



Training to Momentary Muscle Failure (MMF)

Exercise intensity plays an important role in the development of strength. Without enough intensity the overload principle would be unobtainable.

Before we go any further we must define what intensity is. Typically, intensity is the amount of external resistance that your muscle or group of muscles must overcome during a specific workout. During strength conditioning this intensity is commonly expressed as a percentage of one repetition maximum (1RM). Remember that each athlete has a different 1RM for each muscle group.



When conditioning a group of athletes, such as circuit training, caution must be exercised to ensure sufficient intensity for all athletes. It is common for one athlete to train at a high intensity whilst another at a moderate intensity using the same equipment.

Momentary Muscle Failure (MMF)

This requires an athlete to perform a specific number of reps to the point where they are no

longer capable of performing a full and perfect rep. It is generally agreed that strength adaptations occur at intensities between 1RM and 12RM with most strength programmes between the 6-12RM range (See Fig 1 for RM prediction). The physiological response to MMF maximises muscle fibre recruitment, achieves overload and therefore has an impact upon strength development.

Number of reps	% 1RM
1	100
2	95
3	92.5
4	90
5	87.5
6	85
7	82.5
8	80
9	77.5
10	75

Attaining MMF and increasing intensity are vital for all strength development programmes. There are numerous ways to increase intensity coupled with MMF to help increase strength.

Brzycki's equation (1993):
$$= \text{mass} / [1.0278 - (0.0278 \times \text{reps})]$$

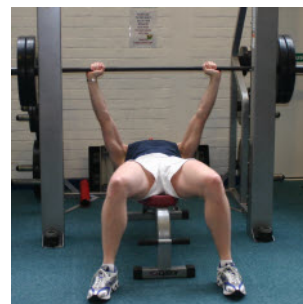
For example 100 kg lifted 10 times would give 1RM of 133.4 kg.

Fig 1. Rep Max prediction equation.

One of the least used and potentially one of the most effective methods to increase intensity is the time taken to perform each rep. Instead of just increasing the number of repetitions or the weight lifted, the athlete can complete the exercise to MMF slower. This keeps the muscle or group under tension for longer and pays particular attention to the eccentric phase. It is known that muscle can produce more force during eccentric movement and this is exploited. By extending the duration of the rep intensity is increased.



Practically this means that each rep should be longer in the eccentric phase and at no point should the muscle relax. For example, when performing a bench press, the bar should never rest on the chest or the elbows lock at full extension. This ensures a constant tension throughout the lift.



This type of training has been described as HIT (high intensity training) and is an effective method to increase muscular strength for all athletes. The duration of the exercise is the important factor in HIT-type conditioning and should be enforced throughout the sets.

You can now add MMF training to more traditional methods of developing strength.

Supersets

Moving from one exercise to another with little or no rest. They can include two exercises for the same group e.g. Bench press and incline flys. Alternatively supersets can work one exercise for the agonist and one for the antagonist e.g. Biceps curl and triceps press down.

Trisets

Three exercises in a row with little rest between sets and then repeating. Again these can be for the same muscle group or in a circuit style.

Both examples are excellent ways to combine MMF with other training methods to increase strength.

Table 2. Time under tension in repetition range.

Rep Range	Time Under Tension (s)
6-8	30-60
9-12	45-90
12-16	60-120

Table 2 shows the recommended time under tension for each set of exercises. In the rep range 6-8, each rep should last approximately 5-7s with longer taken for the eccentric phase than the concentric phase.

About eliteperformance

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