

**RESISTANCE TRAINING
PROGRAMME DESIGN**

Dr. K. P. MANILAL
SENIOR SCIENTIFIC OFFICER
SAI, NSSC, BANGALORE

RESISTANCE TRAINING

Definition

A systematic programme of exercises involving the exertion of force against a load used to develop strength, power, strength endurance, hypertrophy of the muscular system.



RT is used for:

- **Improvement of overall health**
- **Rehabilitation of injury**
- **Changing physical appearance**
- **Competitive sport performance.**

RT is to be done:

- **Under skilled supervision**
- **Proper instruction in form**
- **Breathing techniques**
- **Body mechanics**
- **Prescription of loads**

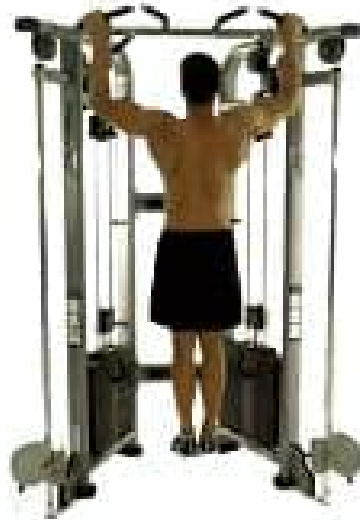
Resistance Training Modalities

- **Any piece of equipment that supplies some degree of resistance can be used for training strength.**
- **Quality strength training programme can be designed with inexpensive equipment also.**



1. Body weight

- **The human body is the most basic form of resistance**
- **Body weight exercises (squat, pull-ups, push-ups, etc.)**



Body weight exercises can be made more difficult by:

- **Changing grip, stance width**
- **Leverage**
- **Using unilateral versus bilateral exercises**
- **Increase repetitions/reducing rest intervals etc.**

e.g.: push-ups, easy-way (performing on knee), difficult-legs on the chair.



However, some individuals may not be able to do body weight exercises due to large body weight.

- Effective for athletes of all fitness levels
- Equipment also can be used (dip bar, horizontal bar, benches etc) to increase the degree of difficulty



2. Partner resistance

ADVANTAGES

- **Dynamic/isometric RT exercises can be performed**
- **Exercises can be performed anywhere**
- **No cost and injury free**
- **Low/high resistance can be applied**
- **Resistance can be adjusted according to the fatigue**
- **Adding variety**



DISADVANTAGES

- **Difficulty in consistently quantify resistance**
- **Low exercise selection/ variation**
- **Using partner with sufficient level of size and strength**
- **Exercise technique to be maintained**

3. Free weights

- **Weight can be moved freely in any direction**
- **Free weights include barbell, dumbbells, plates, collars etc.**

Advantages

- **Less expensive**
- **Less maintenance**
- **Greater balance and coordination**
- **More variation**
- **Can perform many exercises with little equipment**
- **Unilateral/bilateral exercises**



- **Can target
CONCENTRIC,
ECCENTRIC,
ISOMETRIC contraction**
- **Allow performance of
power exercises**
- **Easy to replicate athletic
movements/skills**



Disadvantages

- Greater risk of injury
- Difficult to load/unload
- Require more time to learn exercise technique
- Require spotter



4. Machines

- **Several types of RT machines are available**

e.g. plate loaded

hydraulic

computerised

cable pulley

smith machines



Advantages

- **Safe to use and easy to learn**
- **Easy to load/unload**
- **No need of spotter (smith machine)**
- **Easy to evaluate progress**
- **Some machines are multi unit (combo machines)**
- **Some specific exercise can be done/ excellent muscle isolation**

Disadvantages

- **More costly, more maintenance**
- **Large and heavy**
- **No proper development of coordination/balance**
- **Less variation**
- **May not provide enough resistance**
- **Difficult to accommodate individuals with different height/weight etc**

5. Medicine balls, stability balls etc

- Can be used for general RT, calisthenics and plyometric exercises
- Stability ball for core strength
- BOSU balls (balance trainer)



6. Elastic bands, tubing, chains

- **Provide variable resistance to athletes**
- **Sport specific exercises**
- **High degree of functionality and variation.**



7. Movement specific resistance devices

- **For loading specific motor skill**
e.g. power chutes, harness, weighted vests, sled etc



8. Strength implements

- Increasing popularity in recent years
- Provides specificity
- Provides different stress
- Provides unbalanced resistance

e.g. kettle bells, tyres, sand bags, kegs (fluid filled drums)



9. Water and environment

- **Fluid resistance**
- **Aqua exercises**
e.g. aqua dumbbells etc



- **It reduces stress on joints and skeletal system**
- **Good for rehabilitation**

Environmental factors

- **Hills**
- **Sand running**

The decision to use a type of modality should be based on:

- **Your needs**
- **Training goals**
- **Training experience**