WEIGHTLIFTING TECHNIQUE

TRIAD

EXERCISE CLASSIFICATION & SELECTION

BY MAX AITA

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ABOUT THE AUTHOR

Max Aita is the Head Weightlifting Coach of Team Juggernaut. He has spent 20 years in the Weightlifting and Powerlifting worlds as both an athlete and coach. Max has trained under a wide variety of notable coaches including Steve Gough, Ivan Abadjiev, and Boris Sheiko, who have helped him develop his knowledge and training methodology.

Max has guided multiple athletes to National Championships, American Records and International Teams in Weightlifting, along with All-Time World Record holders in Powerlifting, as well as CrossFit Regional and Games competitors.

Max grew up in the forests of Montana and now resides in Oakland, CA with his wife Jo Ann and their son. He has an extensive knowledge of classic cinema, is a renown parody actor and is the co-host of The JuggLife Podcast.

02. THE TECHNIQUE TRIAD

When we break down the lifts into the most simple elements we come up with three distinct aspects of all lifts that we are concerned with; they are referred to as the Technique Triad. Those components are as follows:

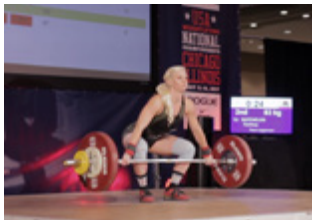
1. Trajectory of the Barbell / Athlete
2. Relative Height of the Barbell
3. Time to Fixation

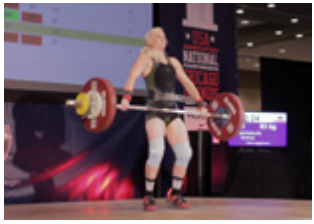
TRAJECTORY OF THE BARBELL / ATHLETE is defined as the movement pattern of both the barbell and athlete that will result in a suitable position for the athlete to receive the barbell without violation of the technical rules (i.e. without elbow re-bending /pressing out, elbow contact with the thigh during the lift, remaining within the competition platform during the lift, etc).

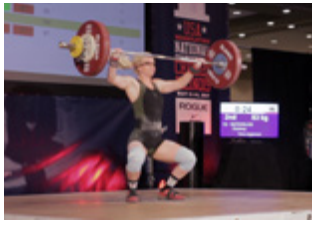
This is the ability of the athlete to control both their own movement and the path of the barbell. Their skill is in the execution of the movement phases from start to finish of the lift with little to no errors.

The actual trajectory or "bar path" can vary slightly depending on the style of the athlete's technique. But it must conform to several basic rules:

- The bar must remain over the athlete's area of support for the duration of the lift.
- The closer the barbell is to the athlete's center of mass, the more likely the success of the lift.
- The barbell must end in a position that is suitable to recover from.

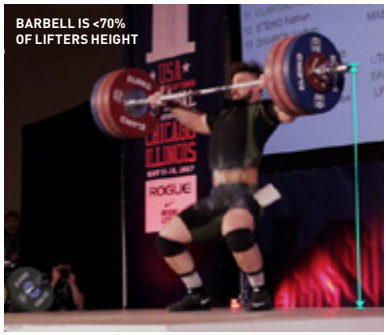


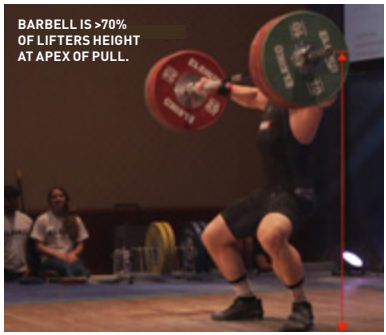




Cortney is an excellent example of these traits, and as such, she displays an optimal trajectory of the barbell.

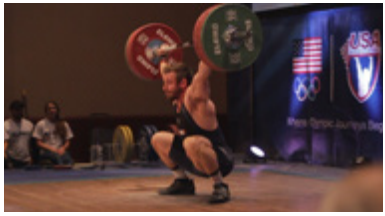
RELATIVE HEIGHT OF THE BARBELL (sometimes referred to as the maximum height of the barbell) is defined as the height the barbell reaches the apex of its vertical movement during a lift. This is measured against the lifters actual height. We measure the relative height (as a percentage of the athlete's total height) because this allows us to compare lifters of different qualification or similar anatomical structure to each other. This is very important for us to have a good understanding of how relative height factors into the athlete's technique. As a lifter becomes more advanced, they will move the bar to a lesser relative height as a byproduct of becoming more efficient. As this relative height becomes consistent within an athlete's career, the role of strength becomes a variable for the lifter to move more weight to the same height.





TIME TO FIXATION is defined as the time it takes the athlete to move into the *lowest point of fixation* from the instant the athlete stops applying vertical force to the barbell.

Lowest Point of Fixation is the lowest relative point the barbell is capable of being received by an athlete. It should be noted this is not a technical component, but it is necessary for us to define and will be used later to help us. These positions are:

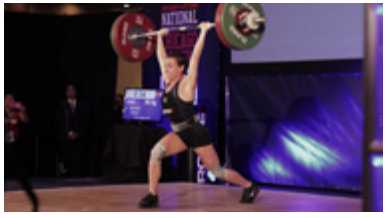


SNATCH

Bottom of the overhead squat

CLEAN

Bottom of the front squat



JERK

Bottom of the split

Something to consider about the *Lowest point of Fixation:*

ANATOMICAL STRUCTURE.

- Lifters with relatively shorter limbs and longer torso will automatically have a higher *Lowest point of Fixation* because of the higher position of their shoulders. A shorter relative torso with longer limbs will have a lower *Lowest point of Fixation* because of the lower position of the shoulder and requires the lifter to pull the bar to a lesser height. Anatomical structure of the hips can also play a role in the depth to which the lifter can squat down under the bar, causing the lifter to pull the barbell to various heights.
- The structure of the hips can play a significant impact on the depth to which an athlete can squat under the barbell. This is an unchangeable variable, meaning no amount of mobility work or stretching will have an impact on the depth of their squat.

When referring to Time to Fixation, we are talking about the speed under the barbell. There are certain physical factors that play into how fast an athlete can move under the bar but combined with the various technical factors that can be present in a given lift, can limit the Time to Fixation.

For example, if the lifter is less skillful in squatting or splitting under the barbell (meaning slower or not deliberate in movement), then they will be forced into point of accommodating. They must move the barbell to a higher position in order to compensate for an increased Time to Fixation. If the lifter is extremely fast and very well organized in moving from one phase to the next without wasted time, they will minimize the Time to Fixation.

The lowest point of fixation lends itself to the discussion of hip anatomy/mobility and depth of bottom position, if that isn't discussed already, it may be useful to have Quinn write an excerpt for you addressing that.

As a side note to the readers, there is an absence of the recovery phase in the Technique Triad. This is done intentionally as it is assumed that the lifter possesses enough general strength to recover after receiving the barbell in any of the final points of fixation, i.e.,

From the Clean after fixation to the shoulder.
From the Snatch after fixation overhead.
From the split/squat after the jerk.

If the lifter is unable to recover from these positions, it simply means they are incapable of completing the lift. If we were to include this factor into the model we would also have to include other factors such as: can the lifter hold on to the bar, does the lifter possess enough fitness to complete a clean & jerk, or do they run out of energy. These are simply byproducts of the general physical qualities, and so they do not fall into our model of looking at the essential aspects of technique.

Now that we know what the critical components of the weightlifting movements are, and have an understanding that the style of technique can be different from individual to individual, we want to figure out how efficient a lifter is with their technique. Why do we need to do this? If a lifter is extremely inefficient, our training plans must reflect that and focus on improving components that contribute to the lifters efficiency. If a lifter is extremely efficient, our training plans should reflect that as well. Should a lifter who is at the limit of technical ability spend most of their time trying to refine the technique further? Or should they be devoting energy to improving their overall strength?

Many times it seems that coaches are making recommendations for exercises without fully understanding the lifts, basing their assessment of factors that seemingly have no grounds, or using subject quantitative metrics to asses a lifters performance. For example, saying a lifter moves the bar very well and concludes that the lifter is technically proficient. While that may be true, it tells us nothing of the lifters deficiencies or strengths. If we don't know what that lifter needs to work on, it will not give us a good guide for selecting the right exercises.

Let's make an equation that allows us to compare our components to determine how good someone's technique is. We want this formula to be universal enough so that we can both use it for an individual lifter, along with a team of lifters with different styles of technique.

This equation will allow us to assign a numeric value to something we call Technical Mastery.

TECHNICAL MASTERY can be defined as the ability to reproduce successful lifts at maximum intensity, with the highest level of Technically Efficiency.

TECHNICAL EFFICIENCY is defined as the ratio of the necessary work performed by a lifter during a lift, compared to the total work being done.

To do this we are going to break down the lift based on the Technique Triad. The main things that we want to look at are:

1. LOWEST POSSIBLE POINT OF FIXATION

When measuring this value for an individual, we will compare the distance the bar is from the ground to the lowest position in the squat/jerk; and then measure that distance against the lifter when they are standing completely upright. If we measure the height of the lifter as well, we can divide the distance to the top of lowest point of fixation by the height of the athlete.

In our example, the lowest point of fixation in the snatch is 93cm. Her height is 156cm.

- 93cm / 156cm = .596 or 59.6% of her height.

This relative value can now be used to compare her lowest point of fixation to other lifters if need be.

2. RELATIVE HEIGHT OF THE BARBELL

When measuring the relative height of the barbell, we will need to use video or still images to accurately measure the actual height the barbell is being pulled to. There are many readily available applications that work for this purpose. (Note that it is more accurate to use a video of the lifter from the side view.)

Back to our example lifter, we look at the apex of the pull and measure the distance it is from the floor 108cm is the height of the barbell. We then can divide that by the lifter's height so that we can get the relative value.

- 108cm / 156cm =.692 or 69.2% of the lifters height.

We now have two values:

1. Lowest point of fixation (L) = 93cm or 59.2% of the lifter total height
2. Relative height of the barbell (H) = 108cm or 69.2% of the lifters total height

3. TRAJECTORY OF THE BARBELL

Because barbell trajectory is heavily influenced by the style of technique, simply looking at a bar path analysis would not work. Two very efficient lifters may have a lot of variance in bar path because of anatomical factors. We must choose a variable that is both quantifiable and related to the accuracy of the trajectory. This is accomplished via a scoring system for any error in movement beyond the base of support.

i.e., if the lifter takes a step forward or backward in order to maintain the center of balance.

For every step the athlete takes we add +1 to our value (T)

In our example, the lifter takes 0 steps in order to fix the barbell overhead. So (T)=0

Our formula for determining Technical Efficiency will look like this:

H/L + T = Coefficient of technical mastery

We will plug our example lifter in the equation:.

Our lifter is 156cm tall; she has pulled the barbell to (H) 108cm (69.2% of her height), her lowest possible point of fixation is (L) 93cm. (59.2% of her height) (T) = 0 because she needed to take no steps

108cm/93cm + 0 = 1.161

The closer the value is to 1.00 the more efficient the lifter's technique.

This equation will lead us to several concluded thoughts:

Technical mastery will improve as the lifter reduces the height they need to pull the bar to in order to receive it. This is accomplished in the first portion of a lifter's career by practicing to catch the barbell lower until they are close the lowest point of fixation.

Once a lifter is already receiving the bar at the lowest possible point, the next level of improvement will come in two stages:

3. Improving the Time to fixation by moving under the bar faster, followed by

4. Improving the Time to fixation via improved coordination in the transition from the pulling phases to the squat under phase.

When technique has become very efficient (and stable) the goal of the lifter should be to increase strength/power. Improvement here will allow the lifter to lift heavier weights to the same relative height and utilize their technique to maximize the Time to fixation.

The fastest way to improve technical mastery is to improve Barbell trajectory, eliminating the need to take steps forward or backward in order to make lifts. This will dramatically improve the result of the equation.

With this tool, we can now assess quantitatively whether or not our training is creating a more efficient technique. We can look at an athlete's technique and determine what the best course of action in training is to improve their results.

We now pose more significant questions to create more definitely answers to our questions:

- Do we need to devote more training to the development of strength (improvement in relative bar height) or do we need to improve the efficiency (improved time to fixation, improved barbell trajectory)?
- Is our lifter's bar trajectory poor but our training is not fixing this issue?
- Are the proper exercises being selected to address this problem?

Now that we have a diagnostic tool and know what aspects of the technique need to improve, we then need to turn to our arsenal of drills to accomplish the goal. The exercises we select and the methods of training we apply will determine the outcome of our plan. We should be able to group the exercises into which component they will have the biggest effect on in training so that we can direct our athletes to a mutual goal.