CHAPTER VII

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The phenomenon of quicker physiological and psychological recovery after rigorous sportive activity, through various recovery techniques have intrigued sports trainers, coaches, and sports physicians. Numerous research studies have been undertaken to find out the effect of various procedures, such as active, passive and relaxation techniques on cardiovascular recovery and subsequent performance. However, the bulk of research evidence did not show any unanimity, whether active, passive, or relaxation techniques could engender quicker cardiovascular recovery and enhancement in subsequent performance. The conflicting results necessitated to undertake the present research study entitled:

"Cardiovascular Responses to Active, Passive and Yogic Recovery Procedures and Maximal Work Output."

The study was based upon the following objectives:

To find out and compare the effects of supramaximal training and recovery techniques on the cardiovascular variables during rest and exercise of the four experimental recovery groups.

To find out and compare the effect of the Active, Passive and Yogic recuperative techniques on cardiovascular variables during recovery period.
To find out and compare the effects of supramaximal training and different recovery techniques on the variables of maximum work output.

To find out and compare the effect of supramaximal training on selected anthropometric variables of Active sitting, Passive sitting, Passive lying and Yoga savasana (relaxation) groups.

To find out and compare the girth measurements of selected anthropometric variables with total cumulative work output of active sitting, passive sitting, passive lying and yoga groups.

The investigation was confined to healthy male volunteers (N=120) of a local non-residential higher secondary school (age ranging between 16 to 18 years). Randomised clustered sampling was followed. Out of five sections in a local higher secondary school, three sections were picked up randomly. The total (120) sample of students were divided into four equated groups of 30 each after matching them according to one minute all out cycle ergometer revolution scores and total three girths (thigh, knee and calf).

The equated groups were randomly designated as (i) Active sitting Recovery group (ii) Passive sitting recovery group (iii) Passive lying recovery group and (iv) Yoga (savasana) lying recovery group.
Active recovery consisted of pedaling the cycle ergometer slowly in the sitting position at the rate of 60 rpm. at one kg. resistance during 10 minutes of recovery period. Passive recovery consisted of two techniques; sitting quietly (passively) on a chair at bike level, whereas passive lying consisted of lying down in the supine position. The yogic recovery implied assuming savasana (relaxed pose) in the supine lying position.

The criterion performance task consisted of 1 minute of all out pedalling on a mechanically braked bicycle ergometer against a frictional resistance of 5 kg. The performance was measured with the help of revolutions scored and recorded at the revolution counter. The subjects undertook criterion performances task twice: before recovery and after recovery to determine subsequent performance (maximum work output) in each testing session. The maximum work output consisted of three variables; 6 sec. by 6 sec. revolution scores, 6 sec. by 6 sec. cumulative revolution scores and total cumulative work output scores in kgm.

The cardiovascular variables consisted of measurements of heart rate, systolic, diastolic and pulse pressures during conventional resting stage. During recovery, heart rate was measured after every minute and the three pressures were recorded after 2, 4, 6, 8 and 10th minutes.

The anthropometric variables comprised of height, weight, three girth measurements (thigh, knee, calf) and skinfold
measures of scapula and triceps to compute body density and Lean body mass.

All the above mentioned variables were recorded before training and after four months of training to observe any changes. The training consisted of running on the spot, squat jumps, jumping jacks to achieve the training stimulus (75-80 per cent of maximum heart rate). The short bouts of exercise (four times a week) were interspaced with particular recovery technique.

Statistical analysis of pre and post training results was based on simple techniques like Mean, SD and t-test.

On the basis of results and statistical analysis following conclusions were drawn:

Supramaximal short bouts of exercises (75-80% heart rate maximum) interspaced with four different recovery techniques had significantly reduced the resting heart rate, systolic and diastolic pressures of all the four recovery techniques groups. The resting pulse pressure had increased significantly.

Yoga relaxation technique (savasana) showed significant heart rate deceleration from 3rd minute to 9th minute of recovery, highest total recovery index score and total cumulative work output than the other recovery techniques. Training had increased the total three girths and lean body mass of all the groups significantly. However, the group
possessing the highest measurement (post training) in total three girths did not show significant improvement in the total cumulative work output than the other groups.

Practically the following implications emerge:

Yoga relaxation technique (savasana) can be used effectively as a recuperative technique during competitions and training sessions. Learning the technique of relaxation can improve the sports skills and performance and also reduce psychological tension and neuro-vegetative dystonias. It can be incorporated as one of the training measures for psychosomatic fitness of athletes.