

Why you should NOT read Fred Hahn's "Slow Burn Fitness Revolution"

An in-depth review of the information presented in
this book.

By the authors of
S.P.E.E.D.

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1/3/2011

This in-depth review was not intended to happen. But, due to the comments we received by Fred Hahn and others after our blog post regarding a review of this book, we felt it was necessary to set the record straight. Our goal was not to be mean or disrespectful. But, as you will see next, it is books like this that contribute to the abundance of misinformation in the health and fitness field. This leads to a less than positive view of the field and to a confused public. It is this view and confusion that we are trying to help change with our writings, i.e., book, blog, etc. Our negative views of this book could easily be applied to many other books, but it was a combination of factors that lead to us doing a critical analysis of this particular book. We have concluded that it is filled with misleading, incorrect, and unsubstantiated claims regarding the benefits of a type of exercise called Slow Burn. We feel that we have offered supporting evidence that our conclusions are correct and our initial assessment of the book and its contents was correct. However, there is the possibility that we could have missed some vital information or misinterpreted the evidence. Therefore, we are open to logical and well supported feedback on the material we have presented. If further evidence is supplied that refutes what we have presented we will gladly update our information to represent it. Send correspondence to jeff@speedweightlossbook.com

Why you should NOT read Fred Hahn's "Slow Burn Fitness Revolution"

FRED HAHN'S SLOW BURN EXERCISE BOOK– PART 2: AN IN-DEPTH ANALYSIS OF THE INFORMATION PRESENTED IN THE BOOK

To Fred and others,

First, we thank you for taking the time to send us your thoughts about our post. We always appreciate feedback. However, we feel that there are many problems with Fred's rebuttal and with much of the information present in his book. The number of non-sequiturs, hasty generalizations, and straw-man types of faulty reasoning found throughout the book is astonishing.

This will be a long; no, very long rebuttal (to make it much easier to read you may want to download the PDF version). The length is necessary in order to give a clear and well supported responses to the many problems we feel are presented in the book and in the follow-up replies by Fred Hahn and others. However, I guess, for brevity and apparently a valid method for stating a position (see comment below), we could have just said "Our friend Dr. X said that everything we say is correct" therefore we are right and you are wrong. Well that would certainly be a very bad response and we would want someone to tell us that we were idiots for using that type of justification for our arguments.

We will cover a few things mentioned in some of the comments from [our first post on this subject](#) first and then will go through the book, chapter by chapter, highlighting the many bold statements and then demonstrating that there are many problems with them. Before proceeding there is one more thing to clear up.

Apparently the word "crap" was not well received. This was said to be mean-spirited and unprofessional. We don't really agree with this assessment, due to the format for which it was presented, a blog. Also, the word crap is a common slang word generally used to describe something that is not very good. In fact, according to Wikipedia crap can mean "used to describe something substandard". Dictionary.com states the following for the slang use of the word crap; "a. nonsense; drivel; b. falsehood, exaggeration, propaganda, or the like". But, we will concede this point and have changed the wording in our original post so that the word crap is removed. Instead we have changed it to; "We feel that this book is filled with misleading, incorrect and unsubstantiated claims regarding the benefits of a type of exercise referred to as Slow Burn. Therefore, it is not worth reading."

Please feel free to send us your comments, debate and intelligent discussions are great learning opportunities. However, we ask for two things; the comments must be logical and have some quality evidence to support them.

Fred stated;

"The likelihood of one individual being right increases in direct proportion to the intensity with which others are trying to prove him wrong." That about sums up this review in a nutshell."

Matt & Jeff's response;

Really Fred, this quote sums up our review? There are so many instances that this is wrong. For example, should the creationist think they are right because virtually every scientist feels that the evidence for evolution is strong and creationists are wrong? There is "intense" opposition to the creationist view; does that make them right? There are typically many people, yes often one side has more opposition than another, who disagree with a particular viewpoint, i.e., Lipid Hypothesis, eating fat makes you fat, and doing cardio is the best type of exercise and so on. However, there is usually one view that has the preponderance of evidence to support it. The view that has greater validity may or may not be the side that has more "intensity" against it. Come on, this is a poor argument and in no way sums up our review in a "nutshell". Talk about a red herring argument!

Fred stated;

"First, the editor of our book chose NOT to put a bibliography in the book. She also did not want too many technical references. She also felt that since two physicians were writing the book, this was authority enough."

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Why you should NOT read Fred Hahn's "Slow Burn Fitness Revolution"

Matt & Jeff's response;

We are not asking for a bibliography we are looking for in-text citations to material that supports your claims. Apparently the editor allowed 10 footnotes with 3 of them referring to peer-reviewed research to support your statements. Those were great, but how come they were so few and far between? Why have any at all? Why were there no footnotes/references for the many bold statements you made? Here are a couple of examples. We will be highlighting many more shortly.

"Slow Burn is a form of exercise that has been shown to provide all the benefits you seek from an exercise regime in only thirty minutes per week, with negligible risk of injury" (p.10) (no references)

"Performing a Slow Burn workout will set in motion biochemical forces make you less hungry and get rid of the aches and pains that may have seemed to be inescapable part of getting older" (pp.14-15) (no references)

"Although it's true that conventional strength training – if it's done properly done – can bring about gains in muscle, strength and fitness, it can be tedious and dangerous" (p.22) (no references)

"Instead of spending hours in the gym, grunting, sweating and straining, you'll learn how to do a controlled Slow Burn that will improve your strength, rebuild your bones and muscles and restore your vitality and post-poner the aging process more safely and effectively than any other single form of exercise, in just thirty minutes a week" (p.23) WOW! (All underlining was added for emphasis)

As long as a medical doctor is writing a book there is no need to support statements, particularly statements that are debunking the typical paradigm, with quality evidence? Really? Do you believe this? No offense to M.D.'s, but just because a person has any type of education, here a medical degree, does not allow them to go spouting anything they want and not give evidence for it. So for fallacious reasoning, here is one, "appeal to authority". It would have been better, but still not excusable, if one of the co-authors was an exercise physiologist/physical therapist, i.e., someone who specializes in human movement. Anyway, we are so sick of the excuses such as the "editor/publisher said" or "people don't care about references" or some other lame excuse for not properly supporting arguments. The excuses are bollocks and have no place in quality writing. There are rules for non-fiction writing. We agree with the following overview of what non-fiction writing should entail.

Definition of Nonfiction Writing

By Robert Vaux, eHow Contributor

Nonfiction writing is essentially factual writing, intended primarily to provide information rather than entertainment or speculative truths. Though the details and conclusions may include a certain amount of opinion, they must be backed up by concrete data and stem from a belief that the details are factual.

Types

Nonfiction includes newspaper articles, magazine articles, autobiographies, travel essays, political essays and product reviews.

Thesis and Support

Many forms of nonfiction start by posing a thesis, then citing pieces of evidence in support of it.

Citation

Because nonfiction can be colored by conjecture and opinion, proper citation of sources is very important. A piece of nonfiction backed up by hard data becomes much more persuasive.

Objective Nonfiction

Objective nonfiction means nonfiction that presents only concrete, verifiable facts. A list of historical dates is an example of this kind of nonfiction. (underlining added for emphasis)

Retrieved from http://www.ehow.com/facts_5506969_definition-nonfiction-writing.html

Why you should NOT read Fred Hahn's "Slow Burn Fitness Revolution"

Yes, there still can be problems. People can misinterpret the information and/or the study/paper itself may be flawed. That is all the more reason to do proper citations. People can actually check to see if what you are saying is really true, not that many people will do this. But that does not matter. This can help to weed out bad information and allows the scientific method to work. We do our best to put forth quality information, but we can certainly mess-up. Being transparent and citing the evidence we use will hopefully lead to good discussions and a greater validity of what we have said or potentially to a change a recommendation if new evidence, sometimes offered by others, supports such a change.

Additionally, using the "Dr said" or some other authority said so often leads to many problems and tends to perpetuate recommendations that actually have no quality evidence to support them. This appeal to authority can often end up producing recommendations that have, for support, nothing more than a repeated reference to a statement made by an authority/expert that never had any good support to start with. I am sure you understand this aspect when it comes to low-carb eating and the "aerobics is the best type of exercise" view. There are experts, both with a lot of formal education and those without, and we can and often should listen to them, but nobody is above the requirement to support their views with good evidence. Finally, why have any footnotes/references at all? On pages 9, 38 and 57 you have footnotes referencing a few studies. So the editor allowed you a few references. Why bother with these? When making strong statements it is your responsibility to support them properly.

Fred stated;

"Slow Burn is not Super Slow. Slow Burn sets last 60-90 seconds. SS sets last well over 2 minutes well out of the anaerobic range" (emphasis added)

Matt and Jeff response;

First, Super Slow is often the general term for resistance training that is done in a slower fashion than the typical recommendation of 2s concentric/4s eccentric (2/4) contraction speed (Greer; Nelson et al; Smith et al; Keeler et al, Westcott et al). For instance Keeler et al state "Superslow (SS) strength training is a resistance training program that involves performing very slow repetitions, approximately 15-20 seconds per repetition." (p.309). Westcott et al also used the term, such as "Conclusion. Super-Slow training is an effective method for middle-aged and older adults to increase strength" (p.154). Therefore, in the general sense Slow Burn is a type of super slow type exercise. However, Slow Burn is not Super Slow in the technical sense of being the exact same thing as the Super Slow[®] which is trademarked and promoted by Ken Hutchins. But the differences seem minor. Let's take a look.

Super Slow (SS) methodology, based on Hutchins, consists of 10s concentric and a 5 s eccentric (10/5) pacing (Hutchins, 1992; cited in Hunter et al & Mazzetti et al) for around 8 reps resulting in a time under tension of about 120 seconds, or 2 minutes. However, according to Baye, the current training protocol of Hutchins Super Slow is 10/10 with 4-8 reps which would result in 80 to 160s per set.

Slow Burn (SB) recommends a 10s concentric and a 10s eccentric (10/10) contraction, for 3 to 6 reps (Hahn, p.91) However Fred also states "Twenty to thirty seconds, or beats, to complete each of the three repetitions" (Hahn, p.91). Therefore each rep could be a 15/15 cadence. Anyway, using the 10/10 for the 3 to 6 rep range would lead to the following set durations;

- 3reps @ 20s each = 60s
- 4reps @ 20s each = 80s
- 5reps @ 20s = 100s
- 6reps @ 20s = 120s

Therefore, the range of set time is potentially 60-120s, or 1 to 2 minutes

Why you should NOT read Fred Hahn's "Slow Burn Fitness Revolution"

As you can see there is a difference, albeit a small one between the set durations of Super Slow and Slow Burn training. However, it seems reasonable to consider Slow Burn a type of super slow training so referring to it as such seems appropriate. This is really beside the point of this analysis, which is to see if the Slow-Burn (SB) style of super slow resistance training is actually superior to other forms of resistance training.

Where has it been demonstrated, empirically, that the SB form of resistance training is superior to a 2/4 cadence, the type recommended by Arthur Jones and Darden (Smith et al)? Is it superior for strength gain? Muscle hypertrophy? Fat loss? Metabolic rate? Muscular endurance? Safety? Where has it been shown that SB is superior to other infrequent, high intensity, 2/4 speed type of resistance training? According to Smith et al "A number of studies found no significant difference between slow and fast-paced repetitions in increasing strength development" (p.60) Smith et al goes on to say "...it appears that Jones' recommendation of a moderate repetition range (~8-12) is efficacious and prudent (p.63)". The SB 10/10 cadence has not been shown to be superior. Even the beloved Westcott et al studies do not support the specific SB approach. Westcott used a 10/4 cadence, either a 3 x a week or a 2-3 x week protocol and a few different exercises. This is not what SB recommends. This will be discussed multiple times throughout this paper.

Fred claims Slow Burn is not the same as Super Slow. He also cites the Westcott study in support of his Slow Burn training. Westcott, even in the abstract, calls the slow training regimen Super Slow as a proper name. You can have it one way or the other; Slow Burn is like Super Slow or it's not. If you feel they're similar enough then by all means use Westcott et al as support. However, if you feel they are different, how can you justify using the research that used super-slow training speeds to support your Slow Burn training speeds?

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Strength training and health.

We want to make it CLEAR that we think strength training, particularly the high-intensity, shorter duration, lower volume, types, often referred to as HIT, are beneficial in many ways. There is ample evidence for the myriad of benefits from properly performed strength training. With respect to weight management, we even state in our book that we think strength training is likely to be the best form of exercise "The advantages of each mode, however, lie in the details, and resistance training proves to be the most effective" (p.61). We are not saying in any respects that infrequent, high-intensity strength training is not safe and efficacious. However, we think there are likely a number of exercise modalities that can elicit many health benefits, even with small amounts of time. For instance the research done on "wind sprints" seems to show that brief, intense bouts of some type of sprinting (clearly NOT a slow form of training) has many potential health, body composition and weight management benefits (Babraj; Gibala 2008; Gibala 2009; Tabata; Trapp; Tremblay). What we are saying is that there is no quality evidence that demonstrates that the Slow Burn type of training is better or really as good as (for health, weight management, etc.) other forms of HIT.

Why you should NOT read Fred Hahn's "Slow Burn Fitness Revolution"

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Chapter 1: The Exercise Myths

"Slow Burn is a form of exercise that has been shown to provide all the benefits you seek from an exercise regime in only thirty minutes per week, with negligible risk of injury" (p.10) (no references)

"Performing a Slow Burn workout will set in motion biochemical forces make you less hungry and get rid of the aches and pains that may have seemed to be inescapable part of getting older" (pp.14-15) (no references)

"Fitness is the ability to perform strenuous work or exercise" (p.16)

Matt and Jeff's response;

Where has it been shown that the Slow Burn approach to exercise will provide all the benefits you seek from exercise? There is absolutely zero quality evidence (not a single study) done with the specific protocol used for Slow Burn that could lead to such a strong statement. Even the two studies (Westcott) that have shown positive results from a slow motion, infrequent, high intensity exercise have not shown that it will produce all of the benefits that can be attained from strength training type exercise. Where in the two Westcott studies did they prove that a slow type of training (10/4 cadence) makes you less hungry and gets rid of aches and pains? There was nothing mentioned in these studies regarding those parameters. How about the Keeler et al or Hunter et al studies? Any mention of a reduction of hunger or aches and pains? Nope, no mention of these factors in these papers. How can you say such a thing? There is a ton of research on the connection between exercise and appetite regulation, see Bilski et al; Blundell et al; King; Trapp et al; Westerterp. Where, in the vast literature on the subject, does it say that the Slow Burn type of training is the best at making you less hungry or affects hunger at all? The whole topic of exercise and appetite is fascinating, but complicated. There is no evidence for your statement. Therefore, to say that Slow Burn will lead to less hunger is misleading and clearly over-simplifies the subject.

Your definition of fitness is interesting. The definition of fitness is elusive and depending on who you talk to you can get many different answers. Even the top certifying bodies, such as NSCA and ACE, do not have a clear definition of fitness. ACE alludes to it by saying that four components should be measured; cardiorespiratory efficiency, muscular strength and endurance, muscle and joint flexibility, and body composition (p.170). According to Webster's Collegiate Dictionary, fitness or being fit is "the ability to transmit genes and being healthy". A very Darwinian definition. According to Dr. Mel C. Siff, "We can arrive at no better definition of fitness than to base it on our intuitive awareness that it is something that allows us to function more easily under specific conditions, and which we can improve if we train regularly to cope under

Why you should NOT read Fred Hahn's "Slow Burn Fitness Revolution"

those conditions. Thus, fitness is the ability to execute a given task effectively and safely" (p.63). It seems, based on your definition, powerlifters and strong man competitors are the fittest people in the world, due to their level of strength. Is this really true? Is it really necessary to be that strong to live a long and healthful life, which, we would argue, is really the essence of "being fit"? Is it more likely that having a decent amount of strength is all that is needed by the majority of the population to be healthy and productive, which again we would argue would be "fit"? There is no clear definition of fitness, but we would say that having the ability to participate in activities that you enjoy, with confidence and with little risk of injury is a good working definition of fitness. We are not saying that your definition is wrong, but we found it interesting that you framed your definition in such a way that it would fit your overall premise that strength is the most important aspect for so many things health related.

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Chapter 2: Slow-Speed Strength Training

"Although it's true that conventional strength training – if it's done properly done – can bring about gains in muscle, strength and fitness, it can be tedious and dangerous" (p.22) (no references)

"Instead of spending hours in the gym, grunting, sweating and straining, you'll learn how to do a controlled Slow Burn that will improve your strength, rebuild your bones and muscles and restore your vitality and post-pone the aging process more safely and effectively than any other single form of exercise, in just thirty minutes a week" (p.23) (no references)

"Studies have shown that subjects following a slow-speed strength-training regimen achieved 50 to 100 percent greater strength gains than those in a traditional weight-lifting program. That's up to two times as much strength, doing fewer reps, taking far less time, with much less risk of injury, and in many cases with much less weight" (pp.23-24). (no references)

"When you join the Slow Burn Fitness Revolution, you vastly improve all your muscle fibers; you'll strengthen the slow ones, the intermediate ones, and even the fast ones." (p.25) (no references)

"The key element is that each exercise must be performed with slow, precise repetitions, in perfect form, with a weight heavy enough to make the muscles being worked to total fatigue in just a few repetitions" (p.27). (no references)

"...you'll spend a mere sixty to ninety seconds perfectly performing a single set of only three to six repetitions." (p.28)

Why you should NOT read Fred Hahn's "Slow Burn Fitness Revolution"

"The ideal weight choice for any give exercise is one that allows you to complete three to six repetitions within the sixty-to-ninety second time frame, before failure occurs" (p.28)

"You'll want to select a weight so heavy that for the first second or two you feel like you won't be able to budge it" (p.28)

"If you spend a couple of minutes on each exercise with a minute or so in between as you shift from one from one exercise to the next, you'll be able to complete the entire Slow Burn fitness regimen in less than half an hour and without breaking much of a sweat" (p.29)

Matt and Jeff's response

Where to begin after that dizzying display of misleading information and contradictions? How about "tedious and dangerous". This is pure nonsense. Where is the evidence for this statement? The fact of the matter is Slow Burn, with its fixed exercises (13 specific exercises are given in the book with no alternatives given) and a fixed cadence is the tedious one. According to Westcott "Super-slow (R) strength training, with a 10-second lifting phase and a 4-second lowering phase, represents an extremely slow repetition speed that most people find unacceptable as a standard exercise technique... from a psychological perspective there was little subject support for the Super-Slow (R) exercise technique. Only one participant in each study continued to train in a Super-Slow (R) manner after completion of the research project." (pp.1-2). Wow, 2 out of 147 people wanted to continue with this type of training. This does not sound like something that will confer a high level of adherence, which is paramount for deriving the benefits of exercise. A quality strength training program that modifies the exercises, rep, set and tempo aspects occasionally would seem to be far less tedious than Slow Burn. But, the fact is virtually all exercise programs have some level of a "tediousness" factor. If you want to get stronger or faster at a particular movement you need to do that particular movement often. Regarding the "danger" component, there is no evidence that a 2/4 cadence of properly performed exercises is more dangerous than the Slow Burn cadence. This is complete conjecture.

No "straining"? You want a person to go to "complete muscular failure" and not strain? You also say *"You'll want to select a weight so heavy that for the first second or two you feel like you won't be able to budge it"* How is it possible to use a load that you feel you cannot move at first and not strain to get it moving? This makes no sense. If Slow Burn is in the class of high-intensity training, then there is a lot of straining! Ever see Mike Mentzer or Dorian Yates completing a single set to failure? I would say there was a bit of straining. If you want to conflate SB with HIT, then you must recognize that there is plenty of straining!

Related to this is the "no sweating" comment. This is as silly as the no straining comment. Doing 13 exercises to complete muscular failure with only about a minute between sets will not elicit some sweating? Are we supposed to be exercising in an ice box? Whether or not you sweat is really no big deal, but insinuating that a Slow Burn workout, if done properly, will not involve straining or sweating is very misleading. Did Mentzer and Yates brake a sweat?

"Hours in the gym", Really? You make it sound like ALL other strength training programs recommended you spend lots of time working out. You are setting up a false dichotomy. Yes, there are some weight lifting programs that do recommend hours in the gym each week. So what? There are also a number of HIT type programs that recommend only 1-3 workouts a weeks, of relatively short duration, usually around 30 minutes. Also most of the strength training programs that are recommended by the big personal training organizations for beginners typically amount to about 30 minutes 2 to 3 times a week.

You mention "taking far less time". Less time than what? In the studies done with super slow type training both groups would exercise for the same amount of time. Although in the Westcott studies (see next) there seemed to be better

Why you should NOT read Fred Hahn's "Slow Burn Fitness Revolution"

strength gains with the slower speed training. But, BOTH groups improved their strength and BOTH groups exercise for the SAME amount of time. How do you conclude that it takes "far less time"?

Well we guess it's time to review the Westcott studies seeing you brought them up, i.e., "*Studies have shown that subjects following a slow-speed strength-training regimen achieved 50 to 100 percent greater strength gains than those in a traditional weight-lifting program.*" Saying studies tends to imply that there are many studies, when it is likely that you are referring to only 2 studies (Westcott). These have actually been well analyzed by a few people in some non-reviewed pieces of work. For instance a couple of blog post by Baye and an article by Nelson and Kravitz have done a good job of going over all of the details of these studies. We will cover a few key points here. First, there are only two studies that have shown better results on one parameter; strength. So to conclude that this is the best way to get strong is taking a pretty big leap of faith. Additionally, how can the Westcott studies be used to say that Slow Burn is good for all kinds of other things (this will be covered in more detail in the following pages)? These were both relatively short duration studies, 8 and 10 weeks. We don't know what will happen with a longer duration. All the subjects used in the two studies were sedentary individuals and the average age was 54 ½. Therefore the external validity of this study is very limited. The other major criticism to these two studies was the lack of quality control over the rep speed. Clearly the emphasis in slower training is the pace at which the reps are completed. Knowing that this is a fundamental aspect why was the reps not timed precisely with a stopwatch or other timing instrument? Due to these limitations the results from these two studies need to be used with caution. Finally, the studies used a 3 x week and a 2-3 x a week program and a 10/4 rep speed. The program you recommend is 1 (your main recommendation) or maybe two times a week and uses a 10/10 rep speed and does not use the exact same exercises; of the 13 exercises, there are 5 different ones used. Due to the limitations of the Westcott studies and the number of differences between what was exactly studied and what you recommended with Slow Burn, not to mention other studies that have been done comparing super slow type training verse traditional type strength training that did not show a better results with super slow (Keeler; Hunter; Mazzetti), there is no good justification to conclude that Slow Burn is a superior type of strength training. It is likely a useful type of training, but in no way is it better than "any other single form of exercise."

One final thing; the safety aspect. You state "much less risk of injury". How did you come to this conclusion? There is no empirical evidence for this statement. Were there any injury differences in the Westcott studies? No. Was there any difference in injuries in any of the studies comparing slower training with traditional speed strength training? We have yet to see any difference. According to Greer, "Because the muscle-tendon unit is under tension for considerably more time during Superslow training, there is a theoretical greater risk for overuse injuries, although as of yet there has been no research investigating this parameter" (p.35). We feel that an honest assessment of the safety issue would result in the following conclusion; a range of controlled speeds during weight lifting exercise and a focus on proper form during the entire exercise would likely be equivalent in minimizing the likelihood of injury.

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Why you should NOT read Fred Hahn's "Slow Burn Fitness Revolution"

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Chapter 3: Turn your body into a fat-burning machine

"...there's no type of exercise that will aid your fat loss effort more and get you to your goals faster than the Slow Burn Fitness Revolution" (p.32) (no reference)

"First, slow-motion strength training builds muscle better than any other type of training" (p.32) (no reference)

"In fact, studies show that slow-speed weight workouts build muscle about twice as fast as traditional weight training..." (p.32) (no references)

"Second, Slow Burn training increases your body's sensitivity to the hormone insulin, the chief culprit behind weight gain" (p.32) (no references)

"If you add aerobics to the mix, believe it or not, you can actually lose more muscle on a typical low-calorie eating plan than if you didn't exercise at all – a finding that's been published in a number of scientific research papers" (p.34) (no references)

"...with the Slow Burn workout, you'll actually gain muscle as you lose fat" (p.35) (no references)

"Intense exercise – such as taking your muscles groups to failure with Slow Burn – also stimulates the production and activity of an enzyme (called AMP kinase) that appears to be the body's master fuel switch. Flipping that switch turns on the fat-burning process during exercise and keeps it going for a substantial amount of time after you quit. Studies have shown that the enzyme-stimulation switch stays flipped for about seven to ten days after a bout of high-intensity training – thus the need to perform a Slow Burn workout only once a week" (p.36) (no references)

"And finally, studies have shown that high-intensity exercise, such as Slow Burn causes as much as a fivefold increase in the number of "fat-burning furnaces" (called mitochondria) within the muscle cells" (p.36) (no references)

Matt and Jeff's response;

These are bold statements. What does the evidence actually say with respect to the statements from Chapter 3?

First, there is no direct evidence for any of these statements. What we mean is that there is not a single study using the Slow Burn methodology that has demonstrated any of these effects. The research on similar training, such as the Westcott studies, has not demonstrated anything that could be interpreted in a way that would result in any of your statements.

We will discuss three specific aspects; fat loss, muscle hypertrophy and mitochondria biogenesis.

For clarity purposes, we are re-stating what you said regarding fat loss "*...there's no type of exercise that will aid your fat loss effort more and get you to your goals faster than the Slow Burn Fitness Revolution*" and "Studies have shown that the

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enzyme-stimulation switch stays flipped for about seven to ten days after a bout of high-intensity training – thus the need to perform a Slow Burn workout only once a week". As we covered in our book SPEED, the general consensus from the abundance of studies and reviews on this topic (exercise and weight loss) is that exercise, any type within relatively realistic time commitments, is likely to have a minimal effect on the speed at which weight is lost. This is why we think exercise is overrated when it comes to fat loss. However, there are a number of other weight loss related benefits from exercise, particularly strength training, but we will not go into that here. For the purpose of this analysis, we will discuss the studies using slow speed type training and general HIT studies and their affect on bodyweight.

- Westcott et al studies say nothing regarding body weight regulation
- Keeler et al study says nothing regarding body weight regulation and overall they found no change in percentage of body fat, body mass index, lean body mass and bodyweight in either group.
- Hunter et al study focused on metabolic and heart rate responses. The clinical endpoints were not bodyweight, bodyfat, or lean tissue modifications. There may be problems with this study, but in no way can it be used to support weight loss benefits for Slow Burn.
- Mazzetti study found that "explosive contractions induced greater increases in the rate of energy expenditure and total kilocalories expended compared with SLOW, despite a longer exercise duration and greater BL [blood lactate] with SLOW" (p.1297). The SLOW group was not a true super slow type training, but it was still a relatively slow method and if slower elicits greater energy expenditure then it should have demonstrated this when compared to the faster training method.

How many calories are burned during one or two full SB workouts? Obviously it depends on the size of the person but it is likely to be about 200 calories (Hunter; Mazzetti). So one or two of these workouts per week could directly increase energy expenditure 200 to 400 respectively for the week. This would equate to an average increase in daily energy expenditure per day of 29 to 57 calories, respectively. With a pound of body fat equating to about 3,500 calories this level of expenditure is going to have a minimal effect on fat loss. However, maybe the weight loss benefits are due to the after-burn effect (EPOC). This will be discussed shortly.

The next question: Is this amount of expenditure likely to be more than another workout done for the exact same duration, but with faster rep speeds? Not likely. There have been a couple of studies comparing calories burned during the exercise session and metabolic rates 12-22 hours post-workout. What have these studies concluded?

Mazzetti et al states "These findings are in agreement with those from previous studies that have reported greater increases in energy expenditure (or O₂ consumption) with faster muscle contractions...Therefore, explosive contractions may be more effective than slow contractions for enhancing energy-expenditure responses for weight loss when using resistance exercise" (p.1297)

Hunter et al stated "Traditional resistance training increased energy expenditure more than SST [super slow] does and thus may be more beneficial for body weight control (p.76).

Also, the paper by Greer had this to say "The premise that Superslow training would not be effective in controlling body weight/body fat is further supported by an unchanged body fat percentage after 16 weeks of Superslow training. The traditional group, following the ACSM guidelines for the same time period, showed a 5.51% decrease in body fat percentage" (p.34). Again, the evidence that a Slow Burn workout, particularly once a week, which is the dominant recommendation in the book, is not likely to have much of a weight loss affect and is in no way better than other HIT type training programs.

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What about the studies showing that SB type training will switch on this fat burning process for 7 to 10 days?

This aspect deals with AMP Kinase (AMPK) production and excess post exercise oxygen consumption (EPOC). So is there any evidence that a single 30 minute SB workout will have a major metabolic effect for 7 to 10 days post workout? No, this is very unlikely. Here is what the evidence actually says.

First, we are unable to find research showing that high-intensity, short duration resistance training increases the production of AMPK. In fact, it is endurance type training that elicits an increase in AMPK production (Baar; Coffey; Nader).

The following is from Nader, G. (2006) Concurrent Strength and Endurance Training: From Molecules to Man. *Med. Sci. Sports Exerc.* 38(11):1965–1970,

"Endurance exercise is associated with signaling involved in metabolic homeostasis, comprising AMPK signaling, among others. Activation of AMPK by endurance exercise or contractile activity may inhibit mTOR signaling via TSC and suppress resistance exercise-induced muscle-protein synthesis"

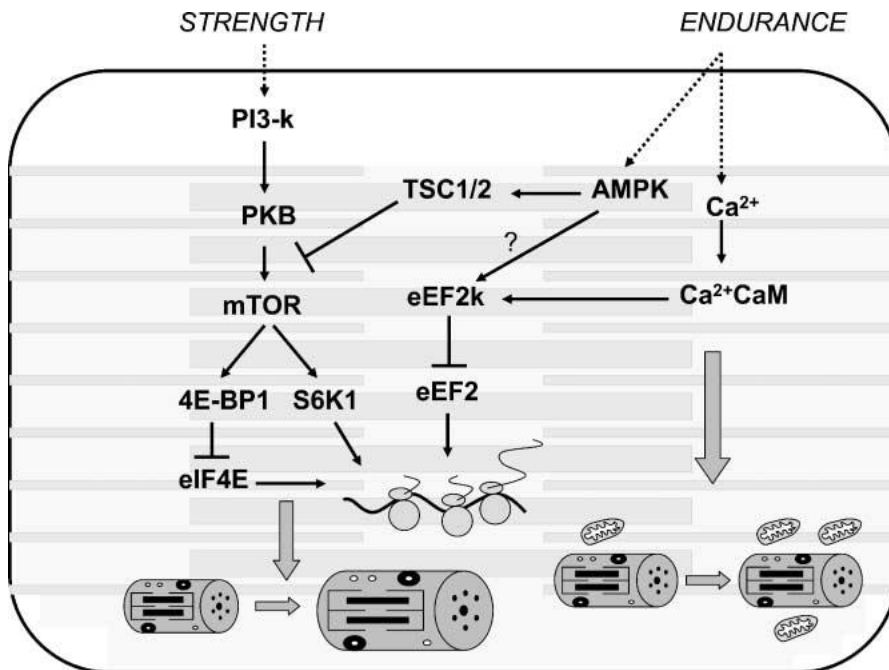


Figure from Nader et al, p.1969

Additionally, two recent papers on cell changes from endurance and strength training do not mention anywhere in the papers that resistance training will increase the production of AMPK. They do, however, go into some detail how endurance type training will increase AMPK production (Baar; Hawley).

A recent paper by Gibala on high-intensity interval training (HIIT or Gibala calls HIT) has the potential to increase AMPK production. However, HIIT is not the same as high-intensity strength training or Slow Burn. Gibala states "Although sometimes equated with strength or heavy resistance training, high-intensity interval exercise training (HIT) does not induce marked fiber hypertrophy. Rather, there is a growing appreciation of the potential for HIT to stimulate the skeletal muscle remodeling normally associated with traditional endurance training" (p.429).

Finally, the "switch" that we think you are referring to is the hypothesis put forth by Atherton, the "AMPK-PKB switch" (Gibala). Apparently the support for this hypothesis is still not clear (Gibala).

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Regarding strength training and AMPK; we will leave it on this note, which is neither a positive or negative position, but clearly does not allow for any suggestion that there will be a 7 to 10 day stimulation of AMPK by SB or other similar types of strength training.

"Few studies that have investigated AMPK signaling in humans have incorporated resistance training as a stimulus. Hence, our knowledge of AMPK signaling following this mode of contractile activity is limited. Of those studies that have employed resistance training protocols, several reported increased AMPK phosphorylation and gene expression following both a single bout and repeated bouts of exercise.[45,59,60] Resistance exercise-induced changes in AMPK phosphorylation may reflect an increase in insulin-independent cellular glucose uptake and transport. However, the physiological significance of increased AMPK following resistance training has yet to be determined." (Coffey et al; p.741). (emphasis added)

Wouldn't an in-depth paper on the molecular bases of training adaptations, published in 2007, mention the awesome ability of strength training to elicit a 7 to 10 day perturbation of AMPK production if there was one?

What about EPOC?

To be clear you did NOT mention anything about EPOC, but just to cover the bases, we thought we would check to see if high-intensity resistance training was likely to elicit a 7 to 10 day EPOC affect. Nope on this one too. It is true that high intensity type resistance training is likely to have the greatest effect on EPOC, but the effect does not last anywhere near 7 to 10 days (Powers; Meirelles; Wu). Again, to be clear, you didn't say it would, but we are trying to find out where this 7 to 10 day phenomenon that you speak of is coming from. The exact duration that an EPOC episode will last is still not clear (Carpinelli; Coffey). In fact, according to Carpinelli et al, "Resistance training may not be effective for increasing metabolic rate in women" (p.505). The range for EPOC seems to be 2 to 48 hours post exercise. Interestingly, according to Mazzetti et al, "...it seems as if high-intensity resistance exercise using explosive contractions would provide the best combination or resistance exercise techniques for optimal energy expenditure" (p.1292) (emphasis added). One recent study using a high-intensity training protocol on young males, lasting 31 minutes, found that EPOC lasted 39 hours (Schuenke et al). So there is a good potential to elicit an EPOC affect for about 2 days. However, no matter what the type of exercise, the best response for EPOC is 2 days. Additionally, the overall effect of EPOC on total calories burned per day is low, with a general estimate of an additional 100kcal/day. According to Meirelles et al, "...EPOC resulting from a single resistance exercise session does not represent a great impact on energy balance, its cumulative effect may be relevant" (p.137). The point with this is that there are certainly some energy expenditure benefits from resistance training. However, the overall effect from the calories burned during one or two 30 minute high-intensity weight training session a week, coupled with the potential EPOC, still does not equate to very many calories burned for the week. That is why (this is the general conclusion from the research), this amount of exercise will not have much of an effect on weight loss. There could be some additional calorie burning benefits if there is an increase in muscle mass, but that is not likely for the majority of people who are trying to lose weight. We have discussed this topic before in a post titled; The Muscle Metabolism Myth.

What about the ability of SB to induce a "fivefold increase in the number of "fat-burning furnaces" (called mitochondria) within the muscle cells"?

Let's see what one exercise physiology textbook has to say on this matter.

Molecular and Cellular Exercise Physiology;

"On the other hand, strength training fails to result in an increase in mitochondrial density" (Mooren & Volker, p.66)

How about a recent paper on this exact topic; *Plasticity in skeletal, cardiac, and smooth muscle. Invited review: Contractile activity-induced mitochondrial biogenesis in skeletal muscle;*

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"Interestingly, resistance training, which does indeed recruit fast-fatigable motor units, does not lead to a mitochondrial adaptation. Because the very high intensity and low duration of most resistance training regimens represent such a strong stimulus for the synthesis of myofibrillar proteins leading to muscle hypertrophy, the mitochondrial content within the enlarged muscle fibers may even be 'diluted within the cell'" (Hood, p.1139)

The two things that seem to have the potential to increase the mitochondria density are endurance training and calorie restriction (Civitarese; Reznick; Hood). However, high-intensity interval training may also increase the number of mitochondria, but the evidence for this is still sparse. (Gibala)

The ability to increase mitochondrial density "fivefold" from SB or high-intensity strength training seems unfounded.

The ability to lose weight and gain lean tissue at the same time is very challenging for many people. We are unaware of any research that has shown that a SB type of weight training (very slow rep pacing vs "regular" pacing, 2/2, 4/2, 4/4) will do this at all or do this better than some other weight training programs, particularly during calorie restriction for weight loss.

So, from the few studies that have specifically tested the slow speed training and for similar SLOW - FAST training methods, the research on AMP Kinase, EPOC, mitochondrial biogenesis and the ability to lose fat and gain muscle at the same time, there is no evidence that the information presented in this chapter regarding these aspects are true. There is no evidence that Slow Burn is actually very useful or a superior method for fat loss.

How about the ability of one or two Slow Burn sessions to elicit muscle hypertrophy?

There are no studies that have concluded that a slow speed type of training is as good as or better than other types of HIT training for eliciting muscle hypertrophy. How can you say "studies show that slow-speed weight workouts build muscle about twice as fast as traditional weight training"? We hope that you are not suggesting that the Westcott studies somehow justify this statement. Our speculation would not be needed if you would have just referenced what you said.

There is a bunch of research on what elicits muscle hypertrophy, but we have yet see any of it say that a super slow type method is as good as or better than some other well-established methods. How about these conclusion from Carpinellie et al (2004) " In summary, neither of these studies of Keeler et al or Westcott et al provides sufficient evidence to support the advantage of one repetition duration over another" (p.6) and "All the studies strongly suggest that within a reasonable range of repetitions, approximately 3 to 20, there does not appear to be a specific number of repetitions (e.g., 4-6, 7-10, 12-15, etc.) the will elicit more favorable gains in muscular strength, power, or hypertrophy" (p.11). Here is one final quote from a recent paper comparing slow speed (~10s concentric and ~4-10 eccentric contractions) with normal speed (3 second eccentric action and maximal acceleration concentric action) strength training;

"Evidence for the load used in resistance exercise emphasizing hypertrophy indicates a possible optimal threshold of 85% 1RM (Fry, 2004), but the multitude of acute training variables that may be altered in addition to load make a precise recommendation difficult. However, the reduced load advocated by PS [slow training] might be less effective for hypertrophy due to load constraints. This reduction in load is seen by PS advocated as inconsequential to the ultimate physiological effects. However, a basic premise of tissue adaptation (i.e., Wolff's and Davis' Laws (Biewener and Bertram, 1994) is that a minimum threshold of force is required to elicit adaptation. The notion that load is peripheral in its importance is in direct opposition to other authors' demonstrating the magnitude of mechanical stress (i.e. load) is most responsible, in the context of exercise volume, for strength gains and muscle hypertrophy (Dudly et al., 1991; Hortobagyi et al., 1996). Please note that although related, load and muscle force are not equal, as propulsive forces can differ" (p.301).

In no way does the research show that the SB approach to strength training is the best method for strength or hypertrophy. High-intensity strength training can lead to muscle hypertrophy. However, let's not forget that diet plays a

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big part in this process (Antonio et al). Also, we are unaware of studies that have shown that the SB type of resistance training will build muscle twice as fast as traditional weight training. If you, Fred, can supply us with these studies (just the proper reference information will do) and the research is legit then we will gladly change what we have said regarding SB and muscle hypertrophy. Otherwise we have to conclude that your statement regarding SB and muscle hypertrophy is fictitious and very misleading to the reader of your book.

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Chapter 4: The heart of the matter

"...if I were to then tell them that thirty minutes a week doing a Slow Burn workout will give them as much endurance as three hours of jogging, they would probably treat you like the village idiot and quickly move away. Strange though it seems, your unlikely claim would be true" (p.37) (no references)

"...whereas the total-body strength gains from Slow Burn will enhance your endurance in almost any athletic pursuit" (p.38, in footnote) (no references)

"The Slow Burn strength-training regimen will give you greater general cardiopulmonary fitness and endurance than running" (p.37) (no references)

"Running and other forms of "aerobic" exercise strengthen the muscles" (p.39)

Matt and Jeff's response;

You have done the field of exercise physiology and athletic performance a huge disservice. How do the decades of research in these fields lead you to the conclusion that SB will enhance a persons' endurance for almost any athletic pursuit? We would love to see the studies that demonstrate this.

So, you say, running and other aerobic activities strengthens muscles? So a long distance runner will have strong leg muscles? His ability to increase his 1RM or 10RM (i.e., strength) in the squat or leg press would increase due to his running. We are confused with this statement. Wouldn't it be more likely that the long distance runner will have more efficient muscles, due to the increase in mitochondrial density and other changes related to energy utilization by the muscles and not greater strength? He would have better muscular endurance, not muscular strength.

You also state "Another problem with low-intensity [long duration aerobic activities] work is that instead of building your overall muscle mass, you actually reduce it" (p.46). So let's get this straight, "running and other forms of 'aerobic' exercise strengthens the muscles" and, at the same time, will decrease the amount of muscle tissue you have. What are you talking about? So, the logical conclusion, from your statements, would be the runner is getting stronger and losing muscle mass at the same time. We know that strength and muscle size are not tightly correlated, but your statements seem illogical.

Also why do you conflate doing "long endurance event such as a marathon" (p.46), with what most people will do for cardio or aerobics? You are creating a false dichotomy. Is the only option, for someone who is going to do aerobic type exercise, to train for a marathon? That is ridiculous. Doing a few mile walk or jog a few times a week is nowhere near the same thing as marathon training, which we would agree has a big potential for negative outcomes on the body. However, based on the research on the Tarahumara runners, lots of running may not be detrimental. Anyway, doing some moderate amounts of walking, biking, swimming, and so on, is likely to have health benefits and not likely to lead to negative effects on the body or injuries.

Regarding cardio or aerobic exercise and lean tissue; during a weight loss diet there is actually a decent amount of research that shows that it helped to preserve lean tissue, such as Janssen et al and Ross et al. So it is not as fatalistic as

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you present it, i.e., "If you add aerobics to the mix, believe it or not, you can actually lose more muscle on a typical low-calorie eating plan than if you didn't exercise at all – a finding that's been published in a number of scientific research papers" (p.34). There are a number of variables, such as protein intake, level of calorie restriction, amount of exercise and others that will determine the effect for an individual.

References;

Janssen, I, et al (2006). Effects of an energy restricted diet with or without exercise on abdominal fat, intermuscular fat, and metabolic risk factors in obese women. *Diabetes Care*; 25(3): 431-438.

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Chapter 5: Enhancing flexibility

"...the most important factor in the kind of flexibility we want is muscular strength" (p.50) (no references)

"Muscle strength actually enhances flexibility. Why? Because [a] trained muscle is not only stronger, it is more supple, has improved circulation, is better hydrated, and can exert much greater force across the joint" (p.52) (no references)

"Any activity that increases strength is going to increase flexibility, but, as we've seen, nothing increases strength as quickly as Slow Burn training, so by extension, nothing will increase flexibility as quickly either" (pp.55-56).

A study done at Democritus Univ on flexibility. "At completion of the training period, the strength-trained subjects had enormous increases in flexibility in all seven categories." (p.56). (finally a reference to a peer-reviewed paper)

"Olympic weight lifters were second only to gymnast in their overall score on a number of flexibility tests. How did these weight lifters get to be so flexible? Was it Yoga? Pilates? A regime of painful stretching exercises? No. There secret is that they have great muscular strength and, accordingly, strong ligaments and tendons, allowing the joints to move easily through their entire range of motion." (p.57) (from Scientific Basis of Athletic Conditioning, but does not give full citation, but at least something to go with)

"Do you want to enhance your flexibility? Forget about stretching, yoga, Pilates, and all the rest. Do Slow Burn for thirty minutes a week instead and make all your joints be the best they can be" (p.57).

Matt and Jeff's response;

Let's look at a couple of things before looking at the research on this topic.

"**Painful stretching**"? Who is recommending painful stretching? What physical therapist or other reputable practitioner recommends that a person get into painful stretches? As is articulated by the researchers in this field, it is likely that the stretching will sometimes be uncomfortable, but not painful. You are giving a false description of what should be occurring during most stretching activities. Related to this, what do you call a full-out effort to move as heavy a weight as possible for 3 to 6 reps at a slow pace until complete muscular failure is reached? Pleasant? Peaceful? Relaxing? Come on, there is a high level of discomfort that will likely be felt during a high-intensity workout. Our point is you have clearly misrepresented what stretching should feel like.

Regarding the study done at Democritus University. What type of strength training were they doing? Was it similar to SB? Also, the result of the aerobic group, the small increase in hip flexibility is logical. They were walking/jogging, therefore they were really only working that joint.

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The "Olympic weight lifters". Seeing this was done on Olympic lifters, we can assume that they were not doing slow speed training and were training with heavy loads at fast speeds and probably training for much long durations and frequency than what SB recommends, which is ideally one full session a week. Also, were these Olympic lifters doing any type of stretching also? Overall, how does this support your type of training as a great way to improve flexibility?

Some research on the topic.

From Fatouros (2006), "Although it seems that resistance training positively affects flexibility performance, the mechanism underlying this relationship is still unknown" (p.639). While there seems to be a correlation between strength gain and ROM increase from resistance training, we can't say that the increase in strength causes the increase in ROM. We could just as easily postulate that the increase in ROM brings about the increase in strength, since long-term stretch programs seem to *enhance* performance (Shrier 2004).

It should be noted that the flexibility changes in the elderly subjects in Fatouros 2006 were intensity dependant, with intensities above 60% 1 RM eliciting the greatest improvements, but with no further improvement at 80% 1 RM compared to 60%.

Monteiro et al and Santos et al have recently found increases in ROM with resistance training. In 2005, Noobrega found that although resistance training alone did not improve flexibility, it did not hinder ROM increases due to specific flexibility training.

More recently, Aquino et al (2009) studied the effects of either stretching or strength training on the flexibility, stretch tolerance, and peak torque angle of the hamstrings. Neither strength training (3 sets of 12 at 60% 1 RM 3x/wk in a lengthened position) nor stretching (4 sets of 30s 3x/wk) increased flexibility, both increased stretch tolerance, and only strength training affected peak torque angle. The authors are unclear of the mechanisms behind the shift in peak torque angle, but postulate a possible addition of sarcomeres in series and/or alterations in muscle properties affecting myofascial force transmission.

A recent study by Huang shows short-term increase in hip ROM with short duration massage, and proposes massage as an alternative to static stretching (Huang 2010). This is not surprising since we know that myofascial mechanoreceptors respond to various types of pressure (Schleip 2003).

Also, whether or not ROM is increased by changes in muscular properties or by an analgesic effect is worth further study for all means of ROM increase (resistance training, stretching, massage, etc.). However, in real-world situations, an increase in ROM is an increase in ROM. If stretching provides an increased stretch tolerance in the hamstrings, which allows a person to keep neutral spine (or close to it) through increased hip mobility while bending over to pick up a child, so be it.

It is believed excessive or improper stretching can cause joint instability due to laxity of connective tissue. Well, excessive or improper strength training could cause damage to connective tissues as well. On an even playing field of intelligent use, strength training and stretching should both be painless (although sometimes a bit uncomfortable) and safe to the subject.

Yes, doing strength training is likely to have positive effects on ROM for most people. However, to say that Slow Burn is the best type of strength training to elicit this type of benefit is not supported by the research. And yes you said that, "by extension" nothing will do it quicker than Slow Burn. Again, it is these exaggerated claims and misleading statements that are so troublesome.

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Chapter 6: Stronger bones

"Let's examine in a little detail a recent study published in the International Journal of Sports Medicine that points the clear benefit – and safety – of strength training" (p.62) (no reference)

"...dozens of other medical studies have demonstrated the clear benefits to bone health that accrue from strength training..." (p.63) (no references)

"A recent study compared two groups of women involved in exercise to strengthen their bones...what the researchers found...significant bone mass increase with the strength regime, especially in the all-important hip-region, but no increase whatsoever with the endurance protocol" (no references)

"Without reservation we can say that a properly performed regular total-body strength-training regimen such as Slow Burn Fitness Revolution brings about bigger and better sustained bone-density gains in women and men of all ages – even those in their eighties and nineties – than any other form of exercise." (pp.64-65) (no references)

"a once or twice a week Slow Burn session is the key to healthier bones and better balance..." (p.65) (no references) (now it might be 2 times a week instead of once? Also better balance, just throwing in that one in, even though at no point did he discuss that strength training can improve someone's balance)

Matt and Jeff's response;

So there have been dozens of studies showing the CLEAR benefits from strength training? Also, the bone benefits from the particular Slow Burn type and frequency of exercise is better for bone-density than "any other form of exercise". Wow, you are certainly not shying away from making definitive statements about what SB can do. Again, you love to throw around that there are "dozen of studies" which is easy to say but do nothing to back up these statements. What is most interesting, as you will see, is the lack of support for your statements.

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Let's start with one older paper that discusses this topic.

According to a 2001 paper by Winett and Carpinelli titled: Potential health-related benefits of resistance training, regarding bone mineral density;

"a training protocol consisting of one set of repetitions for a variety of resistance exercises, using free weights or machines, two or three times a week, should provide an adequate stimulus for increasing BMD in the anatomical regions that are stressed by each specific exercise and is the recommended protocol...It appears likely that the usual generally recommended protocol (6 to 10 repetitions using 4 s to raise the resistance and 4 s to lower the resistance; see later) will favorably impact bone mineral density and is similar to a protocol used in seminal work in this area" (p.507) (emphasis added)

What is interesting is Winett et al referenced a 1994 paper by Nelson et al and consider their work as seminal work in this area. So we checked out the Nelson et al study. It was a year-long study on postmenopausal women. Here was the training protocol;

- Workout 2 x week
- Each workout was 45 minutes plus a 5 min warm-up on a cycle and a 5 min cool-down with stretching
- 5 exercises
- 3 sets of each exercise
- 8 reps for each set
- Weight was set at 80% of 1 RM
- Each rep lasted 6 to 9 seconds
- 3 second rest between each rep
- 90 to 120 seconds rest between each set

Did you notice the length of workouts, number of sets, speed of reps and other variables? These, in no way could be considered nearly identical as the recommendations you give in your book for the Slow Burn workouts. This research can be applied to strength training in general, but not for support of Slow Burn over other types of resistance training.

Well, how about four recent reviews on the topic? Let's look at the conclusions they have come to.

A 2006 paper in *Sports Medicine* titled: Progressive High-Intensity Resistance Training and Bone Mineral Density Changes Among Premenopausal Women (St. James);

"Regular weight-bearing physical activity has been widely recommended for adult women and may be beneficial in preserving bone mineral density (BMD). However, there is conflicting evidence regarding the effects of resistance training on BMD in premenopausal women" (p.683).

"The purpose of this article was to help provide more information on high-intensity resistance for the purpose of prescribing optimal training regime to best augment BMD in adult premenopausal women. The findings of this review and meta-analysis support the interpretation that, among premenopausal women, this mode of exercise may be effective in increasing BMD of the lumbar spine but possibly not the femoral neck. However, these findings should be interpreted carefully, taking into account that the included studies presented high attrition rates and did not present any intention-to-treat analyses, furthermore, that a positive publication bias might also be present" (p.702).

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Clearly this is not a solid recommendation for high-intensity resistance training, in general, as being a great facilitator of increased BMD. Not to mention, there is no clear advantage to one type of high-intensity resistance training over another.

In a 2006 meta-analysis by St James and Carroll on the effectiveness of resistance training on bone health in postmenopausal women, all studies included but one involved a frequency of two or more days/week with some as high as 4-5 days/week. They concluded,

"It would appear from this review that regular high intensity resistance training is appropriate exercise therapy in maintaining lumbar spine BMD amongst postmenopausal women although the inclusion of other weight bearing activities may also be necessary to best augment hip BMD without other therapeutic agents" (p.1238).

Also from St James and Carroll, "However, in the modern era, BMD increasingly appears to be not the most appropriate study endpoint in assessing the effects of exercise regimes on bone strength and fracture risk" (p.1238). What these authors are saying is that measuring bone mineral density may be a mistake, which was also the conclusion from Nikander et al (2010).

A 2009 paper in *Sports Medicine* titled: Exercise and Bone Mass in Adults;

"Not all exercise modalities have shown positive effects on bone mass. For example, unloaded exercise such as swimming has no impact on bone mass, while walking or running has limited positive effects. It is not clear which training method is superior for bone stimulation in adults, although scientific evidence points to a combination of high-impact (i.e. jumping) and weight-lifting exercises. Exercise involving high impacts, even a relatively small amount, appears to be the most efficient for enhancing bone mass, except in postmenopausal women. Several types of resistance exercise have been tested also with positive results, especially when the intensity of the exercise is high and the speed of movement elevated...Additional randomized controlled trials are needed to determine the most efficient training loads depending on age, sex, current bone mass and training history for improvement of bone mass." (p.439). (emphasis added)

Did you notice the last sentence?

A 2010 paper in *BMC Medicine* titled: Targeted exercise against osteoporosis: A systematic review and meta-analysis for optimising bone strength throughout life;

"In premenopausal women, the findings from several meta-analyses of RCTs examining the effects of different modes of exercise on BMD indicate that resistance training and high-impact weight-bearing exercise, alone or in combination, can produce 1%-2% gains at the lumbar spine and femoral neck [26-29]. Although not all RCTs have reported beneficial effects, the findings from the meta-analyses indicate that high-intensity progressive resistance training appears to be more effective for improving vertebral BMD, whereas high-impact training results in greater gains in femoral neck BMD. Whether exercise has a beneficial effect on BMD in young men is not clear, because few RCTs have been conducted in this population. However, one meta-analysis of randomized and nonrandomised trials incorporating both young and older men reported a site-specific beneficial effect of exercise on BMD in men aged older than 31 years versus those younger than 31 years [30]." (p.7)

"In postmenopausal women, there are mixed results from several meta-analyses reviewing the effects of aerobic training, weight-bearing impact exercise, resistance training or their combination on BMD [26,28,29,31-36]. In general, the findings from these meta-analyses indicate that lumbar spine BMD can be increased by 1%-2% following resistance training, but findings from the femoral neck have been somewhat contradictory. According to several meta-analyses, endurance training or walking appears to have little or no effect on either femoral neck

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or lumbar spine BMD [29,31,35,37]. However, a recent meta-analysis reported that mixed-impact loading programs including low- to moderate-impact exercises such as jogging, walking and stair climbing were most effective for preserving BMD at the lumbar spine and femoral neck when combined with resistance training. Interestingly, more demanding high-impact jumping programs without other exercises were ineffective" (p.8)

"In middle-aged and older adults, the evidence for a beneficial effect of training on bone strength was less definitive due to the limited number and short average duration of the available RCTs. However, epidemiological evidence suggests that moderate to vigorous physical activity performed three to four times per week is associated with considerably lower incidence of fragility fractures in both women and men [70,71]. In addition, findings from cross-sectional studies of adult athletes suggest that regular exercise for many years has the potential to substantially improve bone strength. The findings from these studies also suggest that exercise regimens that include moderate- to high-magnitude impacts from varying loading directions (high- and odd impact exercise) may represent the optimal mode to enhance bone structure and strength." (p.14)

Nikander et al (2009), a cross-sectional study, suggests that high-impact and what they call odd-impact activities are more apt to improve bone structure and strength at the femoral neck. The powerlifters (high-magnitude group) came in third. Of course, this is a cross-sectional study and so has no power to convey causation, since we could argue that a natural tendency toward stronger bones could make an athlete gravitate toward squash instead of powerlifting and so the groups are naturally formed (this is true, but we are being somewhat facetious).

So from this very recent review we could conclude that resistance training is probably good for BMD, but possibly not the best for all areas. However, determining what is the BEST method for increasing BMD in adult males and females is still a bit elusive.

Finally, when it comes to frequency, 2-3 days a week is needed for best results on bone density. In a meta analysis by St James and Carroll on the effectiveness of resistance training on bone health, all studies included but one involved a frequency of two or more days/week with some as high as 4-5 days/week. "It would appear from this review that regular high intensity resistance training is appropriate exercise therapy in maintaining lumbar spine BMD amongst postmenopausal women although the inclusion of other weightbearing activities may also be necessary to best augment hip BMD without other therapeutic agents." (p.1238)

It looks good that a high-intensity, full-body strength training workout, with a relatively high load, about 70-80% of 1RM, done 2 to 3 times a week is one of the best methods for maintain or increasing bone density. However, the evidence for high-impact activities also looks good. There is also the recent research that BMD may not be the best clinical endpoint for determining bone health, instead overall bone strength might be the better endpoint. With that said, please explain how you could conclude that "Without reservation we can say that a properly performed regular total-body strength-training regimen such as Slow Burn Fitness Revolution brings about bigger and better sustained bone-density gains in women and men of all ages – even those in their eighties and nineties – than any other form of exercise"? Seriously y, unless these extensive review papers and a number of papers on the topic are trying to hide something there is no evidence to substantiate your claims. It seems, to us, that you are not representing the facts honestly.

References:

Guadalupe-Grau, A. et al (2009). Exercise and bone mass in adults. Sports Med; 39(6): 439-468.

Nelson, M. et al (1994). Effects of high-intensity strength training on multiple risk factors for osteoporotic fractures. JAMA; 272: 1909-1914.

Why you should NOT read Fred Hahn's "Slow Burn Fitness Revolution"

Nikander et al (2009). Targeted exercise against hip fragility. *Osteoporos Int*; 20: 1321-1328.

Nikander, R. et al (2010). Targeted exercise against osteoporosis: A systematic review and meta-analysis for optimising bone strength throughout life. *BMC Med*; 8: 47.

St. James. M. & Carroll, S. (2006). High-intensity resistance training and postmenopausal bone loss: a meta-analysis. *Osteoporos Int*; 17: 1225-1240.

St.James, M. & Carroll, S. (2006). Progressive High-Intensity Resistance Training and Bone Mineral Density Changes Among Premenopausal Women. *Sports Med*; 36(8): 683-704.

Winett, R. & Carpinelli, R. (2001). Potential health-related benefits of resistance training. *Preventative Med*; 33: 503-513.

Chapter 7: Bye-bye back pain

"Why is it so common for our backs to break down? The primary blame can be laid at the door of widespread loss of muscle and soft tissue strength in the lumbar spine" (p.67) (no references)

"but far and away the most crucial factor in the development of most low back pain is loss of muscle mass and strength" (p.68) (no references)

"there is no safer or more effective method [slow-burn] for preventing or resolving this pervasive disorder" (p.70) (no references)

"Take the lumbar muscles to complete failure in three to six reps once a week and say, 'Bye-bye back pain!'"(p.71) (no references)

Matt and Jeff's response

First, your discussion of low back pain and strength severely over-simplifies the topic. The etiology of back pain/dysfunction is multifactorial. Strength in general is often NOT a big component of a pain free back (ref). Additionally, where is the research to support the **superiority** of a "slow-burn" type of strength training compared to other speeds of strength training? With that said how can you say that a "slow-burn" type of strength training will end back pain?

Here's what the late Dr. Siff had to say on the subject. He states "There is no evidence that subjects with low back pain possess particularly weak muscles, except when they have been kept off work for prolonged periods." (p.90) He goes on to say "For instance, numerous articles (many from Spine Journal) have concluded that the incidence of back pain and its ultimate resolution do not show any consistently significant correlation between abdominal strength and training of any of the abdominal muscles" (p.90).

What would an expert in the field of back function say regarding this matter? Well, here is what Dr. McGill, author of *Low Back Disorders*, had to say about the information contained in your book. We sent him the quotes listed above, and he said;

"if this is all they are [saying] then the statements are very simplistic. There are many sources and mechanisms of back pain and a thorough assessment is required to sort out the cause of pain, eliminate it and then build the deficits with appropriate corrective and therapeutic exercise. There are some people who really need to build some back muscle mass in a way that spares the pain causing mechanism - yet others may simply be due to inappropriate movement patterns or motor patterns - for example they may have disc damage such that avoiding flexion at that joint makes daily activity painfree. The reality is that "back pain" must be subclassified

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into groups that will respond to specific approaches, and that each group must be matched with the best approach.

The slow burn may address a very small proportion of back pain sufferers (some do well with endurance training) but it does not address movement problems. It sounds like a pure muscle physiology approach that ignored all we know about injury mechanics. His claim about safety is not buttressed with evidence or at least no evidence was supplied. Taking these muscles to failure would be highly inappropriate for many back pain sufferers." (McGill)

Now there has certainly been some research showing that doing lumbar strengthening exercises can increase the strength in that area and reduce the symptoms of pain and days of absenteeism from work (Carpenter et al; Risch et al). So there are certainly some potential benefits to doing specific strength training in the lumbar area. However, from looking at the preponderance of evidence on this subject, it seems like it is a major oversimplification and mischaracterization of the evidence when you stated, "the most crucial factor...for most low back pain...is muscle mass and strength". Let's look at some more research on the topic.

What seems to be the general consensus is that it is muscular endurance, not absolute strength that is more important in preventing and rehabilitating low back disorders and pain (Grenier et al). A recent paper by Grenier et al has these conclusions;

"To date, no specific exercise intervention has been shown to be substantially more effective than another [for low back pain]" (p.20).

"Several researchers have demonstrated that muscular endurance and not muscular strength is more protective when it comes to the low back" (p.20).

"There is also considerable evidence that general aerobic exercise such as walking plays a key role in both preventing and treating low back injuries" (p.20).

A final piece of evidence from a 2007 Cochrane review, titled: Exercise therapy for treatment of non-specific low back pain (Hayden et al)? This recent and very high-quality review concluded the following;

"Acute low-back pain populations

Ten of 11 trials involving 1192 adults with acute low-back pain had non-exercise comparisons. These trials provided conflicting evidence: one high quality trial conducted in an occupational setting found mobilizing home-exercises to be less effective than usual care (Malmivaara 1995) and one low quality trial conducted in a healthcare setting found a therapist-delivered endurance program improved short-term functioning more than no treatment (Chok 1999). Of the remaining eight low quality trials, six found no statistically significant or clinically important differences between exercise therapy and usual care or no treatment; the results of two trials were unclear" (p.5).

"Chronic low-back pain populations

In 43 trials including 3907 individuals with chronic low-back pain, 33 exercise groups had non-exercise comparisons. These trials provide strong evidence that exercise therapy is at least as effective as other conservative interventions, and conflicting evidence that exercise therapy is more effective than other treatments for chronic low-back pain" (p.5).

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It seems that having a certain level of strength is a good thing for back health and for some people dealing with chronic low back pain doing strength training for the lumbar area is likely to be helpful. However, it is not likely that having strong low back muscles will actually prevent the occurrence of low back pain (Grenier; McGill; Siff). Let's also not forget to consider the placebo effect. For research dealing with pain, there is always the possibility that the therapeutic effects can be due to the placebo effect and not necessarily the specific drug or manual therapy used (Price; Wager). So after reviewing some key literature on the subject and consulting one expert in this area, we think that the ability to say, with any certainty, that "*but far and away the most crucial factor in the development of most low back pain is loss of muscle mass and strength*" and "*there is no safer or more effective method [slow-burn] for preventing or resolving this pervasive disorder*" grossly misrepresents the evidence.

References;

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Chapter 8: Improving athletic performance

"If you do have the genetics for it, Slow Burn will "rip" and "shred" you faster than any other method around" (p.75) (no references)

"He [Barry Bonds] was a good player, but it wasn't until he began strength training that he became the powerhouse home run hitter that he is today" (p.76)

"There is no activity or task or sport imaginable that won't be easier if you are stronger. And there is simply no better way to get stronger fast and without a major time commitment than with Slow Burn training." (p.79) (no references)

Matt and Jeff's response;

See also our comments from Chapter 4

Regarding getting ripped or shredded. This was covered in the Chapter 3 review.

We found only a single study done with super slow type training on sport related activities and not a single study specifically with the Slow-Burn type of training on sports performance. According to Greer "...vertical jump, upper and lower limb power as measured by dynamometry, and grip strength were not improved over 16 weeks of Superslow training" (p.34). Based on this information it does not look promising that this type of training would improve athletic ability. It might, or it might not, but the fact is we don't know and there are, in fact, other types of training strategies that have been studied which show that they will likely improve athletic performance.

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Using Barry Bonds to somehow demonstrate that the Slow Burn type of strength training will work for athletic performance is perplexing to us. How do you make this leap of faith? Does Barry only do Slow Burn type of training? Does he do Slow Burn at all? We hardly doubt it. Did steroids have anything to do with his increase in size and strength? This is just a very bad example.

References;

Greer, B. (2005). The effectiveness of low velocity (Superslow) resistance training. *Strength Cond J*; 27: 32-37.

Chapter 10: Slow burn in the gym

Perform them [exercises ,13 of them] "in the exact order given" (p.137)(no references)

Matt and Jeff's response;

How did 13 become the magic number of exercises and why these 13 exercises? Also, why no mention of alternatives for these particular exercises when working out in a gym? Wouldn't giving some alternatives help people mold the workout to what they had available at their gym as well as reduce the boredom of doing the same thing every time? We think so. Finally, why the "exact order"? Where is the evidence for this type of specificity? There is none that we have seen. In fact, according to Carpinelli, there is no discernable benefit from do exercises in any particular order. This makes no sense to us. But, we could be wrong. Please show us the evidence for this recommendation.

References;

Carpinelli, R. (2010). A critical analysis of the claims for inter-set rest intervals, endogenous hormonal responses, sequence of exercise, and pre-exhaustion exercise for optimal strength gains in resistance training. *Med Sport*; 14(3): 126-156.

Conclusion

There you go, a detailed analysis of the information presented in the book, The Slow Burn Fitness Revolution, and the comments that Fred and others have made at our blog. We obviously think it is very clear that the information Fred has presented in this book is incorrect, misleading, and unsubstantiated. There is no proof that the Slow Burn type of exercise routine is superior, in any way, to other types of high-intensity strength training in relation to the benefits of strength training. Until further research is done on this type of training or at least something very similar, it is purely speculation to say Slow Burn does what the authors say it does, or does it better than other types of strength training.