Chapter III

PROCEDURE

In this chapter the subjects, criterion measures, procedure for administering tests and statistical model for analysis of data have been described.

Subjects

One hundred and seventy gymnasts who participated in various national and inter-university competitions were selected as subjects for this study. They all had already achieved a good level of performance in gymnastics as they all were selected by their respective state associations to represent their states in national competitions.

For the purpose of the study, the gymnasts, who had participated in the Sub-junior Nationals, Junior Nationals and Senior Nationals were selected and designated as Sub-junior Group, Junior Group and Senior Group. The age of the Sub-junior Group was upto 12 years, Junior Group above 12 and upto 16 years and Senior Group above 16 years.

The subjects were thoroughly oriented to the different testing procedures as well as the specific skills being included in the study, so that there was no ambiguity regarding effort that was required on their part and hardships they might endure.
Criterion Measures

The criterion measures chosen to test the hypotheses in designing specific fitness norms for women gymnasts were selected on the basis of their significant correlation with competitive performance in the pilot study. These variables are as follows:

1. Hand-spring on Vaulting Horse
2. Kip on Uneven Bars
3. Back hip circle on Uneven Bars
4. Uprise on Uneven bars
5. Jump from board to roll forward on Beam
6. Standing Scale on Beam
7. Side hand-stand on Beam
8. Back roll to hand-stand on Floor
9. Back flip on Floor
10. Handspring on floor
11. Leg circles over low bar from hanging on high bar from right to left side.
12. Leg circles over low bar from hanging on high bar from left to right side
13. Maximum number of kips on Uneven Bars
14. 60 metres Sprint
15. Sit-ups (Jack Knife Action)
Methodology

All the tests were conducted at the time when subjects were free from competitions. Each subject was given sufficient time for warming up and proper recovery period was also provided in between. Each test was clearly demonstrated by the expert and each gymnast was given one trial-attempt. All the subjects were examined in each of the criterion measures by a panel of three International judges (FIG) and the average score was considered as the final score. All the tests selected for the present study were considered after due consultation with various experts and national coaches of gymnastics and as such all the technical skills represent the different structural groups of gymnastics.

Administration of the Tests

Hand-spring on Vaulting Horse

Equipment:

Beating board, vaulting horse and mattresses.

Purpose:

To evaluate the technique of hand-springs on vaulting horse.

Procedure:

The gymnast started running from the prescribed approach run of 25 M. maximum. After taking off from the board, which is placed at a
distance away from the horse as per the ability of the gymnast, the gymnast performs hand-spring by placing both hands on the horse. During the piking phase the body is kept relaxed where the feet are higher than the head, push off is done with straight arms. After push-off the gymnast must cover a horizontal distance of about 2 metres and vertical distance of about 1 metre in the second flying phase. Then the gymnast lands with her back opposite to take off. The skill is presented in Figs. 1-2.

Scoring:

Each gymnast was given two attempts to perform hand-spring. The better of the two was considered for scoring purpose. The evaluation of each vault was done by a jury of three qualified gymnastic judges Fig. 3. Hand-spring was evaluated out of a maximum of 10 points. Evaluation by all the judges was done as per the rules and regulations laid down in the code of points for women by International Gymnastics Federation. Average of the points given by the three judges for the better vault was considered as the final score of the subjects.
FIG. 1  HAND SPRING ON VAULTING HORSE.
Fig. 2 - HAND-SPRING ON VAULTING HORSE

Fig. 3 - INVESTIGATOR IN CONSULTATION WITH TWO INTERNATIONAL JUDGES FOR AWARDING SCORES FOR HAND-SPRING
Kip on Unevenbars

Equipment:

Uneven-bars, mats and magnesium carbonate powder.

Purpose:

To evaluate the technique of kip on uneven bars.

Procedure:

In the beginning, the gymnast glides and her body is lead into a position where the legs and trunk are above the shoulders, nearly balanced for a short time. The significant flexion of the hip induces an initial force in muscles stretching the hip joint. An immediate explosive stretching of the movement of the hip has to be finished actively before the hip joints have reached at an angle of $180^\circ$. At the same time the bar is pressed with straight arms to reach into support position. The skill is presented in Fig. 4.

Scoring:

After proper warming up a gymnast was asked to perform glides kip on uneven bars. The execution of kip was evaluated out of a maximum of 10 points by each judge, keeping in view the technical and general requirements of kip on uneven bars Figs. 5 & 6. The average of the scores awarded by three judges was taken as the final score of the subject for kip on uneven bars.
FIG. 4  KIP ON UNEVEN BARS
Fig. 5 - INITIAL POSITION OF KIP

Fig. 6 - UPWARD ACCELERATION IN KIP
Back Hip Circle on Uneven Bars

Equipment:

Uneven bars, matresses, magnisium carbonate power.

Purpose:

To evaluate the technique of back hip circle on uneven bars.

Procedure:

In the initial stage of the movement the body is raised away from support position. The backward swing produces some about of potential energy for the main part of the movement. The body is brought near to the apparatus by bringing legs forward and also by throwing the shoulders backward (upper body). Body circles around the lower horizontal bar. A sufficient angular velocity is important to complete the rotation around the bar. The skill is presented in Fig. 7.

Scoring:

Each subject was asked to do proper warming up. After proper warming up, the subject was asked to perform back hip circle on low bar facing inward. The element was evaluated by three qualified judges out of a maximum of 10 points. Considering the technical and general requirements of the skill Figs. 8 & 9. The average score of the scores awarded by the three judges was considered as the final score of the subject for back hip circle on uneven bars.
BACK HIP CIRCLE ON UNEVEN BARS

FIG. 7
Fig. 8 - BACK HIP CIRCLE ON UNEVEN BARS

Fig. 9 - INVESTIGATOR CONSULTING OTHER JUDGES
Uprise on Uneven Bars

**Equipment**: Uneven bars, mats, magnesium carbonate power.

**Purpose**:

To evaluate the technique of uprise on uneven bars.

**Procedure**:

Modified uprise has been used in the present study. The gymnast was asked to assume hang position on high bar facing inward and places both feet on the low bar. From this position she was asked to come to support position on high bar with straight arms by pusing the bent legs placed on the lower bar. The skill is presented in Fig. 10.

**Scoring**:

After proper warming up a gymnast was asked to perform uprise on uneven bars Figs. 11 &12. The execution of uprise was evaluated out of a maximum of 10 points by each judge. The average of the scores awarded by three judges was taken as the final score of the subject for uprise on uneven bars.
Fig. 11 INITIAL POSITION OF UP-RISE ON UNEVEN BARS

Fig. 12 - PULLING ACTION DURING UP-RISE
Jump from Beating Board to Roll Forward at the End of the Beam

**Equipment:**

Beam, Mats, Beating Board.

**Purpose:**

To evaluate the technique of, with jump from board forward roll on beam.

**Procedure:**

The gymnast performed this skill by taking 5-6 running steps. After the take-off the gymnast placed both hands on the beam to do forward roll. Rolling movement is a rotation around momentary axes which are at the momentary touch points between the body and supporting place. The technique of skill is presented in Fig. 13.

**Scoring:**

After proper warming up a gymnast was asked to perform jump from board and forward roll on beam Fig. 14 & 15. The execution of element was evaluated out of a maximum of 10 points by each judge. The average of the scores awarded by three judges was taken as the final score of the subject for this skill.
FIG. 13 WITH JUMP ROLL FORWARD ON BALANCE BEAM
Fig. 14 - INITIAL POSITION FOR ROLL FORWARD ON BEAM FROM TAKE OFF FROM BOARD

Fig. 15 - ROLL FORWARD ON BEAM
Standing Scale on Beam

Equipment:

Beam, Mats.

Purpose:

To evaluate the technique of standing scale on one leg on beam.

Procedure:

The gymnast was asked to perform horizontal standing scale on any one leg by keeping arms sideways. She was to hold the position for two seconds as per the rules and regulations of gymnastics competitions. It is presented in Fig. 16.

Scoring:

The performance was evaluated by three qualified judges. To evaluate static part, the position of supporting and free legs, position of body, head, arms, and duration of hold are the aspects to be considered. Fig. 17. The average score of the scores, given by the three judges was taken as final score for each subject.
Side Hand-stand on Beam

**Equipment:**

Beam, Mats.

**Purpose:**

To evaluate the technique of side handstand on beam.

**Procedure:**

Gymnast was asked to perform side hand-stand from cart-wheel position. The shoulder axis of the gymnast is parallel to the axis of apparatus in side hand-stand on beam. It is presented in Fig. 18.

**Scoring:**

Evaluation of skill was done by three judges, who had evaluated the element out of 10 points. The average of the marks awarded by the three judges was considered as the final score of the gymnast Fig. 19.
Fig. 19 - SIDE HAND-STAND ON BEAM
Back Roll to Hand-stand on Floor

Equipment:

Mats.

Purpose:

To evaluate the technique of back roll to hand-stand on floor.

Procedure:

The gymnast was asked to perform backroll to hand-stand on floor from standing position. Gymnast was required to show momentary hand-stand position. The technique of back roll to hand-stand on floor is presented in Fig. 20.

Scoring:

The technical execution of the back roll to hand-stand (Momentary) was evaluated by a panel of three international judges (Figs. 21-22). Each gymnast was awarded points from out of a maximum of ten. The average of the three scores awarded by three judges was considered as the final score in case of each gymnast.
FIG. 20 BACK ROLL TO HANDSTAND ON FLOOR
Fig. 21 - INITIAL POSITION OF BACK ROLL TO HAND-STAND ON FLOOR

Fig. 22 - FINAL POSITION OF BACK ROLL TO HAND-STAND ON FLOOR
Back Flip on Floor

**Equipment:**

Mats.

**Purpose:**

To evaluate the technique of back flip on floor.

**Procedure:**

Each gymnast was asked to perform back flip from standing position. Back flip on floor falls under balance over movements of swing exercises. Balance over movements are rotatory movements of 360° connected with locomotion of the mass of the body. In its supported part there is a rotation around a temporary fixed axis. The skill is presented in Fig. 23.

**Scoring:**

After warming up a gymnast was asked to perform back flip on floor. The execution of back flip on floor was evaluated out of a maximum of 10 points by each judge. Fig. 24-25. The average of the scores awarded by three judges was taken as the final score of the subject for back flip on floor.
Fig. 24 - INITIAL POSITION OF BACK FLIP ON FLOOR

Fig. 25 - MAIN POSITION DURING BACK FLIP ON FLOOR
Hand-spring on Floor

**Equipment:**

Mats.

**Purpose:**

To evaluate the technique of hand-spring on floor.

**Procedure:**

A gymnast was asked to perform hand-spring on floor with 3-4 running steps. Hand-spring on floor falls under balance over movements of swing exercises. Balance over movements are rotatory movements of 360° connected with locomotion of the mass of the body. In its supported part gymnast has a rotation around a temporary fixed axis. Strong push is the important aspect of the technique of hand-spring. The skill is presented in Fig. 26.

**Scoring:**

Evaluation of hand-spring on floor was done by a panel of three international qualified judges, who evaluated the skill out of ten points Fig. 27. The average of the points awarded by three judges was considered as the final score of the gymnast.
Fig 26  Hand Spring on Floor
Fig. 27 - INITIAL POSITION OF HAND-SPRING ON FLOOR
Leg Circling Over Low Bar from Hanging on High Bar
(Uneven Bars) from Right to Left Side

Equipment:

Uneven Bars, Matresses, and Magnesium Carbonate powder.

Purpose:

To evaluate abdominal, shoulder girdle and arms strength (specific strength required for performing exercises on uneven bars).

Procedure:

After proper warm-up, a gymnast was asked to hang on high bar facing low bar. She was then instructed to lift her legs over low bar to execute a circular movement from right to left side. She was instructed also to perform it with straight legs by bringing the toes near the upper bar. The execution of movement is presented in Fig. 28.

Scoring:

Maximum number of correctly executed circles of legs over low bar was taken as the final score of the gymnast. Fig. 29.
FIG. 28 RAISING LEGS OVER LOW BAR
FROM HANGING ON HIGH BAR
FROM RIGHT TO LEFT SIDE
Fig. 29 - LEG RAISING OVER LOW BAR FROM HANGING ON HIGH BAR FROM RIGHT TO LEFT SIDE
Leg Circles over Low Bar from Hanging on High Bar
(Uneven Bars) from Left to Right Side

Equipment:

Uneven Bars, Mattresses and Magnesium Carbonate Powder.

Purpose:

To measure abdominal, shoulder girdle and arms strength. The test measures the specific strength required for executing movements on Uneven Bars.

Procedure:

After proper warming-up, a subject was asked to assume hang position on high bar facing low bar. She was then instructed to lift her legs over the low bar to execute a circular movements from left to right side. The subject was also instructed to perform the circular movements of the body with straight legs by bringing the toes near the upper bar. The technique of the movement is presented in Fig. 30.

Scoring:

Maximum number of circles over the low bar performed by a subject continuously was her final score for the test. Fig. 31-32.
FIG. 30 Raising legs over low bar from hanging on high bar from left to right side
Fig. 31 - LEG RAISING OVER LOW BAR FROM HANGING ON HIGH BAR FROM LEFT TO RIGHT SIDE

Fig. 32 - LEG RAISING OVER LOW BAR, MIDDLE POSITION
Maximum Number of Kips on Uneven Bars

Equipment:

Uneven Bars, Matresses, Magnisium Carbonate Powder.

Purpose:

To measure the strength endurance of shoulder girdle, abdominal muscles and muscles of lower back. The test measures specific strength required to perform exercise on Uneven Bars.

Procedure:

After proper warming-up the subjects was asked to perform maximum number of kips continuously on low bar by keeping her legs straight. After completing the first kip, she was intructed to swing back (from support position) to assume hang position to perform to the next kip.

Scoring:

Maximum number of kips done continuously without any stoppage was considered as the score of the gymnast.
60 Metres Sprint

Equipment:

Stop-watches.

Purpose:

To measure the sprinting ability of the subjects.

Procedure:

60 Metres area was properly marked for conducting the test. After proper warm-up two subjects were asked to run together. Two time-keepers recorded the time.

Scoring:

The distance of 60 metres covered in seconds was taken as score of the gymnast. The time was recorded to 1/10th of a second. Fig. 33-34.
Fig. 33 - START OF 60 METRE SPRINT

Fig. 34 - FINISHING OF 60 METRE SPRINT
sit-ups (Jack Knife Action) from Lying Position

**Equipment:**

Matresses.

**Purpose:**

To measure the abdominal strength of the subjects.

**Procedure:**

After proper warm-up, a gymnast was asked to assume back lying position keeping her arms over the head. She was asked to flex the body so that her hands should touch her feet and after complete flexion again extend the body to assume an original starting position. This process constituted one sit-up in Jack Knife action. The subject was asked to perform maximum number of sit-ups (Jack Knife action) continuously without any interruption or stoppage. The subjects were also instructed not to hit the ground with feet during the continuous course of movements. The movement is performed as shown in Fig. 35.

**Scoring:**

Maximum number of sit-ups (Jack Knife action) performed by a subject continuously, without any interruption, was taken into consideration as the score of the subject. Fig. 36.
FIG. 35

SIT UPS (JACK KNIEF ACTION)
The data collected by administering tests were reanalyzed to form norms for all the test items. In order to construct norms on the selected variables for female gymnasts belonging to sub-junior, junior, and senior categories, percentile scales were computed.

Fig. 36 - SIT UPS (JACK KNIEF ACTION)
Statistical Technique for Analysis of Data

The data collected by administering tests were statistically treated to form norms for all the test items. In order to construct norms on the selected variables for female gymnasts—belonging to sub-junior, junior, and senior categories, percentile scale was computed. The scores were further classified into five categories i.e. very-good, good, average, poor and very-poor on the basis of the results in sub-junior, junior and senior sections.