Chapter - III

PROCEDURE

In this chapter the selection of subjects, selection of postural defects, spondylometer, instrument adopted for identifying postural Reliability, Test of Reliabilities, Procedure of Administration of texture defects and the statistical model adopted for analyzing data are described in this chapter.

SELECTION OF SUBJECTS

1400 Children studying in 2\textsuperscript{nd}, 3\textsuperscript{rd}, 4\textsuperscript{th}, and 5\textsuperscript{th} standard in 35 school controlled by the Baroda Municipal Corporation were selected as subjects for the investigation. Students were chosen from the various parts of the city so that the whole city was covered for an effective result; the age level of the student were 7 to 10 years. The scholar took the written permission to visit the schools from administrator of Baroda Municipal Corporation. Before conducting test the aim and objective of the investigation was explained to the principal, teachers and students of the school. With the help and co-operation of the teachers and the students of various schools, the research scholar gained optimal benefit for this study.
SELECTION OF POSTURAL DEFECTS

The investigator had discussion with his guide, and other experts in the field of corrective physical education and sports medicine and reviewed the available literature in the field. The scholar had also discussed with orthopedic doctor who is the head of the department in sir Sayajirao government hospital, Dr.Amit shah and also discussed with head of the department of physiotherapy in sir Sayajirao Government hospitals, Dr.Clento Seju. Based on these discussions and study of literature the following four postural defects generally prevalent among children were selected for the study:

➢ Lordosis
➢ Kyphosis
➢ Scoliosis
➢ Flat-foot

SPONDYLOMETER

The proper measuring of the spinal deformity is a most important factor in the initial assessment. Curves are named according to the region of the spine in which the apex of the curve is located. The cervical curve is a
curve of the apex between $C^1$ and $C^6$, a dorsal curve of the apex between $T^2$ and $T^{12}$ and a lumber curve is one with an apex between $L1$ and $L4$.

The most significant deviation from a normal spinal posture result from the loss of the secondary spinal curves; with the elimination of the first lumber and later, the cervical lordosis. The thoracic curves are exaggerated and the spine becomes progressively rounded. As lateral deviations are comparatively rare, the appropriate method of recording spinal posture is the spondylometer.

The spondylometer has a base of platform long vertical rod and horizontal and adjustable pegs. The subject stands on the base of the spondylometer in an upright "most erect posture," he can assume. The heels touch the base of the upright. Pegs spaced at 7.5 centimeters or 3 inches interval upright are adjusted to make light skin contact over the vertebral spines and locked in position. Measurement of the subject's overall height, cervical thoracic and lumbar region are taken. The distance of protrusion of the pegs from the upright is measured and this reading are noted to

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determine the angle of curves of the spines in order to find out any deviation in the posture. The spondylomter, therefore is useful and reliable instrument for measuring the angle of the spine.²

See fig.- 1

Spondylometer used for measuring Spinal Curves.
Instrument Reliability

In as much as the spondylometer – the instrument used for identification of postural defects could not be procured from Sir Sayajirao Government hospital Vadodara. Due to its non-availability, the researcher had a meeting with expert and Dr. Clento Seju, Head of Department; Physiotherapy; Sir Sayajirao Government Hospital Vadodara, and after having reviewed the available literature the decision was taken to get the spondylometer fabricated in a work-shop. For this purpose services of a trained carpenter were utilized who prepared the spondylometer as per the specifications provided to him. After getting the instrument fabricated, the same was shown to Dr. Clento Seju and only after getting his approval the instrument fabricated, the instrument was used for collection of the data. All parts of the spondyтомeter i.e. the Vertical bar, the horizontal adjustable pegs, the Plat-form and the holes on the vertical bar were measured in the presence of the expert so as to ensure the reliability of the instrument for collection of data. The measurements of different parts of the Spondylometer were as follows.

Length of the Vertical bar – 1.80 mts.

Length of the Peg – 30 cms.

Distance between the holes – 7.5

After having seen the instrument the expert certified that the instrument will ensure collection of reliable data.

**Test Of Reliability**

The research scholar took a number of measurements sessions under the guidance of Dr. Clinto Seju, Head of Departement, Physiotherapy; Sir Sayajirao Government Hospital Vadodara to ensure accuracy and measurements. Finally, to ensure tester’s reliability in taking measurements, ten subjects were tested by the research scholar in the presence of the expert. The expert was fully satisfied with the type in which postural defects were identified and measurements recorded.

**Procedure of Administration of Test**

The research Scholar carried spondymeter and pedograph along with him to the various schools where he conducted surveys to collect the
required data. After briefing the subjects regarding good and bad posture deformities and their effect on health, personality and efficiency, the work started with the measurement of height with the help of measuring tape which was fixed on the back side of the spondylometer. Thereafter weight was taken with the weighing machine. Curve for cervical, thoracic and lumber regions were measured with the help of marked pegs fixed in the center of the Spondylometer. After completing the measurements in various schools, the subjects were decided into different height groups in the range of 5 cms. difference. The normal posture was taken out for all height groups, with normal curvature in the cervical, thoracic and lumber regions. On that basis the subjects were divided into normal and abnormal groups of posture and the subjects with abnormal posture were taken up for study.

**Lordosis**

**Equipment :-** Spondylometer

**Procedure :-**

The curve was taken as a criterion for thoracic region for Lordosis. After briefing every student for the use of Spondylometer, marked pegs were fixed in the holes made at distance of 3 inches on the spondylometer. The subject was made to stand with only shorts or pent on
and bare footed on the spondyloimeter, on the marked base with feet apart, the back touching the pegs and hands down in relaxing position and keeping the neck straight. The subject was asked to stand with his body in erect position as if standing against a wall. The curves in the lumber region were measured on marked pegs and were noted down for Lordosis.

**Scoring:**

Scoring was done on norms worked out for different height groups with the gap of 5 cms. Minimum 100-105 cms. And maximum 156-160 cms. See fig. 2.
Scholar measuring lordosis by using spondylometer.
Kyphosis

Equipment :-  Spondylometer

Procedure :-

The curve was taken as criterion for thoracic region for kyphosis. After briefing each subject for the use of spondylometer, marked pegs were fixed in the holes made at distance of 3 inches on the spondylometer. The subject was made to stand with only shorts on and bare footed on the spondylometer, on the marked base with feet apart, the back touching the pegs and hands down in relaxing position and keeping the neck straight. The subject was thereafter asked to stand with his body in erect position as if standing against a wall. The curves in the upper thoracic, middle thoracic and lower thoracic measured on marked pegs were noted down for kyphosis.

Scoring:

Scoring was done on norms worked out for different height groups with the gap of 5 cms. Minimum 100-105 cms. And maximum 156-160 cms. See Fig. 3.
Scholar measuring kyphosis by using spondylolomter.

Fig:3

Norms were framed out for different heights with the gap of 5 cm in 30, 60, 90, 120, 150, and 180 and so on. Scoring was done in each case in the light of norms worked out for various groups minimum 100-105 and max 156-160 cm.
Scoliosis

Equipment: Spondylometer

Procedure:

The curve was taken as a criterion for cervical region for detection of scoliosis. Before starting the test subjects were given detailed instructions about the use of spondylokmeter. Seventh cervical was marked with ink so that it should not touch the peg. The marked pegs were fixed in the holes which were made at distance of 3 inches. The subjects wore only shorts or Pent for the measurement of their spinal curve. The subject was asked to stand bare footed by keeping his heels on the marked base with feet apart, hands down in relaxed position, neck straight and touching the peg fitted on the spondylometer. The subject was asked to take his head back and stand erect as if against a wall. The subject was made to stand atleast for 5 minutes in order to notice his habitual standing. The curve in the middle of cervical region was noted down for scoliosis.

Scoring:

Norms were framed out for different heights with the gap of 5 cms. i.e. 1-5, 6-10 and so on. Scoring was done in each case in the light of norms worked out for various groups minimum 100-105 and max. 156-160 cms. See figure 4.
Fig: 4

Scholar measuring Scoliosis by using spondylometer.
Flat Foot

Equipment :- 1) Pedograph

2) Blank Papers

3) Ink Bottle

4) Brush

Procedure :-

The foot print was taken as the criterion for the detection of flat foot. Before taking the foot print, the subject was given the detailed instructions regarding the use of pedograph. Foot prints were taken on the pedograph which was an ordinary stamp pad. Finger prints ink was evenly spread on the pad sheets with a brush. The subject was asked to stand bare-footed on the pedograph and made to press his feet for proper inking and thereafter to stand on the paper sheets placed before him on a hard card board and asked to press his feet carefully in order to have the proper foot impression on the paper. Through this method height of the longitudinal arch was obtained for detection of flat-foot. In this manner the foot prints of all the students, under study, were obtained. See figure 5
Fig:5

Scholar measuring flat-foot by using ink pad and paper sheet.
**Statistical Procedure used in the Study**

Means and standard deviations in respect of each of the postural defects i.e. Lordosis, Kyphosis and Scoliosis were computed in order to identify the normal children and those suffering from above defects. In order to determine the number of subjects suffering from postural defects, in relation to the population, a percentage analysis is done.

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