

Muscular Power

Muscular power is defined as a muscle's ability to exert maximum force over a short period of time. Your physiotherapist may want you to work on your power to continue activities. This document will take you through some basic ways to approach increasing muscle power. If you have any further questions or concerns, please speak to member of the therapy team.

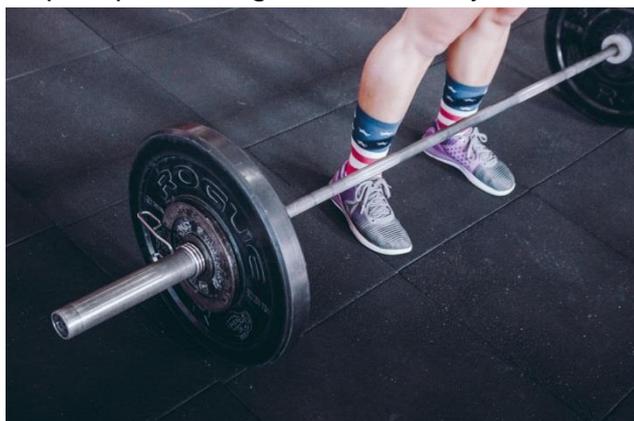
Power differs from strength in that strength is the maximum force that can be exerted against resistance, whereas power is the speed at which the force can be applied against the resistance; strength is important for developing power. Power training generally covers larger muscle groups in the body using multiple muscles, joints and movements. This type of training is used as these movements have a positive effect on functional activities such as jumping and throwing.

In order for any type of resistance programme to be developed for power the one repetition max (1RM) needs to be established. The most an individual can move or lift in one repetition (rep) is referred to as the 1RM. Knowing the 1RM is essential for developing a resistance programme. This document will take you through some basics for power training.



Traditional Power Programme

To improve power, working near your 1RM is needed. Traditional power training programmes require performing at 75-90% of your 1RM, but with low reps and low sets with longer breaks in between. This is important because the body can only perform maximally for a short time before energy stores are depleted and require time to recover. As an example, whilst doing squats, 3 sets of 6 reps at 85% of 1RM with a 5 minute rest in-between sets would be considered a power training method. The first and second set will be difficult but manageable. The third set will be a struggle and you may need a spotter but with enough rest this should be achievable.



This approach is an easy option for those who are new to power training.

Traditional power programme for all exercises		
Sets and reps	Resistance (% of 1RM)	Velocity
3 x 6	75 - 90	Medium

Mixed Method Training

The mixed method (MM) trains power mainly through changes in velocity of reps and weight. Completing reps at different velocities and different resistance loads can have a carry over into functional movements.

The explosive element of the movement requires training at low-load resistance (0-30%) but these exercises are to be done as rapidly as possible with good technique and as the load increases the velocity of the reps should be consciously decreased.

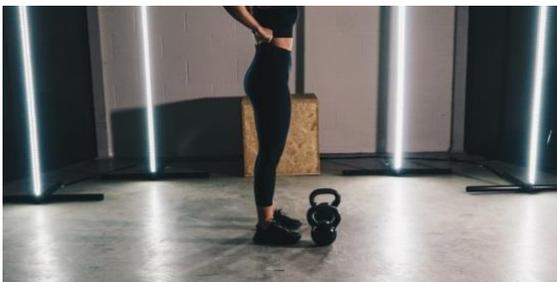
A key benefit of MM is that it can be done with almost any exercise and once learned can be completed with relative ease. The exercises would normally work on the same muscle groups for both velocities and thus achieve the best results. Below is a programme based on MM.



MM Programme:

1. Power clean 3 x 5 at 75-85% 1RM with high velocity
2. Front squat 3 x 5 at 80-85% 1RM with low velocity
3. Jumping squats 3 x 5 at 0-30% 1RM with high velocity
4. Frog jump 3 x 5, no resistance with high velocity

Mixed Method Training Super Setting (MMSS)



A variation of the MM adds a super set to the MM.

The MMSS method begins with a high-load resistance performed for 6-8 reps followed by a low-load resistance for 15-20 reps with no rest between exercises. These two together would complete one set. This would be performed for 3 to 5 sets. Although there are benefits to this, care should be taken to

ensure that good technique is maintained, especially at the end of range of the exercise, taking care not to hyper-extend any joints as this can lead to injuries in the high velocity exercises. This type of training is ideal for those who are familiar with resistance training and for athletes as the exercises can be adapted to functional movements for their specific discipline.

MMSS Programme: Complete each set 3 times

Set 1:

Box Squat x 4 reps at 85% 1RM

Jump Squat x 15 reps at 0-30% 1RM

Set 2:

Stiff leg deadlift x 4 reps at 85% 1RM

Kettlebell swings x 15 reps at 0-30% 1RM

Set3:

Leg press x 4 reps at 85% 1RM

Frog jumps x 10 reps

Set 4:

Nordic curls x 6 reps

Shuttle sprints x 3

The Reverse Pyramid

The reverse pyramid (RP) workout structure involves sets varying in rep range and load but as with all exercises should include a warm up.

- The strength portion of the exercise is completed first with 4 reps or high resistances (80-90% of 1RM).
- This is followed by reducing the weight by roughly 10% but increasing the number of reps done by 2-3 reps.

The heavier sets are to be done at a normal speed but as the weight decreases the speed of the reps should increase. With the heavier weight also longer breaks of 2-3 minutes and as the weight decreases shorter breaks.

As the weight decreases the first few reps will be manageable but as the reps continue the weight that felt manageable will become difficult to move. This approach will have a carry-over effect for power. Although low load reps are explosive, attention to technique is important as this will reduce the likelihood of injury.

Reverse pyramid programme for all exercises

Reps	Resistance (% of 1RM)	Velocity	Rest
3	90	Medium	3 min
6	80	High	2 min
10	70	Medium	90 sec
15	60	High	45 sec
20	40	High	30 sec

In summary, the rest time is highly dependent upon the weight, with higher weights needing bigger rest times and lower weights needing more rest time. In order to develop power, strength, speed and endurance are essentials and would require focus.

Contact us

If you have any questions or concerns about principles of training, please contact the physiotherapy outpatient team on 020 8725 1357 (Monday to Friday, 8.30am to 4.30pm).

For more information leaflets on conditions, procedures, treatments and services offered at our hospitals, please visit www.stgeorges.nhs.uk

Additional services

Patient Advice and Liaison Service (PALS)

PALS can offer you on-the-spot advice and information when you have comments or concerns about our services or the care you have received. You can visit the PALS office between 9.30am and 4.30pm, Monday to Friday in the main corridor between Grosvenor and Lanesborough wings (near the lift foyer).

Tel: 020 8725 2453 **Email:** pals@stgeorges.nhs.uk

NHS Choices

NHS Choices provides online information and guidance on all aspects of health and healthcare, to help you make decisions about your health.

Web: www.nhs.uk

NHS 111

You can call 111 when you need medical help fast but it's not a 999 emergency. NHS 111 is available 24 hours a day, 365 days a year. Calls are free from landlines and mobile phones.

Tel: 111

AccessAble

You can download accessibility guides for all of our services by searching 'St George's Hospital' on the AccessAble website (www.accessable.co.uk). The guides are designed to ensure everyone – including those with accessibility needs – can access our hospital and community sites with confidence.



Reference: THE_MUP_01 **Published:** October 2020 **Review date:** October 2022