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Ars, Virtus, Impetus: Gladiatorial Training and Roman Legionaries

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ARS, *VIRTUS*, *IMPETUS*: GLADIATORIAL TRAINING AND ROMAN LEGIONARIES

by

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ABSTRACT

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This project addresses the physiological and psychological effects of the gladiatorial training for the Roman military used by Publius Rutilius Rufus in 105 BCE. In this pursuit, I begin by arguing that the Greek athletic training system known as the Tetrad would have been applied first to gladiators because of their similarities to other ancient athletes and then to Rufus' legionaries. The regimen itself was a four-day cycle starting with a short and intense preparatory day, a long and difficult second day, a rest day, and finally a day for skills practice before restarting at the first. Working with Utah State Athletics, Nutrition, and Kinesiology, I built a modern tetrad based on the ancient regimen which I followed for seven months and ran tests before and after this training to track how it affected my body.

Using my data, modern sports science, and the ancient primary sources, I connected the changes I saw in myself to the Roman concept of *virtus* and its subordinate qualities. These particular legionaries improved their *impetus* through increases in their strength and power generation primarily through neuromuscular development in addition to increased speed on foot and most likely higher aerobic capacity. The combination of

gymnastic training alongside their military skills preparation increased their technical ability, or *ars*, with a sword and shield. Most importantly, however, they built physical and mental resilience to the stress of campaign and battle, which was valued highly by Roman commanders.

(200 pages)

PUBLIC ABSTRACT

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In 105 BCE, the Roman consul Publius Rutilius Rufus employed gladiatorial training for his legionaries. This thesis examines the physiological and psychological consequences of this style of training on the human body in an effort to understand why these particular soldiers were so effective. I used experiential testing alongside primary and secondary source research to examine how this process better prepared Roman troops for engaging in actual combat.

AGKNOWLEDGMENTS

This endeavor would not have been possible without the assistance of Coach Jimmy Stitz, who helped me build my regimen, Dr. Katie Kraus, who advised me about how to approach my nutrition, and Professor Jon Carey alongside his graduate assistants, Steve Spencer, Riley Welch, Liz Cafferty, and Tom Dickey who all helped run and interpret my tests. I am profoundly grateful to each for their generous aid. I would also like to express my deepest appreciation to my committee, Dr. Frances Titchener, Dr. Mark Damen, and Dr. Charles Oughton, for their support and guidance. I am also grateful to Marie Skinner, Deven Salisbury, and Luke Boardman along the Ancient Languages and Cultures Wall for providing me succor during the long days in the office, to my roommates for putting up with my early morning training, and to my parents for their unwavering encouragement and help.

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Introduction

Historical Background

At the end of the 2nd century BCE, the Roman military was undergoing extensive reforms which turned a collection of citizen-soldiers into professional legions. These changes included a reorganization of battle lines, the introduction of new equipment, and a shift in the source of legionaries' payment.[1] In addition to these, the circumstances in the final decade of the century also forced Gaius Marius, for whom these reforms are named, to dispose of the property requirements which had prohibited the lower classes from enrolling in the army. Rome was fighting a war in Africa against Jugurtha, and, in the north, the Cimbri loomed over Italy after destroying the Roman legions in Gaul at Arausio.

Sources report that in 105 BCE the Roman consul Publius Rutilius Rufus employed a new method to train these new recruits.

> Publius Rutilius, consul alongside Gnaeus Mallius, trained his soldiers in the use of weapons and armor. Unlike any other commander before him, he summoned gladiatorial trainers (*doctoribus*) from the school of C. Aurelius Scaurus, and he implanted a keener manner of avoiding and inflicting blows in his soldiers. He mixed virtue with skill and skill with virtue with the result that their virtue was made stronger and their expertise more secure by this force.[2]

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[1] François Gauthier, "The Changing Composition of the Roman Army in the Late Republic and the So-Called "Marian-Reforms," *Ancient Historical Bulletin* 30, no. 3 (2016): 103-116.

[2] *tractandorum meditatio a P. Rutilio consule Cn. Malli collega militibus est tradita: is enim nullius ante se imperatoris exemplum secutus ex ludo C. Aureli Scauri doctoribus gladiatorum arcessitis vitandi atque inferendi ictus subtiliorem rationem legionibus ingeneravit virtutemque arti et rursus artem virtuti miscuit, ut illa impetu huius fortior, haec illius scientia cautior fieret*. Valerius Maximus, *Factorum ac Dictorum Memorabilium*, 2.3.2.

Then in the following year, according to Frontinus

> Gaius Marius, when he had the opportunity to choose one of two armies, either the one which had served under Rutilius or the one under Metellus and later himself, he preferred Rutilius' legionaries, even though they were fewer in number, because he believed that they demonstrated better discipline (*disciplinae*).[3]

For Marius, a successful general and serving in his second consulship, to have chosen these troops over his own veterans, the gladiatorial regimen must have produced significant results. Clearly, this was due to their *disciplina*, a word which differs from its English derivative in that it implies not only self-control and obedience but also the production and maintenance of the foundational Roman attribute *virtus*.[4] Because of these traits, Rufus saw gladiators as a paradigm of the ideal legionary, and, after these soldiers' training was complete, Marius confirmed his observation.

Virtus itself is a highly complex term which has been studied extensively. At its core are martial skill, physical and psychological resiliency, and courage.[5] The value that Roman culture placed on any citizen's ability to fight and endure pain, as well as show a willingness to die for the Republic, cannot be overstated. Across time, author after author hammers home that there is nothing more glorious than acts of bravery and the impulse to

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All in-text translations are the author's. The other ancient references are from the Loeb editions.

[3] *C. Marius, cum facultatem eligendi exercitus haberet ex duobus, qui sub Rutilio et qui sub Metello ac postea sub se ipso meruerant, Rutilianum quamquam minorem, quia certioris disciplinae arbitrabatur, praeoptavit*. Frontinus. *Iuli Frontini Strategematon*, 4.2.2.

[4] Sarah Elise Phang, *Roman Military Service: Ideologies of Discipline in the Late Republic and Early Empire* (Cambridge: Cambridge University Press, 2008), 3-4.

[5] Catalina Balmaceda, *Virtus Romana: Politics and Morality in the Roman Historians* (Chapel Hill: University of North Carolina Press, 2017) 16-7, 53-4; Myles McDonnell, *Roman Manliness: Virtus and the Roman Republic* (Cambridge: Cambridge University Press, 2006) 64-71.

lay down one's life for the state.[6] It is clear that these were the attributes that both consuls were looking for and must have found that gladiatorial training provided.

Rufus was not the first to employ a systematic training program that attempted to nurture these qualities in recruits. It was widely believed across the classical world that physical exertion produced *virtus* – in Greek, ἀρετή – although there was a great deal of disagreement as to whether manual labor or athletic training accomplished this better. To this end, Scipio Africanus instituted a four-day cycle in 210 BCE which began with weighted marches and runs, followed by a day for maintaining equipment, then skills training, and finally a day of rest before starting the cycle again.[7] It is unclear how long this program was used, but it likely set a precedent for Rufus when his *doctores* began deploying their own four-day cycle, the Tetrad.[8]

While Greek in origin, this system had made its way into Rome at some point during the third or second centuries BCE. It consisted of a short and intense preparatory day, then a long "inescapable test of the body's condition," followed by a rest day, and ending with skills practice before returning to the start and repeating.[9] It could be applied easily to gladiators first because it had been instituted as a program for training Olympic athletes, so the shift to another classification of combat sport would not have been difficult. After this, other Roman citizens took note and began training as private citizens

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[6] A few examples: Livy, *Ab Urbe Condita*, 9.4.10-14, 9.7.6-16, 10.28.10-12; Cicero, *Pro Murena*, 22; Plutarch, *Life of Coriolanius*, 1.6; Pliny the Elder, *Naturalis Historia*, 7.101-6; Polybius, *Histories*, 6.52.5

[7] Livy, *Ab Urbe Condita*, 26.51.4; Polybius, *Histories*, 10.20.

[8] There is no explicit evidence that ties Scipio's training regimen to the Tetrad, but, considering Scipio's fame and the fact that Polybius describes it before Rufus, and Livy after, it is very likely that the regimen was known to Rufus.

[9] Philostratus, *Gymnasticus*, 47.

in the *ludus* before Rufus employed it broadly for his legionaries, producing the soldiers that Marius admired so much.

Many historians have interpreted Valerius Maximus' claim that "a keener manner of avoiding and inflicting blows" implies that the troops were only subject to skills training.[10] One argues that Scipio's use of combat practice means that Rufus was not the first to use gladiatorial preparation.[11] Another concludes that calisthenics were also included in these soldiers' regimen.[12] The latter seems more probable since the fact that Scipio had his men train with their weapons one hundred years earlier is indicative not only of the ancient expectation that skills training was part of martial preparation but also that there was something different about the gladiatorial program. This deviation was the inclusion of traditionally Greek gymnastic strength workouts alongside cardiovascular exercise and drilling with a *scutum* and *gladius*, all of which the Tetrad included. Ancient trainers not only understood the importance of including resistance and endurance training alongside weapons practice but required it in order to enhance their troops' efficiency.

As my thesis will demonstrate, the combination of these methods altered the legionaries' bodies in specific ways that produced the *virtus* desired by both the men

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[10] David Potter, *The Victor's Crown: A History of Ancient Sport from Homer to Byzantium* (Oxford: Oxford University Press, 2011), 60; Carter, "Gladiatorial Combat," 195; Alison Futrell, *Blood in the Arena: The Spectacle of Roman Power* (Austin: University of Texas Press, 1997), 150; Donald G. Kyle, *Sport and Spectacle in the Ancient World 2nd Edition* (Oxford: John Wiley and Sons, Incorporated, 2015), 329; Phang, *Roman Military Service*, 42.

[11] Vegetius, *Epitome of Military Science*, trans. N.P. Milner (Liverpool: Liverpool University Press, 2001), 12.

[12] Mike Duncan, *The Storm Before the Storm: The Beginning of the End of the Roman Republic* (New York: Hachette Book Group, 2017), 131.

themselves and their commanders. They experienced both aerobic and anaerobic increases, which affected their ability to work and fight, and moreover gained technical proficiency with their weapons. However, most importantly, they built psychological resiliency beyond that of an average soldier.

Experiential Methodology

In the pursuit of understanding how the Tetrad may have affected the bodies and minds of the men Rutilius Rufus trained, I have worked closely with Olympic Strength and Conditioning Coach Jimmy Stitz, Nutritionist Dr. Katie Kraus, and Kinesiologist Professor Jon Carey and his team – GAs Steve Spencer, Riley Welch, Liz Cafferty, and Tom Dickey – to build and test a modern Tetrad based on the Greco-Roman model. The exercise plan and dietary requirements used in this project could easily be replicated should another decide to pursue it. However, as I am only a single data point and not a simple random sample, this experiential research is not intended to definitively prove any argument but rather to be used in conjunction with primary as well as secondary research concerning both the ancient world and modern sports science to explore the limits and expand our understanding of the possibilities of this training system.

Chapters

Chapter 1, "Athletes and Gladiators," argues that the Tetrad was the most likely training regimen that gladiators used since they served as a bridge between Greek athletics and Roman warfare. Because no explicit manual for Roman gladiatorial

programs survives from antiquity, I have constructed the following course of study.[13] I wade first into the current discussion about whether or not gladiators were considered athletes in the ancient world to demonstrate that it would be natural to apply this regimen the way Romans would have to any other sport. The arguments against their inclusion stem mostly from ideas of slavery and the overt violence of gladiatorial combat.

The first aspect of this research that needs to be addressed is the fact that most gladiators were enslaved. As such, it is difficult to study this group of people because they infrequently leave behind their own narratives and their stories have come down to us almost entirely through the eyes of their masters. This has helped produce a modern narrative of slavery that does not account for nuance, diversity, difference, or the reality that enslaved individuals did have a certain degree of agency.[14] While there are four typical approaches, I have followed Kostas Vlassopoulos' recent alternative method, which argues that the perception and enforcement of slavery is historically variable and so allows for change over space and time and undercuts preconceived essentialist notions of the institution. [15]

Gladiators themselves were mostly prisoners of war, criminals, or otherwise indentured individuals who were forced to fight for the entertainment of their Roman

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[13] This argument was also recently made by the Historians working for the History Channel. Omar Isuf, "Training like a Gladiator: Ancient Workouts with Omar," in *Ancient Workouts*, produced by History®, January 8, 2022, video, 10:07, https://www.youtube.com/watch?v=VHBTMm94yeM.

[14] Kostas Vlassopoulos, *Historicising Ancient Slavery* (Edinburgh: Edinburgh University Press, 2021), 1-7.
Current scholarship on slavery in the Classical world has identified four fundamental elements: (1) essentialism which tries to use a trans-historical definition of slavery, (2) a top-down perspective, (3) the inclusion of Greece and Rome as slave societies rather than societies with slaves, and (4) a static account of ancient slavery.

[15] Vlassopoulos, *Historicising Ancient Slavery,* 7-8.

audience, and most did not leave behind accounts of their own lives. The closest we get are gravestones paid for by their friends or family, who speak for the dead but still impose their own perceptions onto them. However, for the purposes of this thesis, it is useful to employ the evidence left behind by their masters and these surrogates because the overarching theme of this project deals with the ways those in power used physical training to mold those under their control.

Aristocrats' perception of slavery and *virtus* and the reasoning they provide for their actions demonstrates what they were thinking and why they made the choices they did in regard to their slaves. Employing Vlassopoulos' argument that perceptions of slavery are different across space and time, I explore the conditions that represented enslavement in the minds of the elite to show that even Olympic athletes were to some extent considered slaves. This is not to say, however, that their experiences in their voluntary slavery were the same as those who were forcibly enslaved.

From there I examine the comparable levels of violence seen in both Greek combat sports and gladiatorial spectacle. While governed by rules, sports like wrestling, boxing, and pankration were still explicitly brutal and often led to disfigurement, disability, and death. Conversely, later combat in the Roman forum – and after that, the arena – had regulations on some types of violence along with referees to enforce those restrictions, just as in Olympic sports. More than that, modern research has shown convincingly that gladiators themselves operated within an unwritten professional code that protected them from undue harm. This further closes the gap between these two varieties of sport.

Following that, I explore how war and funerals provided the footings for both

pursuits as well as shared spaces and audiences. This leads into a subsection addressing the well-documented contempt Romans held for Greek athletics, which stems from their varying goals: the latter pursuing beauty and the former military preparation. The culmination of this chapter addresses the logistical realities of training so many men at one time as well as Roman ideas of *virtus*, who can exhibit it, and how to produce it. The evidence presented in this chapter demonstrates that it would have been not only acceptable but necessary to apply the Tetrad to gladiators.

In Chapter 2, "Regimen and Results," I explain the evidence I consulted as well as the methods Coach Stitz and I employed to reconstitute a historically informed Tetrad. Following this, I discuss the evidence for the nutritional goals I set with Dr. Kraus. Then, I explain the physiological tests that Professor Carey and his graduate assistants oversaw and then present the results of those procedures and the data I collected throughout my training.

Chapter 3, "The Tetrad and Legionaries," weaves my data into the primary evidence using secondary research from both the classical and sports science fields. I begin by providing a basic overview of technical terms and concepts including self-efficacy, ATP production, and the distinction between "strength" and "power" in order to build a foundational base to proceed from. Then, I provide a short examination of the end goal that Rufus and Marius were aiming toward alongside a review of the cultural context which highlights the wider desire for the production of *virtus* from a Roman perspective.

In the conclusion, I split the results I gathered based on the collected evidence into sections according to the effects of the regimen on my body. In an attempt to narrow the scope of this argument, I focus on those which make the Tetrad stand out among other

systems in meeting the requirements for Roman soldiers, although some of what will be discussed applies more generally to regimented training. The first subsection of the conclusion of this thesis covers the changes in strength and power that I experienced, followed by those that pertain to my aerobic capacity and speed. These are tied to the various physical aspects of *impetus* by providing examples from the primary sources to demonstrate how they relate to the creation of effective troops. Next, I explore the ways in which the Tetrad would have affected the technical skill of those trained in it. This subsection focuses on the concepts of decision-making and postural cue utilization, which mirrors the ancient Greek concept of καιρός ("opportune time"). All three deal with one's ability to recognize, react to, and take advantage of opportunity more quickly and efficiently, thereby increasing *ars* ("skill.") This serves as a transition toward the psychological development that the Tetrad may have nurtured and that attracted Marius. The possible effects of the regimen in this area represent the most intensely desired trait in legionaries, courage and willingness to persist in the presence of injury and the face of death. The modern equivalent to these aspects of *virtus* is resiliency, which refers to an individual's ability to deal with stressors, both physical and mental.

I end with a short section providing suggestions for future research. These include finding others to train alongside me to open the door to addressing the statistical issues with this project and investigating the effects of group training on the results of the Tetrad. I would also like to include further testing, specifically with regard to heart rate variability which may determine if an individual has been overtrained. Finally, this research should be extended past the end of the Tetrad by switching to training that mimics the work that a legionary would have done while on campaign to see if the

regimen effectively prepared him for that kind of labor.

In the end, the goal of this thesis is to research the connections between seemingly disparate groups: athletes, gladiators, and legionaries. All three, I argue, were subject to a higher authority and needed to perform at peak output to achieve the goals of those who asserted power over them. In pursuit of this, Greek athletic trainers, gladiatorial *doctores*, and Roman commanders employed the Tetrad.

Chapter 1: Athletes and Gladiators

The discussion around whether or not Roman gladiators were considered part of the broader athletic spectrum has shifted in recent years. While earlier scholars claimed that the Greeks and Romans would have considered gladiators as a separate group from athletes in two ways – they were primarily slaves and experienced a different degree of violence[16] – more recent historians have argued that many of the previously held ideas of gladiatorial combat, such as its death rate and purpose, have been blown out of proportion and that these fighters were indeed athletes.[17]

My purpose in this chapter is twofold. First, I add further to this discussion by directly addressing the previous viewpoints through the examination of the elite perspectives of both sports. Then I compare the extreme violence inherent in Greek athletics to recent scholarship about the mortality rates of gladiators. I transition between both points by exploring the origins and audience of each. Second, after strengthening the connection between the two, I demonstrate why the Greek Tetrad would have appealed to *doctores* as an appropriate method for instructing their gladiators through an analysis of σκοπός or goal. Moreover, it offered the advantage of simplifying the logistics required in training large numbers of individuals at once.

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[16] E. Norman Gardiner, *Athletics in the Ancient World* (Oxford, UK: Clarendon Press, 1930), 119; Steve Craig, *Sports and Games of the Ancient World* (Westport: Greenwood Press, 2002), 87.

[17] Heather L. Reid, "Was the Roman Gladiator an Athlete?" *Journal of the Philosophy of Sport* 33, (2006); 37-43; M.J. Carter, "Gladiatorial Combat: The Rules of Engagement," The Classical Journal 102, no. 2 (2006/2007); 97-114; Garrett G Fagan, "Training Gladiators: Life in the Ludus," in *Aspects of Ancient Institutions and Geography: Studies in Honor of Richard J.A. Talbert,* ed. by Lee L. Brice and Daniëlle Slootjes, (Leiden: Brill, 2015), 122-44. ProQuest E-book Central.

Class Distinctions

As discussed in the introduction, the study of ancient slavery is difficult to pursue because it rests on the bias that our extant sources were written from the perspective of the master, and this inevitably distorts the realities of daily life for an enslaved individual. Given that, however, these aristocratic viewpoints can prove useful inasmuch as their focus is on what others thought about these athletes and gladiators even if we do not hear how these competitors saw themselves. I employ this top-down approach because the training assignments of athletes, gladiators, and even soldiers was not directed through the personal choice of the individual, but of the trainer. Their perspective forced the subject into the mold that their superiors believed fit through the use of physiognomy.

For instance, a Greek παιδοτρίβης ("trainer") would utilize this art to study a potential client's body to determine what sport was best for them to pursue, which in turn determined the type of training they would undergo. Philostratus gives a detailed overview of what body types should be assigned to which athletic pursuits and how variations of those affected performance.[18] Although we do not know exactly how gladiators were assigned to different classes, it follows that a similar method was used considering that each class utilized a different style in which certain physiognomies would have been believed to prevail. This same method was also employed in Roman culture to determine who would make a good soldier.[19] This analysis of superficial characteristics correlated with deeper beliefs about bodily autonomy.

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[18] Philostratus, *Gymnasticus*, 31-41.

[19] Gladiator styles: Michael Carter, "*Armorum Studium*: Gladiatorial Training and the Gladiatorial *Ludus*," *Bulletin of the Institute of Classical Studies* 61, no. 1 (2019): 127. Physiognomy for legionaries: Polybius, *Histories*, 6.20. Vegetius, *Epitome Rei Militaris*, 1.6.

In drawing connections between gladiators and Greek athletes, Heather L. Reid applies the lens of stoicism, pointing out that Seneca claimed athletes were enslaved more than any gladiator because of their devotion to their bodies.[20] This idea is not restricted to philosophers. Galen, who wrote extensively on health and fitness and was also a physician for gladiators, says that an individual should not pursue athletics because it enslaves people to harmful practices and their trainers. In doing so, he directly compares athletes to those who have been forced into slavery.[21] He makes this observation because the Greco-Roman concept of freedom for an adult male included respect, autonomy, and freedom from physical punishment, torture, and sexual exploitation.[22] Athletes, at the very least, gave up their autonomy and were subject to beatings and death, and may very well have experienced sexual exploitation as well.[23]

Seneca and Galen both argue that the obsession with unnatural physical ability makes an athlete psychologically subjugated to their compulsion. These two were engaging in a discussion that seems to have been much older. To wit, the fifth-century classical tragedian Euripides in one of his dramas says

> For of all the myriad of evils in Greece,
> there are none worse than the race of athletes.
> First of all, they neither learn how nor would be
> able to manage a household well;
> for how would a man

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[20] Seneca the Younger, *Epistles*, 15.2-3, 47.10, 14.
Heather L. Reid, "Seneca's Gladiators," *Sport, Ethics and Philosophy* 4, no. 2 (2010); 206.

[21] Galen, *Hygiene*, 2.1.

[22] Kostas Vlassopoulos, *Historicising Ancient Slavery* (Edinburgh: Edinburgh University Press, 2021), 122.

[23] Although, pederasty appears to have been quite common in gymnasia, the extent of their sexual exploitation of adult men is unclear. There is some evidence however that these relationships continued on past the age considered appropriate in the ancient Greek world. Hawhee, *Bodily Arts*, 102-08.

> who is a slave to his jaw and who yields to his stomach
> acquire wealth greater than his fathers? [24]

These sources make it clear that some onlookers thought that athletes lacked full mental control over themselves but rather were subservient to the power of their passion.

This begins to blur the distinction between athletes and gladiators based on class made by earlier scholars, and Galen's inclusion of the unequal power dynamic between trainer and trainee only furthers the uncertainty. The relationship not only included loss of bodily autonomy, but also physical punishment and death. Παιδοτρίβαι used rods to enforce correct form, probably in beating the student, a practice which was also present in the enforcement of rules during actual Olympic competition as well as during gladiatorial bouts.[25] Education through pain was the first step across the line into the physical abuse from which free men were exempt but was seen often, and indeed encouraged, for enslaved individuals.

Trainers, however, also seem to have had the power of life and death over their athletes, which implies full ownership. Philostratus, whose *Gymnasticus* provides us the most complete overview of athletic training in antiquity,[26] recounts two popular, but not mutually exclusive, reasons that a γυμναστής ("trainer") should carry a strigil. The first

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[24] κακῶν γὰρ ὄντων μυρίων καθ᾽ Ἑλλάδα
οὐδὲν κάκιόν ἐστιν ἀθλητῶν γένους.
Οἳ πρῶτον οἰκεῖν οὔτε μανθάνουσιν εὖ
οὔτ᾽ ἂν δύναιντο· πῶς γὰρ ὅστις ἔστ᾽ ἀνὴρ
γνάθου τε δοῦλος νηδύος θ᾽ ἡσσημένος
κτήσαιτ᾽ ἂν ὄλβον εἰς ὑπερβολὴν πατρός; Euripides, *Autolycus*, frag. 282.

[25] Hawhee, *Bodily Arts: Rhetoric and Athletics in Ancient Greece* (Austin: University of Texas Press, 2004), 101-2;
David Potter, *The Victor's Crown: A History of Ancient Sport from Homer to Byzantium* (Oxford: Oxford University Press, 2011), 60; Carter, "Gladiatorial Combat," 102.

[26] Charles H. Stocking, "The Use and Abuse of Training 'Science' in Philostratus' Gymnasticus," *Classical Antiquity* 35, no. 1 (2016): 87, https://www.jstor.org/stable/10.2307/26362664.

was to clean his pupil after a match and the second to kill them if the trainer believes they did not compete well or try hard enough.

> And I agree with the story; for it is better to believe than to disbelieve. Indeed, let the strigil be a sword against useless athletes, and let the trainer be above the judges at Olympia in some respect. [27]

Here his agreement, although seemingly hesitant at first, cements in the end his belief that the trainer should have the right to kill any client perceived to be unworthy.

Philostratus again supports this idea when he discusses the wrestler, Gerenus, who died of exertion when his γυμναστὴς overtrained him after he had indulged while celebrating his Olympic victory. He uses this example to criticize the strictness of the Tetrad, not because an athlete died, but instead exclaims "For how is it not grievous that the stadia lost such an athlete?"[28] His focus is on the caliber of Gerenus as a victor, not his status as an athlete, and so uses that to reprimand the trainer for employing such a rigid system and not understanding his craft. The two stories reveal Philostratus' encouragement of the murder of worthless competitors, but not those who had proven their value, which demonstrates his approval of the unbalanced relationship.

The connection to gladiators is obvious. The earliest attested references to gladiatorial combat were Samnite prisoners of war forced to fight in funerary games.[29] Even once the games became a popular spectacle and free aristocratic Romans began to

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[27]καὶ ξυγχωρῶ τῷ λόγῳ· βέλτιον γὰρ πιστεύεσθαι ἢ ἀπιστεῖσθαι. ξίφος μὲν δὴ ἐπὶ τοὺς πονηροὺς τῶν ἀθλητῶν στλεγγὶς ἔστω, καὶ ἐχέτω δή τι ὑπὲρ τὸν ἑλληνοδίκην ὁ γυμναστὴς ἐν Ὀλυμπίᾳ. Philostratus, *Gymnasticus*, 18.

[28] τὸ γὰρ τοιοῦδε ἀθλητοῦ ἁμαρτεῖν τὰ στάδια πῶς οὐ βαρύ; Philostratus, *Gymnasticus*, 54.

[29] Livy, *Ab Urbe Condita*, 9.40.17; Eckart Köhne, "Bread and Circuses: The Politics of Entertainment," in *Gladiators and Caesars: The Power of Spectacle in Ancient Rome*, ed. Eckart Köhne, Cornelia Ewiglenben, and Ralph Jackson (Berkeley: University of California Press, 2000), 11.

join, the ranks of *ludi* were still overwhelmingly made up of criminals and the enslaved who were pressured to compete through threats and the use of violence.[30] This is not intended to compare the actual experiences of the forcibly enslaved to those who chose to become athletes, but rather to point out that the two groups shared a lack of autonomy and subjection to physical violence, qualities which were that were understood to differentiate free from slave in the Greco-Roman world. These commonalities blur the distinctions between those who competed in Greek athletics and those who fought in *munera* ("gladiatorial events") and thereby reveal that the gap between enslaved gladiator and free athlete was narrower than is often asserted.

Mortality Rate

If gladiatorial spectacle and Olympic sport existed on a spectrum with "absolutely fatal" on one end and "completely safe" at the other, the arena sits at "invariably deadly" and the stadium at "only accidental death" in modern perception. In reality, they were much closer, the only substantive difference being that gladiators fought with weapons, making their combat that much more lethal. A great deal of research has been done to outline the rules and practices of both Greek sport and Roman spectacle and articulate the lethality of each, but few scholars have directly compared the two.

Participation in combat sports at Olympia was brutal, as is seen even in mythical competition. Philostratus, for instance, points to Polydeuces as the best example of a boxer, and, in Theocritus' *Idyll* 22, the fighter's skill is shown in his ferocious beating of

[30] Diodorus Siculus, *Bibliotheca Historica*, 34.10.

Amycus. [31] Near the end of their confrontation, Amycus makes an attempt to finish Polydeuces

> But Polydeuces ducked his head, and at the same time struck with his
> strong fist up under Amycus' left temple and attacked him savagely;
> then dark blood spilled out quickly from his gaping temple.
> And Polydeuces struck him in the mouth with his left hand, and Amycus'
> strong teeth rattled;
> He continually pummeled his face with a very sharp onslaught,
> until he crushed his cheek. And Amycus was laid out on the ground barely
> conscious, and he held up
> both his hands together, submitting the fight since he was near death.[32]

Polydeuces' skill did not only consist of his ability to avoid an incoming blow, but of the crushing speed and power he demonstrates in pulverizing Amycus' face. The extent of this damage could easily be chalked up to the hyperbole of myth were it not for the multitude of sources supporting the shedding of blood and taking of life in actual athletic competition.

Michael Poliakoff says concerning Olympic combat sports "the Greek public accepted a good deal of hazard, injury, and death" and quotes an inscription which states "a boxer's victory is gained in blood."[33] Athletes who participated in wrestling, boxing, and pankration were all at severe risk for potentially life ending damage which the audience expected to see as a show of endurance and skill. Wrestling was the least overtly

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[31] Philostratus, *Gymnasticus*, 9.
[32] ἀλλ' ὅγ' ὑπεξανέδυ κεφαλῇ, στιβαρῇ δ' ἅμα χειρί
πλῆξεν ὑπὸ σκαιὸν κρόταφον καὶ ἐπέμπεσεν ὦμῳ·
ἐκ δ' ἐχύθη μέλαν αἷμα θοῶς κροτάφοιο χανόντος·
λαιῇ δὲ στόμα κόψε, πυκνοὶ δ' ἀράβησαν ὀδόντες·
αἰεὶ δ' ὀξυτέρῳ πιτύλῳ δηλεῖτο πρόσωπον,
μέχρι συνηλοίησε παρήια. πᾶς δ' ἐπὶ γαίῃ
κεῖτ' ἀλλοφρονέων καὶ ἀνέσχεθε νεῖκος ἀπαυδῶν
ἀμφοτέρας ἅμα χεῖρας, ἐπεὶ θανάτου σχεδὸν ἦεν. Theocritus, Idylls, 22.123-130.
[33] Michael Poliakoff, "Ancient Combat Sports," *Archaeological Odyssey* 7, no. 4 (2004): 42, 45.

violent of these, as these matches did not need to end in submission, although choking an opponent into submission was considered a legitimate strategy.[34]

Boxing and pankration, on the other hand, had no time limit and only ended when one of the competitors did like Amycus and threw up their hands with their fingers outstretched. In a boxing match, punches were most frequently aimed at the head or genitals, intending to cause the maximum amount of damage and pain as quickly as possible.[35] Philostratus the Elder lays out the rules of the pankration, which counted chokeholds, attacks to the groin, and intentional breaking of fingers along with dislocating of joints as fair game. Only biting and eye gouging were deemed fouls.[36]

All three resulted in death often enough that a legal principle was established in Athens which stated that killing an opponent during competition could at worst be considered unintentional homicide.[37] Beyond this, other competitors brag about ending an opponent's life and medical texts regularly discuss the deaths of athletes.[38] In addition, it seems as though those competing were fully prepared for this outcome. Philostratus recalls speaking to one whose trainer psychologically manipulated him into pushing himself harder by writing a letter to the man's mother that said "If you hear that your son

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[34] Poliakoff, "Ancient Combat Sports," 46.
[35] Potter, *The Victor's Crown*, 84-5.
[36] Philostratus the Elder, *Imagines*, 2.6; Poliakoff, "Ancient Combat Sports," 47-8. cf. Association of Boxing Commissions and Combative Sports, "Unified Rules of Mixed Martial Arts," updated August 1st, 2018, accessed January 17, 2023. https://www.ufc.com/unified-rules-mixed-martial-arts. The danger of blows to the head is well known. The extent of pain caused by blow to the groin can be seen in the ONE Bantamweight World Title fight on October 21, 2022, during which the divisional champion John Lineker took an accidental knee to the groin from his opponent, Fabricio Andrade. This blow shattered his cup and rendered Lineker unable to continue, ending the match.
[37] Demosthenes, *Orations*, 22.53.
[38] Potter, *The Victor's Crown*, 86-7.

is dead, believe it, but if you hear that he has been defeated, do not."[39] The tactic paid off, and the athlete took victory in the pankration, attributing his success to this ploy. The meaning implicit in this letter is that, had he been losing, he would not have submitted to end the match but would rather have forced his opponent to kill him. Another example comes from an inscription in which a boxer at the Olympic games, Camelus of Alexandria, prayed to Zeus for victory or death and received the latter.[40] Whether or not this actually occurred, the individual who commissioned the monument wanted others to believe that Camelus was willing to die in pursuit of laurels.

Athletes obviously recognized the danger of competition in sport but participated nevertheless, and their audiences anticipated seeing brutal violence at these events. Extremely vicious attacks to the body's most vulnerable areas were encouraged and often employed, frequently resulting in disfigurement, permanent disability, and death. On the spectrum of fatality, this brings the Olympic games into closer contact with gladiatorial spectacles and shrinks the gap between the reality of what Greek athletes and Roman gladiators endured.

Despite the sport's reputation for wanton carnage, recent research argues that gladiatorial combat was primarily a show of martial skill and *virtus* with regimented rules and that it was in the best interest of all parties to keep the combatants alive. Gladiators were expensive investments, requiring specialized training, housing, and considerable amounts of food. When an *editor* (the sponsor) hosted games, he rented the combatants

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[39] τὸν υἱὸν εἰ μὲν τεθνεῶτα ἀκούσειας, πίστευσον, εἰ δὲ ἡττώμενον, ἀπίστειPhilostratus, *Gymnasticus*, 23.
[40] Poliakoff, "Ancient Combat Sports," 44-5.

from *lanistae* (those who own gladiators) and, if any fighter were seriously injured or killed, he was required to recompense his full cost.[41] The financial penalty for the loss of an individual athlete could be as high as 12,000 to 15,000 sesterces.[42] This was intended to keep sponsors from frivolously throwing away the lives of gladiators, who were not their own property. In addition to this, these *editors* needed special permission to hold contests *sine missione* (lit. "without release"), which has frequently been interpreted as "to the death," although once again recent scholarship has reexamined this line of thinking and argued that it also could simply mean that the fight could not end in a draw.[43] These laws were meant to keep combatants alive, which would be antithetical to the games if a spectacle's primary draw was death.

Further evidence for the sportive nature of the games is demonstrated by the judges, the *Summa Rudis* and *Secunda Rudis*, who enforced strict adherence to the rules and were supposed to keep gladiators from killing one another without permission. The latter duty was important in upholding the aforementioned laws and obliged *Rudes* to intervene before a deadly blow was struck, while the former required them to use their rods to ensure that each warrior fought in the designated manner of his type.[44] This further strengthens the connection of gladiatorial combat and athletic sport since each were placed in distinct categories with rules that outlined acceptable behavior. The enforcement of these regulations in gladiatorial shows also hints at why audiences

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[41] Carter, "Gladiatorial Combat," 101.
[42] ~$24k to $30k USD in 2023.
[43] Carter, "Gladiatorial Combat," 100-01; Potter, *The Victor's Crown*, 217.
[44] Carter, "Gladiatorial Combat," 102-03. .[44] Gladiators were trained according to class with techniques specific to that style and were expected to engage with their opponent utilizing the method associated with their appellation.

flocked to see both types of events. The rules ensured skillful competition.

Many Romans, especially men, had intimate knowledge of combat and recognized martial skill as one of the pillars of their culture. They watched gladiators fight not because or just out of a thirst for blood, but from a desire to view athletes who possessed a high level of technical proficiency demonstrate their prowess.[45] Prior to a match, each competitor would perform in a pre-show called a *prolusio*, during which, without any intention of harming their opponent, they displayed their ability to skillfully wield their arms.[46] Following this, actual combat would begin, sometimes with dull weapons, and the gladiators would engage one another under the watchful eyes of referees as they exhibited the results of their intensive training to the crowd.

While attacks during this combat always had the possibility of being lethal, Michael Carter argues convincingly that gladiators themselves usually tried to keep their opponent from serious harm. Using inscriptions, epitaphs, and literary evidence, he not only lays out the official rules of combat, but also concludes that the fighters followed an unwritten code of conduct that they not cause serious damage to one another, mostly in order to protect themselves from reprisal.[47] As compared to those Greek athletes who boasted about ending another's life, a surprising number of gladiators' tombstones speak of the mercy they showed their opponents. The friends and family who paid for these monuments clearly wanted others to believe that their deceased loved one had fought in strict accordance with the unstated laws of the arena. In the few examples that we have of

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[45] Carter, "Gladiatorial Combat," 101.
[46] Michael Carter, "*Armorum Studium*: Gladiatorial Training and the Gladiatorial *Ludus*," *Bulletin of the Institute of Classical Studies* 61, no. 1 (2019): 316. https://www.jstor.org/stable/41234763.
[47] Carter, "Gladiatorial Combat," 106-12.

gladiators who intentionally killed an opponent, the victim is cast as one who is a threat to other gladiators.[48] This professional courtesy illuminates not only the connection of mercy between those competing in the same potentially fatal sport, but also one way that enslaved individuals might be able to exert autonomy.

However, when live weapons were in use, there was always the possibility of serious injury. In that case, to preserve their investment, *lanistae* provided their gladiators with the best medical care they could. Galen, who had served as a physician to gladiators in Pergamum, wrote extensively about treating their various wounds including reconnecting major muscle and tendon tissue. His five consecutive appointments to the position of chief physician, ending only when Pergamum fell, bespeaks the proficiency he achieved.[49] Modern forensics also supports the assertion that wounded combatants received high-quality care. A study of gladiators' bones reveals that many who sustained deep cuts or broken bones in combat, and even endured medical amputations, survived long enough that their injuries healed completely.[50] It would make little sense to expend the money and effort to keep a physician on retainer and allow the injured time to recover if their only purpose was to die in the arena.

The official rules of each sport as well as the actions taken by the athletes demonstrate that Olympic competition included at least as much if not more ruthless

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[48] Carter, "Gladiatorial Combat," 109-11; Potter, *The Victor's Crown*, 193-94.
[49] John Scarborough, "Galen and the Gladiators," *Episteme: Revista Critica di Storia Delle Scienze Mediche e Biologiche* 5, no. 2 (2013): 104-07. https://www.academia.edu/3614775/Galen_and_the_Gladiators_Episteme_5_1971_98_111_revised_with_an_Epilogue_2013.
[50] Fabian Kanz and Karl Grossschmidt, "Dying in the Arena: The Osseous Evidence from Ephesian Gladiators," in *Roman Amphitheaters and Spectacula; A 21st Century Perspective*, ed. Tony Wilmott (Ann Arbor: Archaeopress, 2007), 216.

violence than is commonly believed to have occurred during gladiatorial sports. Traditional Greek athletes can be shown to have been willing to inflict serious and life-threatening injury in boxing, wrestling, and pankration matches, while conversely gladiators seemed to have tried to avoid the same as much as they could. This continues to pull the two sports ever closer on the spectrum of violence, at least insofar as the threat of harm or death was inherent and expected in both.

Origins and Audience

This is not to say that the forum and later the arena were free of violence or that gladiators did not deal or receive lethal blows; rather there was indeed an ever-present threat of harm or death which was an integral part of the excitement surrounding many ancient sports including the Greek Olympics. The connection is unsurprising considering their origins: warfare and funerary games.

The earliest literary example of sporting events comes from Patroclus' funeral in book 23 of the *Iliad*, where the Greeks demonstrate their physical prowess in competitions directly related to warfare including both chariot and foot races, boxing, wrestling, throwing large stones or spears, duels with spears, and archery. These competitions served both to celebrate the dead and to prove the martial skill of allies in a non-lethal, but still brutal, manner. Epeius, who competes in boxing against Euryalus, says

> For I will speak thus, and it will happen;
> I will utterly rend his flesh and crush his bones.
> And let his guardians stay here in a crowd on the spot,

so that they can carry him out, beaten at my hands.[51]

Epeius carries out his threat, and, while he does not kill his opponent, Euryalus is left spitting up blood and is dragged away by his companions before he revives.

The earliest evidence for Italian gladiators comes from tomb paintings in Paestum, which was originally a Greek colony. The presence of gladiatorial combat in these monuments displayed alongside boxers, divers, and charioteers directly links this practice both to sports considered more traditionally Greek and also to funerals. The sport's birthplace, however, is unclear. Livy tells us that the Campanians were the ones who forced the Samnite prisoners to fight, whereas Athenaeus, writing in the 1st century CE but citing Nicolaus of Damascus from the 1st century BCE, attributes the origin to the Etruscans.[52] It is entirely possible that the Campanians encountered gladiatorial combat through their interaction with the Etruscans, as Athenaeus implies. Whatever the case, it is clear that Greeks in Italy adopted the practice of gladiatorial competition and included it with events in their already existing athletic competitions.

The Romans first imported this sport in 264 BCE with just three pairs of fighters. The next attested gladiatorial show in Rome involved twenty-two pairs in 216 BCE, followed by sixty pairs in 183 BCE.[53] Surely many more now unattested occurred during

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[51] ὧδε γὰρ ἐξερέω, τὸ δὲ καὶ τετελεσμένον ἔσται·
ἀντικρὺ χρόα τε ῥήξω σύν τ᾽ ὀστέ᾽ ἀράξω.
κηδεμόνες δέ οἱ ἐνθάδ᾽ ἀολλέες αὖθι μενόντων,
οἵ κέ μιν ἐξοίσουσιν ἐμῇς ὑπὸ χερσὶ δαμέντα. Homer, *Iliad*, 23.261-897.

[52] Athenaeus, *Deipnosophistai*, 4.153f.

[53] Valerius Maximus, *Factorum ac Dictorum Memorabilium,* 2.4.7; Livy, *Ab Urbe Condita,* 23.30.15, 39.46.2.
Eckart Köhne, "Bread and Circuses: The Politics of Entertainment," in *Gladiators and Caesars: The Power of Spectacle in Ancient Rome*, ed. Eckart Köhne, Cornelia Ewiglenben, and Ralph Jackson (Berkeley: University of California Press, 2000), 11.

this period. Finally, Lucilius, writing near the end of the 2nd century BCE, when gladiatorial spectacles were still tied exclusively to funerary games and took place in the forum, provides one of the earliest examinations of gladiators. There, Pacideianus, "the best gladiator by far since the birth of man," when he is paired against Aeserninus, "a foul man," says

> "Indeed, I will kill him, and I will win, if you demand it." He said,
> "but I believe that this will happen: first, I'll parry,
> then I'll put my gladius in the stomach and lungs of the idiot.
> I despise that man. I'll fight angry, and it won't take a second longer
> than it does for one of us to fit our sword in our right hand.
> Truly, I am continually driven by my anger, my passion, and my hatred of that man." [54]

This mirrors Epeius' speech. Both Lucilius' gladiator and Homer's hero call their shots, both intend to take victory through explicitly ferocious combat, and both follow through. There is a difference, however. Epeius makes his declaration before he knows who his opponent will be and directs that threat at anyone who dares to challenge him, ally or not. Conversely, Pacideianus knows exactly who he'll fight and so, prompted by his loathing of the man, makes the conscious choice to give into his anger. What is clear is that both men are participating in a ritual celebration of the dead through expressions of martial skill. From that same starting point, both sports grew far beyond their original scope.

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[54] *optimus multo post homines natos gladiator*
spurcus homo
"*Occidam illum equidem et vincam, si id quaeritis,"inquit.*
"verum illud credo fore: in os prius accipiam ipse,
quam gladium in stomacho surdi ac pulmonibus sisto.
Odi hominem, iratus pugno, nec longius quicquam
nobis, quam dextrae gladium dum accommodet alter;
usque adeo studio atque odio illius ecferor ira." Lucilius, *Satires*, 4.176-81.

This development reveals what may be the clearest connection between the two. As gladiatorial contests increased in popularity, they were presented alongside other events in arenas that were built in large multi-sport complexes. Cicero, recording Pompey's celebratory dedication of his theater, says "For why would I think that you want to see athletes, you who have scorned gladiators? [55] His explicit comparison of both suggests that one who did not enjoy watching one would also not enjoy the other, implying their similarity. Augustus's *Res Gestae* lists the many *munera* he sponsored and separates them by categories under the umbrella of sport, including gladiatorial combat, Greek athletics, and hunts.[56] He has classified each of these as performances for the Roman public to enjoy and notes that it takes a great deal of wealth and power to put them on.[57]

These shows utilized the same spaces and, although early on it was more about available open space, cities began to build large compounds that housed the most popular sports, including both Greek and gladiatorial varieties, as well as chariot racing.[58] These structures were dedicated to athletic pursuit, as the presence of altars to gods like Hercules and Nemesis attests who were associated with both traditional Greek

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[55] *nam quid ego te athletas putem desiderare, qui gladiatores contempseris?* Cicero, *Letters to Friends*, 7.3.
[56] Augustus, *Res Gestae*, 22.1-23.1.
[57] Scholars generally agree that the *Res Gestae* was propaganda intended to justify Augustus' actions and to impress following generations. They also point out that the author, whether it was Augustus himself or not, often differentiates between similar categories and makes numerical mistakes while trying to exaggerate the Princeps' accomplishments. A.E. Cooley, *Res Gestae Divi Augusti: Text, Translation, and Commentary* (Cambridge: Cambridge University Press, 2009), 118; J.M. Claasen, "Auto-Memorialisation: Augustus' *Res Gestae* as Slanted Narrative," *In die Skriflig* 53, no. 3 (2019): 2, 4-5. https://doi.org/10.4102/ ids.v53i3.2442.
[58] Potter, *The Victor's Crown*, 121, 165-6, 267, 294; Hazel Dodge, "Amphitheaters in the Roman East," in *Roman Amphitheaters and Spectacula; A 21st Century Perspective*, ed. Tony Wilmott (Ann Arbor: Archaeopress, 2007), 39.

competition as well as Roman gladiatorial shows.[59] This makes it clear that these different types of event were both celebrated with the same religious rites.

In addition to the physical space, the artwork displayed in these arenas further demonstrates the similarities between these subcategories of athletes, especially in the east where Greek culture had greater influence. Rather than capturing the moment of victory, as was common in Roman art, reliefs from Cibyra in Turkey display continuous snapshots of fights and depict gladiators in the same style as pankratists.[60] Not only does this make sense because wrestling and boxing were integral elements in hand-to-hand combat if a combatant were disarmed, but it also shows that artists saw similarities in both subjects. The physical spaces provided for athletic competition and the art showing the contests demonstrate that only the method of contention differentiated the sports. Both used the same spaces, gods, and art, because they were part of the same overarching domain of athletics.

Although on the surface Olympic games and gladiatorial spectacle appear to have existed on opposite ends of the spectrum of violence in sport, they were actually considered much closer, in antiquity. The literary and physical evidence shows that both not only shared the same spaces, but aristocratic viewers treated these different competitions much the same. Both shared an origin in war and funerary rites, and both displayed similar types of violence as methods by which a competitor could exhibit their martial skill to an audience. In sum, gladiators belonged to the same class as wrestlers,

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[59] Alison Futrell, *Blood in the Arena: The Spectacle of Roman Power* (Austin: University of Texas Press, 1997), 110, 185; Hawhee, *Bodily Arts*, 21, 74.
[60] Christof Berns, and H. Ali Ekinci, "Gladiatorial Games in the Greek East: a complex of reliefs from Cibyra," *Anatolian Studies*, 65 (2015): 162, 165-6. doi:10.1017/S0066154615000095.

boxers, and pankratists.

Greek Training, Σκοπός, and Romans

In the 3rd century BCE, Romans began to have more regular contact with Greeks and their culture, adopting and adapting it to the point that Horace wrote his famous line "captive Greece captured its savage conqueror and brought its arts into uncultured Latium."[61] Among the many imports were athletics, which took root and became so popular that by the 1st century BCE cities frequently had more than one gymnasium and aristocrats included *palaestra* – literally "wrestling rooms," in modern terms, "exercise rooms" – within their villas.[62] The growth of these institutions coincided with increased interest in gladiatorial spectacle, but it also sparked pushback from some Roman authors who disdained this foreign import.

Disgusted traditionalists complain that Greek culture as a whole makes men effeminate and lazy, unlike their masculine, warlike forbears. With particular regard to exercise, it comes down to the idea of σκοπός in Greek and *finis* in Latin, which denote the end goal of an undertaking.[63] Many during the Roman period heavily criticized Greek athletes in particular because their σκοπός shifted away from the original purpose of the

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[61] *Graecia capta ferum victorem cepit et artis intulit agresti Latio.* Horace, *Epistles*, 2.1.156-7.
[62] Varro, *De Re Rustica*, 2.1.2-3.
[63] On σκοπός: Galen, *Thrasybulus*, 12; *finis:* Quintilian, *Institutio Oratia,* 2.17.22. Oxford Latin Dictionary, s.v. "*finis*." It is interesting to note that finis accounts for both the goal and the result of that goal, whereas Greek uses σκοπός for "goal" and τέλος for "result." See F.M.J. Waanders, *The History of ΤΕΛΟΣ and ΤΕΛΕΩ in Ancient Greek* (Amsterdam: B.R. Grüner Publishing Co., 1983), 225-7. ProQuest E-Book Central; Joseph C. Podgurski, "The Evolution of Latin *Finis* into Old French" (PhD diss, New York University, 1940), 14-5. Proquest E-Library.

cultivation of ἀρετή in warfare toward an obsession with their physique, and that in turn led to a change in lifestyle many found distasteful. This change occurred more readily in Hellenistic Greece because ἀρετή was no longer tied to combat explicitly. Rather, it had become associated with peak performance in whatever one decided to pursue, so, while still often tied to courage in battle, this sort of virtue could be found elsewhere.[64] However, the stain of this sort of effeteness was more easily avoided when it came to gladiators since their sport featured combatants who wielded live steel. It could not be readily separated from martial prowess.

> Varro, extolling the benefits farming had on the Romans' ancestors, says
>
> While they preserved this practice, they also attained both goals, so that they both kept their land extremely fruitful through cultivation and were themselves more secure in their health and did not long for the Greeks' gymnasia. [65]

He goes on to claim that the rise of such gymnastic pursuits led directly to the collapse of the truly agrarian society Rome was founded upon. His attack on Greek culture was part of a larger discussion that both predated him and survived long after. Diodorus Siculus, discussing the period following the Third Macedonian War in 171 BCE to 168 BCE, says "the young men turned to softness and licentiousness after the end of the wars, and wealth was patron to their desires." [66] Both Polybius and Plutarch mention Cato the Elder's contempt for the Hellenic influence in Rome during the same time as Polybius

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[64] Hawhee, *Bodily Arts*, 17-18.
[65] *Quod dum servaverunt institutum, utrumque sunt consecuti, ut et cultura agros fecundissimos haberent et ipsi valetudine firmiores essent, ac ne Graecorum urbana desiderarent gymnasia*. Varro, *De Re Rustica*, 2.1.1-2.
[66] ἐτράπησαν γὰρ οἱ νέοι μετὰ τὴν ἐκ τῶν πολέμων ἄνεσιν εἰς τρυφὴν καὶ ἀκολασίαν, χορηγὸν ἔχοντες τὸν πλοῦτον ταῖς ἐπιθυμίαις. Diodorus Siculus. *Bibliotheca Historica*, 37.2.

and his fear that it would destroy the warlike nature of the youth by making them soft.[67] It is clear that there was general distrust of the influx of Greek culture and a fear for the *mos maiorum* ("ancestral custom") which to many conservative Romans underlay the moral foundation of their society.

Later authors who focus specifically on athletics provide further insight into Cato and Varro's aversion to the gymnasium. Philostratus claims "when these things changed and (athletes) became inexperienced in war rather than warriors… the stadia was weakened." [68] His argument is that the shift in σκοπός away from preparation for warfare towards a focus on the athlete's body has made the competitors of his day inferior to those of the past. The heart of this criticism echoes in many other authors such as Pliny the Elder

> The extremely fine sand from the Nile is not much different from the dust of Puteoli, not for supporting the seas and for breaking up waves, but for subduing our bodies in the exertions of the wrestling school… I will not say more concerning this subject, not, by Hercules, more than about the use of earth in the ointment for wrestlers, by which our youth destroy the virtue of their minds in exercising their bodies.[69]

Continuing in this vein, Plutarch explains why priests were not allowed to anoint themselves outdoors, saying

> For the Romans mistrusted oiling very much, and they think that there is no other cause for the Greeks' slavery and effeminacy than gymnasia and the wrestling schools, which produce much boredom, leisure, and mischief in the cities as well as the practice of pederasty and ruining the bodies of

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[67] Polybius, *Histories*, 31.25.4-6; Plutarch, *Life of Marcus Cato*, 22.1-5.
[68] Ἐπεὶ δὲ μετέβαλε ταῦτα καὶ ἀστράτευτοι μὲν ἐκ μαχομένων... ἐξενευρίσθη τὰ στάδια. Philostratus, *Gymnasticus*, 44.
[69] *non multum a pulvere Puteolano distat e Nilo harena tenuissima sui parte, non ad sustinenda maria fluctusque frangendos, sed ad debellanda corpora palaestrae studiis… plura de hac parte non dicturus, non, Hercule, magis quam de terrae usu in ceromatis, quibus exercendo iuventus nostra corporis vires perdit animorum*. Pliny, *Naturalis Historia,* 35.13.

> the youth with sleep and walks, and rhythmic movement, and strict diets. Because of these they forgot their weapons, letting them slip away while preferring to be called graceful and beautiful wrestlers rather than good hoplites and horsemen. [70]

On the same subject, Dio Chrysostomus, when praising an athlete, feels the need to qualify that Iatrocles, although unbelievably beautiful, was a unique case and deserving of these accolades because the boxer did not let his beauty enslave him and adds "While beauty customarily drives one to softness even those who have a moderate amount of it, he was very beautiful in form but still extremely self-controlled." [71]

Each of these authors associated the obsession with outer appearance with weakness, wantonness, and a loss of military usefulness. Philostratus' and Plutarch's explicit reasoning for this shift away from martial preparation is echoed by Galen, who claims that the result (τέλος) of athletic training's σκοπός has become the production of unhealthy bodily states, which he calls "gymnastic bodies" (γυμναστικὰ σώματα), implying that these herald inefficiency on campaign.[72] His reasoning for this is that the misplaced goal destroys health and thereby function and true beauty because the three are inextricably linked.[73] This explanation addresses the core issue for each of these authors, that Greek athletes had become too focused on external appearance rather than the

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[70] τὸ γὰρ ξηραλοιφεῖν ὑφεωρῶντο Ῥωμαῖοι σφόδρα, καὶ τοῖς Ἕλλησιν οἴονται μηδὲν οὕτως αἴτιον δουλείας γεγονέναι καὶ μαλακίας ὡς τὰ γυμνάσια καὶ τὰς παλαίστρας πολὺν ἄλυν καὶ σχολὴν ἐντικτούσας ταῖς πόλεσι καὶ κακοσχολίαν καὶ τὸ παιδεραστεῖν καὶ τὸ διαφθείρειν τὰ σώματα τῶν νέων ὕπνοις καὶ περιπάτοις καὶ κινήσεσιν εὐρύθμοις καὶ διαίταις ἀκριβέσιν, ὑφ᾽ ὧν ἔλαθον ἐκρυέντες τῶν ὅπλων καὶ ἀγαπήσαντες ἀνθ᾽ ὁπλιτῶν καὶ ἱππέων ἀγαθῶν εὐτράπελοι καὶ παλαιστρῖται καλοὶ λέγεσθαι. Plutarch, *Roman Questions*, 274d-e.

[71] εἰωθότος δὲ τοῦ κάλλους εἰς τρυφὴν ἄγειν καὶ τοὺς μετρίως αὐτοῦ μετειληφότας, τοιοῦτος ὢν τὸ εἶδος ἔτι σωφρονέστερος ἦν· Dio Chrysostomus, *Discourses*, 28.6.

[72] Galen, *Thrasybulus*, 9-14, 46.

[73] Galen, *Thrasybulus*, 15-16.

internal attributes of morality, strength and courage, in other words, *virtus*.

These latter qualities represented to many ancient Romans the correct goal of athletic pursuits, the production of martial skill. Plato supports this when he says "'Indeed,' I said, 'some more refined type of exercise is necessary for warlike athletes.'"[74] The philosopher goes on to acknowledge that the current approach to training athletes does not suffice for warriors, but nevertheless he suggests a regimen tailored to those preparing for war. This is because physical exertion was linked to the nurturing of ἀρετή in Greece and *virtus* in Rome, which among other attributes include courage and skill in battle.[75] It was precisely for this reason that gladiators were able to avoid the pitfalls of Greek athletic training and become the model for the exhibition of *virtus*.

Greek Training, *Virtus*, and Gladiators

As previously mentioned, the influx of Hellenic culture into Rome happened alongside the popularization of gladiatorial shows. On its own, this parallel growth is corelative, not direct evidence that *doctores* applied the Tetrad to their gladiators. However, in conjunction with the description of the system and a consideration of the Roman belief that the martial qualities which were at the foundation of their society could be cultivated through exercise, an argument to that effect can be made.

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[74] Κομψοτέρας δή τινος, ἦν δ' ἐγώ, ἀσκήσεως δεῖ τοῖς πολεμικοῖς ἀθληταῖς. Plato, *Republic*, 3.404a.

[75] Hawhee, *Bodily Arts*, 22; Catalina Balmaceda, *Virtus Romana: Politics and Morality in the Roman Historians* (Chapel Hill: University of North Carolina Press, 2017) 24; Myles McDonnell, *Roman Manliness: Virtus and the Roman Republic* (Cambridge: Cambridge University Press, 2006) 64.

At a logistical level, assigning the Tetrad to gladiators makes the most sense of all the extant regimens due to the large numbers which any one *lanista* could own. Only fifty years after Rufus, Caesar sponsored a spectacle and proposed to include so many combatants that the senate passed legislation restricting the number of gladiators anyone could keep in the city, clearly out of fear that they would be used against the government.[76] It is unknown how many competitors were Caesar's own nor the limit the Senate set on him, but, from a broader perspective, there was a dramatic increase in pairs over time, from three in 264 BCE to sixty in 183 BCE. Given this, Caesar was most likely seeking to present an impressive number. Then, at the end of the 1st century CE, the *Ludus Magnus* was built in Rome to house and train up to one thousand competitors under one roof.[77] Thus the data suggests that, in the span of two and a half centuries, gladiatorial shows increased dramatically in number.

Gladiators were divided into groups based on the style they were assigned and each was trained in their particular method. Even in those divided classes, there would be too many in the larger *ludi* to train one-on-one so the Tetrad was used instead. Philostratus describes the system this way "those practicing this all-encompassing method systematically and repeating these tetrads in this way remove the understanding of a naked athlete from the profession [of trainer]." [78] The complaint he makes, that this regimen undercuts scientific knowledge by taking away the personal understanding of each athlete, is exactly what would have made this program useful for gladiatorial

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[76] Suetonius, *Divus Iulius*, 10.2.
[77] Fagan, "Training Gladiators," 123.
[78]τὴν τοιάνδε ἰδέαν πᾶσαν ἁρμονικῶς γυμνάζοντες καὶ τὰς τετράδας ταύτας ὧδε ἀνακυκλοῦντες ἀφαιροῦνται τὴν ἐπιστήμην τὸ ξυνιέναι τοῦ ἀθλητοῦ τοῦ γυμνοῦ. Philostratus, *Gymnasticus*, 47.

trainers. The Tetrad's complete nature implies that it was a modular system which could be applied to any sport with only slight modification to account for different competitions. By taking advantage of this, the *doctores* who taught each style could adjust for their specialization and assign it to the whole group at once without having to personalize it for each student. This practice would have seemed distressingly Greek to a conservative Roman were in not for the obvious veneer of *virtus* that lay on top.

By the end of the 2nd century BCE, honor and glory were becoming less associated with bloodline and more with personal displays of valor, a quality any man could now demonstrate regardless of his lineage.[79] Cicero put gladiators at the center of this very discussion

> Gladiators, or condemned men, or barbarians, what blows they endure! How those who have been well instructed prefer to receive strikes than to avoid them shamefully… What mediocre gladiator has ever groaned or grimaced? Which one has not only stood fast, but then also laid down disgracefully? Which one, after he had laid down, withdrew their neck when they were ordered to receive the fatal blow? Such is the strength of exercise, practice, and habit. Then will this be the case for "a Samnite, a foul man, worthy of that life and place;" while a man born to fame will have any part of his soul so soft that he cannot strengthen it with practice and preparation? [80]

He explicitly attributes a gladiator's *virtus* to his training and quotes Lucilius to make the point that even those considered the lowest of the low could be taught to display courage

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[79] Balmaceda, *Virtus Romana*, 42-51.

[80] *Gladiatores, aut perditi homines aut barbari, quas plagas perferunt! quo modo illi, qui bene instituti sunt, accipere plagam malunt quam turpiter vitare… Quis mediocris gladiator ingemuit, quis vultum mutavit umquam? quis non modo stetit, verum etiam decubuit turpiter? quis cum decubuisset, ferrum recipere iussus collum contraxit? Tantum exercitatio, meditatio, consuetudo valet. Ergo hoc poterit "Samnis, spurcus homo, vita illa dignus locoque:"vir natus ad gloriam ullam partem animi tam mollem habebit quam non meditatione et ratione corroboret*? Cicero, *Tusculanarum Disputationum*, 2.41.

in the face of injury and death.

Note that Cicero delineates three specific ways to show off this attribute. He alludes to pain-tolerance when he asks, "what mediocre gladiator has ever groaned or grimaced?," to perseverance, "Which one has not only stood fast, but then also laid down disgracefully?," and to bravery and acceptance of death, "Which one, after he had laid down, withdrew their neck when they were ordered to receive the fatal blow?" These were foundational aspects of *virtus* and were highly sought after by both individual Romans and those who had power over them.[81]

In addition to this, gladiators also demonstrated the discipline of their *impetus*, which was yet another valuable quality closely related to *virtus*. Pacideianus' quote above may seem to contradict this notion, but control over anger and aggression included both restraint and release in appropriate situations. It was positive if aimed at a threat and negative if unbridled and directed at comrades or Rome itself.[82] Modern scholars have concluded that Aeserninus was the same type of threat to other gladiators, which is why Pacideianus is praised for wanting to kill him so aggressively.[83] However, even if it were not true that there was a professional code of conduct amongst this group, the ability of the *Summa Rudis* to halt a match and prevent premature fatality itself demonstrates that self-control was expected from gladiators. Melee combat is highly stressful, and initiates fight-or-flight responses even in combat veterans. This hormonal reaction is associated with a temporary decrease in decision-making ability, including the discrimination of

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[81] These elements of virtus will be discussed further in chapter three.
[82] Sarah Elise Phang, *Roman Military Service: Ideologies of Discipline in the Late Republic and Early Empire* (Cambridge: Cambridge University Press, 2008), 46-9.
[83] Potter, *The Victor's Crown*, 193-4.

friend and foe, but it is also possible to mitigate these effects through both physical and psychological training.[84] For a gladiator to halt mid-attack would require them to overcome their body's natural response to immediate danger, which they would have been able to do through practice and exercise.

As Cicero's observation reveals, the production of each of these aspects of *virtus* was the primary goal of physical training in Rome.[85] Recognizing this, *doctores* could easily have applied Tetrads to their athletes without fear of their becoming soft because the *finis* was overtly martial. In the end, by using Greek techniques in a manner more tolerable to the general Roman audience, trainers in the late Republic had a unique opportunity to improve their gladiators' skill, *impetus*, and overall *virtus*.

Conclusion

The gap that existed between Olympic athletes and Roman gladiators is much smaller than has been previously recognized. The claim that the latter would not have been considered athletes due to their status is a false construct built on modern, rather than ancient notions of slavery and does not take into account the complex conception of what amounted to enslavement by ancient aristocrats. Greek athletes were frequently referred to as being enslaved to their regimen and scorned as addicts unable to break away or make their own choices. In addition, they were subjected to the same physical beatings and capital punishments which truly enslaved individuals faced. Moreover,

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[84] Vicente Javier Clemente-Suarez, Pablo Ruisoto Palomera, and José Juan Robles-Perez, "Psychophysiological Response to Acute-High-Stress Combat Situations in Professional Soldiers," *Stress and Health* 34, no. 2 (2018): 250. https://doi.org/10.1002/smi.2778.
[85] Phang, *Roman Military Service*, 38-45.

Olympic combat sports were as brutal and dangerous as gladiatorial spectacle is often presumed to be today, the only difference being that athletes fought without live weapons. Conversely, in antiquity gladiatorial *munera* were not defined by indiscriminate killing but instead governed by official rules enforced by referees and unwritten codes of proper conduct among the combatants themselves.

The real difference in the minds of the elite audience during the classical age was not "athlete" versus "gladiator" but instead "κάλλος" versus "*virtus*," beauty instead of courage. These enslaved individuals bridge the gap between Greek athletics and Roman warfare because armed combat was their sport. Given this, *doctores* would have been able to employ the logistically compatible Tetrad to produce the desired attributes that they believed to be essential to *virtus*. Through this regimen, they achieved their goal, and the qualities their athletes demonstrated caught the attention of Publius Rutilius Rufus at the end of the 2nd century BCE. He then hired trainers to impose the same protocol on his legionaries, thereby altering the manner Romans prepared for war.

Chapter 2: Regimen and Results

The Tetrad

The first and most important element of this experiential project that needs to be addressed is that I am in no way an ancient person.[86] I have not experienced the same environment, cultural pressures, and general ways of life that shaped their bodies as well as their minds. In addition, those same variables have altered my own body in ways that an ancient Roman would not have had the opportunity to experience. Despite this, basic human biomechanics have not changed drastically in the last two thousand years, which has encouraged both osteological analysis of ancient skeletons and experimental testing of ancient technologies as methods by which we may explore history. With this in mind, the creation and enaction of this regimen was intended to test the possible effects of the Tetrad in a modern context by examining pre- and post-Tetrad test results. In addition, I also compare what I experienced to what modern science says should happen as well as to what ancient sources say did happen.

Philostratus describes the Tetrad in this way

> We consider the tetrad to be a cycle of four days requiring one exercise on one day and another exercise on another. The first prepares the athlete, the next pushes, the next relaxes, and the next keeps him on a middle path. The preparatory exercise is intense, rousing the athlete with short and fast movement and makes him ready for the impending toil. While the intense exercise is an inescapable test of the strength stored in his condition. The rest day is a time for reviving his movement within reason, and the middle day (teaches the athlete) to flee his opponent and not to let up when his

[86] See Appendix E for some of my athletic background. This is necessary for a complete understanding of athletic baseline entering into this project.

opponent has fled.[87]

This explanation does not include details as to what specifically went on during each phase. However, a careful reading of Galen's treatises on health and exercise can fill in some necessary information. It should be noted here that, although both Galen and Philostratus wrote in the 2nd or 3rd centuries CE, it is generally agreed that they are discussing systems as old as the 6th century BCE.[88]

One of the types of exercise Galen describes is "violent" (σφοδρὸν) and is characterized by the speed at which the trainee can perform the action.

> It is the right time to move on to violent exercise. This, as I said, is the combination of vigor and speed, for as many exercises as are called "vigorous," someone might use all the same as "violent" if they add quick movements… of course those exercising like this stop after a short while…and they use all the recently aforementioned exercises intermittently.[89]

Any exercise may be "violent" if done quickly (ἐξ … ταχέος), however, because of the high intensity of this phase in the Tetrad, these kinds of actions force an athlete to stop after a brief time (κατὰ βραχύ). These are the same words for "quick" and "brief" used above by Philostratus in reference to the initial day of the cycle.[90] It follows then that

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[87] ἡγούμεθα δὲ τὴν τετράδα κύκλον ἡμερῶν τεττάρων ἄλλο ἄλλην πράττουσαν· ἡ μὲν γὰρ παρασκευάζει τὸν ἀθλητήν, ἡ δ' ἐπιτείνει, ἡ δὲ ἀνίησιν, ἡ δὲ μεσεύει. ἔστι δὲ τὸ παρασκευάζον γυμνάσιον σύντονος πρὸς βραχὺ καὶ ταχεῖα κίνησις ἐγείρουσα τὸν ἀθλητὴν καὶ [σὺν] τῷ μέλλοντι μόχθῳ ἐφιστᾶσα, τὸ δὲ ἐπιτεῖνον ἔλεγχος ἀπαραίτητος τῆς ἐναποκειμένης ἰσχύος τῇ ἕξει, ἡ <δ'> ἀνέσις [ὡς] ὥρα κίνησιν [καὶ] ξὺν λόγῳ ἀνακτωμένη, ἡ δὲ μεσεύουσα τῶν ἡμερῶν διαφεύγειν μὲν τὸν ἀντίπαλον, διαφυγόντος δὲ μὴ ἀνιέναι. Philostratus, *Gymnasticus*, 47.

[88] David Potter, *The Victor's Crown: A History of Ancient Sport from Homer to Byzantium* (Oxford: Oxford University Press, 2011), 148.

[89] ἐπὶ δὲ τὸ σφοδρὸν ἰέναι καιρός. ἔστι δ', ὡς εἴρηται, τοῦτο σύνθετον ἐξ εὐτόνου τε καὶ ταχέος. ὅσα γὰρ εὔτονα τῶν γυμνασίων εἴρηται, τούτοις ἅπασιν ὡς σφοδροῖς ἄν τις χρῷτο, ταχείας κινήσεις προστιθείς… ἀμέλει καὶ οἱ γυμναζόμενοι διά τινος τῶν τοιούτων ἀναπαύονται κατὰ βραχύ… τὰ γὰρ εἰρημένα νῦν δὴ πάντα διαλείποντες μᾶλλον εἰς χρείαν ἄγουσι, Galen, *Hygiene*, 2.10.

[90] Philostratus, *Gymnasticus*, 47.

Galen is describing a broader concept which was used to begin the Tetrad. This distinguishing factor, he says, is what marks exercises as intermittent (διαλείποντες). In addition to adding rapid movement to any other workout, activities like digging, throwing a discus, continual jumping, and practice in armor are added to this category. His description aligns well with what today is called high intensity interval training (HIIT).

HIIT is "exercise consisting of repeated bouts of high intensity work…interspersed by periods of low intensity exercise or complete rest"[91] and is frequently included in modern combat sports. Of these, mixed martial arts (MMA) are of particular interest as they require both striking – short bursts of high-intensity effort – and grappling – longer bouts of lower-intensity activity – which were also necessary in both gladiatorial combat and in war. Modern HIIT programs for mixed martial artists utilize high velocity movements in order to increase explosive force, prolonged work output, a well-developed neuromuscular system, and ATP production. [92]

With regard to the ancient world, a plethora of art and literary sources stress the value of both striking and grappling movements. Among the many images of gladiators engaged in armed combat relying heavily on strikes is a relief from Turkey that depicts the transition from standing combat with blade and shield to wrestling.[93] The first panel shows a fighter who has closed to disarm his opponent. The second portrays a clinch in which both combatants have immobilized each other's weapons. In the third, the fight has

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[91] Paul Laursen and Martin Buchheit, *Science and Application of High Intensity Interval Training: Solutions to the Programming Puzzle* (Champaign: Human Kinetics, 2019), 3.
[92] Laursen and Buchheit, *Science and Application of High Intensity Interval Training*, 230-5.
The specific ways in which HIIT accomplishes this will be discussed in the conclusion alongside the other specific changes imposed on Rufus' legionaries.
[93] Appendix A, Figure A.6. cf. Figure A.5.

gone to the ground and the first gladiator has submitted his adversary. Clearly, the victor's ability to grapple allowed him to come out on top.

As important as this skill was, it was secondary to the production of powerful blows with weaponry. Writing in the 1st century BCE, Cornelius Nepos says of the Greek general Epaminondas "And so, toward that end (military preparation), he frequently trained himself in running and wrestling, to the point where, while standing, he was able to grasp and fight. But he spent the majority of his effort in the study of weapons."[94] One of the subjects Nepos concerned himself with were foreign leaders who demonstrated Roman values, which supports the belief that these physical abilities were universal and underlay the preparation of any good soldier.

Livy is specific about shocking displays of power when describing a clash between Philip of Macedon's forces and the Roman army during the Macedonian wars at the end of the 3rd century BCE. "They saw bodies beheaded by the Spanish sword, with arms cut off along with the shoulder, or heads separated from the body because their neck had been severed completely, and the organs exposed, as well as other horrid wounds." [95] Livy's claims of the devastation caused by expert use of *gladii* are backed up by skeletal evidence from both the battlefield and the arena.[96] Even with a sharp *gladius*, whose design often

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[94] *Itaque exercebatur plurimum currendo et luctando ad eum finem, quoad stans complecti posset atque contendere. In armis vero plurimum studii consumebat*. Cornelius Nepos, *Liber De Excellentibus Ducibus Exterarum Gentium*, 15. 2.5.

[95] *Gladio Hispaniensi detruncata corpora, bracchiis cum umero abscisis, aut tota cervice desecta divisa a corpore capita patentiaque viscera et foeditatem aliam volnerum viderunt.* Livy, *Ab Urbe Condita*, 34. 31, 4-5.

[96] Brian Campbell, *War and Society in Imperial Rome 31 BC-AD 284* (New York: Routledge: 2022); Fabian Kanz, and Karl Grossschmidt, "Dying in the Arena: The Osseous Evidence from Ephesian Gladiators," in *Roman Amphitheaters and Spectacula, a 21st Century Perspective*, ed. Tony Wilmott (Ann Arbor: Archaeopress, 2007), 216.

includes a swell near the end to generate more velocity, it requires a great deal of skill and force to decapitate or dismember an opponent.[97]

These connections point toward the likelihood that both ancient and modern trainers used HIIT in pursuit of the same σκοπός. Indeed, Galen's inclusion of combat practice under the umbrella of "violent" exercise all but cements the case. In the same way that his description of this type aligns with the broader category of high intensity interval training, weighted weapons training belongs to the sub-category of game-based HIIT (GBHIIT). This type includes the other benefits of HIIT training but adds to it a cognitive element which improves the athlete's sport-specific skills and decision-making.[98]

The data suggests that Roman trainers recognized the effects of this training. Vegetius describes military preparation, referring specifically to one method the ancients employed.

> They wove round *scuta* from willows in the manner of shields, so that the weight of the shield was double that which a common *scutum* was normally. And similarly, to new recruits they gave wooden foils also of double weight instead of swords (*gladii*)… Neither the arena nor the battlefield has ever proved a man invincible in warfare unless instructed carefully and well trained against the post… moreover, a shield and foil of double weight were given so that, when the recruit has taken up real and lighter weapons, he may fight more easily and nimbly since he has been freed from the heavier weight. [99]

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[97] Rebecca C. Thompson, *Fire, Ice, and Physics: The Science of Game of Thrones* (Cambridge: The MIT Press, 2019), 228-31.
The skill aspect of wielding a *gladius* as opposed to power will be discussed below.

[98] Laursen and Buchheit, *Science and Application of High Intensity Interval Training*, 105-6, 236.

[99] *Scuta de vimine in modum cratium conrotundata texebant, ita ut duplum pondus cratis haberet quam scutum publicum habere consueuit. Idemque clavas ligneas dupli aeque ponderis pro gladiis tironibus dabant… Nec umquam aut harena aut campus invictum armis virum probavit nisi qui diligenter exercitatus docebatur ad palum… dupli autem ponderis illa cratis et clava ideo dabantur, ut, cum vera et leviora tiro arma sumpsisset, uelut graviore pondere liberatus securior alacriorque pugnaret*. Vegetius, *Epitome Rei Militaris*, 1.11-12.

The explicit mention of the soldiers' increase in speed and skill through this method demonstrates that ancients grasped the principles underlying this regimen.

So, with a secure understanding of the ancient concept of "violent" training and its analogue in modern sport, the first day of my Tetrad was a 45 minute to 1 hour HIIT workout. It consisted of three circuits of three exercises – lifts done in succession with short breaks in between – during which I attempted to complete as many repetitions as possible in 30 seconds for each. As this day was supposed to be a preparatory day, the lifts I completed were slight variations of those I was to do the next day. It is important to note that all the exercises in the entire regimen are compound movements, utilizing multiple muscle groups rather than isolating individual ones. This is not to say that ancient athletes never isolated any muscle groups, rather that the overwhelming majority of example exercises mentioned in the primary sources are multijoint.[100] In addition to this, the heavy focus on the σκοπός of military function, as discussed above, points towards the greater use of exercises intended to train multiple parts of the body at the same time as an analogy for combat.

Once the first day was established, the second came into clearer focus. As the name implies, this "inescapable test" was intended to push athletes to the limits of their strength and endurance. The verb Philostratus uses to describe what one does on this day is ἐπιτείνω whose semantic range includes "to exert oneself greatly," "to make stronger," and also in the passive, although the form in the passage is active, "to suffer more

[100] Galen, *Hygiene*, 2.8-10; Galen, *Thrasybulus*, 41; Galen, *On Exercise with a Small Ball,* 2-3; Philostratus, *Gymnasticus*, 43; Vegetius, *Epitoma De Re Militaris*, 9-14, 18-9, 23.

intensely" and "to be tormented."[101] From here, it was back to Galen because Philostratus does not include examples of exercises done on particular days. The other major type of training Galen discusses is "strenuous" (εὔτονος) which includes weightlifting, carrying heavy weights, controlling horses with reins, and various partner workouts such as lifting each other. The examples of strenuous exercises he gives and his primary archetype, Milo of Croton, suggest that the closest modern equivalent is heavy resistance training.[102]

Milo's mythical feat of carrying a bull over a mountain daily is still regularly used in textbooks and articles to introduce and discuss the concept of progressive overload, which is vital to strength training and says that slow and steady increases in weight over time lead to strength gains.[103] Besides that story, other sources demonstrate ancient trainers' clear understanding of this concept. Galen, for instance, recognizes that fitness levels differ among individuals and also that it can vary within a single person over time. On this subject of personal improvement, Lucian compares strength to a hydra and exercise to cutting off one of its heads.[104] This evidence reveals the ancient understanding that muscle growth required slow and steady increases in effort.

In addition to this, the value of strength in combat was clearly understood throughout the ancient world. Diodorus Siculus, writing in the 1st century BCE about an

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[101] Philostratus, *Gymnasticus*, 47.
[102] Galen, *Hygiene*, 2.9.
[103] Scott K. Powers and Edward T. Howley, *Exercise Physiology: Theory and Application to fitness and Performance* (New York: McGraw Hill, 2012), 488; Braulio Henrique Magnani Branco and Emerson Franchini, "Developing Maximal Strength for Combat Sports Athletes," *Revista de Artes Marciates Asiaticas* 16, no.1 (2021): 88, https://doi:10.18002/rama.v16i1s.7002; Álvaro Morente, "Sports Training in Ancient Greece and its Supposed Modernity," *Journal of Human Sport and Exercise* 15, no. 1 (2020): 171.
[104] Galen, *Hygiene*, 2.2; Lucian, *Anacharsis or Athletics*, 35.

event in 335 BCE, says

> The Macedonians exerted a force that was difficult to withstand because of the numbers of their men and weight of their phalanx. However, the Thebans excelled in the strength of their bodies and in persistent exercise in the gymnasia.[105]

It took a long time for Alexander's Macedonians to defeat these heavily outnumbered Thebans who exhibited great physical strength and courage. The battle turned only when he breached the city wall, and his opponents left the field in an attempt to defend their homes. The Thebans' ability to hold back the pressure of the oncoming Macedonian phalanx took immense strength, but equally important, it required a great deal of endurance to do so for a long time.

With that in mind, increasing aerobic capacity was the other component of fitness which athletes practiced on the second day. Galen describes exercises which we now know to improve aerobic ability as "rapid" (τάχος) but not "strenuous" (εὔτονος) or "violent" (σφοδρῶς).[106] As Epaminondas' training shows, running was part of military preparation early on, and probably much earlier, as Achilles' epithet "swift footed" seen often in Homer implies. Cardiorespiratory training continued to be employed by Roman commanders primarily through weighted marches, running, and swimming.[107] Caesar, in particular, brags about the speed and endurance of his legions in both long, forced

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[105] οἱ μὲν γὰρ Μακεδόνες διὰ τὸ πλῆθος τῶν ἀνδρῶν καὶ τὸ βάρος τῆς φάλαγγος δυσυπόστατον εἶχον τὴν βίαν, οἱ δὲ Θηβαῖοι ταῖς τῶν σωμάτων ῥώμαις ὑπερέχοντες καὶ τοῖς ἐν τοῖς γυμνασίοις συνεχέσιν ἀθλήμασιν. Diodorus Siculus, *Bibliotheca Historica*, 17.11.4.

[106] Galen, Hygiene, 2.10.

[107] Livy, *Ab Urbe Condita*, 26.51.4; Vegetius, *Epitome Rei Militaris,* 9; Plutarch, *Life of Marius*, 13.1.
It is interesting to note that, despite these practices being used regularly, Galen puts much greater weight on the important of strength in battle. See Galen, *On Exercise with a Small Ball*, 3.

marches and in charges into battle.[108] In addition to marching and approaching an enemy, combat itself places a high demand on both aerobic and anaerobic systems. [109]

This evidence led to the decision to make the second day of my Tetrad one of heavy resistance and cardiovascular training. Interval runs were chosen to match with the generally short distance of charges and because the space within ancient *ludi* themselves lent itself more to sprints than to continuous distance running. The *Ludus Magnus*, one of the largest known schools, had a training area measuring 62.15 by 41.45 meters which is much shorter than an American football field although about as wide.[110] The sprints were set for both 1 minute on/1 minute off and 30 seconds on/30 seconds off, during which I ran hard for the "on" period and walked or jogged for the "off" period as my aerobic capacity and recovery allowed. I had control over these interval runs, being able to increase the distance as I felt able, which I pushed to around 4 to 5 miles because of Scipio's regimen, but the remainder of the day was much more rigid. In addition to running, I performed circuits of two lifts for five sets each, slowly increasing weight and decreasing reps. The whole process took around three hours, not including warm up or cool down time. It truly was, as Philostratus describes, an inescapable test of my athleticism.

As for the third day, this part of the cycle was meant for "rest" (ἀνέσις) and

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[108] Caesar, *Bellum Civile*, 3.92-93; Caesar*, Bellum Gallicum*, 1.7, 10, 21, 23, 2.3, 26, 4.14, 34.
[109] Laursen and Buchheit, *Science and Application of High Intensity Interval Training*, 231.
[110] Garrett G. Fagan, "Training Gladiators: Life in the Ludus," in *Aspects of Ancient Institutions and Geography: Studies in Honor of Richard J.A. Talbert,* ed. by Lee L. Brice and Daniëlle Slootjes, (Leiden: Brill, 2015), 123. ProQuest E-book Central. Finkelberg, Margalit. "'Time' and 'Arete' in Homer." *The Classical Quarterly* 48, no.1 (1998

"restoring movement within reason."[111] Galen speaks at length about the need for restorative treatment (ἀποθεραπεία) in his third book of *Hygiene*. He says that this concept is essential for athletes due to the intensity of their training but is important for everyone and includes stretching, massages, baths, and light movement.[112] Despite athletic trainers' understanding of the necessity of rest, there is a fair amount of criticism aimed at athletes for their lazy lifestyles outside of the gymnasium, so the question arises as to whether Roman commanders also understood it.

Put simply, it's clear they did. Scipio Africanus included a rest day in his cycle, and, when planning for the final confrontation with the Cimbri, Marius made sure that his soldiers were well rested before leading them out to fight. In addition, Vegetius impresses the importance of allowing troops to rest and recover.[113] All of these accounts are in specifically military contexts and show that Roman generals recognized that recovery time was vital in improving their men's performance during battle. It is also important to remember that the legions Rufus had trained were not currently on campaign and that the *doctores* he hired were from Capua.[114] This means that there was much greater opportunity for these recruits to engage in restful activities as they were probably near Capua or Rome for this process.

For my own rest day, I went on a 15 to 20 minute walk, did 30 minutes of foam rolling and stretching, and about an hour of yoga and light mobility work. None of it was

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[111] κίνησιν [και] ξὺν λογωι ανακτωμένη. Philostratus, *Gymnasticus*, 47.
[112] Galen, *Hygiene*, 3.2, 3.6; Galen, *Thrasybulus*, 19.
[113] Livy, *Ab Urbe Condita*, 26.51.4; Polybius, *Histories*, 10.20; Plutarch, *Life of Marius*, 20.4; Vegetius, *Epitoma De Re Militaris*, 3.11.
[114] Donald G. Kyle, *Sport and Spectacle in the Ancient World 2nd Edition* (Oxford: John Wiley and Sons, Incorporated, 2015), 329.

intended to be strenuous and I took it all at a slow pace. My research impressed on me the importance of this day, as did Coach Stitz who told me, when first discussing this project, that I had to rest as hard as I played if I intended to avoid injury.[115] Not only does rest allow for the body to repair itself, but it also prevents serious harm and lessens the risk of overtraining syndrome (OTS), which will be discussed more thoroughly in chapter 3.[116]

This leaves only the fourth day, dedicated to sword and shield practice. The area designated for it is blank on the regimen because that specific training was entirely up to me to determine. Just as elsewhere, I relied on literary sources and art, and then supplemented them with my own previous experience with Historical European Martial Arts (HEMA). In the description of combat practice against the pell – a stationary training dummy – given earlier, Vegetius gives further clues about how exactly to train.

> Against that post, just as against an enemy, the recruit trained himself with that shield and foil, just like with a *gladius* and *scutum*, so that at one time he attacked as if it (the pell) were the head and face, at another he threatened from the flanks, while he sought to cut the hamstrings and lower legs, he withdrew, he attacked, he leapt forward, just as if an opponent was present, he tested the post in this way with all his force, with every art of war… Moreover, they learned not to strike with the edge but with the point. For it is not only easy for the Romans to beat those who fight with the edge but also to scorn them. And a cut does not often kill however much force it comes with, and the vitals are protected by armor and bones. But, on the other hand, a thrust driven in only two inches is fatal, for it is necessary that whatever enters penetrates the vitals. Furthermore, while a cut is made, the right arm and flank is exposed, but a thrust is made with the body covered and it wounds the enemy before he sees the blow. [117]

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[115] Jimmy Stitz, Personal Interview, February 18, 2022.
[116] Powers and Howley, *Exercise Physiology,* 479-500.
[117] *Contra illum palum tamquam contra adversarium tiro cum crate illa et clava velut cum gladio se exercebat et scuto, ut nunc quasi caput aut faciem peteret nunc a lateribus minaretur interdum contenderet poplites et crura succidere recederet adsultaret insiliret, quasi praesentem adversarium sic palum omni impetu, omni bellandi arte temptaret... Praeterea non caesim sed punctim ferire discebant. Nam caesim pugnantes non solum facile vicere sed etiam derisere Romani. Caesa enim quovis impetu ueniat non frequenter*

In addition to this, Quintilian, in comparing orators' rhetoric and gladiators' attacks, describes how offensive strikes are woven together.

> They are made like the gladiators blows which they call "second" and "third" if the first was made to bait the enemy's blow and "fourth" if the feint has been repeated, so that he must guard twice and strike twice.[118]

These sources demonstrate two important elements of sword combat, namely mobility and tactics, including where and how to strike with the *gladius*. For the purpose of setting up my training on this day, these sources told me that I would need to practice footwork, thrusts, and flowing from one blow to the next, but seemed to discourage cuts except those which could be made safely under the shield at an opponent's legs. However, considering the design of the sword and the osteological evidence for cutting attacks, I decided to include a variety of cuts as part of my skills training.

From Vegetius' discussion about the reason cuts are inferior, the Romans seemed to make use of what is known as a "passing step" in HEMA terminology. This movement has the combatant pivoting on their forward foot and stepping through with their back foot as they make the cut.[119] Such a movement has the advantage of producing more powerful blows but does leave the user exposed in the way that Vegetius describes. Confirmation for this theory comes from Greek art in Anatolia which depicts a *secutor* who has made a

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interficit cum et armis uitalia defendantur et ossibus; at contra puncta duas uncias adacta mortalis est; necesse est enim, ut uitalia penetret quicquid inmergitur. Deinde dum caesa infertur brachium dextrum latusque nudatur; puncta autem tecto corpore infertur et adversarium sauciat antequam uideat.
Vegetius, *Epitome Rei Militaris*, 1.11-12; He repeats the importance of this training in in book 2. Vegetius 2.23.

[118] *ut gladiatorum manus quae secundae vocantur fiunt et tertiae si prima ad evocandum aduersarii ictum prolata erat, et quartae si geminata captatio est, ut bis cavere, bis repetere oportuerit.* Quintilian, *Institutio Oratia,* 5.13.54.

[119] For a demonstration of the thrust as described by Vegetius see Appendix B: Figures B. 1-2; For the passing step, see Appendix B: Figure B. 3-5.

passing step to avoid his opponent's trident and then strikes at his head.[120] This motion could also be employed to take advantage of the *scutum* offensively.

There are two ways to perform such a maneuver, with the boss of the shield or with its lower edge. The first is done by simply pushing the *scutum* out away from the body in order to create space, crush ribs, or simply knock an opponent off guard. It may be used with or without a passing step.[121] Marius, for example, ordered his men "to use their swords, and to push back with their shields, and so overwhelm (the enemy)."[122] This first type would have been far more suitable for use in pitched battle than the second as it keeps the user defended and, while it still requires shoulder strength and stability, is more energy efficient.

The other method attested in gladiatorial art involves making an initial passing step while chambering the shield arm, most likely alongside a feint as mentioned by Quintilian, and then making a second passing step while at the same time throwing an overhand punch with the lower edge of the scutum.[123] The sheer strength and energy expenditure required to complete this action make it inefficient for pitched battles, but useful in single combat and highly popular in the arena as a demonstration of *virtus*. The repercussions of the shield strikes on the user's body will be discussed later, but the devastating power of the attack is apparent from osteology. Fabian Kanz and Karl Grossschmidt point to three wounds on skeletons identified as gladiators from Ephesus and conclude that these could only have

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[120] Christof Berns, and H. Ali Ekinci, "Gladiatorial Games in the Greek East: a complex of reliefs from Cibyra," *Anatolian Studies*, 65 (2015): 157. doi:10.1017/S0066154615000095.
[121] Appendix B: Figure B. 6-7.
[122] χρῆσθαι ταῖς μαχαίραις καὶ τοῖς θυρεοῖς ἀντερείσαντας βιάζεσθαι. Plutarch, *Life of Marius*, 20.5-6.
[123] Appendix A. Figure A. 1-4; Appendix B. 8-10.

been the result of "force with the shield and whole bodyweight of the aggressor." [124] Although the authors do not say explicitly that this type of blow caused the trauma, it is likely that an overhand shield bash was responsible based on the fact that it is almost exclusively aimed at the head in art.

Before I could begin, I built a *scutum* based on the Kasr-el-Harit find and modern research. My shield reflects the transitionary nature of many during this time. It is almost rectangular and curved, but it lacks the intense curvature indicative of those during the empire. At 17 lbs., it splits the difference between the 12 lbs. and 22 lbs. which modern scholars believe *scuta* weighed.[125] After this, I began skills training with a short warm up during which I practiced footwork and made stationary cuts in all major directions. Following this I spent 15 minutes to 30 minutes practicing mobile cuts and thrusts without my shield before doing several sets of both types of shield bashes. Finally, I ended by training fully armed for 30 minutes to an hour. This day was the most variable in regard to length of time depending on how I felt but lasted usually between 1 hour 15 minutes and 2 hours.

At the beginning, I exercised unweighted and against no post, but after becoming comfortable, I began increasing the weight on my body to that of the armor popular during this time (*lorica hamata*), which weighed approximately 22 lbs., and made my own pell to attack by wrapping camping pad foam around my squat rack.[126] I also eventually doubled

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[124] Fabian Kanz and Karl Grossschmidt, "Dying in the Arena: The Osseous Evidence from Ephesian Gladiators," in *Roman Amphitheaters and Spectacula; A 21st Century Perspective*, ed. Tony Wilmott (Ann Arbor: Archaeopress, 2007), 214.
[125] For shield details: Adrian Goldsworthy, *The Complete Roman Army* (London: Thames and Hudson, 2003), 129-30.
[126] Adrian Goldsworthy, *The Complete Roman Army*, 126.

the weight of my *gladius*, which I had purchased, from 1.5 lbs. to 3 lbs. by wrapping the blade in leather. Though I added a few pounds to my shield by attaching weights, I never made it above the upper limit of 22 lbs. out of concern for straining my shoulder. [127]

This cycle from HIIT to heavy to rest to skills was the Tetrad I followed after my pre-regimen testing until my post-regimen tests. [128] However, returning to the reality that I am a modern human and asked a professional for help, there were necessary precautions which Coach Stitz took to try and ensure my health as much as possible given the intensity of the training. These included the order of the exercises prescribed and the inclusion of two six-week programs with varying lifts that I switched between. These were intended to prevent me from experiencing the potentially dangerous condition that comes from an athlete overloading their system, as Gerenus did.[129] However, this is also in line with Álvaro Morente's conclusion that Greek training "had a certain degree of modernity," including aspects of periodization.[130]

Closely related to the training precautions was the nutrition plan Dr. Katie Kraus helped me establish. My goal in this was not to imitate the diet of either a legionary nor a gladiator, but was to reflect the macronutrient – carbohydrates, protein, and fats – percentages which were likely to approximate the diet of Roman soldiers. I decided to choose soldiers because it is clear that gladiators had enough to eat, including a great deal

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[127] In my communication with Craig Sitch, an armorer who works using ancient methods and has been able to work with extant pieces, he told me that he believes that ancient equipment falls at the lighter end of the spectrum because of his experiences. My own experience with the strain the heavier shield puts on my shoulder during offensive action leads me to agree with him.

[128] See Appendix C for the regimen.

[129] See p. 14 above.

[130] Morente, "Sports Training in Greece and its Supposed Modernity," 171-75.

of plant protein, and enough rest to allow their bodies to recover and build muscle.[131] On the other hand, the more active lifestyle of a typical Roman male would not have stopped after the day's training when he almost certainly continued to burn more calories addressing his other duties throughout the day. Unlike gladiators, they would not have been provided with the higher protein content diet typically consumed by athletes.[132] Emile Fornaris and Marc Aubert's "The Roman Legionary: The Unknown Athlete" provides a comprehensive breakdown of military diet and proposed dietary intake based on literary and archaeological evidence. From this I got the macronutrient levels of ~78% carbohydrates, ~14% protein, and ~ 8% fat which I adopted as my diet for the duration of this project.[133]

Dr. Kraus also helped me figure out how to meet these percentages using primarily chicken, brown rice, oats, yogurt, nuts, fruit, vegetables, and a small amount of protein supplement. Most importantly, Dr. Kraus advised me on how to achieve my necessary daily caloric intake during this project. Based on my resting metabolic rate and my caloric burn, I aimed for 3,500 kcal to 4,500 kcal depending on the day of the cycle. This again ties back to the fact that I live in a modern world and cannot fully replicate the experiences and lifestyle of the past. However, it is not farfetched to conclude that legionaries generally

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[131] Andrew Curry, "The Gladiator Diet," *Archaeology* 61, no.6 (2008): 29.
[132] Ann C. Grandjean, "Diets of Elite Athletes: Has the Discipline of Sports Nutrition Made an Impact?" (Presentation, Nutrition and Physical Performance: A Century of Progress and Tribute to the Modern Olympic Movement, Experimental Biology 96, Washinton, D.C., April 15, 1996); Sandra Lösch, Negahnaz Moghaddam, Karl Grossschmidt, Daniele U. Risser, and Fabian Kanz, "Stable Isotope and Trace Element Studies on Gladiators and Contemporary Roman from Ephesus (Turkey, 2nd and 3rd ct. AD) – Implications for Differences in Diet," PLoS One 9, no 10 (2014): 14. e110489. doi:10.1371/journal.pone.0110489.
[133] Emile Fornaris and Marc Aubert. "Le Légionnaire Romain: Cet Athlète Méconnu," *Histoire Des Sciences Médicales* 32, no. 2 (1998): 163-4.

consumed enough calories to function considering that osteological evidence from Pompeii shows no sign of malnutrition in them. In addition, Rufus' specific troops who underwent this training must have eaten properly as they survived to eventually win Marius' praise.[134]

The precautions in both training and diet were chosen with the intention that they would protect me as much as possible while at the same time allowing me to gain some sort of measure about how effective the Tetrad was. Even with them, because of the intensity and length of the regimen, Dr. Kraus kickstarted my research into OTS and made me aware of the symptoms I needed to watch out for, along with a warning that I needed to adjust the research or stop if I noticed them. As will be discussed later, the condition of OTS is a difficult affliction to diagnose, but I do not believe that I experienced any of the typical symptoms during this project.

Once the Tetrad had been set and before I could begin, I needed to establish an athletic fitness baseline for comparison once my training was complete. I ran a panel of physiological tests with Professor Carey and his team of graduate assistants. We tracked my resting metabolic rate (RMR), body composition, VO_2 max, 1-Rep maxes for the major compound lifts, my force and power generation, standing vertical jump reach, and grip strength.

We included RMR and body composition to help determine my caloric need and to reveal overall changes in my body in terms of fat and muscle gain. VO_2 max is the measure of maximum aerobic capability, which is tied to a legionary's ability to run,

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[134] Sara C. Bisel and Jane F. Bisel, "Health and Nutrition at Herculaneum: An Examination of Human Skeletal Remains," in *The Natural History of Pompeii*, ed. Wilhelmina Feemster Jashemski and Frederick G. Meyer (Cambridge: Cambridge University Press, 2002), 468; Coulston, Jon. "Courage and Cowardice in the Roman Imperial Army." *War in History* 20, no. 1 (2013): 17. Doi:10.1177/0968344512454518.

jump, fight, and march. The compound lifts included in the 1-Rep max tests were squat, bench press, and deadlift which are measures of lower body, upper body, and total body strength respectively. These metrics are reflective of a soldier's overall strength and are also tied to power generation which is vital for effective blows in combat.[135] Vertical jump was included as one test of lower body explosive power and specifically because of Vegetius' insistence on the importance of leaping obstacles.[136] Grip strength is necessary for holding onto a sword and shield and has also been shown to be a determining factor in grappling sports.[137]

Once I had completed these tests and had my regimen set, I trained from May 2022 until December 2022.[138] I had originally chosen to train until February to get as much data as possible but decided to cut it back so that I would be able to consolidate the data and finish my degree in time. Athletes using this method would have trained for as long as they pursued their chosen sport, but sources do not make it clear for how long Rufus trained these troops in this style. It conceivably would have been during the winter months when the Romans did not normally campaign as Scipio had done, although later, Cicero states that he himself had spent a full year training on the *Campus Martius*.[139] Considering the circumstances of Rufus' decision, with the Cimbri looming and the need

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[135] Force = Mass x Acceleration; Work = Force x Distance; Power = Work ÷ Time; Essentially, greater energy is generated when an action is done more quickly, which then transfers to the opponent if the blow lands.
[136] Vegetius, *Epitome Rei Militaris*, 1.9.
[137] Braulio Henrique Magnani Branco and Emerson Franchini, "Developing Maximal Strength for Combat Sports Athletes," *Revista de Artes Marciates Asiaticas* 16, no.1 (2021): 89, https://doi:10.18002/rama.v16i1s.7002.
[138] The dates on the regimen represented my initial start goal, which I postponed until I could finish my pre-testing.
[139] Polybius, *Histories*, 10.20; Livy, *Ab Urbe Condita*, 26.51.4; Cicero, *Pro Caelio*, 11.

for new soldiers to be produced quickly, it is most likely that these men were trained in the off-season just prior to setting out.

With this primary and secondary research and the advice and assistance of Coach Stitz, Dr. Katie Kraus, Professor Carey and his graduate assistants, I designed and built my own Tetrad and prepared to execute it.

Results

After a period of adjustment at the beginning, the data that I tracked over the course of the project shows slow and steady increases to both muscular strength and endurance for most lifts as would be expected from any regimented physical training program aimed at such. The following results from my pre- and post-tests focus on the endpoints and succinctly show this gradual change.

My muscle mass increased by .979 lbs. (.444 kg) and fat mass by 2.5 lbs. (1.135 kg). The results of my VO_2 max test showed a slight decrease of 1.3ml/kg/min from 58.3 ml/kg/min down to 57.0 ml/kg/min, putting me in the 97^{th} percentile for aerobic capacity for my sex and age. During this test, my respiratory exchange rate (RER) increased from 1.15 to 1.55. My 1-Rep max bench press improved by 15 lbs. from 220 lbs. to 235 lbs., my squat by 25 lbs. from 285 lbs. to 310 lbs., and my deadlift by 40 lbs. from 315 lbs. to 355 lbs. In addition to this I increased my peak power and peak force outputs on bench press from 935 W to 1,120 W and from 708 N to 879 N respectively. Average grip strength over three tests increased from 66.6 lbs. (30.209 kg.) to 68.6 lbs. (31.116 kg.),

and my standing vertical jump reach showed no change.[140]

Here, I will highlight the lifts whose results vary from the norm and come from the data I collected throughout my training rather than just the beginning and end. The single-leg Romanian deadlifts (SL-DB-RDL) and its variant with a knee punch, split squat jumps, and incline dumbbell row, stayed consistent throughout the whole program including across weight increases. The barbell shoulder press of the Capacity phase showed a drastic decrease in weight shortly after starting, which did not come from an acute injury as happened with the hex bar deadlift. The single-arm bent over dumbbell row reveals my right shoulder's muscular endurance slowly increasing over my left through both number of repetitions and consistency.

With regard to the endurance element of my training, my heart rate after each lifting session slowly increased over the course of the training, while it stayed fairly consistent after the cardiovascular exercise. However, the minutes-per-mile time during the interval runs shows a slight decreasing trend even though the total distance I covered increased throughout the program.

Conclusion

This chapter provides an explanation for how I came to my conclusions about the Greek Tetrad and how those informed the production of my own regimen. I consulted both Greek and Latin primary sources alongside modern sports science and advice from the experts I consulted to create and test a historically informed regimen. This, alongside

[140] Data and results are in Appendix D.

the summary of my tracked data and results, lays much of the groundwork for the following discussion about how the Tetrad may have affected Roman legionaries.

Chapter 3: The Tetrad and Legionaries

Background

A discussion of the effects of the Tetrad system first requires a basic understanding of the complex interconnectivity of the body. As the seat of the mind and center of the nervous system, the brain influences action through both psychological and physiological processes. In regard to psychology, an individual's perception of themselves, others, and their environment has a profound impact on their ability to function. Self-efficacy, which consists of beliefs about someone's own ability to achieve a desired outcome in a specific situation, and self-esteem, the evaluative measure of one's value, are two overarching concepts which play a role in performance.[141] These are heavily shaped by a person's life experiences.

The brain's control over its musculature is exerted through the neuromuscular system by sending electrical signals along motor neurons to individual muscle fibers. The neurons and each fiber it innervates is called a motor unit. The force that a muscle can exert may be increased in three ways: (1) the neuromuscular system may recruit greater numbers of larger motor units, (2) the system may increase the firing frequency of those motor units – known as "tetanic" if the contraction is sustained – and (3) the very size of

[141] Sarah McLachlan, Derwin King-Chang Chan, Dave Keatly, and Martin Hagger, "Social Psychology Theories and Models," in *The Psychology of Strength and Conditioning*, ed. David Tod and David Lavalle (New York: Routledge, 2012), 47; Magnus Lindwall, "Exercise, Self-Esteem, and Self-Perceptions," in *The Psychology of Strength and Conditioning*, ed. David Tod and David Lavalle (New York: Routledge, 2012), 83.

the muscle itself may be increased.[142]

The respiratory exchange rate (RER) is a flat number without units which is gathered during a VO_2 max test. It compares the volume of O_2 being used by the body for the production of CO_2 which results in an important ratio (O_2/CO_2). For example, a RER of 1 means that the amount of CO_2 being produced through exercise is equal to the amount of O_2 being consumed. The true value of the RER is that it reveals whether carbohydrates or fat is being burned as the primary fuel source. At low intensities, the body burns mostly fat mixed with O_2, while, at maximal levels, the body used more carbohydrates which results in a higher CO_2 output. At extremely high intensity, there is not adequate O_2 for aerobic energy production and so the pathway becomes anaerobic.[143]

"Anaerobic" refers to one of the two methods by which the body produces adenosine triphosphate (ATP) which is the energy source used for muscular contraction. Anaerobic production using the body's store of glycogen is employed at the beginning of high intensity exercise as well as when the body is no longer receiving enough oxygen to keep up with its output. This is called "glycolysis" and it is important to note that the process only produces 2 ATPs per gram of glucose as opposed to the 32 ATPs generated through aerobic production which is the pathway used at submaximal effort by means of carbohydrates. In terms of testing, when someone is in glycolysis, this means that they will fatigue much more quickly and have a RER above 1. From this disparity, it is clear that an individual operating in that submaximal range can continue to move longer

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[142] Scott K. Powers and Edward T. Howley, *Exercise Physiology: Theory and Application to Fitness and Performance* (New York: McGraw Hill, 2012), 50-61, 151-3, 177-8, 181.
[143] Jon Carey, email to author, February 27, 2023.

because they have access to more energy.

The concept of "strength" represents an individual's ability to generate force which is then tied to "work" by multiplying that force by the distance moved. Then it is connected to "power" by dividing "work" by the time it took to complete the motion. Simply put, completing an action faster or against heavier resistance means that greater power has been generated than before.[144] While somewhat abridged, this information lays the groundwork for a discussion of how the Tetrad affected the legionaries who underwent gladiatorial training.

Finis

With the foundation of this thesis finally set, it is possible to explore more fully what Marius noticed in Rufus' legionaries who trained in a gladiatorial style. It is important here to remember the goals of Roman commanders. The overarching *finis* of military leaders at this time was to produce efficient and obedient soldiers who were willing and able to fight and kill or die for the Republic.[145] As Valerius Maximus makes clear, these ideal troops would exhibit strong *virtus*, directed *impetus*, and finally unmatched *ars* which constitutes the physical aspects of the first two concepts.[146] With this, it is easy to see how Rufus instantly saw the attributes he sought in gladiatorial combatants fighting in the forum.

Although Rufus was the first commander to apply the same training as these men

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[144] Powers and Howley*, Exercise Physiology*, 16-7.
[145] Sarah Elise Phang, *Roman Military Service: Ideologies of Discipline in the Late Republic and Early Empire* (Cambridge: Cambridge University Press, 2008), 4.
[146] See p. 1 above.

to his soldiers, he was far from the first individual to have noticed its effects. Gladiatorial spectacle spread throughout the Mediterranean, and Antiochus IV Epiphanes, the Seleucid King in the mid-2nd century BCE, had witnessed the same and was able to stop importing gladiators because enough young men in Syria had decided to join voluntarily.[147] The first clear evidence for this kind of explicit connection to personal gladiatorial exercise does not appear in Italy until much later, in the 1st century BCE, when Cicero attacks Lucius Antonius for training as a *murmillo*.[148] By the time of the principate and beyond, many joined the *familia gladiatoria*, as can be seen by the law prohibiting women from choosing that life and by the names of the formerly elite who became gladiators but held onto aristocratic naming conventions.[149] Beyond the individual, legionaries continued to be trained in *ludi* throughout the imperial period.[150] Evidently, interest in the production of *virtus* through this regimen grew after the end of the 2nd century BCE. Whether or not gladiatorial training became popular in Rome itself before that time is unknown. However, it is more likely that Rufus was simply applying a trend to legionaries *en masse* rather than starting one without precedent.

Remarking on the soldiers post-Tetrad, Marius is explicit about what he believes made them good fighters, or so Sallust reports.

> But I have been taught those things best by far for the republic: to strike the enemy, to hold the defenses, to fear nothing except a disgraceful reputation, to endure winter and summer equally, to sleep on the ground, to tolerate

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[147] Livy, *Ab Urbe Condita*, 41.20.12-13.
[148] Cicero, *Philippic*, 3.31; Michael Carter, "*Armorum Studium*: Gladiatorial Training and the Gladiatorial *Ludus*," *Bulletin of the Institute of Classical Studies* 61, no. 1 (2019): 126.
[149] David Potter, *The Victor's Crown: A History of Ancient Sport from Homer to Byzantium* (Oxford: Oxford University Press, 2011), 216-17, 258-60.
[150] Alison Futrell, *Blood in the Arena: The Spectacle of Roman Power* (Austin: University of Texas Press, 1997), 151.

> want and work at the same time. I will encourage the soldiers with these precepts, lest I care for them strictly, and myself sumptuously, lest I make their toil my glory. This is beneficial, this is civic command. [151]

Although there is no way to know whether or not these are actually Marius' words, it is clear that Sallust's text embraces the later conception of the man and must to some extent be reasonably accurate about his personality and thinking.[152] Plutarch's Marius supports this conclusion when he says that he wants his men to be "hardworking" (φιλοπόνους). This Marius goes so far as to reward one of his troops for killing a commanding officer who tried to seduce him and even trains himself to fight on the front line.[153]

Physical *Impetus*: Strength and Power

Now let us look at how each element of Marius' quote above were affected by the Tetrad. As has already been discussed, martial skill was an essential ingredient in the *virtus* which gladiators demonstrated while engaged with opponents. The physiological characteristics of athletes who participate in combat sports have been studied extensively in modern research and point to specific qualities that are present in elite fighters. Although success in these arenas derives from a complex nexus of variables, sports science has identified several physical attributes including power, strength, muscular endurance, and aerobic capacity which differentiate high-skill athletes from others.[154] The

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[151] *At illa multo optuma rei publicae doctus sum: hostem ferire, praesidia agitare, nihil metuere nisi turpem famam, hiemem et aestatem iuxta pati, humi requiescere, eodem tempore inopiam et laborem tolerare. His ego praeceptis milites hortabor, neque illos arte colam, me opulenter, neque gloriam meam laborem illorum faciam. Hoc est utile, hoc civile imperium*. Sallust, *Jugurthine War*, 85.33-35.
[152] McDonnell, *Roman Manliness,* 271-5.
[153] Plutarch, *Life of Marius*, 13, 14.3-5, 21.6.
[154] This evidence will be discussed below.

data gathered from my experiential research shows the possible ways that the ancient Tetrad affected these aspects in gladiators and legionaries.

In a Roman military context, "*impetus*" describes aggression and violence indicating those who are eager to engage the enemy and do so with forceful blows. It was considered a subset of *virtus*, thus was necessary for the ideal soldier. Power is a major aspect of the physical nature of *impetus* and directly affects attacks with any weapon since a more powerful blow is made at a higher velocity and therefore transfers greater energy into the target.[155] Vegetius demonstrates the ancient understanding of this concept when describing how ancient trainers employed double-weight equipment by saying that its use strengthens the right arm.[156] The technical term in sports science for movements like a shield bash or sword cut is "ballistic." These actions require a single high-velocity effort, needing force to be generated quickly without progressive loading. The body accomplishes this by repeatedly firing a great number of larger motor units.[157]

The recruitment used in performing strikes with a sword or shield is not limited to the upper body but necessitates coordination throughout the whole system. Boxing as well as javelin and discus throwing are connected directly to ancient combat and training. Studies of athletes from each discipline show that power and function in the lower body are vital for ballistic motion. All three generate power from the lower extremities and

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[155] M.B. Lozhkina, S.N. Neupokoev, S.G. Krivoshchekov, and L.V. Kapilevich, "Physiological Parameters of the Performance of Ballistic Punch Movements," *Human Physiology* 46, no. 2 (2020): 150. https://doi:10.1134/S0362119720020085.
[156] Vegetius, *Epitoma Rei Militaris*, 1.12-4.
[157] Brian Wallace and Jonathon Janz, "Implications of Motor Unit Activity on Ballistic Movement," *International Journal of Sports Science and Coaching* 4, no. 2 (2009): 285-6. Motor units are made up of a motor neuron (activates skeletal muscle) and all of the muscle fibers it innervates. Powers and Howley, *Exercise Physiology*, 152-3.

transfer it upwards so that the athlete can complete the movements effectively.[158] Just as today, these concepts held true in ancient combat where the use of javelins and sword cuts, specifically thrusts, required motions similar to throwing a punch. In addition to ballistic actions, combat also required semi- and non-ballistic movements. As discussed in previous chapters, throwing and grappling were integral parts of hand-to-hand combat and use progressive loading of the muscles to disable an opponent. The body's complex system of power development relies both on strength and on efficient neuromuscular coordination.

A gladiator's ability to produce this kind of power was a hallmark of their skill and was highly valued in the arena. The most obvious representation of this is the overhand shield punch discussed above.[159] This attack is portrayed in art where a *murmillo* is shown overcoming his opponent.[160] The frequency with which the attack appears in art explains the move's popularity with the Roman audience, and the strength required to complete it shows why. As citizen soldiers, most spectators would have firsthand knowledge of the burden of a *scutum*. The sheer weight of such a shield means that much more force is required in order to deliver a powerful blow.[161] The *murmillo* would need exceptional full-body strength to generate enough power to crack skulls in

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[158] M.B. Lozhkina et al, ""Physiological Parameters of the Performance of Ballistic Punch Movements," 156-9; Barbara Lysoń-Uklańska, Michalina Błażkiewicz, Monika Kwacz, and Andrzej Wit, "Muscle Force Patterns in Lower Extremity Muscles for Elite Discus Throwers, Javelin Throwers and Shot-Putters – A Case Study," *Journal of Human Kinetics* 78, (2020): 5, 10. https://doi:10.2478/hukin-2021-0026.

[159] See p. 48.

[160] Appendix A: Figure A.2. This piece includes the earliest extant depiction of the *murmillo* from around 30 BCE, which demonstrates that this move was popular early on.

[161] Force = Mass x Acceleration; Work = Force x Distance; Power = Work ÷ Time; Essentially, greater energy is generated when an action is done more quickly, which then transfers to the opponent if the blow lands.

the way osteological evidence suggests.[162] Modern research has shown that "the maximum velocity of muscle shortening is the greatest at the lowest force (i.e., resistance against the muscle). "[163] So, the stronger the muscle groups utilized in the shield bashes, the lower the resistance and the more ably a combatant was able to wield the weapon. Rufus would have recognized the relative ease and dexterity with which a gladiator could handle equipment and wanted all his troops to be able to do the same.

My data reveals how the Tetrad may have affected these legionaries' strength. I saw in myself notable increases in both bench press and squat 1-rep max, which represent upper and lower body strength respectively, and a drastic increase in my deadlift, a move which requires total body strength. In addition to this, my force and power output also grew substantially. The nature of how this change came about is far more significant than the simple improvement which one would expect from introducing beginners to gymnastic training. Throughout the seven months I trained, low protein intake and limited rest period limited me to only about a pound of muscle growth, which means that those changes were brought about almost exclusively by an increase in my neuromuscular systems' ability to recruit motor units and to reach tetanic contraction.

The phenomenon represents a split in outcome that Rufus could not have anticipated. Neuromuscular improvement must have been present in gladiators; however, they also would have been able to further increase their muscle mass due to their diet and their increased rest time after training. The consul's legionaries would have had a much

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[162] Fabian Kanz and Karl Grossschmidt, "Dying in the Arena: The Osseous Evidence from Ephesian Gladiators," in *Roman Amphitheaters and Spectacula; A 21st Century Perspective*, ed. Tony Wilmott (Ann Arbor: Archaeopress, 2007), 214.
[163] Powers and Howley, *Exercise Physiology*, 183.

more difficult time producing major muscle growth but still would have seen dramatic strength increases due to the development of their neuromuscular system.

The effect may have been even more substantial in light of the circumstances in which Rufus trained these fresh recruits. The new levy which Marius had established earlier included the poor who did not have land to work nor leisure time to exercise. These men would have seen accelerated neuromuscular development as their bodies adapted to the new stressors. However, these would not have been the only men to benefit. Even the farmers, who would have been fit already, would see serious improvement in the same way. Commonly known as "beginner gains," these quick increases in strength come primarily from neuromuscular adaptation when an individual first starts a training regimen.[164]

That my strength increased through neuromuscular development well after I had left the beginner phase and not through muscle hypertrophy demonstrate a major potential benefit of the Tetrad. The distribution of work throughout the cycle seems to have allowed legionaries to work around their low protein intake to develop their strength and power through the continual improvement of existing muscle. This would produce the lean, defined, but powerful body type that Vegetius says should be looked for in potential recruits.

> Then let the youth who is going to be chosen for military service have vigilant eyes, a straight neck, broad chest, muscular shoulders, strong arms, very long fingers, a moderately sized stomach, quite slender buttocks, and calves and legs not swollen with excess fat but compact from the hardness of their muscle.[165]

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[164] Powers and Howley, *Exercise Physiology*, 303-4.

[165] *Sit ergo adulescens Martio operi deputandus vigilantibus oculis, erecta cervice, lato pectore, umeris musculosis, valentibus brachiis, digitis longioribus, ventre modicus,*

The overall image painted here is of a man whose muscle is defined due to his low body fat percentage, which itself points to high caloric expenditure. An individual of this sort would naturally have had difficulty putting on elevated amounts of muscle mass.

The heavy, multijoint movements which were popular in ancient athletic training would have helped build and sculpt each of those areas, but most interesting by far is his explicit mention of the shoulders. Overall, slow and steady improvements in muscular strength and endurance are apparent in the data tracked throughout the course of this project. Exercises that rely heavily on my shoulders, however, saw much slower gains and higher rates of stagnation. I experienced a sharp decrease in the weight I was able to lift while performing the barbell shoulder press, and although I was able to build back to my starting ability, I plateaued there. The same thing happened with the number of repetitions I could complete while doing barbell body rows and incline dumbbell rows, and my incline bench press weight also increased by only a very small amount. The shared factor in each of these lifts was that they placed higher stress on my deltoids than the others, which points toward a potential downside in the Tetrad.

My shoulders' ability to recover was limited by the actions I performed on the fourth day of the cycle. The skills training increased the load on my deltoids through practice with the *gladius* and *scutum*. Legionaries who trained through this method probably would have experienced similar limitations in the maximum strength of their shoulders, although it is apparent from my final test results that power generation at a

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exilior clunibus, suris et pedibus non superflua carne distentis sed nervorum duritia collectis. Vegetius, *Epitoma Rei Militaris*, 1.6.

lighter weight would not have experienced the same stagnation.

The final day of the Tetrad affected my body further, and the data supports an observation made by osteological studies of Roman soldiers and gladiators. These men showed enlarged muscle markers in general, but especially in relation to the right arm, which was also elongated, demonstrating heavy use.[166] The difference in weight and mode of utility between the shield in the left hand and sword in the right led to this phenomenon which one author calls "mutant musculature."[167] The heavy *scutum* would be held in place more often than not and could be used only sparingly in offensive maneuvers due to the energy required. Conversely, the *gladius* would be swung hundreds of times in practice. This low resistance but highly repetitive use would lead to more muscle growth and greater muscular endurance in the affected right arm as the body adapts.[168]

The data from the single-arm dumbbell bent over row shows the beginning of this process. After the initial adjustment period, I could produce the same number of reps on each side, but, as the program went on, my right arm began slowly to be able to perform a higher number of repetitions with greater consistency than my left. Although the difference in my data over the course of a mere seven months was relatively small, the

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[166] R.J. Henneberg and M. Henneberg, "The "Gladiator" from Pompeii," *Homo-Journal of Comparative Human Biology* 52, (2006): 230; Sara C. Bisel and Jane F. Bisel, "Health and Nutrition at Herculaneum: An Examination of Human Skeletal Remains," in *The Natural History of Pompeii*, ed. Wilhelmina Feemster Jashemski and Frederick G. Meyer (Cambridge: Cambridge University Press, 2002), 468; Fabian Kanz and Karl Grossschmidt, "Dying in the Arena: The Osseous Evidence from Ephesian Gladiators," in *Roman Amphitheaters and Spectacula; A 21st Century Perspective*, ed. Tony Wilmott (Ann Arbor: Archaeopress, 2007), 218.

[167] Jon Coulston, "Courage and Cowardice in the Roman Imperial Army," *War in History* 20, no. 1 (2013): 20. Doi:10.1177/0968344512454518.

[168] Powers and Howley, *Exercise Physiology*, 301.

effect of regular combat practice would have, no doubt, led to the level observable in the osteological data if the Tetrad was continued for the sixteen to twenty years that legionaries in the Republic regularly served.[169]

Continuing through Vegetius' description, he moves from the upper body to the lower, looking for recruits whose legs are heavily muscled with little to no fat. Throughout all my results, there is no doubt that I saw the greatest gains in my lower half. As discussed above, this is vital for power generation as the process begins in the legs. The phenomenon is so prevalent that lower body strength, specifically through 1-Rep max tests, may consistently be used to distinguish elite and amateur MMA participants.[170] If Rufus' legionaries exhibited similar increases in strength in their lower body, then they would have been capable of generating far more powerful blows with their weapons.

It is apparent that soldiers themselves desired this ability. The character of the braggart soldier in Roman comedy represents an over-the-top stereotype for how military men acted. Pyrgopolynices, in Plautus' *Miles Gloriosus*, claims to have broken an elephant's leg with a single punch and, in the same author's *Curculio*, Therapontigonus to have split an elephant in half with his sword.[171] In Terence's *Eunuchus*, another braggart soldier Thraso says that he was envied by the elephant tamer, who would have been an

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[169] Nathan Rosenstein, *Rome at War: Farms, Families, and Death in the Middle Republic* (Chapel Hill: The University of North Carolina Press, 2004), 189-90.
[170] João C.A. Bueno, Heloiana Faro, Seth Lenetsky, Aleksandro F. Gonçalves, Stefane B.C.D. Dias, André L.B. Ribeiro, Bruno V.C. da Silva, Carlos A. Cardoso Filho, Bruna M. de Vasconcelos, Julio C. Serrão, Alexandro Andrade, Tacito P. Souza-Junior, and João G. Claudino, "Exploratory Systematic Review of Mixed Martial Arts: An Overview of Performance of Importance Factors with over 20,000 Athletes," *Sports* 80, no. 10 (2022): 4-12. https:// doi.org/10.3390/sports10060080.
[171] Plautus, *Miles Gloriosus*, 26-30; Plautus, *Curculio*, 422-23.

individual strong enough to bend the massive animal to his will.[172] The basis for the success of these jokes was a legionary's desire to demonstrate *virtus*, and everything associated with it, including the type of physical *impetus* required to cut down five hundred men, as Pyrgopolynices also boasts.[173]

These attributes represent the physical aspects of the first two items in Marius' quote above, "to strike the enemy" and "to hold the defenses." Although a willingness to enter combat is necessary, on a practical level, both actions require physical strength and power for soldiers to carry them out effectively. Marius' troops, of whom the gladiatorially trained men were a part, demonstrated their ability to do this throughout the campaign against the Cimbri. In the first encounter they routed the Ambrones, considered to be on of the most warlike tribes, in the second they followed Marius' exhortation to push the enemy back with their shields, forcing the Germans to retreat again, and, in the third and final pitched battle, the Romans slaughtered the invaders.[174]

The muscular strength, endurance, and power gains that I experienced through the Tetrad may point toward the production of Roman soldiers who were stronger and therefore more capable of delivering highly forceful attacks despite the low amount of protein in their diet. Although, it is unlikely that Rufus recognized that this would occur, he must have seen gladiators' displays of strength and power and wanted his own troops to be able to match them. Later, Marius would have noted the same attributes as these men helped to win him a triumph for the victory over the Cimbri.

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[172] Terence, *Eunuchus*, 410-415.
[173] Plautus, *Miles Gloriosus*,
[174] Plutarch, *Life of Marius*, 19-21.2, 26-27.2.

Physical *Impetus*: Aerobic Capacity and Speed

In addition to strength and power, aerobic endurance was absolutely vital for campaign and combat. Simply put, increasing aerobic capacity allows the body's muscles to continue working correctly during extended exercise.[175] As discussed in the chapter "Regimen and Results," ancient warriors clearly understood this concept and, it should be noted, Caesar valued it highly.[176]

The VO_2 max test results show that I experienced a very slight decrease in aerobic capacity over the course of the training. However, it is critical to understand that I began the program in the 97th percentile for aerobic fitness. What this means is that I had a very small window for improvement, and anyone in a lower percentile would have a greater opportunity for increase in proportion to their position. However, starting at a high level was also arguably a more accurate place to begin than from the norm today, because, as many scholars surmise, ancient people had higher, perhaps much higher aerobic fitness on average than modern people based on their lifestyle.[177] The difficulty in assessing ancient aerobic capacity and the genetic variables that restrict each individual's upper limit make it difficult to come to any strong conclusions about the possibility of increasing that metric through the Tetrad. Assuming that the average VO_2 max has not dropped so much since the days of Rome that even someone like me would be considered below average in the ancient world, the best that can be posited is that the legionaries

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[175] Powers and Howley, *Exercise Physiology*, 291.
[176] See p. 43-4 above.
[177] Victor Davis Hanson, *The Other Greeks: The Family Farm and the Agrarian Roots of Western Civilization* (New York: The Free Press, 1995), 264-5; Peter Krentz, "A Cup by Douris and the Battle of Marathon," in *New Perspectives on Ancient Warfare*, ed Garrett G. Fagan and Matthew Trundle (Leiden: Koninklijke Brill NV, 2010), 198-9.

who began at a lower threshold would have been able to maintain what they already had and may even have had greater opportunity than I to make improvements in this aspect of their fitness.

However, in conjunction with the strength gains that I experienced, that aerobic upkeep is significant. Most modern training programs for athletes do not train both resistance and cardiovascular simultaneously because to do so is inefficient.[178] In addition to this, both VO_2 max and submaximal performance drop quickly when not being targeted at the same level.[179] Together, the fact that I was able to increase strength and power while maintaining a high aerobic capability provides another possible benefit to the Tetrad. Rufus' legionaries may have, at the very least, preserved the cardiovascular fitness they built through daily life while they were training their bodies to deliver effective blows.

Related to this was the speed at which a soldier could run. I performed both long, 1 minute, and short, 30 second, interval sprints over the course of the program and saw an overall decrease in my minutes-per-mile. This means that I was able to maintain a greater pace throughout my runs which also increased in distance as I was able to push myself harder. So not only did my speed increase, but my aerobic recovery did as well.

The pace at which ancient combatants could reach the enemy also influenced their physical *impetus* when making a charge. Vegetius says "But the young men must become accustomed to running especially so that they will charge the enemy with greater

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[178] Powers and Howley, *Exercise Physiology*, 307-8.
[179] Powers and Howley, *Exercise Physiology*, 299-301.

impetus." [180] Although, there is no explicit discussion of the speed at which Marius' troops entered battle, Caesar underscores the velocity of attack when some of his men stopped a flanking maneuver by Pompey's cavalry. "They charged quickly and in their hostile attack impacted with such force into Pompey's cavalry that not one of the horsemen held their ground." [181] Here, both Caesar and Vegetius stress the value of faster legionaries with higher aerobic capability who would be able to maintain a faster pace across a greater distance and therefore transfer more of their energy into their assault.

Despite the lack of direct sources on the nature of ancient combat, the value that Marius placed on aerobic capacity and speed is clear from his actions when he first set out against the Cimbri in 104 BCE. "And on the expedition, he cultivated their strength while on the road, training them thoroughly both by all manner of runs and long marches." [182] "All manner of runs" implies long endurance training as well as sprints, both of which increase cardiovascular endurance and speed.

Beyond the production of *impetus*, increased aerobic recovery means that soldiers would need less time to recover during battle. The normal practice was to switch out fatigued cohorts with fresh troops held in reserve. The high intensity nature of hand-to-hand combat required maximal energy output and meant that opposing armies would separate after a short while.[183] Caesar makes note of the endurance and recovery of the

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[180] *Sed et cursu praecipue adsuefaciendi sunt iuniores, ut maiore impetu in hostem procurrant*. Vegetius, *Epitoma Rei Militaris*, 1.9.
[181] *Illae celeriter procucurrerunt infestisque signis tanta vi in Pompei equites impetum fecerunt ut eorum nemo consisteret.* Caesar, *Bellum Civile*, 3.92-3.
[182] Ἐν δὲ τῇ στρατείᾳ τὴν δύναμιν διεπόνει καθ᾽ ὁδὸν ἐξασκῶν δρόμοις τε παντοδαποῖς καὶ μακραῖς ὁδοιπορίαις. Plutarch, Life of Marius, 13.1.
[183] Adrian Goldsworthy, *The Complete Roman Army* (London: Thames and Hudson, 2003), 184-5.

12th legion under Galba's command. They had been sent to secure a trade route and were wintering away from the rest of the army when they were attacked, forcing them to fight alone. In the encounter, the enemy could replace their tired men but,

> nothing of the sort was able to be done by our men because of the scarcity of their numbers, and not only could a tired man not withdraw from battle, but also a wounded man could not give up his assigned post and recover himself, seeing as the battle had continued uninterrupted for more than six hours, and not only our men's strength but also their javelins were failing… Therefore, after the centurions had convened, [Galba] quickly ordered the soldiers to stop the fighting for a short while, and only to intercept the discharged missiles, and to refresh themselves after their work, and, after the signal was given, to burst out of the camp and to place all hope of safety in courage." [184]

Caesar focuses on the length of continued combat as well as these men's endurance and ability to recover because those qualities demonstrate his soldiers' *virtus*, which, in turn, reflects on his own.[185] It is apparent that these were desirable attributes for legionaries during Caesar's day and were likely to have been the same fifty years before Marius, considering the aerobic training discussed above which he subjected his men to.

The immediate implementation of these practices would easily allow Marius to compare the base physical ability of the men he received from Rufus against others who were not trained this way and come to the conclusion that he did. These legionaries with the skills of a gladiator simply operated on another level.

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[184] *quarum rerum a nostris propter paucitatem fieri nihil poterat, ac non modo defesso ex pugna excedendi, sed ne saucio quidem eius loci ubi constiterat relinquendi ac sui recipiendi facultas dabantur, cum iam amplius horis sex continenter pugnaretur, ac non solum vires sed etiam tela nostros deficerent… Itaque convocatis centurionibus celeriter milites certiores facit, paulisper intermitterent proelium ac tantummodo tela missa exciperent seque ex labore reficerent, post dato signo ex castris erumperent atque omnem spem salutis in virtute ponerent*.
Caesar, *Bellum Gallicum,* 3.4-5.

[185] Andrew Riggsby, *Caesar in Gaul and Rome: War in Words* (Austin: University of Texas Press, 2006), 104-5.

Ars: Technical Skill

This subsection begins to mark the shift away from a focus on the physical toward an exploration of the psychological dynamics of combat. As we saw, the technical skills associated with hand-to-hand combat was one of the primary ways for Roman soldiers to demonstrate their *impetus* and *ars*, both of which were major elements of *virtus*. Gladiators practiced against the post and in sparring matches, both of which include an element of cognitive, not just physical practice in which the fighter learns to weave cuts together and quickly recognize patterns in their adversary's behavior. The latter is known as postural cue utilization and allows an athlete to react swiftly and with greater accuracy to their opponent's movements and planned movements.[186] The evidence hints that ancient trainers recognized the benefits of this skill. Vegetius, for instance, while describing the ancient training method of double weight equipment, says, "Neither the arena nor the battlefield has ever proved a man invincible in warfare unless instructed carefully, and having been well trained against the post." [187] Vegetius' claim is apt, because one of the primary ways a person's mind learns to anticipate another's action is by comparing it with their own movements.[188]

This can also be achieved through situational practice like sparring with training

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[186] A. Mark Williams, Colm P. Murphy, David P. Broadbent, and Christopher M. Janelle, "Anticipation in Sport," in *Advances in Sport and Exercise Psychology,* ed. Thelma S. Horn and Alan L. Smith (Champaign: Human Kinetics, 2019): 230-34.
[187] *Nec umquam aut harena aut campus invictum armis virum probavit nisi qui diligenter exercitatus docebatur ad palum*. Vegetius, *Epitome Rei Militaris*, 1.11.
[188] Cosimo Urgesi, "Visual and Motor Components of Action Anticipation in Basketball and Soccer," in *Moving Bodies in Interaction – Interacting Bodies in Motion: Intercorporeality, Interkinaesthesia, and Enaction in Sports*, ed. by Christian Meyer and Ulrich V. Wedelstaedt, 93-112. (Amsterdam: John Benjamins Publishing Company, 2017), 94-6.

partners.[189] Lucian gives the clearest description of this phenomenon while discussing the benefit of general athletic training for combat.

> Anyone who wrestles and bends down together with another, learns both to fall down safely and to get up easily, how to push and interlock and twist, and to be able to bear being choked and to lift an opponent into the air…for it is clear that such a man, having locked with an enemy, will trip him up and throw him down more quickly and, when he has fallen down, he will know how to get back up as easily as possible.[190]

His account explicitly notes that offensive, defensive, and reactive actions all benefit from sparring.

This psychological growth is associated with skills practice in general, and so soldiers before Rufus, like those of Scipio, would have acquired sharper minds as they honed their bodies. The Tetrad would have allowed for even further advancement in this area. Modern research concerning strength training for combat athletes shows that those who engage in both skills and resistance exercises, as the Tetrad provided. exhibit greater technical ability than those who drill only the former. In one study, judo practitioners whose regimen included strength training not only saw quantitative increases in their maximal strength, but also qualitative improvements in their throws and were judged

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[189] The third main method is through observing an opponent before facing them. Although it is not directly related to physical training and so will not be addressed further in the body of this work, it is interesting that Marius had his men watch the Germans from the safety of the camp (Plutarch, *Life of Marius*, 16.2). While Plutarch says this was to make them seem less terrifying, this may have brought on the unintended benefit of increased anticipatory ability.

[190] Ὅσοι δὲ αὐτῶν κάτω συννενευκότες παλαίουσιν, καταπίπτειν τε ἀσφαλῶς μανθάνουσι καὶ ἀνίστασθαι εὐμαρῶς καὶ ὠθισμοὺς καὶ περιπλοκὰς καὶ λυγισμοὺς καὶ ἄγχεσθαι δύνασθαι καὶ εἰς ὕψος ἀναβαστάσαι τὸν ἀντίπαλον… δῆλον γὰρ ὅτι καὶ πολεμίῳ ἀνδρὶ ὁ τοιοῦτος συμπλακεὶς καταρρίψει τε θᾶττον ὑποσκελίσας καὶ καταπεσὼν εἴσεται ὡς ῥᾷστα ἐξανίστασθαι.
Lucian, *Athletics or Anacharsis,* 24.

significantly higher than those who lacked this sort of training.[191] This supports the claim that the gladiatorially trained legionaries surpassed others because they had experienced the benefit accrued from strength-based exercises combined with martial training.

Both postural cue utilization and the increase in technical ability shown by combat athletes after strength training are tied into decision making, an integral feature of the ancient idea of καιρός, the precise timing and placement of an action. This quality was considered vital for athletes as evidenced by the statue of Καιρός and his altar at the entrance to the stadium at Olympia. The god presided over the events and served as a reminder to the competitors as his inscription details

[191] Branco and Franchini, "Developing Maximal Strength for Combat Sports Athletes," 105-6.

On a Statue of Kairos

A. Where is your sculptor from?
B. Sicyon
A. What is his name?
B. Lysippus
A. And who are you?
B. Kairos the All-Subduer
A. And why have you arrived on your tip-toes?
B. I always run quickly.
A. And why do you have wings on both your feet?
B. I fly swift as the wind.
A. And why do you have a razor in your right hand?
B. It is evidence to men that I am sharper than every point.
A. And your hair, why does it cover your face?
B. For one having met me to grab.
A. By Zeus, but why is it almost bald in the back?
B. Because no one, even if they want to, will grab me from behind once I have overtaken them.
A. For what reason did the artist make you?
B. For your sake, stranger, he placed me as a lesson on the doorstep.

Εἰς ἄγαλμα τοῦ Καιροῦ

α. Τίς πόθεν ὁ πλάστης;
β. Σικυώνιος.
α. Οὔνομαδὴ τίς;
β. Λύσιππος.
α. Σὺ δὲ τίς;
β. Καιρὸς ὁ πανδαμάτω
α. Τίπτε δ᾽ ἐπ᾽ ἄκρα βέβηκας;
β. Ἀεὶ τροχάω.
α. Τί δὲ ταρσοὺς ποσσὶν ἔχεις διφυεῖς;
β. Ἴπταμ᾽ ὑπηνέμιος.
α. Χειρὶ δὲ δεξιτερῇ τί φέρεις ξυρόν;
β. Ἀνδράσι δεῖγμα, ὡς ἀκμῆς πάσης ὀξύτερος τελέθω.
α. Ἡ δὲ κόμη, τί κατ᾽ ὄψιν;
β. Ὑπαντιάσαντι λαβέσθαι.
α. Νὴ Δία, τἀξόπιθεν δ᾽ εἰς τί φαλακρὰ πέλει;
β. Τὸν γὰρ ἅπαξ πτηνοῖσι παραθρέξαντά με ποσσὶν οὔτις ἔθ᾽ ἱμείρων δράξεται ἐξοπιθεν.
α. Τοὕνεχ᾽ ὁ τεχνίτης σε διέπλασεν.
β. Εἵνεκεν ὑμέων, ξεῖνε· καὶ ἐν προθύροις θῆκε διδασκαλίην.

This ode describes Καιρός as the “all-subduer,” in constant and swift motion, “sharper

than any point," and impossible to catch once passed.[192] The Greeks clearly understood that a pivotal moment could make all the difference in athletics and there would be no time to hesitate when faced with the opportunity to take advantage of it.

Decision-making in combat and other fast-paced sports often occurs under heavy time constraints. It forces athletes to act in response to stimuli in under a second. This is impossible to do without anticipatory representations which are created based on an individual's own previous physical actions and their recognition of their opponent's bodily cues.[193] Modern studies concerning decision-making show that elite athletes make choices more quickly and with greater accuracy than amateurs, thereby allowing them to recognize and take advantage of opportunities in their sport of choice. [194] It is theorized that this sense of καιρός can only be developed through training, both in motor skills and observation of an opponent. As a Roman gladiator or soldier trained, they increased their anticipatory mechanisms by teaching their body the cues that foreshadowed what actions were to follow and by becoming increasingly familiar with the visual stimuli of their opponent. This mastery of καιρός was critical in real-world competition, either at funerary games or in battle, through which the combatants would be proven useful to Rufus and Marius as well as receive recognition of their *virtus*.

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[192] Posidippus, *Anthology*, 16.
[193] Cosimo Urgesi, "Visual and Motor Components of Action Anticipation in Basketball and Soccer," in *Moving Bodies in Interaction – Interacting Bodies in Motion: Intercorporeality, Interkinaesthesia, and Enaction in Sports*, ed. Christian Meyer and Ulrich V. Wedelstaedt (Amsterdam: John Benjamins Publishing Company, 2017), 93-6.
[194] Gershon Tenenbaum and Edson Filho, "Decision-Making in Sports: A Cognitive and Neural Basis Perspective," *Neuroscience and Biobehavioral Psychology,* (2017): 2-8; Vicente Lius del Campo, Jose Manuel Pajuelo Miranda, and Jesús Morenas Martín, "Training with Direct Versus Indirect Spatial Stimulus-Response Compatibility in Combat Sports," *Perceptual and Motor Skills* 127, no. 4 (2020): 723-24. Doi:10.1177/0031512520917806.

Cicero shows an understanding of these effects when he says

> But let them consider what they want; whether they will arm themselves for sport or battle; truly fight(s) and battle(s) require one thing, sport and our training field another; but nevertheless, that sportive skill of arms provides some benefit for both gladiators and soldiers; but indeed, a sharp mind, both resolute and keen and, at the same time, also dexterous makes men unconquerable and with no more difficultly having been united with skill. [195]

Writing half a century after Marius, Cicero explicitly states that skills training in the same manner as gladiators teaches the minds of soldiers to be quick and reactive in addition to improving their technical ability. The benefit that resistance training adds to this effect, as shown by modern research, means that Rufus' gladiatorially trained troops would have had better skills in decision-making and anticipation than others in their legions.

Psychological *Impetus*: Control

The self-discipline that gladiators exhibited when forced to halt before striking a killing blow was contingent on their ability to check their mental *impetus*. As discussed in Chapter 1, this capacity is closely related to the body's fight-or-flight hormone response which can be improved through training.[196] This effect is not Tetrad-specific. Rather, it applies to high-intensity physical and psychological situational preparation, but it is important to note here because of the extent to which Roman commanders in general and Marius in particular valued it. Commanders wanted legionaries who were easily

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[195] *sed videant quid velint; ad ludendumne an ad pugnandum arma sint sumpturi; aliud enim pugna et acies, aliud ludus campusque noster desiderat; ac tamen ars ipsa ludicra armorum et gladiatori et militi prodest aliquid; sed animus acer et praesens et acutus idem atque versutus invictos viros efficit non difficilius arte coniuncta*. Cicero, *De Oratore* 2.84

[196] See p. 33-4 above.

controlled which required those troops could control themselves.

The underlying implication in Marius' speech above is that the good soldiers he describes, while willing, were following orders to strike, defend, and endure. His desire and search for disciplined men are supported by his actions during the campaign against the Cimbri. The consul's legionaries built such a reputation that "even after these things, those who are industrious (lit. "work-loving") and who are content to do what they are commanded in silence were called 'Marian Mules'." [197]

The consul also berated those who showed poor *impetus* control as much as he praised those who demonstrated proper aggression. While in a fortified encampment

> he harshly upbraided overconfident men and he called those who wanted to fight and who attacked in anger, traitors to their country. For their ambition should not be for the sake of triumphs and trophies, but how they intend to preserve Italy, having repelled such a great storm of war.[198]

Only a short while later, he is proud when his men say

> Indeed, has Marius recognized some cowardice in us and so continues to keep us from fighting like women behind locked doors? Come, since we are free men, let us ask whether he awaits some other soldiers who will fight for Italy, and will he use us as workmen for everything, whenever it is necessary to dig ditches, and to clear away earth, and to divert some river? For it seems that it was for this purpose that he exercised us with so many toils… but it is better to suffer while acting, as they did, than to sit as spectators of our allies' destruction.[199]

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[197] ὥστε καὶ μετὰ ταῦτα τοὺς φιλοπόνους καὶ σιωπῇ μετ᾽ εὐκολίας τὰ προστασσόμενα ποιοῦντας ἡμιόνους Μαριανοὺς καλεῖσθαι. Plutarch, *Life of Marius*, 13.1.

[198] καθήπτετο πικρῶς τῶν θρασυνομένων, καὶ τοὺς προπίπτοντας ὑπὸ θυμοῦ καὶ μάχεσθαι βουλομένους προδότας ἀπεκάλει τῆς πατρίδος. οὐ γὰρ ὑπὲρ θριάμβων τὴν φιλοτιμίαν εἶναι καὶ τροπαίων, ἀλλ᾽ ὅπως νέφος τοσοῦτον πολέμου καὶ σκηπτὸν ὠσάμενοι διασώσουσι τὴν Ἰταλίαν. Plutarch, *Life of Marius*, 16.1-2.

[199] Τίνα δὴ καταγνοὺς ἀνανδρίαν ἡμῶν Μάριος εἴργει μάχης ὥσπερ γυναῖκας ὑπὸ κλεισὶ καὶ θυρωροῖς; φέρε, παθόντες ἀνδρῶν πάθος ἐλευθέρων ἐρώμεθα πότερον ἄλλους ἀναμένει μαχουμένους ὑπὲρ τῆς Ἰταλίας, ἡμῖν δὲ λειτουργοῖς χρήσεται διὰ παντός, ὅταν δέηται τάφρους ὀρύσσειν καὶ πηλὸν ἐκκαθαίρειν καὶ ποταμούς τινας παρατρέπειν; ἐπὶ ταῦτα γάρ, ὡς ἔοικεν, ἤσκει τοῖς πολλοῖς πόνοις ἡμᾶς... ἀλλὰ καὶ παθεῖν τι δρῶντας, ὡς ἐκεῖνοι, κάλλιον ἢ καθῆσθαι πορθουμένων τῶν συμμάχων θεατάς.
Plutarch, *Life of Marius*, 16. 4-5.

It is unclear if these two groups included the same individuals or not. There are, however, two primary differences in his men's behavior that warranted the change in Marius' reaction.

First, the second group's *finis* shifted from a desire to exhibit their *virtus* to one of defense of their country. This devotion to Rome over personal glory allowed them to actually demonstrate their *virtus* to their commanding officers rather than bragging about it. Second and more closely related to their training, these men were in control of their anger rather than under its power. While still angry, they used their passion as a tool in much the same way that Pacideianus had. Through logic, they reached the conclusion that their rage was warranted and so remained disciplined even while questioning the tactics of their superior. They proved to Marius that they both had *impetus* and were able to regulate and employ it at will.

Modern military leaders still desire this trait and use training to produce it in their troops. Studies show that non-elite soldiers have much higher stress responses than elite troops who have undergone intense training regimens.[200] As discussed above, this leads to diminished impairment of decision-making and greater control over their emotional responses. Even non-elite soldiers experience these effects, enlisted veterans attribute the discipline they learned and their acceptance of hierarchy to the harsh basic training they endured before deployment.[201] While the Tetrad may not have been the only program that

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[200] José Francisco Tornero-Aguilera, José Juan Robles-Pérez, Vicente Javier Clemente-Suárez, 'Effect of Combat Stress in Psycophysiological Response of Elite and Non-Elite Soldiers," *Journal of Medical Systems*, (2017): 4. Doi:10.1007/s10916-017-0748-x.
[201] Alair Maclean, "The Cold War and Modern Memory: Veterans Reflect of Military Service," *Journal of Political and Military Sociology* 36, no. 1 (2008): 117-18.

engendered *impetus* control in legionaries, it would certainly have helped produce troops with the same restraint that gladiators demonstrated.

Virtus: Resilience

The attributes discussed thus far have been shown to be instrumental a Roman soldier's ability to perform physically at a high level on campaign and would be indispensable to Roman generals. However, courage and a willingness to endure the discomforts of a campaign and to face death for the Republic must have been present before a legionary could demonstrate the results of his training on the battlefield. Marius lists these among the traits he believes best, "to fear nothing except a disgraceful reputation, to endure winter and summer equally, to sleep on the ground, to tolerate want and work at the same time," but he is not the only one. Polybius reinforces the importance of fortitude, writing

> The man speaking about the one who is going to be buried, when he has recounted the dead man's story, begins to tell those of the others who are present… but the greatest outcome is that the youth are inspired to bear everything for the common good for the sake of gaining the glory which follows the brave deeds of heroes.[202]

The seeming embodiment of this perseverance and willingness to give all for the Republic, Marcus Sergius, whom Pliny the Elder says was the best Roman, endured twenty-two major wounds including the loss of his right hand, two separate captures totaling twenty months, and the loss of two horses. Despite these afflictions he continued to

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[202] ὅ γε λέγων ὑπὲρ τοῦ θάπτεσθαι μέλλοντος, ἐπὰν διέλθῃ τὸν περὶ τούτου λόγον, ἄρχεται τῶν ἄλλων ἀπὸ τοῦ προγενεστάτου τῶν παρόντων… τὸ δὲ μέγιστον, οἱ νέοι παρορμῶνται πρὸς τὸ πᾶν ὑπομένειν ὑπὲρ τῶν κοινῶν πραγμάτων χάριν τοῦ τυχεῖν τῆς συνακολουθούσης τοῖς ἀγαθοῖς τῶν ἀνδρῶν εὐκλείας. Polybius, *Histories*, 6.54.1-3.

serve in the army and accomplished a plethora of brave deeds.[203] Whether or not true, this was the ideal Pliny wanted his audience to aspire to. Livy builds on these authors when he speaks through Lucius Lentulus "Indeed, I confess that death for one's country is magnificent."[204] The ideal Roman man, in the minds of his superior, would voluntarily suffer discomfort, hard labor, life-altering wounds, and death for Rome, which would require extreme commitment, self-control, and resolve.

These attributes are closely related to the modern understanding of mental health and general resiliency, which, as a technical term, refers to the ability to both recover from and to limit the physical and mental harm done by stressors to the body.[205] In the military, the purpose of building resiliency is the same today as it was in Rome, to prepare soldiers for combat and to keep them healthy in the field.[206] The physiological expressions of mental and emotional afflictions can be extremely detrimental to performance. Athletes who are depressed or anxious experience nausea, muscle pain, fatigue, insomnia, hormonal dysregulation, amotivation, cognitive decline, and a general decrease in ability.[207]

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[203] Pliny the Elder, *Natural History*, 7.104-6.
[204] *Equidem mortem pro patria praeclaram esse fateor* Livy, *Ab Urbe Condita*, 9.4.10.
[205] Hymie Anisman, *Stress and Your Health: From Vulnerability to* Resilience (Oxford: John Wiley and Sons, LTD, 2015), 13.
[206] Meredith et. al., *Promoting Psychological Resilience in the U.S. Military*, 4.
[207] Claudia L. Reardon and Robert M. Factor, "Sport Psychiatry: A Systematic Review of Diagnosis and Medical Treatment of Mental Illness in Athletes," *Sports Medicine* 40, no.11 (2010): Gale Academic OneFile 3.1.1. https://link.gale.com/apps/doc/A239816356/AONE?u=utah_gvrl&sid=bookmark-AONE&xid=04aae3a0: Claudia L. Reardon, "The Mental Health of Athletes: Recreational to Elite," *Current Sports Medicine Reports* 20, no.12 (2021): 631-7. https://10.1249/JSR.0000000000000916; Kelly T. O'Brien and Kelly A. Kilrea, "Unitive Experience and Athlete Mental Health: Exploring Relationships to Sport-Related Anxiety, Motivation, and Well-Being," *The Humanistic* Psychologist 49, no. 2 (2021): 314-337. http://dx.doi.org/10.1037/hum0000173.

The Greeks and Romans recognized these symptoms and how to avoid them.

Xenophon's attribution to Socrates shows one of the oldest extant examples.

> For towards things, as many as men do, the body is useful; and, in every function of the body, it is very important to keep it in as best condition as possible. Since, even in that thing which you believe that the function of the body is smallest, in thinking, who doesn't know that also in this many people make great mistakes because their body is unhealthy? And very frequently forgetfulness, and despondency, and discontent, and madness attack the minds of many in this way because of the poor condition of their body, so that they drive out (the person's) knowledge.[208]

Lucian follows suit when he has Solon explain to Anacharsis how athletic training produces the best soldiers.

> We teach one how to box, and another pankration, so that they become accustomed to endure work and to come to blows with the enemy and not turn away out of fear of injury. This produces two effects in them which are highly beneficial for us, it both makes them high spirited for risking danger and to be reckless with their bodies, and further still to strengthen themselves and to be resolute… Now, neither disease nor fatigue would easily fall upon such a body and test it nor readily overpower it… These are the ways which we train our young men intending that they become courageous guards of our city.[209]

Finally, Philostratus, writing around the same time as Lucian, says "let anxious athletes be

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[208] πρὸς πάντα γάρ, ὅσα πράττουσιν ἄνθρωποι, χρήσιμον τὸ σῶμά ἐστιν· ἐν πάσαις δὲ ταῖς τοῦ σώματος χρείαις πολὺ διαφέρει ὡς βέλτιστα τὸ σῶμα ἔχειν· ἐπεὶ καὶ ἐν ᾧ δοκεῖς ἐλαχίστην σώματος χρείαν εἶναι, ἐν τῷ διανοεῖσθαι, τίς οὐκ οἶδεν, ὅτι καὶ ἐν τούτῳ πολλοὶ μεγάλα σφάλλονται διὰ τὸ μὴ ὑγιαίνειν τὸ σῶμα; καὶ λήθη δὲ καὶ ἀθυμία καὶ δυσκολία καὶ μανία πολλάκις πολλοῖς διὰ τὴν τοῦ σώματος καχεξίαν εἰς τὴν διάνοιαν ἐμπίπτουσιν οὕτως, ὥστε καὶ τὰς ἐπιστήμας ἐκβάλλειν. Xenophon, *Memorabilia*, 3.12.5-6.

[209] τὸν μέν τινα πυκτεύειν, τὸν δὲ παγκρατιάζειν διδάσκομεν, ὡς τούς τε πόνους καρτερεῖν ἐθίζοιντο καὶ ὁμόσε χωρεῖν ταῖς πληγαῖς μηδὲ ἀποτρέποιντο δέει τῶν τραυμάτων. τοῦτο δὲ ἡμῖν δύο τὰ ὠφελιμώτατα ἐξεργάζεται ἐν αὐτοῖς, θυμοειδεῖς τε παρασκευάζον εἰς τοὺς κινδύνους καὶ τῶν σωμάτων ἀφειδεῖν καὶ προσέτι ἐρρῶσθαι καὶ καρτεροὺς εἶναι… Οὐ τοίνυν οὐδὲ νόσος οὐδὲ κάματος εἰς τοιοῦτο σῶμα ἐμπεσόντα ῥᾳδίως ἐλέγξειεν ἂν οὐδ᾽ ἐπικρατήσειεν εὐμαρῶς…Ταῦτ᾽ ἔστιν, ὦ Ἀνάχαρσι, ἃ τοὺς νέους ἡμεῖς ἀσκοῦμεν οἰόμενοι φύλακας ἡμῖν τῆς πόλεως ἀγαθοὺς γενέσθαι. Lucian, *Anacharsis or Athletics*, 24-30.

cared for… systematic training is good for them." [210] These four authors, dating from the 5th century BCE to the 5th century CE, demonstrate the consistency of the belief that physical training also positively affects mental and emotional health.

In the Roman military, the symptoms of OTS were to be avoided at all costs. Vegetius discusses how weariness, hunger, homesickness, boredom, fear, and despair lead to desertion and surrender before stressing that "care must be taken that you never lead a wavering and frightened army into open battle."[211] The danger was increased by the contagious nature of panic and terror. Caesar notes

> Such great fear suddenly seized the entire army, that the intellect and courage of all were significantly disturbed. It arose first from the tribunes, the commanders of the soldiers, and the others who had followed Caeser from the city for the sake of his friendship but did not have any great experience in military matters. *[212]*

Caesar expelled the roots of the problem from the army and gave a speech to his troops in an attempt to undo the damage, but it was better to stop the spread in the first place. Vegetius states "however, it is easier to train young men for *virtus* than to recall it in those who have already been terrified."[213] It is clear they recognized that regular athletic training nurtured resiliency, which could mitigate the traumatic effects of entering live combat.

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[210] Ἀγωνιῶντες δὲ ἀθληταὶ θεραπευέσθων... εὖ τούτοις ἔχει τὸ ἁρμονικὸν γυμνάσιον. Philostratus, *Gymnasticus*, 53.
[211] *Cavendum enim est, ne dubitantem formidantemque exercitum ad pugnam publicam aliquando producas*. Vegetius, *Epitome Rei Militaris*, 3.9.
[212] *Tantus subito timor omnem exercitum occupavit, ut non mediocriter omnium mentes animosque perturbaret. Hic primum ortus est a tribunis militum praefectis reliquisque, qui ex urbe amicitiae causa Caesarem secuti non magnum in re militari usum habebant.* Caesar, *Bellum Gallicum*, 1.39-40.
[213] *Facilius autem est ad virtutem novos inbuere quam revocare perterritos.* Vegetius, *Epitome Rei Militaris*, 3.10; Further examples of the need for training to avoid mental health problems; Vegetius, 2.23; 3.4, 10, 12.

Current research shows that exercise, especially in a planned and structured form, helps the body better adapt to other types of stress, including psychological.[214] This may also extend beyond athletes, as one study of veterans found that those at the bottom 15% of physical health made up 58% of PTSD cases and, in addition, the current psychological assessment for members of the US military includes physical fitness as a contributing factor.[215] The desire to cultivate resiliency is part of the reason for the intensity of the boot camps which the armed forces subject their recruits to. Resilient personalities are linked to self-efficacy which deals with one's ability to achieve a desired outcome in a specific situation. This is important because "individuals with high self-efficacy are more likely to persevere in the face of difficulty or failure, invest more time and commitment into the task, and be more interested in the task and more willing to spend time problem solving."[216] So, a legionary who has built up their sense of personal competence is not only more likely to enter a dangerous situation, but also is more likely to stay there.

While these mental benefits would apply equally to most training methods, the

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[214] Zhihao Zhang, Ting Wang, Jin Kuang, Fabian Herold, Sebastiian Luyga, Jingming Li, Daniel L. Hall, Alyx Taylor, Sean Healy, Albert S. Yeung, Arthur F. Kramer, and Liye Zou. "The Roles of Exercise Tolerance and Resilience in the Effect of Physical Activity on Emotional States Among College Students," *International Journal of Clinical and Health Psychology* 22, no. 3 (2022): 2. https://doi: 10.1016/j.ijchp.2022.100312.

[215] Martin E.P. Seligman and Raymond D. Fowler. "Comprehensive Soldier Fitness and the Future of Psychology." *American Psychologist* 66, no. 1 (2011): 84. Doi:10.1037/a0021898; Lisa S. Meredith, Cathy D. Sherbourne, Sarah Gaillot, Lydia Hansell, Hans V. Ritschard, Andrew M. Parker, and Glenda Wrenn. *Promoting Psychological Resilience in the U.S. Military* (Santa Monica: RAND Corporation, 2011), 38.

[216] Anisman, *Stress and Your Health*, 18-9; Sarah McLachlan, Derwin King-Chang Chan, Dave Keatly, and Martin Hagger, "Social Psychology Theories and Models," in *The Psychology of Strength and Conditioning*, ed. David Tod and David Lavalle (New York: Routledge, 2012), 47.

Tetrad may have amplified the effects of psychological resilience beyond the expected limit, though not without danger. While performing a VO_2 max test, one of the metrics tracked is the respiratory exchange rate. As long as the RER is between 0 and 1, the aerobic system is keeping up with the energy output of the activity. However, when the RER moves above 1, the body enters glycolysis and energy production becomes anaerobic which indicates a much higher intensity effort that cannot be maintained for long. There is a possible point during the test at which those monitoring the subject may forcibly end the procedure if the participant shows signs of fatigue. This cut-off that few make it past is at 1.15, which happens to be where I voluntarily ended my pre-test.

However, in the post-test, I pushed my RER up to 1.55 before being forced to stop by my body. This continued expenditure of energy far beyond the level where most would quit suggests that I had learned to ignore the signals that my body was sending to my brain telling me to slow down. I reached 1.15 at approximately the same time as I had during the pre-test but then continued at maximal energy output for another 4 minutes.[217] Two major implications emerge from this. First, that my body had been trained to continue to produce ATP well beyond the point at which others would have run out of energy. This ability may have been in part the result of the first day of the cycle. Modern studies have shown that HIIT increases an individual's ability to produce both ATP and the high energy phosphates which are critical for maintaining ballistic movement.[218] Second, that I had learned to ignore signals from my body telling me to stop. The Tetrad

[217] Pre-test stopping point: 13 min 30 sec. Post-test stopping point: 17 min 30 sec.
[218] Paul Laursen and Martin Buchheit, *Science and Application of High Intensity Interval Training,* 235.

brought about this psychological change through the "inescapable test" that was the second day of the Tetrad. The length and intensity of the workout continually pushed my body's ability to produce ATP and required me to learn to ignore pain to do so. Together, both days prepared me both physically and psychologically to expend greater amounts of energy for longer.

The most obvious application of this is in battle. As previously discussed, hand-to-hand combat strains both aerobic and anaerobic energy systems to their limit, and 4 additional minutes at that maximal aerobic output represents a significant amount of time. For comparison, the official rules for professional MMA competition set the duration for individual rounds at 5 minutes with 1 minute rest periods in between.[219] So, if Rufus' legionaries experienced similar psychological changes as I did, they very well could have outlasted most other allies and opponents on the battlefield.

The less apparent, but more valuable, result of these men's increased resilience was visible throughout the remainder of campaign outside the fighting. Marius makes this clear in his quote describing the ideal soldier when he discusses the need to be able to endure harsh conditions, work, and hunger. Those resilient fighters termed "Marian Mules" were not only easy to command but were also able to endure the physically and mentally exhausting labor and hardships associated with campaign.

Such qualities were vital to the functioning of the army even before Marius's day, as Appian shows when he discusses the repercussions of their breakdown during the Punic

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[219] Association of Boxing Commissions and Combative Sports, "Unified Rules of Mixed Martial Arts," updated August 1st, 2018, accessed January 17, 2023. https://www.ufc.com/unified-rules-mixed-martial-arts.

Wars,

> And Atilius, being encamped next to a stagnant lake in the hot season, marched around the lake against the enemy. He suffered from the weight of his equipment, and the heat, and thirst, and the march, as well as being under fire from the overhanging cliffs, and when it was around dusk, a river separated the armies. He immediately crossed it intending to surprise Xanthippus by doing so. But Xanthippus drew up his army and attacked from his camp, hoping that he would beat the fatigued and suffering enemy.[220]

His soldier's poor conditioning led to an inability to wield their weapons effectively and, that, when paired with heat and thirst, exhausted his troops so completely that almost thirty thousand were killed or captured in that battle. [221]

As briefly discussed above, endurance and resilience were highly valued because the reality was that campaigns were long stretches of difficult work, in particular, marching and building camps, punctuated by short, high-intensity periods of battle. The stretches of monotonous and hard labor constantly threatened to eat away at the moral and discipline of the army, and ancient commanders recognized that wars were won and lost on the backs of strong, stable, and easily controlled soldiers who were in reasonably good spirits. Just as in relation to combat, the Tetrad's increased ability to train psychological resilience adds to the benefits of general, regular, and regimented training. The increased perception of self-efficacy, competence, and autonomy which led to greater perseverance would have been

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[220] ὁ δὲ Ἀτίλιος ἀμφὶ λίμνῃ στρατοπεδεύων ὥρᾳ καύματος περιώδευε τὴν λίμνην ἐπὶ τοὺς πολεμίους, ὅπλων τε βάρει καὶ πνίγει καὶ δίψει καὶ ὁδοιπορίᾳ κακοπαθῶν, καὶ βαλλόμενος ἀπὸ κρημνῶν ἄνωθεν. ὡς δ᾽ ἐπλησίασε περὶ ἑσπέραν καὶ ποταμὸς αὐτοὺς διεῖργεν, ὁ μὲν εὐθὺς ἐπέρα τὸν ποταμὸν ὡς καὶ τῷδε τὸν Ξάνθιππον ἐκπλήξων, ὁ δὲ συντεταγμένην τὴν στρατιὰν ἐπαφίησι διὰ τῶν πυλῶν, ἐλπίσας κεκμηκότος καὶ κακοπαθοῦντος περιέσεσθαι. Appian, *The Punic Wars*, 1.3.

[221] This passage also highlights the Roman belief that is was up to commanders to ensure their men trained. Atilus is the singular subject throughout and that is indicative of the fact that all the blame for the loss is placed at his feet. In addition to his poor command decision, he failed to properly prepare and supply his men.

augmented by the increased ability to endure physical and psychological pain and produced legionaries able to withstand the rigors of campaigning.

However, the same intensity that allowed the Tetrad to have such a drastic effect on its practitioners also put them in serious danger of overtraining syndrome (OTS), including the psychological symptoms that influence physical performance. Athletes and soldiers, both today and in the past, who suffer from this affliction may experience a variety of psychological symptoms: higher rates of anger, depression, anxiety, and confusion, along with difficulty concentrating as well as other mood and cognitive issues. The signs of OTS in any combination typically begin to occur when training intensity outweighs recovery for a long period of time. If unattended, the symptoms will worsen, and recovery take longer. The development of this condition depends very much on the capacity of any particular individual to hold it off, nor is it clear whether someone will be made more resilient with a higher threshold for OTS through an exercise regimen or will experience overtraining syndrome through the same regimen.[222] Outcomes are difficult to predict.

It is unclear how many soldiers experienced these symptoms, but it may be assumed that they played a role in the mutinies and desertions that Roman commanders

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[222] Meeusen et. al., "Prevention, Diagnosis, and Treatment of the Overtraining Syndrome," 193-4; Susan Vrijkotte, Bart Roelands, Maj Nathalie Pattyn, and Romain Meeusen, "The Overtraining Syndrome in Soldiers: Insights from the Sports Domain," *Military Medicine* 184, (May/June 2019); e192-e193.
Overtraining Syndrome is very complex and not fully understood by modern science in part because of the difficulties in studying it. Not only is it unethical and dangerous to force an athlete into this state, but also the development of it is influenced by a complex system of physiological and psychological stressors. Generally, OTS is distinguished from non-functional overreaching (NFOR) by the length of time a person experiences symptoms and the amount of recovery time needed. In light of the length of campaigning seasons in the ancient world, OTS is probably the better diagnosis.

feared and punished so brutally.[223] Despite the fact that some must have experienced worsening symptoms, based on Plutarch's description of Marius' troops in conjunction with Frontinus' claim, the relatively small number of soldiers who came out of the Tetrad unscathed were considered more disciplined and resilient than others.

Conclusion

As gladiators clashed in the forum, they exhibited physical strength and endurance, technical skill, and cognitive ability, in addition to resilience in the face of pain and death. Among spectators in the late Republic was the consul Publius Rutilius Rufus, who saw in them the byproduct of a system which could engender an all-important Roman attribute, *virtus*, and produce more efficient, more courageous, combat-ready legionaries at a point in history when Rome desperately needed them. Desirable physical and psychological elements were tied up in a gladiator's pursuit of *virtus*, qualities that could be nurtured in ordinary soldiers through the application of athletic training. Both παιδοτρίβαι who coached Greek athletes and *doctores* who oversaw the training of gladiators were producing the very type of competitor whose skills translated well to military combat. Rufus felt sure that the system employed by those trainers would shape his recruits into fighters who were exceptionally prepared to defend the Republic.

The regimen to which his men were subjected, the Tetrad, had been adopted from the Greeks, whom many believed had misused the program in pursuit of the incorrect goal or σκοπός. However, the program's logistical practicality when adjoined to the

[223] See p. 86 above.

obvious martial overtones of gladiatorial spectacle, made it a perfect vehicle for trainees in the growing combat sport since the brutal yet rigid rules mirrored Greek boxing, wrestling, and pankration. It quickly became clear that the individuals forced to participate, slaves though they may have been, could be rated on par with their Olympic counterparts, because they were able to develop and demonstrate the extraordinary *virtus* that Roman commanders wanted in their soldiers.

In the next year, Gaius Marius chose men who had been trained in this system and were notable for their *disciplina* including *virtus*. These soldiers quickly showed they could exert greater physical *impetus* through the strength, power, and speed they had gained. It's very likely they had improved aerobic capacity and were better able to seize the moment in combat, called καιρός just as Polydeuces is described by Theocritus (*Idyll* 22) in his fight against Amycus. But most important, they developed vastly superior resilience. Marius himself extols the importance of having his soldiers display the courage to stand and receive the onslaught of an enemy, an attribute which Cicero ascribes to even a mediocre gladiator. This physiological and psychological endurance allowed Tetrad-trained legionaries to attain *virtus* above their comrades. For that reason, Marius selected them to fight against the Cimbri, and military training was tied to the *ludus*, a process that only continued to grow throughout the remainder of the Republic and lasted late into the Empire.

Future Research

There are several avenues that I want to pursue through which I could vastly improve this research. First, I would like to involve other individuals who are willing to

undertake this training with me. This would allow me to both address the statistical issue discussed above and also to explore the effects of group training on individual athletic outcomes as well as leadership qualities.[224] Modern sports science discusses these two aspects of exercise at great length, and, in addition, Greek athletes, gladiators, and legionaries trained alongside others.[225] Greeks worked out in a gymnasium, which allowed them to both see others and be seen, and as mentioned in Chapter 1, gladiators exercised with the others housed in their *ludus*, and legionaries with their comrades on the *Campus Martius*.[226] The psychological effects of competition and encouragement influences physical output, and I would be interested to see how it may impact the results of a program as intense as the Tetrad.

Second, I want to expand the scope of the physiological testing I performed with the kinesiology department. During my post-testing, Professor Carey told me about a physiological phenomenon called "heart rate variability" that provides some indication about whether someone has over-trained. If I had known about this, I would have included it in my pre-testing. This metric would allow me, an anyone willing to train alongside me, to produce more concrete conclusions about whether this regimen puts us in danger of OTS or not.

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[224] See p. 5 above.

[225] Alan L. Smith, Kathleen T. Mellano, and Sara Ullrich-French, "Peers and Psychological Experiences in Physical Activity Settings," in *Advances in Sport and Exercise Psychology*, ed. by Thelma S. Horn and Alan L. Smith (Champaign: Human Kinetics, 2019), 133-50; Mark R. Beauchamp, Ben Jackson, and Todd M. Loughead, "Leadership in Physical Activity Contexts," in *Advances in Sport and Exercise Psychology*, ed. by Thelma S. Horn and Alan L. Smith (Champaign: Human Kinetics, 2019), 151-70.

[226] For legionaries see Vegetius, *Epitoma Rei Militaris,* 3.9.
For Greek athletes see Hawhee, *Bodily Arts*, 109-133.
For gladiators see p. 32 above.

Finally, I want to switch programs from the Tetrad to exercise based on manual labor, marching, and running as if I was leaving on campaign. As briefly mentioned above, this was arduous and involved long weighted marches, digging, camp erection, and continued skills practice. According to Vegetius, a legionary was required to be able to march twenty miles at full weight in five hours and twenty-four miles in the same time if required as well as continually drilling in preparation for combat.[227] In regard to the labor required for fortifying a camp, Polybius describes the enormity of a Roman camp and mentions that it is surrounded by ditches and a palisade, which Vegetius describes later in full detail.[228]

I am curious about how this change from regimented athletic training to extended cardiovascular exertion and heavy manual labor would affect a soldier. Would the Tetrad make this work less strenuous, and would they experience any increases or decreases in muscular strength? The second question came to mind because of what I experienced after ending my training. I switched back to a less intense, more regular workout split that took much of the strain off my shoulders and almost immediately noticed strength gains where I had previously plateaued. Within three weeks, my barbell shoulder press jumped from my previous best of 125 lbs. to 135 lbs.[229] This phenomenon fits with the periodization discussed earlier, although on a larger scale.[230] I could explore these questions if I

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[227] Vegetius, *Epitoma Rei Militaris,* 1.9, 1.28.
[228] Polybius, *Histories*, 6.27-34; Vegetius, *Epitoma Rei Militaris,* 1.24.
Alan Richardson calculates the space within the walls of a camp at 1,617 ft². Alan Richarson, "The Numerical Basis for Roman Camps," *Oxford Journal of Archaeology* 19, no. 4 (2000): 426.
[229] I chose not to include this above because I had stopped tracking my data and had altered my diet to include the modern recommended macronutrient intake.
[230] See p. 51.

continued tracking my own data and also repeating the same tests after spending an equivalent amount of time training as if I was on campaign.

These suggestions for how to move forward provide me with the opportunity to continue to explore physicality in the ancient world. They are necessary in order to either support or refute the conclusions that I have come to in this thesis and to open new interdisciplinary possibilities for experiential history in the future.

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Appendices

Appendix A. Ancient Art

Figure A. 1

Mosaic with Gladiators. Mosaic. Römerhalle, Bad Kreuznach, Germany

Figure A. 2

Relief with Gladiators. 30-10 BCE. Marble. Museo Nazionale Romo alla Tarme di Diocleziano, Rome, 126119.

Figure A. 3

Mosaic with Gladiators. Mosaic. Musée Saint-Remi. Reims, France.

Figure A. 4

Glass Gladiator Cup. Ca. CE 50-80. Cup. The Metropolitan Museum of Art, New York. https://library-artstor-org.dist.lib.usu.edu/#/asset/SS7731421_7731421_11403560

Figure A. 5

Relief with Gladiators. Marble. Burdur Archaeological Museum. Pisidia, Turkey.

Figure A. 6

Relief with Gladiators. Marble. Burdur Archaeological Museum. Pisidia, Turkey.

Appendix B. Modern Gladius and Scutum Demonstration

Figure B. 1

Figure B. 2

Figure B. 3

Figure B. 4

Figure B. 5

Figure B. 6

Figure B. 7

Figure B. 8

Figure B. 9

Figure B. 10

Appendix C. Regimen

Table C. 1

CAPACITY
Utah State Olympic Sport Daniel Porter | Built with FYTT (www.fytt.io)

CAPACITY

FYTT

WEEK 1 APR 10, 2022 - APR 16, 2022

APR 10	APR 11	APR 12	APR 13	APR 14	APR 15	APR 16
HIIT TRAINING WARM UP CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps • Jumping Jacks: 20 reps CIRCUIT • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps	**HEAVY TRAINING WARM UP** Grab a barbell and do 5 reps of each exercise for 3-5 sets. CIRCUIT × 5 • BB RDL: 5 @ 0 lbs • BB Front Squat: 5 @ 0 lbs • BB Shoulder Press: 5 @ 0 lbs • BB Bent Over Row: 5 @ 0 lbs • BB Forward Lunge: 5 @ 0 lbs • BB High Row: 5 @ 0 lbs • BB Overhead Squat: 5 @ 0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP** CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps • Jumping Jacks: 20 reps CIRCUIT • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps	**HEAVY TRAINING WARM UP** Grab a barbell and do 5 reps of each exercise for 3-5 sets. CIRCUIT × 5 • BB RDL: 5 @ 0 lbs • BB Front Squat: 5 @ 0 lbs • BB Shoulder Press: 5 @ 0 lbs • BB Bent Over Row: 5 @ 0 lbs • BB Forward Lunge: 5 @ 0 lbs • BB High Row: 5 @ 0 lbs • BB Overhead Squat: 5 @ 0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00

CAPACITY

FYTT

APR 10	APR 11	APR 12	APR 13	APR 14	APR 15	APR 16
HIIT WORKOUT PHASE I As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettlebell Split Squats (each): 0 @ 0 lbs for 0:30 • DB Bench Press (each): 0 @ 0 lbs for 0:30 • Barbell Body Row: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL (each): 0 @0 lbs for 0:30 • Chin Ups (each): 0 @ 0 lbs for 0:30 • Flutter Kicks (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30 CIRCUIT × 3 • DB Push Press (each): 0 @ 0 lbs for 0:30 • SA DB Bent Over Row (each): 0 @ 0 lbs for 0:30 • Squat Jumps (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30	**HEAVY TRAINING PHASE I** The goal of this phase is muscle growth. Aim to lift as heavy as possible with the correct form. Be prepared for a lot of volume and soreness. CIRCUIT • Front Squat: 10 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 10 @ 0 lbs then rest 1:00 • Front Squat: 8 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 2:00 • Front Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Front Squat: 5 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 5 @ 0 lbs then rest 2:00 • Front Squat: 4 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Deadlift: 10 @ 0 lbs then rest 1:00 • Barbell Bench Press: 10 @ 0 lbs then rest 1:00 • Deadlift: 8 @0 lbs then rest 2:00 • Barbell Bench Press: 8 @ 0 lbs then rest 2:00 • Deadlift: 6 @0 lbs then rest 2:00 • Barbell Bench Press: 6 @ 0 lbs then rest 2:00 • Deadlift: 5 @0 lbs then rest 2:00 • Barbell Bench Press: 5 @ 0 lbs then rest 2:00 • Deadlift: 4 @0 lbs then rest 2:00 • Barbell Bench Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Barbell Reverse Lunge: 10 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 10 @0 lbs then rest 1:00 • Barbell Reverse Lunge: 8 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 8 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 5 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 5 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 4 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 4 @0 lbs then rest 2:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 3 mi for 1:00 then rest 1:00	**RECOVERY CIRCUIT** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats: 10 reps • Down Dogs: 10 reps • Cat and Camels: 10 reps • Birddogs: 10 reps • Supported Figure Four Squats: 10 reps • Bent Knee Wipers: 10 reps		**HIIT WORKOUT PHASE I** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettlebell Split Squats (each): 0 @ 0 lbs for 0:30 • DB Bench Press (each): 0 @ 0 lbs for 0:30 • Barbell Body Row: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL (each): 0 @0 lbs for 0:30 • Chin Ups (each): 0 @ 0 lbs for 0:30 • Flutter Kicks (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30 CIRCUIT × 3 • DB Push Press (each): 0 @ 0 lbs for 0:30 • SA DB Bent Over Row (each): 0 @ 0 lbs for 0:30 • Squat Jumps (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30	**HEAVY TRAINING PHASE I** The goal of this phase is muscle growth. Aim to lift as heavy as possible with the correct form. Be prepared for a lot of volume and soreness. CIRCUIT • Front Squat: 10 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 10 @ 0 lbs then rest 1:00 • Front Squat: 8 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 2:00 • Front Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Front Squat: 5 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 5 @ 0 lbs then rest 2:00 • Front Squat: 4 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Deadlift: 10 @ 0 lbs then rest 1:00 • Barbell Bench Press: 10 @ 0 lbs then rest 1:00 • Deadlift: 8 @0 lbs then rest 2:00 • Barbell Bench Press: 8 @ 0 lbs then rest 2:00 • Deadlift: 6 @0 lbs then rest 2:00 • Barbell Bench Press: 6 @ 0 lbs then rest 2:00 • Deadlift: 5 @0 lbs then rest 2:00 • Barbell Bench Press: 5 @ 0 lbs then rest 2:00 • Deadlift: 4 @0 lbs then rest 2:00 • Barbell Bench Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Barbell Reverse Lunge: 10 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 10 @0 lbs then rest 1:00 • Barbell Reverse Lunge: 8 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 8 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 5 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 5 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 4 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 4 @0 lbs then rest 2:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 3 mi for 1:00 then rest 1:00	**RECOVERY CIRCUIT** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats: 10 reps • Down Dogs: 10 reps • Cat and Camels: 10 reps • Birddogs: 10 reps • Supported Figure Four Squats: 10 reps • Bent Knee Wipers: 10 reps

CAPACITY

FYTT

WEEK 2 APR 17, 2022 - APR 23, 2022

APR 17	APR 18	APR 19	APR 20	APR 21	APR 22	APR 23
	HIIT TRAINING WARM UP CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps • Jumping Jacks: 20 reps CIRCUIT • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps	**HEAVY TRAINING WARM UP** Grab a barbell and do 5 reps of each exercise for 3-5 sets. CIRCUIT × 5 • BB RDL: 5 @0 lbs • BB Front Squat: 5 @0 lbs • BB Shoulder Press: 5 @0 lbs • BB Bent Over Row: 5 @0 lbs • BB Forward Lunge: 5 @0 lbs • BB High Row: 5 @0 lbs • BB Overhead Squat: 5 @0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP** CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps • Jumping Jacks: 20 reps CIRCUIT • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps	**HEAVY TRAINING WARM UP** Grab a barbell and do 5 reps of each exercise for 3-5 sets. CIRCUIT × 5 • BB RDL: 5 @0 lbs • BB Front Squat: 5 @0 lbs • BB Shoulder Press: 5 @0 lbs • BB Bent Over Row: 5 @0 lbs • BB Forward Lunge: 5 @0 lbs • BB High Row: 5 @0 lbs • BB Overhead Squat: 5 @0 lbs

CAPACITY

APR 17	APR 18	APR 19	APR 20	APR 21	APR 22	APR 23
	HIIT WORKOUT PHASE I As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettleball Split Squats (each): 0 @ 0 lbs for 0:30 • DB Bench Press (each): 0 @ 0 lbs for 0:30 • Barbell Body Row: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL (each): 0 @0 lbs for 0:30 • Chin Ups (each): 0 @ 0 lbs for 0:30 • Flutter Kicks (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30 CIRCUIT × 3 • DB Push Press (each): 0 @ 0 lbs for 0:30 • SA DB Bent Over Row (each): 0 @ 0 lbs for 0:30 • Squat Jumps (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30	**HEAVY TRAINING PHASE I** The goal of this phase is muscle growth. Aim to lift as heavy as possible with the correct form. Be prepared for a lot of volume and soreness. CIRCUIT • Front Squat: 10 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 10 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 2:00 • Front Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Front Squat: 5 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 5 @ 0 lbs then rest 2:00 • Front Squat: 4 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Deadlift: 10 @ 0 lbs then rest 1:00 • Barbell Bench Press: 10 @ 0 lbs then rest 1:00 • Deadlift: 8 @0 lbs then rest 2:00 • Barbell Bench Press: 8 @ 0 lbs then rest 2:00 • Deadlift: 6 @0 lbs then rest 2:00 • Barbell Bench Press: 6 @ 0 lbs then rest 2:00 • Deadlift: 5 @0 lbs then rest 2:00 • Barbell Bench Press: 5 @ 0 lbs then rest 2:00 • Deadlift: 4 @0 lbs then rest 2:00 • Barbell Bench Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Barbell Reverse Lunge: 10 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 10 @0 lbs then rest 1:00 • Barbell Reverse Lunge: 8 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 8 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 5 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 5 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 4 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 4 @0 lbs then rest 2:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 3 mi for 1:00 then rest 1:00	**RECOVERY CIRCUIT** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats: 10 reps • Down Dogs: 10 reps • Cat and Camels: 10 reps • Birddogs: 10 reps • Supported Figure Four Squats: 10 reps • Bent Knee Wipers: 10 reps		**HIIT WORKOUT PHASE I** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettleball Split Squats (each): 0 @ 0 lbs for 0:30 • DB Bench Press (each): 0 @ 0 lbs for 0:30 • Barbell Body Row: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL (each): 0 @0 lbs for 0:30 • Chin Ups (each): 0 @ 0 lbs for 0:30 • Flutter Kicks (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30 CIRCUIT × 3 • DB Push Press (each): 0 @ 0 lbs for 0:30 • SA DB Bent Over Row (each): 0 @ 0 lbs for 0:30 • Squat Jumps (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30	**HEAVY TRAINING PHASE I** The goal of this phase is muscle growth. Aim to lift as heavy as possible with the correct form. Be prepared for a lot of volume and soreness. CIRCUIT • Front Squat: 10 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 10 @ 0 lbs then rest 1:00 • Front Squat: 8 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 2:00 • Front Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Front Squat: 5 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 5 @ 0 lbs then rest 2:00 • Front Squat: 4 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Deadlift: 10 @ 0 lbs then rest 1:00 • Barbell Bench Press: 10 @ 0 lbs then rest 1:00 • Deadlift: 8 @0 lbs then rest 2:00 • Barbell Bench Press: 8 @ 0 lbs then rest 2:00 • Deadlift: 6 @0 lbs then rest 2:00 • Barbell Bench Press: 6 @ 0 lbs then rest 2:00 • Deadlift: 5 @0 lbs then rest 2:00 • Barbell Bench Press: 5 @ 0 lbs then rest 2:00 • Deadlift: 4 @0 lbs then rest 2:00 • Barbell Bench Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Barbell Reverse Lunge: 10 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 10 @0 lbs then rest 1:00 • Barbell Reverse Lunge: 8 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 8 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 5 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 5 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 4 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 4 @0 lbs then rest 2:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 3 mi for 1:00 then rest 1:00

CAPACITY

FYTT

WEEK 3 APR 24, 2022 - APR 30, 2022

APR 24	APR 25	APR 26	APR 27	APR 28	APR 29	APR 30
RECOVERY WARM UP Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps **CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps • Jumping Jacks: 20 reps **CIRCUIT** • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps **CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps	**HEAVY TRAINING WARM UP** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB RDL: 5 @0 lbs • BB Front Squat: 5 @ 0 lbs • BB Shoulder Press: 5 @ 0 lbs • BB Bent Over Row: 5 @0 lbs • BB Forward Lunge: 5 @0 lbs • BB High Row: 5 @0 lbs • BB Overhead Squat: 5 @ 0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps **CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps • Jumping Jacks: 20 reps **CIRCUIT** • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps **CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps

CAPACITY

FYTT

APR 24	APR 25	APR 26	APR 27	APR 28	APR 29	APR 30
RECOVERY CIRCUIT Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats: 10 reps • Down Dogs: 10 reps • Cat and Camels: 10 reps • Birddogs: 10 reps • Supported Figure Four Squats: 10 reps • Bent Knee Wipers: 10 reps		**HIIT WORKOUT PHASE I** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettleball Split Squats (each): 0 @ 0 lbs for 0:30 • DB Bench Press (each): 0 @ 0 lbs for 0:30 • Barball Body Row: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • S L DB RDL (each): 0 @0 lbs for 0:30 • Chin Ups (each): 0 @ 0 lbs for 0:30 • Flutter Kicks (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30 CIRCUIT × 3 • DB Push Press (each): 0 @ 0 lbs for 0:30 • SA DB Bent Over Row (each): 0 @ 0 lbs for 0:30 • Squat Jumps (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30	**HEAVY TRAINING PHASE I** The goal of this phase is muscle growth. Aim to lift as heavy as possible with the correct form. Be prepared for a lot of volume and soreness. CIRCUIT • Front Squat: 10 @ 0 lbs then rest 1:00 • Barball Shoulder Press: 10 @ 0 lbs then rest 1:00 • Front Squat: 8 @ 0 lbs then rest 2:00 • Barball Shoulder Press: 8 @ 0 lbs then rest 2:00 • Front Squat: 6 @ 0 lbs then rest 2:00 • Barball Shoulder Press: 6 @ 0 lbs then rest 2:00 • Front Squat: 5 @ 0 lbs then rest 2:00 • Barball Shoulder Press: 5 @ 0 lbs then rest 2:00 • Front Squat: 4 @ 0 lbs then rest 2:00 • Barball Shoulder Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Deadlift: 10 @ 0 lbs then rest 1:00 • Barball Bench Press: 10 @ 0 lbs then rest 1:00 • Deadlift: 8 @0 lbs then rest 2:00 • Barball Bench Press: 8 @ 0 lbs then rest 2:00 • Deadlift: 6 @0 lbs then rest 2:00 • Barball Bench Press: 6 @ 0 lbs then rest 2:00 • Deadlift: 5 @0 lbs then rest 2:00 • Barball Bench Press: 5 @ 0 lbs then rest 2:00 • Deadlift: 4 @0 lbs then rest 2:00 • Barball Bench Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Barball Reverse Lunge: 10 @ 0 lbs then rest 1:00 • Barball Bent Over Row: 10 @0 lbs then rest 1:00 • Barball Reverse Lunge: 8 @ 0 lbs then rest 2:00 • Barball Bent Over Row: 8 @0 lbs then rest 2:00 • Barball Reverse Lunge: 6 @ 0 lbs then rest 2:00 • Barball Bent Over Row: 6 @0 lbs then rest 2:00 • Barball Reverse Lunge: 5 @ 0 lbs then rest 2:00 • Barball Bent Over Row: 5 @0 lbs then rest 2:00 • Barball Reverse Lunge: 4 @ 0 lbs then rest 2:00 • Barball Bent Over Row: 4 @0 lbs then rest 2:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 3 mi for 1:00 then rest 1:00	**RECOVERY CIRCUIT** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats: 10 reps • Down Dogs: 10 reps • Cat and Camels: 10 reps • Birddogs: 10 reps • Supported Figure Four Squats: 10 reps • Bent Knee Wipers: 10 reps		**HIIT WORKOUT PHASE I** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettleball Split Squats (each): 0 @ 0 lbs for 0:30 • DB Bench Press (each): 0 @ 0 lbs for 0:30 • Barball Body Row: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • S L DB RDL (each): 0 @0 lbs for 0:30 • Chin Ups (each): 0 @ 0 lbs for 0:30 • Flutter Kicks (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30 CIRCUIT × 3 • DB Push Press (each): 0 @ 0 lbs for 0:30 • SA DB Bent Over Row (each): 0 @ 0 lbs for 0:30 • Squat Jumps (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30

CAPACITY

FYTT

WEEK 4 MAY 1, 2022 - MAY 7, 2022

MAY 1	MAY 2	MAY 3	MAY 4	MAY 5	MAY 6	MAY 7
HEAVY TRAINING WARM UP Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB RDL: 5 @ 0 lbs • BB Front Squat: 5 @ 0 lbs • BB Shoulder Press: 5 @ 0 lbs • BB Bent Over Row: 5 @ 0 lbs • BB Forward Lunge: 5 @ 0 lbs • BB High Row: 5 @ 0 lbs • BB Overhead Squat: 5 @ 0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP** CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps **CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps • Jumping Jacks: 20 reps **CIRCUIT** • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps **CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps	**HEAVY TRAINING WARM UP** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB RDL: 5 @ 0 lbs • BB Front Squat: 5 @ 0 lbs • BB Shoulder Press: 5 @ 0 lbs • BB Bent Over Row: 5 @ 0 lbs • BB Forward Lunge: 5 @ 0 lbs • BB High Row: 5 @ 0 lbs • BB Overhead Squat: 5 @ 0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00	

CAPACITY

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MAY 1	MAY 2	MAY 3	MAY 4	MAY 5	MAY 6	MAY 7
HEAVY TRAINING PHASE 1 The goal of this phase is muscle growth. Aim to lift as heavy as possible with the correct form. Be prepared for a lot of volume and soreness. CIRCUIT • Front Squat: 10 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 10 @ 0 lbs then rest 1:00 • Front Squat: 8 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 2:00 • Front Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Front Squat: 5 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 5 @ 0 lbs then rest 2:00 • Front Squat: 4 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Deadlift: 10 @ 0 lbs then rest 1:00 • Barbell Bench Press: 10 @ 0 lbs then rest 1:00 • Deadlift: 8 @ 0 lbs then rest 2:00 • Barbell Bench Press: 8 @ 0 lbs then rest 2:00 • Deadlift: 6 @0 lbs then rest 2:00 • Barbell Bench Press: 6 @ 0 lbs then rest 2:00 • Deadlift: 5 @0 lbs then rest 2:00 • Barbell Bench Press: 5 @ 0 lbs then rest 2:00 • Deadlift: 4 @0 lbs then rest 2:00 • Barbell Bench Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Barbell Reverse Lunge: 10 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 10 @0 lbs then rest 1:00 • Barbell Reverse Lunge: 8 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 8 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 5 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 5 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 4 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 4 @0 lbs then rest 2:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 3 mi for 1:00 then rest 1:00	**RECOVERY CIRCUIT** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats: 10 reps • Down Dogs: 10 reps • Cat and Camels: 10 reps • Birddogs: 10 reps • Supported Figure Four Squats: 10 reps • Bent Knee Wipers: 10 reps		**HIIT WORKOUT PHASE 1** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettlebell Split Squats (each): 0 @ 0 lbs for 0:30 • DB Bench Press (each): 0 @ 0 lbs for 0:30 • Barbell Body Row: 0 @0 lbs for 0:30 Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL (each): 0 @0 lbs for 0:30 • Chin Ups (each): 0 @ 0 lbs for 0:30 • Flutter Kicks (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30 CIRCUIT × 3 • DB Push Press (each): 0 @ 0 lbs for 0:30 • SA DB Bent Over Row (each): 0 @ 0 lbs for 0:30 • Squat Jumps (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30	**HEAVY TRAINING PHASE 1** The goal of this phase is muscle growth. Aim to lift as heavy as possible with the correct form. Be prepared for a lot of volume and soreness. CIRCUIT • Front Squat: 10 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 10 @ 0 lbs then rest 1:00 • Front Squat: 8 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 2:00 • Front Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Front Squat: 5 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 5 @ 0 lbs then rest 2:00 • Front Squat: 4 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Deadlift: 10 @ 0 lbs then rest 1:00 • Barbell Bench Press: 10 @ 0 lbs then rest 1:00 • Deadlift: 8 @0 lbs then rest 2:00 • Barbell Bench Press: 8 @ 0 lbs then rest 2:00 • Deadlift: 6 @0 lbs then rest 2:00 • Barbell Bench Press: 6 @ 0 lbs then rest 2:00 • Deadlift: 5 @0 lbs then rest 2:00 • Barbell Bench Press: 5 @ 0 lbs then rest 2:00 • Deadlift: 4 @0 lbs then rest 2:00 • Barbell Bench Press: 4 @ 0 lbs then rest 2:00 CIRCUIT • Barbell Reverse Lunge: 10 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 10 @0 lbs then rest 1:00 • Barbell Reverse Lunge: 8 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 8 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 5 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 5 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 4 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 4 @0 lbs then rest 2:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 3 mi for 1:00 then rest 1:00	**RECOVERY CIRCUIT** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats: 10 reps • Down Dogs: 10 reps • Cat and Camels: 10 reps • Birddogs: 10 reps • Supported Figure Four Squats: 10 reps • Bent Knee Wipers: 10 reps	

CAPACITY

FYTT

WEEK 5 MAY 8, 2022 - MAY 14, 2022

MAY 8	MAY 9	MAY 10	MAY 11	MAY 12	MAY 13	MAY 14
HIIT TRAINING WARM UP CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps • Jumping Jacks: 20 reps CIRCUIT • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps	**HEAVY TRAINING WARM UP** Grab a barbell and do 5 reps of each exercise for 3-5 sets. CIRCUIT × 5 • BB RDL: 5 @0 lbs • BB Front Squat: 5 @0 lbs • BB Shoulder Press: 5 @0 lbs • BB Bent Over Row: 5 @0 lbs • BB Forward Lunge: 5 @0 lbs • BB High Row: 5 @0 lbs • BB Overhead Squat: 5 @0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps • Jumping Jacks: 20 reps CIRCUIT • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps	**HEAVY TRAINING WARM UP** Grab a barbell and do 5 reps of each exercise for 3-5 sets. CIRCUIT × 5 • BB RDL: 5 @0 lbs • BB Front Squat: 5 @0 lbs • BB Shoulder Press: 5 @0 lbs • BB Bent Over Row: 5 @0 lbs • BB Forward Lunge: 5 @0 lbs • BB High Row: 5 @0 lbs • BB Overhead Squat: 5 @0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00

CAPACITY

MAY 8	MAY 9	MAY 10	MAY 11	MAY 12	MAY 13	MAY 14
HIIT WORKOUT PHASE I As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. **CIRCUIT** × 3 • Kettlebell Split Squats (each): 0 @ 0 lbs for 0:30 • DB Bench Press (each): 0 @ 0 lbs for 0:30 • Barbell Body Row: 0 @0 lbs for 0:30 • Total Time: for 0:00 **CIRCUIT** × 3 • SL DB RDL (each): 0 @0 lbs for 0:30 • Chin Ups (each): 0 @ 0 lbs for 0:30 • Flutter Kicks (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30 **CIRCUIT** × 3 • DB Push Press (each): 0 @ 0 lbs for 0:30 • SA DB Bent Over Row (each): 0 @ 0 lbs for 0:30 • Squat Jumps (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30	**HEAVY TRAINING PHASE I** The goal of this phase is muscle growth. Aim to lift as heavy as possible with the correct form. Be prepared for a lot of volume and soreness. **CIRCUIT** • Front Squat: 10 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 10 @ 0 lbs then rest 1:00 • Front Squat: 8 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 2:00 • Front Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Front Squat: 5 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 5 @ 0 lbs then rest 2:00 • Front Squat: 4 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 4 @ 0 lbs then rest 2:00 **CIRCUIT** • Deadlift: 10 @ 0 lbs then rest 1:00 • Barbell Bench Press: 10 @ 0 lbs then rest 1:00 • Deadlift: 8 @ 0 lbs then rest 2:00 • Barbell Bench Press: 8 @ 0 lbs then rest 2:00 • Deadlift: 6 @ 0 lbs then rest 2:00 • Barbell Bench Press: 6 @ 0 lbs then rest 2:00 • Deadlift: 5 @ 0 lbs then rest 2:00 • Barbell Bench Press: 5 @ 0 lbs then rest 2:00 • Deadlift: 4 @ 0 lbs then rest 2:00 • Barbell Bench Press: 4 @ 0 lbs then rest 2:00 **CIRCUIT** • Barbell Reverse Lunge: 10 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 10 @ 0 lbs then rest 1:00 • Barbell Reverse Lunge: 8 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 8 @ 0 lbs then rest 2:00 • Barbell Reverse Lunge: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @ 0 lbs then rest 2:00 • Barbell Reverse Lunge: 5 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 5 @ 0 lbs then rest 2:00 • Barbell Reverse Lunge: 4 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 4 @ 0 lbs then rest 2:00 **SUPERSET** • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 3 mi for 1:00 then rest 1:00	**RECOVERY CIRCUIT** Move at your own pace. This is all bodyweight movement. **CIRCUIT** × 5 • Supported Sumo Squats: 10 reps • Down Dogs: 10 reps • Cat and Camels: 10 reps • Birddogs: 10 reps • Supported Figure Four Squats: 10 reps • Bent Knee Wipers: 10 reps		**HIIT WORKOUT PHASE I** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. **CIRCUIT** × 3 • Kettlebell Split Squats (each): 0 @ 0 lbs for 0:30 • DB Bench Press (each): 0 @ 0 lbs for 0:30 • Barbell Body Row: 0 @0 lbs for 0:30 • Total Time: for 0:00 **CIRCUIT** × 3 • SL DB RDL (each): 0 @0 lbs for 0:30 • Chin Ups (each): 0 @ 0 lbs for 0:30 • Flutter Kicks (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30 **CIRCUIT** × 3 • DB Push Press (each): 0 @ 0 lbs for 0:30 • SA DB Bent Over Row (each): 0 @ 0 lbs for 0:30 • Squat Jumps (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30	**HEAVY TRAINING PHASE I** The goal of this phase is muscle growth. Aim to lift as heavy as possible with the correct form. Be prepared for a lot of volume and soreness. **CIRCUIT** • Front Squat: 10 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 10 @ 0 lbs then rest 1:00 • Front Squat: 8 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 2:00 • Front Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Front Squat: 5 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 5 @ 0 lbs then rest 2:00 • Front Squat: 4 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 4 @ 0 lbs then rest 2:00 **CIRCUIT** • Deadlift: 10 @ 0 lbs then rest 1:00 • Barbell Bench Press: 10 @ 0 lbs then rest 1:00 • Deadlift: 8 @ 0 lbs then rest 2:00 • Barbell Bench Press: 8 @ 0 lbs then rest 2:00 • Deadlift: 6 @ 0 lbs then rest 2:00 • Barbell Bench Press: 6 @ 0 lbs then rest 2:00 • Deadlift: 5 @ 0 lbs then rest 2:00 • Barbell Bench Press: 5 @ 0 lbs then rest 2:00 • Deadlift: 4 @ 0 lbs then rest 2:00 • Barbell Bench Press: 4 @ 0 lbs then rest 2:00 **CIRCUIT** • Barbell Reverse Lunge: 10 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 10 @ 0 lbs then rest 1:00 • Barbell Reverse Lunge: 8 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 8 @ 0 lbs then rest 2:00 • Barbell Reverse Lunge: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @ 0 lbs then rest 2:00 • Barbell Reverse Lunge: 5 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 5 @ 0 lbs then rest 2:00 • Barbell Reverse Lunge: 4 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 4 @ 0 lbs then rest 2:00 **SUPERSET** • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 3 mi for 1:00 then rest 1:00	**RECOVERY CIRCUIT** Move at your own pace. This is all bodyweight movement. **CIRCUIT** × 5 • Supported Sumo Squats: 10 reps • Down Dogs: 10 reps • Cat and Camels: 10 reps • Birddogs: 10 reps • Supported Figure Four Squats: 10 reps • Bent Knee Wipers: 10 reps

CAPACITY

FYTT

WEEK 6 MAY 15, 2022 - MAY 21, 2022

MAY 15	MAY 16	MAY 17	MAY 18	MAY 19	MAY 20	MAY 21
	HIIT TRAINING WARM UP CIRCUIT • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps **CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps • Jumping Jacks: 20 reps **CIRCUIT** • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps **CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps	**HEAVY TRAINING WARM UP** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB RDL: 5 @ 0 lbs • BB Front Squat: 5 @ 0 lbs • BB Shoulder Press: 5 @ 0 lbs • BB Bent Over Row: 5 @ 0 lbs • BB Forward Lunge: 5 @ 0 lbs • BB High Row: 5 @ 0 lbs • BB Overhead Squat: 5 @ 0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps **CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps • Jumping Jacks: 20 reps **CIRCUIT** • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps **CIRCUIT** • Jumping Jacks: 20 reps • Air Squats: 10 reps • Push Ups: 10 reps • Sit Ups: 10 reps • Russian Twists: 20 reps • Reverse Lunges: 10 reps	**HEAVY TRAINING WARM UP** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB RDL: 5 @ 0 lbs • BB Front Squat: 5 @ 0 lbs • BB Shoulder Press: 5 @ 0 lbs • BB Bent Over Row: 5 @ 0 lbs • BB Forward Lunge: 5 @ 0 lbs • BB High Row: 5 @ 0 lbs • BB Overhead Squat: 5 @ 0 lbs

CAPACITY

FYTT

MAY 15	MAY 16	MAY 17	MAY 18	MAY 19	MAY 20	MAY 21
	HIIT WORKOUT PHASE I As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. **CIRCUIT** × 3 • Kettleball Split Squats (each): 0 @ 0 lbs for 0:30 • DB Bench Press (each): 0 @ 0 lbs for 0:30 • Barbell Body Row: 0 @0 lbs for 0:30 • Total Time: for 0:00 **CIRCUIT** × 3 • SL DB RDL (each): 0 @0 lbs for 0:30 • Chin Ups (each): 0 @ 0 lbs for 0:30 • Flutter Kicks (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30 **CIRCUIT** × 3 • DB Push Press (each): 0 @ 0 lbs for 0:30 • SA DB Bent Over Row (each): 0 @ 0 lbs for 0:30 • Squat Jumps (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30	**HEAVY TRAINING PHASE I** The goal of this phase is muscle growth. Aim to lift as heavy as possible with the correct form. Be prepared for a lot of volume and soreness. **CIRCUIT** • Front Squat: 10 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 10 @ 0 lbs then rest 1:00 • Front Squat: 10 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 2:00 • Front Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Front Squat: 5 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 5 @ 0 lbs then rest 2:00 • Front Squat: 4 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 4 @ 0 lbs then rest 2:00 **CIRCUIT** • Deadlift: 10 @ 0 lbs then rest 1:00 • Barbell Bench Press: 10 @ 0 lbs then rest 1:00 • Deadlift: 8 @0 lbs then rest 2:00 • Barbell Bench Press: 8 @ 0 lbs then rest 2:00 • Deadlift: 6 @0 lbs then rest 2:00 • Barbell Bench Press: 6 @ 0 lbs then rest 2:00 • Deadlift: 5 @0 lbs then rest 2:00 • Barbell Bench Press: 5 @ 0 lbs then rest 2:00 • Deadlift: 4 @0 lbs then rest 2:00 • Barbell Bench Press: 4 @ 0 lbs then rest 2:00 **CIRCUIT** • Barbell Reverse Lunge: 10 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 10 @0 lbs then rest 1:00 • Barbell Reverse Lunge: 8 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 8 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 5 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 5 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 4 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 4 @0 lbs then rest 2:00 **SUPERSET** • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 3 mi for 1:00 then rest 1:00	**RECOVERY CIRCUIT** Move at your own pace. This is all bodyweight movement. **CIRCUIT** × 5 • Supported Sumo Squats: 10 reps • Down Dogs: 10 reps • Cat and Camels: 10 reps • Birddogs: 10 reps • Supported Figure Four Squats: 10 reps • Bent Knee Wipers: 10 reps		**HIIT WORKOUT PHASE I** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. **CIRCUIT** × 3 • Kettleball Split Squats (each): 0 @ 0 lbs for 0:30 • DB Bench Press (each): 0 @ 0 lbs for 0:30 • Barbell Body Row: 0 @0 lbs for 0:30 • Total Time: for 0:00 **CIRCUIT** × 3 • SL DB RDL (each): 0 @0 lbs for 0:30 • Chin Ups (each): 0 @ 0 lbs for 0:30 • Flutter Kicks (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30 **CIRCUIT** × 3 • DB Push Press (each): 0 @ 0 lbs for 0:30 • SA DB Bent Over Row (each): 0 @ 0 lbs for 0:30 • Squat Jumps (each): 0 @ 0 lbs for 0:30 • Total Time: for 0:30	**HEAVY TRAINING PHASE I** The goal of this phase is muscle growth. Aim to lift as heavy as possible with the correct form. Be prepared for a lot of volume and soreness. **CIRCUIT** • Front Squat: 10 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 10 @ 0 lbs then rest 1:00 • Front Squat: 8 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 2:00 • Front Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Front Squat: 5 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 5 @ 0 lbs then rest 2:00 • Front Squat: 4 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 4 @ 0 lbs then rest 2:00 **CIRCUIT** • Deadlift: 10 @ 0 lbs then rest 1:00 • Barbell Bench Press: 10 @ 0 lbs then rest 1:00 • Deadlift: 8 @0 lbs then rest 2:00 • Barbell Bench Press: 8 @ 0 lbs then rest 2:00 • Deadlift: 6 @0 lbs then rest 2:00 • Barbell Bench Press: 6 @ 0 lbs then rest 2:00 • Deadlift: 5 @0 lbs then rest 2:00 • Barbell Bench Press: 5 @ 0 lbs then rest 2:00 • Deadlift: 4 @0 lbs then rest 2:00 • Barbell Bench Press: 4 @ 0 lbs then rest 2:00 **CIRCUIT** • Barbell Reverse Lunge: 10 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 10 @0 lbs then rest 1:00 • Barbell Reverse Lunge: 8 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 8 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 5 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 5 @0 lbs then rest 2:00 • Barbell Reverse Lunge: 4 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 4 @0 lbs then rest 2:00 **SUPERSET** • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 3 mi for 1:00 then rest 1:00

Table C. 2

MAXIMUM GAINS

FYTT

WEEK 7 MAY 22, 2022 - MAY 28, 2022

MAY 22	MAY 23	MAY 24	MAY 25	MAY 26	MAY 27	MAY 28
HIIT TRAINING WARM UP **#2 CIRCUIT** × 5 • Jumping Jacks Overhead Squat: 20 reps • Prisoner Squats: 10 reps • Push Ups + Shoulder Taps: 10 reps • Sit Ups w. Twist: 10 reps • Side Dips: 10 reps • Lateral Lunges: 10 reps	**HEAVY TRAINING WARM UP #2** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB Snatch Grip RDL: 5 @0 lbs • Back Squat: 5 @0 lbs • BB Behind The Neck Shoulder Press: 5 @0 lbs • BB Supine Grip Bent Over Row: 5 @0 lbs • BB Lateral Squat: 5 @0 lbs • BB Reverse Curl: 5 @0 lbs • BB Squat with Overhead Press: 5 @0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP** **#2 CIRCUIT** × 5 • Jumping Jacks Overhead Squat: 20 reps • Prisoner Squats: 10 reps • Push Ups + Shoulder Taps: 10 reps • Sit Ups w. Twist: 10 reps • Side Dips: 10 reps • Lateral Lunges: 10 reps	**HEAVY TRAINING WARM UP #2** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB Snatch Grip RDL: 5 @0 lbs • Back Squat: 5 @0 lbs • BB Behind The Neck Shoulder Press: 5 @0 lbs • BB Supine Grip Bent Over Row: 5 @0 lbs • BB Lateral Squat: 5 @0 lbs • BB Reverse Curl: 5 @0 lbs • BB Squat with Overhead Press: 5 @0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00

MAXIMUM GAINS

FYTT

MAY 22	MAY 23	MAY 24	MAY 25	MAY 26	MAY 27	MAY 28
HIIT WORKOUT PHASE 2 As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettlebell Curtsy Squats (each): 0 @0 lbs for 0:30 • Incline DB Bench Press (each): 0 @0 lbs for 0:30 • Barbell Body Row w. Feet Elevated: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL w. Knee Punch (each): 0 @0 lbs for 0:30 • Pull Ups (each): 0 @0 lbs for 0:30 • V Ups (each): 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SA ALT DB Push Press (each): 0 @0 lbs for 0:30 • DB Incline Row (each): 0 @0 lbs for 0:30 • Split Squat Jumps (each): 0 @0 lbs for 0:30 • Total Time: for 0:00	**HEAVY TRAINING PHASE 2** The goal of this phase is maximum strength. Aim to lift as heavy as possible with the correct form. Be prepared to rest between sets. CIRCUIT • Back Squat: 8 @0 lbs then rest 1:00 • Barbell Shoulder Press: 8 @0 lbs then rest 1:00 • Back Squat: 6 @0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @0 lbs then rest 2:00 • Back Squat: 3 @0 lbs then rest 3:00 • Barbell Shoulder Press: 3 @0 lbs then rest 3:00 • Back Squat: 2 @0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @0 lbs then rest 3:00 • Back Squat: 2 @0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @0 lbs then rest 3:00 CIRCUIT • Trap Bar Deadlift: 8 @0 lbs then rest 1:00 • Barbell Incline Bench Press: 8 @0 lbs then rest 1:00 • Trap Bar Deadlift: 6 @0 lbs then rest 2:00 • Barbell Incline Bench Press: 6 @0 lbs then rest 2:00 • Trap Bar Deadlift: 3 @0 lbs then rest 3:00 • Barbell Incline Bench Press: 3 @0 lbs then rest 3:00 • Deadlift: 2 @0 lbs then rest 3:00 • Barbell Bench Press: 2 @0 lbs then rest 3:00 • Trap Bar Deadlift: 2 @0 lbs then rest 3:00 • Barbell Incline Bench Press: 2 @0 lbs then rest 3:00 CIRCUIT • Barbell Split Squat: 8 @0 lbs then rest 1:00 • Barbell Bent Over Row: 8 @0 lbs then rest 1:00 • Barbell Split Squat: 6 @0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Split Squat: 3 @0 lbs then rest 3:00 • Barbell Bent Over Row: 3 @0 lbs then rest 3:00 • Barbell Reverse Lunge: 2 @0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 • Barbell Split Squat: 2 @0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 2 mi for 0:30 then rest 0:30	**RECOVERY CIRCUIT #2** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats + Pause: 10 reps • Down Dogs + Groin March: 10 reps • Childs Pose: 10 reps • Donkey Kicks: 10 reps • Figure Four Stretch: 10 reps • Supine Knee Hugs: 10 reps		**HIIT WORKOUT PHASE 2** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettlebell Curtsy Squats (each): 0 @0 lbs for 0:30 • Incline DB Bench Press (each): 0 @0 lbs for 0:30 • Barbell Body Row w. Feet Elevated: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL w. Knee Punch (each): 0 @0 lbs for 0:30 • Pull Ups (each): 0 @0 lbs for 0:30 • V Ups (each): 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SA ALT DB Push Press (each): 0 @0 lbs for 0:30 • DB Incline Row (each): 0 @0 lbs for 0:30 • Split Squat Jumps (each): 0 @0 lbs for 0:30 • Total Time: for 0:00	**HEAVY TRAINING PHASE 2** The goal of this phase is maximum strength. Aim to lift as heavy as possible with the correct form. Be prepared to rest between sets. CIRCUIT • Back Squat: 8 @0 lbs then rest 1:00 • Barbell Shoulder Press: 8 @0 lbs then rest 1:00 • Back Squat: 6 @0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @0 lbs then rest 2:00 • Back Squat: 3 @0 lbs then rest 3:00 • Barbell Shoulder Press: 3 @0 lbs then rest 3:00 • Back Squat: 2 @0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @0 lbs then rest 3:00 • Back Squat: 2 @0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @0 lbs then rest 3:00 CIRCUIT • Trap Bar Deadlift: 8 @0 lbs then rest 1:00 • Barbell Incline Bench Press: 8 @0 lbs then rest 1:00 • Trap Bar Deadlift: 6 @0 lbs then rest 2:00 • Barbell Incline Bench Press: 6 @0 lbs then rest 2:00 • Trap Bar Deadlift: 3 @0 lbs then rest 3:00 • Barbell Incline Bench Press: 3 @0 lbs then rest 3:00 • Deadlift: 2 @0 lbs then rest 3:00 • Barbell Bench Press: 2 @0 lbs then rest 3:00 • Trap Bar Deadlift: 2 @0 lbs then rest 3:00 • Barbell Incline Bench Press: 2 @0 lbs then rest 3:00 CIRCUIT • Barbell Split Squat: 8 @0 lbs then rest 1:00 • Barbell Bent Over Row: 8 @0 lbs then rest 1:00 • Barbell Split Squat: 6 @0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Split Squat: 3 @0 lbs then rest 3:00 • Barbell Bent Over Row: 3 @0 lbs then rest 3:00 • Barbell Reverse Lunge: 2 @0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 • Barbell Split Squat: 2 @0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 2 mi for 0:30 then rest 0:30	**RECOVERY CIRCUIT #2** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats + Pause: 10 reps • Down Dogs + Groin March: 10 reps • Childs Pose: 10 reps • Donkey Kicks: 10 reps • Figure Four Stretch: 10 reps • Supine Knee Hugs: 10 reps

MAXIMUM GAINS

FYTT

WEEK 8 MAY 29, 2022 - JUN 4, 2022

MAY 29	MAY 30	MAY 31	JUN 1	JUN 2	JUN 3	JUN 4
	HIIT TRAINING WARM UP **#2 CIRCUIT** × 5 • Jumping Jacks Overhead Squat: 20 reps • Prisoner Squats: 10 reps • Push Ups + Shoulder Taps: 10 reps • Sit Ups w. Twist: 10 reps • Side Dips: 10 reps • Lateral Lunges: 10 reps	**HEAVY TRAINING WARM UP #2** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB Snatch Grip RDL: 5 @0 lbs • Back Squat: 5 @0 lbs • BB Behind The Neck Shoulder Press: 5 @0 lbs • BB Supine Grip Bent Over Row: 5 @0 lbs • BB Lateral Squat: 5 @0 lbs • BB Reverse Curl: 5 @0 lbs • BB Squat with Overhead Press: 5 @0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP** **#2 CIRCUIT** × 5 • Jumping Jacks Overhead Squat: 20 reps • Prisoner Squats: 10 reps • Push Ups + Shoulder Taps: 10 reps • Sit Ups w. Twist: 10 reps • Side Dips: 10 reps • Lateral Lunges: 10 reps	**HEAVY TRAINING WARM UP #2** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB Snatch Grip RDL: 5 @0 lbs • Back Squat: 5 @0 lbs • BB Behind The Neck Shoulder Press: 5 @0 lbs • BB Supine Grip Bent Over Row: 5 @0 lbs • BB Lateral Squat: 5 @0 lbs • BB Reverse Curl: 5 @0 lbs • BB Squat with Overhead Press: 5 @0 lbs

MAXIMUM GAINS

FYTT

MAY 29	MAY 30	MAY 31	JUN 1	JUN 2	JUN 3	JUN 4
	HIIT WORKOUT PHASE 2 As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettleball Curtsy Squats (each): 0 @0 lbs for 0:30 • Incline DB Bench Press (each): 0 @0 lbs for 0:30 • Barbell Body Row w. Feet Elevated: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL w. Knee Punch (each): 0 @0 lbs for 0:30 • Pull Ups (each): 0 @0 lbs for 0:30 • V Ups (each): 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SA ALT DB Push Press (each): 0 @0 lbs for 0:30 • DB Incline Row (each): 0 @0 lbs for 0:30 • Split Squat Jumps (each): 0 @0 lbs for 0:30 • Total Time: for 0:00	**HEAVY TRAINING PHASE 2** The goal of this phase is maximum strength. Aim to lift as heavy as possible with the correct form. Be prepared to rest between sets. CIRCUIT • Back Squat: 8 @0 lbs than rest 1:00 • Barbell Shoulder Press: 8 @0 lbs than rest 1:00 • Back Squat: 6 @0 lbs than rest 2:00 • Barbell Shoulder Press: 6 @0 lbs than rest 2:00 • Back Squat: 3 @0 lbs than rest 3:00 • Barbell Shoulder Press: 3 @0 lbs than rest 3:00 • Back Squat: 2 @0 lbs than rest 3:00 • Barbell Shoulder Press: 2 @0 lbs than rest 3:00 • Back Squat: 2 @0 lbs than rest 3:00 • Barbell Shoulder Press: 2 @0 lbs than rest 3:00 CIRCUIT • Trap Bar Deadlift: 8 @0 lbs than rest 1:00 • Barbell Incline Bench Press: 8 @0 lbs than rest 1:00 • Trap Bar Deadlift: 6 @0 lbs than rest 2:00 • Barbell Incline Bench Press: 6 @0 lbs than rest 2:00 • Trap Bar Deadlift: 3 @0 lbs than rest 3:00 • Barbell Incline Bench Press: 3 @0 lbs than rest 3:00 • Deadlift: 2 @0 lbs than rest 3:00 • Barbell Bench Press: 2 @0 lbs than rest 3:00 • Trap Bar Deadlift: 2 @0 lbs than rest 3:00 • Barbell Incline Bench Press: 2 @0 lbs than rest 3:00 CIRCUIT • Barbell Split Squat: 8 @0 lbs than rest 1:00 • Barbell Bent Over Row: 8 @0 lbs than rest 1:00 • Barbell Split Squat: 6 @0 lbs than rest 2:00 • Barbell Bent Over Row: 6 @0 lbs than rest 2:00 • Barbell Split Squat: 3 @0 lbs than rest 3:00 • Barbell Bent Over Row: 3 @0 lbs than rest 3:00 • Barbell Reverse Lunge: 2 @0 lbs than rest 3:00 • Barbell Bent Over Row: 2 @0 lbs than rest 3:00 • Barbell Split Squat: 2 @0 lbs than rest 3:00 • Barbell Bent Over Row: 2 @0 lbs than rest 3:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 2 mi for 0:30 then rest 0:30	**RECOVERY CIRCUIT #2** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats + Pause: 10 reps • Down Dogs + Groin March: 10 reps • Childs Pose: 10 reps • Donkey Kicks: 10 reps • Figure Four Stretch: 10 reps • Supine Knee Hugs: 10 reps		**HIIT WORKOUT PHASE 2** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettleball Curtsy Squats (each): 0 @0 lbs for 0:30 • Incline DB Bench Press (each): 0 @0 lbs for 0:30 • Barbell Body Row w. Feet Elevated: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL w. Knee Punch (each): 0 @0 lbs for 0:30 • Pull Ups (each): 0 @0 lbs for 0:30 • V Ups (each): 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SA ALT DB Push Press (each): 0 @0 lbs for 0:30 • DB Incline Row (each): 0 @0 lbs for 0:30 • Split Squat Jumps (each): 0 @0 lbs for 0:30 • Total Time: for 0:00	**HEAVY TRAINING PHASE 2** The goal of this phase is maximum strength. Aim to lift as heavy as possible with the correct form. Be prepared to rest between sets. CIRCUIT • Back Squat: 8 @0 lbs than rest 1:00 • Barbell Shoulder Press: 8 @0 lbs than rest 1:00 • Back Squat: 6 @0 lbs than rest 2:00 • Barbell Shoulder Press: 6 @0 lbs than rest 2:00 • Back Squat: 3 @0 lbs than rest 3:00 • Barbell Shoulder Press: 3 @0 lbs than rest 3:00 • Back Squat: 2 @0 lbs than rest 3:00 • Barbell Shoulder Press: 2 @0 lbs than rest 3:00 • Back Squat: 2 @0 lbs than rest 3:00 • Barbell Shoulder Press: 2 @0 lbs than rest 3:00 CIRCUIT • Trap Bar Deadlift: 8 @0 lbs than rest 1:00 • Barbell Incline Bench Press: 8 @0 lbs than rest 1:00 • Trap Bar Deadlift: 6 @0 lbs than rest 2:00 • Barbell Incline Bench Press: 6 @0 lbs than rest 2:00 • Trap Bar Deadlift: 3 @0 lbs than rest 3:00 • Barbell Incline Bench Press: 3 @0 lbs than rest 3:00 • Deadlift: 2 @0 lbs than rest 3:00 • Barbell Bench Press: 2 @0 lbs than rest 3:00 • Trap Bar Deadlift: 2 @0 lbs than rest 3:00 • Barbell Incline Bench Press: 2 @0 lbs than rest 3:00 CIRCUIT • Barbell Split Squat: 8 @0 lbs than rest 1:00 • Barbell Bent Over Row: 8 @0 lbs than rest 1:00 • Barbell Split Squat: 6 @0 lbs than rest 2:00 • Barbell Bent Over Row: 6 @0 lbs than rest 2:00 • Barbell Split Squat: 3 @0 lbs than rest 3:00 • Barbell Bent Over Row: 3 @0 lbs than rest 3:00 • Barbell Reverse Lunge: 2 @0 lbs than rest 3:00 • Barbell Bent Over Row: 2 @0 lbs than rest 3:00 • Barbell Split Squat: 2 @0 lbs than rest 3:00 • Barbell Bent Over Row: 2 @0 lbs than rest 3:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 2 mi for 0:30 then rest 0:30

MAXIMUM GAINS

FYTT

WEEK 9 JUN 5, 2022 - JUN 11, 2022

JUN 5	JUN 6	JUN 7	JUN 8	JUN 9	JUN 10	JUN 11
RECOVERY WARM UP Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP** **#2 CIRCUIT** × 5 • Jumping Jacks Overhead Squat: 20 reps • Prisoner Squats: 10 reps • Push Ups + Shoulder Taps: 10 reps • Sit Ups w. Twist: 10 reps • Side Dips: 10 reps • Lateral Lunges: 10 reps	**HEAVY TRAINING WARM UP #2** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB Snatch Grip RDL: 5 @0 lbs • Back Squat: 5 @0 lbs • BB Behind The Neck Shoulder Press: 5 @0 lbs • BB Supine Grip Bent Over Row: 5 @0 lbs • BB Lateral Squat: 5 @0 lbs • BB Reverse Curl: 5 @0 lbs • BB Squat with Overhead Press: 5 @0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP** **#2 CIRCUIT** × 5 • Jumping Jacks Overhead Squat: 20 reps • Prisoner Squats: 10 reps • Push Ups + Shoulder Taps: 10 reps • Sit Ups w. Twist: 10 reps • Side Dips: 10 reps • Lateral Lunges: 10 reps

MAXIMUM GAINS

FYTT

JUN 5	JUN 6	JUN 7	JUN 8	JUN 9	JUN 10	JUN 11
RECOVERY CIRCUIT #2 Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats + Pause: 10 reps • Down Dogs + Groin March: 10 reps • Childs Pose: 10 reps • Donkey Kicks: 10 reps • Figure Four Stretch: 10 reps • Supine Knee Hugs: 10 reps		**HIIT WORKOUT PHASE 2** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettleball Curtsy Squats (each): 0 @0 lbs for 0:30 • Incline DB Bench Press (each): 0 @0 lbs for 0:30 • Barbell Body Row w. Feet Elevated: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL w. Knee Punch (each): 0 @0 lbs for 0:30 • Pull Ups (each): 0 @0 lbs for 0:30 • V Ups (each): 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SA ALT DB Push Press (each): 0 @0 lbs for 0:30 • DB Incline Row (each): 0 @0 lbs for 0:30 • Split Squat Jumps (each): 0 @0 lbs for 0:30 • Total Time: for 0:00	**HEAVY TRAINING PHASE 2** The goal of this phase is maximum strength. Aim to lift as heavy as possible with the correct form. Be prepared to rest between sets. CIRCUIT • Back Squat: 8 @0 lbs then rest 1:00 • Barbell Shoulder Press: 8 @0 lbs then rest 1:00 • Back Squat: 6 @0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @0 lbs then rest 2:00 • Back Squat: 3 @0 lbs then rest 3:00 • Barbell Shoulder Press: 3 @0 lbs then rest 3:00 • Back Squat: 2 @0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @0 lbs then rest 3:00 • Back Squat: 2 @0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @0 lbs then rest 3:00 CIRCUIT • Trap Bar Deadlift: 8 @0 lbs then rest 1:00 • Barbell Incline Bench Press: 8 @0 lbs then rest 1:00 • Trap Bar Deadlift: 6 @0 lbs then rest 2:00 • Barbell Incline Bench Press: 6 @0 lbs then rest 2:00 • Trap Bar Deadlift: 3 @0 lbs then rest 3:00 • Barbell Incline Bench Press: 3 @0 lbs then rest 3:00 • Deadlift: 2 @0 lbs then rest 3:00 • Barbell Bench Press: 2 @0 lbs then rest 3:00 • Trap Bar Deadlift: 2 @0 lbs then rest 3:00 • Barbell Incline Bench Press: 2 @0 lbs then rest 3:00 CIRCUIT • Barbell Split Squat: 8 @0 lbs then rest 1:00 • Barbell Bent Over Row: 8 @0 lbs then rest 1:00 • Barbell Split Squat: 6 @0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Split Squat: 3 @0 lbs then rest 3:00 • Barbell Bent Over Row: 3 @0 lbs then rest 3:00 • Barbell Reverse Lunge: 2 @0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 • Barbell Split Squat: 2 @0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 2 mi for 0:30 then rest 0:30	**RECOVERY CIRCUIT #2** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats + Pause: 10 reps • Down Dogs + Groin March: 10 reps • Childs Pose: 10 reps • Donkey Kicks: 10 reps • Figure Four Stretch: 10 reps • Supine Knee Hugs: 10 reps		**HIIT WORKOUT PHASE 2** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettleball Curtsy Squats (each): 0 @0 lbs for 0:30 • Incline DB Bench Press (each): 0 @0 lbs for 0:30 • Barbell Body Row w. Feet Elevated: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL w. Knee Punch (each): 0 @0 lbs for 0:30 • Pull Ups (each): 0 @0 lbs for 0:30 • V Ups (each): 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SA ALT DB Push Press (each): 0 @0 lbs for 0:30 • DB Incline Row (each): 0 @0 lbs for 0:30 • Split Squat Jumps (each): 0 @0 lbs for 0:30 • Total Time: for 0:00

MAXIMUM GAINS

FYTT

WEEK 10 JUN 12, 2022 - JUN 18, 2022

JUN 12	JUN 13	JUN 14	JUN 15	JUN 16	JUN 17	JUN 18
HEAVY TRAINING WARM UP #2 Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB Snatch Grip RDL: 5 @0 lbs • Back Squat: 5 @ 0 lbs • BB Behind The Neck Shoulder Press: 5 @ 0 lbs • BB Supine Grip Bent Over Row: 5 @0 lbs • BB Lateral Squat: 5 @ 0 lbs • BB Reverse Curl: 5 @0 lbs • BB Squat with Overhead Press: 5 @0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP** **#2 CIRCUIT** × 5 • Jumping Jacks Overhead Squat: 20 reps • Prisoner Squats: 10 reps • Push Ups + Shoulder Taps: 10 reps • Sit Ups w. Twist: 10 reps • Side Dips: 10 reps • Lateral Lunges: 10 reps	**HEAVY TRAINING WARM UP #2** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB Snatch Grip RDL: 5 @0 lbs • Back Squat: 5 @ 0 lbs • BB Behind The Neck Shoulder Press: 5 @ 0 lbs • BB Supine Grip Bent Over Row: 5 @0 lbs • BB Lateral Squat: 5 @ 0 lbs • BB Reverse Curl: 5 @0 lbs • BB Squat with Overhead Press: 5 @0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00	

MAXIMUM GAINS

FYTT

JUN 12	JUN 13	JUN 14	JUN 15	JUN 16	JUN 17	JUN 18
HEAVY TRAINING PHASE 2 The goal of this phase is maximum strength. Aim to lift as heavy as possible with the correct form. Be prepared to rest between sets. CIRCUIT • Back Squat: 8 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 1:00 • Back Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Back Squat: 3 @ 0 lbs then rest 3:00 • Barbell Shoulder Press: 3 @ 0 lbs then rest 3:00 • Back Squat: 2 @ 0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @ 0 lbs then rest 3:00 • Back Squat: 2 @ 0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @ 0 lbs then rest 3:00 CIRCUIT • Trap Bar Deadlift: 8 @ 0 lbs then rest 1:00 • Barbell Incline Bench Press: 8 @ 0 lbs then rest 1:00 • Trap Bar Deadlift: 6 @ 0 lbs then rest 2:00 • Barbell Incline Bench Press: 6 @ 0 lbs then rest 2:00 • Trap Bar Deadlift: 3 @ 0 lbs then rest 3:00 • Barbell Incline Bench Press: 3 @ 0 lbs then rest 3:00 • Deadlift: 2 @0 lbs then rest 3:00 • Barbell Bench Press: 2 @ 0 lbs then rest 3:00 • Trap Bar Deadlift: 2 @ 0 lbs then rest 3:00 • Barbell Incline Bench Press: 2 @ 0 lbs then rest 3:00 CIRCUIT • Barbell Split Squat: 8 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 8 @0 lbs then rest 1:00 • Barbell Split Squat: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Split Squat: 3 @ 0 lbs then rest 3:00 • Barbell Bent Over Row: 3 @0 lbs then rest 3:00 • Barbell Reverse Lunge: 2 @ 0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 • Barbell Split Squat: 2 @ 0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 SUPERSET • Warm Up Running 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 2 mi for 0:30 then rest 0:30	**RECOVERY CIRCUIT #2** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats + Pause: 10 reps • Down Dogs + Groin March: 10 reps • Childs Pose: 10 reps • Donkey Kicks: 10 reps • Figure Four Stretch: 10 reps • Supine Knee Hugs: 10 reps		**HIIT WORKOUT PHASE 2** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettlebell Curtsy Squats (each): 0 @0 lbs for 0:30 • Incline DB Bench Press (each): 0 @0 lbs for 0:30 • Barbell Body Row w. Feet Elevated: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • S L DB RDL w. Knee Punch (each): 0 @0 lbs for 0:30 • Pull Ups (each): 0 @0 lbs for 0:30 • V Ups (each): 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SA ALT DB Push Press (each): 0 @0 lbs for 0:30 • DB Incline Row (each): 0 @0 lbs for 0:30 • Split Squat Jumps (each): 0 @0 lbs for 0:30 • Total Time: for 0:00	**HEAVY TRAINING PHASE 2** The goal of this phase is maximum strength. Aim to lift as heavy as possible with the correct form. Be prepared to rest between sets. CIRCUIT • Back Squat: 8 @ 0 lbs then rest 1:00 • Barbell Shoulder Press: 8 @ 0 lbs then rest 1:00 • Back Squat: 6 @ 0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @ 0 lbs then rest 2:00 • Back Squat: 3 @ 0 lbs then rest 3:00 • Barbell Shoulder Press: 3 @ 0 lbs then rest 3:00 • Back Squat: 2 @ 0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @ 0 lbs then rest 3:00 • Back Squat: 2 @ 0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @ 0 lbs then rest 3:00 CIRCUIT • Trap Bar Deadlift: 8 @ 0 lbs then rest 1:00 • Barbell Incline Bench Press: 8 @ 0 lbs then rest 1:00 • Trap Bar Deadlift: 6 @ 0 lbs then rest 2:00 • Barbell Incline Bench Press: 6 @ 0 lbs then rest 2:00 • Trap Bar Deadlift: 3 @ 0 lbs then rest 3:00 • Barbell Incline Bench Press: 3 @ 0 lbs then rest 3:00 • Deadlift: 2 @0 lbs then rest 3:00 • Barbell Bench Press: 2 @ 0 lbs then rest 3:00 • Trap Bar Deadlift: 2 @ 0 lbs then rest 3:00 • Barbell Incline Bench Press: 2 @ 0 lbs then rest 3:00 CIRCUIT • Barbell Split Squat: 8 @ 0 lbs then rest 1:00 • Barbell Bent Over Row: 8 @0 lbs then rest 1:00 • Barbell Split Squat: 6 @ 0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Split Squat: 3 @ 0 lbs then rest 3:00 • Barbell Bent Over Row: 3 @0 lbs then rest 3:00 • Barbell Reverse Lunge: 2 @ 0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 • Barbell Split Squat: 2 @ 0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 SUPERSET • Warm Up Running 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 2 mi for 0:30 then rest 0:30	**RECOVERY CIRCUIT #2** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats + Pause: 10 reps • Down Dogs + Groin March: 10 reps • Childs Pose: 10 reps • Donkey Kicks: 10 reps • Figure Four Stretch: 10 reps • Supine Knee Hugs: 10 reps	

MAXIMUM GAINS

FYTT

WEEK 11 JUN 19, 2022 - JUN 25, 2022

JUN 19	JUN 20	JUN 21	JUN 22	JUN 23	JUN 24	JUN 25
HIIT TRAINING WARM UP **#2** CIRCUIT × 5 • Jumping Jacks Overhead Squat: 20 reps • Prisoner Squats: 10 reps • Push Ups + Shoulder Taps: 10 reps • Sit Ups w. Twist: 10 reps • Side Dips: 10 reps • Lateral Lunges: 10 reps	**HEAVY TRAINING WARM UP #2** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB Snatch Grip RDL: 5 @0 lbs • Back Squat: 5 @0 lbs • BB Behind The Neck Shoulder Press: 5 @0 lbs • BB Supine Grip Bent Over Row: 5 @0 lbs • BB Lateral Squat: 5 @0 lbs • BB Reverse Curl: 5 @0 lbs • BB Squat with Overhead Press: 5 @0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP** **#2** CIRCUIT × 5 • Jumping Jacks Overhead Squat: 20 reps • Prisoner Squats: 10 reps • Push Ups + Shoulder Taps: 10 reps • Sit Ups w. Twist: 10 reps • Side Dips: 10 reps • Lateral Lunges: 10 reps	**HEAVY TRAINING WARM UP #2** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB Snatch Grip RDL: 5 @0 lbs • Back Squat: 5 @0 lbs • BB Behind The Neck Shoulder Press: 5 @0 lbs • BB Supine Grip Bent Over Row: 5 @0 lbs • BB Lateral Squat: 5 @0 lbs • BB Reverse Curl: 5 @0 lbs • BB Squat with Overhead Press: 5 @0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00

MAXIMUM GAINS

FYTT

JUN 19	JUN 20	JUN 21	JUN 22	JUN 23	JUN 24	JUN 25
HIIT WORKOUT PHASE 2 As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettlebell Curtsy Squats (each): 0 @0 lbs for 0:30 • Incline DB Bench Press (each): 0 @0 lbs for 0:30 • Barbell Body Row w. Feet Elevated: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL w. Knee Punch (each): 0 @0 lbs for 0:30 • Pull Ups (each): 0 @0 lbs for 0:30 • V Ups (each): 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SA ALT DB Push Press (each): 0 @0 lbs for 0:30 • DB Incline Row (each): 0 @0 lbs for 0:30 • Split Squat Jumps (each): 0 @0 lbs for 0:30 • Total Time: for 0:00	**HEAVY TRAINING PHASE 2** The goal of this phase is maximum strength. Aim to lift as heavy as possible with the correct form. Be prepared to rest between sets. CIRCUIT • Back Squat: 8 @0 lbs then rest 1:00 • Barbell Shoulder Press: 8 @0 lbs then rest 1:00 • Back Squat: 6 @0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @0 lbs then rest 2:00 • Back Squat: 3 @0 lbs then rest 3:00 • Barbell Shoulder Press: 3 @0 lbs then rest 3:00 • Back Squat: 2 @0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @0 lbs then rest 3:00 • Back Squat: 2 @0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @0 lbs then rest 3:00 CIRCUIT • Trap Bar Deadlift: 8 @0 lbs then rest 1:00 • Barbell Incline Bench Press: 8 @0 lbs then rest 1:00 • Trap Bar Deadlift: 6 @0 lbs then rest 2:00 • Barbell Incline Bench Press: 6 @0 lbs then rest 2:00 • Trap Bar Deadlift: 3 @0 lbs then rest 3:00 • Barbell Incline Bench Press: 3 @0 lbs then rest 3:00 • Deadlift: 2 @0 lbs then rest 3:00 • Barbell Bench Press: 2 @0 lbs then rest 3:00 • Trap Bar Deadlift: 2 @0 lbs then rest 3:00 • Barbell Incline Bench Press: 2 @0 lbs then rest 3:00 CIRCUIT • Barbell Split Squat: 8 @0 lbs then rest 1:00 • Barbell Bent Over Row: 8 @0 lbs then rest 1:00 • Barbell Split Squat: 6 @0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Split Squat: 3 @0 lbs then rest 3:00 • Barbell Bent Over Row: 3 @0 lbs then rest 3:00 • Barbell Reverse Lunge: 2 @0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 • Barbell Split Squat: 2 @0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 2 mi for 0:30 then rest 0:30	**RECOVERY CIRCUIT #2** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats + Pause: 10 reps • Down Dogs + Groin March: 10 reps • Childs Pose: 10 reps • Donkey Kicks: 10 reps • Figure Four Stretch: 10 reps • Supine Knee Hugs: 10 reps		**HIIT WORKOUT PHASE 2** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettlebell Curtsy Squats (each): 0 @0 lbs for 0:30 • Incline DB Bench Press (each): 0 @0 lbs for 0:30 • Barbell Body Row w. Feet Elevated: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL w. Knee Punch (each): 0 @0 lbs for 0:30 • Pull Ups (each): 0 @0 lbs for 0:30 • V Ups (each): 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SA ALT DB Push Press (each): 0 @0 lbs for 0:30 • DB Incline Row (each): 0 @0 lbs for 0:30 • Split Squat Jumps (each): 0 @0 lbs for 0:30 • Total Time: for 0:00	**HEAVY TRAINING PHASE 2** The goal of this phase is maximum strength. Aim to lift as heavy as possible with the correct form. Be prepared to rest between sets. CIRCUIT • Back Squat: 8 @0 lbs then rest 1:00 • Barbell Shoulder Press: 8 @0 lbs then rest 1:00 • Back Squat: 6 @0 lbs then rest 2:00 • Barbell Shoulder Press: 6 @0 lbs then rest 2:00 • Back Squat: 3 @0 lbs then rest 3:00 • Barbell Shoulder Press: 3 @0 lbs then rest 3:00 • Back Squat: 2 @0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @0 lbs then rest 3:00 • Back Squat: 2 @0 lbs then rest 3:00 • Barbell Shoulder Press: 2 @0 lbs then rest 3:00 CIRCUIT • Trap Bar Deadlift: 8 @0 lbs then rest 1:00 • Barbell Incline Bench Press: 8 @0 lbs then rest 1:00 • Trap Bar Deadlift: 6 @0 lbs then rest 2:00 • Barbell Incline Bench Press: 6 @0 lbs then rest 2:00 • Trap Bar Deadlift: 3 @0 lbs then rest 3:00 • Barbell Incline Bench Press: 3 @0 lbs then rest 3:00 • Deadlift: 2 @0 lbs then rest 3:00 • Barbell Bench Press: 2 @0 lbs then rest 3:00 • Trap Bar Deadlift: 2 @0 lbs then rest 3:00 • Barbell Incline Bench Press: 2 @0 lbs then rest 3:00 CIRCUIT • Barbell Split Squat: 8 @0 lbs then rest 1:00 • Barbell Bent Over Row: 8 @0 lbs then rest 1:00 • Barbell Split Squat: 6 @0 lbs then rest 2:00 • Barbell Bent Over Row: 6 @0 lbs then rest 2:00 • Barbell Split Squat: 3 @0 lbs then rest 3:00 • Barbell Bent Over Row: 3 @0 lbs then rest 3:00 • Barbell Reverse Lunge: 2 @0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 • Barbell Split Squat: 2 @0 lbs then rest 3:00 • Barbell Bent Over Row: 2 @0 lbs then rest 3:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 2 mi for 0:30 then rest 0:30	**RECOVERY CIRCUIT #2** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats + Pause: 10 reps • Down Dogs + Groin March: 10 reps • Childs Pose: 10 reps • Donkey Kicks: 10 reps • Figure Four Stretch: 10 reps • Supine Knee Hugs: 10 reps

MAXIMUM GAINS

FYTT

WEEK 12 JUN 26, 2022 - JUL 2, 2022

JUN 26	JUN 27	JUN 28	JUN 29	JUN 30	JUL 1	JUL 2
	HIIT TRAINING WARM UP **#2 CIRCUIT** × 5 • Jumping Jacks Overhead Squat: 20 reps • Prisoner Squats: 10 reps • Push Ups + Shoulder Taps: 10 reps • Sit Ups w. Twist: 10 reps • Side Dips: 10 reps • Lateral Lunges: 10 reps	**HEAVY TRAINING WARM UP #2** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB Snatch Grip RDL: 5 @ 0 lbs • Back Squat: 5 @ 0 lbs • BB Behind The Neck Shoulder Press: 5 @ 0 lbs • BB Supine Grip Bent Over Row: 5 @ 0 lbs • BB Lateral Squat: 5 @ 0 lbs • BB Reverse Curl: 5 @ 0 lbs • BB Squat with Overhead Press: 5 @ 0 lbs	**RECOVERY WARM UP** Be gentle here. This is meant to move your body without causing muscle damage or stress. • Walk: for 15:00 • Total Body Foam Roll: for 10:00 • Total Body Stretch: for 10:00		**HIIT TRAINING WARM UP** **#2 CIRCUIT** × 5 • Jumping Jacks Overhead Squat: 20 reps • Prisoner Squats: 10 reps • Push Ups + Shoulder Taps: 10 reps • Sit Ups w. Twist: 10 reps • Side Dips: 10 reps • Lateral Lunges: 10 reps	**HEAVY TRAINING WARM UP #2** Grab a barbell and do 5 reps of each exercise for 3-5 sets. **CIRCUIT** × 5 • BB Snatch Grip RDL: 5 @ 0 lbs • Back Squat: 5 @ 0 lbs • BB Behind The Neck Shoulder Press: 5 @ 0 lbs • BB Supine Grip Bent Over Row: 5 @ 0 lbs • BB Lateral Squat: 5 @ 0 lbs • BB Reverse Curl: 5 @ 0 lbs • BB Squat with Overhead Press: 5 @ 0 lbs

MAXIMUM GAINS

FYTT

JUN 26	JUN 27	JUN 28	JUN 29	JUN 30	JUL 1	JUL 2
	HIIT WORKOUT PHASE 2 As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettleball Curtsy Squats (each): 0 @0 lbs for 0:30 • Incline DB Bench Press (each): 0 @0 lbs for 0:30 • Barbell Body Row w. Feet Elevated: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL w. Knee Punch (each): 0 @0 lbs for 0:30 • Pull Ups (each): 0 @0 lbs for 0:30 • V Ups (each): 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SA ALT DB Push Press (each): 0 @0 lbs for 0:30 • DB Incline Row (each): 0 @0 lbs for 0:30 • Split Squat Jumps (each): 0 @0 lbs for 0:30 • Total Time: for 0:00	**HEAVY TRAINING PHASE 2** The goal of this phase is maximum strength. Aim to lift as heavy as possible with the correct form. Be prepared to rest between sets. CIRCUIT • Back Squat: 8 @0 lbs than rest 1:00 • Barbell Shoulder Press: 8 @0 lbs than rest 1:00 • Back Squat: 6 @0 lbs than rest 2:00 • Barbell Shoulder Press: 6 @0 lbs than rest 2:00 • Back Squat: 3 @0 lbs than rest 3:00 • Barbell Shoulder Press: 3 @0 lbs than rest 3:00 • Back Squat: 2 @0 lbs than rest 3:00 • Barbell Shoulder Press: 2 @0 lbs than rest 3:00 • Back Squat: 2 @0 lbs than rest 3:00 • Barbell Shoulder Press: 2 @0 lbs than rest 3:00 CIRCUIT • Trap Bar Deadlift: 8 @0 lbs than rest 1:00 • Barbell Incline Bench Press: 8 @0 lbs than rest 1:00 • Trap Bar Deadlift: 6 @0 lbs than rest 2:00 • Barbell Incline Bench Press: 6 @0 lbs than rest 2:00 • Trap Bar Deadlift: 3 @0 lbs than rest 3:00 • Barbell Incline Bench Press: 3 @0 lbs than rest 3:00 • Deadlift: 2 @0 lbs than rest 3:00 • Barbell Bench Press: 2 @0 lbs than rest 3:00 • Trap Bar Deadlift: 2 @0 lbs than rest 3:00 • Barbell Incline Bench Press: 2 @0 lbs than rest 3:00 CIRCUIT • Barbell Split Squat: 8 @0 lbs than rest 1:00 • Barbell Bent Over Row: 8 @0 lbs than rest 1:00 • Barbell Split Squat: 6 @0 lbs than rest 2:00 • Barbell Bent Over Row: 6 @0 lbs than rest 2:00 • Barbell Split Squat: 3 @0 lbs than rest 3:00 • Barbell Bent Over Row: 3 @0 lbs than rest 3:00 • Barbell Reverse Lunge: 2 @0 lbs than rest 3:00 • Barbell Bent Over Row: 2 @0 lbs than rest 3:00 • Barbell Split Squat: 2 @0 lbs than rest 3:00 • Barbell Bent Over Row: 2 @0 lbs than rest 3:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 2 mi for 0:30 then rest 0:30	**RECOVERY CIRCUIT #2** Move at your own pace. This is all bodyweight movement. CIRCUIT × 5 • Supported Sumo Squats + Pause: 10 reps • Down Dogs + Groin March: 10 reps • Childs Pose: 10 reps • Donkey Kicks: 10 reps • Figure Four Stretch: 10 reps • Supine Knee Hugs: 10 reps		**HIIT WORKOUT PHASE 2** As many reps as possible in 0:30s. Record how many reps you are able to complete. Record the total time it takes you to complete the set of exercises. Recover for that same amount of time. 1:1 work to rest ratio. CIRCUIT × 3 • Kettleball Curtsy Squats (each): 0 @0 lbs for 0:30 • Incline DB Bench Press (each): 0 @0 lbs for 0:30 • Barbell Body Row w. Feet Elevated: 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SL DB RDL w. Knee Punch (each): 0 @0 lbs for 0:30 • Pull Ups (each): 0 @0 lbs for 0:30 • V Ups (each): 0 @0 lbs for 0:30 • Total Time: for 0:00 CIRCUIT × 3 • SA ALT DB Push Press (each): 0 @0 lbs for 0:30 • DB Incline Row (each): 0 @0 lbs for 0:30 • Split Squat Jumps (each): 0 @0 lbs for 0:30 • Total Time: for 0:00	**HEAVY TRAINING PHASE 2** The goal of this phase is maximum strength. Aim to lift as heavy as possible with the correct form. Be prepared to rest between sets. CIRCUIT • Back Squat: 8 @0 lbs than rest 1:00 • Barbell Shoulder Press: 8 @0 lbs than rest 1:00 • Back Squat: 6 @0 lbs than rest 2:00 • Barbell Shoulder Press: 6 @0 lbs than rest 2:00 • Back Squat: 3 @0 lbs than rest 3:00 • Barbell Shoulder Press: 3 @0 lbs than rest 3:00 • Back Squat: 2 @0 lbs than rest 3:00 • Barbell Shoulder Press: 2 @0 lbs than rest 3:00 • Back Squat: 2 @0 lbs than rest 3:00 • Barbell Shoulder Press: 2 @0 lbs than rest 3:00 CIRCUIT • Trap Bar Deadlift: 8 @0 lbs than rest 1:00 • Barbell Incline Bench Press: 8 @0 lbs than rest 1:00 • Trap Bar Deadlift: 6 @0 lbs than rest 2:00 • Barbell Incline Bench Press: 6 @0 lbs than rest 2:00 • Trap Bar Deadlift: 3 @0 lbs than rest 3:00 • Barbell Incline Bench Press: 3 @0 lbs than rest 3:00 • Deadlift: 2 @0 lbs than rest 3:00 • Barbell Bench Press: 2 @0 lbs than rest 3:00 • Trap Bar Deadlift: 2 @0 lbs than rest 3:00 • Barbell Incline Bench Press: 2 @0 lbs than rest 3:00 CIRCUIT • Barbell Split Squat: 8 @0 lbs than rest 1:00 • Barbell Bent Over Row: 8 @0 lbs than rest 1:00 • Barbell Split Squat: 6 @0 lbs than rest 2:00 • Barbell Bent Over Row: 6 @0 lbs than rest 2:00 • Barbell Split Squat: 3 @0 lbs than rest 3:00 • Barbell Bent Over Row: 3 @0 lbs than rest 3:00 • Barbell Reverse Lunge: 2 @0 lbs than rest 3:00 • Barbell Bent Over Row: 2 @0 lbs than rest 3:00 • Barbell Split Squat: 2 @0 lbs than rest 3:00 • Barbell Bent Over Row: 2 @0 lbs than rest 3:00 SUPERSET • Warm Up Running: 0.25 mi for 0:00 then rest 0:00 • Interval Runs: 2 mi for 0:30 then rest 0:30

Appendix D. Data

Table D. 1

Test Type	Pre-Test	Post-Test	Difference
Resting Metabolic Rate	2437 kcal/day	2453 kcal/day	16 kcal/day
Weight	215.88 lbs (97.923 kg)	219.36 lbs (99.503 kg)	3.48 lbs (1.58 kg)
Fat Mass	9.04 lbs (4.101 kg)	11.54 lbs (5.236 kg)	2.5 lbs (1.135 kg)
Fat Free Mass	206.8 lbs (93.822 kg)	207.82 lbs (94.266 kg)	1.02 lbs (.444 kg)
VO_2 Max	58.3 ml/kg/min	57 ml/kg/min	1.3 ml/kg/min
Peak Respiratory Exchange Rate during VO_2 Max Test	1.15	1.55	0.4
1-Rep Max Squat	285 lbs (129.274 kg)	310 lbs (140.614 kg)	25 lbs (11.34 kg)
1-Rep Max Bench Press	220 lbs (99.790 kg)	235 lbs (106.594 kg)	15 lbs (6.804 kg)
1-Rep Max Deadlift	315 lbs (142.882 kg)	355 lbs (161.025 kg)	40 lbs (18.144 kg)
Peak Power	935 w	1120 w	185 w
Peak Force	708 n	879 n	171 n
Grip Strength	66.6 lbs (30.209 kg)	68.6 lbs (31.116 kg)	2 lbs (.907 kg)
Standing Vertical Jump Reach	22 in (55.88 cm)	22 in (55.88 cm)	0 in (0 cm)

Table D. 2

KB Split Squat

		Left				Right			
Date	Weight (lbs)	Set 1 Reps	Set 2 Reps	Set 3 Reps	Average Left Reps	Set 1 Reps2	Set 2 Reps3	Set 3 Reps4	Average Right Reps
5/5/2022	35	12	10	11	11.0	10	11	11	10.7
5/9/2022	35	14	14	12	13.3	13	13	13	13.0
5/13/2022	35	12	12	12	12.0	12	11	11	11.3
5/17/2022	35	13	14	13	13.3	12	15	13	13.3
5/21/2022	35	13	14	13	13.3	13	14	12	13.0
5/25/2022	35	14	14	13	13.7	13	14	12	13.0
5/29/2022	35	12	13	14	13.0	12	12	13	12.3
6/2/2022	35	13	13	12	12.7	14	13	12	13.0
6/6/2022	35	15	13	13	13.7	14	13	12	13.0
6/10/2022	35	14	14	14	14.0	14	14	14	14.0
7/24/2022	35	15	15	14	14.7	14	14	13	13.7
7/28/2022	35	15	15	14	14.7	14	14	13	13.7
8/1/2022	35	15	14	13	14.0	15	15	14	14.7
8/5/2022	35	14	13	13	13.3	14	14	12	13.3
8/9/2022	35	14	14	14	14.0	14	14	14	14.0
8/13/2022	35	14	15	14	14.3	14	15	13	14.0
8/17/2022	35	14	15	15	14.7	14	15	14	14.3
8/21/2022	35	15	14	14	14.3	14	14	14	14.0
8/25/2022	45	13	13	12	12.7	13	13	12	12.7
8/29/2022	45	13	13	12	12.7	13	13	12	12.7
9/2/2022	45	13	13	12	12.7	13	13	12	12.7
10/20/2022	45	14	14	14	14.0	14	14	14	14.0
10/24/2022	45	15	14	15	14.7	15	14	15	14.7
10/28/2022	45	15	15	15	15.0	15	15	14	14.7
11/1/2022	45	16	16	15	15.7	15	15	15	15.0
11/5/2022	45	16	16	15	15.7	15	15	15	15.0
11/9/2022	45	16	15	16	15.7	16	15	15	15.3
11/13/2022	45	16	16	15	15.7	15	16	15	15.3
11/17/2022	45	16	16	16	16.0	15	15	16	15.3
11/21/2022	45	16	16	16	16.0	16	15	16	15.7
25-Nov	45	17	16	16	16.3	16	16	16	16.0
11/29/2022	45	16	16	15	15.7	16	16	16	16.0

Figure D. 1

Table D. 3

DB Bench Press

Date	Weight (lbs)	Set 1 Reps	Set 2 Reps	Set 3 Reps	Ave Reps
5/5/2022	35	14	16	15	15.0
5/9/2022	35	14	15	16	15.0
5/13/2022	35	17	16	15	16.0
5/17/2022	45	15	13	12	13.3
5/21/2022	45	15	14	12	13.7
5/25/2022	45	15	14	12	13.7
5/29/2022	45	15	14	12	13.7
6/2/2022	45	16	14	13	14.3
6/6/2022	45	15	14	13	14.0
6/10/2022	45	15	15	13	14.3
7/24/2022	45	15	13	11	13.0
7/28/2022	45	14	13	11	12.7
8/1/2022	45	15	13	12	13.3
8/5/2022	45	15	14	13	14.0
8/9/2022	45	14	14	13	13.7
8/13/2022	45	15	14	13	14.0
8/17/2022	45	14	14	13	13.7
8/21/2022	45	15	13	13	13.7
8/25/2022	45	15	13	13	13.7
8/29/2022	45	15	13	12	13.3
9/2/2022	45	15	13	12	13.3
10/20/2022	45	15	15	13	14.3
10/24/2022	45	15	15	14	14.7
10/28/2022	45	17	16	15	16.0
11/1/2022	45	16	16	15	15.7
11/5/2022	45	18	17	15	16.7
11/9/2022	45	17	16	16	16.3
11/13/2022	45	17	17	14	16.0
11/17/2022	45	17	17	15	16.3
11/21/2022	45	17	16	16	16.3
25-Nov	45	18	17	17	17.3
11/29/2022	45	17	16	15	16.0

Figure D. 2

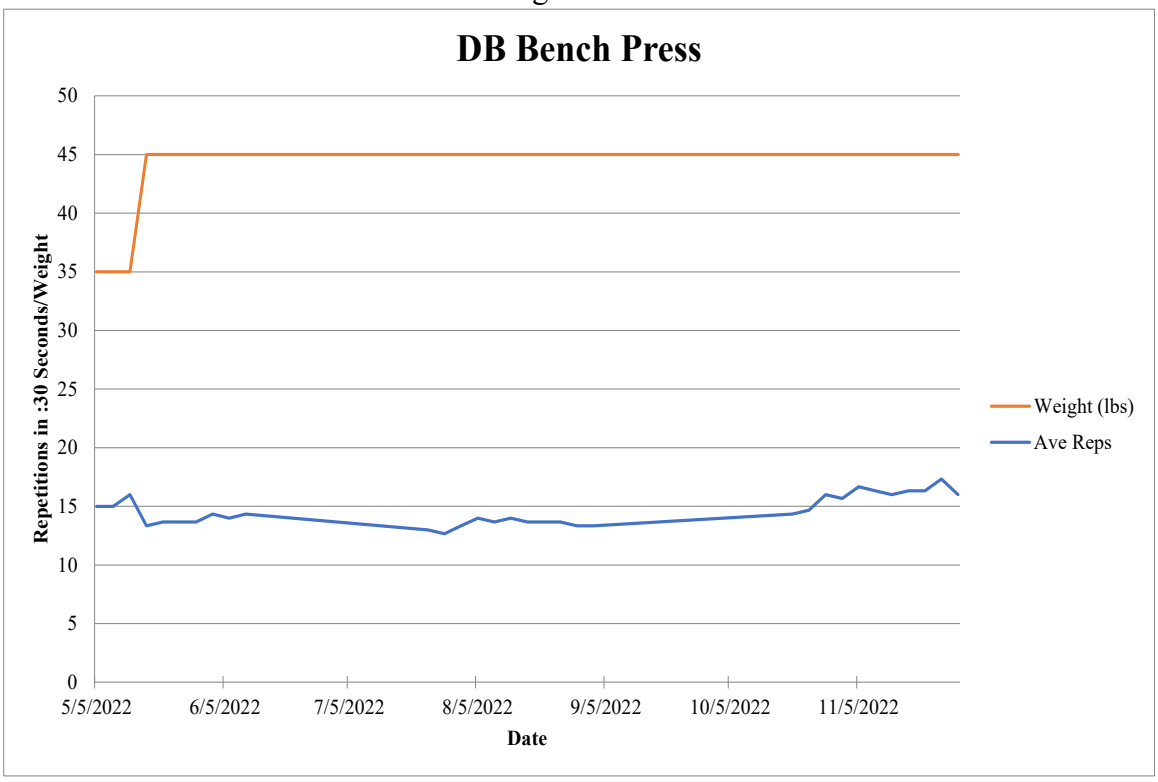


Table D. 4

BB Body Row

Date	Weight (lbs) Set 1	Weight (lbs) Set 2	Weight (lbs) Set 3	Max Weight (lbs)	Ave Weight	Set 1 Reps	Set 2 Reps	Set 3 Reps	Max Reps	Ave Reps
5/5/2022	0	0	0	0	0.0	15	13	13	15	13.7
5/9/2022	0	0	0	0	0.0	15	13	12	15	13.3
5/13/2022	10	10	0	10	6.7	12	11	14	14	12.3
5/17/2022	10	10	0	10	6.7	13	12	13	13	12.7
5/21/2022	10	0	0	10	3.3	12	14	11	14	12.3
5/25/2022	0	0	0	0	0	13	12	11	13	12.0
5/29/2022	0	0	0	0	0	13	11	11	13	11.7
6/2/2022	0	0	0	0	0	13	11	13	13	12.3
6/6/2022	0	0	0	0	0	13	12	11	13	12.0
6/10/2022	0	0	0	0	0	13	11	12	13	12.0
7/24/2022	0	0	0	0	0	12	11	11	12	11.3
7/28/2022	0	0	0	0	0	13	11	12	13	12.0
8/1/2022	0	0	0	0	0	14	14	11	14	13.0
8/5/2022	0	0	0	0	0	13	13	11	13	12.3
8/9/2022	0	0	0	0	0	13	13	12	13	12.7
8/13/2022	0	0	0	0	0	14	13	12	14	13.0
8/17/2022	0	0	0	0	0	15	13	13	15	13.7
8/21/2022	0	0	0	0	0	13	12	12	13	12.3
8/25/2022	0	0	0	0	0	14	13	13	14	13.3
8/29/2022	0	0	0	0	0	14	12	11	14	12.3
9/2/2022	0	0	0	0	0	13	12	12	13	12.3
10/20/2022	0	0	0	0	0	14	13	12	14	13.0
10/24/2022	0	0	0	0	0	14	13	12	14	13.0
10/28/2022	0	0	0	0	0	14	14	13	14	13.7
11/1/2022	0	0	0	0	0	15	14	12	15	13.7
11/5/2022	0	0	0	0	0	15	13	13	15	13.7
11/9/2022	0	0	0	0	0	14	13	13	14	13.3
11/13/2022	0	0	0	0	0	16	14	13	16	14.3
11/17/2022	0	0	0	0	0	15	14	12	15	13.7
11/21/2022	0	0	0	0	0	14	13	14	14	13.7
25-Nov	0	0	0	0	0	15	14	12	15	13.7
11/29/2022	0	0	0	0	0	14	13	13	14	13.3

Figure D. 3

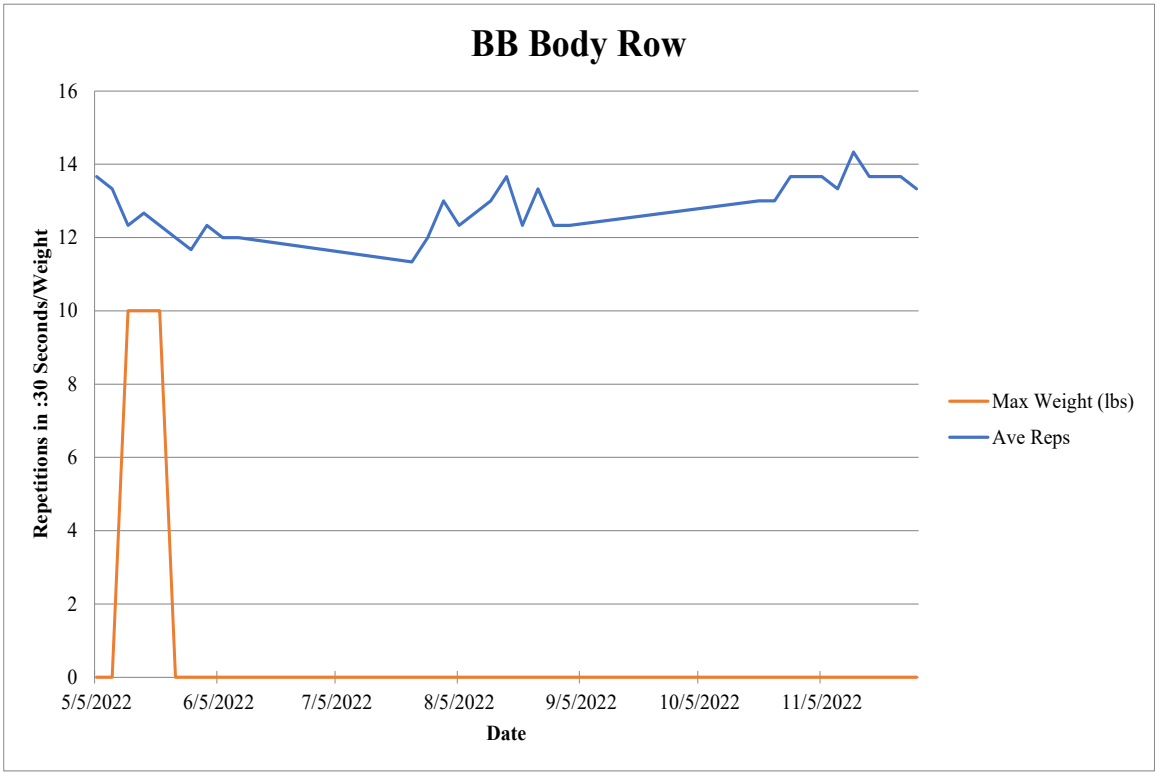


Table D. 5

SL DB RDL

						Left				Right			
Date	Weight Set 1	Weight Set 2	Weight Set 3	Max Weight (lbs)	Ave Weight (lbs)	Set 1 Reps	Set 2 Reps	Set 3 Reps	Average Left Reps	Set 1 Reps2	Set 2 Reps3	Set 3 Reps4	Average Right Reps
5/5/2022	35	35	35	35	35.0	9	10	11	10.0	9	9	10	9.3
5/9/2022	35	35	35	35	35.0	12	13	12	12.3	11	12	12	11.7
5/13/2022	35	35	35	35	35.0	11	13	11	11.7	11	12	12	11.7
5/17/2022	35	40	45	45	40.0	11	13	11	11.7	11	12	12	11.7
5/21/2022	45	45	45	45	45.0	11	13	11	11.7	12	12	12	12.0
5/25/2022	40	45	45	45	43.3	11	12	11	11.3	11	11	12	11.3
5/29/2022	40	45	45	45	43.3	12	12	12	12.0	12	13	12	12.3
6/2/2022	40	40	45	45	41.7	11	12	12	11.7	12	11	11	11.3
6/6/2022	40	40	45	45	41.7	12	12	12	12.0	12	11	12	11.7
6/10/2022	45	45	45	45	45.0	10	11	11	10.7	11	11	12	11.3
7/24/2022	45	45	45	45	45.0	10	10	10	10.0	11	10	11	10.7
7/28/2022	45	45	45	45	45.0	11	11	10	10.7	11	11	9	10.3
8/1/2022	45	45	45	45	45.0	10	11	11	10.7	10	12	10	10.7
8/5/2022	45	45	45	45	45.0	10	10	11	10.3	11	10	10	10.3
8/9/2022	45	45	45	45	45.0	10	11	10	10.3	11	9	10	10.0
8/13/2022	45	45	45	45	45.0	10	10	10	10.0	11	11	11	11.0
8/17/2022	45	45	45	45	45.0	10	10	10	10.0	11	10	10	10.3
8/21/2022	45	45	45	45	45.0	10	9	10	9.7	10	10	9	9.7
8/25/2022	45	45	45	45	45.0	10	11	10	10.3	11	11	10	10.7
8/29/2022	45	45	45	45	45.0	10	11	10	10.3	11	11	11	11.0
9/2/2022	45	45	45	45	45.0	11	11	10	10.7	11	11	10	10.7
10/20/2022	50	50	50	50	50.0	10	10	11	10.3	10	10	10	10.0
10/24/2022	50	50	50	50	50.0	11	11	11	11.0	11	11	11	11.0
10/28/2022	50	50	50	50	50.0	11	11	12	11.3	11	12	12	11.7
11/1/2022	50	50	50	50	50.0	12	12	11	11.7	12	12	12	12.0
11/5/2022	50	50	50	50	50.0	12	12	12	12.0	12	13	12	12.3
11/9/2022	50	50	50	50	50.0	13	12	13	12.7	12	12	13	12.3
11/13/2022	50	50	50	50	50.0	12	12	12	12.0	11	12	12	11.7
11/17/2022	50	50	50	50	50.0	12	11	13	12.0	12	12	12	12.0
11/21/2022	50	50	50	50	50.0	13	12	12	12.3	13	12	12	12.3
25-Nov	50	50	50	50	50.0	12	12	12	12.0	12	13	12	12.3
11/29/2022	50	50	50	50	50.0	12	12	12	12.0	12	12	12	12.0

Figure D. 4

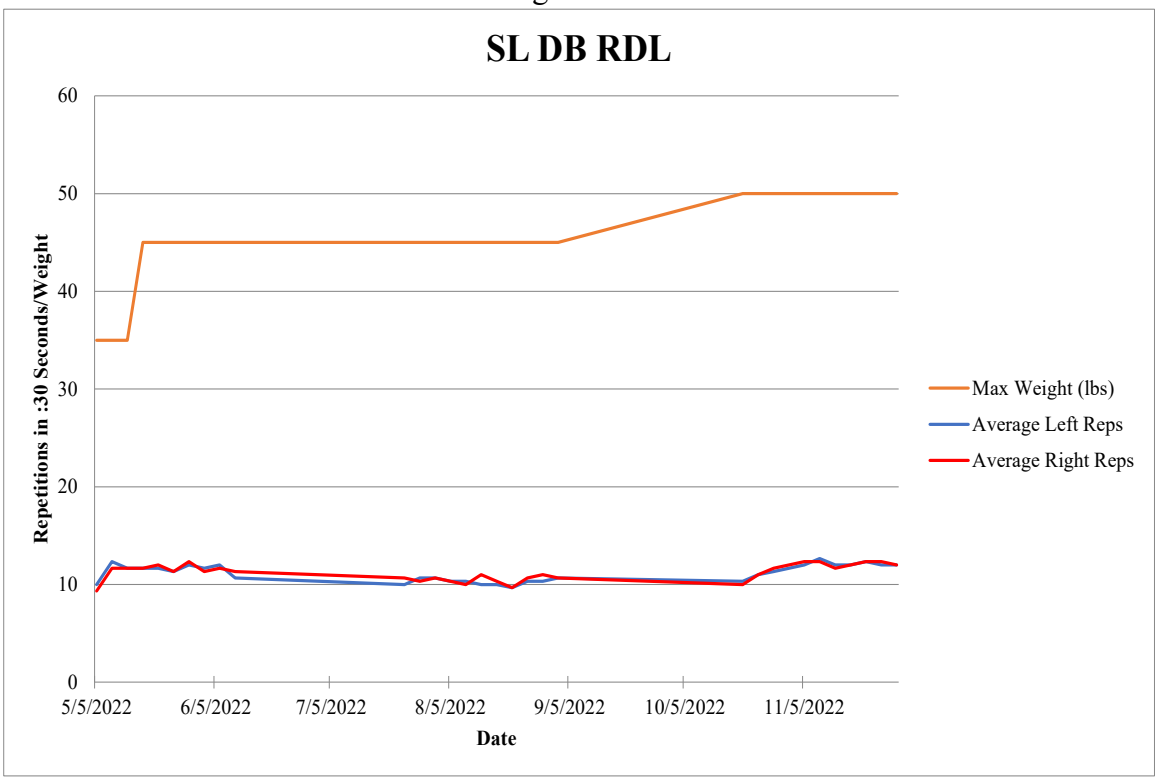


Table D. 6

Chin Ups

Date	Weight (lbs) Set 1	Weight (lbs) Set 2	Weight (lbs) Set 3	Max Weight (lbs)	Ave Weight	Set 1 Reps	Set 2 Reps	Set 3 Reps	Max Reps	Ave Reps
5/5/2022	0	0	0	0	0.0	9	9	7	9	8.3
5/9/2022	0	0	0	0	0.0	10	9	7	10	8.7
5/13/2022	10	0	0	10	3.3	8	9	6	9	7.7
5/17/2022	10	0	0	10	3.3	7	8	7	8	7.3
5/21/2022	10	0	0	10	3.3	7	8	6	8	7.0
5/25/2022	0	0	0	0	0	8	7	7	8	7.3
5/29/2022	0	0	0	0	0	9	7	6	9	7.3
6/2/2022	0	0	0	0	0	8	7	6	8	7.0
6/6/2022	0	0	0	0	0	9	7	7	9	7.7
6/10/2022	0	0	0	0	0	8	6	6	8	6.7
7/24/2022	0	0	0	0	0	9	8	7	9	8.0
7/28/2022	0	0	0	0	0	10	8	7	10	8.3
8/1/2022	0	0	0	0	0	9	7	7	9	7.7
8/5/2022	0	0	0	0	0	9	8	7	9	8.0
8/9/2022	0	0	0	0	0	9	8	7	9	8.0
8/13/2022	0	0	0	0	0	9	8	7	9	8.0
8/17/2022	0	0	0	0	0	10	8	8	10	8.7
8/21/2022	0	0	0	0	0	9	8	7	9	8.0
8/25/2022	0	0	0	0	0	10	8	6	10	8.0
8/29/2022	0	0	0	0	0	9	8	8	9	8.3
9/2/2022	0	0	0	0	0	9	8	7	9	8.0
10/20/2022	0	0	0	0	0	9	8	7	9	8.0
10/24/2022	0	0	0	0	0	10	8	7	10	8.3
10/28/2022	0	0	0	0	0	9	9	8	9	8.7
11/1/2022	0	0	0	0	0	9	8	7	9	8.0
11/5/2022	0	0	0	0	0	9	8	8	9	8.3
11/9/2022	0	0	0	0	0	10	8	8	10	8.7
11/13/2022	0	0	0	0	0	10	8	8	10	8.7
11/17/2022	0	0	0	0	0	10	9	8	10	9.0
11/21/2022	0	0	0	0	0	9	8	8	9	8.3
25-Nov	0	0	0	0	0	9	8	7	9	8.0
11/29/2022	0	0	0	0	0	10	9	7	10	8.7

Figure D. 5

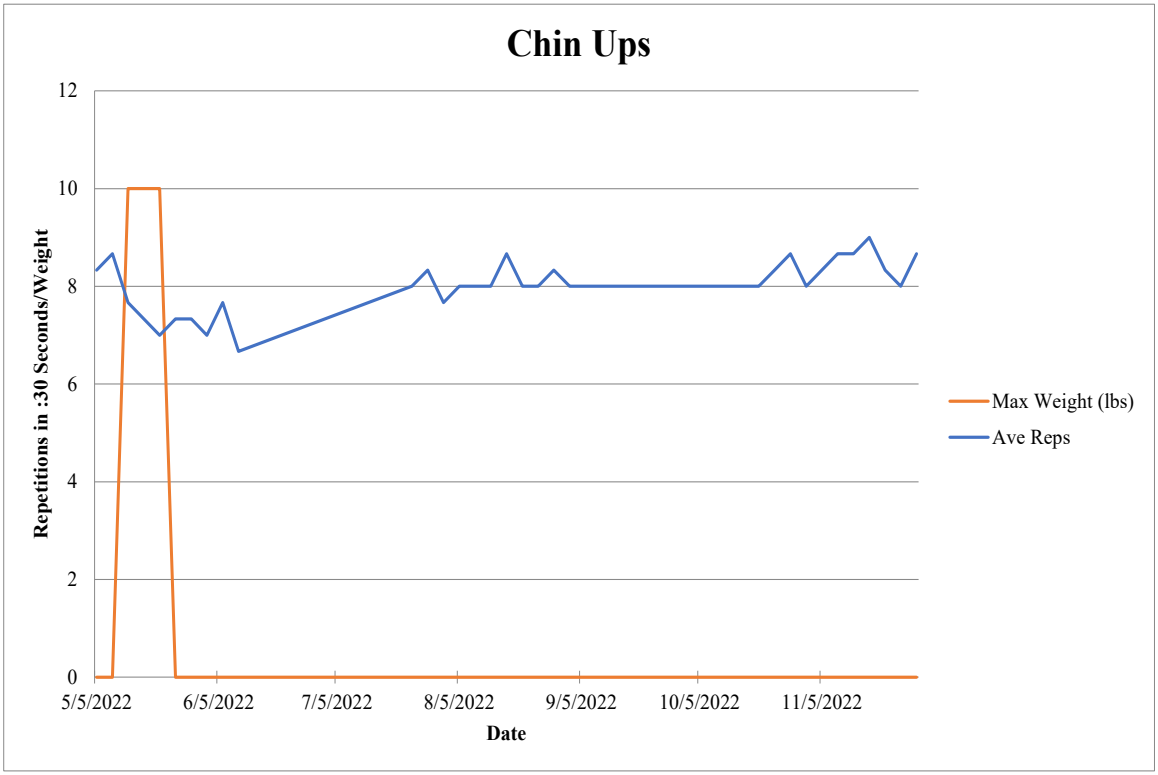


Table D. 7

Flutter Kick

Date	Weight (lbs) Set 1	Weight (lbs) Set 2	Weight (lbs) Set 3	Ave Weight	Set 1 Reps	Set 2 Reps	Set 3 Reps	Max Reps	Ave Reps
5/5/2022	0	0	0	0	61	64	69	69	64.7
5/9/2022	0	0	0	0	81	76	75	81	77.3
5/13/2022	0	0	0	0	73	69	67	73	69.7
5/17/2022	0	0	0	0	79	76	73	79	76.0
5/21/2022	0	0	0	0	74	75	72	75	73.7
5/25/2022	0	0	0	0	77	74	72	77	74.3
5/29/2022	0	0	0	0	77	74	69	77	73.3
6/2/2022	0	0	0	0	70	73	74	74	72.3
6/6/2022	0	0	0	0	81	77	76	81	78.0
6/10/2022	0	0	0	0	76	73	74	76	74.3
7/24/2022	0	0	0	0	75	69	67	75	70.3
7/28/2022	0	0	0	0	76	73	70	76	73.0
8/1/2022	0	0	0	0	76	77	73	77	75.3
8/5/2022	0	0	0	0	79	78	76	79	77.7
8/9/2022	0	0	0	0	83	75	73	83	77.0
8/13/2022	0	0	0	0	72	75	73	75	73.3
8/17/2022	0	0	0	0	79	76	77	79	77.3
8/21/2022	0	0	0	0	83	79	79	83	80.3
8/25/2022	0	0	0	0	84	76	77	84	79.0
8/29/2022	0	0	0	0	78	73	74	78	75.0
9/2/2022	0	0	0	0	80	76	73	80	76.3
10/20/2022	0	0	0	0	79	83	83	83	81.7
10/24/2022	0	0	0	0	84	86	85	86	85.0
10/28/2022	0	0	0	0	84	85	83	85	84.0
11/1/2022	0	0	0	0	87	83	78	87	82.7
11/5/2022	0	0	0	0	88	85	85	88	86.0
11/9/2022	0	0	0	0	84	85	80	85	83.0
11/13/2022	0	0	0	0	84	89	87	89	86.7
11/17/2022	0	0	0	0	89	87	83	89	86.3
11/21/2022	0	0	0	0	82	84	81	84	82.3
25-Nov	0	0	0	0	89	85	81	89	85.0
11/29/2022	0	0	0	0	83	82	82	83	82.3

Figure D. 6

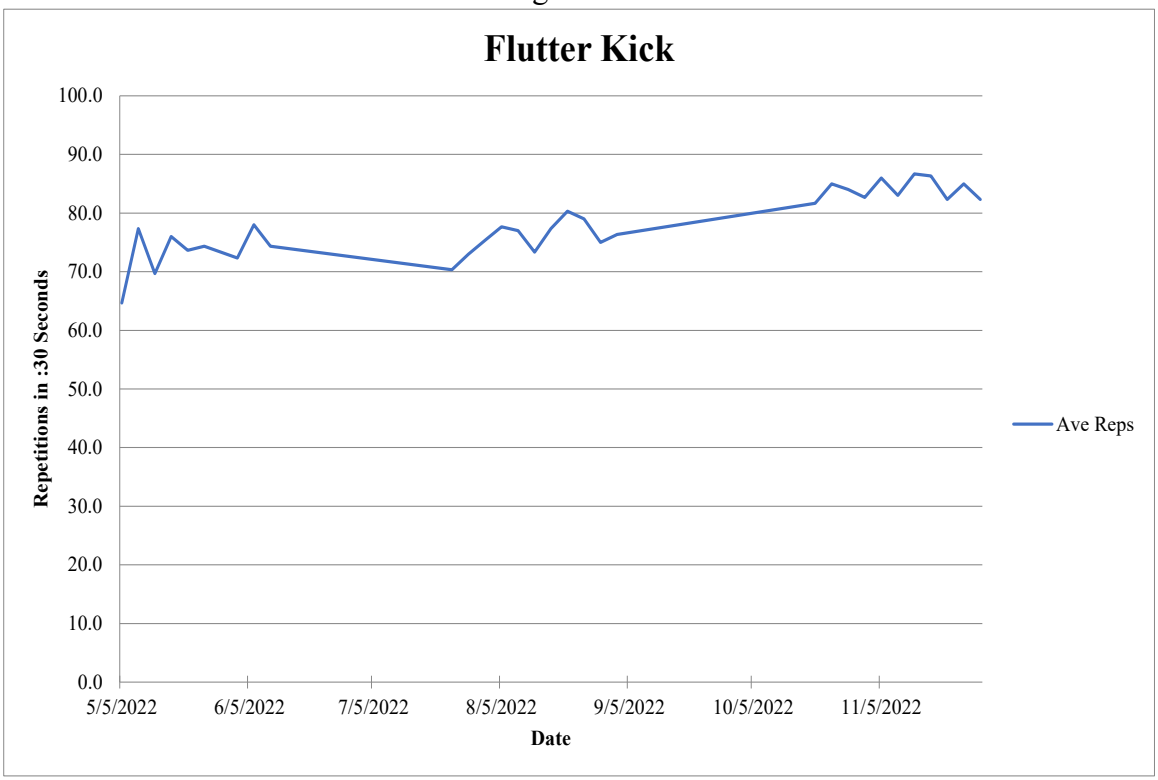


Table D. 8

DP Push Press

Date	Weight (lbs) Set 1	Weight (lbs) Set 2	Weight (lbs) Set 3	Max Weight (lbs)	Ave Weight (lbs)	Set 1 Reps	Set 2 Reps	Set 3 Reps	Max Reps	Ave Reps
5/5/2022	25	25	25	25	25.0	15	14	12	15	13.7
5/9/2022	25	25	25	25	25.0	13	11	10	13	11.3
5/13/2022	25	25	25	25	25.0	11	10	12	12	11.0
5/17/2022	25	25	25	25	25.0	10	12	11	12	11.0
5/21/2022	25	25	25	25	25.0	13	11	13	13	12.3
5/25/2022	25	25	25	25	25	11	12	10	12	11.0
5/29/2022	25	25	25	25	25	12	11	12	12	11.7
6/2/2022	25	25	25	25	25	13	11	12	13	12.0
6/6/2022	25	30	30	30	28.3	15	12	11	15	12.7
6/10/2022	30	30	30	30	30	13	12	11	13	12.0
7/24/2022	30	30	30	30	30	11	11	11	11	11.0
7/28/2022	25	25	25	25	25	13	13	12	13	12.7
8/1/2022	25	25	25	25	25	13	12	12	13	12.3
8/5/2022	25	25	25	25	25	13	12	12	13	12.3
8/9/2022	25	25	25	25	25	13	13	12	13	12.7
8/13/2022	25	25	25	25	25	15	13	13	15	13.7
8/17/2022	25	25	25	25	25	13	13	11	13	12.3
8/21/2022	30	30	30	30	30	12	12	11	12	11.7
8/25/2022	30	30	30	30	30	14	13	12	14	13.0
8/29/2022	30	30	30	30	30	13	12	12	13	12.3
9/2/2022	30	30	30	30	30	14	13	11	14	12.7
10/20/2022	30	30	30	30	30	13	12	11	13	12.0
10/24/2022	30	30	30	30	30	16	14	14	16	14.7
10/28/2022	30	30	30	30	30	15	12	12	15	13.0
11/1/2022	30	30	30	30	30	16	15	15	16	15.3
11/5/2022	30	30	30	30	30	15	15	14	15	14.7
11/9/2022	30	30	30	30	30	15	15	13	15	14.3
11/13/2022	30	30	30	30	30	15	16	15	16	15.3
11/17/2022	30	30	30	30	30	15	16	15	16	15.3
11/21/2022	30	30	30	30	30	15	15	14	15	14.7
25-Nov	30	30	30	30	30	16	16	16	16	16.0
11/29/2022	30	30	30	30	30	15	15	14	15	14.7

Figure D. 7

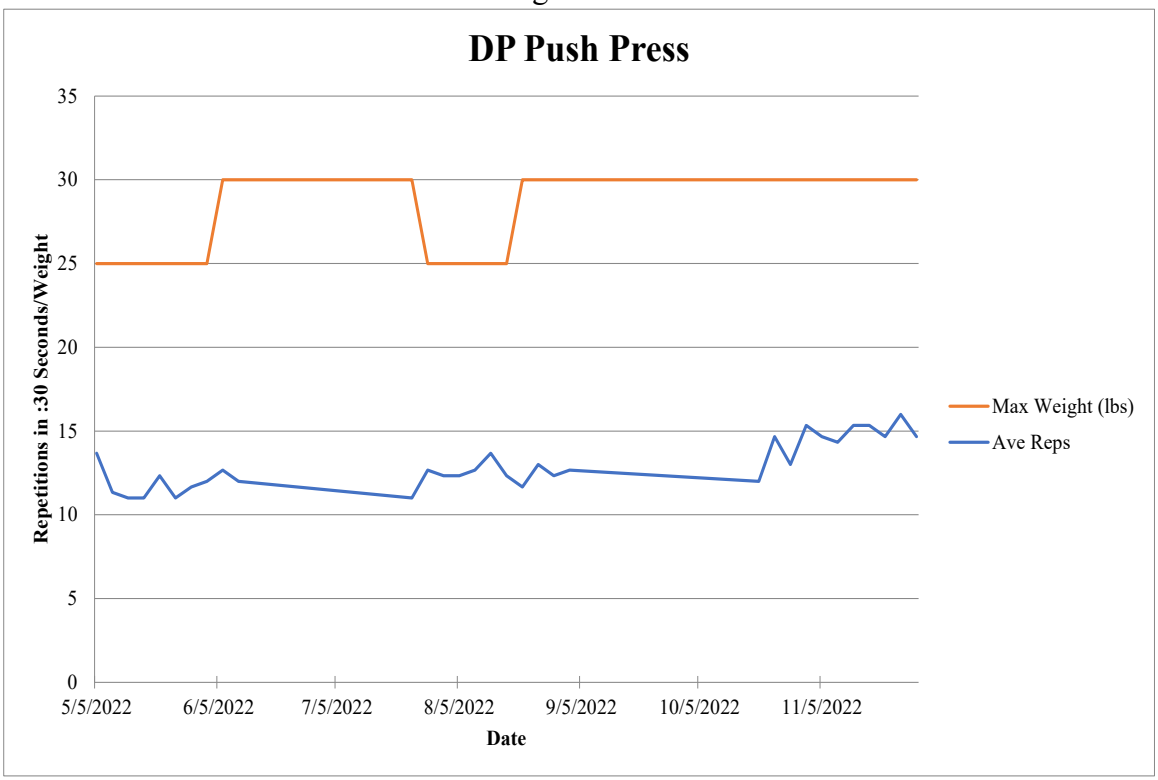


Table D. 9

SA DB Bent Over Row

						Left				Right			
Date	Weight Set 1	Weight Set 2	Weight Set 3	Max Weight (lbs)	Ave Weight (lbs)	Set 1 Reps	Set 2 Reps	Set 3 Reps	Average Left Reps	Set 1 Reps2	Set 2 Reps3	Set 3 Reps4	Average Right Reps
5/5/2022	37.5	42.5	47.5	47.5	42.5	23	27	24	24.7	23	27	24	24.7
5/9/2022	52.5	52.5	52.5	52.5	52.5	18	20	17	18.3	18	20	17	18.3
5/13/2022	50	50	50	50	50.0	17	20	18	18.3	18	21	19	19.3
5/17/2022	50	50	50	50	50.0	16	17	18	17.0	18	19	18	18.3
5/21/2022	60	50	50	60	53.3	19	18	16	17.7	18	16	17	17.0
5/25/2022	50	50	50	50	50.0	18	17	17	17.3	18	18	17	17.7
5/29/2022	50	50	50	50	50.0	18	19	17	18.0	17	18	17	17.3
6/2/2022	50	50	50	50	50.0	19	19	18	18.7	18	19	17	18.0
6/6/2022	55	55	55	55	55.0	20	18	18	18.7	19	18	18	18.3
6/10/2022	55	50	50	55	51.7	18	16	17	17.0	17	16	17	16.7
7/24/2022	50	50	50	50	50.0	18	16	16	16.7	19	17	18	18.0
7/28/2022	50	50	50	50	50.0	18	17	16	17.0	20	19	15	18.0
8/1/2022	50	50	50	50	50.0	19	18	17	18.0	19	19	18	18.7
8/5/2022	50	50	50	50	50.0	18	18	16	17.3	20	19	17	18.7
8/9/2022	50	50	50	50	50.0	17	18	17	17.3	19	19	18	18.7
8/13/2022	50	50	50	50	50.0	20	18	17	18.3	21	19	19	19.7
8/17/2022	50	50	50	50	50.0	18	17	15	16.7	19	19	17	18.3
8/21/2022	50	50	50	50	50.0	20	18	17	18.3	20	19	18	19.0
8/25/2022	50	50	50	50	50.0	18	18	17	17.7	20	19	18	19.0
8/29/2022	50	50	50	50	50.0	17	17	20	18.0	19	18	21	19.3
9/2/2022	50	50	50	50	50.0	20	18	18	18.7	21	19	19	19.7
10/20/2022	50	50	50	50	50.0	19	19	18	18.7	20	20	20	20.0
10/24/2022	50	50	50	50	50.0	20	19	20	19.7	20	20	20	20.0
10/28/2022	50	50	50	50	50.0	21	20	20	20.3	21	21	21	21.0
11/1/2022	50	50	50	50	50.0	21	21	21	21.0	23	23	23	23.0
11/5/2022	50	50	50	50	50.0	21	21	20	20.7	23	23	23	23.0
11/9/2022	50	50	50	50	50.0	22	23	21	22.0	23	23	22	22.7
11/13/2022	50	50	50	50	50.0	22	21	21	21.3	24	24	22	23.3
11/17/2022	50	50	50	50	50.0	21	21	21	21.0	24	23	23	23.3
11/21/2022	50	50	50	50	50.0	21	22	21	23.0	23	23	23	23.0
25-Nov	50	50	50	50	50.0	22	21	21	21.3	24	23	23	23.3
11/29/2022	50	50	50	50	50.0	22	22	21	21.7	24	24	23	23.7

Figure D. 8

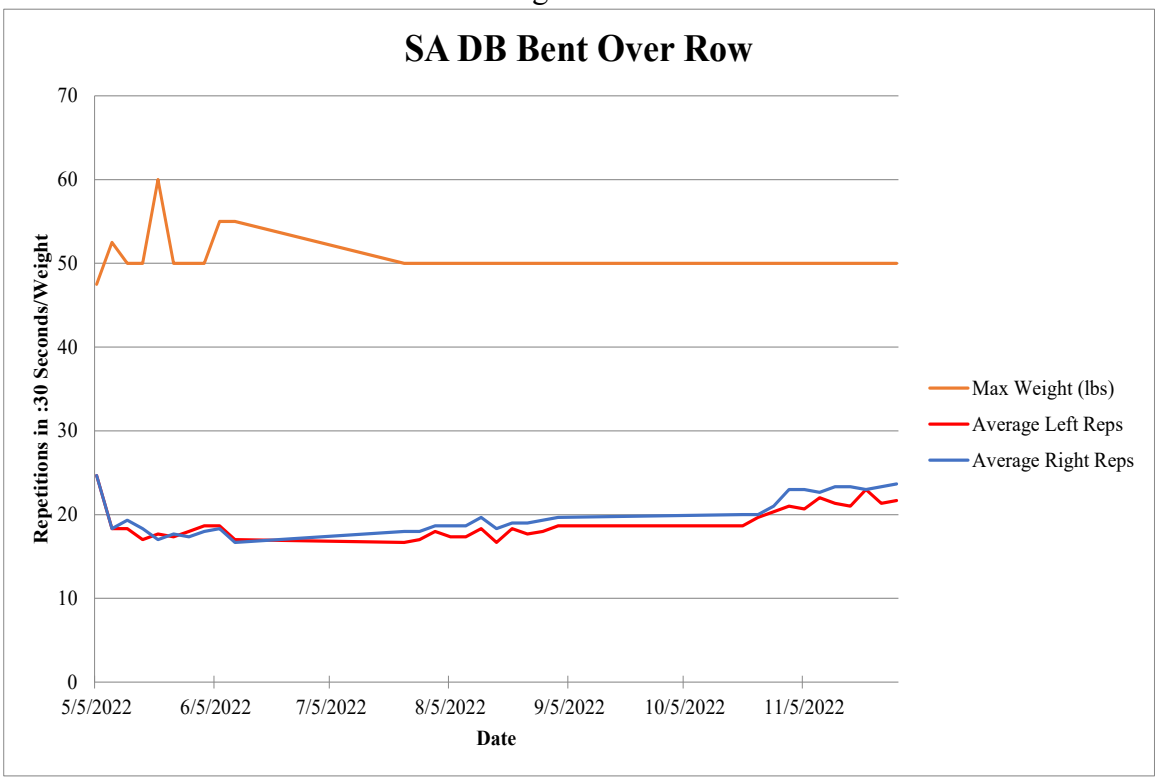


Table D. 10

Squat Jumps

Date	Weight (lbs) Set 1	Weight (lbs) Set 2	Weight (lbs) Set 3	Ave Weight	Set 1 Reps	Set 2 Reps	Set 3 Reps	Ave Reps
5/5/2022	0	0	0	0.0	17	18	16	17.0
5/9/2022	0	0	0	0.0	19	18	16	17.7
5/13/2022	0	0	0	0.0	19	18	15	17.3
5/17/2022	0	0	0	0.0	19	19	18	18.7
5/21/2022	0	0	0	0.0	19	17	17	17.7
5/25/2022	0	0	0	0	16	17	17	16.7
5/29/2022	0	0	0	0	19	17	16	17.3
6/2/2022	0	0	0	0	19	20	17	18.7
6/6/2022	0	0	0	0	19	19	18	18.7
6/10/2022	0	0	0	0	19	19	17	18.3
7/24/2022	0	0	0	0	21	19	20	20.0
7/28/2022	0	0	0	0	20	21	21	20.7
8/1/2022	0	0	0	0	20	21	18	19.7
8/5/2022	0	0	0	0	22	19	19	20.0
8/9/2022	0	0	0	0	23	21	19	21.0
8/13/2022	0	0	0	0	21	20	18	19.7
8/17/2022	0	0	0	0	21	20	18	19.7
8/21/2022	0	0	0	0	21	19	19	19.7
8/25/2022	0	0	0	0	21	20	17	19.3
8/29/2022	0	0	0	0	22	20	18	20.0
9/2/2022	0	0	0	0	22	21	20	21.0
10/20/2022	0	0	0	0	20	19	20	19.7
10/24/2022	0	0	0	0	22	20	20	20.7
10/28/2022	0	0	0	0	23	20	20	21.0
11/1/2022	0	0	0	0	23	21	20	21.3
11/5/2022	0	0	0	0	22	21	21	21.3
11/9/2022	0	0	0	0	23	21	22	22.0
11/13/2022	0	0	0	0	23	22	21	22.0
11/17/2022	0	0	0	0	23	21	21	21.7
11/21/2022	0	0	0	0	24	22	21	22.3
25-Nov	0	0	0	0	22	20	19	20.3
11/29/2022	0	0	0	0	24	23	21	22.7

Figure D. 9

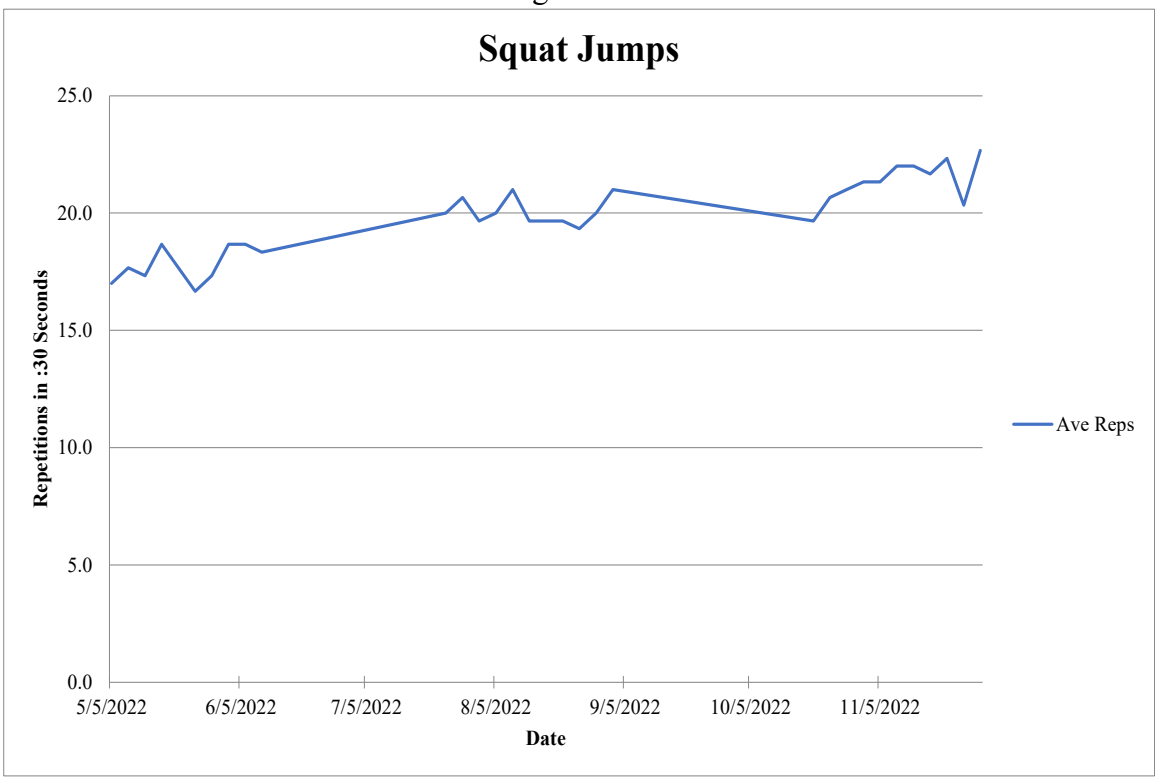


Table D. 11

Heart Rate at End of 3rd Set

Date	Heart Rate
5/5/2022	114
5/9/2022	166
5/13/2022	141
5/17/2022	134
5/21/2022	141
5/25/2022	149
5/29/2022	139
6/2/2022	152
6/6/2022	140
6/10/2022	143
7/24/2022	147
7/28/2022	137
8/1/2022	138
8/5/2022	141
8/9/2022	138
8/13/2022	141
8/17/2022	131
8/21/2022	142
8/25/2022	161
8/29/2022	144
9/2/2022	142
10/20/2022	149
10/28/2022	150
10/29/2022	150
10/30/2022	150
10/31/2022	150
11/1/2022	150
11/2/2022	150
11/3/2022	150
11/4/2022	150
11/5/2022	150
11/6/2022	150
11/7/2022	150
10/24/2022	168
10/28/2022	147
11/1/2022	165
11/5/2022	146
11/9/2022	150
11/13/2022	142
11/17/2022	147
11/21/2022	138
25-Nov	154
11/29/2022	158

Figure D. 10

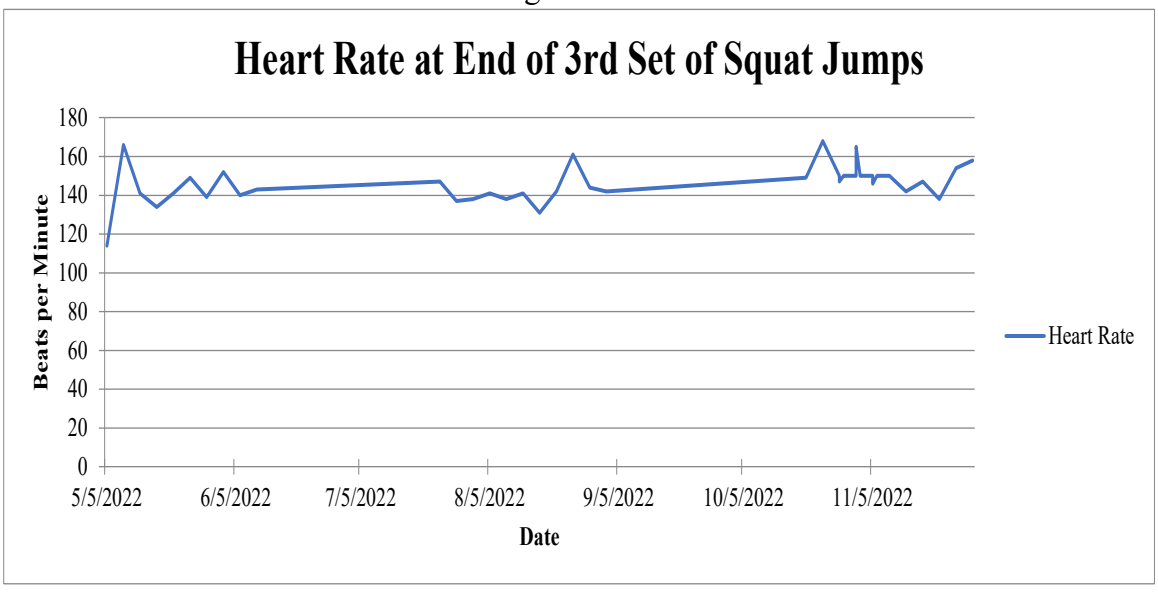


Table D. 12

Front Squat

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Max Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
5/6/2022	135	155	165	175	175	175	161.0	10	8	6	4	3	6.2
5/10/2022	135	155	165	175	175	175	161.0	10	7	6	5	3	6.2
5/14/2022	145	155	165	175	175	175	163.0	10	8	6	4	4	6.4
5/18/2022	145	155	165	175	185	185	165.0	10	8	6	5	4	6.6
5/22/2022	150	160	170	180	190	190	170.0	10	8	6	5	4	6.6
5/26/2022	155	160	170	175	190	190	170.0	10	8	6	5	4	6.6
5/30/2022	155	160	170	180	195	195	172.0	10	8	5	5	4	6.4
6/3/2022	155	165	175	190	200	200	177.0	10	8	6	5	4	6.6
6/7/2022	155	165	175	190	200	200	177.0	10	8	6	5	3	6.4
6/11/2022	160	170	180	195	205	205	182.0	10	8	6	5	3	6.4
7/25/2022	165	175	185	195	195	195	183.0	10	8	6	4	4	6.4
7/29/2022	160	170	185	190	200	200	181.0	10	8	6	5	4	6.6
8/2/2022	160	170	185	190	195	195	180.0	10	8	6	5	4	6.6
8/6/2022	160	170	175	185	190	190	176.0	10	8	6	5	4	6.6
8/10/2022	160	170	180	185	200	200	179.0	10	8	6	5	4	6.6
8/14/2022	160	175	185	195	210	210	185.0	10	8	6	5	4	6.6
8/18/2022	170	185	195	205	210	210	193.0	10	8	6	5	4	6.6
8/22/2022	170	185	195	205	210	210	193.0	10	8	6	5	4	6.6
8/26/2022	170	185	195	205	205	205	192.0	10	8	6	5	4	6.6
8/30/2022	175	185	195	205	220	220	196.0	10	8	6	5	4	6.6
9/3/2022	175	190	200	210	215	215	198.0	10	8	6	5	4	6.6
10/21/2022	175	185	200	205	220	220	197.0	10	8	6	5	4	6.6
10/25/2022	175	185	200	210	220	220	198.0	10	8	6	5	4	6.6
10/29/2022	180	190	200	205	220	220	199.0	10	8	6	5	4	6.6
11/2/2022	180	190	200	210	220	220	200.0	10	8	6	5	4	6.6
11/6/2022	185	190	200	210	220	220	201.0	10	8	6	5	4	6.6
11/10/2022	190	195	200	210	220	220	203.0	10	8	6	5	4	6.6
11/14/2022	190	195	200	210	220	220	203.0	10	8	6	5	4	6.6
11/18/2022	190	195	205	215	225	225	206.0	10	8	6	5	4	6.6
11/22/2022	190	200	205	215	225	225	207.0	10	8	6	5	4	6.6
11/26/2022	190	200	205	215	225	225	207.0	10	8	6	5	4	6.6
11/30/2022	195	200	205	215	220	220	207.0	10	8	6	5	4	6.6

Figure D. 11

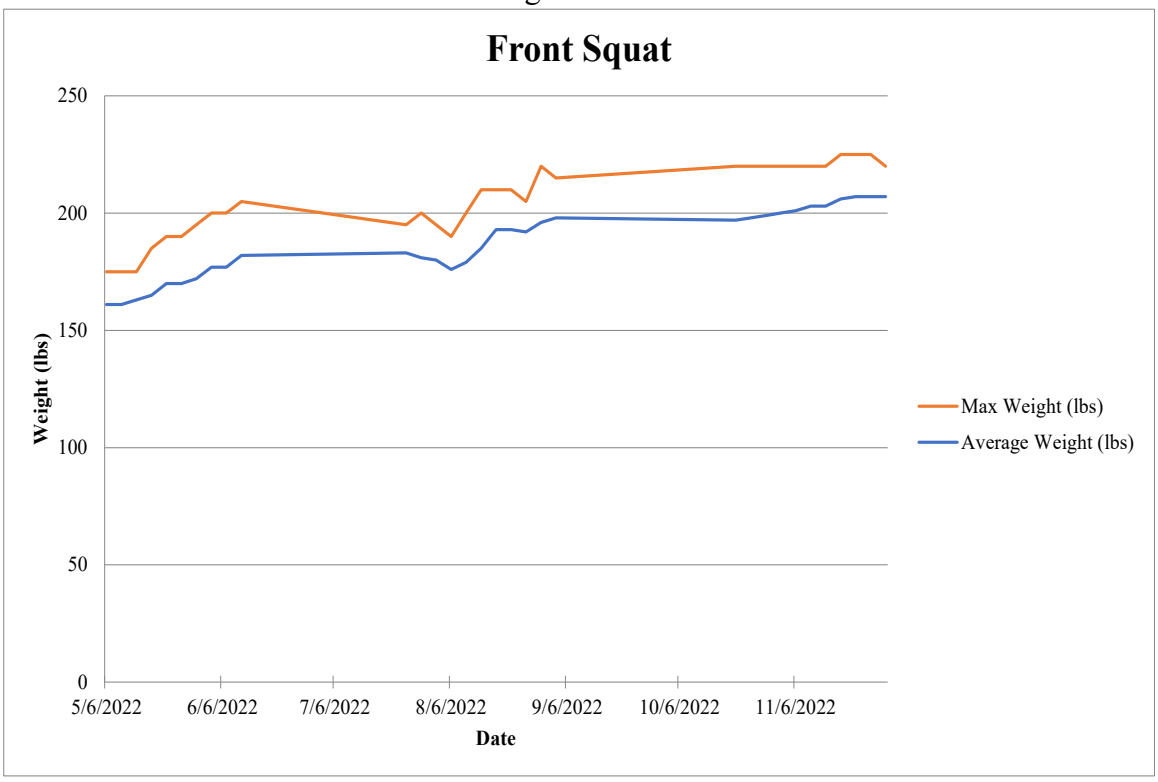


Table D. 13

BB Shoulder Press

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Max Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
5/6/2022	85	95	95	105	115	115	99.0	10	8	6	5	3	6.4
5/10/2022	95	105	115	115	125	125	111.0	10	7	5	5	3	6.0
5/14/2022	90	100	110	110	120	120	106.0	10	8	6	5	4	6.6
5/18/2022	100	100	110	110	100	110	104.0	10	8	5	4	4	6.2
5/22/2022	70	80	85	90	95	95	84.0	10	8	6	5	4	6.6
5/26/2022	70	80	85	90	95	95	84.0	10	8	6	5	4	6.6
5/30/2022	70	80	90	95	100	100	87.0	10	8	6	5	4	6.6
6/3/2022	75	80	85	90	95	95	85.0	10	8	6	5	4	6.6
6/7/2022	75	80	85	90	95	95	85.0	10	8	6	5	4	6.6
6/11/2022	75	80	85	90	95	95	85.0	10	8	6	5	4	6.6
7/25/2022	95	95	100	100	105	105	99.0	10	8	5	5	4	6.4
7/29/2022	85	95	100	105	105	105	98.0	10	8	6	4	4	6.4
8/2/2022	85	90	95	100	105	105	95.0	10	8	6	5	4	6.6
8/6/2022	85	90	95	100	100	100	94.0	10	8	6	5	4	6.6
8/10/2022	85	90	95	100	105	105	95.0	10	8	6	5	4	6.6
8/14/2022	85	90	95	105	110	110	97.0	10	8	6	5	4	6.6
8/18/2022	85	90	95	100	105	105	95.0	10	8	6	5	4	6.6
8/22/2022	85	90	95	100	110	110	96.0	10	8	6	5	4	6.6
8/26/2022	85	90	95	105	110	110	97.0	10	8	6	5	4	6.6
8/30/2022	85	90	95	105	105	105	96.0	10	8	6	5	4	6.6
9/3/2022	90	95	100	105	105	105	99.0	10	8	6	5	4	6.6
10/21/2022	95	100	105	110	115	115	105.0	10	8	6	5	4	6.6
10/25/2022	95	100	105	110	115	115	105.0	10	8	6	5	4	6.6
10/29/2022	95	100	105	110	115	115	105.0	10	8	6	5	4	6.6
11/2/2022	100	105	110	115	120	120	110.0	10	8	6	5	4	6.6
11/6/2022	100	105	110	115	115	115	109.0	10	8	6	5	4	6.6
11/10/2022	100	105	110	115	115	115	109.0	10	8	6	5	4	6.6
11/14/2022	100	105	110	115	120	120	110.0	10	8	6	5	4	6.6
11/18/2022	100	105	110	115	120	120	110.0	10	8	6	5	4	6.6
11/22/2022	100	105	110	115	120	120	110.0	10	8	6	5	4	6.6
11/26/2022	100	105	110	115	120	120	110.0	10	8	6	5	4	6.6
11/30/2022	105	110	115	120	120	120	114.0	10	8	6	4	4	6.4

Figure D. 12

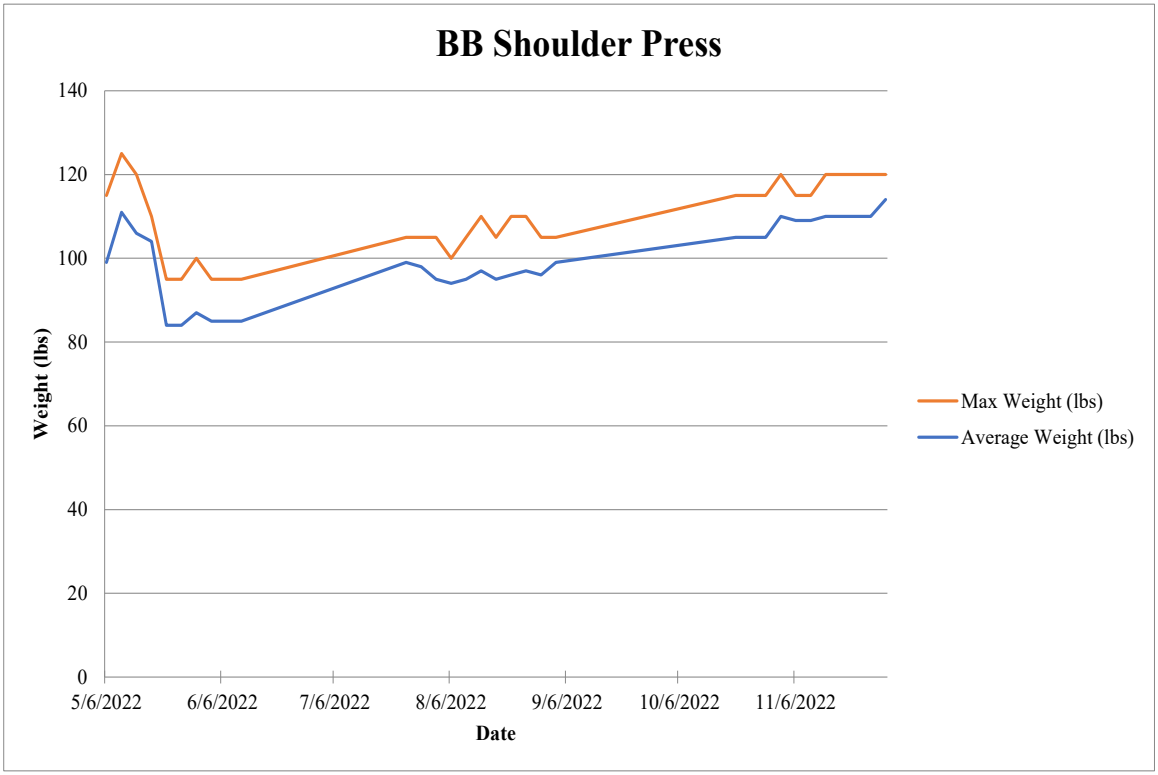

BB Shoulder Press
140
120
100
80
60
40
20
0
Weight (lbs)
5/6/2022
6/6/2022
7/6/2022
8/6/2022
9/6/2022
10/6/2022
11/6/2022
Date
Max Weight (lbs)
Average Weight (lbs)

Table D. 14

BB Deadlift

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Max Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
5/6/2022	185	225	245	255	275	275	237.0	10	8	6	5	3	6.4
5/10/2022	195	235	255	275	275	275	247.0	10	8	6	4	3	6.2
5/14/2022	205	235	255	275	275	275	249.0	10	8	6	5	4	6.6
5/18/2022	205	235	255	275	275	275	249.0	10	8	6	4	4	6.4
5/22/2022	210	240	260	275	280	280	253.0	10	8	6	5	4	6.6
5/26/2022	205	240	255	265	275	275	248.0	10	8	6	5	4	6.6
5/30/2022	210	240	250	260	270	270	246.0	10	8	6	5	4	6.6
6/3/2022	210	240	255	265	275	275	249.0	10	8	6	5	4	6.6
6/7/2022	210	240	255	265	280	280	250.0	10	8	6	5	4	6.6
6/11/2022	225	240	260	270	280	280	255.0	10	8	6	5	4	6.6
7/25/2022	235	245	255	265	275	275	255.0	10	8	6	5	4	6.6
7/29/2022	235	245	255	265	280	280	256.0	10	8	6	5	4	6.6
8/2/2022	235	245	255	265	275	275	255.0	10	8	6	5	4	6.6
8/6/2022	235	245	255	265	265	265	253.0	10	8	6	5	4	6.6
8/10/2022	235	245	255	265	275	275	255.0	10	8	6	5	4	6.6
8/14/2022	235	245	255	265	280	280	256.0	10	8	6	5	4	6.6
8/18/2022	235	245	255	265	275	275	255.0	10	8	6	5	4	6.6
8/22/2022	240	250	260	270	280	280	260.0	10	8	6	5	3	6.4
8/26/2022	240	250	260	275	290	290	263.0	10	8	6	5	4	6.6
8/30/2022	240	250	260	275	285	285	262.0	10	8	6	5	4	6.6
9/3/2022	240	250	260	275	290	290	263.0	10	8	6	5	4	6.6
10/21/2022	250	260	270	285	295	295	272.0	10	8	6	5	4	6.6
10/25/2022	250	260	280	290	300	300	276.0	10	8	6	5	4	6.6
10/29/2022	255	265	280	290	300	300	278.0	10	8	6	5	4	6.6
11/2/2022	260	270	280	290	300	300	280.0	10	8	6	5	4	6.6
11/6/2022	260	270	280	290	300	300	280.0	10	8	6	5	4	6.6
11/10/2022	265	275	285	295	300	300	284.0	10	8	6	5	4	6.6
11/14/2022	265	275	285	295	305	305	285.0	10	8	6	5	4	6.6
11/18/2022	265	275	285	295	305	305	285.0	10	8	6	5	4	6.6
11/22/2022	270	275	285	295	310	310	287.0	10	8	6	5	4	6.6
11/26/2022	280	285	295	305	310	310	295.0	10	8	6	5	4	6.6
11/30/2022	280	285	295	305	310	310	295.0	10	8	6	5	3	6.4

Figure D. 13

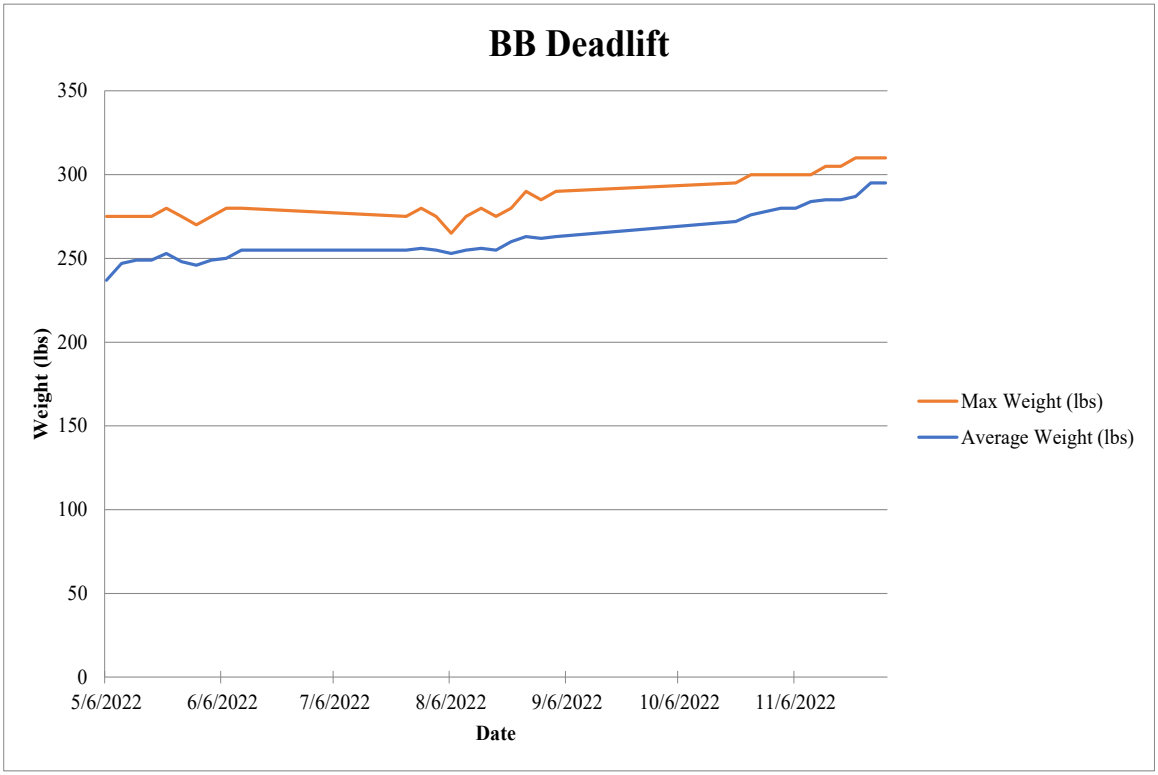

BB Deadlift
350
300
250
200
150
100
50
0
Weight (lbs)
5/6/2022
6/6/2022
7/6/2022
8/6/2022
9/6/2022
10/6/2022
11/6/2022
Date
Max Weight (lbs)
Average Weight (lbs)

Table D. 15

BB Bench Press

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Max Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
5/6/2022	155	175	185	185	185	185	177.0	10	8	6	5	4	6.6
5/10/2022	155	175	185	195	195	195	181.0	10	8	6	4	3	6.2
5/14/2022	155	185	195	205	205	205	189.0	10	8	6	4	3	6.2
5/18/2022	155	185	195	195	195	195	185.0	10	8	5	5	3	6.2
5/22/2022	160	190	195	190	190	195	185.0	10	8	5	5	4	6.4
5/26/2022	155	185	190	195	200	200	185.0	10	8	6	5	4	6.6
5/30/2022	160	185	190	195	200	200	186.0	10	8	6	5	3	6.4
6/3/2022	160	185	190	200	205	205	188.0	10	8	6	5	3	6.4
6/7/2022	160	185	190	195	200	200	186.0	10	8	6	5	3	6.4
6/11/2022	160	185	190	195	200	200	186.0	10	8	6	5	4	6.6
7/25/2022	160	185	190	195	195	195	185.0	10	8	6	4	4	6.4
7/29/2022	165	185	190	195	195	195	186.0	10	8	6	5	4	6.6
8/2/2022	165	175	185	190	200	200	183.0	10	8	6	5	4	6.6
8/6/2022	170	180	190	195	200	200	187.0	10	8	6	5	3	6.4
8/10/2022	170	185	190	195	205	205	189.0	10	8	6	5	3	6.4
8/14/2022	170	185	190	195	205	205	189.0	10	8	6	5	4	6.6
8/18/2022	170	185	195	200	210	210	192.0	10	8	6	5	4	6.6
8/22/2022	170	185	195	205	210	210	193.0	10	8	6	5	4	6.6
8/26/2022	175	185	195	205	210	210	194.0	10	8	6	5	4	6.6
8/30/2022	180	190	195	205	210	210	196.0	10	8	6	5	4	6.6
9/3/2022	180	190	200	210	215	215	199.0	10	8	6	5	4	6.6
10/21/2022	180	185	195	205	210	210	195.0	10	8	6	5	4	6.6
10/25/2022	180	190	200	205	210	210	197.0	10	8	6	5	4	6.6
10/29/2022	185	190	200	210	205	210	198.0	10	8	6	4	3	6.2
11/2/2022	185	190	200	205	215	215	199.0	10	8	6	5	3	6.4
11/6/2022	185	195	205	210	215	215	202.0	10	8	6	5	4	6.6
11/10/2022	185	190	200	210	215	215	200.0	10	8	6	5	3	6.4
11/14/2022	190	195	200	210	215	215	202.0	10	8	6	5	4	6.6
11/18/2022	190	195	200	205	215	215	201.0	10	8	6	5	3	6.4
11/22/2022	190	195	200	205	220	220	202.0	10	8	6	5	4	6.6
11/26/2022	190	195	200	210	220	220	203.0	10	8	6	5	4	6.6
11/30/2022	190	195	205	210	220	220	204.0	10	8	6	5	4	6.6

Figure D. 14

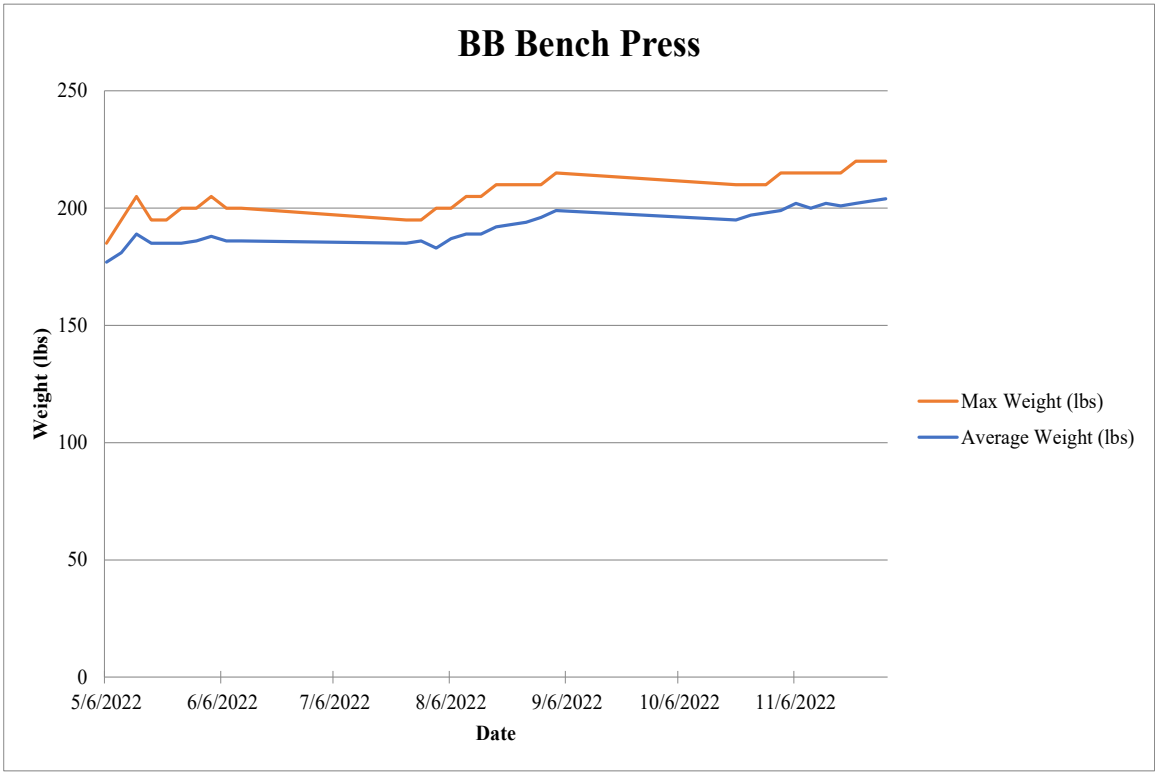

BB Bench Press
250
200
150
100
50
0
Weight (lbs)
5/6/2022
6/6/2022
7/6/2022
8/6/2022
9/6/2022
10/6/2022
11/6/2022
Date
Max Weight (lbs)
Average Weight (lbs)

Table D. 16

BB Reverse Lunge

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Max Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
5/6/2022	75	85	95	105	115	115.0	95.0	10	8	6	5	4	6.6
5/10/2022	95	115	135	145	165	165.0	131.0	10	8	6	5	4	6.6
5/14/2022	105	115	135	145	155	155.0	131.0	10	8	6	5	4	6.6
5/18/2022	115	125	135	145	155	155.0	135.0	10	8	6	5	4	6.6
5/22/2022	120	130	140	150	160	160.0	140.0	10	8	6	5	4	6.6
5/26/2022	120	130	140	150	160	160.0	140.0	10	8	6	5	4	6.6
5/30/2022	125	130	135	140	145	145.0	135.0	10	8	6	5	4	6.6
6/3/2022	125	130	135	140	150	150.0	136.0	10	8	6	5	4	6.6
6/7/2022	130	135	140	145	160	160.0	142.0	10	8	6	5	4	6.6
6/11/2022	130	135	140	145	155	155.0	141.0	10	8	6	5	4	6.6
7/25/2022	125	135	145	155	165	165.0	145.0	10	8	6	5	4	6.6
7/29/2022	125	130	130	145	155	155.0	137.0	10	8	6	5	4	6.6
8/2/2022	125	135	145	155	160	160.0	144.0	10	8	6	5	4	6.6
8/6/2022	110	115	125	135	145	145.0	126.0	10	8	6	5	4	6.6
8/10/2022	115	125	135	145	155	155.0	135.0	10	8	6	5	4	6.6
8/14/2022	120	130	140	145	160	160.0	139.0	10	8	6	5	4	6.6
8/18/2022	125	135	145	155	165	165.0	145.0	10	8	6	5	4	6.6
8/22/2022	125	135	145	155	165	165.0	145.0	10	8	6	5	4	6.6
8/26/2022	125	135	145	155	165	165.0	145.0	10	8	6	5	4	6.6
8/30/2022	125	135	145	155	170	170.0	146.0	10	8	6	5	4	6.6
9/3/2022	130	135	145	155	165	165.0	146.0	10	8	6	5	4	6.6
10/21/2022	135	145	155	170	175	175.0	156.0	10	8	6	5	4	6.6
10/25/2022	135	145	155	165	180	180.0	156.0	10	8	6	5	4	6.6
10/29/2022	135	145	155	165	175	175.0	155.0	10	8	6	5	4	6.6
11/2/2022	140	150	155	165	175	175.0	157.0	10	8	6	5	4	6.6
11/6/2022	145	155	165	175	190	190.0	166.0	10	8	6	5	4	6.6
11/10/2022	145	155	165	175	190	190.0	166.0	10	8	6	5	4	6.6
11/14/2022	145	155	165	175	190	190.0	166.0	10	8	6	5	4	6.6
11/18/2022	145	155	165	175	190	190.0	166.0	10	8	6	5	4	6.6
11/22/2022	145	155	165	175	190	190.0	166.0	10	8	6	5	4	6.6
11/26/2022	145	155	165	175	185	185.0	165.0	10	8	6	5	4	6.6
11/30/2022	145	155	165	180	190	190.0	167.0	10	8	6	5	4	6.6

Figure D. 15

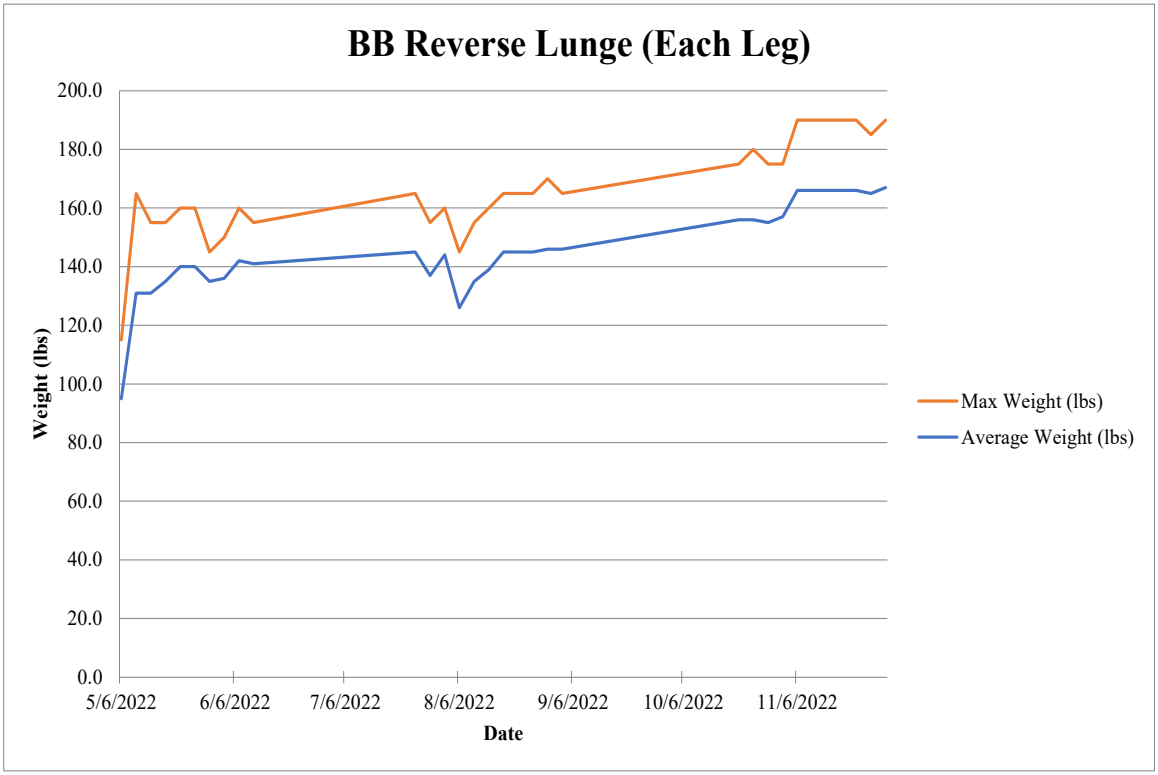

BB Reverse Lunge (Each Leg)
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Weight (lbs)
5/6/2022
6/6/2022
7/6/2022
8/6/2022
9/6/2022
10/6/2022
11/6/2022
Date
Max Weight (lbs)
Average Weight (lbs)

Table D. 17

BB Bent Over Row

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Ave Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
5/6/2022	135	145	155	155	155	155.0	149.0	10	8	5	5	3	6.2
5/10/2022	135	145	155	165	175	175.0	155.0	10	8	6	5	3	6.4
5/14/2022	140	140	150	160	170	170.0	152.0	10	8	6	5	3	6.4
5/18/2022	130	140	150	160	170	170.0	150.0	10	8	6	5	3	6.4
5/22/2022	130	140	150	160	165	165.0	149.0	10	8	6	5	4	6.6
5/26/2022	130	135	145	155	155	155.0	144.0	10	8	6	5	4	6.6
5/30/2022	130	135	140	145	150	150.0	140.0	10	8	6	5	4	6.6
6/3/2022	130	135	140	145	155	155.0	141.0	10	8	6	5	4	6.6
6/7/2022	135	140	145	150	155	155.0	145.0	10	8	6	5	4	6.6
6/11/2022	135	140	145	150	160	160.0	146.0	10	8	6	5	4	6.6
7/25/2022	140	145	150	155	160	160.0	150.0	10	8	6	5	4	6.6
7/29/2022	135	140	145	150	155	155.0	145.0	10	8	6	5	4	6.6
8/2/2022	130	140	145	155	160	160.0	146.0	10	8	6	5	4	6.6
8/6/2022	130	140	145	150	155	155.0	144.0	10	8	6	5	4	6.6
8/10/2022	130	140	145	155	165	165.0	147.0	10	8	6	5	4	6.6
8/14/2022	135	145	155	160	170	170.0	153.0	10	8	6	5	4	6.6
8/18/2022	135	145	150	160	165	165.0	151.0	10	8	6	5	4	6.6
8/22/2022	135	145	155	165	170	170.0	154.0	10	8	6	5	4	6.6
8/26/2022	135	145	150	160	165	165.0	151.0	10	8	6	5	4	6.6
8/30/2022	140	145	150	150	160	160.0	149.0	10	8	6	5	4	6.6
9/3/2022	140	145	150	155	165	165.0	151.0	10	8	6	5	4	6.6
10/21/2022	145	150	160	165	170	170.0	158.0	10	8	6	5	4	6.6
10/25/2022	145	155	160	165	170	170.0	159.0	10	8	6	5	4	6.6
10/29/2022	145	155	160	165	170	170.0	159.0	10	8	6	5	4	6.6
11/2/2022	145	155	160	165	170	170.0	159.0	10	8	6	5	4	6.6
11/6/2022	150	155	160	165	175	175.0	161.0	10	8	6	5	4	6.6
11/10/2022	150	155	160	165	170	170.0	160.0	10	8	6	5	4	6.6
11/14/2022	150	155	160	170	180	180.0	163.0	10	8	6	5	4	6.6
11/18/2022	150	155	160	170	180	180.0	163.0	10	8	6	5	4	6.6
11/22/2022	150	155	160	170	180	180.0	163.0	10	8	6	5	4	6.6
11/26/2022	150	155	160	170	180	180.0	163.0	10	8	6	5	4	6.6
11/30/2022	155	160	165	170	180	180.0	166.0	10	8	6	5	4	6.6

Figure D. 16

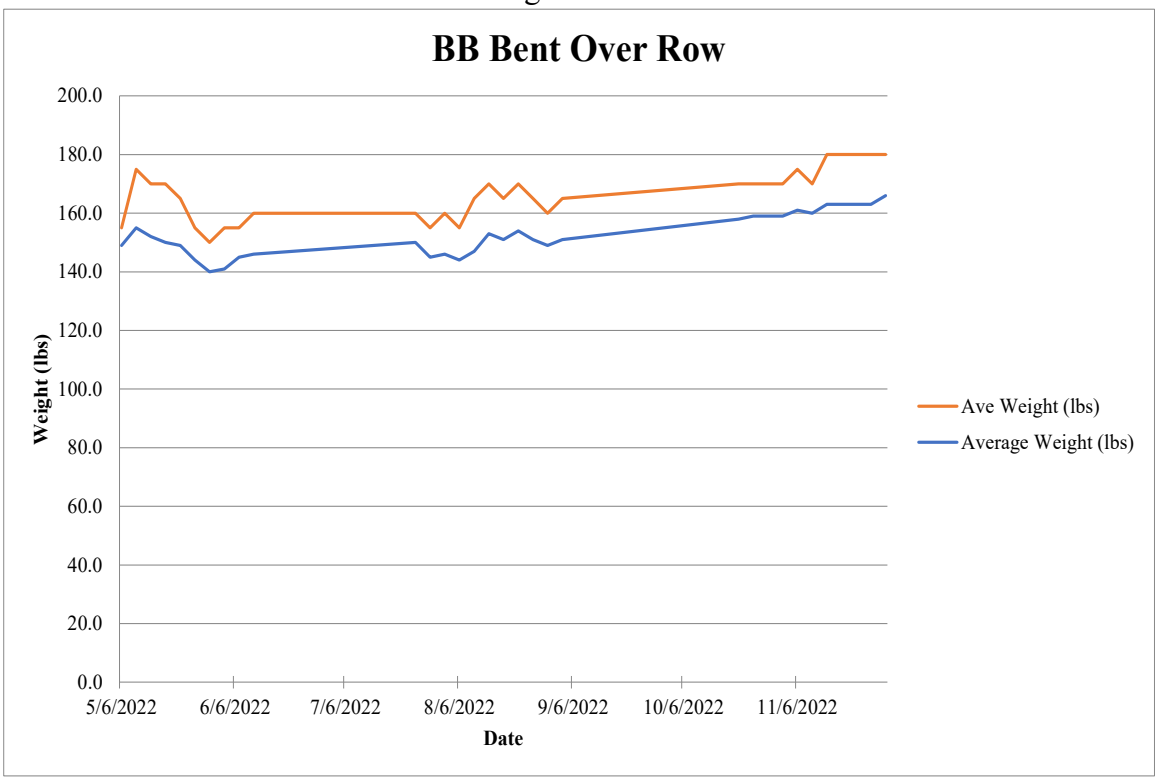


Table D. 18

Heart Rate at End of 5th Set

Date	Heart Rate
	0
	0
	0
5/18/2022	90
5/22/2022	93
5/26/2022	97
	0
6/3/2022	85
6/7/2022	93
6/11/2022	86
7/25/2022	104
7/29/2022	101
8/2/2022	93
8/6/2022	93
8/10/2022	90
8/14/2022	93
8/18/2022	101
8/22/2022	91
8/26/2022	96
8/30/2022	90
9/3/2022	103
10/21/2022	111
10/25/2022	107
10/29/2022	107
11/2/2022	123
11/6/2022	113
11/10/2022	106
11/14/2022	104
11/18/2022	106
11/22/2022	106
11/26/2022	107
11/30/2022	111

Figure D. 17

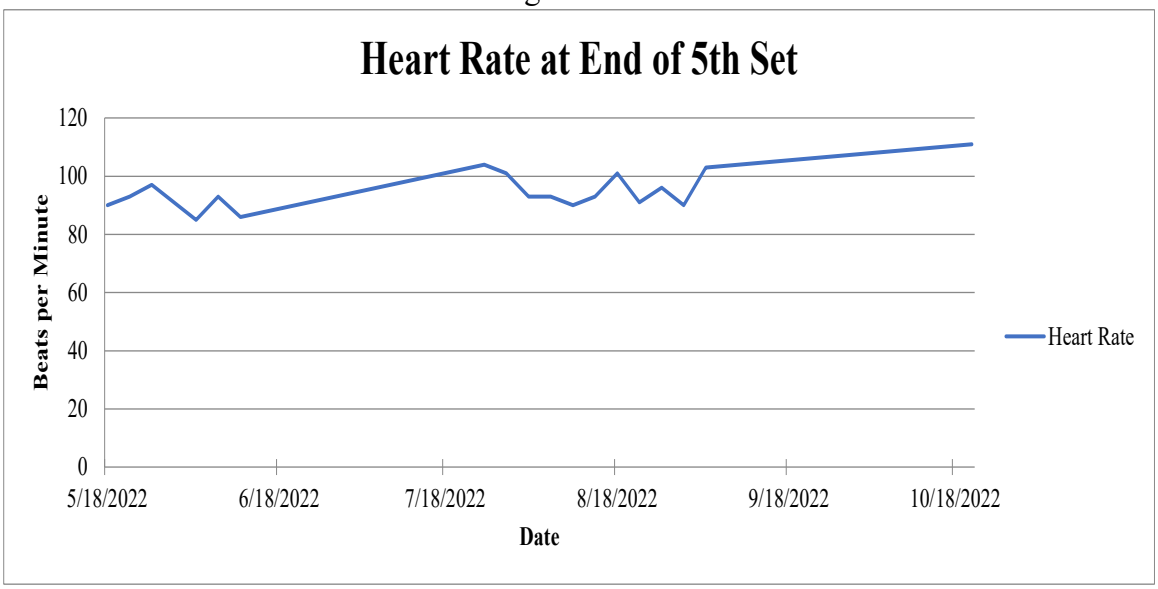

Heart Rate at End of 5th Set
120
100
80
60
40
20
0
Beats per Minute
5/18/2022
6/18/2022
7/18/2022
8/18/2022
9/18/2022
10/18/2022
Date
Heart Rate

Table D. 19

Interval Training - Minutes per Mile

Date	Elapsed Time Minutes	Seconds	Distance	Minutes per Mile	Heartbeat at End of Interval Sprints
5/6/2022	31	44	3.80	8.35	148
5/10/2022	31	0	3.80	8.16	137
5/14/2022	31	48	3.90	8.15	149
5/18/2022	32	11	3.90	8.25	144
5/22/2022	31	40	3.90	8.12	154
5/26/2022	31	13	3.90	8.00	151
5/30/2022	30	22	3.90	7.79	154
6/3/2022	31	3	3.90	7.96	174
6/7/2022	30	39	3.90	7.86	149
6/11/2022	30	16	4.00	7.57	161
7/25/2022	32	12	4.00	8.05	159
7/29/2022	32	4	4.06	7.90	150
8/2/2022	35	42	4.03	8.86	151
8/6/2022	35	16	4.02	8.77	139
8/10/2022	33	6	4.02	8.23	146
8/14/2022	38	21	4.65	8.25	148
8/18/2022	33	49	4.00	8.45	146
8/22/2022	34	23	4.10	8.39	139
8/26/2022	37	6	4.61	8.05	155
8/30/2022	37	16	4.58	8.14	165
9/3/2022	37	37	4.61	8.16	154
10/21/2022	35	8	4.67	7.52	156
10/25/2022	35	2	4.69	7.47	154
10/29/2022	35	13	4.69	7.51	149
11/2/2022	36	46	4.72	7.79	163
11/6/2022	34	26	4.70	7.33	153
11/10/2022	35	33	4.72	7.53	153
11/14/2022	35	26	4.72	7.51	148
11/18/2022	35	46	4.72	7.58	138
11/22/2022	35	42	4.72	7.56	151
11/26/2022	35	4	4.72	7.43	152
11/30/2022	34	51	4.72	7.38	153

Figure D. 18

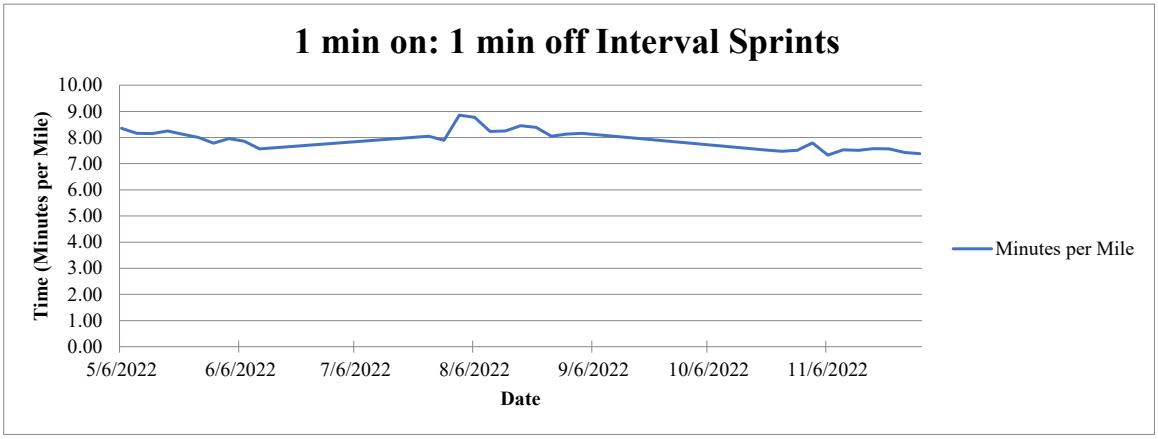


Figure D. 19

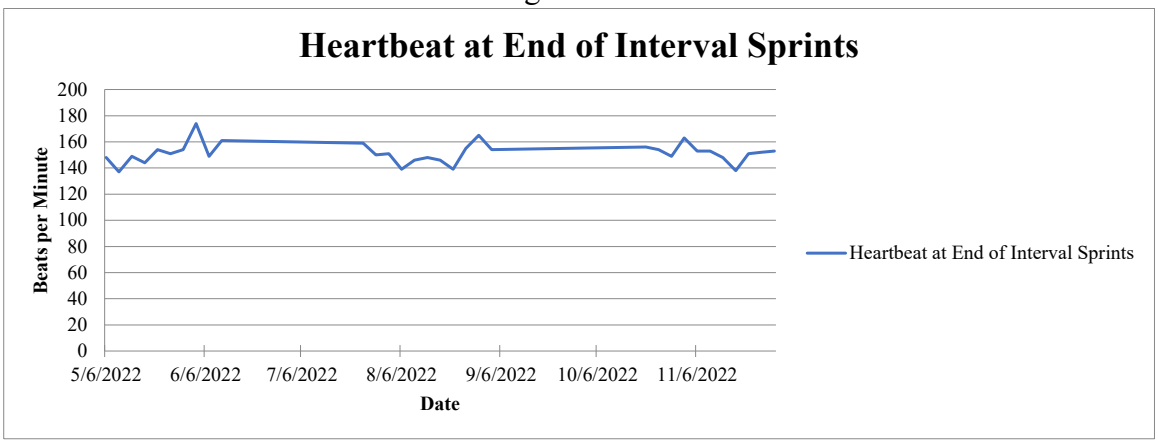


Table D. 20

KB Curtsy Squat

					Left					Right				
Date	Weight Set 1	Weight Set 2	Weight Set 3	Ave Weight	Set 1 Reps	Set 2 Reps	Set 3 Reps	Max Left Reps	Average Left Reps	Set 1 Reps2	Set 2 Reps3	Set 3 Reps4	Max Right Reps	Average Right Reps
6/14/2022	35	35	35	35.0	10	11	11	11	10.7	9	11	10	11	10.0
6/18/2022	35	35	35	35.0	11	11	12	12	11.3	12	11	12	12	11.7
6/22/2022	35	35	35	35.0	11	12	11	12	11.3	10	10	11	11	10.3
6/26/2022	35	35	35	35.0	13	13	12	13	12.7	12	13	12	13	12.3
6/30/2022	35	35	35	35.0	13	14	13	14	13.3	14	14	14	14	14.0
7/4/2022	35	35	35	35.0	12	13	14	14	13.0	13	13	13	13	13.0
7/8/2022	35	35	35	35.0	13	14	14	14	13.7	14	13	13	14	13.3
7/12/2022	35	35	35	35.0	13	14	12	14	13.0	14	13	12	14	13.0
7/16/2022	35	35	35	35.0	13	14	13	14	13.3	14	14	13	14	13.7
7/20/2022	35	35	35	35.0	12	14	13	14	13.0	13	13	12	13	12.7
9/6/2022	35	35	35	35.0	13	13	12	13	12.7	13	14	13	14	13.3
9/10/2022	35	35	35	35.0	14	13	14	14	13.7	14	14	14	14	14.0
9/14/2022	35	35	35	35.0	14	15	15	15	14.7	14	14	15	15	14.3
9/18/2022	35	35	35	35.0	14	15	15	15	14.7	14	14	15	15	14.3
9/22/2022	35	35	35	35.0	15	14	14	15	14.3	15	14	14	15	14.3
9/26/2022	35	35	35	35.0	15	15	14	15	14.7	15	15	14	15	14.7
9/30/2022	35	35	35	35.0	15	16	14	16	15.0	15	15	14	15	14.7
10/4/2022	35	35	35	35.0	16	15	15	16	15.3	15	14	15	15	14.7
10/8/2022	35	35	35	35.0	15	15	15	15	15.0	15	15	15	15	15.0
10/12/2022	35	35	35	35.0	15	15	15	15	15.0	15	15	15	15	15.0
10/16/2022	35	35	35	35.0	15	15	14	15	14.7	15	15	14	15	14.7

Figure D. 20

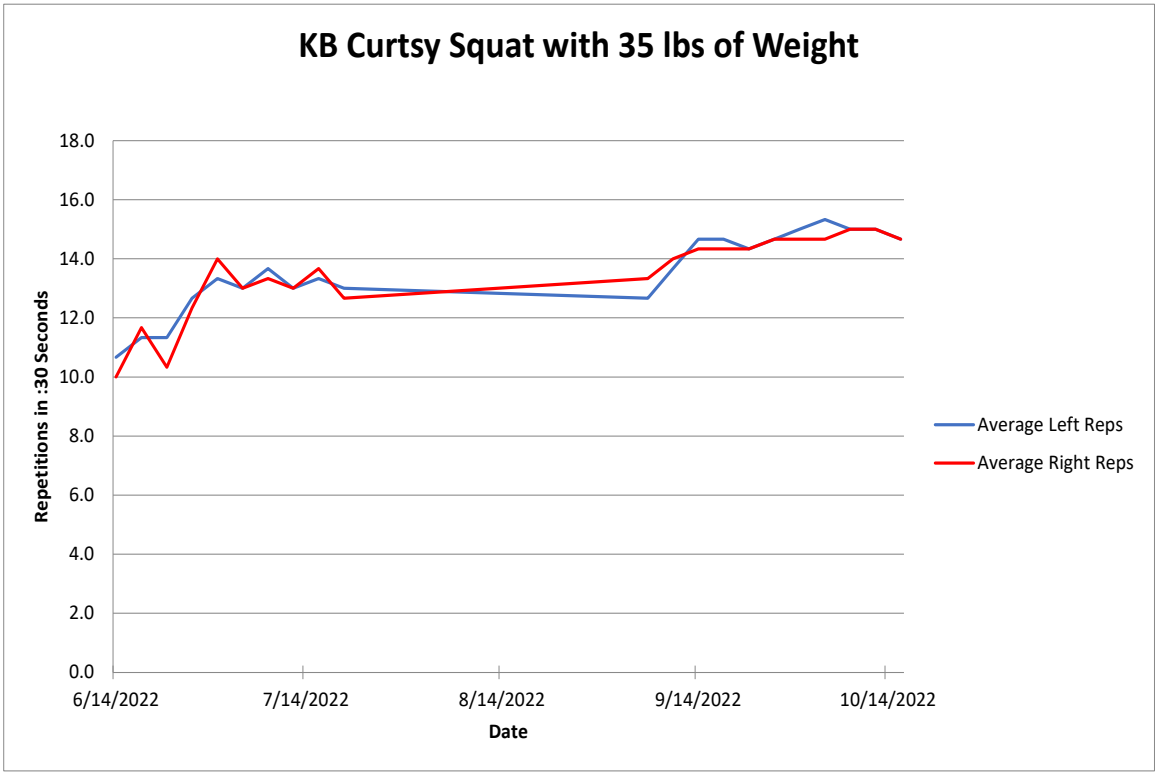


Table D. 21

Incline DB Bench Press

Date	Weight Set 1	Weight Set 2	Weight Set 3	Ave Weight	Set 1 Reps	Set 2 Reps	Set 3 Reps	Max Reps	Ave Reps
6/14/2022	45	45	45	45	12	11	10	12	11.0
6/18/2022	45	45	45	45	12	12	11	12	11.7
6/22/2022	45	45	45	45	13	12	12	13	12.3
6/26/2022	45	45	45	45	12	11	10	12	11.0
6/30/2022	45	45	45	45	12	11	9	12	10.7
7/4/2022	45	45	45	45	13	11	10	13	11.3
7/8/2022	45	45	45	45	12	11	10	12	11.0
7/12/2022	45	45	45	45	11	10	9	11	10.0
7/16/2022	45	45	45	45	12	11	8	12	10.3
7/20/2022	45	45	45	45	13	12	10	13	11.7
9/6/2022	45	45	45	45	11	11	10	11	10.7
9/10/2022	45	45	45	45	12	12	11	12	11.7
9/14/2022	45	45	45	45	12	13	12	13	12.3
9/18/2022	45	45	45	45	14	13	11	14	12.7
9/22/2022	45	45	45	45	14	13	11	14	12.7
9/26/2022	45	45	45	45	14	14	13	14	13.7
9/30/2022	45	45	45	45	15	13	12	15	13.3
10/4/2022	45	45	45	45	14	13	12	14	13.0
10/8/2022	45	45	45	45	14	13	12	14	13.0
10/12/2022	45	45	45	45	14	14	12	14	13.3
10/16/2022	45	45	45	45	15	14	13	15	14.0

Figure D. 21

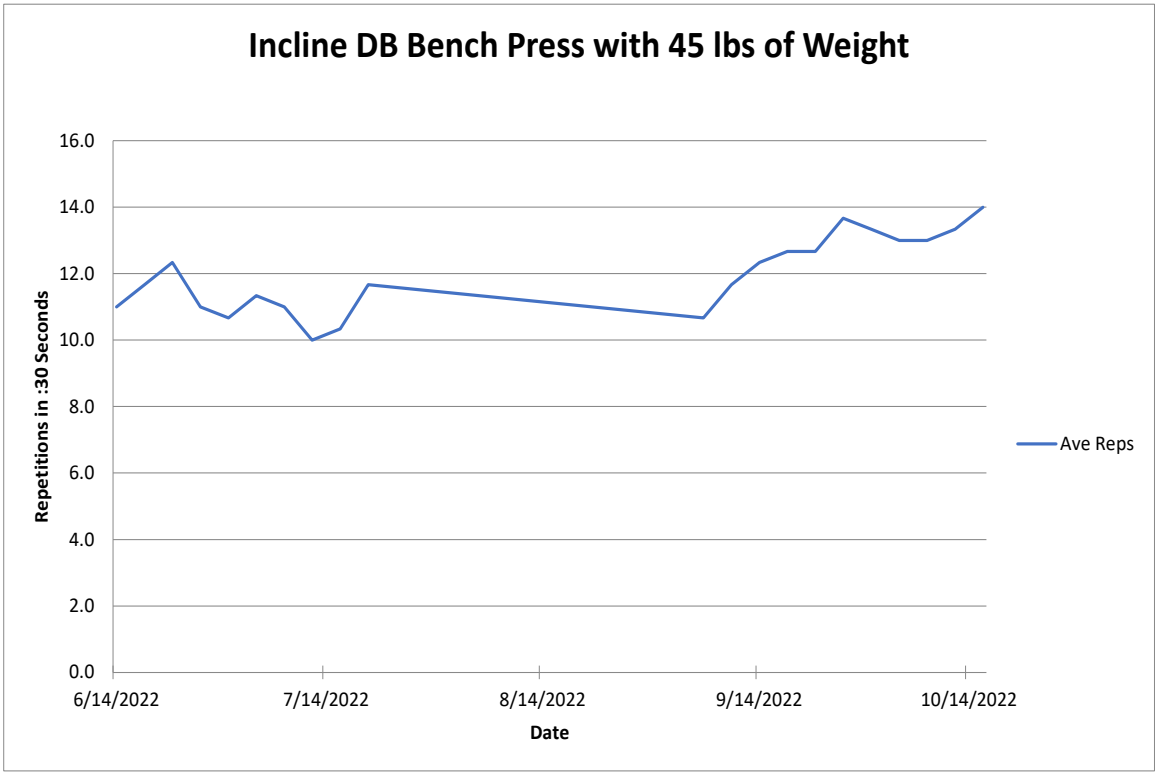


Table D. 22

Elevated Feet BB Body Row

Date	Weight Set 1	Weight Set 2	Weight Set 3	Ave Weight	Set 1 Reps	Set 2 Reps	Set 3 Reps	Max Reps	Ave Reps
6/14/2022	0	0	0	0	12	11	11	12	11.3
6/18/2022	0	0	0	0	13	12	11	13	12.0
6/22/2022	0	0	0	0	14	12	11	14	12.3
6/26/2022	0	0	0	0	14	12	11	14	12.3
6/30/2022	0	0	0	0	13	12	12	13	12.3
7/4/2022	0	0	0	0	13	12	12	13	12.3
7/8/2022	0	0	0	0	13	12	12	13	12.3
7/12/2022	0	0	0	0	14	12	10	14	12.0
7/16/2022	0	0	0	0	13	12	11	13	12.0
7/20/2022	0	0	0	0	13	11	12	13	12.0
9/6/2022	0	0	0	0	13	13	12	13	12.7
9/10/2022	0	0	0	0	14	13	12	14	13.0
9/14/2022	0	0	0	0	13	13	12	13	12.7
9/18/2022	0	0	0	0	15	14	12	15	13.7
9/22/2022	0	0	0	0	14	12	11	14	12.3
9/26/2022	0	0	0	0	14	12	12	14	12.7
9/30/2022	0	0	0	0	14	13	12	14	13.0
10/4/2022	0	0	0	0	14	13	12	14	13.0
10/8/2022	0	0	0	0	15	13	12	15	13.3
10/12/2022	0	0	0	0	15	13	12	15	13.3
10/16/2022	0	0	0	0	15	13	12	15	13.3

Figure D. 22

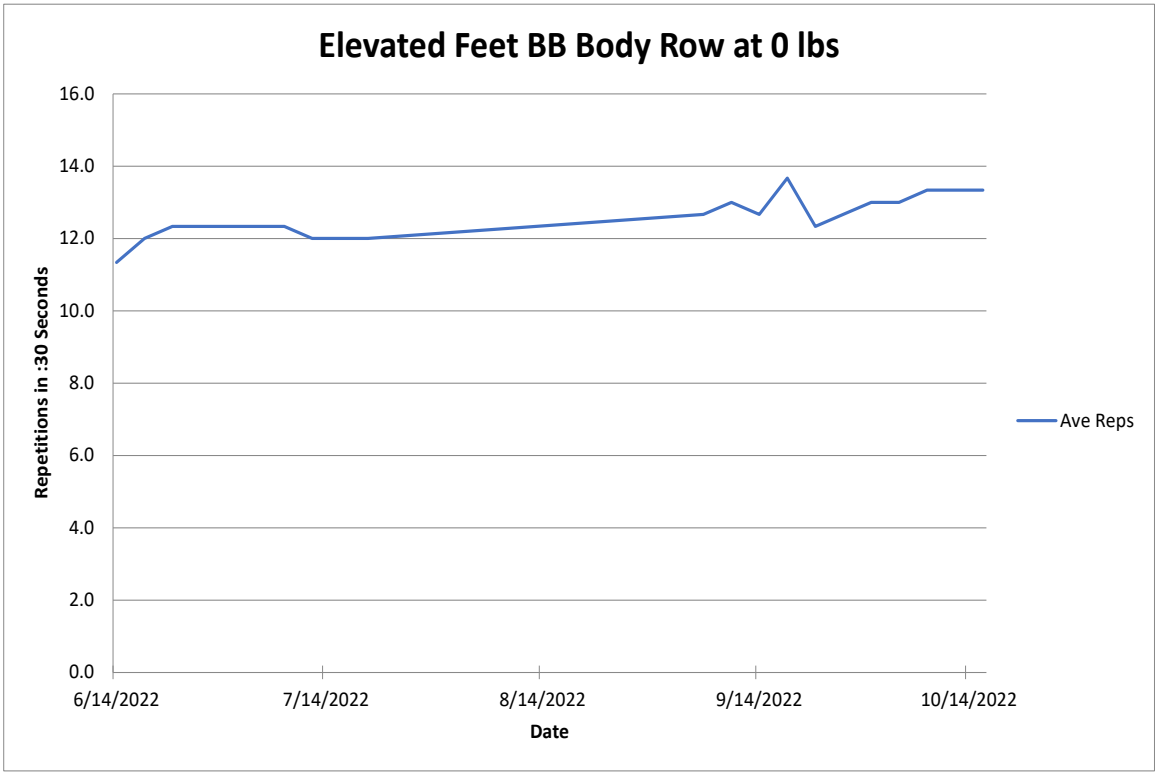


Table D. 23

SL DB RDL w/Knee Punch

					Left				Right			
Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight (lbs)	Set 1 Reps	Set 2 Reps	Set 3 Reps	Average Left Reps	Set 1 Reps2	Set 2 Reps3	Set 3 Reps4	Average Right Reps
6/14/2022	45	45	45	45.0	11	11	11	11.0	10	11	12	11.0
6/18/2022	45	45	45	45.0	11	12	12	11.7	12	11	12	11.7
6/22/2022	45	45	45	45.0	10	11	11	10.7	11	11	10	10.7
6/26/2022	45	45	45	45.0	10	11	9	10.0	11	11	11	11.0
6/30/2022	45	45	45	45.0	10	11	10	10.3	11	11	11	11.0
7/4/2022	45	45	45	45.0	10	11	11	10.7	11	11	10	10.7
7/8/2022	45	45	45	45.0	10	11	10	10.3	11	11	10	10.7
7/12/2022	45	45	45	45.0	10	10	11	10.3	11	11	11	11.0
7/16/2022	45	45	45	45.0	10	10	9	9.7	11	10	10	10.3
7/20/2022	45	45	45	45.0	10	10	10	10.0	11	9	11	10.3
9/6/2022	45	45	45	45.0	11	11	11	11.0	11	11	10	10.7
9/10/2022	50	50	50	50.0	10	10	10	10.0	10	11	10	10.3
9/14/2022	50	50	50	50.0	10	11	10	10.3	11	10	10	10.3
9/18/2022	50	50	50	50.0	10	11	9	10.0	11	11	9	10.3
9/22/2022	50	50	50	50.0	11	11	9	10.3	11	11	10	10.7
9/26/2022	50	50	50	50.0	11	11	9	10.3	10	11	10	10.3
9/30/2022	50	50	50	50.0	11	11	10	10.7	11	11	10	10.7
10/4/2022	50	50	50	50.0	10	11	10	10.3	11	11	10	10.7
10/8/2022	50	50	50	50.0	10	11	11	10.7	10	11	11	10.7
10/12/2022	50	50	50	50.0	10	11	11	10.7	10	11	11	10.7
10/16/2022	50	50	50	50.0	10	10	10	10.0	10	10	11	10.3

Figure D. 23

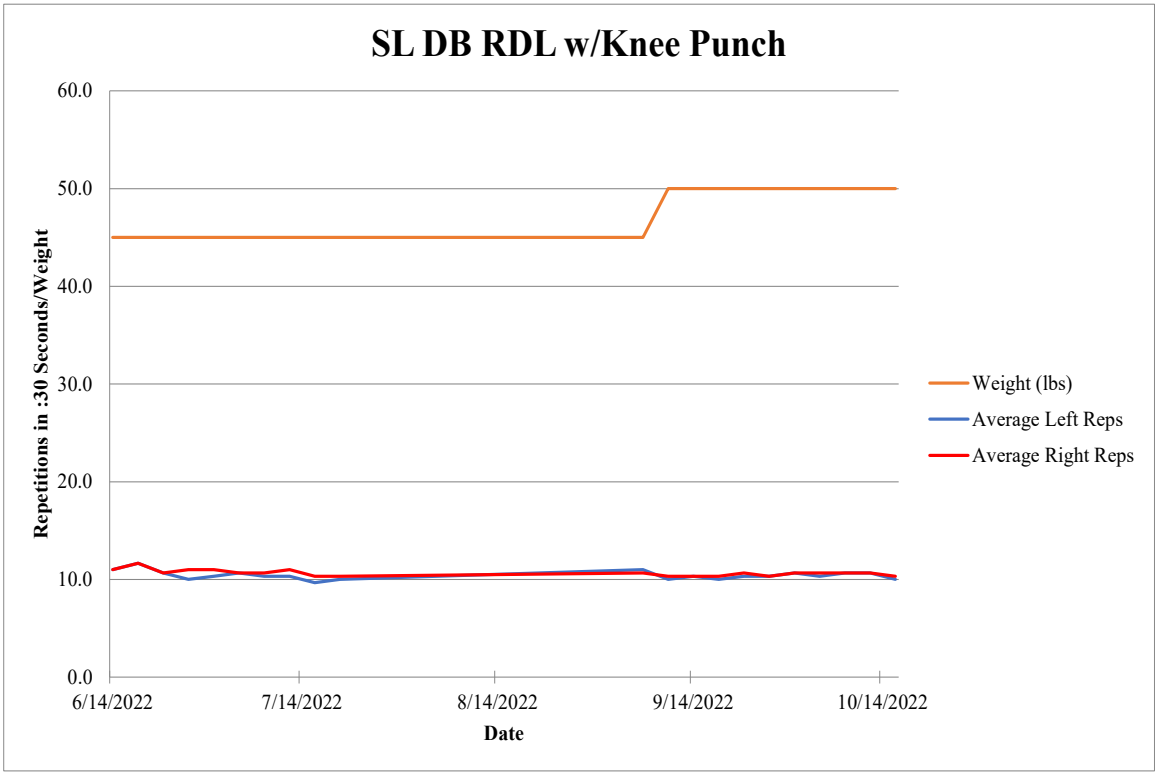


Table D. 24

Pull Ups

Date	Weight Set 1	Weight Set 2	Weight Set 3	Ave Weight	Set 1 Reps	Set 2 Reps	Set 3 Reps	Max Reps	Ave Reps
6/14/2022	0	0	0	0	7	7	5	7	6.3
6/18/2022	0	0	0	0	7	7	5	7	6.3
6/22/2022	0	0	0	0	7	6	6	7	6.3
6/26/2022	0	0	0	0	8	6	6	8	6.7
6/30/2022	0	0	0	0	8	7	6	8	7.0
7/4/2022	0	0	0	0	8	6	6	8	6.7
7/8/2022	0	0	0	0	7	7	6	7	6.7
7/12/2022	0	0	0	0	8	6	5	8	6.3
7/16/2022	0	0	0	0	7	7	5	7	6.3
7/20/2022	0	0	0	0	8	7	5	8	6.7
9/6/2022	0	0	0	0	8	8	6	8	7.3
9/10/2022	0	0	0	0	8	8	7	8	7.7
9/14/2022	0	0	0	0	9	8	6	9	7.7
9/18/2022	0	0	0	0	9	7	7	9	7.7
9/22/2022	0	0	0	0	8	7	6	8	7.0
9/26/2022	0	0	0	0	8	8	6	8	7.3
9/30/2022	0	0	0	0	8	7	6	8	7.0
10/4/2022	0	0	0	0	9	8	7	9	8.0
10/8/2022	0	0	0	0	9	7	7	9	7.7
10/12/2022	0	0	0	0	9	8	7	9	8.0
10/16/2022	0	0	0	0	7	6	5	7	6.0

Figure D. 24

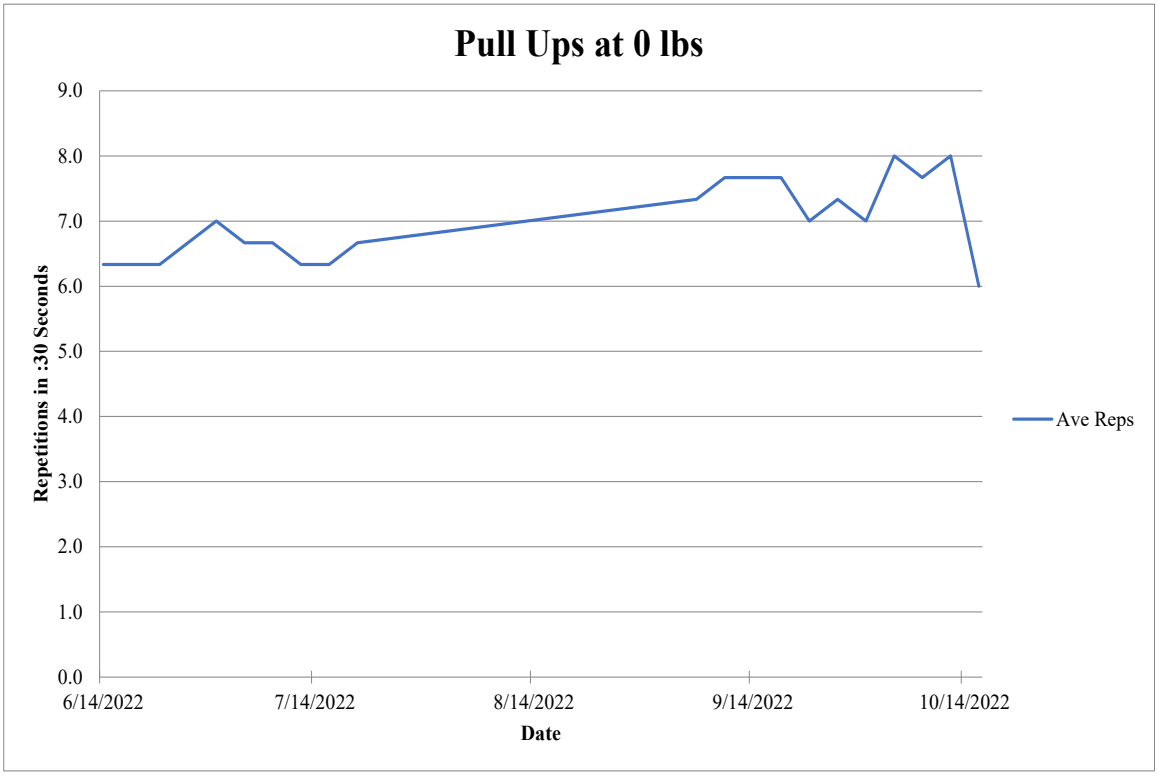


Table D. 25

V Up

Date	Weight Set 1	Weight Set 2	Weight Set 3	Ave Weight	Set 1 Reps	Set 2 Reps	Set 3 Reps	Max Reps	Ave Reps
6/14/2022	0	0	0	0	10	11	10	11	10.3
6/18/2022	0	0	0	0	12	12	11	12	11.7
6/22/2022	0	0	0	0	13	13	11	13	12.3
6/26/2022	0	0	0	0	12	13	11	13	12.0
6/30/2022	0	0	0	0	13	11	12	13	12.0
7/4/2022	0	0	0	0	12	11	11	12	11.3
7/8/2022	0	0	0	0	13	12	11	13	12.0
7/12/2022	0	0	0	0	12	12	10	12	11.3
7/16/2022	0	0	0	0	13	11	11	13	11.7
7/20/2022	0	0	0	0	13	13	11	13	12.3
9/6/2022	0	0	0	0	14	13	12	14	13.0
9/10/2022	0	0	0	0	15	13	12	15	13.3
9/14/2022	0	0	0	0	14	13	12	14	13.0
9/18/2022	0	0	0	0	15	13	12	15	13.3
9/22/2022	0	0	0	0	15	13	11	15	13.0
9/26/2022	0	0	0	0	15	14	12	15	13.7
9/30/2022	0	0	0	0	13	12	12	13	12.3
10/4/2022	0	0	0	0	15	13	11	15	13.0
10/8/2022	0	0	0	0	15	13	13	15	13.7
10/12/2022	0	0	0	0	15	15	13	15	14.3
10/16/2022	0	0	0	0	13	12	12	13	12.3

Figure D. 25

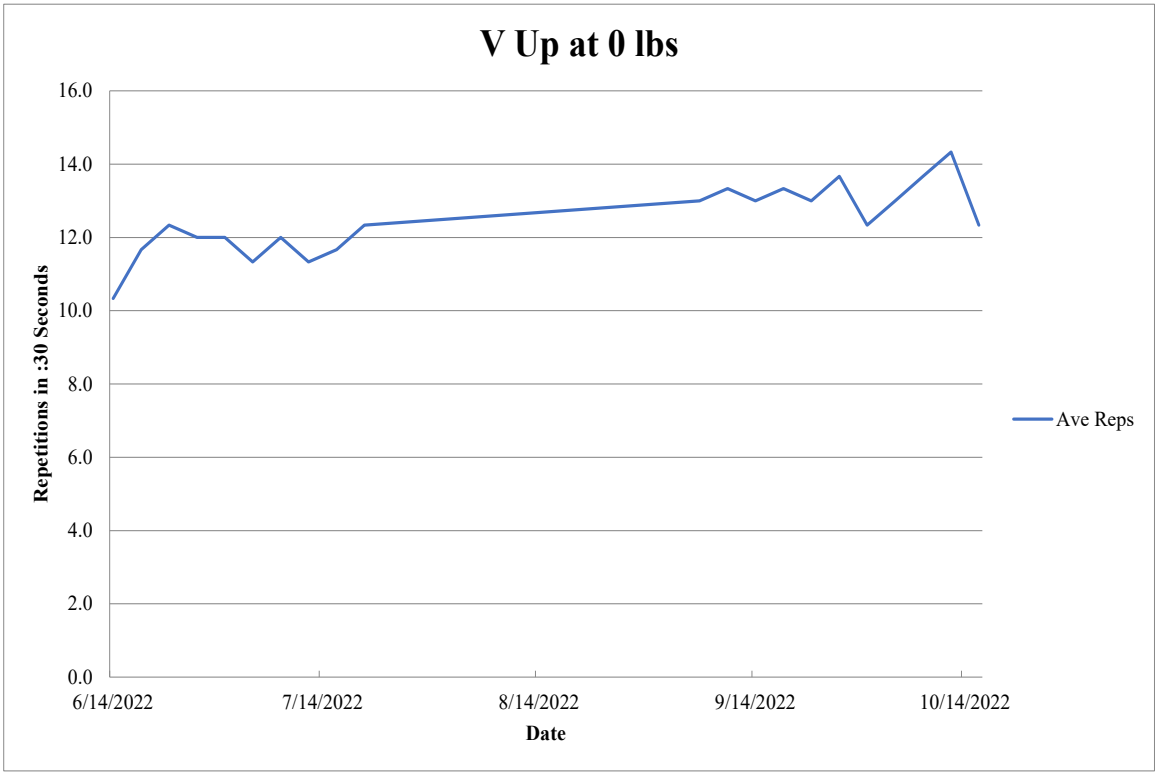


Table D. 26

SA ALT DB

Date	Weight Set 1	Weight Set 2	Weight Set 3	Max Weight (lbs)	Ave Weight (lbs)	Set 1 Reps	Set 2 Reps	Set 3 Reps	Ave Reps
6/14/2022	35	30	30	35	32	10	14	13	12.3
6/18/2022	30	30	30	30	30	14	14	13	13.7
6/22/2022	30	30	30	30	30	14	15	12	13.7
6/26/2022	30	30	30	30	30	15	14	13	14.0
6/30/2022	30	30	30	30	30	14	13	12	13.0
7/4/2022	30	30	30	30	30	14	14	13	13.7
7/8/2022	30	30	30	30	30	15	13	12	13.3
7/12/2022	30	30	30	30	30	12	12	11	11.7
7/16/2022	30	30	30	30	30	13	12	12	12.3
7/20/2022	30	30	30	30	30	14	13	12	13.0
9/6/2022	30	30	30	30	30	16	15	14	15.0
9/10/2022	30	30	30	30	30	16	16	15	15.7
9/14/2022	30	30	30	30	30	16	16	16	16.0
9/18/2022	35	35	35	35	35	15	16	14	15.0
9/22/2022	35	35	35	35	35	14	13	13	13.3
9/26/2022	35	35	35	35	35	15	14	13	14.0
9/30/2022	35	35	35	35	35	13	12	12	12.3
10/4/2022	35	35	35	35	35	16	16	14	15.3
10/8/2022	35	35	35	35	35	16	16	14	15.3
10/12/2022	35	35	35	35	35	16	16	16	16.0
10/16/2022	35	35	35	35	35	18	14	14	15.3

Figure D. 26

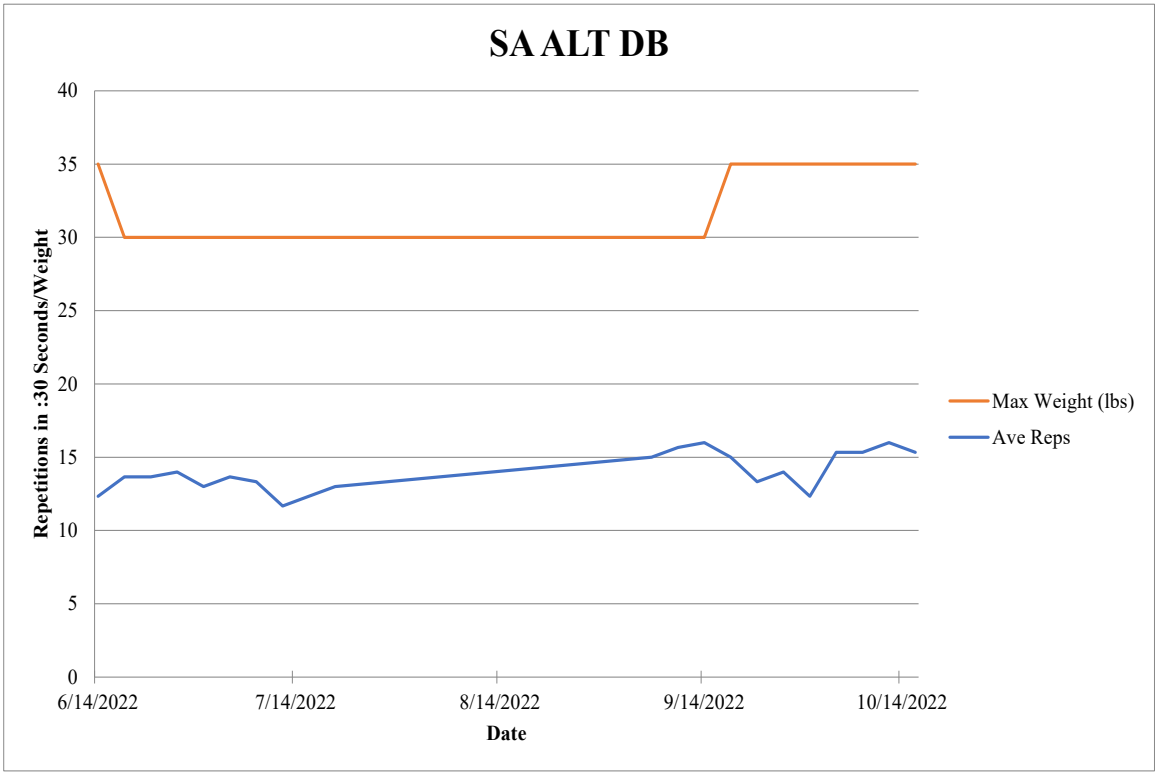


Table D. 27

Incline DB Row

Date	Weight Set 1	Weight Set 2	Weight Set 3	Max Weight (lbs)	Ave Weight (lbs)	Set 1 Reps	Set 2 Reps	Set 3 Reps	Ave Reps
6/14/2022	45	30	30	45	35	9	14	13	12.0
6/18/2022	30	30	30	30	30	12	13	15	13.3
6/22/2022	30	30	30	30	30	14	14	13	13.7
6/26/2022	30	30	30	30	30	12	12	10	11.3
6/30/2022	30	30	30	30	30	13	12	13	12.7
7/4/2022	30	30	30	30	30	13	12	11	12.0
7/8/2022	30	30	30	30	30	14	13	12	13.0
7/12/2022	30	30	30	30	30	14	11	12	12.3
7/16/2022	30	30	30	30	30	12	12	12	12.0
7/20/2022	30	30	30	30	30	13	13	12	12.7
9/6/2022	30	30	30	30	30	14	13	12	13.0
9/10/2022	30	30	30	30	30	15	14	13	14.0
9/14/2022	30	30	30	30	30	15	15	15	15.0
9/18/2022	35	35	35	35	35	14	13	12	13.0
9/22/2022	35	35	35	35	35	14	13	13	13.3
9/26/2022	35	35	35	35	35	13	12	13	12.7
9/30/2022	35	35	35	35	35	14	13	12	13.0
10/4/2022	35	35	35	35	35	15	13	14	14.0
10/8/2022	35	35	35	35	35	14	13	13	13.3
10/12/2022	35	35	35	35	35	15	14	14	14.3
10/16/2022	35	35	35	35	35	13	12	10	11.7

Figure D. 27

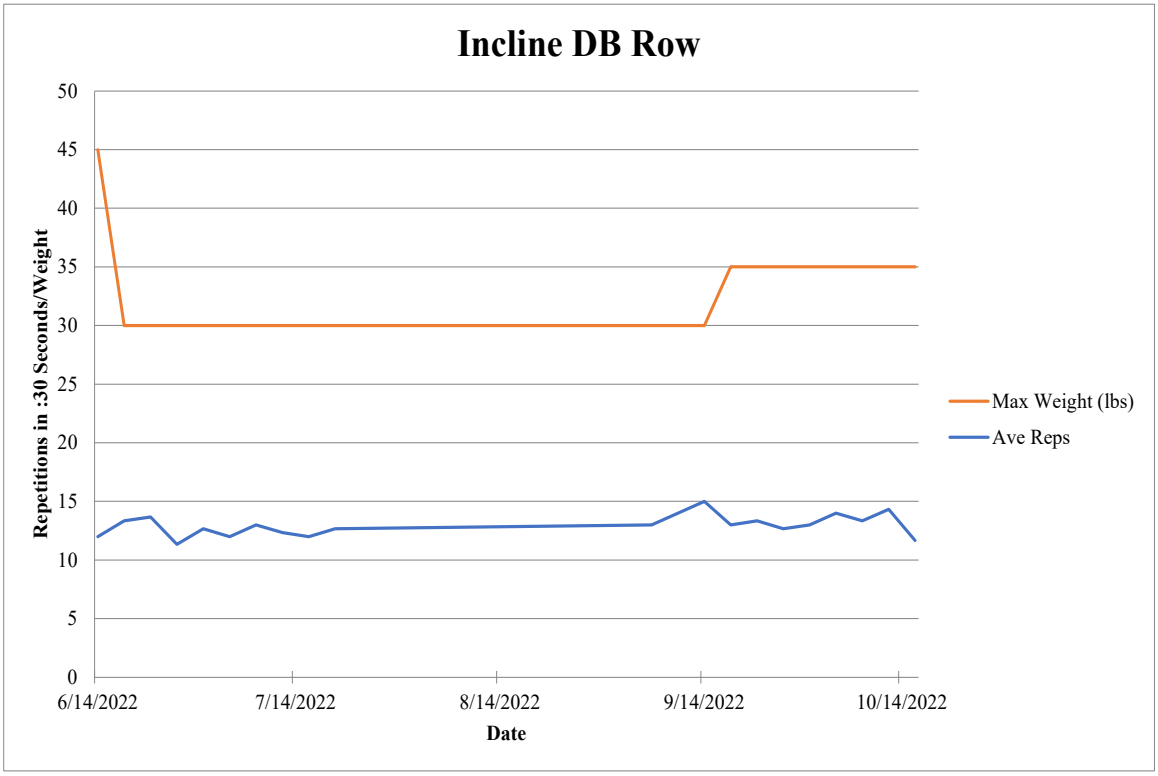


Table D. 28

Split Squat Jumps

Date	Weight Set 1	Weight Set 2	Weight Set 3	Ave Weight	Set 1 Reps	Set 2 Reps	Set 3 Reps	Max Reps	Ave Reps
6/14/2022	0	0	0	0	23	22	24	24	23.0
6/18/2022	0	0	0	0	24	22	26	26	24.0
6/22/2022	0	0	0	0	26	26	23	26	25.0
6/26/2022	0	0	0	0	28	27	28	28	27.7
6/30/2022	0	0	0	0	25	25	24	25	24.7
7/4/2022	0	0	0	0	21	23	25	25	23.0
7/8/2022	0	0	0	0	24	24	23	24	23.7
7/12/2022	0	0	0	0	24	23	20	24	22.3
7/16/2022	0	0	0	0	24	22	21	24	22.3
7/20/2022	0	0	0	0	25	23	24	25	24.0
9/6/2022	0	0	0	0	23	22	22	23	22.3
9/10/2022	0	0	0	0	24	24	22	24	23.3
9/14/2022	0	0	0	0	23	24	22	24	23.0
9/18/2022	0	0	0	0	25	26	24	26	25.0
9/22/2022	0	0	0	0	24	24	22	24	23.3
9/26/2022	0	0	0	0	24	25	24	25	24.3
9/30/2022	0	0	0	0	24	25	24	25	24.3
10/4/2022	0	0	0	0	25	25	23	25	24.3
10/8/2022	0	0	0	0	24	26	24	26	24.7
10/12/2022	0	0	0	0	24	25	24	25	24.3
10/16/2022	0	0	0	0	26	23	19	26	22.7

Figure D. 28

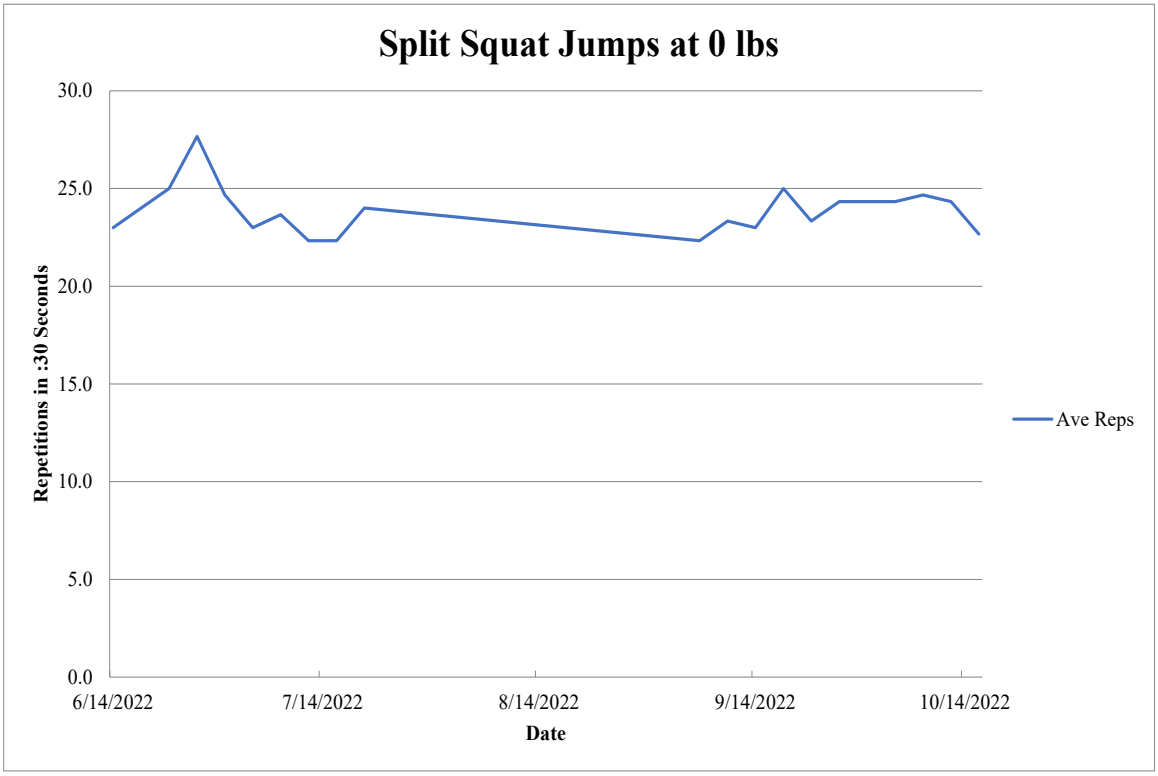


Table D. 29
Heart Rate at End of 3rd Set

Date	Heart Rate
6/14/2022	138
6/18/2022	148
6/22/2022	131
6/26/2022	131
6/30/2022	134
7/4/2022	146
7/8/2022	138
7/12/2022	148
7/16/2022	139
7/20/2022	137
9/6/2022	147
9/10/2022	140
9/14/2022	147
9/18/2022	146
9/22/2022	146
9/26/2022	161
9/30/2022	155
10/4/2022	149
10/8/2022	149
10/12/2022	162
10/16/2022	181

Figure D. 29

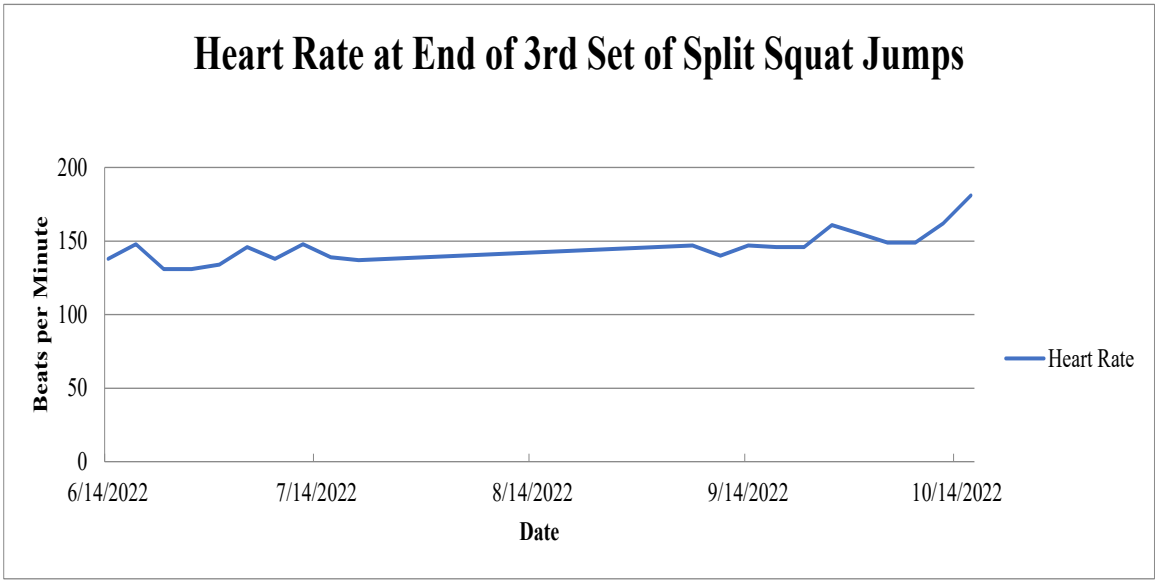


Table D. 30

BB Back Squat

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Max Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
6/14/2022	185	205	235	260	270	270	231.0	8	6	3	2	2	4.2
6/19/2022	185	205	235	255	260	260	228.0	8	6	3	2	2	4.2
6/23/2022	185	205	235	265	275	275	233.0	8	6	3	2	2	4.2
6/27/2022	190	210	245	270	275	275	238.0	8	6	3	2	2	4.2
7/1/2022	195	215	245	265	275	275	239.0	8	6	3	2	2	4.2
7/5/2022	200	220	245	265	275	275	241.0	8	6	3	2	2	4.2
7/9/2022	200	220	250	265	275	275	242.0	8	6	3	2	1	4.0
7/13/2022	200	225	255	270	280	280	246.0	8	6	3	2	2	4.2
7/17/2022	200	225	255	270	270	270	244.0	8	6	3	2	2	4.2
7/21/2022	210	235	260	275	290	290	254.0	8	6	3	2	1	4.0
9/7/2022	210	235	260	290	300	300	259.0	8	6	3	2	2	4.2
9/11/2022	220	235	275	300	310	310	268.0	8	6	3	2	2	4.2
9/15/2022	235	260	280	290	300	300	273.0	8	6	3	2	2	4.2
9/19/2022	240	260	290	300	305	305	279.0	8	6	3	2	2	4.2
9/23/2022	250	260	290	300	305	305	281.0	8	6	3	2	2	4.2
9/27/2022	255	265	290	300	305	305	283.0	8	6	3	2	2	4.2
10/1/2022	255	265	290	300	305	305	283.0	8	6	3	2	2	4.2
10/5/2022	255	265	290	295	295	295	280.0	8	6	3	2	2	4.2
10/9/2022	260	270	290	300	305	305	285.0	8	6	3	2	2	4.2
10/13/2022	255	265	280	290	295	295	277.0	8	6	3	2	2	4.2
10/17/2022	255	265	275	295	300	300	278.0	8	6	3	2	2	4.2

Figure D. 30

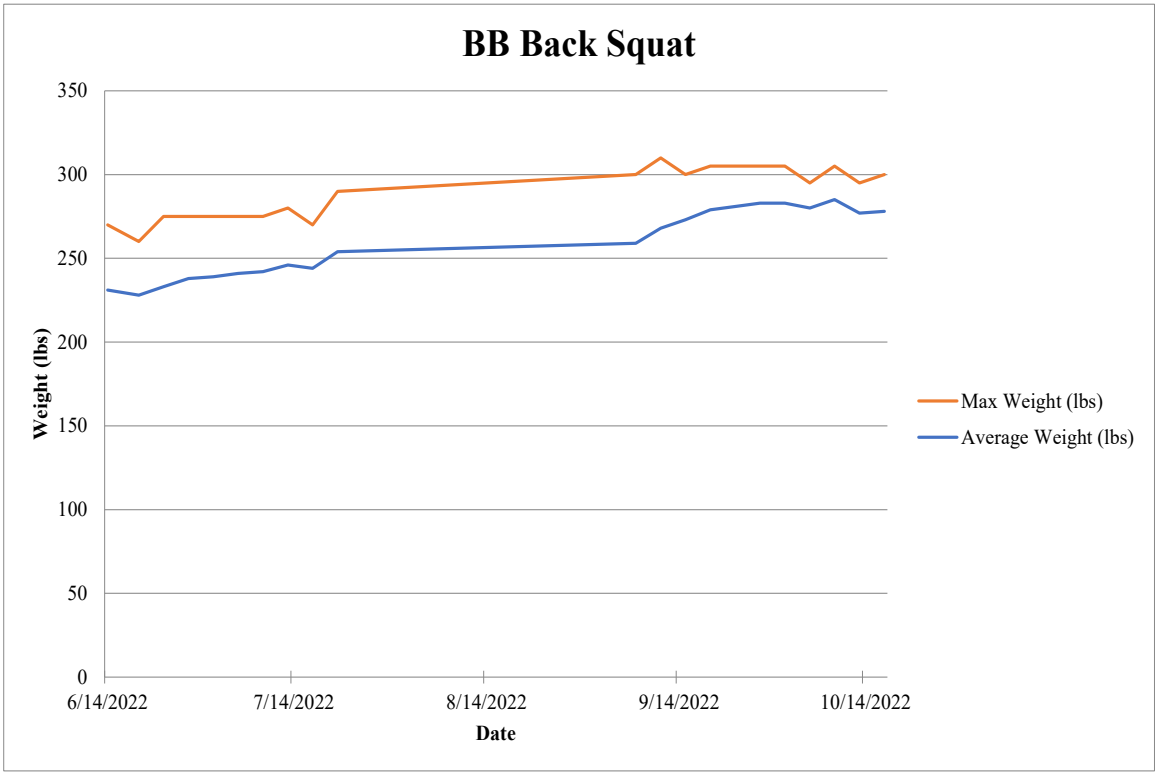


Table D. 31

BB Shoulder Press

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Max Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
6/14/2022	80	85	95	105	115	115	96.0	8	6	3	2	2	4.2
6/19/2022	80	85	95	105	105	105	94.0	8	6	3	2	2	4.2
6/23/2022	85	90	95	105	110	110	97.0	8	6	3	2	2	4.2
6/27/2022	85	95	105	110	110	110	101.0	8	6	3	2	1	4.0
7/1/2022	90	95	100	105	110	110	100.0	8	6	3	2	1	4.0
7/5/2022	90	95	100	105	110	110	100.0	8	6	3	2	2	4.2
7/9/2022	90	95	100	105	110	110	100.0	8	6	3	2	2	4.2
7/13/2022	90	95	100	110	115	115	102.0	8	6	3	2	2	4.2
7/17/2022	90	95	100	105	110	110	100.0	8	6	3	2	2	4.2
7/21/2022	95	100	105	115	120	120	107.0	8	6	3	2	2	4.2
9/7/2022	95	105	115	125	125	125	113.0	8	6	3	2	2	4.2
9/11/2022	95	105	115	125	125	125	113.0	8	6	3	2	2	4.2
9/15/2022	95	105	115	125	125	125	113.0	8	6	3	2	2	4.2
9/19/2022	100	105	110	120	120	120	111.0	8	6	3	2	2	4.2
9/23/2022	100	105	115	120	125	125	113.0	8	6	3	2	2	4.2
9/27/2022	100	105	115	125	125	125	114.0	8	6	3	2	2	4.2
10/1/2022	100	105	115	125	125	125	114.0	8	6	3	2	2	4.2
10/5/2022	100	105	115	120	120	120	112.0	8	6	3	2	2	4.2
10/9/2022	105	110	120	125	125	125	117.0	8	6	3	2	2	4.2
10/13/2022	105	110	120	125	130	130	118.0	8	6	3	2	2	4.2
10/17/2022	100	105	110	120	125	125	112.0	8	6	3	2	2	4.2

Figure D. 31

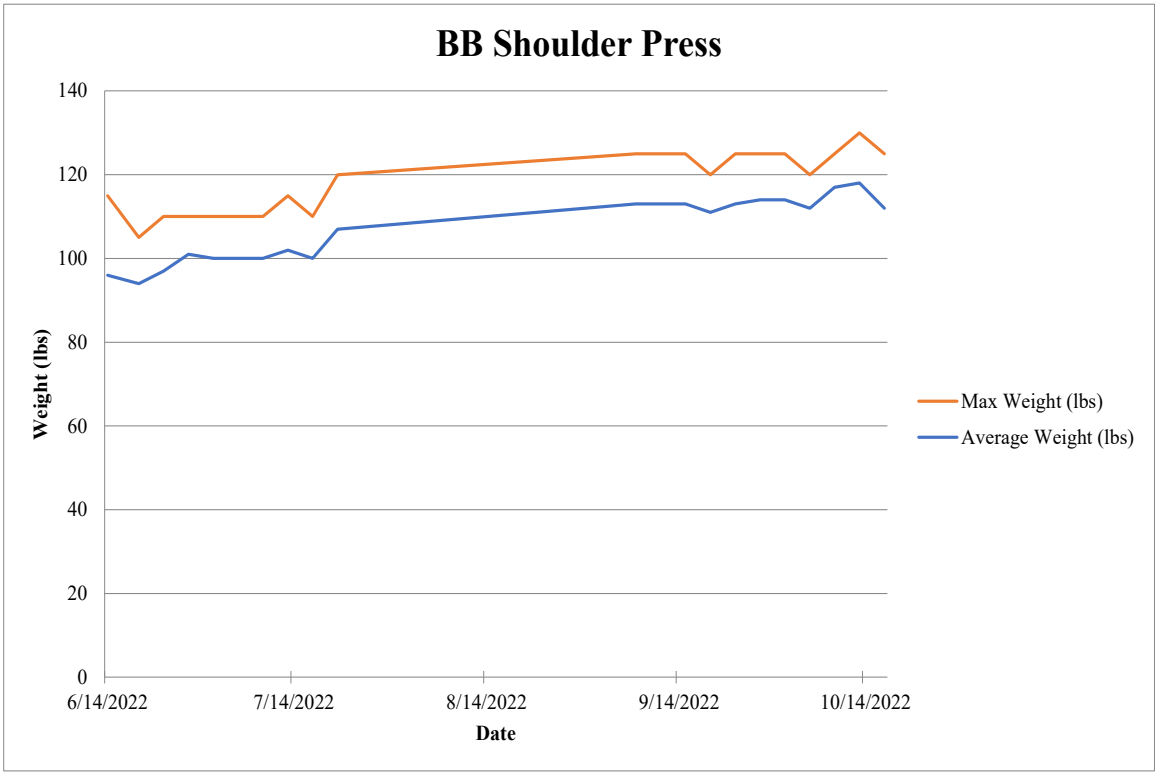


Table D. 32

Hex Bar Deadlift

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Max Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
6/14/2022	240	265	275	290	300	300	274.0	8	6	3	2	2	4.2
6/19/2022	240	255	265	275	290	290	265.0	8	6	3	2	2	4.2
6/23/2022	240	255	265	280	300	300	268.0	8	6	3	2	2	4.2
6/27/2022	240	260	280	290	295	295	273.0	8	6	3	2	2	4.2
7/1/2022	240	260	275	285	285	285	269.0	8	6	3	2	2	4.2
7/5/2022	220	240	240	245	255	255	240.0	8	6	3	2	2	4.2
7/9/2022	220	235	250	260	270	270	247.0	8	6	3	2	2	4.2
7/13/2022	220	240	260	270	280	280	254.0	8	6	3	2	2	4.2
7/17/2022	220	240	260	270	280	280	254.0	8	6	3	2	2	4.2
7/21/2022	230	250	275	290	300	300	269.0	8	6	3	2	2	4.2
9/7/2022	240	270	290	300	310	310	282.0	8	6	3	2	2	4.2
9/11/2022	250	280	300	320	320	320	294.0	8	6	3	2	2	4.2
9/15/2022	250	280	300	320	320	320	294.0	8	6	3	2	2	4.2
9/19/2022	250	280	300	320	320	320	294.0	8	6	3	2	2	4.2
9/23/2022	250	280	310	320	320	320	296.0	8	6	3	2	2	4.2
9/27/2022	260	285	305	320	320	320	298.0	8	6	3	2	2	4.2
10/1/2022	260	290	310	320	320	320	300.0	8	6	3	2	2	4.2
10/5/2022	260	290	310	320	320	320	300.0	8	6	3	2	2	4.2
10/9/2022	270	290	310	320	320	320	302.0	8	6	3	2	2	4.2
10/13/2022	270	290	310	330	340	340	308.0	8	6	3	2	2	4.2
10/17/2022	270	290	310	330	330	330	306.0	8	6	3	2	2	4.2

Figure D. 32

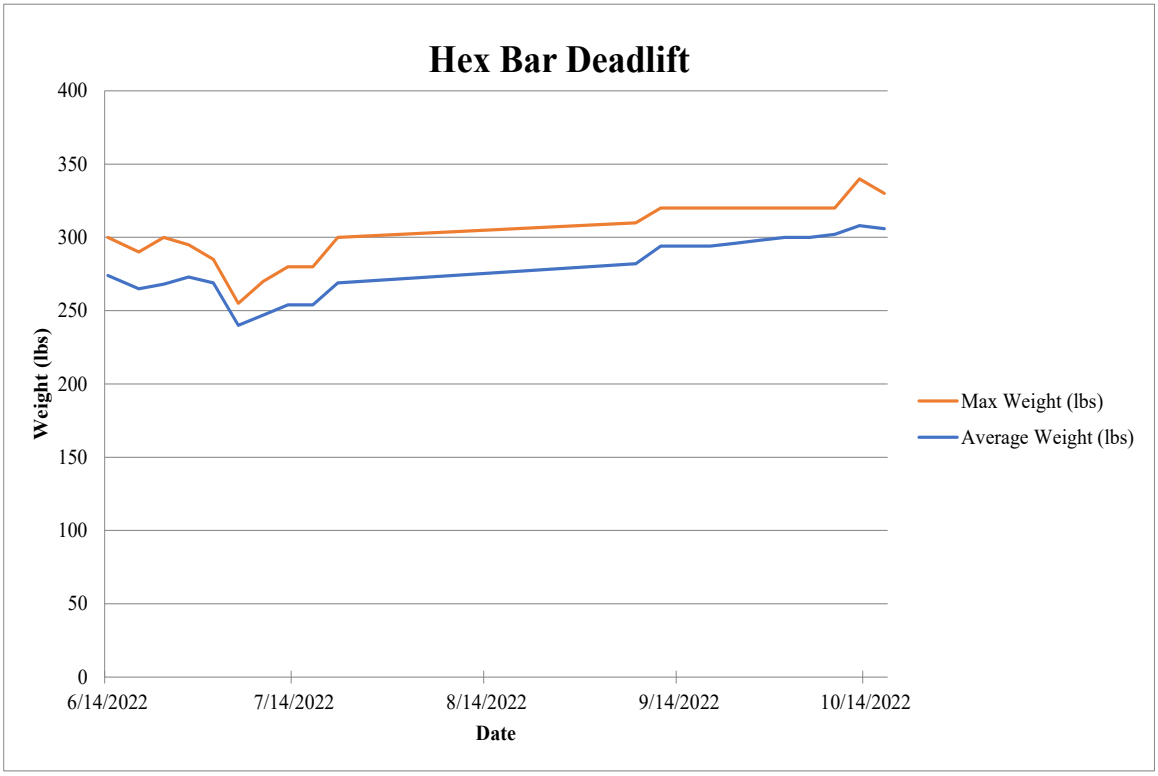


Table D. 33

BB Incline Bench Press

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Max Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
6/14/2022	145	150	160	170	175	175	160.0	8	6	3	2	2	4.2
6/19/2022	145	150	160	165	170	170	158.0	8	6	3	2	2	4.2
6/23/2022	145	155	165	170	175	175	162.0	8	6	3	2	2	4.2
6/27/2022	150	160	170	175	175	175	166.0	8	6	3	2	2	4.2
7/1/2022	155	160	170	175	180	180	168.0	8	6	3	2	2	4.2
7/5/2022	155	160	170	175	180	180	168.0	8	6	3	2	2	4.2
7/9/2022	155	160	170	175	180	180	168.0	8	6	3	2	2	4.2
7/13/2022	155	160	170	175	180	180	168.0	8	6	3	2	1	4.0
7/17/2022	155	165	170	175	175	175	168.0	8	5	3	2	2	4.0
7/21/2022	155	165	175	180	185	185	172.0	8	6	3	2	2	4.2
9/7/2022	155	165	185	190	190	190	177.0	8	6	3	2	1	4.0
9/11/2022	155	165	185	185	175	185	173.0	8	6	3	1	2	4.0
9/15/2022	155	165	175	180	190	190	173.0	8	6	3	2	2	4.2
9/19/2022	155	160	165	170	175	175	165.0	8	6	3	2	2	4.2
9/23/2022	155	160	170	175	180	180	168.0	8	6	3	2	2	4.2
9/27/2022	160	165	175	180	185	185	173.0	8	6	3	2	2	4.2
10/1/2022	160	170	180	185	185	185	176.0	8	6	3	2	2	4.2
10/5/2022	160	165	175	185	190	190	175.0	8	6	3	2	2	4.2
10/9/2022	160	170	180	190	190	190	178.0	8	6	3	2	2	4.2
10/13/2022	165	170	175	190	190	190	178.0	8	6	3	2	2	4.2
10/17/2022	165	175	180	185	185	185	178.0	8	6	3	2	2	4.2

Figure D. 33

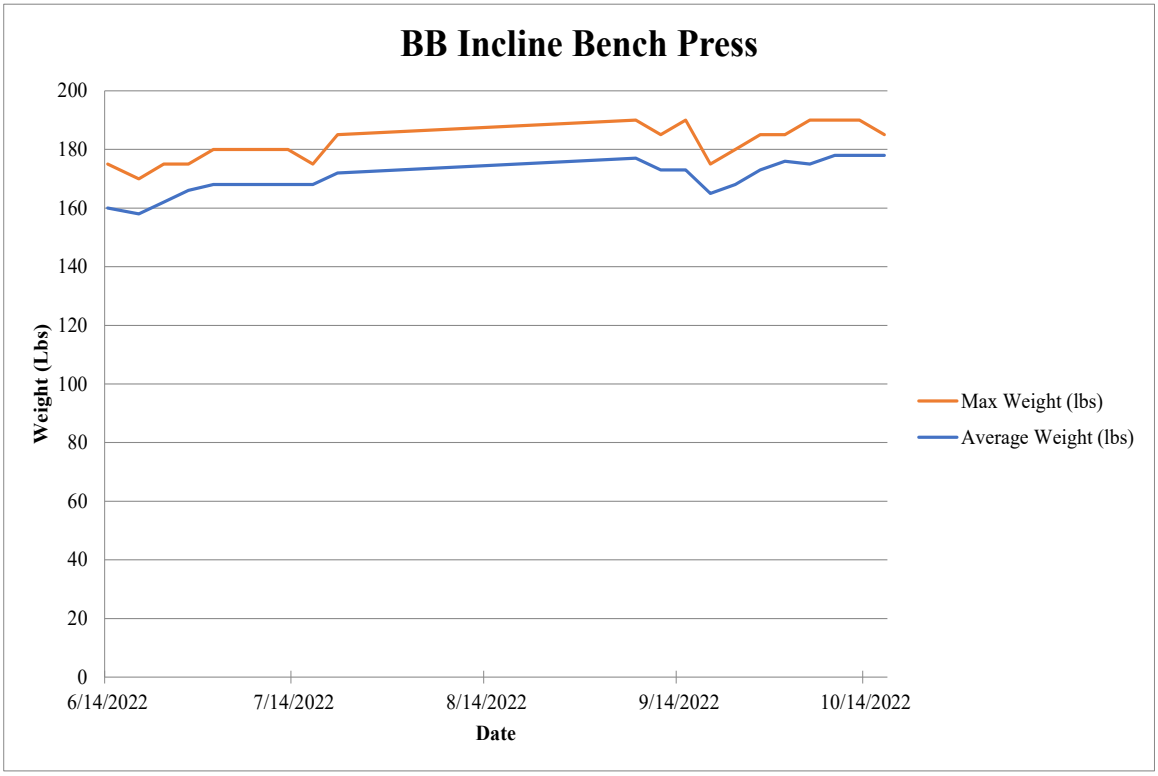


Table D. 34

BB Split Squat

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Max Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
6/14/2022	125	130	140	155	155	155	141.0	8	6	3	2	2	4.2
6/19/2022	115	125	135	140	140	140	131.0	8	6	3	2	2	4.2
6/23/2022	115	130	140	155	160	160	140.0	8	6	3	2	2	4.2
6/27/2022	115	125	145	155	155	155	139.0	8	6	3	2	2	4.2
7/1/2022	120	130	145	160	165	165	144.0	8	6	3	2	2	4.2
7/5/2022	125	135	145	155	160	160	144.0	8	6	3	2	2	4.2
7/9/2022	125	135	145	155	165	165	145.0	8	6	3	2	2	4.2
7/13/2022	125	135	145	165	175	175	149.0	8	6	3	2	2	4.2
7/17/2022	125	135	145	155	165	165	145.0	8	6	3	2	2	4.2
7/21/2022	125	135	145	155	170	170	146.0	8	6	3	2	2	4.2
9/7/2022	125	145	165	180	185	185	160.0	8	6	3	2	2	4.2
9/11/2022	135	145	165	180	185	185	162.0	8	6	3	2	2	4.2
9/15/2022	135	145	170	180	190	190	164.0	8	6	3	2	2	4.2
9/19/2022	140	150	170	180	190	190	166.0	8	6	3	2	2	4.2
9/23/2022	140	150	170	190	200	200	170.0	8	6	3	2	2	4.2
9/27/2022	140	150	170	180	200	200	168.0	8	6	3	2	2	4.2
10/1/2022	145	155	175	190	195	195	172.0	8	6	3	2	2	4.2
10/5/2022	145	155	175	190	200	200	173.0	8	6	3	2	2	4.2
10/9/2022	145	155	175	200	200	200	175.0	8	6	3	2	2	4.2
10/13/2022	145	160	190	200	200	200	179.0	8	6	3	2	2	4.2
10/17/2022	145	155	175	200	200	200	175.0	8	6	3	2	2	4.2

Figure D. 34

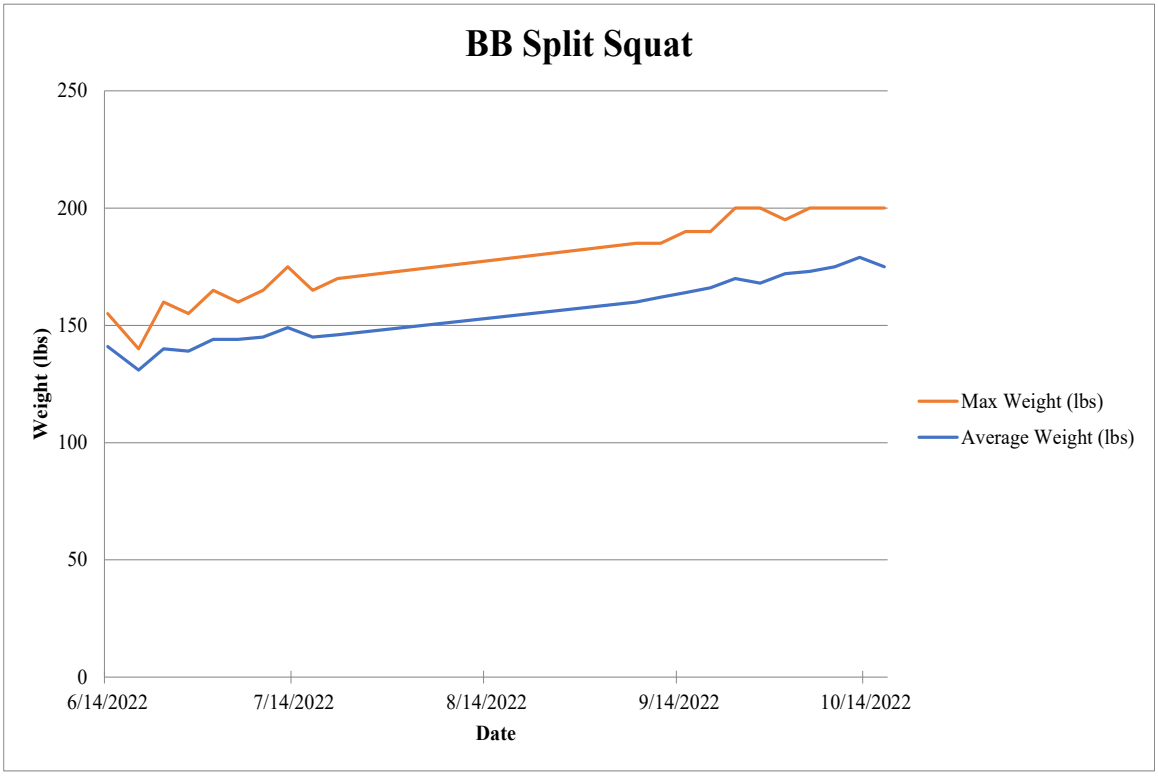


Table D. 35

BB Bent Over Rows

Date	Weight Set 1	Weight Set 2	Weight Set 3	Weight Set 4	Weight Set 5	Max Weight (lbs)	Average Weight (lbs)	Reps Set 1	Reps Set 2	Reps Set 3	Reps Set 4	Reps Set 5	Ave Reps
6/14/2022	140	150	165	170	170	170	159.0	8	6	3	2	2	4.2
6/19/2022	140	145	155	160	160	160	152.0	8	6	3	2	2	4.2
6/23/2022	140	145	155	165	165	165	154.0	8	6	3	2	2	4.2
6/27/2022	140	150	160	165	165	165	156.0	8	5	3	2	1	3.8
7/1/2022	140	150	160	165	165	165	156.0	8	6	3	2	2	4.2
7/5/2022	135	145	155	160	165	165	152.0	8	6	3	2	2	4.2
7/9/2022	135	140	155	165	170	170	153.0	8	6	3	2	2	4.2
7/13/2022	140	145	155	165	165	165	154.0	8	6	3	2	2	4.2
7/17/2022	140	145	155	170	175	175	157.0	8	6	3	2	2	4.2
7/21/2022	145	150	160	170	180	180	161.0	8	6	3	2	1	4.0
9/7/2022	145	155	170	180	185	185	167.0	8	6	3	2	2	4.2
9/11/2022	145	155	170	180	185	185	167.0	8	6	3	2	2	4.2
9/15/2022	145	160	170	180	190	190	169.0	8	6	3	2	2	4.2
9/19/2022	145	160	170	180	190	190	169.0	8	6	3	2	2	4.2
9/23/2022	150	160	170	180	190	190	170.0	8	6	3	2	2	4.2
9/27/2022	150	160	170	180	190	190	170.0	8	6	3	2	2	4.2
10/1/2022	150	160	170	180	190	190	170.0	8	6	3	2	2	4.2
10/5/2022	150	160	175	185	190	190	172.0	8	6	3	2	2	4.2
10/9/2022	155	165	175	185	190	190	174.0	8	6	3	2	2	4.2
10/13/2022	155	165	175	190	190	190	175.0	8	6	3	2	2	4.2
10/17/2022	155	160	175	185	195	195	174.0	8	6	3	2	2	4.2

Figure D. 35

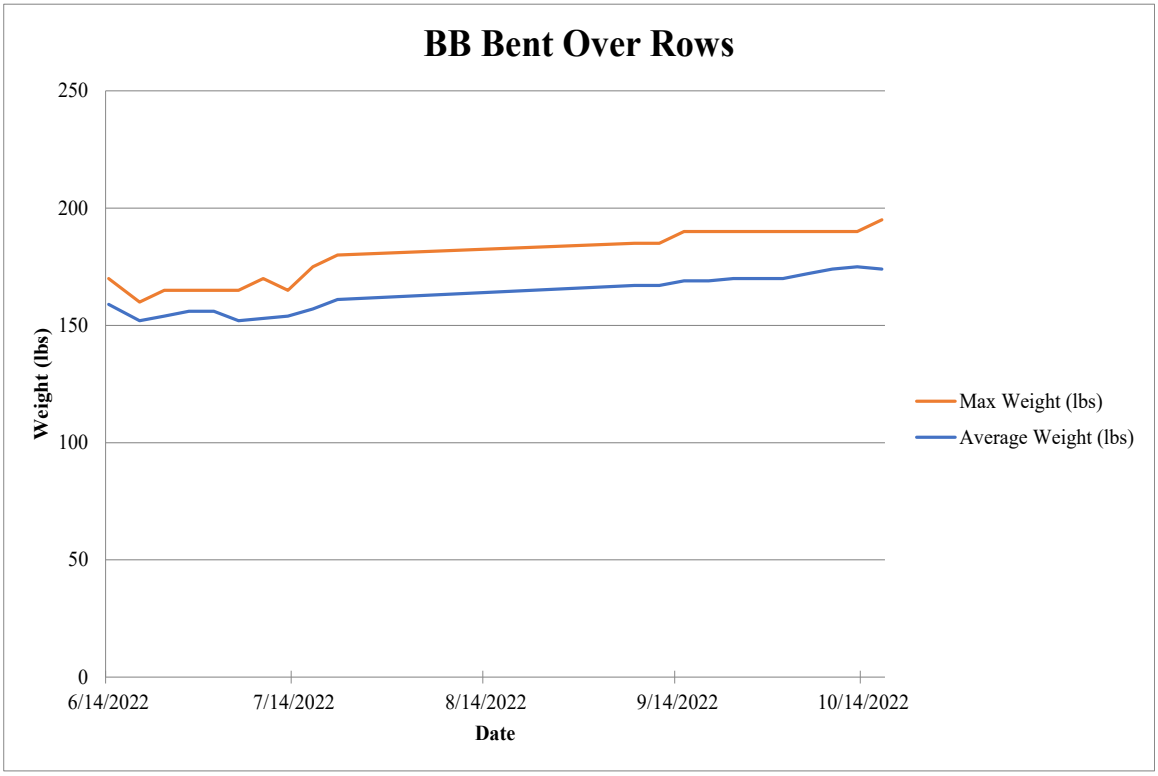


Table D. 36
Heart Rate at End of 5th Set of BB Bent Over Rows

Date	Heart Rate	
6/14/2022	76	
6/19/2022	90	
6/23/2022	116	
6/27/2022	98	
	0	no data
	0	no data
7/9/2022	96	
7/13/2022	101	
	0	no data
	0	no data
9/7/2022	82	
9/11/2022	91	
9/15/2022	93	
9/19/2022	87	
9/23/2022	88	
9/27/2022	85	
10/1/2022	93	
10/5/2022	93	
10/9/2022	99	
10/13/2022	101	
10/17/2022	97	

Figure D. 36

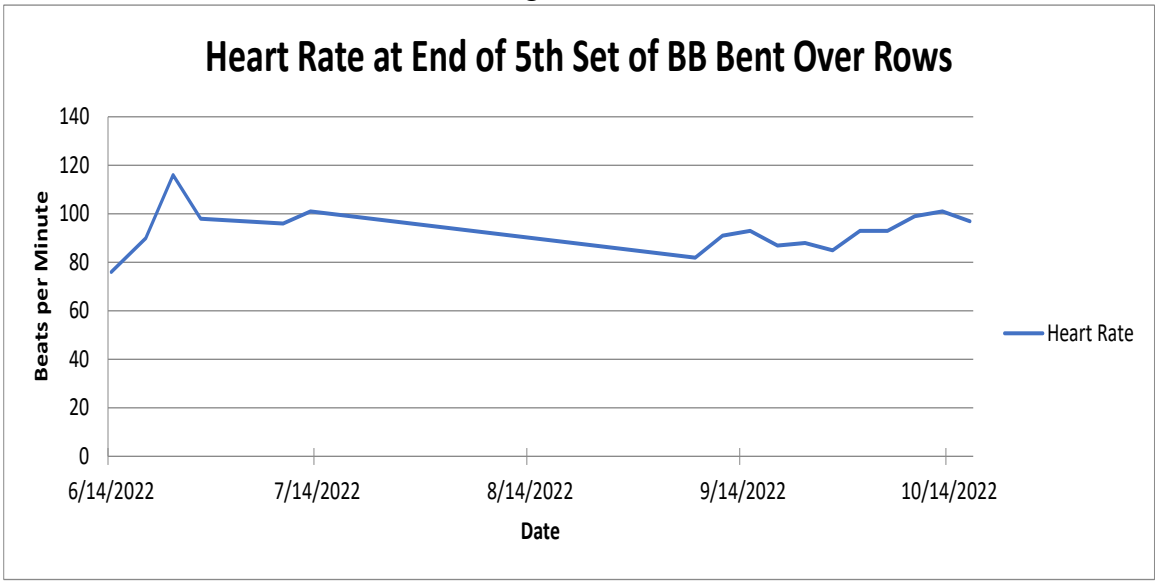


Table D. 37

Interval Training - Minutes per Mile

Elapsed Time

Date	Minutes	Seconds	Distance	Minutes per Mile	Heartbeat at End of Interval Sprints
6/14/2022	23	26	2.95	7.94	171
6/19/2022	26	33	2.93	9.06	153
6/23/2022	26	51	2.94	9.13	173
6/27/2022	24	6	2.97	8.11	141
7/1/2022	25	48	3.30	7.82	156
7/5/2022	27	13	3.49	7.80	139
7/9/2022	24	38	2.95	8.35	155
7/13/2022	25	46	2.95	8.73	150
7/17/2022	25	11	2.96	8.51	161
7/21/2022	30	49	4.07	7.57	157
9/7/2022	23	1	3.08	7.47	153
9/11/2022	25	43	3.42	7.52	143
9/15/2022	26	1	3.42	7.61	137
9/19/2022	25	30	3.42	7.46	145
9/23/2022	25	44	3.42	7.52	143
9/27/2022	25	25	3.42	7.43	151
10/1/2022	25	9	3.42	7.35	161
10/5/2022	25	1	3.42	7.31	155
10/9/2022	25	9	3.42	7.35	161
10/13/2022	24	58	3.42	7.30	163
10/17/2022	27	42	3.42	8.10	176

Figure D. 37

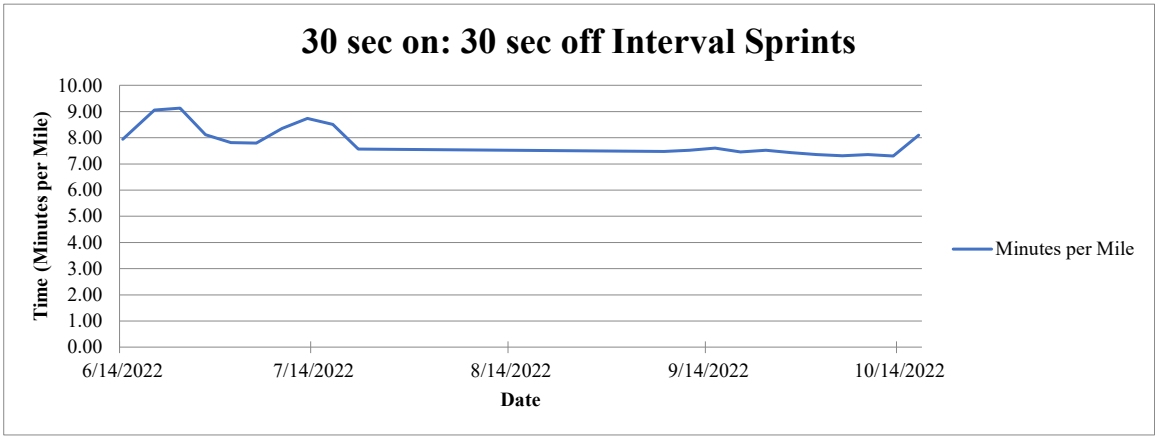
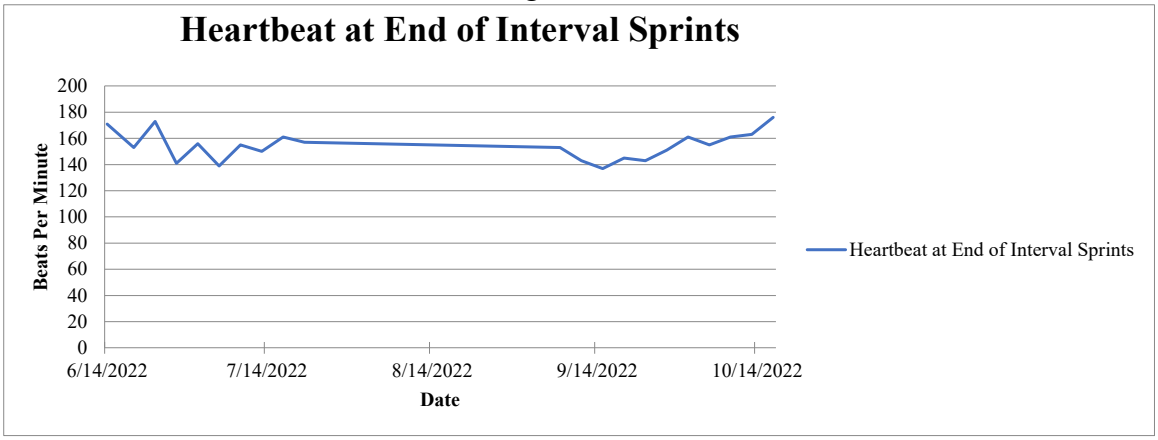


Figure D. 38



Appendix E. Exercise Experience

Figure E. 1

Prior to August 2016, I was heavily overweight and entirely unathletic. After that time, I made a drastic shift in lifestyle which included extreme dietary restrictions and an inflexible commitment to exercise. Then, in March 2020, I encountered the question concerning the plausibility of the charge at the Battle of Marathon in 490 BCE. Scholars have questioned whether the fully equipped Greeks could have made the mile-long run described by Herodotus and still have been able to rout the Persians. I trained for the next year to see if I could do it, adjusting the distance – 1.3 miles – and weight – 73 lbs. – to account for my increased size, and then I tested to see how this exertion affected my body using the same VO_2 max test described above. As part of this endeavor, I also further restricted my diet to more closely match the agrarian diet of an ancient Greek. During this project I reached what is probably the upper limit of my VO_2 max at 60 ml/kg/min, which then fell slightly to the 58.3 ml/kg/min I was at when I began my thesis. As is discussed in the "Aerobic Capacity and Speed" section of Chapter 3, this high cardiovascular fitness level puts me in a unique position because of the assumed aerobic ability of ancient people.