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The Frequency of Head Injuries in Relation to Games and Sports

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THE prevention and control of serious aftermaths from injuries to the head are problems, not only for the medical man, but also, upon occasion, for the athletic director and the coach. Because the coach occasionally encounters situations in which a player is either stunned, dazed, or "knocked out," he must know how best to meet the emergency. While no coach can ever serve as a physician, he can, however, apply generally accepted rules of first aid until a physician arrives or until the player can be taken to a doctor.

The purpose of this report on the frequency of head traumas is to present the results of a survey based upon a sampling of 4,822 naval inductees. These men were Caucasian in race and ranged in age from seventeen to fifty years. Each man was examined in consecutive sequence by medical specialists in order to determine, among other items of health, the presence or absence of head injuries. If a man had earlier sustained one or more head traumas, he was further examined to ascertain the nature and degree of possible post-traumatic conditions. These examinations were one feature of the neuropsychiatric and psychologic interviews afforded each inductee prior to his admission to basic training units in the navy. In this way those men earlier subjected to trauma could be identified and their aptitude for military service determined. It should be emphasized at this point that head injuries may precipitate psychoneurotic symptoms latent in the personality. They may also result in the development of organic states, partially disabling a man for military training or for participation in strenuous athletic programs. They, indeed, may occasionally result in the appearance of traumatic epilepsy and insanity.[1] While no one of these unfortunate conditions necessarily results from head injuries, each is a distinct potentiality. Thus, it is wise for the coach to assume each injury to be serious until it is proved otherwise by competent medical examination. By so doing early treatment will be assured. This is vital, because it is universally recognized that the earlier the application of appropriate treatment, the less the likelihood for the development of serious and incapacitating aftermaths. Post-traumatic sequelae, accordingly, can be reduced in frequency and severity by the intelligent action taken by those present at the accident. The role of the coach is thus unmistakable at the time of an injury to the head of a player.

To illustrate and amplify the points mentioned above, the results of the present survey have been selectively analyzed and arranged specifically for those engaged in directing and conducting civilian and military athletic programs. These findings follow.

1. *Gross frequency of head injuries sustained by a sampling of 4,822 men.* Slightly more than 13 per cent of this group was found to have sustained one or more head injuries. This percentage is a minimal estimate for reasons already set forth in an earlier report.[4] Thus, 634 men provided reliable evidence of having sustained head traumas prior to the dates of their examinations at one or the other of the two naval training stations studied. Of this number, however, only 566 sets of data were sufficiently complete for incorporation in the present report. These were given by 548 men and accordingly show that several inductees had suffered two or more head injuries.

2. *The frequency with which 548 men, reporting a history of head injury, failed to obtain treatment.* Data from 566 cases of head trauma were so arranged that the number of untreated injuries could be shown. Table I incorporates these findings. Attention is called to the fact that each of these injuries has been rated for severity (Table I). A brief description of each class follows. First, *mild injuries*, by definition, are those in which coma (disturbance in consciousness) lasted no longer than ten minutes. These men at the time of naval examination rarely revealed any marked neurological

TABLE I
Percentages of Untreated Injuries for Each Class of Head Traumas

Class	N	No Hospital	No Doctor	No Bed Rest
Mild	387	81.9	58.4	68.7
Moderate ...	69	72.5	37.7	44.9
Severe	110	43.6	14.5	10.9
Total	566	73.3	47.4	54.6

defects or positive X-ray findings. Second, *moderate traumas* are arbitrarily defined as those in which the comas lasted from ten to sixty minutes. In these cases the men exhibited, as compared to those of the mild category, a larger number of positive neurological and psychiatric symptoms. Third, *severe head injuries* are defined as those in which disturbances in consciousness were present from sixty minutes to days or even weeks. Among this group of cases an increase in the frequency of neurologic and psychiatric defects, compared to those of the second class, were apparent. It is of interest to note that the percentages of injuries accompanied by organic or functional (or both) symptoms increased from 4 (mild) to 18.8 (moderate) to 29 (severe) for the 634 cases studied.[4]

The forementioned series of definitions are based for the most part upon those formulated earlier (1940) by Gross and Ehrlich.[2] These definitions, however, have been presently applied to the classification of "old" injuries. Gross and Ehrlich, on the other hand, applied them in the classification of injuries recently sustained. In this connection it is wise to realize that no agreement exists on the basis for adjudging the severity of a head trauma. Many accept the duration of the coma as a gross index. Others[1] hold that the nature and duration of impairment in memory and other intellectual functions are more suitable indices. This latter criterion, however, has been of limited value in this survey by virtue of the time that elapsed between the dates of injury and the date of present naval examination.

3. *The frequency and adjudged severity of head injuries in relation to games and competitive sports.* Data on these points were available for 566 cases of head injuries. These ranged in severity from mild to severe. Of this group, 224 injuries were sustained in play activities broadly defined. This is approximately 40 per cent of the 566 cases used in this tabulation. Because this percentage superficially may appear unduly high, it is wise to recall that instances of simple stuns were classified as mild traumas. This procedure, of course, raised the gross number of head injuries recorded, but their inclusion can be justified on the grounds that cases of stuns occasionally may be more serious than some ordinarily assume.[3] Had simple stuns been excluded from consideration, the percentage of head injuries caused by games and sports would more nearly approximate 25 per cent. Table II incorporates the frequency of traumas for each of three severity-classes per sporting activity. In this table childhood games, as well as competiitve and non-competitive sports, have been listed. It is obvious from this tabular arrangement that sports of many kinds occasionally and accidently cause head traumas. It does not follow, however, that these data negate the values that accrue from active participation in games and sports. Table II, rather, must be interpreted as proof of the need for the early treatment of head injuries, whenever and wherever they occur.

TABLE II
A List of Competitive and Non-competitive Games Accompanied by the Frequency and Rated Severity of Resulting Head Injuries

Sport	Mild	Moderate	Severe	Total	Percentage
Football	72	7	4	83	37.05
Boxing	33	3	1	37	16.51
Baseball Hit	24	0	1	25	11.16
Struck by Ball Bat.............	15	1	5	21	9.37
Cycling Accidents	9	1	2	12	5.35
Swings (Falls From; Blows By)..	7	2	2	11	4.09
Skating (Ice, Roller)...........	7	2	0	9	4.02
Equitation	4	2	2	8	3.50
Wrestling	4	0	0	4	1.80
Sled Accidents	4	0	0	4	1.80
Basketball	3	0	0	3	1.33
Horseshoes	2	0	0	2	.90
Swimming	1	1	0	2	.90
Golf	2	0	0	2	.90
Mountain Climbing	0	1	0	1	.45
Total	187	20	17	224	100

TABLE III
Number and Percentage of Untreated Injuries for Each Class of Head Traumas

Class	N	No. Hospit.	%	No Doctor	%	No Bed Rest	%
Mild	187	176	94.1	137	73.3	147	78.5
Moderate	20	16	80.0	6	30.0	8	40.0
Severe	17	10	60.0	4	23.5	2	11.7
Total	224	202	90.2	147	65.6	157	70.0

4. *The frequency with which those who sustain head injuries via sports fail to obtain treatment.* It was early learned that each man can easily recall whether he had (1) been hospitalized, (2) had a doctor, (3) received bed rest. The examiners consequently queried each sailor to ascertain the frequency with which each of these three conditions of treatment were encountered in a sampling of the draft population. Table III summarizes the results of these interrogations. It clearly shows the relatively high frequency with which those sustaining head traumas during sporting events fail to obtain medical attention and supervision. Comparison with Table I reveals a tendency for those injured during athletic contests to seek treatment less frequently than those injured by other agents. This trend, of course, is limited by the fact that a relatively few cases of moderate and severe craniocerebral traumas from sports were reported by those examined. To the degree that the present sampling is atypical of the draft population, then to this degree is the present statistical trend a biased one.

Study of Tables I and III, however, is none the less profitable. First, they show that most moderate and severe injuries are sustained by agents other than those related to sports. This fact is clearly shown by reference to Table IV. Second, in terms of the present sampling, those injured in athletic contests are slightly less likely to seek treatment than are those injured, for example, in auto accidents and by falls in the home.[2,4] The athletic director and the coach can thus both play important roles in the reduction of the number of men failing to obtain appropriate medical attention and supervision after sustaining any form of head injury.

Summary

A sampling, consisting of 4,822 naval inductees, has been consecutively examined to determine the frequency with which head injuries are sustained in a

TABLE IV
The Frequency of Head Injuries Caused by Sports as Compared with the Total Number of Traumas Reported

Class	Total Number (Any cause)	Number caused by sports	Percentage (sports of total number)
Mild	387	187	48.32
Moderate ..	69	20	29.00
Severe	110	17	15.45
Total	566	224	39.57

draft population. The following statements summarize results that are particularly significant for the athletic director, coach, and playground supervisor.

1. Thirteen per cent, a minimal estimate, of the 4,822 men had sustained one or more head injuries prior to their induction into the armed services. Of the 634 men who had been injured in this manner only 566 sets of data, however, were sufficiently complete for use in the present analysis.

2. Very nearly 40 per cent of the 566 cases of craniocerebral trauma was in some manner the result of accidents encountered on the playground or in athletic activities broadly defined. This percentage may appear unduly high because many cases of so-called simple stuns have been classified as mild traumas. While their inclusion is readily justified on medical grounds, their exclusion would reduce the percentage of cases sustaining more marked disturbances in consciousness to about 25 per cent.

3. Survey of the types of sports accidently resulting in head traumas shows football, boxing, and baseball to lead in the order named. It is worthy of note that the majority of simple stuns was reported by those injured in football and boxing. See Table II.

4. Those injured in sporting events appear less likely to obtain medical attention and adequate post-traumatic supervision than do those injured by other agents. The roles of the coach and the playground director are accordingly clear. It is their duty to reduce the number of cases exhibiting post-traumatic sequelae by requiring, whenever possible, each injured contestant to obtain immediate medical attention and supervision. Each head injury may advisedly be considered severe until medical examination has proved otherwise (Table III).

5. Sports, broadly defined, are less prone to induce moderately severe and severe head traumas than are other accident-causing agents. Sports, however, produce nearly 50 per cent of the cases of mild craniocerebral trauma (Table IV).

6. The duration of the disturbance in consciousness (coma) is often used as a gross index of the severity of the injury.[2] Regardless of this, however, the coach can best protect himself and the injured player by making available immediate medical examination. Only in this way can post-traumatic sequelae, resulting from sports, be reduced in frequency and severity.

7. The fact that head injuries are induced upon occasion by play, games, and sports does not mean that athletic programs should be eliminated. The present data, rather, support the conclusion that early and appropriate treatment for those sustaining injuries is imperative.

References

[1] Denny-Brown, D.: The Sequelae of War Head Injuries, New Eng. J. Med., *227*: 771-780, 813-821, 1942.

[2] Gross, S. W. and Ehrlich, W.: Diagnosis and Treatment of Head Injuries, New York, Paul Hoeber, 1940.

[3] Munro, D.: Craniocerebral Injuries: Their Diagnosis and Treatment, New York, Oxford University Press, 1938.

[4] Pennington, L. A. and Mearin, R. J.: The Frequency of Craniocerebral Injuries in Relation to Military Screening Examinations, War Medicine, Chicago, in press.

Athletics and the Size of the Heart

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FOR many years we were under the impression that the heart was very delicate, and that to preserve life, it was necessary to take special precautions to protect such a delicate organ as the heart must be. With the development of various laboratory techniques, however, we have discovered that the heart is perhaps more persistent in carrying on its work than any other organ in the body. By considering man's activity and his living habits, we must conclude that the heart is able to take more abuse than anyone had ever suspected, and yet do its work well. If the heart were not a most sturdy organ, no doubt many of us would have died at an early age.

Athletics have been accused of doing widespread heart damage and we went so far as to describe what was termed "athlete's heart." In reality there is no more reason for describing "athlete's heart" than there is for describing "farmer's heart" or "coal miner's heart." In any case the changes which occur are due to the exercise, not to the occupation as such.

Strenuous exercise of any description causes certain changes in the heart. This paper is concerned chiefly with the changes in heart size which result from repeated bouts of strenuous exercise over long periods of time. The immediate effect of exercise on heart size will also be discussed. This subject is of interest to trainers because certain cases have been reported in which strenuous exercise was said to be the cause of a harmful enlargement of the heart. Other cases are on record where strenuous exercise proved beneficial to cardiac function.

The most outstanding characteristic of the heart is its ability to adjust its output to the needs of the skeletal muscles and other body structures, that is, the heart compensates for a want of oxygen or fuel by pumping more blood. In so doing, cardiac capacity is increased so that more and more work can be done during a course of training. It must not be forgotten that, in explaining the increased capacity due to physical training, the heart undergoes changes in the same sense as do the muscles attached to the skeleton.

Many experiments dealing with the effects of exercise on the size of the heart have been reported. These investigations have involved many types of animals. An array of techniques have been employed, but none of them are especially suitable for detecting small changes in heart size. The results obtained are conflicting so that, from the experimental point of view, one is scarcely justified in drawing conclusions one way or another. Most people, however, are convinced that frequently repeated bouts of strenuous exercise cause an enlargement of the heart. This conclusion has been reached partly by an examination of experimental data, and partly by the process of reasoning.

If we familiarize ourselves with the effects of strenuous exercise on muscle cells in general, a clearer idea is obtained why it is safe to conclude that a strenuously exercised heart undergoes hypertrophy. Let us examine the heart itself, as to the function of the various parts and the work which each part does. The auricles have little work to do. The right auricle serves as a reservoir for the returning venous blood while the left is a reservoir for the oxygenated blood returning from the lungs. The only pumping action the auricles perform is at the end of ventricular filling. At this time they prevent a back flow rather than pump blood into the ventricles. The auricles are thin-walled, and have little pumping power, because they do not need it.

Similarly let us examine the ventricles.

The function of the right ventricle is to pump blood through the lesser circulation, that is through the lungs. There is not much resistance offered in this circuit, consequently the right ventricle does not have to develop a very high blood pressure. The wall of the right ventricle is much thicker than that of the auricles but considerably thinner than that of the left ventricle which must send the blood to the head and extremities. An examination of the left ventricle shows a very heavy wall capable of doing much more work than that of the right ventricle. Obviously the arrangement must be thus since the left ventricle must overcome approximately four times as much peripheral resistance as the right. By a process of reasoning, therefore, we may conclude, that the strength and thickness of the walls of the auricles and ventricles of the heart have developed in accordance with the work which they must do.

In order to shed more light on the question of the chronic effect of exercise on the size of the heart, let us consider the effect of exercise on skeletal muscle. It is not difficult to demonstrate that, if a skeletal muscle is subjected to a systematic program of rather strenuous exercise, it undergoes hypertrophy. This increase in size is known to be due to an increase in the amount of protoplasm in the individual cells. There is also an increase in the amount and toughness of the connective tissue which binds the cells into a muscle mass. The result is a muscle which is able to withstand greater mechanical stress.

Conversely, when an hypertrophied muscle is freed from strenuous exercise, or if it is immobilized, there is a partial retrogression. This process, known as atrophy, is due to a loss of protoplasmic substance. The loss in protoplasm, however, is not paralleled by a proportionate loss of connective tissue, thus, leaving the individual more or less "muscle bound."

While there is general acceptance of the effect of exercise described for skeletal muscle, there are some who are unwilling to apply the principles to the effects of strenuous exercise on heart muscle. It seems logical, however, that the same principles should hold for both skeletal and heart muscle. Although the evidence, gathered experimentally, relative to the effects of strenuous exercise on the size of the heart is not conclusive, the results, together with what we know to be true for muscle in general, seem to us to warrant the conclusion that strenuous exercise causes an increase in heart size. In addition, one seems justified in going farther and concluding that, if an individual ceases exercise, or materially reduces it after participating in a strenuous program, the heart is reduced in size.

We do not regard a skeletal muscle that has undergone atrophy due to all reduction of use as an injury. By the same token, it seems unlikely that a heart which has undergone hypertrophy as a compensatory change to meet the demands made upon it suffers injury; there seems, also, to be no good reason for assuming that, if a heart atrophies because of less demand for work, it suffers damage.

The evidence points to the idea that the more or less permanent compensatory changes in size do not damage the heart. In fact, these changes indicate that the heart is meeting demands made on it in the proper fashion.

The structural changes, just discussed, in heart size are to be distinguished from the changes due to a gain or loss of tonus in the heart muscle. These changes in size which accompany exercise and which follow immediately after strenuous exercise are functional and transitory. They are difficult to understand as well as to demonstrate. There is no doubt that there are changes in heart size both during strenuous exercise and immediately after, but the difficulties already mentioned relative to the determination of heart size are magnified here since the body is either in motion or a steady position is difficult to hold.

Heart-size changes following exercise seem to depend on the strenuousness of the work, as far as the participant is concerned. If the exercise is moderate, there seems to be a slight decrease in heart size; if the exercise is exhaustive, that is, so strenuous that the point of near exhaustion is reached, the heart seems to dilate, that is, lose muscle tonus.

The decrease in heart size during exercise is apparently due to the fact that the volume of blood returning to the heart during exercise can not be adequately moved out by the accompanying increase in rate alone. As a result, there is a more complete emptying per stroke, that is, the heart contracts more, the result being a diminished heart size during contraction.

Where a decrease in heart size occurs following exercise, it seems to be explained by the fact that the amount of blood returned to the heart is less; and even though the rate is slower, the relaxation need not be so complete to accommodate the returning blood, the result being a decrease in size during the relaxation phase.

The immediate effects of exercise on the size of the heart are merely adjustments which are made to meet the demands of the work which is being done, and ordinarily need to be of no concern to the trainer. It is better, however, that work undertaken by anyone not be carried to the point of exhaustion which results in accute dilation of the heart.

Summarizing, we may say that strenuous exercise may give rise to hypertrophy and to transitory changes in heart size. It is fairly safe to assume, however, that these changes do not affect health or longevity adversely, provided the participants are healthy young adults. The trainer, after being assured that team members possess no heart ailments, need have no anxiety relative to heart-size changes which normally almost always occur as the result of strenuous exercise.

Posture

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IN DISCUSSING any athletic activity, we should always consider the physiology associated with the activity. The underlying factor of body function in exercise, is posture.

In order to understand posture, let us examine the function of the body. Logically, we shall attack the problem from its foundation, the feet.

Normally the foot has a tripodal balance, the three bases of weight bearing, being the heel, and the first and fifth metatarso-phalangeal joints. In order that the body weight may be properly borne, distributed and balanced, it is necessary that each of these bases serve its full purpose. To accomplish this, the feet in standing or in walking must be held parallel to each other. This position in walking, permits the weight to be carried forward from the strong heel base along the outer and stronger side of the foot to the fifth metatarsal head, to become equalized through the anterior metatarsal area to the head of the first metatarsal.

Feet trained to be held in this equilateral position are seldom, if ever, subject to undue stress or strain upon any of the muscle groups of the foot and leg, and normal activity of this musculature in all weight-bearing and ambulatory functions of the foot thus is accomplished. The mistaken idea that the normal standing position is one with the heels together and the toes pointed away from the median line of the body to an angle of about 45 degrees, has been the cause of much structural foot weakness, and a clearer understanding of foot mechanics has discarded the idea. In this incorrect position, the body weight, instead of falling principally on the outer border of the foot, as is normal, lies mainly on the astragalo-scaphoid joint with resultant strain upon that area, and the development of a weak foot or other symptoms.

In walking, the heel should strike the ground first. Civilized people who wear modern footgear are naturally "heel-and-toe" walkers—and thus the weight is carried forward along the outer segments of the tarsus and metatarsus to the base of the fifth digit, when it is transposed across the metatarsal heads to the great toe joint where the principal stress is absorbed as the foot propels the body weight forward and to the other foot at the completion of the step. If the feet are held in any other save a parallel position in walking, the weight tends to fall more directly upon the weaker inner segments of the tarsus and metatarsus, the heel does not serve its full function as the fulcrum by which the body weight is propelled forward, and the gripping function of the great toe in the forward push is accomplished with the weight coming upon it directly from the rear and above, instead of gradually from the outer side of the foot across the anterior metatarsal arch. The tibial muscles are over-strained, the scaphoid is forced to rotate inward and downward, the os calcis tilts inward from its normal vertical axis, and the whole skeletal arrangement of the foot is thus deranged and weakened.

It is necessary to advocate as an aid to general foot health, and subsequently good posture, certain exercises which tend to keep the feet and their musculature free from imbalance. All of the exercises suggested are to be done, preferably barefooted.

Exercise 1—Place one knee over the other so that the elevated foot hangs limply and free from contact with the other leg. Beginning slowly, stretch the calf muscles by bringing the dorsum of the elevated foot upward toward its own tibia; now circle the foot from the ankle, following an arc outward, downward, inward, upward to the place of beginning. This exercise should be done twenty or twenty-five times with each foot; it may be necessary to employ fewer repetitions to begin with, and gradually increase the circles until the desired number is reached.

Exercise 2—Sit forward on a low chair so that the legs are straight out in front, heels resting on the floor. From the ankles, turn the feet inward toward each other until the great toes touch. Now bend the toes under, flexing them forcibly three or four times. Release and relax. This exercise should be done from fifteen to twenty times, but the same precautions as in Exercise 1 should be taken in working up to this number.

Exercise 3—Standing by a chair or table to maintain balance, place one foot about eight inches in front of the other, and directly on a straight line with it, toes straight, body erect. Now bend the forward knee, and from the ankle, let the whole body drop forward into a "charge" position, all of its members except the flexed knee maintaining their same relative positions; both heels on the floor. This will stretch the posterior muscle groups of the hindmost leg, and is particularly essential for women who wear high-heeled shoes, to prevent painful spasms in the calf muscles which are already shortened to compensate the heel lift.

It is also advisable as a general hygienic measure to grasp each toe individually and gently move it in all directions, more particularly forcing it downward. All of these exercises help the general circulation, more particularly in the deeper vessels which supply the musculature, and thus aid in carrying off the waste products in the muscles which are largely the cause of fatigue.

Raising the whole body weight on the toes and walking around the room in that position may be excellent diversion for baseball players and popular movie stars who advocate such calisthenics in unscientific health articles, but this form of exercise is too strenuous for the average person, and simply tends to add too great a strain to already overburdened muscles.

Now that we have completed our discussion of the foot as it is related to posture, let us go to those factors which concern the rest of the body. The underlying thought in good posture is "the feeling of well-being." We should stand as tall as we possibly can, getting the added height by stretching the spine at its base, the coccyx; abdomen in, thighs thrust slightly forward, knees slightly bent. No effort should be made to throw the shoulders back or inflate the chest. The simple process of spine stretching will have a tendency to raise the diaphragm and place the lungs in such a position as to be able to give maximum efficiency. The head should be held erect, chin up and in, so that if one were to lean against a wall, he would feel that almost all the dorsal surfaces were touching the wall.

In an issue of the *Saturday Evening Post*, Bill Miller, a Tulsa, Oklahoma, basketball coach, gives a simple formula for postural co-ordination and maximum muscular efficiency and reaction. The following is his formula for obtaining best results.

"Commence by standing with your feet comfortably apart. (Miller has discovered that the distance between the feet for proper stance is identical to the distance from your elbow to your finger tips.) Bend the knees slightly, with your weight on the balls of the feet. Now execute the following movements:

"1—Holding your arms parallel to the ground, shake your wrists lightly at first, then with increasing vigor. To make sure the wrists are loose, grasp each wrist with the opposite hand and wave good-by energetically.

"2—Sag a little more at the knees with your arms dangling between in ape fashion. Flop your shoulders, trying to touch them to your ears on the upward movement. Let the shoulders droop to the original position.

"3—Unlock the hips and knees by letting the hands hang loosely between the knees. Work downward slowly, in sections, until the backs of the hands are flat on the floor. Lower the hips and knees as you descend. Stiff knees are the common fault of the mediocre athlete. Show me a man with knees as limp as a dish rag and I'll show you a potential top-notcher.

"Return to the erect position by three stages. Raise the hips first, straighten the back, then lift the head. The three-way breakdown should be executed three times to take the squeaks out of your hinges. Each of the three loosening movements—with the wrists, shoulders and knees—should be done at least ten times.

"The second important factor in complete relaxation is proper breath control. Stand erect with the feet apart comfortably, then bend over from the waist, keeping the knees straight. Suck in the stomach consciously while you reach down with your extended finger tips as far as possible. Next take a long, deep breath into the chest, pulling back the shoulders and coming erect at the same time. Now, very slowly, exhale through the nose while you relax the abdominal muscles.

"With the first exhalation, start bending the knees and allow your body to slump slowly and loosely. Say the word "s-a-g" and time it to end with the finish of the slow slump, so that the web formed by the first finger and the thumb fits above and against each kneecap. If you are utterly loose and relaxed, you will, upon releasing the hands from your kneecaps, collapse like a spent accordion to the floor."

In basketball, as in any other sport, posture is important as related to feinting. It is based on the fact, that whenever we start an action such as dribbling, we must make a preliminary adjustment of the body before the action is put under way. A shift of the weight, a turn of the shoulder or head, is the tip-off. It telegraphs to the opponent just what is going to be done. Every instant during a basketball game, all the players are unconsciously tipping off their movements, and all players are subconsciously reading the tip-off of their opponents and playing to meet it.

The aforementioned suggestions, superficially look simple, but it is only by diligent practice that the average man can approach the desired good posture.