Pimp My HST Foreword

"There are no rules, only options." - Ian King on designing strength training programs

This board contains the most knowledgeable, friendly and helpful members of any I visit. Given the vast and detailed knowledge of its members, and my lack thereof, I hope to consolidate the advanced "tweaking" information in one place – for the benefit of all of us.

Bryan has said that the original program was developed as close to "one size fits all" as possible, which by definition means it won't be optimal for all. I've printed and read 241 pages in the last few days (in addition to the several hundred printed and digested over the last two and a half years).

There is a TON of information on this site to sift through, I just want to get most of the tweaking / optimizing ideas in one place.

If you are a beginner, do NOT read this thread – it will only bore you (at best) or confuse you (at worst). Do the original HST routine at least twice before considering these tweaks.
-- Proteus9

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1.1 Introduction to Workout Design

This is my high-level roadmap on how an entire "tweaked" workout cycle ought to be designed for HST. You may have or develop your own roadmap of how the workouts should be laid out.
The key thing is to be able to see the forest from the trees. Once you can see this clearly, then you can add tweaks in a methodical, predictable manner. And if you can't, then you won't understand why you're not seeing the gains.

A HST workout can be split into four phases: 15s, 10s, 5s, post-5s. My general philosophy is that techniques/tweaks should be installed layer-by-layer upon entering each phase. That is, your 15s would represent the bare essence of your routine. And the post-5s will use everything.

The exercises in your routine can be defined into three sections: Core, Specialization and Metabolic Stress. Your exercise selection is defined by familiarity, preference, and priorities. Some people will prefer a basic core routine; others will have a lot of specialization. There are good reasons for both, but it's crucial to understand that frequency and volume comes last in your decision-making.
These three sections established a priority of exercise selection, that determines the total # of exercise you plan for your program. Ideally, you won't be using more than 20 exercises for a routine. If you do, then consider a split.

Below is a summary of how these three steps work. It involves concepts and terminology that will be explained and expanded upon later, but this will give you a gestalt of the workout design process.

1.1.1 Step A: Choosing Core Movements

Highest priority. These are your primary movements for growth/coverage. Core movements will be usually compound-joint exercises. But you may add single-joint isolation movements (such as leg curls) that function as the primary stimulators for that body part.
Although different compound exercises may be better at hitting areas than others, really that isn't your primary goal. Neither is overlap (the volume thing), which should be low-to-moderate. You want to make sure you're covering the muscles you want with exercises that you like and can properly HST with.

1.1.2 Step B: Choosing Specialization

While planning your next cycle, decide on what section you want to "bring up." You will apply most of your specialization (which includes exercise selection and techniques) to this section.

You choose isolation movements that increase stretch with load. If you don't make this distinction (i.e. you choose tricep pushdown over skullcrushers), then you're not making enough differentiation between doing an isolation movement and performing more sets of the adjunct compound movement.

For the bodyparts that you don't add a stretch-point isolation movement, THEN increase the overlap with more core movements from different angles or grips.

1.1.3 Step C: Choosing Metabolic Stress Techniques

Lowest priority and sometimes optional. You choose isolation movements to increase load at contraction in order to emphasize burn. This is nice for adding hypoxic stress with a highly efficient means without wasting time or glycogen and over-fatiguing yourself.

This is actually what most people do when using isolation movements, and it's also why most people do not get very good results. In choosing, for example, tricep pushdowns over skullcrushers, they are doing step C) instead of B) For a bodypart, you shouldn't consider C) *until* you've done B)

If you don't add isolation movements for burn for that bodypart, THEN you look into adding more work sets/exercise for that part. You may add in a light burn set to create a general burn. Thus, your exercise selection should create a trickle down effect on issues with volume, specifically # of sets/exercise and # of total exercises. Whatever the case, you should follow the above order of priority with the exercise selection.

1.2 Sample Case Study

Example: I do military press and db laterals for the delts. I'm wondering if the laterals are really unnecessary This is an example of doing issue A (military press) but doing issue C (db laterals) without having done issue B. You would either throw out DB laterals altogether or add flat/incline-bench DB laterals to emphasize stretch.

1.2.1 Exercise Selection – Sample Process

A person decides he wants to primarily gain mass and doesn't really have a preference for bodypart specialization. In his workout history, he's found that he does squats very well, but his height and limb lengths means that the deadlift causes him problems.

Therefore, for his "core routine" he wants to make sure everything important to him is covered, and since he doesn't plan on using the deadlift, he throws in pulling movements at various angles and grip widths. He decides to add hyperback extensions to work his lower back. Say his total routine amount amounts to 6-8 compound exercises (squat, chin, cable row, bent-over row, dips) plus back extensions.

Thus, he fulfills issue A and gets adequate coverage from his routine. Then he goes to issue B. Because he isn't really interested in fine specialization, he decides to add more compound movements in order to increase overlap. And, so, he decides to add close-grip bench, military press, and close-grip underhand pulldowns. Then he looks at issue C.

Because he didn't any stretch-point exercises and instead choose adding compound movements to increase overlap, he shouldn't look at adding any more isolation movements at all. He's arrived at a 9-execise routine for his selection. Then he looks at his workout schedule. He realizes he can't train 6x-a-week, but he can do the alternating AM/PM thing and cover summation. He reviews the # of sets per exercise. To do this, he projects how many sets will be viable during 5s.

Because he's doing a core routine without extra frequency, from his workout journal, he figures he can do more sets. Judging the bodypart overlap, he decides that he'll shoot for 4 sets of 5s with squats and dips, 3 sets of 5s with rows and chins, and 2 sets for pulldowns and military press. He understands he doesn't have to try to hit 5 full reps per set after the first. From there, he scales back the # of sets for 10s and 15s. For example, he may only do 2 sets of 15s and 3 sets of 10s for squats. If, when performing his routine, he realizes that 3 sets of 10s are more than plenty, then he'll establish that as his "set ceiling" for 5s as well.

Finally, he plans out what intensity techniques to use during post-5s, if to use them at all.

1.3 Scheduling of HST Phase and Sections

As mentioned before, I prefer layering in the techniques according to each phase. More or less, this is the general template (though there are exceptions.)

Note: Because of this layout, most isolation movements are not performed during 15s. This is intentional.

HST Phase	Section
15s	Core
10s	Core + Specialization
5s	Core + Specialization + Metabolic Stress + some optimisation techniques
Post-5s	Core + Specialization + Metabolic Stress + all optimisation techniques

2.1 Introduction to Frequency

Frequency is perhaps the easiest way to tweak your routine. After all, you can just take your current routine and do it more often, repeating the same weights.

Choosing frequency should come before your decisions on overall volume (i.e. # of sets/exercise), but after your exercise selection. Frequency can be also used to split a routine if there are too many exercises or are time constraints.

Because frequency is a relatively easy tweak, the problems with increasing frequency are discussed first. Then you'll read why it can be desirable.

2.1.1 Cons of Increasing Frequency

1 It's more likely you'll get overuse injuries from this than high volume. It takes awhile for tissue to increase elasticity during a workout. That's great for muscle microtrauma; that's bad for your tendons and ligaments.

2 Anytime you significantly increase sarcomere disruption, you're also frying the E-C system, which prevents you from training frequently.

3 The more often you train, the more likely you'll reach systemic overtraining (namely, elevated cortisol levels.

4 The metabolic work initially creates a negative net effect between protein synthesis and protein breakdown. Performing one curl set every 60-90 minutes would not significantly dampen protein synthesis levels in the biceps. Deadlifting every hour could effectively lower protein synthesis rates altogether.

5 Even everyday training will boost daily BMR significantly as well as deplete glycogen stores rather quickly. Going twice-a-day training, which is not unusual for collegiate sports as well as pro, requires major caloric intake. If you're not doing that, high frequency will kill ya.

6 It's mentally exhausting. Have YOU tried Poliquin's one-day arm cure?

7 Finally, the sheer amount of loading you impose on a muscle, be it from volume or frequency, eventually increases RBE more. I feel that whatever frequency you do (same with volume for a bodypart), you want to try to maintain it or something near it.

2.1.2 Advantages to bleeding edge frequency

1 Summation effect. This can be minimally met by switching between morning and evening 3x-a-week workouts. Again, this is really the most basic and effective optimization technique you can do for your HST routine.

2 Acute effects from each workout. Temporarily higher IGF-1, testosterone, etc. responses will usually overcome elevated cortisol levels.

3 More potential loading due to better managed CNS. Obviously, it's easier to split up 10 sets into 2 consecutive days than to do all of them at once.

4 More acute effects of loading per set. I tend to feel that more microtrauma is generated from, say, 10 sets of a load spread over one day (i.e. Poliquin's Arm cure) than 10 sets performed contiguously for a bodypart (Poliquin's GVT.)

5 Increasing volume or frequency will make your sets more amenable to sarcoplasmic hypertrophy.

6 Better nutrient partitioning effect.

7 If you take two workouts with the same volume and the same caloric bulking diet, the more frequent one will create less "wasted calories" (less fat) and perhaps facilitate more efficient upload of glycogen than the less frequent one.

8 Training twice a day -- be it a split, full-body, or whatever -- can be a surreal experience. You become your workout, mate.

2.2 Frequency Scheduling

In order of preference . . .

1 Every other day training at about the same time. (Least effective)

2 Train every 36 hours. This requires some alternate AM/PM scheduling and occasionally everyday training. By doing this, you'll get continuously high protein synthesis levels as well as a summation effect. **Note:** Most trainees will want to achieve at this level regardless of their exercise selection. Therefore, if you have too many exercises to prevent you from training often enough for the summation effect, you'll want to back track the exercises until you can achieve at least this level. That is the big exception for workout planning.

3 5-6x-a-week, every day training. You may get an enhanced summation effect as well as increased loading.

4 3x-a-week, two-a-day training. Same as 3) plus better management of CNS and metabolic resources.

5 10-12x-a-week training. 6) Ultra-high frequency bodypart specialization. For example, the Poliquin One-Day Arm Cure.

3.1 Specialization and Metabolic Stress Terminology

Below are some terminology you will see again and again in the Specialization section. Again, some of the explanations are getting a little ahead of their proper sections in this document, but it's probably better to get exposed now before you get bombarded with it later.

3.1.1 Stretch point exercise vs. Peak Contraction exercise

These are Position of Flexion-related terms. Essentially, stretch-point exercises are exercises that work the target muscle through a particularly stretched range of motion. Usually the sticking point is at the point of full stretch. They increase strain through stretch and *increase MAPKp38 activity and accelerate sarcomere hypertrophy.* Most stretch-point exercise is single-joint, isolation movements with the exception of legs (SLDL, sissy squats.) Peak-contraction exercises are exercises that work the target muscle in its most contracted range of motion. Virtually all peak-contraction exercises are isolation movements.

These don't increase strain that much over normal compound movements, but they do a great job at *increasing metabolic stress, fatigue, MAPKerk1/2 activity, and sarcoplasmic hypertrophy* in the target muscle. Most of y'all been doing this movement for years. There are POF tables detailing a sample of them. Note: certain movements can "qualify" as both, but the actual technique does vary whether you want to emphasize the stretch or the contraction.

3.1.2 Static hold vs. Loaded Stretch (LS)

Static hold is just holding the weight at a certain position. Your static strength is greater than your concentric strength, though less that your eccentric strength. Static holds let you milk the benefits of the muscle's contracted or stretched point and can be way to extend the TUL of a set.

Loaded stretches are essentially static holds in an extremely stretched position. When a mildly heavy-to-heavy weight is held in an unusually stretched position for sufficient time, the passive-stretch reflex kicks in and slowly increases the effective tension at that point. Natural application of loaded stretch is to simply perform a static hold with your stretch-point movement at that load. That facilitates a progressive element with loaded stretches. A more thorough discussion is covered in the respective Customizing section.

3.1.3 Partial vs. Pulsing

Partials are about performing a rep in a limited range of motion. You can't use as much weight as you would with a static.

However, you introduce concentric and eccentric motion. Various applications exist in using partials to accentuate strain and accentuate metabolic stress.

A more thorough discussion is covered in the respective Customizing section. Pulsing are essentially partials with very short ROM (like 1-3 inches.) Pulsing with peak contraction exercises is perhaps the most effective way to generate metabolic stress.

A variation of pulsing, by hitching the myotatic reflex, exists in order to accentuate strain as well. A more thorough discussion is covered in the respective Customizing section.

3.1.4 Pulses vs. Pulse Stretch (PS)

Pulsing is a form of generating high metabolic stress. It involves working at the ROM near contraction.

Pulse stretch is a form of generating extremely intense stretches. It is a variation of ballistic/PNF stretching and is arguably the most effective and dangerous technique to generate strain.

PS is “bouncing” at near stretch. That is, as the weight approaches lockout, suddenly “slack” the weight to rapidly increase the speed of the descent. Then, suddenly change direction, raising the weight.

When this occurs, an intense contraction should occur. As soon as this happens, lower the weight, stretching against this contraction.

3.1.5 Rest pause

Ideally, you'd hold the barbell in its locked out position until you can do another rep. But, what I espouse (for boosting metabolic stress) is a combination of rest-pause and a steady progression of normal, then partial, then pulse, then finally static movements in order to extend TUL.

3.2 Specialization

Before somebody adds in isolation exercises for specialization, they need to establish that they've been growing with their current HST program.

Muscle	% ST	Composition Type
Upper torso		
Deltoid	57.1	Tonic
Erector Spinae	56.4	Tonic
Supraspinatus	59.3	Tonic
Frontalis	64.1	Tonic
Trapezius	53.7	Tonic
Latissmus Dorsi	50.5	Tonic
Gluteus Maximus	52.4	Tonic
Infraspinatus	45.3	Phasic
Rectus Abdominis	46.1	Phasic
Temporalis	46.4	Phasic
Orbicularis Oculi	12.8	Phasic
Biceps Brachii	46.5	Phasic
Ext. Dig.	47.3	Phasic
Ext. Dig. Brev.	47.3	Phasic
Flexor Digitorum Prof.	47.3	Phasic
Brachioradialis	39.8	Phasic
Triceps	32.6	Phasic
Upper leg		
Abd. Poll. Long.	63.0	Tonic
Add. Poll.	80.4	Tonic
1st Dors. Inter.	57.4	Tonic
Abd. Dig. Min.	51.8	Tonic
Rectus Femoris	35.4	Phasic
Lower leg		
Add. Magnus	58.2	Tonic
Biceps Femoris	66.9	Tonic
Peroneus Longus	62.6	Tonic
Soleus	87.7	Tonic
Tibialis Anterior	73.0	Tonic
Vastus Medialis Oblique	52.1	Tonic
Sartorius	49.6	Phasic
Vastus Lateralis	42.3	Phasic
Gastrocnemius (lateral head)	50.5	Tonic
Gastrocnemius(medial head)	43.5	Phasic
Trunk		
Rhomboid	44.6	Phasic
SCM – Trunk	35.2	Phasic

A lot of people, if they haven't seen satisfactory results in their program, add more exercises believing that their body just needs more work. In fact, this can make things worse if they haven't looked at their diet, aren't doing the load progression correctly, or aren't training frequently enough. Specialization and optimization strategies do not solve fundamental flaws in your individual workout design and eating regimen.

Specialization exercises are about bringing up lagging or "pet" bodyparts. For a full-body routine, a person establishes a separate between core mass-gain movements and specialization exercises. Including 20 isolation movements in your routine isn't specialization at all; it's effectively substituting your compound/core movements with curls and such to "increase mass." That strategy is logistically and metabolically inefficient, but it's a common move when people port their split routines to full-body. I'm not saying a person should artificially limit the # of auxiliary isolation movements or work within a prescribed exercise range, but like I said before, it represents a conceptual misunderstanding that won't help your results.

3.3 Various reasons for lagging bodypart

Conventional wisdom goes that lagging bodyparts require higher volume to bring them up. However, the real circumstances behind it can be more complex. Since specialization is partly about bringing up lagging bodyparts (hello calves!), the next part covers the various variables that go into why a bodypart may not be "responding." It goes deeper than muscles being slow twitch.

3.3.1 Fiber composition

The muscle may have high ST composition (and thus small # of "eligible for growth" FT fibers.) In the past, it was usually recommended that high-ST bodyparts like calves (soleus) required lengthy, low-load sets to "fatigue" the fibers into growth.

However, muscles with high ST composition (tonic), by virtue of having so few FT fibers for real growth, require higher-than-average starting HST loads and larger load increments than other muscles. If you're using a sitting calf raise machine, you may have to start at 75% of 1RM out of SD and progress with 10% load steps in order to enjoy significant growth in the area.

Conversely, muscles with very high FT composition (phasic) can use lower-than-average starting HST loads (such as triceps) and smaller load increments. Below is a chart showing "typical" composition. Of course, they'll vary, sometimes greatly, from person to person. But this can give you an idea of where to go with this.

For highly tonic muscles (such as the soleus), then, you may have to start at 70-75% 1RM (~ 10RM) right out of SD and work up to 120% 1RM (high-load negatives) with larger than 5% increments in order to facilitate growth. Because most trainees are unaccustomed to working beyond 85% of 1RM for any bodypart, let alone the calves, this has been traditionally perceived as a difficult bodypart to accentuate.

For HST trainers, this may cause some logistical problems with their scheduling, as they would essentially be doing their middle-point 10s for calves during their 15s phase for everything else, and probably starting negatives for calves as soon as they hit 5s for everything else. Moreover, because they have to take larger/more frequent load increments, they may hit the load ceiling before they complete HST. As you can see, this can be a logistically tough situation for a severely ST muscle.

3.3.2 Role of Stretch and Load

The alternative, which is the basis for stretch-point movements in general, is to manipulate the muscle's tension-load curve by increasing stretch or ROM under load. A tension-length curve can represent the optimum tension generated at a certain contractile length of the sarcomere; conversely, they also give a shape of the "yield points", the level of tension on structural tissue at a specific length that will lead to disruption or deformation.

During remodeling, when sarcomere number increases, the tension-length curve shifts to the right, increasing the effective generation tension and yield point tension at a given sarcomere length point. If you look at tension-load curves for most actively contracting sarcomeres, they roughly form a jagged hill-shape, whose slope changes as you extend the sarcomere length.

What's interesting is that, when you juxtapose a remodeled muscle's curve on top of the original curve, the yield point difference, in tension, varies by sarcomere length. Generally, for an actively contracting fiber, this difference steadily decreases as the sarcomere length increases after the point of its optimal peak tension. This is another way of saying that the "progressive load" and absolute load requirements for disruption decreases as a muscle is stretched farther under load.

Therefore, in situations (say the soleus muscle) where a muscle may require a very high starting load and/or more sizable, frequent load increments, it may be preferable to choose a movement with a higher stretch component. It should be noted, though, that non-actively contracting fibers seem to have a more straight forward relationship and the manipulation of stretch has much less of an effect on varying the effects of progressive load and load increments.

Consider the recent discussion we've had about the role of mechanical strain on passive and actively contracting fibers, it doubly emphasizes how increasing ROM becomes accentuated as load increases. I've found this to be 100% true in my personal experience. By making adjustments manipulating load and ROM, one can experience a rate of gain in line with the other exercises in HST without having to make special adjustments in terms of rep scheme or use extremely high load negatives.
In the case of calves, this can be accomplished using a combination of adjustments for the standing calf raises. You would curl your toes in. You would do calf raises on a block and go as low as possible. Finally, you would perform calf raises while keeping your toes behind your body (by leaning forward slightly.) Likewise, this becomes the basis for using stretch-point movements in order to accelerate growth in other areas. Which leads to the other conditions for lagging bodyparts.

3.3.3 Range of motion

The isolation movements that you chose for that bodypart work roughly the same amount of stretch (particularly the triceps). While this isn't a problem, per se, people often choose isolation movements that do not expand ROM, providing only marginal value (if any) over the primary compound movement.

Therefore, given the choice between adding that isolation movement or more sets to the compound exercise, it would likely be more productive for both general and specialized results, to do more compound sets. For example, between choosing between tricep pushdowns and performing more dips or close-grip bench presses, the differences in the triceps would be negligible; therefore, you would probably choose to perform more dips or presses. However if you substituted pushdowns with skullcrushers or overhead extensions, you increase the effective stretch and ROM.

3.3.4 Weak link vs. peak tension vs. ROM

The weak links of all exercises working a bodypart is toward the point of peak contraction rather than stretch. Not only does this demonstrate why most isolation movements servicing adjunct pressing movements only offer marginal improvement (reasoning for the superiority of most compound movements over isolation for specialization), it also points out why lat and back development can lag even if bodyparts are phasic.

Traditionally, lateral raises, most fly movements, pushdowns and most bicep curls are only marginally more effective (or not at all) compared to their matching compound movements. Moreover, regardless of burn or pump, they only demonstrate noticeable results over matching compound movements when you're into the 85%+ 1RM territory. In certain cases (such as dip vs. machine fly, or deadlift vs. bicep curl), the load on the same muscle will be higher for the compound movement than the isolation movement, given the same range-of-motion.

This doesn't make intuitive sense until you consider that, in most cases, you will limit/measure your 5RM, 10RM, and other maximals against the weakest portion of an exercise. For many isolation movements (i.e. those with correct direction of resistance), the weak point (the point where you define your maximal points) is somewhere toward maximal contraction, which also happens to be the least effective part of an exercise.

For compound movements, non-limb areas such as back, pecs, and so on, are usually worked only through a more limited, but relatively stretched range-of-motion; the weak point of the compound movement movements don't usually align with the contracted portions of the muscle. Given all other variables the same, the overall mechanical strain on the muscle starts and ends at a higher level than for most isolation movements. The dip is particularly superior to most fly movements for pecs for those reasons.

Key exception is the pulling movements. Because the weakest part of the ROM is roughly the same of highest contraction, most pulling movements work the back, delts, traps, and biceps about the same (and sometimes less) with the same strain as their matching isolation movements. Likewise, development in the back comes a little slower than other areas.

In fact, it may not be such a bad idea to use a little body English with your pulldowns and rows to negotiate slightly higher loads. But, at least, it becomes necessary to use very high-load negatives during the last phase of HST. The other alternative is to use higher-load, stretch-partials that emphasize the stretch-point. For rows and chins, you may only go up halfway using loads 30-50% heavier (you'd be surprised how much heavier you can go when you're not trying to bring the bar to the sternum.)

Then, for a 2nd set, you would do a normal set at a lower load range. The redeemer is the deadlift. The deadlift *presumes* a relatively fixed and stretched position for the arms and back. The weak point-load (which is partially mitigated by traditional deadlift technique) for the deadlift is still helluva heavier than the other movements, because it isn't aligned with any muscle's maximal contraction.

The advantage it has over pulling movements only gets challenged once you shift to negatives for the pulling movements. Deadlift deserves its godlike status as The Elvis of all exercises. Isolation movements with very incorrect direction of resistance (such as DB flies and curls) can have an advantage over compound, because the point of maximal contraction happens to be the strong point of the exercise. In this case, the isolation movement can be manipulated to emphasize high-loads along the stretch with stretch-point movements. Which is what I recommend with stretch-point movements such as incline bench flies and bicep curls.

3.3.5 Mismanaged RBE.

Anytime you increase mechanical strain (by stretch, load, volume, modality techniques), you'll increase the remodeling effect. Should a person, then, be doing drop sets or stretch-point movements or even plain vanilla isolation movements during 15s . . . right after they deconditioned for ~2 weeks?

Probably not. In insisting on adding a whole slew of exercises, and then having to do with the limited load choices for many highly effective isolation movements, people accelerate RBE for a little bit more of growth. Unless the isolation movement is your primary movement for bodypart (i.e. leg curl), I think people should wait until 10s to add them.

You can set up a more linear load progression this way as well. Although it can be argued that perhaps the first few workouts may not have a degree of strain higher than the matching compound movement, and thus offer only a volume-redundant loading effect, well what's wrong with that?

Just as 15s ingratiates you to your core workout, 10s helps you mentally set up for the weird techniques you'll be doing with the isolation movements. By the mid-10s or beginning of 5s, the stretch-point movements, not the compound movements, will become the primary disruptors for the target bodyparts. This is where the specialization really begins.

3.4 Stretch movements and stretch-point exercises

To give you an idea of what would be a "stretch-point" movement; here are the Position Of Flexion exercises

Muscle Group	Exercise
Quads:	sissy squats
Hamstrings:	stiff-legged deadlifts
Calves:	donkey calf raises
Abs:	cable crunches with low-back support
Chest:	dumbbell flyes
Lats:	Pullovers
Midback:	close-grip cable rows
Delts:	incline one-arm laterals
Biceps:	incline bench curls
Triceps:	overhead extensions

Many of the above movements have technique variations in order to emphasize stretch. To give you a feel for what that may be, below are an example of Parillo's "fascia stretches", and Doggcrapp's.

Not that you would necessarily do them, but it would give you an idea of what I mean by emphasizing the stretch. Some of this can be applied to traditional exercises.

Parillo's Stretches

Quad Stretch

Start: Stand next to a bench or other piece of sturdy gym equipment. Bend your right knee. Holding your right ankle, bring your bent leg behind you. Position your ankle so that your instep is secured against the equipment. For balance, hold on to the equipment.

Stretch: Press your right heel to your glute while pushing your quad down and back. Hold for 10 seconds, then release. Repeat with the left quad. Variation: To stretch your upper quad, press your leg down first. Then push your heel to your glute.

Start: This movement stretches your inner thighs and hips. Sit on the floor with your knees bent and the bottoms of your feet pressed together.

Stretch: With your back arched, move your upper body toward the floor while pressing your inner thighs down with your forearms. Hold for a count of 10.

Start: Sit on the floor, bend your knees out, and place the bottoms of your Quad

Stretch - Partner Assisted Start: Like most of these stretches, this one will feel painful at first. The pain merely indicates that your quads are very tight. Many of the bodybuilders I stretch can barely get their knees off the floor. After a few workouts, however, I can lift their quads up 45 degrees or more. To begin, lie on your stomach. Then bend your elbows and rest your head on your forearms. Bend your left leg up so that your heel touches your glutes.

Stretch: Your partner presses down on your left ankle while pulling your bent leg upward with his right hand, as illustrated. This position is held for 10 seconds. You should feel an intense stretch in your quad. Repeat with the opposite leg. Butterfly Butterfly/Partner-Assistedfeet together. Kneeling behind you, your partner presses his stomach against your lower back and places his hands on the inner portion of your knees.

Stretch: Lean forward slightly, bringing your upper body toward the floor. Your partner assists the stretch by pushing forward with his stomach against your lower back and by pushing down on your knees. The stretched position is held for 10 seconds.

Calf Stretch

Start: With one foot, stand on a block of wood or elevated platform. For balance, hold on to a piece of equipment. Keep all your weight on the calf being stretched. To stretch your gastrocnemius, keep your knee locked. To stretch your soleus, keep it flexed. For an even greater stretch, use a standing calf machine. Allow the weight of the machine to push you down for a deep stretch.

Stretch: Rise up on the ball of your foot, lifting your heel as high as you can.Then lower your heel toward the floor, obtaining a deep stretch as you all the weight on the left side of your body - the side that will be stretched first. Cross your right leg over your left leg and step forward so that all your weight is on your left foot.

Stretch: Lean away from the bar, forming a comma with your body. With your left hand, push your shoulders in and through, as illustrated. Hold this position for 10 seconds. Repeat with the other side of your body.

Start: This stretch is performed at a bench press rack with a bar.

Bend at the Start: This stretch can be performed from a seated or standing position. To begin, press your shoulders and arms back. Standing behind you, your partner threads his arms through yours so that his elbows meet your elbows. Your partner clasps his wrist with one hand. Be sure to push your chest out. **Stretch:** Arch your back as your partner pulls your arms together, straightening his arms as he pulls back. The stretch should be held for 10 seconds before releasing.

Start: With both hands, grasp a bar or piece of stationary equipment. Place waist and take a wide grip on the bar. Your upper body should be parallel to the floor, as illustrated.

Stretch: Flex your lats and lower your shoulders down toward the floor as far as you can. Keep your arms tightly locked. Hold this position for a count of 10, then release.

Start: Grasp the dip bars with your palms facing inward.

Stretch: Keeping your knees bent, lower yourself as far down as you can. Press your elbows back. Hold the descended position for 10 seconds, then release.

Start: Stand at arm's length from the bar. Then grip the bar with your right hand,asillustrated.press down. Repeat the stretch with your other leg.

Pec Stretch/Partner-Assisted Back Fascial Stretches/Lat Stretch Shoulder Stretch/Parrillo Dips Biceps Stretch - Hold on to the equipment and push your shoulder up against the bar. This pushes your triceps up. Bend your arms behind your head and point your elbows up toward the ceiling. Grab your triceps with your other hand and pull it back. Bend your knees.
Stretch: To stretch your triceps, simply straighten your knees. Hold the stretched position for 10 seconds, then release.
Start: Take a seated position. As if to perform a dumbbell triceps extension.
Stretch: Rotate your torso as far to the left as you can. Hold for 10 seconds, then release. Repeat with the other arm. Wide-grip skin-the-cats are also excellent for stretching your biceps.
Start: Sit on a bench and lean back against your partner's lower leg. Extend your arms out behind you . **Stretch:** Holding your wrists, your partner pulls your arms in and back. The stretched position is held for 10 seconds.
Start: Place your back against a bar or piece of stationary equipment, as bend your right arm and lift your elbow up so that it points to the ceiling. For leverage, your partner stands behind you with his stomach pressed against your back. With his left hand, your partner grasps your extended elbow. His right hand holds your wrist, which should be positioned at your rear delt.
Stretch: Your partner pushes your wrist against the back of your delt, while pressing your elbow up and back. This position is held for 10 seconds before being released. You should feel a deep stretch throughout the length of your triceps.

Doggcrapp's stretches . . .

1 Chest DB fly - Lying on flat bench, 50% of 5RM lungs full of air, drop down into deepest stretch first 10seconds. Shin. Do 12 reps. to keep heel on ground. The lower you crouch, the harder the stretch. Next 50 seconds really push the stretch (this really hurts)

2 Triceps Overhead barbell extensions, 50% of 5RM
- **2.1** Seated on a flat bench, sink barbell into position for first 10 seconds
- **2.2** Slightly lean back and push barbell down with back of head delts
- **2.3** Place barbell on squat rack, shoulder high and face away from it. Reach back and grab, palms up (hands on bottom of bar.) Walk out until you are on heels and stretch is painful.
- **2.4** Roll shoulder blades inward and hold for 60 seconds.

3 Biceps
- **3.1** Do same as step 1 of delts, except hold palms down (hands on top of bar)
- **3.2** Kneel if you can. If you can do that, sit.
- **3.3** If you can go beyond, 60 seconds, raise bar another rung.

4 Back
- **4.1** Hang on a bar with wrist strap. Add belt weights.
- **4.2** Shoot for as long as you can. (I'd do one arm at a time)

5 Pullovers In The Stretched Position
- **5.1** The best stretches for the latisimus dorsi are any form of dumbbell pullovers emphasizing the stretching position. Take close grip semi bent arm pullovers.
- **5.2** Grasp the barbell with a 12-inch spacing and extend it directly overhead after laying flat on a bench.
- **5.3** Following this, lower the weight until you feel a complete stretch in your lats.
- **5.4** Now hold for the appointed amount of time.
- **5.5** I suggest using barbells, dumbbells, and straight-arm cable pullovers in the stretched position to expand the connective tissue in the lats.

6 Seated Rows Stretched
- **6.1** Simply sit down next to a seated cable row machine, grasp the handle and fasten yourself feet firmly in front of you.
- **6.2** Now pull row the weight so as to get a complete peak contraction and slowly lower it until in a stretched position.
- **6.3** At this point, hold for the appointed amount of time.
- **6.4** I prefer a good amount of weight on the stack, for a maximum stretch. This technique can be done with t-bar rows, bent over rows etc.

7 medial deltoid
- **7.1** The key is to place your arms at your sides.
- **7.2** Then keeping your arms straight move them behind your back and try and bring them together. It is similar to behind the back side laterals(the starting position), except you do not have dumbbells.
- **7.3** From here have your partner assist you in pressing your arms together. This will maximally stretch the side deltoid.

7.4 You can also grasp a low cable pulley, stand up and allow the pull from the weight stack to stretch your side deltoid.

7.5 A third way to perform this would be to use a wall as a focal point and simply lean into the wall for resistance in the stretched position.

7.6 Finally you can lie down on a bench as you would when performing lying dumbbell held to the rear laterals, and simply hold the dumbbell in the lower aspect of the exercise(this can be done on incline as well).

8 Hams

8.1 Leg up on a high barbell, hold toe.

8.2 Use free hand to straighten leg for 60 seconds

8.3 **Forward Seated Hamstring Stretch** - Personally this is my favorite way to enlarge the bag surrounding the hamstring region.

8.4 Sit with your legs together, extended out in front of you.

8.5 Bend forward at your waist and reach as far forward as possible! You will need your training partner to apply pressure from behind.

8.6 The whole point is to expand the connective tissue, and for this to happen, pressure needs to be applied.

8.7 You can also use variations such as spreading your legs all the way out to either side.

9 Quads

9.1 Facing a barbell in a power rack about hip high, grip it and simultaneously sink down and throw your knees under the barbell.

9.2 Do a sissy squat underneath it while going up on your toes.

9.3 Straighten your arms and lean as far back as you can calves

9.4 At the bottom of squat, stretch out calves for 15 seconds by pointing toe toward You could probably do a variation by kneeling down, pointing your toe in, and try Stretches from a b c bodybuilding (there's a lot of paraphrasing in this section. Comments here derived from the author, not me.)

9.5 **Quad expansion** - The absolute best way to expand the connective tissue around your quadriceps is to utilize seated thigh stretches

9.6 Simply knee down and separate your feet enough so that you can sit between them.

9.7 Put your hands on the floor behind you and lean back as far as possible, feeling the stretch in the quadriceps.

9.8 **Seated quadriceps stretch** - As a variation you can spread your legs out further to hit the inner thighs. The most painful variation and probably most effective is the no handed stretch.

9.9 Bring your feet together so that you have to sit on them, and not between them!

9.10 Now fold your arms (or place them behind you) and lean back, using your bodyweight as resistance to the stretch! Try these after a drop set on leg extensions and your quads will literally explode in ways you never imagined possible!

10 Chest

10.1 Dumbbell Flys In a Stretched Position - Take a pair of dumbbells. About the amount of weight you would use for a 12 repetition set of flys.

10.2 Lie flat on a bench and lift them in a contracted position.

10.3 Now slowly lower them to the position that stretches your pectorals maximally. Hold this for the target amount of seconds.

10.4 I suggest using a decline and incline position. back front delt

11 Front Deltoid Stretch

11.1 Grasp a pair of dumbbells in a hammer position and lie back on an incline bench.

11.2 Allow your arms to lean all the way backward, producing a maximum stretch in the anterior deltoid.

11.3 Now hold for appointed amount of time.

12 Incline Front Deltoid Stretch

12.1 Find a stationary bar of sorts. It may be the smith machine bar.

12.2 Now turn facing away from it and grasp it with your palms down.

12.3 Walk forward slowly until your delts are maximally stretched.

13 Trapezium Stretch

13.1 Grasp a pair of heavy dumbbells as if you were going to shrug them.

13.2 However, you will simply lower the weight down until your traps are maximally stretched. This can be done with dumbbells, and a barbell to the front and back.

13.3 I also recommend cable shrugs in the stretched position.

13.4 As a side note, if you grasp one dumbbell and lower it till fully stretched, and then move your neck to the opposite side of the body, it can not only add to the trap stretch, but also expand the connective tissue surrounding the medial deltoid.

14 Calves

14.1 The absolute best method of expanding the permimysium, epimysium and fascia is to use the lower position of a specific exercise.

14.2 I believe that standing calf raises and leg press calf raises are the best (when in the bottom position and held) for the gastrocnemius (upper calves).

14.3 However, seated are most effective when stretching the soleus (lower calf).

14.4 Simply stand or sit underneath the calf raise machine, get a peak contraction and then lower the weight until a maximum stretch has been reached.

14.5 Now hold for an appropriate amount of time. Be sure and use as many variations as possible for maximum growth!

15 Forearms Barbell stretches

15.1 Simply grasp a barbell with an underhand grip for the forearm flexors and an overhand for the extensors.

15.2 Wrest your arms on your knees so that your wrists can hang off the edge.

15.3 Now slowly lower the weight until a maximum stretch has been achieved. Hold for specified amount of time.

15.4 As with all the above, use as many variations a possible! My personal favorite variation is the barbell over a bench stretch!

16 Biceps Incline/flat stretch

16.1 The two single best stretches for the biceps are the bottom positions of both incline and flat dumbbell curls.

16.2 Simply sit or lie back on the bench, curl the weight up and lower slowly until a maximum stretch has been reached in the biceps.

16.3 The second front delt stretch using the bar above is also an excellent way to expand the connective tissue in this area.

17 Triceps Old School Stretches

17.1 The movement starts out in the same position as a dumbbell pullover.

17.2 Bend your elbows back until they almost touch the floor.

17.3 From here allow the weight to completely stretch the triceps to their maximum!

17.4 **Pre-Extension Stretch** - This simply emphasizes the lower portion of any form of triceps extensions.

17.5 I prefer dumbbells as it allows for a greater stretch and they are easy to control.

17.6 Grasp a pair of dumbbells and lay back on a bench.

17.7 Extend both arms straight upward and then lower the dumbbells slowly to either side of your head. Hold until stretch is complete.

3.5 Variations of technique with stretch-point movements

A few variations of technique go into stretch-point movements.

1) Because the emphasis is on producing high-strain eccentric contractions rather than increase metabolic work (i.e. lifting the weight), ROM must be expanded as much as possible even if mechanical leverage drops significantly. For example, you will want to perform DB flies as close to the floor as your body will allow, even though your strength at that stretch will be extremely low.

2) For 10s and 5s, increase effective load vs. ROM by using loads that you would normally use for normal ROM movements. The maximal weights will be heavier than what you can often do at an extremely stretched position. When you cannot perform the reps correctly anymore (you try to be honest until it gets too hard), use some cheating in order to raise the weight. For example, you can use a pressing movement for flies. Swing with the bicep curls.

3) Don't zig-zag. Use significant load increments when possible.

4) For calf raises, curl toes in. For extension, move elbows closer together and pushing "outwards" or towards the ceiling. For flies, arch out your back as you approach the bottom.

5) Perform (unilateral) negatives and aggressively increment load beyond 2RM. Ideally, you'll expand negatives into 4 weeks, and increment loads until you hit around 110-120% 1RM, or whenever the load cannot be stopped.

6) If you're comfortable with the movement, initiate the myotatic reflex on last 2-3 reps and/or incorporate load stretches. In both cases, you would do them during or after 5s.

3.6 Myotatic Reflex, Loaded Stretches, and Pulse Stretches

The myotatic reflex is the basis for plyometrics. When a muscle is stretched with a combination of an extreme length and/or heavy load, the muscle spindles sends a charge to contract suddenly. When people try to initiate the myotatic reflex, they are essentially trying to create a sense of danger in order to cause this protective mechanism to occur.

This can be easily accomplished by performing a "fast stretch" with the stretch-point movement. Just before full-stretch, you suddenly "drop" the heavy weight, then "explode" upwards (i.e. you reverse direction.)

This causes an intense, localized muscle contraction way out of proportion with the training load you're using. This itself doesn't have a significant effect on increasing p38. The next thing does.

As soon as you feel the intense contraction, you stretch against it by lowering the weight again. Therefore, rather than use it as you would in plyometrics to create a force impulse, you use this technique to accentuate the load of a eccentric contraction.

Although there is some disagreement about whether the myotatic reflex primarily activates slow twitch fibers, the end-goal is to merely increase total mechanical strain. When done correctly, it can look like bouncing or ballistic movement. It can be dangerous, but very effective.

The stretch reflex can also be initiated by prolonged periods of extreme stretch. That is the basis for loaded stretch, which is to use a light-to-moderate load, hold it in a very extreme stretch position, and then wait until the stretch reflex picks up and steadily increases effective tension. This is perhaps safer than initiating the Myotatic reflex directly, but it's also deeply painful.

Plus this technique stimulates metabolic work and can increase an enormous pump. Did I mention it's painful? One big problem with both techniques is that the myotatic reflex becomes more and more detrained as you use it more. This is especially true of 60-second loaded stretches; eventually, adding longer times won't be adequate and you'll need to increase load.

If you use loaded stretches, it's best to increase either the degree of stretch and/or the load in order to progressively increase p38 and keep the reflex working for you. I think loaded stretches make most sense during negatives.
You could use your stretch-point movements and just hold it at the bottom of the negative. This may amount to no more than 10-15 seconds tops.

Or you could use Parillo or Doggcrapp's stretches, keeping in mind that you'll need to modulate load to a safe, but progressive, variable. This is a relatively safe, though painful technique to increase both erk1/2 and p38 activity, and it doesn't always require weights. Initiating the myotatic reflex probably is best done with your 5s with your stretch points. But, you can also use it with and your compound movements safely, really at any time. You're probably doing it anyway with your squats and deadlifts on the last 2-3 reps.

3.7 Techniques for post-5s

If negatives are unavailable for a movement (problems getting somebody to spot your 700lbs squat?), below are some techniques that will increase strain beyond normal 5RM training. Drop sets, though they stimulate some significant p38 activity, are out of the scope of this post. They're a good idea, but they'll be covered with the erk1/2-stimulating techniques.

3.7.1 Adjusting grip widths and depth

Elbow placement and angle can increase the stretch for a compound movement. For example, the downward angle and wider spacing of the elbows are the reasons why dips are traditionally better at stimulating growth in the pecs than the flat bench.

Once you hit your 5RM for the bench, you can widen your hand spacing by 4-6 inches every other workout until the load is too heavy. You can adjust the depth of your descent to increase stretch. For example, you can deadlift from a raised platform. You can squat or dip a notch lower than you normally would. With both approaches (and all the others listed below this), it's important that you don't start your HST routine with the lowest squat or the widest bench press or chin.

Since the idea is to create an 8-week period of progressive strain, you want to allow yourself some adjustment room in order to make progress continuous when you hit the load ceiling for that movement. This is the same thing as starting at your ~50% 1RM and having 8 weeks to grow, rather than 85% 1RM and then only having 2-4 weeks before you can't go any heavier.

3.7.2 Squeeze the bar, curl the toes (Stabilizer Theory)

Most of the arguments between plane of movement, machine vs. free weights, bodyweight vs. whatever, fixed platform vs. medicine ball, really comes down to how hard you're squeezing your hands and your feet. Balance makes you squeeze harder. Bigger bars make you squeeze harder.

Wearing soles in your shoes makes you squeeze harder. And squeezing harder boosts the neural drive through the entire working section and thus effective tension. So, another adjustment you can make is to use a larger bar, squeeze harder, curl your toes in, or create imbalance, instability issues around your hands and feet. You could wrap more towels around the hand spacing where you press, or roll a sock around the ball of your feet. That will do the trick too.

It's a neural drive technique used in power lifting circles for many years, but popularized by Pavel to the BB mainstream in his books and T-mag articles. When you clench your fist, you'll notice that your forearms, triceps, and biceps contract. When you curl your toes in, you'll notice that your leg muscles contract too. When you flex your belly into your spine, you'll notice your entire lower core contracting. Irradiation takes advantage of this in order to create higher amounts of tension for the muscle.

For example, if you're about to approach failure on the bench press, you can probably squeeze out 2 or 3 more reps if you try to "crush" the bar with your hands. Irradiation is also the basis for the stabilizer theory. We use our hands, feet, and core in order to balance ourselves, meaning that we clench our hands, feet, and core harder than we would on machines or cables. That in turn causes an irradiation effect boosting neural drive and increasing effective peak tension for the bodyparts.

A person working with machines can compensate by consciously "crushing" the bars or curling their toes in, but it's obviously easier and more effective to add a progressive, destabilizing requirement.

3.7.3 Partials for pulling movements (highly recommended)

Because most pulling movements have the strong range through the stretched part of the motion, the training load doesn't really take advantage of the most productive portion for sarcomere hypertrophy. Thus, upon hitting 5RM, you would chop the ROM in half, strictly working from near-lockout to where the bar at eye-level, and continue the load progression until you hit your partial 5RM.

You should be at least 25% stronger in this range and have no problems making a linear progression workout to workout. Upon finishing your partials, you can choose to perform a regular set at your 5RM. That would make sense if you were planning to perform multiple sets of the exercise anyway. Or you could try a drop-set modality. This technique doesn't quite work as well with pressing movements. Because the strong range coincides with where muscles are most contracted, you'll probably need to double the size of your load increments in order to enjoy a tangible effect. Moreover, to make sure you're getting the full training effect, you would definitely want to perform a regular set at 5RM.

3.7.4 Hitching the Reflex (Pulse Stretch)

Most compound movements are safer (albeit less effective) with using the myotatic reflex than the isolation movements. This is somewhat like Steve Holman's X-Rep training and his pulsing technique. You perform 3-5 "pulses" through the most stretched position of the compound movement. The technique, however, more resembles bouncing.

You take the weight about halfway up, lower it slowly, then before lockout, let it free fall (or loosen the grip a bit.) Then, you suddenly jerk the direction upwards, as if you're pressing explosively. Note: you don't raise the weight all that much; rather you make an "intention" in doing this. As soon as you feel an increased contraction, you lower the weight, lengthening against the contraction. Finally, you take the weight about halfway up again and repeat.

This technique is perhaps more desirable after a few workouts at your 5RM has been performed. This will enable the 5RM load to run its course. If you're doing "progressive partials", you can use them right away.

3.7.5 Loaded stretches

You can supplement your workout with the DC and Parillo stretches. If you choose stretches that you can modulate progressively, then you have the opportunity to use them as your primary p38 stimulator for certain bodyparts and extend your post-5s another week or so.

However, this is a very painful way to go about it, and you have to wonder -- why wasn't I doing negatives? Anyway, those are just some of the options you can use. I'd rather use negatives; in fact, I do, but these techniques enable you to milk what you can get from the post-5s and possibly extend the training period, if you wish. In every case, you'll know whether you produced a worthwhile effect by gauging the post-exercise "tightness" or "pulling" sensation.

3.7.6 LS (load stretches) vs PS (pulse stretches) (Technical explanation)

Below is a more technical explanation from the stretch reflex.

When the muscle is stretched. The muscle spindle records the change in length (and how fast) and sends signals to the spine, which convey this information. This triggers the stretch reflex (also called the myotatic reflex), which attempts to resist the change in muscle length by causing the stretched muscle to contract.

The more sudden the change in muscle length, the stronger the muscle contractions will be (plyometric, or "jump", training is based on this fact). This basic function of the muscle spindle helps to maintain muscle tone and to protect the body from injury. One of the reasons for holding a stretch for a prolonged period of time is that as you hold the

muscle in a stretched position, the muscle spindle habituates (becomes accustomed to the new length) and reduces its signaling.

Gradually, you can train your stretch receptors to allow greater lengthening of the muscles. Some sources suggest that with extensive training, the stretch reflex of certain muscles can be controlled so that there is little or no reflex contraction in response to a sudden stretch. While this type of control provides the opportunity for the greatest gains in flexibility, it also provides the greatest risk of injury if used improperly. Only consummate professional athletes and dancers at the top of their sport (or art) are believed to actually possess this level of muscular control.

The stretch reflex has both a dynamic component and a static component. The static component of the stretch reflex persists as long as the muscle is being stretched. The dynamic component of the stretch reflex (which can be very powerful) lasts for only a moment and is in response to the initial sudden increase in muscle length. The reason that the stretch reflex has two components is because there are actually two kinds of intrafusal muscle fibers: nuclear chain fibers, which are responsible for the static component; and nuclear bag fibers, which are responsible for the dynamic component.

Nuclear chain fibers are long and thin, and lengthen steadily when stretched. When these fibers are stretched, the stretch reflex nerves increase their firing rates (signaling) as their length steadily increases. This is the static component of the stretch reflex. Nuclear bag fibers bulge out at the middle, where they are the most elastic. The stretch-sensing nerve ending for these fibers is wrapped around this middle area, which lengthens rapidly when the fiber is stretched.

The outer-middle areas, in contrast, act like they are filled with viscous fluid; they resist fast stretching, and then gradually extend under prolonged tension. So, when a fast stretch is demanded of these fibers, the middle takes most of the stretch at first; then, as the outer-middle parts extend, the middle can shorten somewhat. So the nerve that senses stretching in these fibers fires rapidly with the onset of a fast stretch then slows as the middle section of the fiber is allowed to shorten again.

This is the dynamic component of the stretch reflex: a strong signal to contract at the onset of a rapid increase in muscle length, followed by slightly "higher than normal" signaling which gradually decreases as the rate of change of the muscle length decreases.

Loaded stretches activate mainly the static. **Pulse stretches** activate the dynamic portion of the reflex. Pulse stretching is similar to PNF stretching. Specifically, it's a tweaked version of the "hold-relax-swing" PNF stretch. Because chins and other pulling movements don't have particularly stretched ROM, they're not bad candidates for pulse stretches. And PS is perhaps the best way to bring up calves. But I feel PS with stretch-point movements is a bit like playing with fire. The option is certainly there, perhaps something to explore if you feel the LS are coming too easily.

Ballistic stretching uses the momentum of a moving body or a limb in an attempt to force it beyond its normal range of motion. This is stretching, or "warming up", by bouncing into (or out of) a stretched position, using the stretched muscles as a spring, which pulls you out of the stretched position. (e.g. bouncing down repeatedly to touch your toes.) This type of stretching is not considered useful and can lead to injury. It does not allow your muscles to adjust to, and relax in, the stretched position. It may instead cause them to tighten up by repeatedly activating the stretch reflex . . . PNF stretching is currently the fastest and most effective way known to increase static-passive flexibility.

PNF is an acronym for **proprioceptive neuromuscular facilitation**. It is not really a type of stretching but is a technique of combining passive stretching and isometric stretching in order to achieve maximum static flexibility . . . the hold-relax-swing (i.e. the pulse stretch) This technique (and a similar technique called the hold-relax-bounce) actually involves the use of dynamic or ballistic stretches in conjunction with static and isometric stretches.

It is very risky, and is successfully used only by the most advanced of athletes and dancers that have managed to achieve a high level of control over their muscle stretch reflex. It is similar to the hold-relax technique except that a dynamic or ballistic stretch is employed in place of the final passive stretch. . . .

Even more risky are dynamic and ballistic PNF stretching techniques like the hold-relax-swing, and the hold-relax-bounce. If you are not a professional athlete or dancer, you probably have no business attempting either of these techniques (the likelihood of injury is just too great). Even professionals should not attempt these techniques without the guidance of a professional coach or training advisor. These two techniques have the greatest potential for rapid flexibility gains, but only when performed by people who have a sufficiently high level of control of the stretch reflex in the muscles that are being stretched.

4.1 Introduction to Metabolic Stress

Increasing metabolic work is pretty easy. If you do a short bout of HIIT cardio with a full-body exerciser, you'll induce enough metabolic stress in your legs and back. If you do 15s after your normal set, you'll induce enough metabolic stress. You also know that increasing metabolic work, partially by further activating the erk1/2 pathway, increases the muscle's metabolism, which increases mobilization of nutrients, increases glycogen and speeds protein uptake at a faster pace, improves recovery, etc. It stimulates "sarcoplasmic" hypertrophy and indirectly sarcomere hypertrophy.

4.2 Increasing Metabolic Stress vs. Increasing Mechanical Strain

But, the question remains: should you spend your extra time working on burn sets, or should you be trying to add another set of incline flies?

4.2.1 Extra metabolic work (esp. failure) can fry your neuromuscular junction and ECC system. This decreases the ability to excite the muscle to contract, but it also decreases your general ability to produce neural drive. However, most of us are good at managing this kind of fatigue now, and you can help things by replenishing glycogen and sleeping more. Moreover, this tends to be more skill-specific. Even if you fried out on dips, you can still manage on the incline press. If you did breathing squats, you can still muster enough to do leg extensions.

4.2.2 Extra mechanical strain, i.e. muscle damage by eccentric strain, decouples the ECC system quickly. The difference is that though you can muster the neural drive, you immediately find your muscle unresponsive. This transcends specific movements too. If you did negatives on flies, with little metabolic fatigue, than tried to do a normal bench, that bench will be suddenly very hard. To compensate, you would increase neural drive, which leads to step 1. Therefore, in my opinion, increasing strain -- though it will directly stimulate sarcomere hypertrophy -- has much higher risk for causing problems with progressive loading with 3x-a-week or higher frequency. In a sense, it becomes an issue of descending risk. If you want to bring up a bodypart, you increase strain on it. Once you've designed your work to increase strain, you have to review your training experience and consider whether adding more strain (by adding more sets, increasing stretch, using a modality) will cause problems with completing the next workout. If you think this could be a problem, then you look at increasing metabolic work. Once you've done this, then you finally look at how many sets you want to add to all of your exercises to bring up the bottom line effect.

4.3 Relationship between metabolic stress, HST phases and diet

It's probably useful to point out that if a trainee chooses to use negatives after 5s, and especially if he chooses to use an extended period of negatives, he'll need to add more metabolic stress. Likewise, if he stays with 5s, then he would need less metabolic work in order to produce the intended effect. If he is primarily interested in bumping up total metabolic work in order to make short-term efficient usage of post-WO nutrients, he can just stick with generic fatigue sets and cardio.

Or he may do a combination of techniques, adding a lot of extra metabolic stress to his pecs and back, but not as much for his lower back and legs. Diet figures largely into what combination of techniques you will use. Most variables of your training, such as volume, frequency, and general exercise selection, will influence the caloric intake and diet. That is, your training usually dictates your diet.

HOWEVER, when it comes to metabolic stress, you should actually train according to your diet. Using a lot of high-stress techniques on a low-carb, moderate-calorie diet will cause fatigue and overtraining issues. Likewise, if you don't use a lot of high-stress techniques on a very high calorie diet, especially one tuned to glycogen storage, not using more high-stress techniques can lead to wasted calories and fat storage. Or to view another way, the more food you take, the more resources you have available to produce hypertrophy. By increasing metabolic stress in training, you'll use more of it. In other words, for the issue of metabolic stress training, diet will dictate your training.

Through a HST phase (starting with 5s), you want to establish a baseline level of fatigue-inducing techniques. For most people, particularly those who rely mostly on compound movements, it will likely be a combination of short HIIT cardio, drop sets, or a 15s set. For those who are using stretch-point techniques to specialize bodyparts, they may intermittingly add a few peak-contraction pulse movements in order to generate stress.

Then, as their 5s phase progresses, they may switch from drop set to some combination of rest pause and partials. Or they may vary rep cadence. Or increase their fatiguing load or the target # of fatigue reps. Then, at the end of 5s, if they go into negatives, that becomes their baseline fatigue techniques for the negatives. If they stay at 5RM, they may choose to reduce some of the overall fatigue level. If they lower their carb intake, they may lower their levels too. It's all about matching the current environment of your muscles, your overall CNS system, and diet, with your goals.

4.4 Variables of Metabolic Stress

4.4.1 Range of motion, Concentric vs. Eccentric Contraction

There is sort of reciprocal relationship between Range of Motion and muscle. The more you increase stretch, the more amenable muscle becomes toward strain (and increasing the p38 signal.) But, the more you increase the contraction, the more a muscle becomes likely to fatigue. Two reasons figure into that: the force-production in an extremely

contracted position significantly drops (though leverage factors can play a larger role in the actual strength), and decreases supply of oxygen to muscle.

Also, the concentric and eccentric portions of exercise work like a pump -- the lengthening of muscle pools blood in, the shortening of the muscle pumps it out. So, on a metabolic stress scale . . . 1) Contracted position > Stretched position 2) Concentric movement > Static > Eccentric Essentially, you want to manipulate these two variables as best you can in order to generate metabolic stress from the set. Lengthening the period of concentric movement increases metabolic stress. Working from a more contracted position increases metabolic stress.

4.4.2 Rep cadence and TUL

Shortening and lengthening velocities (provided you're not going too slow that it's turning into static contractions) do not seriously factor into force production. However, they affect metabolic stress in basically two ways:

1) Vary the effective TUL ratio between concentric and eccentric. Practically speaking, we're talking about accumulation of metabolic stress vs. respite of same stress. The higher the concentric phase is relatively to eccentric, the higher net metabolic stress will be created for a given TUL. In effect, you want to delay the respite.

2) In the case of isolation exercises and any movements where the weak-link is at contraction (i.e. pulling movements), a slower rep speed of the concentric portion increases the rate of accumulation of fatigue. In fact, *slowing down* as you complete your concentric rep is the best way to go. The more contracted positions (specifically, in isolation and pulling movements) have significantly effect for metabolic fatigue.

By slowing down or using a slow rep speed, you increase the effective time *at that moment* spent at that rate. This, and not momentum, is the basis for why the 10/5 superslow cadence requires a significant drop in load in order to complete the same TUL as a normal set.

It should be noted, though, that pressing movements have leverage advantages that complicates the above situation. The effective load on muscle decreases as you approach lockout, thus the use of near-lockout (where the limbs are most contracted) can create something of a respite. Thus, there's a necessary balance between force-production of the movement and actual contracted position. Often the point in the movement where metabolic stress is highest will be somewhere in the middle, closer to the lockout than full stretch.

It's harder to locate for pressing movements. In short, using slow rep cadences (without static contraction) with a very, very short eccentric period is ideal for increasing metabolic stress. That may be something like 10/1 or 4/1. Total range of motion will influence this.

4.4.3 Peak contraction exercises

Below is a list of POF peak-contraction exercises.

Body part	Peak-contraction Exercise
Quadriceps	Leg extensions
Hamstrings	Leg curls
Calves	Standing calf raises
Abs	Full-range crunches
Chest	Cable flies or pec deck flies
Lats	Stiff-arm pulldowns or pullover machine
Mid-back	Bent-arm bent-over rows
Deltoids	Lateral raises
Biceps	Concentration curls or double-biceps cable curls
Triceps	One-arm pushdowns or kickbacks

Most of them are pretty familiar. Generally, I think machine-assisted movements work much better than cables and free weights, because you want to get correct direction of resistance in the contracted position.

A Nautilus biceps machine is going to work better than a concentration curl. A pec-dec or fly machine is going to work better than cable flies.

A Cyber or Nautilus pullover produces an amazing amount of metabolic stress in the lats that would take twice as much volume with chins. (And note: I actually think the machine pullover is a better exercise for the lats than chins.)

Isolation movements are more efficient at generating metabolic stress than compound movements. You don't need a lot of time or glycogen to generate an incredible amount of metabolic stress. I also feel it's a much, much better alternative than using pressing movements.

I personally feel that if you're doing a stretch-point exercise, you might as well add a matching machine-assisted movement. Since most people do specialization in their arms, it would make sense to throw in a triceps pushdown, biceps machine, and lateral raise to thoroughly burn the arms. That being said, you don't want to pile on isolation movements just to fatigue your entire body.

Specialization still applies. Therefore, you have to make the same judgment call between specialization and general bodypart coverage.

4.4.4 Progressive loading and absolute load

Of course, increasing the weight builds fatigue. But, it is not necessary in order to create sufficient metabolic stress for endurance adaptations, let alone create sufficient metabolic work. Progressive loading is designed to manipulate strain to beat RBE. Likewise, when working with isolation and pulling movements, you can and should use lighter loads than what you've been working with. Therefore, sets used to build metabolic stress DO NOT follow the HST rep scheme. Reps end by feel.

4.5 Metabolic Stress Techniques

4.5.1 Partials and Pulsing with Isolation Movements

Regular sets have the disadvantage of a lot of wasted effort with both a pronounced eccentric contraction, which leads to a respite and oxygen "refeed" (due to blood pooling back in), and lack of relative TUL spent in the most contracted part of the ROM, which has the highest fatiguing rate.

Static contractions have advantage of fixing at a peak contraction, but the disadvantage of decreased force requirement in an isometric position.

Partials, particularly pulsing, with isolation movements are by far the most effective way to generate metabolic stress in a specific muscle. A true pulse is really a very short partial (1-3 inches) done at near peak-contraction (but not lock-out.) The idea is to just get enough ROM in order for the target muscle to palpably shorten.

A pulse is performed slowly (but not so slow as to turn it into a static contraction) during the concentric and quickly at the eccentric. You'll be doing pulses of roughly 1-2 second concentric and ~0.5 seconds. You'd use a load that's fairly low (for isolation movements, that's somewhere in the 15s range) to produce 15 pulses. In a short 30-40 seconds, you can create an excruciating burn. Another advantage to do this technique is that you can use them rest-pause style.

That is, when you start out, if you can't make 15 pulses, you can periodically have respites by lowering the weight all the way down, breathe, and then rejoin in the fun. Unlike drop sets, you can easily manage the amount of neural fatigue in order to generate the net metabolic stress that you want. Finally, let me vouch for the machine-assisted pullover, especially the Nautilus pullover. It's my favorite isolation movement; so much so that I think it can supplant chins for lat development.

However, it's also truly terrific for creating metabolic stress in the abs, traps and upper back as well as the lats. Even if your routine comprises of only compound movements, I strongly recommend pulsing with this exercise in order to create an effect in many parts. Again, highly recommended.

4.5.2 Statics, Partials, Pulsing and Grip Width with Compound Movements

Because pulling movements tend to have their weak links in the point of contraction, pulsing is the way to go with pulling movements too. However, due to the pulsing needs a slightly wider range of motion in order to generate a palpable shortening in the target muscle. Since there are multiple primary movers at work, loads will be heavier too, approaching what you'd normally use at the end of 15s or beginning of 10s.

Using a close-grip helps too, since it situates all of the primary movers at more contracted position. For example, you can do wide-grip pulldowns for your normal set. Lower the poundage significantly, and then pulse out with close-grip pulldowns. Partials can work well with pressing movements. Here, traditional pulsing would be a bad idea because you're simply too strong near lockout.

BUT, normal partial training, from 50% to near-lockout with a close-grip, essentially works like an instantaneous drop set. You don't need to reset the weight, and so you can go straight into partial training right after your normal set. You can control the # of reps you can perform by adjusting ROM and rep speed. When it gets too hard, you can rerack and repeat rest-pause style, which lets you control respite better than drop sets.

For example, after your 5RM set, you can perform another 5 partials reps, then another 5 pulses, then finally use static holds for a few seconds, all without adjusting the weight. By varying your ROM and speed and concentric vs. static, you can increase metabolic stress and manage the neural fatigue simultaneously.

4.5.3 Drop sets vs. Rest/Pause and Density Training

To be honest, I don't like drop sets (i.e. the stripping of loads) all that much. I kind of view it as a "neither here nor there" approach to increasing metabolic strain and extending metabolic work. Moreover, the stripping of loads within a short period isn't practical unless you have access to selectorized equipment or training partners worthy of Nascar.

However, it goes without saying that many of the techniques used to extend metabolic stress will require a lower load than your current training load. Generally, I like rest/pause training. Not only does it give you more control over your respite periods (by not having you switch the weight all the time), but also it enables you to use higher loads, which can create some extra strain.

20 rep breathing squats is the most famous codification of rest-pause training. Obviously, the traditional disadvantage is that loads near 5RM are too high to properly extend for anything beyond a few reps without a significant respite, thus defeating the purpose of rest-pause training.

However, by using partials as described above, you can modulate the tension requirements of the weight while using range of motion to reliably increase hypoxia stress. Really, rest/pause vs. drop set comes down to density training between load and rest in order to reach a specified # of reps.

1 You need to have a significant rate of metabolic fatigue, by load, contraction, concentric, movement, etc. That is determined by your choice between partial vs. pulses vs. full ROM reps, cadence, and your choice of load.
2 You need to have enough work in a short time period. That is the target # of reps. Generally that will be extra 10-15 reps or 30-60 extra seconds, be it pulses, partials, or full reps.
3 Finally, you need to manage effective training density. This will influence your choice in using rest/pause or drop sets, or modulating load in order to increase density. By doing all three, you can increase net metabolic stress efficiently without torching your neural fatigue or burning through too much glycogen.

4.5.4 15s and cardio

This is in essence, a low-end drop set that induces only moderate metabolic stress, but doesn't require the micromanaging your endurance. If you're just interested in bringing up metabolic work, with little complication and only mild hit to CNS, you could just repeat a set of 15s.

This may be particularly useful if you switch to negatives for the compound movement. It's safe; it's simple; it can help out prevent overuse problems with connective tissue; it brings you back into your inner lactic acid being.

Finally, you could just do moderate cardio or short bout of HIIT. For those of you with access to full-body exercises, this is an efficient and perhaps the easiest way to get metabolic work through many of the major muscles of the body. It also creates a more general effect with metabolism, which helps the nutrient partitioning effect without depleting too much glycogen, incurring too much CNS fatigue, and so on.

One big problem is that most cardio movements will not significantly evaluate erk1/2 pathway activation in muscles not worked. Thus, doing HIIT cardio with the bike will not improve muscle metabolism that much in your back or upper torso. That said, cardio would help your body and general metabolism become more amenable to post-WO nutrition.

4.6 "Metabolic Stress" Chart

Here's a summary of the aforementioned viable techniques, from most fatiguing to least . . .

1 Pulsing with isolation (peak contraction) movements
2 Pulsing with pulling movements, close-grip
3 Partials with pressing movements, close-grip
4 Pulsing with pressing movements, close-grip
5 Rest pause
6 Drop set with selectorized equipment
7 15s or low-rep high fatiguing

Cardio

Here's a summary of rep speed and ROM

1 Higher concentric-to-eccentric ratios is more fatiguing
2 Slower concentric phases (and shorter eccentric phases) is more fatiguing
3 Highly contracted, non-lockout ROM is more fatiguing
4 Pressing movements have leverage issues which can mitigate

And you would definitely throw in pulses. For an overall "body burn", you may pulse the following:

1 Machine Pullover
2 Leg extension
3 Leg Curl
4 Peak contraction movements for upper torso
5 Nelson situp, pulse-style

5.1 Volume and Absolute Load
This will be a much shorter post than the other sections, namely because aspects of the issue of volume has been a part of this entire thread. Volume should always be the last variable in your workout design. Once you've broken training into more and more subdivisions, volume becomes more of a "baking time" to let the ingredients coalesce into a harmonious dish. Undercook and you don't fully realize the flavors.

Overdo it and you burn the product irrecoverably. The trick isn't in mastering a perfect cooking time, but rather understand how all the flavors evolve. As stated near the top of this thread, volume comes after the exercise selection, after the frequency schedule, and after all the decisions are made between what to do to create strain and what to do to crease metabolic stress.

After all this has been defined in your routine, volume has only really two purposes:
1 To establish the baseline or control of your routine during the 5s phase. In other words, what is the minimum # of sets that you want for your body-parts
2 As a stabilizing variable in order to make the "strain steps" in progressive loading relatively constant or increase Before we get into cluster, Gironda, or rep x set matrix style training, it's important to recognize that as absolute load approaches 1RM and beyond, the level of mechanical strain over the existing RBE widens.

That is why it's not as important to retain the same # of reps that you performed during 15s as you would during 5s. That being said, more reps = more microtrauma, and that you don't want the # of reps between each phase to drop so extreme that you're bridging the gap between phases. Maintaining the same # of sets through each phase, to me, represents a baseline compromise between the higher # of reps with 15s with the low reps of 5s. You want to maintain the # of sets In a sense, that is why I often strongly recommend holding off stretch-position exercises and the other intensity techniques until the 10s or, more often, the 5s.

You don't want to do a lot in the beginning because
A. Your body will be sufficiently deconditioned that a little will accomplish a lot, and
B. Arbitrary using a high number of sets during 15s increases the total bout distance that needs to be covered by 10s and especially 5s. Thus, a general rule of thumb is to plan the pragmatic # of reps for your 15s, then divide that by three. That number will be the minimum target # of 5s reps you will use. If you plan 3x15 or 45 reps for 15s, then plan on performing at least 15 reps for 5s. Why would you want to do this? Well, if you're concentrating on mainly the big movements, such as doing a Big Four-style routine, 3x-a-week, then you will likely want to raise the minimum volume of your routine. In your setup, you may decide on a minimum of 3 sets for dips and chins. During 15s, you may actually plan on only doing 35 reps or so (assuming that the other 2 sets are submaximal.) Thus, for 5s, you would work at completing at least 12 reps. Which leads you to cluster training.

5.2 Theory on Cluster Training
Conventional wisdom goes that cluster training works well becomes it enables you to manage your fatigue in order to perform more reps. However, from my experiences experimenting with chopping up sets and high frequency training, I feel the greater issue is that fatigue (i.e. net MU recruitment) and possibly metabolic work (i.e. core temperature increasing tissue elasticity) in general creates protective mechanisms whereby the stress of a rep exhibits less and less strain.

There is a lengthy discussion of this over at Littledoc's thread, but essentially the idea goes that when MU recruitment decreases due to fatigue, the contribution to passive muscle strain (which affects all fibers) decreases. The theory goes (derived from the Morgan studies) that if you can sustain the optimal, synchronous MU recruitment parameters,

then you can create progressive damage in percentage of muscle fibers until you reach fibers whose true yield stress will not be seriously damaged by the passive strain.

However, due to fatigue and/or metabolic work mostly produced during concentric work, especially with 8+ reps, this level of damage usually not reached within one set. Clustering, then, is really about keeping the loading effect as potent per rep as possible. In short, during a given set, after a certain # of reps (ostensibly representing fatigue or absolute load creating the maximal # of MU recruitment), the level of microstrain (and ostensibly MAPKp38 activity) starts to dip.

This usually represents a period where the rate coding significantly rises, and thus is felt by you by increased neural drive. In this form of training, you would stop before this even starts; that would define the # of reps of your miniset. Then, you'd rest shortly and repeat. It follows that concentric contractions should be done fairly quickly; though eccentric contractions should be done in slowly. Then a short-to-long rest period follows before the next miniset.

The lower # of reps, he shortens the rest period and the higher # of total reps you can complete. Cluster is the opposite of density training. Where the latter enables a given load to optimize aggregate metabolic stress (and MAPerk1/2 activity), cluster training enables a load to optimize net mechanical strain (and MAPKp38 activity.)

5.2.1 Setting up a Rep x Set Matrix and Adjusting toward Total Volume

1 The maximum # of reps is set by a period in which net MU recruitment starts to drop. This is roughly measured by a significant rise in rate coding.

2 The lower you are from this max # of reps, the more total reps you can complete. Practically speaking, you'd be dividing the usual reps by either 2 or 3 and round down.

3 The lower you are from this max # of reps, the less rest time you should start with. This is important since some fatigue is necessary in order to facilitate MU recruitment.

4 Rest time goes up steadily. You could use enormous rest periods (the high-frequency indirectly came from this idea), but of course you have to be pragmatic. Also, if you plan on the set being a source of significant metabolic stress, you'll want to increase rest time more slowly. Remember that before we mentioned in the classic HST setup, ideally you'll have the # of reps for that bodypart during 5s be at least 1/3 of your total 15s reps.

Thus, after a 2x15 set -- 30 reps, you'll have a minimum of 10 reps to complete for 5s. For example, you could use a 5x2 setup with 20-40 second rest range. For 10s, you'll have a minimum of 20 reps to complete. You could use a 5x4 setup with that 20-40 second rest period. If you want to approach 30 reps for 5s, you could perform 30x1 reps with 5-20 second rest range. As you can see, the higher your target reps, the finer your application is.

Thus, the improvement in microstrain comes from two places: the increase in # of loaded reps and a lengthier, more thorough period where MU recruitment is near-optimal and thus strain is accentuated. Because this technique is designed to accentuate sarcomere disruption, the pragmatic limit (besides time constraints) will essentially be the effect of disruption on your progressive loading.

In one cluster scheme, they use an ultra-fine rep x set matrix, while only permitting progressive loads once a week. In other words to facilitate the progressive loading of classic HST, you'll want to keep it relatively estimate. That being said, this method works better when the total # of target reps would exceed the normal # of reps for 1 set.

Thus, if you're planning to micromanage just 5 reps for your 5s, this probably isn't worth it. However, those of you planning 2 to 4 sets of 10s and 5s anyway, this is a way to accentuate the results while incurring much less neural fatigue. Sweet deal, innit?

5.2.2 Testing for Yourself

You can test how this works for you right now. Take your current set # and chop it up. If you're doing 2 sets of 5s, chop it into 10x2. See how it works for you and make notes of how you feel the next day. How much difference do you feel? If it does nothing to increase strain for you, at least you've done a finer job of managing fatigue.

That, of course, was its original intended purpose -- to get you the benefits of higher volume without the price. For those of you using stretch-point exercises, this is a natural technique in order to both accentuate its effect and manage favorable loads.

6.1 Diet

Not much to add here. I favour high protein intake as the basis for bulking. Below is an example of how one could structure a bulking diet for an extreme 12x-a-week routine. But such a plan could also apply to work out days for high frequency trainees, especially if they have above average metabolism. Anyway, this gives you a picture of how things can break down with a highly tweaked program.

6.1.1 Eating for a 10-12x-a-week routine (or a high frequency routine in general)

Training twice a day means that you'll be experiencing acute post-workout effects (for 3-4 hours right after workout) for up to 44% of your waking hours.

That means twice as long acute elevations of mRNA, net protein synthesis, glycogen depletion and uptake, growth hormone, testosterone, elevated cortisol / lowered insulin, growth hormone, and metabolic rate.

It also means that, compared to a normal 3x-a-week schedule, your body will be experiencing the acute effects of post-workout at least FOUR times as much as your normal routine. None of that takes into account the overall summation effect and increased microtrauma, the stuff we usually pay attention to when we talk about caloric intake during bulking. Yeah, you need to eat.

6.1.2 Assumptions

1 DC's program requires that (natural! trainees eat at least 2g/lbs protein. Although there's little evidence from scientific domestic studies that eating protein beyond 1g/lbs (which is considered a lot anyway) will benefit you beyond extra calories, most serious DC trainees strongly abide by this. I don't think it hurts; it's relatively difficult for your body to convert protein into energy or excess fat. You have two training bouts where mRNA and protein synthesis levels will be acutely elevated as well as the overall summation effect. And, frankly, do you really want to eat all those extra calories in carbs and fat? I think that guideline goes up to even 3g/lbs, but for this diet (and the fact that the carb intake would be higher than a normal DC bulking diet), we'll leave it at 2 g/lbs protein. For increasing glycogen stores, Bryan recommends:

2 A total of 7-10g/KG carbs over a 24-hour period. Because the protein intake is so high that some of it will convert to glycogen, we'll leave it at 7g/KG. For post-WO replenishment, Bryan recommends:

3 At least 0.7-1g/KG carbs right after workout and again 1-2 hours after. Since this is a baseline recommendation and that your body right after lifting is really good at using carbs for anything but fat storage, let's increase the carb intake right after workout by 50%, but keeping the guideline for 1-2 hour the same.

4 The net carbs from your post-WO feeds will of course be deducted from the total carbs. During 5s and post-5s, because we assume you'll have reasonably high glycogen levels, you may just drop the extra, non-WO carbs. It's actually not a lot.

5 No presumptions for fat intake besides EFA preference.

6 Trainee is 10-15% If he is higher (or lower), then estimate your LBM and use that.

7 Eat as you normally would on your rest day; that is, your normal caloric rate with 300-500 extra calories.

6.1.3 Recommendations

1 Protein: 0.943g / kg

2 Post-WO Carbs: 1.5g / kg

3 Post-WO Carbs, 1-2 hours later: 1.0g / kg

4 The net, non-WO carbs: 2g/kg. You may drop this during 5s.

6.1.4 And in the Queen's Old-English:

1 Protein: 2g/lbs

2 Post-WO Carbs: 0.71g/lbs

3 Post-WO Carbs, 1-2 hours later: 0.47g/lbs

4 Net Carbs: 0.94g/lbs. You may drop this during 5s

6.1.5 Scenario

Say you're a 150lbs 12% skinny man . . . Let's use calculations for Eating for Size as a reference:
MR = lbs / 2.12 * 24 * 1.5 (very high activity level) MR for 150lbs skinny man = 2547 calories 150lbs skinny man with 500 caloric surplus = 3047 calories Bulking Diet:

1 Protein: 300g

2 Post-WO Carbs: 106g

3 Post-WO Carbs, 1-2 hours later: 70g

4 Net carbs: 141g 5) 70g fat. (Assuming 5g fat per 25g protein and EFA supplementation)

5 Total protein intake: 300g

6 Total carb intake: (106 + 70) * 2 + 141 = 495g

7 Total fat: 70g

8 Total calories: 3800 calories ~ 52% carbs, 32% protein, 16% fat For 5s/post-5s: Breakdown: 350g carbs, 300g protein, 70g fat Total calories: 3230 calories ~ 43% carbs, 37% protein, 20% fat

6.2 Diet on Workout vs. Non-Workout days.

People generally should eat a lot more aggressively on their workout days than their non-WO days. If you work out at night, then a "WO day" would extend into the noontime of the next day, beginning from the evening of the workout.

It seems so obvious, but I've seen so many people eat too much on rest days, too little on workout days, and wonder why the heck they're gaining badly.

Generally, I use the below formula to calculate needs. I think about 75% of people just lifting HST-style can fit into this template.

1. Protein = BW or LBM * 2.
2. WO day: Carbs = 100 – 166% of protein intake
3. Rest day (no cardio, sports, etc.)
4. Carbs = 70-100% of protein intake
5. Fat: At least 25-50% of protein calories

6.2.1 Modulating Diet

Recalculate your diet with your new weight about 4 weeks into your routine. Usually if you've done everything correctly, your glycogen stores will be pretty saturated or at least optimal going into the 5s. If you're not planning to include significant metabolic stress strategies, then it's probably best to lower carb intake. This will avoid rapid fat gain during the last 4-6 weeks of HST. On the other hand, if you're seeing results stagnate, then increase all of your calories aggressively and write down what you needed to do.

Between that major restructuring of your diet, you can use the below guidelines to adjust week-to-week.
If you feel flat in the muscles, increase carbs, particularly post-WO carbs.
If you feel fat, reduce carb intake.
If glycogen stores are saturated, reduce carb intake.
If you feel hungry, increase protein and fat intake
If you feel fatigued/tired during WO day, increase carbs significantly and after workout
If you feel tired during non-WO day, increase carbs and fat intake.
If you're not gaining at least 1lbs/week during 15s/10s, increase carbs significantly
If you're not gaining at least during 5s/post-5s, increase protein intake significantly

7 HST and Strength Programs

The beauty of classic HST is that strength goals don't figure into the picture. But, when *measurable* strength gains are a primary goal or implemented into the system, then you must consider how additional hypertrophy techniques complicate things. Any strain technique that creates significant microtrauma (i.e. strain over RBE) drops your strength levels almost immediately, or the responsiveness of your muscles to neural drive.

Loaded stretches and negatives (they themselves require less drive than normal reps), coupled with HST's high frequency, will affect your ability to make failure-based strength gains week-to-week. To what degree, it is not clear; it will probably depend on the individual. It's important to remember that, in this approach, you'll be training to failure once a week every week. In this and most strength-oriented hypertrophy systems, the basis for success is to be able to produce load progressions in order to continue the cycle.

Once a trainee cannot make any more progress, their bulk cycle ends. A bulk cycle should be at least 4 weeks and ideally 6+ weeks to be favorably compared with DC and Max-OT systems. It's about risk, really. When implementing a functional strength layer upon the core HST system, you ask yourself this -- "can I *demonstrate* load improvements every week if you use this or that hypertrophy technique *in addition* to the basic requirements of this functional strength system?"

7.1 Adjusting your Max-OT routine minimally

This isn't a thread about comparing different programs, and this isn't a post specifically about tweaking your HST routine. But a lot of people do Max-OT and secretly wish they could dump their HST routine in order to go heavy (or avoid 15s forever, same thing no?) all the time. Here's one systematic approach to get your mind jogging.

Instead of waiting until you surpass your rep range to add weight, progressively load week to week. This is similar advice to DC training. This requires some experience with Max-OT and/or training heavy in order to figure how much increments are foreseeable. While ideally you'll want to make 5-10% increments, look at making 2.5% increments if need be.

1. The big assumption here is that you'll gain enough muscle week-to-week in order to compensate for residual CNS fatigue. Whatever the case, you want the weight to go up every week. If you feel unusually strong (especially in the beginning), go for 10-15%. If you feel kind of iffy, go for 2.5-5% There's a bit of trial and error, sure, and so look at your journal for guidance.
2. Start with a 5-7 or 6-8 rep range. Choose a weight that approaches the high end of your rep range. As you add weight per week, don't worry if your reps go down. Just try your best to keep it within the range. This will give you a good idea how big your load increments should be week-to week.
3. When the strength plateaus, then switch down to the 3-5 rep range. Make sure you warm up plenty before trying this. Use the irradiation technique and be well rested in order to work at this range. With pulling

movements, adjust ROM so that you're pulling less toward your body. With dips and presses, adjust so that your rotator cuff doesn't get irritated. With squats and such, don't go quite as deep.

4 Do a carb refeed during weekends. This will help prime your energy stores for next week's new PR. Get a lot of sleep. Make some love. Enjoy life, etc.

5 SD for 9-14 days. If everything is working well, you should have at least 6-8 week of progressive load before you plateau. The layoff is a little longer than Max-OT's, so that you can decondition yourself. When you start again, start at a load about 15% lower than your last "3RM" (i.e. the last weight you worked with) and restart at the 5-7/6-8-rep range.

6 Suggestion: Consider pre-empting your Max-OT cycle with one week of 15s using low-volume, full-body workouts. If you plan to do one week of 15s, consider a full 2-week SD before you do 15s and the Max-OT cycle. Yeah, yeah, 15s is the devil, blah blah blah.

But consider that -->

a) This will provide some protection for your joints.

b) This light training will lessen the DOMS (and thus initial drop in strength) between SD and the beginning of the proper Max-OT cycle

c) It will facilitate glycogen storage, which is necessary to handle strength. Thus, during this period, you would combine this with a high-carb regimen

d) This will mentally prep you to go heavy again. By doing the above relatively simple changes, you can more or less use the same Max-OT routine you're using -- same schedule, # of sets, and everything -- but enhance its hypertrophy productivity. If, however, you're looking for something along similar lines but more progressive, look below . . .

7.2 "Progressive" variation of Cluster HST

1 Plan out your typical full-body routine or 2-way split.

2 For the first session of that week for your bodypart (in other words, if you were using a split, this would apply to your first two workouts), perform as stated in the above section. However, work only one or two sets per exercise, with that optional 2nd set self-terminated. Preferably just stick with one.

3 For the rest of the week (hitting a bodypart 3x-a-week), stay with the same weight, but switch to cluster training. Here's how:

- **A.** Work with the # of sets you usually prefer, but in this case, instead of doing proper sets, you work up to a "total rep" count. For example, if you managed 6 reps for the bench press, and normally you prefer 3 sets for bench press, you may shoot for 18 reps. If you were to able to perform 10 reps before hitting failure, you may choose to cap off the # of reps to 7 per set, and then perform 3 * 7 = 21 reps.
- **B.** Use clusters of 1 or 2 reps (use 1 rep when you're working with loads befitting the 3-5 rep range) and take as much rest as needed between clusters in order to hit the quota. If you're currently working in the 5-7 rep range and calculate some thing like 15 total reps, then you may do something like 5x2 with 1-2 minute rests, then 5x1 with 45 second rest periods. The idea is to hit your rep quota without overfatiguing yourself. This will create much less CNS fatigue than typical Max-OT, but provide all of the sarcomere hypertrophy benefits.
- **C.** Keep that in mind that depending on the # of exercises, your gym situation, and # of total reps, your workout may be rather long, easily into the 1.5-2 hour range. You may need to superset. You may need to cut down on total reps. But make sure you're not overfatiguing yourself and that your post-WO nutrition is generous.

4 Follow the other guidelines as stated in the previous Max-OT section. In other words, every Monday, you train to failure and test out the new weight. Then, Wednesday and Friday, you switch to cluster training to use that weight without frying your CNS. The next Monday, you test out a new load again. You'd follow the same points on 5-7/6-8 vs. 3-5, refeeds, SD and other guidelines as stated above. The big advantage to this variation is that you'll elevate protein synthesis levels more frequently and evenly per bodypart than true Max-OT, but you'll get to push your strength gains to a much higher degree and more methodically than classic HST.

8 Abs Specialization

This is sort of a retread of earlier abs posts. But I wanted to collate everything into a proper post, so that people can easily pick this topic out. Everybody has his or her own spin on abs. If you're interested in this unique approach, continue reading. I'm not a big fan of specialized abs training for various reasons:

1 You probably need to be <12% bodyfat to actually see the fruits of your effort.

2 Heavy compound movements, particularly pulling and rowing movements, already work the rectus abdominis (6-pack) and transversus abdominal muscles.

3 Truly effective abdominal training -- the stuff that could actually produce DOMS in the area -- weakens the core. With a weakened core, this makes almost every other exercise an ordeal. Trust me; this really sucks.

4 Most abdominal crunches are poor at recruiting the abdominals. Only when using significant weights do the abs become serious worked.

5 Because the ROM of most abdominal crunches is so limited, they're more like peak contraction exercises. That is, they're excellent at generating burn and increasing functional strength, but they don't create a lot of DOMS without a heavier load. This is, practically speaking, a good thing because you want to avoid a significantly weakened core.

8.1 Vacuum and Using the Transversus Abdominus to Enhance your Crunches

You don't "see" the transversus muscle; it's the girdle that tightens your waistline and keeps you from throwing your lower back on the deadlift and squat. Much of stability training is about developing the strength of this muscle. When you perform your core movement, ideally you want to contract your transversus abdominus along with everything else.

Not only will this protect your lower back, but also it helps to strengthen this muscle and "tighten" your tummy. To do this, you "flex" your belly button into your spine without sucking in your stomach. If you want to work on this muscle (and feel what is your transversus abdominus), you can try out stomach vacuums. Here is just one example of performing said vacuum. http://www.bodybuilding.com/fun/ms-fit5.htm

The other thing is this . . . when you contract the transversus abdominis, you are also contracting your rectus abdominis. That is, the harder you flex your belly into your spine, the harder you are making your entire ab section work *in addition* to whatever core or abs movement you're already performing.

This is the reason why crunches on medicine ball are so effective -- the ball forces you to contract the transversus abdominis muscles harder to stabilize yourself, that in turn significantly increases the intensity of your ab contractions while doing crunches or core movements. This is also an important basis for Pilates's efficacy. Thus, by contracting this muscle, you can make your current abs workout much more effective.

8.2 Pulling movements, Pullovers, and Abs

Pulling movements (especially chins) are pretty good ab exercises in their own right, because the arm-limb movement causes the rib cage/sternum to go up and down. Abdominal muscles -- oblique and rectus abdominis -- are attached to the sternum. When the rib cage goes up and down, well that is largely the extent of the ROM of your abs and is your concentric and eccentric motion.

Because barbell/DB pullovers use a more exaggerated arc with the arms (going backwards of the body), it naturally provides a bigger stretch for the abdominals. And because machine pullovers provide significant resistance and concentric motion through the bottom of the movement, they provide a bigger burn for the abdominals.

In general, pullovers -- either baby -- are actually superior exercises to crunches for both reasons. And they're excellent movements for back width and traps as well. You may recognize barbell/DB pullovers as stretch-point movements, and machine pullovers as a peak contraction movement. But, generally, both are pretty good for developing the abs.

8.3 The Nelson Situp

If you're looking for a change of pace in your abs exercise, try this one out. This movement is great and pretty intense. Like the pullovers, it has a very exaggerated arm arc to facilitate proper concentric and eccentric motion.

I would add this into 10s, even halfway into the 10s. I think it's the best general-purpose abdominal exercise out there. Below is a reprint of a previous post on the Nelson situp.

A) It takes out the hip flexors and completely isolates the abs section. You don't work anything but the abs with this movement. Completely safe for the lower back.

B) You can do it in front of the telly! No additional equipment necessary! It's free! Just 30-60 seconds a day on the carpet!

C) It brings men closer to women, for they too shall know what abdominal cramps feels like! Did I mention you could do it in front of the telly!

D) Pretty easy to modulate tension. You can perform it on an incline. You can bend your elbow (as if doing an overhead tricep extension) at the end; the contraction can be excruciating. You can hold a weight. Because this completely isolates the abs, you can generate ridiculous amount of tension in just this area. For most people, this will be all they need. http://marinefeatures.subportal.com/fitnesslink/men/diffab.html E) GREAT for pulses. It sets the abs on fire.

8.4 Ab-based stretches

The key to creating mechanical strain on the abdominal muscle (which has relatively average FT/ST composition . . . unlike calves, it has normal growth potential) is to increase the stretch under significant load. And this is done by moving the rib cage/sternum as far above (by raising your arms) and behind the pelvis (by bending backwards) as possible. By default, it means to use ab-specific stretches with loads.

Ironically, this is how obliques (side bends) are often worked. And people often complain that side bends seem to overdevelop the obliques. Hmm. This is one example of such a standard stretch -- the Standing Stretch. http://www.exrx.net/Stretches/RectusAbdominis/Standing.html The combination of bending backwards and raising the arms creates the effective stretch and ROM of this movement. Preferably, one would do this one kneeling (similar to this: http://www.exrx.net/Stretches/RectusAbdominis/Kneeling.html but with arms raised.)

It's both safer and more effective this way. While kneeling, a person would hold a heavy weight with arms straight, though slightly in front of the heads. They then flex their transversus abdominis. Then, as they bend backwards, their arms move backwards as if this were a pullover movement. When the arms cannot move anymore, then the person can bend their arms as if it were a tricep extension. Then, to move back into position, they unbend their arms, move their arms forward, and reset. A more extreme version of this stretch is to perform this movement on a roman chair or hyperextension bench.

One would try to "situp" moving from 90 degrees to way below the bench, with arms starting perpendicular, then moving backwards until they are behind the head. This lets you use less weight than the above example and, given that your upper body is pulling downwards, usually produces a much deeper stretch. However, this movement can be a little dangerous if you don't have your ankles firmly in place, and if you don't have your lower back firmly supported by the bench. It's ideal that the bench not only supports your buttocks, but your tailbone as well.

The stretches are not that intense (usually because you're actually much stronger in this ROM), but they can produce significant DOMS. Thus, it may not be a good idea to use these techniques until the 5s, opting to use 10s-ish weights and progress linearly until they match. And these stretch-point movements are excellent for LS. A combination of this movement and some form of pulsing (from pullovers or Nelson situp) for metabolic stress would probably cover all you need for your rectus abdominis.

9.1 Cookie Cutter Routine #1 (Basic Upper Torso Specialization)
Frequency: High to Very high (5x-12x/wk) Duration: 10 weeks (4 weeks of post-5s)
Post-WO Cardio: optional but recommended.
Add during 10s (5-10 minutes HIIT or 20-30 minutes steady state) SD: 17-21 days.
Diet: A lot. Be very, very aggressive with post-WO carbs if you add cardio. Try out the vinegar.

An earlier post offers one hypothetical bulking scheme to approach a program like this. (Hint: 2*BW protein)
Core Leg Press Leg Curl Dip (cluster++)/Deadlift (cluster++)/DB Bent Over Row/DB Incline Press Pulldown
DB Upright Row

Notes
1 One-two work sets. Second set may be pre-terminated or clustered
2 Add 15s for each movement starting with 5s and post-5s
3 During post-5s, switch to negatives.
4 For items marked with (cluster++), switch to clustering and shoot for an increment per week
5 Extend post-5s for another 2 weeks. Thus would make it a ten-week long program.
6 Post-WO cardio

Stretch Point
Incline bench/deep DB fly/DB Skullcrushers/Incline bench/DB bicep curl
Notes

1 One or two work sets
2 Add stretch point movements during 10s
3 Add LS during 5s
4 See notes in previous threads on accentuating stretch
5 Use compound-isolation technique and/or clustering when approaching maxes
6 Peak Contraction - Pec deck or machine fly

Tricep pushdown or extension machine Bicep machine Notes 1) One work set 2) 10-15 Pulses 3) When you feel it's "easier", progress by increasing # of pulses and/or weight

9.2 Cookie Cutter Routine #1 (Big Four Oriented)

Frequency: Normal to High (3x-6x)
Duration: 8-14 weeks

Post-WO Cardio: highly recommended.
Add during 10s (5-10 minutes HIIT or 20-30 minutes steady state)
SD: 14-21 days

Core
Squat/Deadlift/Dip or bench/Chin/Row movements

Cluster structure
1 Two weeks of normal 15s, the rest of the cycle is done cluster style
2 Descending density. That is, start with short rest periods. Then increase rest time for each cluster, but as little as necessary.
3 10s = 20-30 target reps, 3-5 rep clusters, 15-30 second starting rest period.
4 5s and post 5s =10-15 target reps with 1-3 rep clusters, 5-15 second starting rest period.
5 15 rep burn set starting with 5s.

Post-5s
1 Shoot for one increment per week for 2 weeks.
2 Switch to strong-range partials for row movements and chins and make another 2 or 3 increments
3 LS: For dip, hold at very bottom for 45-90 seconds. Cave shoulder blades in. Be mindful of rotator cuff.
4 PS: For chin and row movements, add 10-15 pulse stretches (this is not the same thing as pulsing) after work sets.
5 If you're interested in strength, switch to a PL-style routine or one of the HST/strength fusion programs in previous thread.

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