MAXING OUT

Heavy Days and Maxing Out

In the pursuit of fitness, capacity must be raised in both strength and metabolic conditioning as well as a range of sport-specific skills. Some of these objectives are more readily achieved than others through a standard CrossFit program; but above all others, strength is considered to take the longest. Former CrossFit Games finalist and CrossFit Strongman, Rob Orlando, famously states the tagline "Strength Takes a Lifetime to Acquire" giving reference both to the sheer length of time that it takes to truly maximise strength but also to the notion that the acquisition of strength is effectively never done.

While the hormonal and nervous system adaptations that come about through maximising intensity in general WODs will contribute to the development of strength over time, more deliberate attention can be given to the development of strength as a single entity by employing dedicated strength sessions or 'heavy days'. At CrossFit Glasgow we program these twice a week.

When programming to develop strength we look to the best strength programs in the world; utilised by the best strength athletes in the world. Generally, we lean toward the methodology employed by Westside Barbell in Columbus Ohio, a multi World Record holding gym, fronted by strength training legend Louie Simmons.

Westside Barbell advocate the use of the "Conjugate Method" - a training system employed by some of the most successful Russian athletics and Weightlifting clubs in the world during the 1970's. Louie and his athletes have taken these foundations to new levels by treating the training of athletes as an endless experiment into what methods are optimal for their development. Westside draw from their own experience as well as methodologies from the leading Chinese and Bulgarian weightlifting methodologies.

In this article we look at how this methodology can be used during our heavy days so that you can make the most out of them. Note that at CrossFit Glasgow strength days are for *strength*. Strength followed by metcon is generally (there are some conditions in which we can make exceptions) a poor way of organising the development of strength and by the same token, the metcon that follows it. While doing a gassy metcon after your strength training can be fun and might make you feel like you have done more, more than likely, you are actually undermining what you set out to achieve in the first place.

An Effective Strategy for Maxing Out

In summary

Warm up generally; with equipment relevant to the movement you are producing. Complete a couple of practice sets around 50% of your max to feel out the lift and then start executing lifts at as high a percentage of your max as you are comfortable. Take only a few jumps in load to the max – a total of about 9 'working' lifts is optimal. An ideal loading scheme is as below:

Loading Percentage	Number of Repetitions
20-50%	10
50%	10
80%	3
90%	2
95%	1
97.5%	1
100%	1
101+%	1

In detail

The Maximal Effort Method is used to obtain and maximise absolute strength by training our capacity in maximum voluntary efforts. The objective during these sessions is to lift as much load as possible in a single lift without any constraints on the time taken to execute that lift. By way of clarification, this means that we can take as long as necessary to complete the lift once the bar is in motion. A slow deadlift at 300kg is still a deadlift at 300kg. A maximally loaded clean on the other hand, still requires significant amounts of speed: it will happen quickly or not at all.

By virtue of being 'maximal' these lifts are singular – so heavy that if someone offered you a million pounds to produce two lifts at that weight, their money would be safe. Maximal lifts recruit the most motor units and require the most efficient coordination of the muscles: both in terms of their capacity to produce force; but also in terms of which muscles produce the force; how long they produce it for and when they should stop. In this way, the lifts maximally stimulate the muscle tissues and also the nervous system that supports them.

There is no greater voluntary stimulus that an athlete can apply to their body; it comes at significant cost to the nervous system and therefore the training session should be optimised to maximise rate of return on this stimulus as well as to minimise the risk of injury. Both too little preparation and too much preparation can be detrimental to obtaining new maxes so here we have laid out what is considered optimal.

Warm Up

A good general warm up should be executed in order to prime the body for training by restoring functional range and promoting physiological systems such as oxygen delivery and uptake, intra and intermuscular coordination and enzymatic activity. Essentially, you need to get a bit of a stretch and start making your muscles feel ready to lift.

Short sharp bursts of activity on a cardio machine - bike, rower, or ski - should precede more specific preparation with dumbbells and work against bands for the upper body or reverse hypers for the lower body. A couple of practice sets at light load ~50% can be used to check for pain or restrictions; to get feedback on technique and bar path; and to practice moving quickly and confidently through the full range.

Loading

It's entirely possible to exhaust yourself during warm up and practice lifts. I've seen people work up to a 150kg deadlift with 10 reps on an empty bar then, 5x 60kg, 5x 70kg, 5x 80kg, 5x 90kg, 5x 100kg, 5x 110kg, 3x 120kg 2x 130, 1x 135, 1x 140, 1x 145, 1x 147.5, 1x 150kg; which is simply too much. I've also popped a rib by walking in to the gym, dropping my bag and lifting 200kg cold. There exists an optimum in contrast to these extremes.

Figure 1.0

Load	Reps	Volume (Load x Reps)	Total	Special Strength' and Volume	% of Max
20	10	200	200	"Practice Explosive Strength 1250kg"	10
60	5	300	500		30-55%
70	5	350	850		
80	5	400	1250		
90	5	450	1700	"Speed 950kg"	55-70%
100	5	500	2200		
110	5	550	2750	"Speed Strength 1170kg"	70-85%
120	3	360	3110		
130	2	260	3370		
135	1	135	3505	Strength Speed 275kg	85-95%
140	1	140	3645		
145	1	145	3790	"Maximum Strength 442.5kg"	95% +
147.5	1	147.5	3937.5		
150	1	150	4087.5		

Figure 1.0 represents the session building from an empty bar to a 150kg deadlift maximum. Note the breakdown in column 5 of how the loads (and typical bar speeds at those loads) represent the contribution of the session to developing particular subsets of an athlete's 'special strengths'.

NB: The percentages and corresponding special strengths in this table have been manipulated somewhat to fit the figures here. More exact figures may be found by reviewing A.S. Prilepin's (1974) work.

In a max effort session, the objective is to train very heavy lifts at 95% or above, up to 100% of an athlete's capacity on that day; ideally aiming for a new record in that lift. However, we can see from figure 1.0 that the greatest amount of time and volume is given to training speed and explosive strength. Only 11% of the training volume actually falls within the intended maximal stimulus range.

Therefore, the session in Figure 1.0 is actually training a different stimulus to that intended; and, given the stated purpose of the session (what the athlete believes they are training): the bar speeds are likely to be lower and are more likely to be training endurance rather than either speed or maximum strength.

This kind of build up is cautious and probably better suits a more novice athlete. They'd be gaining significant volume across a range of bar speeds and loads that enable them to maintain correct form and to get the hypertrophic (muscle building) and neurological effects that will later enable them to max out effectively. The sheer length of time that this strategy requires could be more productively used by a more advanced athlete on other exercises after the max. The advanced athlete would be better suited to the following strategy, which is considered closer to optimal.

Figure 2.0

Load	Reps	Volume (Load x Reps)	Total	Special Strength' and Volume	% of Max
60	10	600	600	Practice Explosive Strength 1600kg	30%
100	10	1000	1600		50%
160	3	480	2080	Speed Strength 840kg	80%
180	2	360	2440		90%
190	1	190	2630	Maximum Strength 787kg	95%
195	1	195	2825		97.50%
200	1	200	3025		100%
202	1	202	3227		101%

In Figure 2.0 we can see that of the total volume (3227kg), half is over 80% of the 1RM and almost a quarter in our maximal target range. The strategy in Figure 1.0 provides only 17% of the volume over 80% of the 1RM and 11% in our target range. Additionally, there are significantly less 'waste' reps in irrelevant percentages in Figure 2.0. There are only twenty reps outside of the working sets and these are used for checking bar path and other sources of feedback.

In 1974, after a study of over 800 elite weightlifters evaluating load, bar speed and technique, Russian sport scientist A.S. Prilepin devised a series of charts that describe optimal percentage loadings for these athletes at given bar speeds and the number of sets and reps optimal to the session. The segment from the chart for loadings over 90% is detailed in Figure 3.0.

Figure 3.0

Percentage of 1RM	Number of Sets	Optimal No. of Reps	Total Rep Range
90+	1 - 2	4	1 – 10

Prilepin's study used a sample of elite level athletes dedicated to a single sports modality. As such, the sample is not representative of a wider population but the chart he produced remains an effective guideline for the management of training volumes, loadings and speeds in strength sports. Prilepin's work has been reinterpreted for other populations, particularly Westside Barbell powerlifters and later the CrossFit athletes at CrossFit Conjugate and it is from these sources that we draw our own guidelines. You can see from our own example of a 200kg deadlifter in Figure 2.0, that we use more repetitions (9) than the prescribed optimum of 4 across 6 sets rather than one or two. We do, however, remain within the total rep range and there is certainly no issue with moving toward fewer reps (I tend to build to any max over 5 singles after the specific warm up) as you gain confidence in doing so.

By maxing out a given lift in fewer sets you are able to optimise your training session by consistently hitting your target training percentage range; you do not waste volume practicing other special strengths that have their own dedicated sessions; you achieve your maximum lift sooner and fatigue less, thereby reducing the risk of failure or injury and you complete the maximum lift earlier in the session, keeping your training density high and creating space for meaningful accessory work.

Technical

When attempting your max, give full attention and discipline to the technique since it not only offers the greatest chance of achieving the max but it is also the safest. Deviations from form can be used to address selection of accessory movements to correct weaknesses but if the deviations become compensations (knees falling in on squats, shoulders rising off the bench, hitching the bar up the thigh in the deadlift) with no attempt to redress the technique you simply reinforce poor mechanics which lead to stalled progress and potentially injury. It is better to fail a lift holding perfect form at the sticking point (we call this a mini max), since this reinforces and actually develops proper technique and minimises injury, than to change something mid lift to get an ugly fluke record.

When selecting your final increments you should try to 'jump' your previous record. For instance: an athlete with a 200kg deadlift record would potentially lift 4 singles as 190, 195, 198, 201 or potentially even 195, 198, 201, 203 depending on an evaluation of bar speed by the coach in the build up. In newer lifters it is possible to see new records of up to 20kg over their max where improvements to muscular coordination, technique and strength allow such leaps but it is rare in more advanced lifters unless major detriments to technique or specific weaknesses have been addressed throughout the greater training cycle. Generally a 1-2kg record is sufficient to maintain progress across the season and is psychologically beneficial long term since the performances are consistently successful.

Finally, be aware of the difference between training maximums and competition maximums. A competition maximum is likely to be higher since your physiological state is significantly heightened. A lift conducted at a competition will have you full of adrenaline with much more at stake and a lot more anxiety about performance evaluation; you'll be wearing a belt, specialist shoes, have done some positive self talk, drunk a lot of caffeine, there will be loud music in the background and people will be shouting at you. The result is often a new record that you subsequently fail to match in training. This is to be expected.

In training, you should not attempt to recreate the excitatory state of a competition. Generally you hold everyone up with your weird rituals, but you also significantly increase your chances of failure – all of the most hilarious fails happen at competition – and therefore, injury. It also means that come the day of competition you have no 6th gear: you've already performed to the highest level that you can with all the eyes-closed, headphones-on self-indulgence with every piece of accessory equipment you can find. Train under normal circumstances to produce the most robust, aggressive natural body that you can and then enhance it with training aids when it counts for points and pride.

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