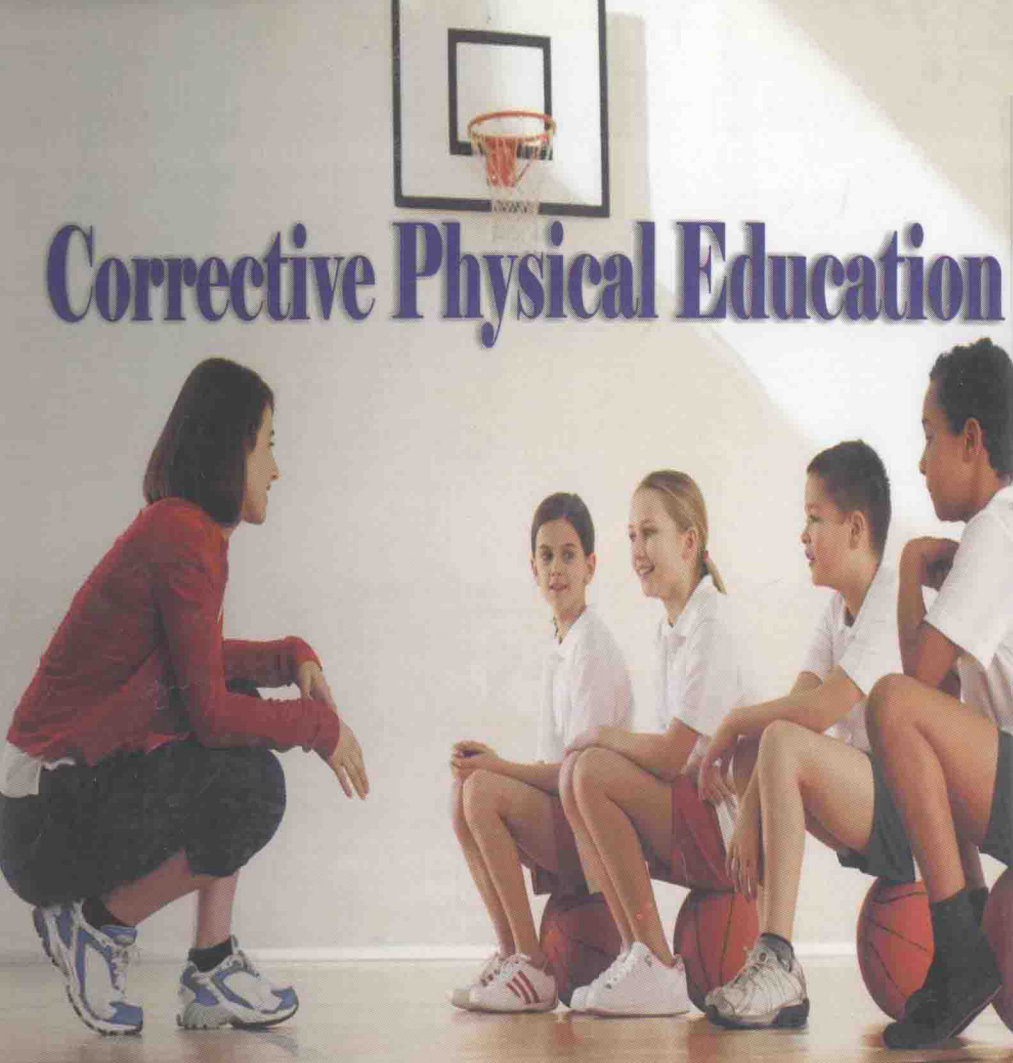
Corrective Physical Education



Dr. Sanjeev Sinha

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Edited & Compiled By
Dr. Sanjeev Sinha

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Ph.: (O) 011-65190343, 43551324, 42564726
(M) 9811088729, (Fax) 42564726, (Res.) 47091605

E-mail: *khelsahitya1@rediffmail.com*

Web: *www.khelsahitya.trade-india.com*

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Corrective Physical Education

Preface

This book is presented as a theoretical and practical guide for teachers in the field, and students in training for physical education. We have made an effort to meet the need that has long been felt for a finer grading of students, for adapted group exercises, for an all round program of varied activities suited to the capacities of the groups involved. We offer suggestions for organisation and methods, in order that the program of physical education may have corrective values for all. In outlining this text it has been impossible to confine the discussion solely to the small majority of boys and girls who may be assigned to corrective classes. In view of the physical needs of all boys and girls, in any comprehensive treatment of the corrective problem, a suitable program of activities must be definitely planned and consistently carried out for all students. We have suggested activities for regular groups in brief outline only, but have resented, in detail, methods and a comprehensive program for the groups designated other than regular, as the restricted and corrective groups. The practical value of the material set forth has long been proven in many schools.

Physical education is now a requirement in a majority of courses. Examinations by physicians in Colleges, High Schools and Junior High Schools and PE Colleges have shown that growth faults are the rule rather than the exception. It immediately becomes apparent then, that the same type of physical education program cannot be applied to all students with effective results. Consequently there arises the need for an adapted group program to fit the physical capacities of all students. The question most often asked by physical education teachers is, "What shall I do with corrective classes?"

Our purpose in this work has not been to supply a text for orthopedic technicians in their work with individual patients. The major object has been to call attention to certain schedules of safe exercises, together with as to administration and organisation of corrective class work and to give a reasonable amount of theory to show our reasons for the same.

Author

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THE CORRECTIVE PROBLEM

Statement of the Need

Physical therapists are devoted to fixing problems after injuries happen, some due to posture problems. Orthopaedic surgeons physically repair any musculoskeletal overuse or traumatic injuries, some which are due to posture problems. When someone mentions posture you probably immediately think of static posture. Static posture is the alignment of your body while you are still.

More importantly static posture refers to the length-tension relationships of your muscles and the corresponding alignment of your joints. You may first notice posture problems when someone or yourself observes your static posture.

The length-tension relationships between working and opposing muscles are especially important to dynamic posture. Dynamic posture is the alignment of your body during movement. Poor dynamic posture can influence static posture and vice versa. Since many exercises are repetitive movements, it is important to keep your dynamic posture in mind.

If you have imbalanced length-tension relationships and improper dynamic posture during movement, the constant tug of war between muscles can prematurely age your joints and possibly lead to muscle, joint, tendon and ligament injuries. These groups of muscle imbalances are called postural distortion patterns.

There are many problems associated with poor posture which have negative long term effects on your body and health. These problems with your posture will not only impact how you feel but how

your body looks. If you continue to exercise with poor posture you will recruit the wrong muscles and build your body disproportionately.

The cumulative injury cycle illustrates how muscle imbalances originate. There is a trauma, which can result from repetitive motion with poor dynamic posture, or poor static posture. The trauma causes inflammation which causes your muscles to spasm and develop knots or adhesions.

The adhesions decrease the functionality of your muscles which your brain cannot control properly. The inability of your nervous system to maintain proper postural alignment causes muscle imbalances. If you do not correct your muscular imbalances the cycle will repeat over and over again and get progressively worse.

A chiropractor may tell you that your spine is out of alignment and that causes posture problems. A podiatrist (foot doctor) may tell you your whole body is out ob alignment because of a bad fitting pair of shoes or flat feet.

A psychologist may even tell you that your bad posture is due to depression. The point is, there are many different ways to look at posture problems and there may be many ways to solve them. You don't have to be a personal trainer, doctor or specialist who deals with the human body to see that muscle imbalance is a likely cause of posture problems.

If you have muscles which are chronically tight, corrective flexibility takes a direct approach. Muscles which are tight due to chronic posture such as sitting all day at a desk take time to correct. Just like weight loss, what happens over weeks, months and even years, is not easily reversible.

Once you know your correctable, structural posture problems you can follow a corrective flexibility program. Each corrective flexibility exercise should be specific to your situation. Since this takes time, you should perform these corrective flexibility exercises daily if possible.

To all those physicians whose activities lead them to deal with the physical problems of the school child, it must be definitely evident that their findings show a very high percentage of deviations from the

so-called normal. The percentages of these various findings vary, of course, in accordance with the powers of discrimination of the examiner. But, even the findings on gross examinations show a percentage of foot and leg deviations, as well as those of shoulder girdle and back, which is so great that the problem of their correction becomes one of considerable magnitude.

There is a continuous flow through the orthopaedic surgeon's office of adults who present themselves for treatment, between the ages of thirty and fifty. They come complaining of various types of backaches, foot and leg symptoms, sciatica and other forms of neuritis, *etc.* In the majority of them, faults in bodily alignment are found to be definite causative factors. It is altogether too common a practice among the disinterested or untrained, to make the statement that the child will "outgrow" such deviations. We all know that under certain circumstances quite a high percentage of cases of postural deviations, such as mild back knees and bowlegs, round shoulders, *etc.*, do, ultimately, become corrected through the normal avenues of activity of the child. In the examination of large groups of adults, however, we find a continuation of these conditions in a high percentage of cases. If men with good orthopaedic training and with good powers of discrimination are unable to say which child will outgrow these divergeneies, it certainly is quite evident, from a prophylactic and preventive standpoint that it is essential not to trust to luck that the growing child will overcome his difficulties without assistance.

A careful perusal of the results of the examinations made of drafted men during the last war shows that even among the young men of the country of college age, a very high percentage of whom had at least high school training, there were many who had some physical deviation. Even among those who had several years of regular physical education, there was such a very high degree of physical unfitness, that the percentage unfit for service was extraordinarily high. Consideration of this fact gives us much food for thought. It has awakened so much interest that since the war every one who has had to deal with the physical education problem has learned to realize that the corrective aspect of the-work is assuming a position of greater importance than it has heretofore. It is likewise a self-evident fact, to

all those connected with the work of the high schools, that a very large percentage of students of high school age are scarcely physically able to stand the stress of life during that period. It is also obvious to those of us who examine a great many adults that an enormously high percentage of them are physiologically inadequate to meet the demands of social and business life.

COLLEGES AND UNIVERSITIES

Observations: Being upright is and was the most natural body position. This was the norm during almost the entire history of humanity. Standing also was the norm in factories, plants, shops and offices up to the beginning of the 20th century.

Most modern people prefer to sit. Moreover, we can easily see in offices, colleges, schools and libraries that over 95% of people slouch while sitting and often when standing. The gait of modern people also shows signs of stress and muscular tension. Tense muscles distort our natural grace and elegance. These negative tendencies are stronger in sick people. Severely sick people have even more muscular tension. They like to lie down during the day as well as at night. Chronic fatigue is a common complaint. Severely ill patients often lie for days and nights, since even sitting requires their muscular and mental efforts. Why do we have all these negative effects?

Physiological causes: The state of our muscles depends mostly on circulation (blood flow) and their oxygenation and relaxation. Medical evidence shows that all these parameters are usually linked together through our unconscious breathing pattern. Let us consider how.

The first respiratory physiologists were called "cardio-respiratory physiologists" since the link between the cardiovascular and respiratory systems, as they found it, was very intimate. Yale University Professor Yandell Henderson, the author of first physiological textbooks, was one of the most prominent scientists in this area. His article "Carbon dioxide" was published in 1940 in Cyclopedia of Medicine. In the section with the title "Relations of Carbon Dioxide and Oxygen in the Body" he wrote, "Moreover, under clinical conditions low oxygen and low carbon dioxide-anoxemia and

acapnia-generally occur together. Each of these abnormal states tends to induce and intensify the other."

What does he mean? He claimed that low level of oxygen in the living body usually happens when cellular CO_2 is low. Reduced CO_2 values are possible only in conditions of over-breathing when we remove too much CO_2 from body cells by breathing too heavy. Hence, the heavier we breathe, the less oxygen our bodies have.

Body oxygen content can be evaluated using the stress-free breath holding time test done after usual exhalation. Exhale normally, pinch the nose, and count the time, but only until the fist signs of stress. As soon as this stress starts to grow, release the nose. After the correct test you should be able to resume your usual breathing pattern. A century ago ordinary people had about 40–60 s of oxygen in the body. Breathing of modern people is about 30–50% bigger than it was about a century ago. We are mild hyperventilators.

Numerous medical publications revealed that sick people with diabetes, asthma, heart disease and many other chronic conditions breathe even more (about 2–3 times heavier than the medical norm) without noticing it, but have reduced body oxygenation stores (usually about 10–20 s of oxygen).

In the severely sick these effects are even more pronounced. Breathing is very heavy (audible and visible), but oxygenation is critically low (less than 10 s of oxygen). The sicker we get, the bigger we breathe (even at rest), and the less oxygen our cells have.

What about relaxation of muscles? In 1953 Dr. Brown in his article "Physiological effects of hyperventilation" analysed almost 300 professional studies and stated, "Studies designed to determine the effects produced by hyperventilation on nerve and muscle have been consistent in their finding on increased irritability". This large study was published in Physiological Reviews. Hence, the more we breathe, the tenser our muscles are. This is another CO_2-related effect.

By the way, usefulness of deep or big breathing is the greatest myth or superstition of modern times. There is no a single medical study that shower or proved that deep breathing is beneficial for health. Meanwhile, thousands of publications revealed negative effects of

over-breathing on body oxygenation, perfusion of all vital organs, and state of nerve cells and the immune system.

People in the past had very light and easy breathing pattern (about 4–6 l/min for ventilation). Their bodies had large oxygen stores (about 40–60 s), muscles were relaxed, and they had good postures even without paying attention to it. It is natural for humans to have straight spine 24/7, when breathing is light.

Modern people breathe heavier (about 7–9 l/min). They have less oxygen in the body (about 25–30 s) and some muscular tension manifested in chronic slouching and desire to sit. Sick people sit or lie for the most of the day. They breathe even bigger (10–20 l/min), but body oxygenation is reduced (10–20 s) and muscles are tense. Severely sick people breathe very heavy (over 25 l/min), but body oxygenation is critically low (less than 10 s). Muscular tension is so high that they can spend over 12 hours in bed.

There are many factors that make our breathing heavier: stress, breathing through the mouth, sleeping on one's back, lack of physical activity, overeating, pollution, nutritional deficiencies, and many others.

Restoration of body oxygenation is the goal of the Buteyko medical breathing therapy. Russian MDs who practice this therapy noticed that people naturally improve their posture when they improve their body oxygenation. Breathing becomes lighter, muscular tension disappears. Many western breathing practitioners teach elements of the Buteyko method and educate people about the role of breathing in our health.

Results of Survey, Dr. Brown

Estimates made by various orthopaedic surgeons, based upon their experience with posture cases, are well justified and confirmed by the findings in colleges, high schools and elementary schools. That the need is most urgent in colleges and universities for a more specific physical education is shown by the results of a survey made by Dr. L. T. Brown, of Harvard University. It can be taken for granted, surely, that the young men who enter Harvard have had opportunities in training and equipment in the best High and Preparatory Schools in

the country. Dr. Brown found in 1916 in his examination of entering freshmen that 80% had "poor" or "very poor" mechanical use of the body. In 1919 the results were 84.1% "poor" and "very poor."

Dr. Brown grades posture as follows (taken from Body Mechanics Pamphlet, issued by the Department of Hygiene and Physical Education, Harvard University, Cambridge, Mass.):

A — Excellent Mechanical Use of the Body.

B — Good Mechanical Use of the Body.

C — Poor Mechanical Use of the Body.

D — Very Poor Mechanical Use of the Body.

He gives as a result of a four–year survey the following:

Class of	A	B	C	D	Number examined
1923	99%	14.81%	49.31%	34.89%	513
1924	2.36%	17.19%	51.41%	29.04%	599
1925	2.73%	22.51%	47.73%	27.03%	773
1926	2.64%	20.84%	49.87%	26.65%	758

Dr. Browai's survey indicates a high percentage—from 80% to 85%—in the C and D groups. Is this not an appalling fact, especially when one considers that the young men entering Harvard University represent a selected group of individuals?

Results of Survey, Professor, University of Illinois

George T. Stafford, Professor of orthopaedics and Physical Diagnosis, University of Illinois, in "Corrective and Remedial gymnastics" gives some illuminating results of a thorough and comprehensive survey of entering freshmen class of 1927:

"The University of Illinois has made an effort since 1922 to give special exercises to those who, from their physical examinations, show faulty body mechanics. The result of the examination of the freshmen, class of 1927, reveals the following facts:

Total number of men examined	1, 940	Anterior	arches	third	degree
Number having normal spine	171	(Left)	.....		241
Number having kyphosis (med.)(right)	772	Anterior	arches	normal	1.035

Number having kyphosis (si.) (left)	401	Anterior	arches normal	1, 038
Number having kyphosis (sev.)	541			
Number having scoliosis (med.)	496		**General Development**	
Number having scoliosis (si.)	555		Excellent	28
Number having scoliosis (sev.)	342		Good	719
Number having lordosis (med.)	661		Fair	958
Number having lordosis (si.)	508		Poor	235
Number having lordosis (sev.)	347			
Long arches first degree (right)	534		**Nutrition**	
Long arches first degree (left)	519		Thin	553
Long arches second degree (right)	191		Average	1, 228
Long arches second degree (left)	202		Other	49
Long arches third degree (right)	334			
Long arches third degree (left)	360			
Long arches normal (right)	865		**Birth**	
Long arches normal (left)	838		Stocky	135
Anterior arches first degree (right)	359		Medium	1,477
Anterior arches first degree (left)	349		Slender	328
Anterior arches second degree (right)	281		**Defective Hearts**	
Anterior arches second degree (left)	291		Defective	75
Anterior arches third degree (right)	240		**Constipation**	
			Constipation	62

Prof. Stafford says: "The percentage of orthopaedic defects for the class of 1927 is much larger than that for the class of 1926. Only 43.4% of the men of 1927 had normal feet, while 71.25% of the men of the 1926 class were graded as having normal feet. This marked difference does not mean that any unusual degree of deterioration has occurred in the 1927 group. The difference in figures is due to the examination of the 1927 men being made on a basis of functional or potential defects. The 1926 examination was based on clinical findings.

"The functional basis is used to detect defects of a potential nature, thus allowing for correction before any material damage has occurred. It has been found from experience that the more definite the clinical symptoms the more difficult is the correction. It is common knowledge that the more marked the clinical symptoms of

tuberculosis, or cancer, the less hope there is for the patient's recovery. Thus in pronation of the feet, though the feet are not flat, a potential weakness is present. Continued use of the feet in this position causes undue strain and poor mechanical use of the feet, thus predisposing the feet to weakness and possible disability."

Both Professor Stafford's and Dr. Brown's findings in connection with the examination of their entering students indicate very definitely the need of a finer grading, classification and a more carefully organized system of physical education for the pre–elementary, elementary and high school boy and girl.

HIGH SCHOOL, JUNIOR HIGH SCHOOL AND ELEMENTARY SCHOOL

Corrective Physical Education— Los Angeles City Schools

The needs of boys and girls of high school and elementary age are well stated and summarized by Dr. Sven Lokrantz, Director Health and Corrective Physical Education Department, Los Angeles City Schools, in the Annual Report of the Department of Health and Corrective Physical Education 1925–1926: The Corrective Physical Education Section of the Department of Health and Corrective Physical Education, Los Angeles City Schools, was established in 1918. After eight years of growth it is now able, with all its workers, to reach and help approximately 45,000 children. All of the senior and junior high schools have corrective rooms with teachers in charge. Since January, 1924, there have been nine corrective physical education centers in operation to take care of the elementary school children. Prom various schools, children are sent with bad posture, flat feet, heart affections, nutritional disturbances and paralysis.

Once a month an orthopaedic specialist examines the most extreme cases of indigent paralytic children. The medical supervision of the examination is taken care of by a specially qualified physician. Most excellent work has been done during the past four years. Procedures for corrections are: free floor corrective group gymnastics,

individual corrective gymnastics, orthopaedic gymnastics, non-surgical orthopaedics, rest, diet, sun baths, strapping: and home exercises.

There are about 30,000 children with different abnormal postural conditions, such as round shoulders, spinal curvatures and narrow chests. These children, if not helped, will fail to develop into strong men and women. Hygiene, rest, corrective exercises, jackets and general corrective procedures will give astounding results in a short time. There are nine thousand children with heart defects who have been aided by the Department of Health and Corrective Physical Education. Children with heart defects are excused from regular physical training and assigned to corrective physical training classes. By giving such children an opportunity to rest and by giving them graded exercises to enlarge their chest capacity, we give them longer lives. In most of the elementary schools, we find a great number of heart cases which demand investigation, examination and reexamination, and the problem of handling these cases is a very important one. The functional heart conditions and minor lesions are handled in groups of from ten to twenty-five and special heart exercises are given. Other more serious lesions, like aortic regurgitation, mitral stenosis, and double lesions, come under the care of private physicians. The corrective work among the kindergarten children is a problem in itself.

The Junior and Senior High School Corrective Classes have been a potent factor in the schools during the past year. As we sit in retrospection, it is well to be able to say that certain aims have been actually accomplished. In addition to the splendid work in the senior and junior high schools and elementary corrective centers, the work of the traveling corrective teacher has eliminated the transportation-problem. It has been possible to take care of more children with less expense and equipment. Also the traveling teacher has a more personal contact with the principals.

Nutrition Section

The value of nutrition classes is being realized as time advances and work has an opportunity to prove itself. Reports on improvement in school work, physical appearance, concentration, cooperation,

disposition, aside from decided improvement in general health, have been received from the principals in schools where classes were conducted. Milk, instruction in correct foods, health habits, the value of rest, and a twenty or thirty-minute rest period form the principal features of these classes. Cots are provided by the Board of Education for these classes and provisions are made for rest in the open air. Children with physical defects are referred to specialists for correction. There are conferences with parents and home studies are carefully planned. Special health rooms are being opened in several schools this year. These rooms will more completely carry out the health program necessary for children well enough to attend school, but unable to carry the regular school schedule.

Kindergarten Corrective Centers

The Kindergarten Corrective work is well worth Mobile. It has not taken long to see that very small children can follow the directions and do the exercises as well as the older children— if they are presented in a simple and play-like way. In fact a class of eight kindergarten children can easily be handled in corrective work, if the children are all mentally sound, but the most nervous type should be taken individually or in small groups of two or three. There is a great need for this work in Los Angeles. A few hundred children could be reached each year, if the work was carried on in the most suitable places. It is felt that kindergarten teachers can do more by constantly stressing good sitting and standing postures, by commenting on the best type of shoes and by discouraging scooters and riding on one skate.

Table: Report of Corrective Physical Education Centers for Year 1925–1926

Kindergarten Corrective Work

Center	Attending						
	New	Holdovers	Dropped	Moved	Transferred	Corrected	Total Receiving Attention
Total (All Schools)	250	36	80	4	2	27	399