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Goiter Prevention and Treatment Explained

CITY CLUB COMMITTEE STUDIES IMPORTANT HEALTH QUESTION AND SUGGESTS MEANS TO BE USED

The prevalence of goiter in Portland, means of prevention and approved methods of treatment are outlined in a report of a special committee of the City Club's Public Health Section. The personnel of the committee comprises Dr. J. Earl Else, Dr. G. E. Burget and B. A. Thaxter.

The report in full follows:

I. DEFINITION

The term goiter is an indefinite term signifying any one of several disturbances occurring in the thyroid gland. The thyroid gland is a gland consisting of two parts and a connecting isthmus situated in the neck. Its function is to produce a secretion which is needed by every cell in the body in order to properly function.

II. INCIDENCE.

A partial survey of the children of ten schools in Portland has been made under the direction of the City Health Bureau and a complete survey of one.

School	Girls examined	Boys examined	Percentage having goiter
Kennedy.....	104	.....	73%
Horsford.....	133	.....	64%
Alameda.....	200	.....	44%
Glencoe.....	515	.....	56%
Irvington.....	258	.....	52%
Vernon.....	443	.....	62%
Couch.....	114	.....	63%
Ainsworth.....	105	.....	66%
Montavilla....	165	.....	54%
Mills.....	49	.....	52%
Ockley-Green	393	.....	45%
Ockley-Green	.....	407	27%
Total girls 2,279			56.2%
Totals boys.....407			27%

While this survey is limited, it has been taken in various portions of the city and is probably a fairly accurate index of the presence of goiter

among the children in the grade schools. This would indicate that over one-half of the girls in the grade schools (56.2%) and over one-fourth of the boys (27%) have goiters. The actual incidence of goiter will be higher than this because pupils leave the grade schools during the adolescent period to enter high school and there will be some who will develop goiter during the high school period so that the actual percentage of the development of goiter among the public school children in the City of Portland is in reality higher than the figures indicate. Surveys that have been made outside the City of Portland show the presence of goiter in practically all communities.

III. TYPES.

There are several types of goiter.

1. *Simple Goiter.* In most goiters the secretion of the thyroid is approximately normal so that there is no general evidence of goiter other than the enlargement appearing in the neck. This type is commonly termed simple goiter.

2. *Myxedema or Hypothyroidism.* In some cases there is a decrease in the secretion of the thyroid gland producing an increase in body weight and sluggishness both mentally and physically if the disease becomes pronounced. This condition is known as hypothyroidism or myxedema.

3. *Toxic Goiter.* In some cases there is an over secretion from the thyroid so that the patient shows definite symptoms such as, rapid pulse, nervousness, increased appetite, easily fatigued and loss of weight. This condition is known as toxic goiter. There are two different types of toxic goiter, one which comes on rapidly and another which comes on slowly. A patient with the latter type of goiter must not take iodine as it does great harm.

There are certain definite times in life at which goiter is more likely to appear than at other times. This is due to the fact that there are

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certain periods in which the load thrown upon the thyroid gland is greater than at other periods. The periods in life at which goiter is most likely to appear are as follows:

First—Congenital goiter. Goiter at birth is quite common in the Pacific Northwest among animals, but is not often seen among babies. It does occur, however.

Second—At about two years of age. This is because the thyroid gland could produce the amount of secretion needed so long as the child was being carried about or was creeping, but when he began to walk more secretion was needed and hence the goiter developed.

Third—At about six or seven years of age, or the time the children start to school. They usually begin to play differently and play harder. They enter into competition in games and play more frequently to exhaustion and consequently a greater amount of secretion is needed from the thyroid gland.

Fourth—Adolescent age. At this age the bodily changes are such that a greater amount of secretion from the thyroid gland is needed and hence more goiter is developed at this time than at any other period of life. Girls go through the adolescent period two years quicker than do the boys, consequently there is more goiter among the girls than in boys. In rapidly growing boys, however, at this age goiter appears just as frequently as in girls and perhaps more frequently.

Fifth—Adult life. During adult life goiter appears more frequently among women than men. The reason for this is: First—Because of the greater frequency of goiter among girls at the age of puberty, women are more likely to have weak thyroid glands. Second—Because of the strain connected with pregnancy and nursing of children, a greater demand is thrown upon the thyroid gland. Third—Because in the rearing of

children the mother frequently works during the entire working hours in addition to having her sleep disturbed, thus throwing greater work on the thyroid gland as well as the entire body. In men undergoing great strain, goiter often appears, for example, there was an increased frequency among the soldiers in the world war.

Sixth—Late life. Goiter appears after forty-five years of age occasionally. In the majority of cases of goiter at this age, however, the condition is a late goiter which has existed for some time and has become active. Goiter developing before the adolescent age and after the age of fifty occurs just as frequently among the male as among the females.

IV. CAUSES.

Thyroxin, the chief constituent of the thyroid secretion, is made up of approximately 65% iodine, therefore the thyroid gland must receive iodine in order to make this substance and hence there must be iodine in our food intake.

Marine and Lenhart working in the Pennsylvania fish hatcheries in 1909 and 1910 with fish that were developing large goiters discovered that the addition of iodine to the water prevented goiter in fish. Recently McClendon working at the University of Minnesota has shown that in the districts where goiter is prevalent the surface water contains much less iodine than in the districts where there is but little goiter. In some of the non-goiter districts there is as much as a thousand times more iodine in the surface water than in the water of some of the goiter districts. In one goiter district in northern Michigan, there is no iodine in the surface water. The iodine content of the surface water is an indication of the iodine content of the soil and hence an indication of the iodine content of the vegetation of the district so that in the districts in which the surface water is deficient in iodine, the food intake of the people of that district must also be deficient in iodine. Rush and Jones, working at the University of Oregon in a survey of the goiter situation in the Pacific Northwest and among the American Indians found in the records of the Indian Service that there were two tribes of Indians which formerly lived along the Columbia river, where salmon was one of their chief articles of diet. During this time there was no goiter among these Indians, but later, when moved to other districts where they could not obtain salmon, goiter developed among them. Salmon contains considerable iodine.

In the work in goiter prevention which will be referred to later in this report, it has been shown that the supplying of iodine to the people and animals in the districts in which the food intake is deficient in iodine prevents the development

of goiter. Taking then the findings that the food intake in the goiter district is deficient in iodine and that the replacing of this deficiency in iodine prevents goiter, allows the conclusion that the primary cause of goiter is an iodine deficiency in the food and water intake. There are other factors that have some influence, but these other factors probably have their effect through increasing the load thrown upon the thyroid gland and thus increasing the need of more thyroid secretion and hence more iodine.

Goiter, especially the toxic type, often appears after a severe or protracted illness.

V. PREVENTION.

The principle cause of goiter having been shown to be due to a deficiency in iodine, very naturally the prevention of goiter comes through the supply of this deficiency as previously stated. Marine and Lenhart in their original work in the Pennsylvania fish hatcheries found that the addition of minute quantities of iodine to the water prevented goiter among fish. Dr. Kalkus, working in the Methow Valley in Washington where congenital goiter among animals was so prevalent that it was a menace to animal industry, found the giving of small quantities of iodine to the pregnant female prevented congenital goiter. Marine and Kimball did the first systematic work in the prevention of goiter among people. Working in the public schools in Akron, Ohio, in 1917, they first made a survey to find the frequency of goiter. After the survey had been made, the parents of the girls were given the opportunity of having the preventive treatment given to the girls. About one-half of the parents elected to have the treatment given and about one-half elected not to have it given. At the end of the year another survey was made at which time it was found that only two new cases of goiter had developed among those taking the preventive treatment and in both instances the girls had a constitutional disease. Of the girls who did not take the treatment, 27.6% developed goiter. Since that time the goiter prevention work has been carried out systematically in many other cities, all with the same results.

In the prevention of goiter, two different policies have been followed; one, making up of the deficiency of iodine in the food intake by supplying iodine to all the people in the district and the other by supplying the deficiency only to individuals or groups of individuals.

In the first plan, that of supplying the deficiency of iodine in the food intake to all of the individuals in the district, two methods have been followed: one, putting sodium iodide in the water supply; and two, the use of salt containing iodine.

Sodium Iodide in the Water Supply.

The plan of putting sodium iodide in the water supply has been carried on at Rochester, New York. Sufficient sodium iodide was put into the reservoir to give twenty parts of iodine to one billion of water. Later the amount was increased to give fifty parts of iodine to one billion of water. Advantages claimed for this system are, first, it is cheap, costing only about one cent per person, including of course the entire population; second, the iodine is taken by everyone so that those that need it receive it. One objection to this method is that it is inefficient in that the amount of iodine received per individual is not sufficient to meet the need. According to Plummer each individual needs daily one milligram of thyroxin, an active principle of the secretion of the thyroid gland. This would correspond to 65/100 of a milligram of iodine per day. As this is the amount of iodine that the thyroid gland receives, the intake would have to be more because all of the iodine would not reach the thyroid gland. It has been estimated that our daily intake should be about one milligram of iodine. This would require the drinking of five gallons of water per day, making the method impractical. Another objection is that it wastes the iodine. Since only a small portion of the water is used for preparation of food or drink, most of the iodine is wasted.

Use of the Iodine Containing Salt

Originally all salt came from the sea and contained iodine, but at present most of our salt comes from other sources and it has been the custom to free that which did contain iodine from its iodine. The State of Michigan is at present trying this method. Advantages claimed for the method are, first, it is cheap; second, it will reach all the people; third, it is a natural method because it replaces iodine in the iodine-deficient food before it is consumed. The objections raised to the method are, first, that it is an inaccurate method of administering iodine as the amount of salt consumed varies so much with different people, some getting more iodine than is needed and others not getting enough. This must be considered because there is a possibility that small children would not get the amount of iodine necessary. Second, as there is no standard, the amount of iodine in the various products upon the market may vary,—some products might contain too much and some not enough. Third, patients having a toxic goiter or an adenoma which has not yet become toxic might be harmed. Kocker, years ago, showed the evil effects of iodine upon some patients with what appeared to be simple goiter and Plummer has repeatedly warned against the use of iodine in patients having an adenoma.

At the goiter clinic at the University of Oregon the patients are advised that if there is no member of the family who has a rapid pulse, it is safe for the family to use the salt containing iodine. If there is a member of the family who has a rapid pulse, it should be investigated before the iodine containing salt is taken. To overcome the possibility that children may not receive the amount of iodine that is necessary in the families that are using the iodine containing salt, the clinic advises that all those in the adolescent period take the iodostarin tablets referred to below or other tablets containing 10 milligrams of iodine in addition to the use of salt by the family.

Individual or Group Administration

The individual administration of the preventive treatment is based upon the occurrence of goiter in this vicinity as shown by the records of the goiter clinic of the University of Oregon Medical School. For the prevention of congenital goiter, women during pregnancy are advised to take the preventive treatment if they do not have toxic goiters, this being protection to both the mother and the child. As the goiter appearing at two years of age and about seven years of age is so infrequent, treatment among children at this age is not advised unless there is a special indication.

Adolescent goiter. The changes of the thyroid gland may appear in the pre-adolescent age as well as during adolescence and the pre-adolescent changes begin in some children as early as eight years of age. The preventive treatment is advised in children from eight to eighteen. In adult life the individual preventive treatment applies only to women during pregnancy except on special indication.

At present the best method for individual administration is the iodostarine tablets or other chocolate tablets containing 10 milligrams of iodine. These are little chocolate tablets, each one of which contains 10 milligrams of iodine. In the prevention of adolescent goiter one tablet is given each week beginning at eight years of age and continuing until eighteen. In pregnancy, two tablets each week are advised. Some of the parent-teacher associations in Portland have arranged for the giving of iodostarine tablets in the public schools.

VI. TREATMENT.

In the goiter clinic at the University of Oregon and in the clinic for internal secretions at the University of California, it has been shown that iodine, while of great value in the prevention of goiter, is not of much value in the treatment of goiter. In the goiter clinic at the University of Oregon, the best method of treatment has been found in the use of the dried thyroid gland which is obtained and prepared from various animals used for food purposes.

This substance, like many other substances used for treatment, is of value if properly used, but very dangerous when improperly used and consequently should never be taken except under the immediate supervision of a competent physician.

VII. CONCLUSIONS.

1. Goiter exists in Portland and the Pacific Northwest with such frequency that it demands public attention.

2. The presence of goiter is due to an iodine deficiency in the food and water intake.

3. Goiter is easily preventable by replacing the iodine deficiency in the food intake by the administration of very small quantities of iodine.

4. The placing of sodium iodide in the public water supply is inefficient as it is being used.

5. The use of the iodine containing salt offers the best method of administering iodine to the community as a whole. It is possible, however, that those who need it most, the adolescent children, would not receive a sufficient quantity with their food. There is also some danger to patients having certain types of goiter taking iodine, so that, while we believe it is advisable that the majority of people should use the iodine containing salt, we think that it would be inadvisable to require all salt offered for sale to contain iodine. Stores handling the iodine containing salt should be required to carry in stock the iodine free salt so that it might be obtained by those patients having toxic goiters or adenomas that have not yet become toxic.

6. The administration of iodostarine tablets or other chocolate tablets containing 10 milligrams of iodine to the children of the public schools, either through some municipal agency or the parent-teacher associations, offers the most accurate and best controlled method of general administration of the necessary iodine to the public school children. It should be administered under the direction and supervision of the local health board.

Respectfully submitted,

J. EARL ELSE, M. D., *Chairman*

DR. G. E. BURGET

B. A. THAXTER

Approved by the Board of Governors February 2.
To be presented to the Club February 13.

To the City Club:—

The goiter report of the City Club has the approval and appreciation of the State Board of Health. The State Board of Health is conducting a goiter survey and has adopted a standard form for this purpose.

At this time the Board would like to commend the excellent work of the City Club in the interest of Public Health.

FREDERICK D. STRICKER,
State Health Officer.