



Concept 2 **DYNO**

Training Guide

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CONCEPT 2 DYN0 TRAINING GUIDE

The Concept 2 DYN0 Training Guide was written by Keith & Celia Atkinson, and international rowing coach Terry O'Neill, and produced by Concept 2 Ltd.

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Safety Note: Do not attempt to lift a free weight of the same amount that you can push or pull on the DYN0. The DYN0 lift is not limited by your 'weak point' of the motion. Therefore the DYN0 force reading may be greater than the amount of free weight you can lift.

CONTENTS

SECTION 1	HOW TO USE THE DYNO	4
1.	Introduction	5
2.	Description of the DYNO	5
3.	Key Features of the DYNO	6
4.	Using the Force Monitor	7
5.	Damper Levers	11
6.	Getting Started	12
7.	Monitoring Your Progress	15
8.	Safe Exercise	16
9.	Care and Maintenance	16
10.	DYNO Demo Protocol	17
11.	DYNO Quick Reference Guide	19

SECTION 2	STRENGTH TRAINING	20
1.	Why the DYNO is Effective	21
2.	What Happens to Your Body	21
3.	The Muscles Used on the DYNO	22
4.	Benefits of strength training	22
5.	How Long Will it Take?	23
6.	Strength Training Components	23
7.	Four Types of Strength Training	25
8.	Other Types of Training	26
9.	Test Protocols	27

SECTION 3	TRAINING	29
1.	Beginning Your Programme	30
2.	The Exercises	30
3.	Finding Your Max	31
4.	Strength Training Bands	31
5.	Training Strategies	32
6.	Periodisation of Strength Training	33

SECTION 4	APPENDIX	34
1.	DYNO Training Log	35
2.	DYNO Strength Testing Log	37

SECTION 1 :

HOW TO USE

THE DYNO

1. INTRODUCTION
2. DESCRIPTION OF THE DYNO
3. KEY FEATURES OF THE DYNO
4. USING THE FORCE MONITOR
5. DAMPER LEVERS
6. GETTING STARTED
7. MONITORING YOUR PROGRESS
8. SAFE EXERCISE
9. CARE AND MAINTENANCE
10. DYNO DEMO PROTOCOL
11. DYNO QUICK REFERENCE GUIDE

1 : HOW TO USE THE DYNO

1 . INTRODUCTION

DYNO - short for Dynamometer, a device which measures force.

Dynamic Strength Training

The Concept 2 DYNO takes the air technology principles of the Concept 2 Indoor Rower and applies them to strength training, to create a unique dynamic strength training machine. Offering three core exercises: Leg Press, Seated Bench Press and Seated Bench Pull, the DYNO's two great strengths are its almost limitless range of resistance and its highly accurate Force Monitor. The resistance is a direct response to your effort - the more force you apply the more weight you 'lift', and an accurate measurement of each repetition is immediately displayed and stored in the monitor's memory.

With traditional weight training the weight you use is limited by the amount of force you can exert at the weakest point in the lift. However, dynamic strength training on the Concept 2 DYNO enables your muscles to be fully challenged throughout the complete movement. The air resistant nature of the DYNO varies the resistance through the lift, so at the points in the 'lift' where you are able to push harder, the resistance will be greater.

2 . DESCRIPTION OF THE DYNO

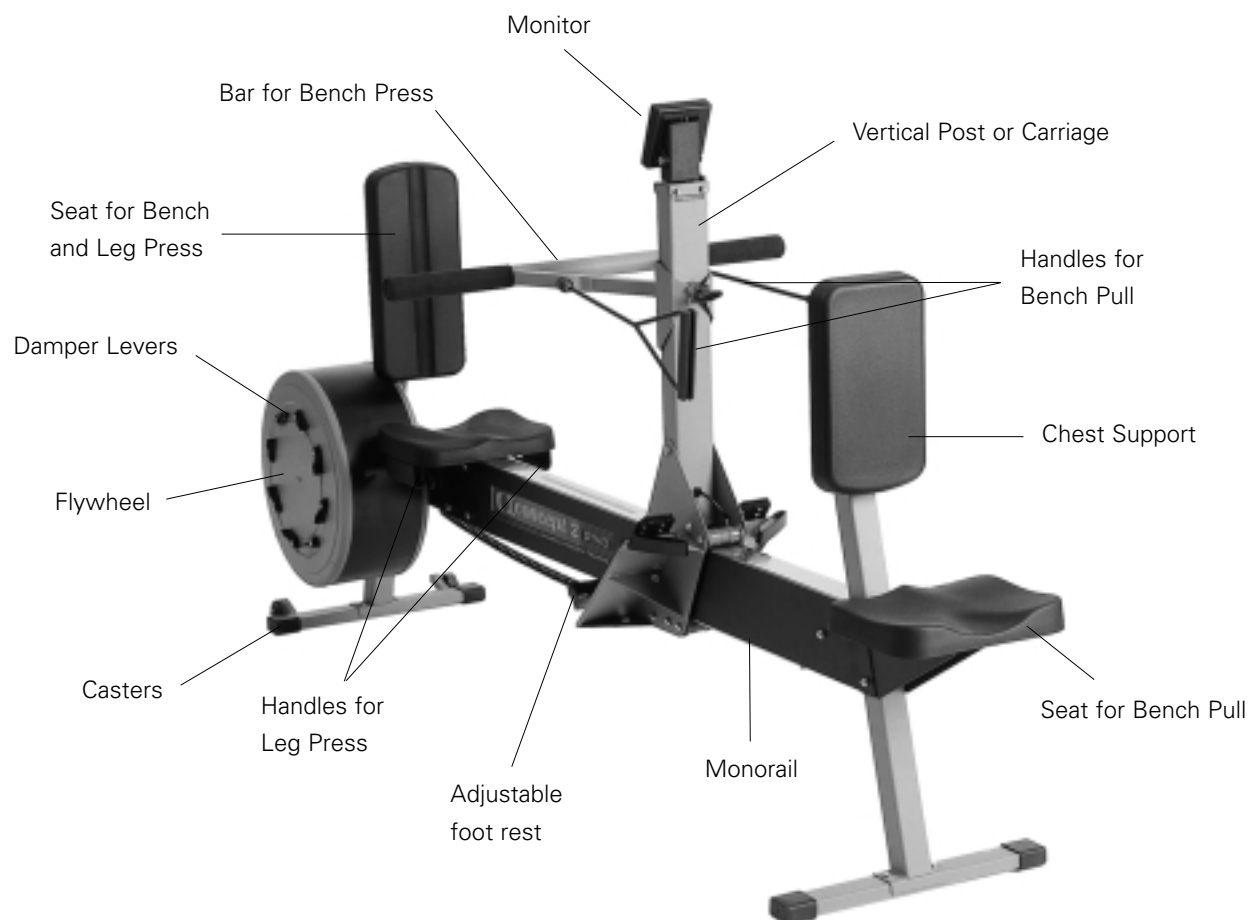
The heart of the DYNO is the flywheel, specially designed to produce a range of resistance levels suitable for all types of strength training. The amount of air reaching the flywheel is controlled by eight damper levers which regulate the load that you have on the wheel. The more dampers open, the heavier the load, and the harder the DYNO will feel at a given speed of movement. The 'lifts' are done by pushing or pulling the carriage which rides on the monorail.

The incredible versatility of the flywheel technology becomes apparent when you realise that anything up to 500kg of force can be applied to the DYNO, yet it only weighs 55kg, and has the same footprint as the Indoor Rower. The built in casters below the flywheel make it very easy for one person to move the machine, numerous exercise variations are possible, including the option to safely exercise the arms and legs individually, and there are no heavy weights to injure the user if they are unable to complete a 'lift'.

1: HOW TO USE THE DYNO

3. KEY FEATURES OF THE DYNO

- Three Core Exercises. The DYNO offers the Leg Press, Seated Bench Press and Seated Bench Pull exercises plus variations. These three movements provide the basic strength foundation for most sports and activities.
- Dynamic Loading. The more force you apply, the more weight you 'lift'. Up to 500kg can be 'lifted' on the 55kg DYNO. Eight damper levers regulate the airflow to the fan, setting different loads (or drag factors)
- Specific Strength Training. The arms and legs can be specifically, and individually, isolated and trained through each movement. The Leg Press geometry is designed to match the leg movement of the Concept 2 Indoor Rower and the Bench Pull and Bench Press handles are fully height adjustable.
- Multiple Use. The DYNO can be used for developing pure strength, power, muscular endurance and general endurance. It is also ideal for strength testing, circuit training and rehabilitation.
- Smart Force Monitor. The Force Monitor provides instant, accurate feedback and is calibrated for comparison with all other DYNOS. Data for up to 300 reps across 19 sets are automatically stored and available for recall.
- Safe Exercise for All. Anyone of any age can use the DYNO without supervision as there is no risk of heavy weights or bars causing injury. If you can't complete a 'lift' you can just stop.
- Extreme Durability. Built to the same exacting standards as the Indoor Rower, the DYNO has been built to meet the demands of its toughest customers and require minimal maintenance.



1: HOW TO USE THE DYNO

4. USING THE FORCE MONITOR

Description of the Display

Top left:

This display counts down the warm-up reps. When you start you will see: START IN 3 REP. If the set/rest time is turned on by pressing the TIMER button, this display will show the elapsed time for the set, then the elapsed time for the rest.

Top right:

After the warm-up this display shows how many reps you have done. For example, it will show REP 12 when you have completed your twelve reps.



Central:

During each set this display shows the force exerted on the rep just completed. 104 KG means you have generated an average force of 104 KG over the entire range of the 'lift' just completed. Ten seconds after the last rep is completed in this set this display will change to show the average of all the reps in that set.

You may choose between units of LBS or KG.

Lower left:

This display shows your maximum force for the set. You may choose between units of LBS or KG. You may also choose to view other data in this display, including power (watts), heart rate (bpm), work (newton-metres), load and velocity (mm/sec).

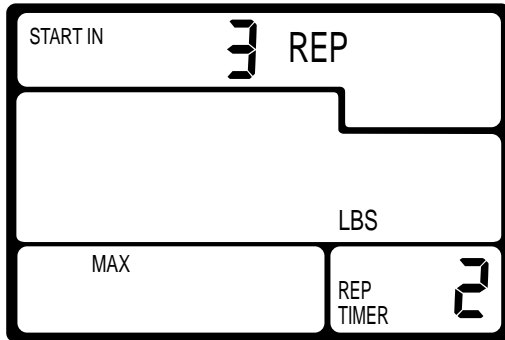
Lower right:

During each set, this display shows the REP TIMER, which counts the elapsed time since the completion of the last rep.

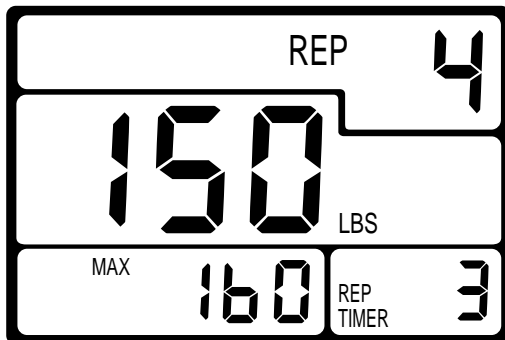
After each set this display shows the number of completed sets.

1: HOW TO USE THE DYNO

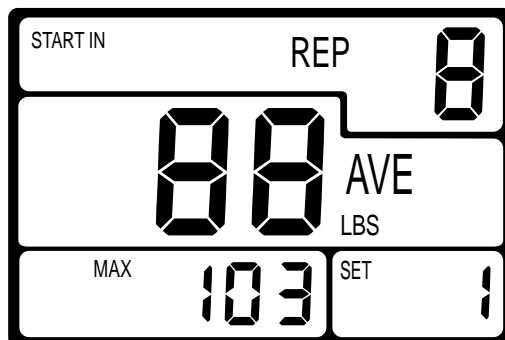
Basic Operation



Warm-up Display



Display During Workout



Display at End of Set

Power-up

The Force Monitor has been designed to start automatically when you begin lifting. No button pushing is required.

Start in 3 Reps

The Force Monitor will count down the first three reps as warm-up reps, during which no force data will be displayed. This allows the monitor to re-calibrate and adjust for any load (damper lever) change.

After the warm-up, the Force Monitor will automatically display your workout data as follows:

- **Centre display.** Your force reading for each rep.
- **Bottom left.** Your maximum force reading for the set.
- **Top right.** The number of reps completed.
- **Bottom right.** The elapsed time since your last rep, and the number of sets completed at the end of the set.

At the end of each set the Force Monitor will display the following data:

- **Centre display.** Your average force for all the reps.
- **Bottom left.** Your maximum force exerted during the set.
- **Top right.** Number of reps completed in the set.
- **Bottom right.** Number of sets completed.

Automatic Power Down

The monitor will power down automatically after 10 minutes of no activity. It can also be turned off using the I/O button.

1: HOW TO USE THE DYNO

Advanced Operation

Button Functions

SETS - puts the monitor into RECALL mode and displays the set summary data for the last set done.

REPS - puts the monitor into RECALL mode and displays the data for the last rep of the last set done.

CLEAR - removes all data from memory and returns the monitor to a reset/on state.

DISPLAY - changes the information in the lower left display. You can chose between watts, work, load, velocity, and heart rate for the units to be displayed for the current rep (not the max rep).

(When you are in RECALL mode the DISPLAY button will allow you to review a past workout in all the available display options (for the set summary screens only - no secondary outputs will be saved for the individual rep recall).

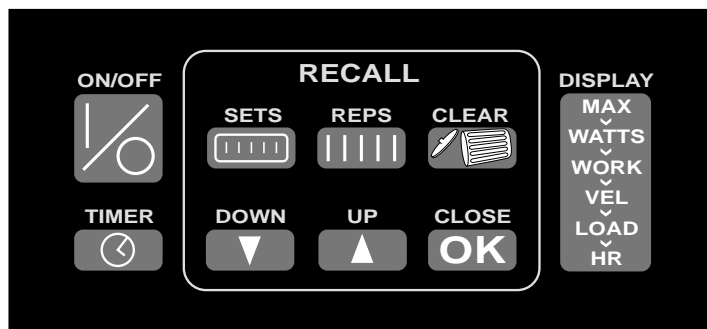
OK - allows you to get out of memory mode without clearing data. Also used for second function of buttons.

UP - moves forward through reps or sets when in RECALL mode.

DOWN - moves backward through reps or sets when in RECALL mode.

TIMER - turns on and off the set/rest timer, in the top left display.

ON/OFF - turns Force Monitor on or off; resets monitor after using RECALL or other second functions.



Second Function of Buttons

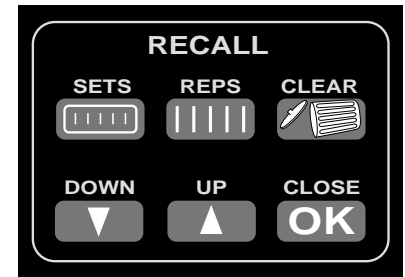
OK + UP - Pounds or Kilograms

Toggles between LBS and KG for the units in the central display. It can be done at any time i.e. in the middle of a set or while recalling from memory. The monitor should power up in the units that were last selected.

1: HOW TO USE THE DYNO

Recall Features

- Recall enables you to save up to 19 set summary screens and over 300 rep screens.
- When either limit is reached the oldest data will be dropped first.
- Workout data is stored as reps within sets.
Example: set 1 (rep 1, rep 2 ...) set 2 (rep 1, rep 2 ...)
- After the CLEAR button is pressed the first set completed will be set 1.
- The memory will save all sets and reps during power down, but will be automatically cleared before rep #1 of the first set after a full power down. (A full power down occurs when the dash in the lower right hand display completely disappears).
- The first set to be recalled will be the most recently completed set.



NOTE: If a new user starts to work out and the memory has not been cleared, their sets will just be added to memory. (i.e. their first set may be set 17).

Using the memory buttons

- Upon completion of the last rep the 'results screen' will be displayed. At this point the monitor is not in the memory mode.
- If the user presses the SETS or the REPS button while in the 'results screen' (or in an on state activated by pressing the on button) the monitor goes into recall mode.
- If the recall mode is entered by pressing SETS the first screen is the set summary screen for the most recent set. This set summary screen is similar to the result screen except the rest time is replaced by the set time and the down/up buttons will scroll you through the set numbers.
- If the recall mode is entered by pressing REPS the rep recall screen for the last rep of the last set will show. The rep enunciator should flash to show that you have selected reps and the up/down buttons will move through the reps. The rep recall screen shows the rep #, the force, and the set #.
- At any time during review of reps, if the SETS button is pressed, the set summary screen will appear of the current set being viewed and the up/down buttons will move through the set summary screens.
- At any time during the review of the set summary screens if the REPS button is pressed, the rep recall screen for the last rep of that set will show. The rep enunciator should flash to show that you have selected reps and the up/down buttons will move through the reps.

Getting out of memory mode

- Pressing the CLEAR will remove all data from memory and return the monitor to a reset/on state.
- If the user wants to get out of memory without clearing the data, they press the OK (close) button. Remember that if the monitor powers down, it will automatically clear memory before rep #1 of the first set after power-up.

5. DAMPER LEVERS



Figure 1



Figure 2

Summary

There are eight damper levers on the fan cage of the flywheel. They control the flow of air through the flywheel, (see figure 1).

The flow of air to the fan determines how fast the DYNO carriage will move when a given force is applied. When more dampers are open you will tend to achieve a higher force but at a slower speed of movement. When fewer dampers are open you will tend to achieve a lower force but at a faster speed of movement.

To summarise this, the more dampers open the greater the flow of air, the greater the flow of air the higher the resistance, which means the effort required on the machine is harder. To open a damper turn it anti-clockwise, (see figure 2).

It is recommended that, initially, you work with no more than one or two dampers open. If you have never previously done any exercise with weights or any strength training you may prefer to try out the machine with all dampers in the closed position, (see figure 1).

Your use of the dampers will be determined in the first instance by your strength and latterly by your training goals. Generally, if your aim is to improve general endurance, you will be working with a low air resistance, ie with a low number of dampers open. This allows you to work at a higher speed and lower force. If your training is for pure strength, then your strategy will be to exert maximum force, and you will work with a higher number of dampers open, for fewer repetitions. The Training Programmes later in the booklet offer detailed advice on training.

NOTE: Damper lever settings should not be changed once a set has been started. The built-in warm-up reps (first 3 presses/pulls on the machine) allow the monitor to re-calibrate, adjusting for any load changes, before the set begins. For this reason, it is important that damper changes be made **before** the warm-up cycle of a set.

6. GETTING STARTED

During your first workout, you will want mainly to familiarise yourself with the machine and get to know something about the Force Monitor. It is essential to establish good habits, so be sure that you do a thorough warm-up before starting your programme. Ten to fifteen minutes of cardio-vascular exercise to raise the heart rate and warm up the body (indoor rowing is ideal as it uses the same muscle groups), should be followed by some stretching. At the end of your exercise, cool down by doing some gentle cardio-vascular work and some more stretching.

Note: Use this first session to get comfortable. Work gently and do not strain. At the end of the session record all settings that you used on the machine for future reference.

Terminology

- **REP.** A repetition. Each press or pull you do is one rep.
- **SET.** A group of reps.
- **COMPRESSION.** The amount of bend in your knees when you start the leg press. The lower the number on the compression scale, clearly marked on the monorail, the greater your leg compression

Before you Start

Turn on the monitor by pressing the I/O button once. If the Dyno was recently used the monitor may already be on and contain the results of the last user. This result data can be cleared from memory by pressing the SETS button then pressing CLEAR. Alternatively just press the I/O button on the monitor to turn it off to remove previous data, then press it again to turn the monitor on.

Choose a low damper setting, with no more than one or two dampers open. The monitor will count down the first three repetitions as warm-up, and no other data will be displayed. After this, the monitor will automatically display your workout data, (see section on the Force Monitor).

The Seated Bench Press



- Adjust the handle height by loosening the knob on the vertical post. Set the bar to a comfortable height, just below your sternum. Tighten the knob.
- Sit on the seat beside the flywheel. Set the damper levers with no more than 1 or 2 open.
- Sit with your back straight, but not rigid, and firmly supported by the seat back. Your feet should be flat on the floor, knees turned slightly out. Keep your head level. Start with the bar close to your body. Hold the bar with a wide overhand grip, with the heel of the hand pushing firmly forward. Push the bar firmly away from your chest until the arms are straight, then return.

The monitor will count down the first 3 pushes as practices, then will display data on subsequent work.

- Try 2 sets of 5 repetitions.

1: HOW TO USE THE DYNO

The Leg Press



- Raise the handle bar so that it is well clear of your knees when fully compressed.
- Adjust your feet in the footrests on either side of the vertical column. Adjust the footrests so that the balls of your feet rest on the flat stationary section of each Flexfoot.
- Set the damper levers with no more than 1 or 2 open.
- Sit as straight as possible with the head level, and the back well supported. Hold the handles below the seat.
- Note the position on the monorail of the vertical bar. The numbers on the monorail indicate the degree of compression you achieve. Start from a position which feels natural.
- Push the legs firmly and strongly forward until they are straight but not rigid then return to the same compressed position (check the number on the monorail) and repeat.

The monitor will count down the first 3 pushes as practices, then will display data on subsequent work.

- Try 2 sets of 5 repetitions.

The Seated Bench Pull



- Move to the other end of the machine. Loosen the knob on the vertical post and adjust the height of the handles to a comfortable position slightly lower than your bench press position.
- Set the damper levers with no more than 1 or 2 open.
- Sit astride the seat, facing the machine, with your chest supported. Your feet should be flat on the floor. Keep the knees far enough apart to allow the carriage to travel to the chest support. Grasp the handles with the palms down.
- Pull the handles towards the chest, keeping the forearms horizontal, until the handles are just past the chest support, then return.

The monitor will count down the first 3 pulls as practices, then will display data on subsequent work.

- Try 2 sets of 5 repetitions.

1: HOW TO USE THE DYNO

Variations to the Basic Exercises

In addition to the exercises described above, it is possible to use variations.

Single Limb Exercises

For each of the three basic exercises, it is possible to work the arms or legs separately. This is particularly useful in the case of injury, as it allows the injured limb to be isolated and work to be maintained on other areas.

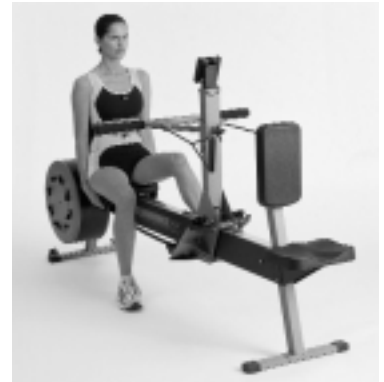
Hand Positions

The position of the hands can be varied:

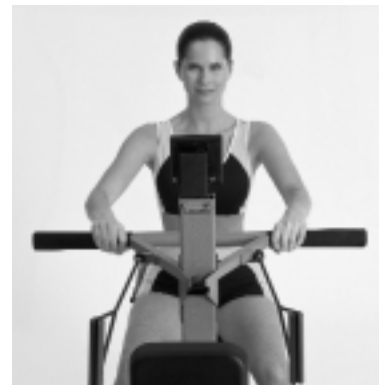
- Bench Press. Hands can be close together or wide apart. Palms may be up or down.
- Bench Pull. Hands may be facing up, down, or palms facing.

Rehabilitation

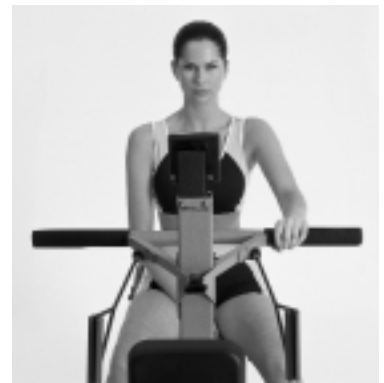
It can also be useful for gentle rehabilitation work. All rehabilitation exercise should be undertaken only after taking medical advice.



Single Leg Leg Press



Narrow Grip Bench Press



Single Arm Bench Press



Hands Facing up Bench Pull

7. MONITORING YOUR PROGRESS

You will find it useful to keep a record of your results. It will confirm progress and help you to plan future training.

Record the information from the monitor and such variables as:

- number of open dampers
- height of handle bar
- compression
- orientation of hand grip (up/down, wide/narrow)
- number of reps per set
- number of sets per session

A sample log sheet is included in the Appendix. Using such a log you should help you to maintain consistency in your DYNO variables. Be aware that if you do variations, you will get different results.

Starting Point - your Max

Before you start your training programme, you will probably want to assess your current strength status for each of the three basic exercises, (see Section 2.9 Test Protocols).

8. SAFE EXERCISE

Strength training is safe and beneficial for most people. However, it is always sensible to have a health check before embarking on an exercise programme, and to work with a trainer to plan an overall fitness programme.

- Always warm up, cool down and stretch thoroughly before and after each exercise session.
- Never exercise if you are unwell.
- Check that the machine is functioning correctly before using.
- Clothing should be close fitting. Wear trainers or suitable exercise shoes.
- Drink plenty of water during and after exercise.
- When starting an exercise programme, don't overdo it. Start slowly and build up gradually.

9. CARE AND MAINTENANCE

The DYNO is very reliable and robust, and requires minimal care and maintenance.

We recommend the following maintenance be performed regularly to prolong the life of the machine.

- Clean the monorail at least weekly using a cloth with water or a household spray cleaner to wipe sweat and dirt off the rail.
- Oil the chain several times a year or more frequently if needed, using the chain oil provided. Apply the oil to a paper towel and run it over the chain as someone gently uses the machine to move the chain for you.
- Oil the threads of the handle-tightening knob when you oil the chains.
- Check all nuts and bolts for tightness monthly.
- Damper lever tension can be adjusted by tightening or loosening the screw at the pivot point of the lever. A fraction of a turn on the screw will make a significant change in tension.
- Wipe the handles and seats periodically with a damp cloth.

Warranty

Five years on metal frame parts. Two years on all other parts.

10. DYNO DEMO PROTOCOL

Getting on the DYNO

- Demonstrate the use of the flywheel dampers, then close them all to set the DYNO on minimum resistance.
- Raise the bench press bar to the top of the vertical post so that it is clear of the knees when using the leg press.
- Sit on the DYNO at the same end as the flywheel.
- Adjust the foot brackets to a comfortable height and insert feet.
- Take hold of the grips underneath the seat.

The Leg Press and Basic Monitor Information

- Start a set of gentle leg press.
- Explain how the monitor starts in 3-2-1 reps.
- Do as many reps as it takes to explain the basic information displayed on the monitor.
- The rep counter - top right.
- The set timer - top left.
- Individual 'lifts' - centre display.
- Maximum 'lift' for the set - bottom left.
- Rep timer - bottom right - which times out after 10 seconds.
- Stop exercising and wait for the monitor to time out.
- Explain the average lift calculation in the centre display and the set number shown in the bottom right of the monitor.

The Range of Resistance

- Start a second set of leg press.
- Open one damper for each rep to show the range of resistance.
- (Altering the number of open dampers during a set can cause slightly inaccurate monitor readings. Therefore, under normal use the damper settings should not be changed between reps. This part of the demonstration is just used to illustrate the range of resistance)
- Stop exercising and wait for the monitor to time out.

The Bench Press

- Place feet on the floor - wide enough apart for the carriage to pass between the knees.
- Adjust the bar to a comfortable height for bench press - just below the sternum.
- Close all the dampers.
- Grip the bar - hands slightly more than shoulder width apart.

1: HOW TO USE THE DYNO

- Start a first set of bench press.
- Show that the monitor works in the same way for bench press as it does for leg press.
- Stop exercising and wait for the monitor to time out.

Advanced Monitor Information

- Start a second set of bench press.
- Work through the monitor functions by pressing the display button.
- Explain watts, work (Nm), velocity (mm/s), load and heart rate.
- Stop exercising and wait for the monitor to time out.

The Bench Pull

- Rotate the monitor.
- Move to the other seat.
- Place feet on the floor - wide enough apart for the carriage to pass between the knees.
- Adjust the height of the handles and the orientation of the grips.
- Brace the chest against the support.
- Start a set of bench pull.
- Stop exercising and wait for the monitor to time out.

Data Recall

- Explain the recall capability.
- Look back through the 5 sets illustrating the use of the sets, reps, up and down buttons.

1 1 . DYNO QUICK REFERENCE GUIDE

Starting Up

- Warm up with at least 10 to 15 minutes of continuous cardiovascular exercise. Include thorough stretching of all muscles and joints.
- Keep other people away from the machine when in use.
- Keep the feet apart for the seated bench pull so that the carriage does not hit your legs.
- Use the seat support for the back and torso during the exercises. When performing the leg press, hold the handles under the seat for stability. (A lumbar roll or thick towel may be used to support the lower back for extra safety and comfort).
- Eight damper levers control the load that you feel at a given speed of movement.

Note: Damper levers should not be changed once a set has been started.

The Monitor

- The monitor will start automatically when the carriage is activated. No button pushing is required. The first three reps are not recorded. They serve as a warm-up and allow the monitor to re-calibrate, adjusting for any damper changes.
- The set will end automatically if 10 seconds has elapsed since the end of the last rep.
- When a set has ended, the set summary data will be displayed.
- Set summary information and the data for individual reps may be recalled using the RECALL buttons. The monitor memory can be cleared with the CLEAR button. The OK button exits RECALL mode without clearing the memory. The memory will also clear automatically just before the first rep of the first set after a power down.
- The TIMER button turns the set/rest button in the upper left display on or off.
- The DISPLAY button cycles between the 5 options for the data shown in the bottom left display.

Recording

Keeping accurate records of your workout results helps you to monitor progress and plan future workouts. In order to be able to compare your results from one workout to the next, we recommend that you record the following variables:

- number of open dampers.
- height setting of handle bar.
- degree of compression.
- orientation of hand grip (up/down, wide/narrow).
- number of reps per set.
- number of sets per session.

The set max and average are only comparable if the variables are held constant.

SECTION 2 :

STRENGTH TRAINING

1. WHY THE DYNO IS EFFECTIVE
2. WHAT HAPPENS TO YOUR BODY
3. THE MUSCLES USED ON THE DYNO
4. THE BENEFITS OF STRENGTH TRAINING
5. HOW LONG WILL IT TAKE?
6. STRENGTH TRAINING COMPONENTS
7. FOUR TYPES OF STRENGTH TRAINING
8. OTHER TYPES OF TRAINING
9. TEST PROTOCOLS

2 : STRENGTH TRAINING

1. WHY THE DYNO IS EFFECTIVE

Strength is the ability of the body to apply force against a resistance. The reason why the DYNO is not only safe but also extremely effective in strength training is because the resistance against which the muscles work is created by air.

In traditional weight training, the maximum weight that can be lifted is limited at the weakest point in the muscle contraction. The DYNO flywheel produces a wide range of resistance in response to the user's efforts. Dynamic Strength Training on the DYNO enables your muscles to be fully challenged throughout the complete movement. The air resistant nature of the DYNO varies the resistance through the 'lift', so at the points in the 'lift' where you are able to push harder, the resistance will be greater.

2. WHAT HAPPENS TO YOUR BODY

Strength or resistance training has been shown to have many health benefits. It can improve cardiovascular fitness, reduce fat levels, improve bone density, increase tissue strength, benefit the endocrine system, as well as increasing lean body mass. It has also been found to help reduce psychological stress and bring about an improved sense of well-being.

Resistance training is a means of bringing about adaptive changes in the following areas:

Muscular Strength

This is the ability of a muscle/group of muscles to overcome a resistance. The maximum resistance that the muscle(s) can overcome is the MAX or 1RM (one repetition maximum).

Muscular Power

This is the explosive aspect of strength, it is the product of strength combined with speed of movement.

Muscular Endurance

This is the ability of a muscle(s) to overcome a resistance repeatedly without becoming unduly tired.

Muscle Tone

This is the resting tension of a muscle.

Neural Activity

Strength has a direct correlation with the motor system. As activity increases, the body uses more muscle fibres to produce movement. Adaptations occur which improve coordination and increase the activity of prime mover muscles.

2 : STRENGTH TRAINING

The Gender Question

Many women are apprehensive about strength training. Misapprehension about hypertrophy - the growth of muscle - is misplaced; strength training is very beneficial. The hormone testosterone is thought to be partly responsible for the growth of a muscle, so men experience greater hypertrophy than women. Women can achieve good strength gains without an undue gain in muscle mass.

3. THE MUSCLES USED ON THE DYNO

For each exercise there is a prime mover, and synergists. The prime mover is the main muscle doing the action, and the synergist is the supporting muscles assisting the main muscle.

Leg Press

Prime Mover: Quadriceps (Rectus Femoris, Vastus Lateralis, Vastus Medialis, Vastus Intermedius).

Synergists: Gluteus Maximus. Calves (Soleus and Gastrocnemius) assist to a lesser extent.

Seated Bench Press

Prime Mover: Pectoralis Major.

Synergists: Triceps (become more involved with a closer hand grip), Anterior Deltoids.

Seated Bench Pull

Prime Mover: Latissimus Dorsi

Synergists: Biceps (become more involved when the palms are facing up); Rhomboids - the deeper lying rhomboids in the upper back are involved when the grip is palms facing inward; Posterior Deltoids may assist to a smaller degree when palms are on top.

4. BENEFITS OF STRENGTH TRAINING

Feeling Good

Strength training will help you to feel fit and energetic. You start to lose muscle strength as early as the mid-twenties and by the age of 65 you can lose 30-40% of your strength if you don't exercise. Aging does not make this unavoidable; it happens as a result of neglect of our bodies. It is possible to retain strength by maintaining a strength programme, and it's never too late to start. Studies show that even over-sixties can double their strength by weight training. The DYNO allows you to do this in a safe and controlled way.

Looking Good

Strength training firms and shapes muscles. The body's shape and appearance improve, and posture is better. Weight training may also help you to shed fat if it is part of a planned programme which includes aerobic exercise and diet. Some scientists think that weight training can increase your metabolism (metabolic rate).

2 : STRENGTH TRAINING

Reducing Injury Risk

You are less prone to injury when your muscles are strong, and the time it takes to recover from injury or accidents is likely to be shorter.

Strong Bones

Strength training helps maintain bone density and combat osteoporosis. Bone loss begins around the age of 35, and accelerates for women after the menopause. By doing weight bearing and aerobic exercise, and taking calcium and Vitamin D, you can slow the rate of bone loss significantly. Studies show that bones benefit from strength training at any age.

5. HOW LONG WILL IT TAKE?

Most of the apparent improvement in the first six weeks will be due to your body becoming increasingly skilled at performing the exercises. From six weeks, the size of the muscle fibres will increase, so muscles start to grow. The large muscles (eg in the chest and back) will grow faster than the smaller muscles (in the arm and shoulder). Strength gains can be seen relatively quickly. You may be able to increase your strength as much as 40% after just 10 weeks exercising each muscle group twice a week.

6. STRENGTH TRAINING COMPONENTS

To maximise your performance in any sport you will need to reach a high standard in seven defined elements - Strength, Speed, Power, Oxygen Transportation (CV), Endurance, Flexibility and Skill. Five of these elements can be carried out on the DYNO. The emphasis on each of them and their timing within the programme will depend on what you are training for. Allocating time to each element will form the building blocks of your training programme.

Strength

In a sporting context strength can be defined as the muscle(s) ability to overcome or resist a load. When a load is moved over a distance, that is known as WORK. Strength is the bedrock of all sporting activity, whether you use your strength to do work in an explosive way or sustain it over hours.

Speed

Speed can be measured as either reaction time - how quickly a sprinter leaves the blocks - or the time in which a given task can be completed. Reaction time can be improved by developing the neurological pathways that link the brain with the muscles. At its best it is automatic.

Power

Power is the combination of strength and speed and is measured as the rate of doing work.

2 : STRENGTH TRAINING

Oxygen Transportation (CV)

Muscles need a constant supply of oxygen to be able to do continuous work. This oxygen is collected from the lungs and pumped out to the muscles by the action of the heart. This system is commonly known as oxygen transport or the cardio-vascular system.

Endurance

The efficient utilisation of the oxygen within the muscle will have a direct bearing on the level at which work output can be sustained. Muscular endurance is developed by increasing the number of capillaries around muscle fibres. This has the effect of increasing the cross-over time for oxygen to pass from the blood to the muscle.

Flexibility

In any activity, the participant needs to be able to move freely through the range of movements required. Not everyone needs a gymnast's flexibility, but if you are using energy to overcome lack of flexibility, there is less available to meet the demands of the activity.

Skill

Arguably, the ability to make the task look easy. More apparent to the observer than the performer.

Skill and flexibility are the two elements that are not addressed by strength training on the DYNO.

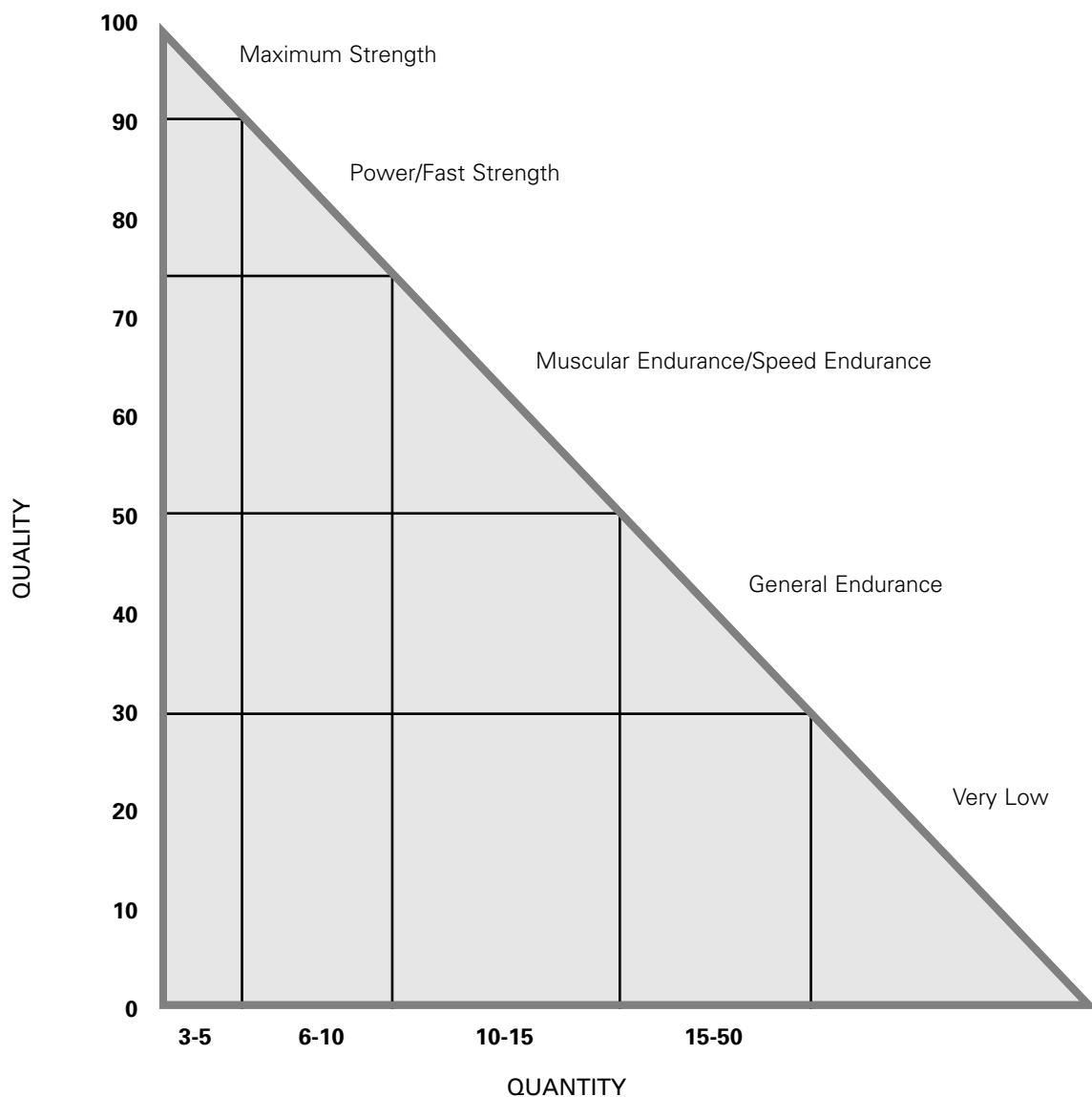
7. FOUR TYPES OF STRENGTH TRAINING

The DYNO can be used for 4 different types of strength training: Maximum strength, Power, Strength endurance and General endurance

Training programmes will vary according to your general level of fitness and training goals. The different types of training are based on varying the quality and quantity of work where quantity is the number of repetitions carried out during an exercise; and quality is the relative exertion of power or effort during the exercise.

For example, when the load is so heavy it can only be lifted once, it is called your maximum or 100% - you need maximum effort or 100% quality work to lift it. Low quality work is the effort you need simply to walk about.

The diagram below illustrates the ratios between quality and quantity which produce the different physical characteristics when training for strength.



2 : STRENGTH TRAINING

Maximum strength (90-100%)

This is acquired by using very high quality work. It will only be possible to do up to 3-5 reps before fatigue sets in. Allow full recovery before starting the next set.

Power/Fast strength (75-90%)

This requires less force. You should be able to do around 8 repetitions at faster speeds. A full rest period is required between each set.

Muscular Endurance/Speed Endurance (50-75%)

Between 10 and 15 repetitions should be possible in this range, and they should be carried out as fast as possible. The rest period, which should not allow complete recovery, should be approximately twice as long as the work period.

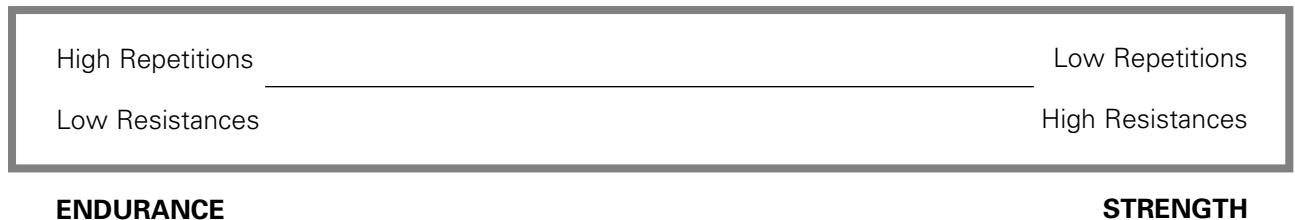
General Endurance (30-50%)

Work is done with a small load, and many repetitions. The work should not be interrupted by rest periods except to change from one activity to another. A circuit arrangement is best for this type of work.

Very Low (30% or below)

Active recovery or rehabilitation.

The Endurance Strength Continuum



8. OTHER TYPES OF TRAINING

Aerobic training

The DYNO can be used as a free-standing aerobic circuit machine. For this, dampers would be closed and exercises would be done at speed and with a high number of repetitions.

Rehabilitation

All the exercises on the DYNO can be carried out safely with one limb. An injured limb can be gently worked with all dampers on the machine closed when medical advice allows.

9. TEST PROTOCOLS

General Notes

For each individual note the settings of the DYNO that are being used for both training and especially testing. Settings should be constant to obtain comparable data. The settings include:

- Number of dampers opened.
- Height of foot (if applicable).
- Height of handlebar (if applicable).
- Leg compression must be the same each rep for accurate data from the leg press. Use the numbers on the monorail to gauge leg compression.
- Seated Bench Press: adjust handle bar height to just below the sternum.
- Seated Leg Press: raise the handle bar well clear of the knees when finally compressed. Hold the handles below the seat.
- Seated Bench Pull: adjust handle bar height slightly lower than for the Bench Press.
- Regular re-testing on a cycle of 6-8 weeks will help monitor progress and re-establish maxima to use in future training.

Initial Strength Assessment (5 rep test)

Note: Record both the maximum and average values at the end of the set.

- Warm-up as usual.
- Include a set of 8 reps of the lift to be tested on the DYNO at the end of the warm-up (moderate intensity).
- Begin test by going through the motion 3 times (3, 2, 1 countdown).
- When the monitor shows 'rep 0' the rep timer will start counting seconds. Let the rep timer count 5 seconds, then give your best effort.
- After finishing rep 5 stop the exercise. Do no more reps. 10 seconds after finishing the last rep your average rep force will be displayed in the centre window of the monitor and your maximum force displayed in the bottom right window. Record both scores.

1RM Test (maximum force)

The one Repetition Maximum Test

- Warm-up as usual.
- Include a set of 8 reps of the lift to be tested on the DYNO at the end of the warm-up (moderate intensity).
- Begin test by going through the motion 3 times (3, 2, 1 countdown).
- When the monitor shows 'rep 0' the rep timer will start counting seconds. Hold your starting position until the rep timer hits 5 seconds, then give your best effort.

2 : STRENGTH TRAINING

- Read and record the force achieved.
- Repeat the trial (starting at step #3) for three attempts. The highest of the three attempts is your 1RM max.

Endurance Test (50 reps at a rate of 1 rep every 3 seconds)

Note: The score will be your average force per rep. The goal is not to get the highest single rep force but to achieve the highest average.

- Warm-up as usual.
- Include a set of 8 reps of the lift to be tested on the DYNO at the end of the warm-up (moderate intensity).
- Begin test by going through the motion 3 times (3, 2, 1 countdown).
- When the monitor shows 'rep 0' the rep timer will start counting seconds. At this time begin the test set using the rep timer to regulate your frequency of repetition. So, make one rep approximately every 3 seconds.
- After finishing rep 50 stop the exercise. Do no more reps. 10 seconds after finishing the last rep your average rep force will be displayed in the centre window of the monitor. This is your endurance test score.

Note: This same procedure can be used for a 30 rep or 20 rep endurance test.

SECTION 3 :

TRAINING

1. BEGINNING YOUR PROGRAMME
2. THE EXERCISES
3. FINDING YOUR MAX
4. STRENGTH TRAINING BANDS
5. TRAINING STRATEGIES
6. PERIODISATION OF TRAINING

3 : TRAINING

1. BEGINNING YOUR PROGRAMME

You may initially find the DYNO quite a challenge but it will enable you to work safely and with control. Persistence pays - be assured that if you stick at it sensibly, without overdoing it, you will see results.

Remember the following:

- Exercise safely and sensibly.
- Ensure you are medically able to start exercising. Have a fitness assessment.
- Always listen to your body and be prepared to take a rest if you are tired. Rest is required to allow your body to adapt to training.
- Take care not to overdo it especially in the early stages.
- Never train when you are ill.
- Don't become a slave to the programme.
- For all programmes remember it is essential to thoroughly warm-up before, and cool down after exercise.

2. THE EXERCISES

The DYNO offers three core exercises: Leg Press, Seated Bench Press and Seated Bench Pull.

However, as you become more familiar with the DYNO numerous variations to these core exercises can be performed. Variations include:

DYNO Exercises			
	Leg Press	Seated Bench Press	Seated Bench Pull
Core	Full leg compression	Palms down, wide grip	Palms down
Variation 1	Varying degree of compression	Narrow grip, palms down	Palms up
Variation 2	Single leg action	Wide grip, palms up	Palms facing inwards
Variation 3	-	Narrow grip, palms up	Single arm action
Variation 4	-	Single arm action	-

Note:

Full leg compression will differ for each individual. If you are unsure how far you should compress we recommend you seek advice from your fitness instructor or personal trainer.

3. FINDING YOUR MAX

Any strength training programme is based on your maximum strength. Before embarking on a training programme you will need to establish the maximum load you can move - that will be your max, (see Section 2.9 Test Protocols).

4. STRENGTH TRAINING BANDS

Traditional weight training programmes utilise Strength Training Bands which define work in percentages of your max. The table below shows the percentage of max you would set your weight for each training goal.

Strength Training Bands				
Aim	Reps	Sets	% Max	Rest
Strength	3-5	3-6	90-100	Full recovery
Power/Fast Strength	6-10	3-6	75-90	Full recovery
Muscular/Speed Endurance	10-15	1-6	50-75	2 x work
General Endurance	15-50	1-6	30-50	1 x work

Notes

- i. You will need to experiment with the number of dampers open. In general, for strength work you will need more dampers open and for endurance you will need fewer open.
- ii. Aim to work each muscle group two or three times a week. If your aim is maximum strength be aware that more than three sessions a week on one muscle group may not allow sufficient recovery time.

A fundamental difference between training on the DYNO and traditional weight training is that on the DYNO you do not set the weight before you lift. Training strategies on the DYNO utilise the ability to alter the relationship of speed to force and the fact that the load will always 'adjust' to be equal to the force you are capable of applying.

5. TRAINING STRATEGIES

Suggested workout frequency: 1-3 times per week.

Maximum Strength

The goal of this workout is to exert the maximum force you can each repetition for a small number of repetitions. You are continually trying to achieve a new PB.

- Number of open dampers: minimum that lets you achieve maximum force.
- Number of reps: 3-5.
- Recovery between reps: 5-10 seconds.
- Number of sets: 3-6.
- The Force Monitor will display your force after each rep. Go for max force every time.

Power

Power is a function of both strength and speed. Increasing power requires both increased strength and increased ability to apply that strength at faster speeds. Use this strategy to improve your ability to deliver force at faster speeds of movement.

- Number of open dampers: 2 or more (fewer than for building maximum strength).
- Number of reps: 6-10.
- Recovery between reps: 3-5 seconds.
- Number of sets: 3-6.
- Set the monitor to display speed and force, and go for max force each rep.

Muscular Endurance

The goal here is to improve your ability to sustain effort over a long period of time.

- Number of open dampers: the same or fewer than in Strategy 2.
- Number of reps: 10-15.
- Recovery between reps: 2-3 seconds.
- Number of sets: 1-6 depending on number of reps.
- At the end of each set the Force Monitor will display your average force for the set. Work to improve this average.

General Endurance

The goal of this workout is to condition your muscles to weight training.

- Number of open dampers: the same or fewer than Muscular Endurance.
- Number of reps: 15-50.
- Recovery between reps: 1-3 seconds.
- Number of sets: 1-6 depending on number of reps.
- As with Muscular Endurance, work to improve your average force.

6. PERIODISATION OF STRENGTH TRAINING

Serious competitors will use strength training as part of their preparation for competition. Dividing your training into periods can enable you to be at your peak when required. The chart below can be applicable to almost every sport. It divides the training time into three main headings: preparation period; competition period and transition period. You work from the date of the main event in your calendar - this is the date to enter in the Late Competition box.

Each of the boxes on the left represents a training block of 4 to 6 weeks.

Periodisation					
Period	General Condition	Strength	Muscular Endurance	Power	Speed
Early Preparation	Yes	Yes	No	No	No
Mid Preparation	No	Yes	Yes	No	No
Late Preparation	No	Yes	Yes	Yes	No
Early Competition	No	No	Yes	Yes	Yes
Mid Competition	No	No	No	Yes	Yes
Late Competition	No	No	No	No	Yes
Transition	Yes	No	No	No	No

SECTION 4 :

APPENDIX

1. DYN0 TRAINING LOG

2. DYN0 STRENGTH TESTING LOG

