishing the risk of injuries. One of the most common injury for athletes is the hamstring strainⁱⁱⁱ. Epidemiology studies have revealed that hamstring injuries alone account for 6–29 % of all injuries reported in Australian football, rugby union, football, basketball, cricket, and track sprinters. It also has a high prevalence of reinjury rate of 13-21%ⁱⁱⁱ.

Some suggest that most hamstrings injury occur when athletes peak torque is achieved at shorter length due to a lack of flexibility of the hip flexors and a lack of strength at greater length. Which is why eccentric training can be a great tool in order to recover those strength deficits at different length of the strength curve. This type of intervention has consistently shown to reduce the risk of injury^{iv}

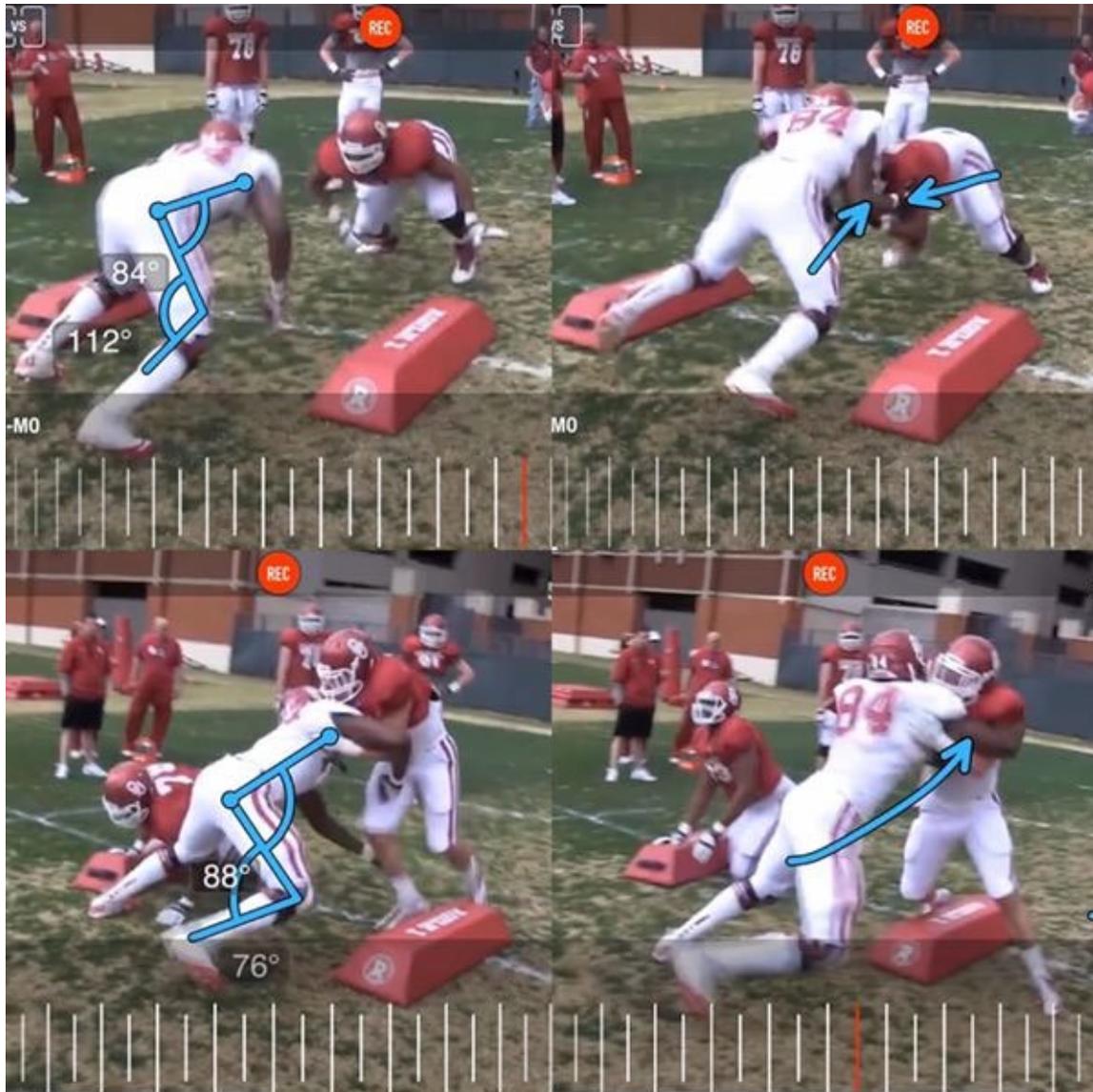
High impact sports like football/rugby and combat sports share similarities. Let's take a judoka and an offensive lineman. Positional strategy is primordial when a few seconds could settle the score or an advantage.

The push/pull and reactive power/strength is a very common strategy in combat sports (football lineman have very similar strategies as grappling for tackles and blockages). Hand placement plays a major role in how to stop your opponent and inside grabs gives the advantage and control more often than not.



The guy throwing is Shohei Ono, one of the top competitors today. To provoke his opponent to open up his stance and to stand up, Ono needs to push and pull a few times, timing his entrance with his opponent's reaction. As he pushes, the opponent pushes back. That's when Ono pulls at the same time, pulling him inside with inside

grips flaring the elbow of his opponent to throw his balance off. That's where Ono goes in for the Uchi and loads him up on his hips to hit him with the earth. Rotation power and speed at it's best.

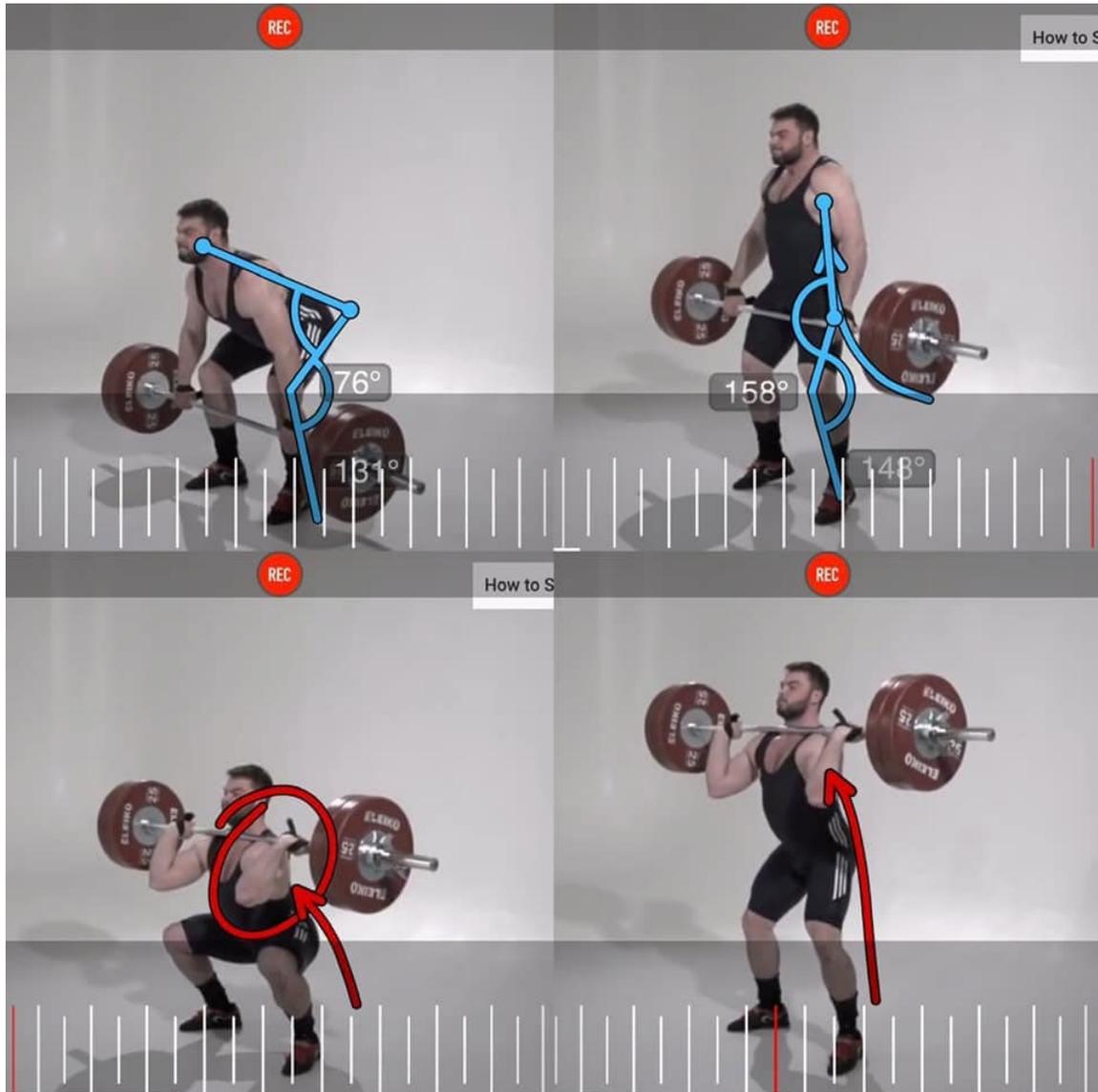


In grappling, wrestling and Brazilian jiu-jitsu, especially high levels, the starting position is very similar as an Offensive or defensive lineman. They charge forward. The difference between the offensive line and grappling is that they want to break defense, they must charge through, break the wall. Here we can see that he deters one opponent to stop the other passing through.

For both scenarios, think posterior chain. The angle of attack is practically the same. Also, front pressing/pushing and yet again, the core. You can clearly see how the core

plays a major role into redirecting or stopping a greater force, decelerating and changing direction.

The goal dictates the exercise choices. To cover strength/speed I would go for pulls, rack pulls, deadlifts and hang cleans and power cleans. Why?



See anything similar? Top left picture would look like a O-line pushing through and top right, a judoka pulling their opponent in for the throw. Bottom left is also for the push forward in wrestling or Offensive and defensive line. This is the reason why Olympic lifts are number one in my book since they offer the greatest transfer of strength and power to their line of duty.

While mastering those lift with heavy and relatable loads might be time consuming, you could always use similar movements, somewhat of a break down if these lifts in your periodization.

For hockey, wrestling and combat sports, unilateral work must be included such as split squats, split jerks, front barbell split squats, lunges and so many more of their variations. In almost every plan, I always focus on unilateral work first and move on to bilateral work such as deadlift, pulls, rack pulls and specific Olympic lifts like variations of the cleans.

Although this might seem complex to match the appropriate strength curve, lifting and practicing, watching videos and slow-motion reviews sharpens your eye. Evaluate the sport, the athlete and make both worlds meet. Work your way up from weaknesses, nothing can go wrong since you'll be leaving no room for mishaps and unforeseen injuries, or at least, putting all the cards on your side.

Coach Eric

ⁱ Croisier JL, Forthomme B, Namurois MH, et al. Hamstring muscle strain recurrence and strength performance disorders. *Am J Sports Med* 2002;30(2):199-203.

ⁱⁱ Mendiguchia J., Alentorn-Geli E., Samuelsson K., Karlsson J. (2014) Prevention of Hamstring Muscle Injuries in Sports. In: Doral M., Karlsson J. (eds) *Sports Injuries*. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-36801-1_169-1

ⁱⁱⁱ Opar DA, Williams MD, Shield AJ (2012) Hamstring strain injuries. Factors that lead to injury and re-injury. *Sports Med* 42:209–226

^{iv} Petersen J, Thorborg K, Nielsen MB, Budtz-Jorgensen E, Holmich P (2011) Preventive effect of eccentric training on acute hamstring injuries in men's soccer: a cluster-randomized controlled trial. *Am J Sports Med* 39:2296–2303