CRUDE FIBRE, BOWEL MOTILITY, AND PATTERN OF DIET

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It has been known for long that there is a relationship between crude-fibre intake, bulk-forming capacity of diet, and bowel motility. Whereas fibre intakes and bulk-forming capacity have attracted attention only relatively recently, there is an extensive literature on the subject of adequacy of bowel movement, laxation, and constipation. Purging was often referred to in Biblical times. Down through the ages in the various pharmacopoeias and recipes for herbs and simples, there was no lack of remedies for the costive.

Cereal Fibre in the Diet

Cereal-fibre intake was high in civilized communities until 3-4 generations ago. In Britain, before 1870-80, stone-ground wheat meal had little of the bran fraction removed from it. Bread made from this meal (often mixed with rye) was consumed in large amounts; a century ago the average daily consumption was about 21 oz. per person. In addition, oatmeal porridge formed much of the diet of the poorer classes. Thus, a considerable amount of cereal fibre was ingested by the majority of the population. Since 1870-90, however, wheat has been ground in roller mills permitting the production of a bran-free wheat having negligible fibre content. The bread made from it was eagerly welcomed by the general public, and in time almost entirely superseeded the wholemeal bread. As prosperity increased and foods other than bread became more easily available, the amount of this foodstuff eaten per person slowly declined; whereas it was 16 oz. in 1902, by 1945 it had decreased to about 11 oz. Moreover, of the present low intake, only a small proportion is made from high extraction meal. In the United States, Riley has related how the mass of the food of our fathers and grandfathers was 'assayed' that was subjected to the simplest and most necessary processing only, and then referred to the changes in milling that took place when Benjamin Harrison was President. By 1942, of the total amount of cereal consumed, only 5% was of high extraction type.

The progressive reduction in the consumption of bread was accompanied by great increases in the amounts of other foodstuffs eaten. Of these increases, perhaps the most outstanding has been that of sugar. In Britain, from 1835 to 1935 its consumption rose by about 500%; similar rises occurred in other Western countries. Sugar, upon digestion, leaves no residue. Major increases in consumption also occurred in dairy produce, eggs, and meat; these foods yield little residue after digestion. Very marked changes have taken place in the consumption of fruit and vegetables (other than potatoes). Yet in bulk-forming capacity, experimental and clinical observations indicate that lightly milled bread easily ranks highest, followed by vegetables like cabbage and carrots, with fruit lowest in the list. Briefly, the change in cereal extraction rate, the fall in bread consumption, and the lesser effectiveness in laxation of the increased consumption of fruit and vegetables, together greatly reduced the bulk-forming capacity of the diet.

Early Views on Constipation

How did this change affect bowel movement? There was no doubt among the authorities of the period of change that constipation was common, and would seem to have become increasingly so, although adequate information is lacking. By 1886 Cheadle, a leading clinician, wrote that there was 'no disordered condition of the body which is so frequently the subject of medical treatment as constipation'. This was reiterated by Sir John Sawyer in 1910, when he said that the treatment and cure of habitual constipation engage attention oftener than other details of remedial art. In the same year, Goodhart, speaking of a bran-wide fibre-dwindling civilization, a negligible amount of which would always be with us, but lamented 'the change from the occasional pill of our forefathers to the excess of the present day'. There seems, moreover, to have been agreement over the primary cause of the increase in constipation. Cheadle, for example, listed the chief cause as consumption of 'food which leaves little residue; very completely digested food . . . . meal matter too small to duly excite peristalsis'. This view was reiterated in various ways by later observers. It is recognized, of course, that factors other than crude fibre are influential in laxation. Thus it is accepted that physical exercise, as against sedentariness, is beneficial for bowel movement. In various discussions in the past (when the subject evoked much more attention than at present), the question was asked occasionally: whoever heard of a ploughman or of a labouring man being constipated? Understandably, the urbanization accompanying the industrial age, the mechanization of the home, the greater emphasis on cleanliness, and the lesser effective diet, directly or indirectly, is the bulk-forming capacity of the diet. In this respect, it is of significance that during the last war, in countries which experienced dietary changes which included an increase in crude-fibre intake, marked reductions in the consumption of purgatives were reported.—In Britain, Eire, the Channel Islands, Switzerland, etc., and the sale of aperients fell.

Excessive Treatment of Constipation

Regarding the situation at present, it has been stated in 'in no function of the body of civilized man is there so much self-interference as in the elimination of faecal waste.' The extent of the 'interference' must be enormous. In Britain, in a study of 1,352 National Health Insurance male workers, it was found that 6% of them took aperients at least once a week, and almost a quarter were taking aperients twice a week or more often; there was an increase in the practice with age, reaching 40% by the sixth decade. It is not therefore to be wondered at that inadequacy of bowel movement or constipation has been called the 'bane of the British people', and 'the national curse'. Nor is the condition less common in the United States; an editorial in American Medical News once movingly referred to the imperative need that millions of persons feel for something that will assist in the regulation of the bowel. As to the amounts and the cost of purgatives used, accurate figures are not available. But in Eire (3 million inhabitants) in 1941, data given by Saunders indicated that the consumption of one purgative, Epsom salts, was approaching 300 tons per annum. If we extrapolate this consumption to the United States, then the amount ingested annually would approach 20,000 tons. In relation to costs, it was reported some years ago that over 100 million dollars were spent annually in the United States on laxatives; not included in this figure was the cost of proprietary cereal products frequently used for the same purpose and calculated to be in the neighbourhood of this sum. Concerning the publication, Thompson recorded that in Britain in 1941 about £300,000 were spent annually on advertising constipation cures; from the information given by him 2% of all newsprint advertisement space was thus occupied.

Significance of Constipation

The question which now arises is, is it really of any significance to health whether stools are hard or soft, large or small, formed or formless, eliminated regularly or infrequently, with ease or with pain? In the early days, clinicians had no doubt that constipation was deleterious. Sir Lauder Brunton and many others discovered expansively on the relevant toxaeamias and other ill effects. From the turn of the century onwards, patients with 'intractable constipation' were subjected to 'multilating' opera-
tions (severe at that time) whereby various lengths of the large gut were removed. Sir William McEwen in his Huxley lecture in 1910 sarcastically stated: 'There is at present openly expressed discontent about the alimentary tract. Somewhere or other one feels that there is too much, and that this extra whorl requires to be short circuited'. As late as 1929, an Annotation in the Lancet indicated that 'constipation is undoubtedly the cause of much ill-health'. About that time, however, largely due to the careful studies of able gastro-enterologists like Alvarez, it was demonstrated that the direct ill effects of constipation are largely psychogenic, and that the 'well recognized train of symptoms: malaise, headache, hebetude, poor appetite, coated tongue and foul breath', associated with a loaded intestine, appear to be mainly of nervous origin. At the other extreme, the Gilbertian situation is such that Lord Horder drew attention rather to 'the harmful habit of swallowing purgative drugs'.

At present, therefore, the low intake of crude fibre associated with a measure of inadequacy of bowel movement, while common, is not apparently of direct importance to health; the condition is so readily relieved by 'something' from the chemist shop, that it is no longer a problem for the physician. The unimportance with which the subject is now regarded may be judged by the fact that the word 'constipation' is not mentioned in 60-66 per cent of a recently published authoritative textbook on nutrition.

**Inferior Present-day Dietary Pattern**

The more important aspect of the subject which should be investigated is whether the pattern of diet which, *inter alia*, includes a low or negligible intake of crude fibre, is broadly inferior to that pattern which includes a high intake. The diet of our forefathers was high in crude fibre and bulk-forming capacity; but it was possibly low in energy value, and certainly so remote as not to merit serious consideration. This view is indisputable, the likelihood of peace-time populations changing from a palatable diet to one of less palatability is so readily relieved by 'something' so readily available and which was eaten in such civilized countries as the United States, England and Switzerland, are surely no ramifications of this factor, and the ramifications of the total associated pattern of diet. There is some evidence, however, that addition of crude fibre to the diet of small animals has a promotive effect on general health, including fertility and longevity. Surely we ought to know much more about the pattern of diet of which a high intake of crude fibre is or is not of importance in human nutrition, especially among contrasting populations. For instance, the South African Bantu has a higher rate of bowel motility, larger stools and greater frequency of defaecation than the European. Have these any bearing on health or disease? Are such habits and are they connected with the amount of crude fibre in the diet?

**Conclusions**

The conclusions reached from the above wartime observations have been apparent to authorities in other periods. Charles Mayo was not happy about the changing pattern of disease accompanying modern changes in diet. Cathcart persistently maintained that it was possible to be well and to keep well on the simplest of diets. It has been averred by Wilder that the need for better nutrition arises largely from the use of processed foods, white bread and refined sugar.

Assuming that these observations are true and their interpretation valid, then it is inescapable that there is much to learn from that pattern of diet of which a high intake of crude fibre is a feature. One implication is that the philosophy of producing 'bigger and better' by the reiteration of 'drink more milk', 'eat more fish', and similar popular slogans, requires re-examination. It is, of course, argued by many that, while the importance of the observation cited is indisputable, the likelihood of peace-time populations changing from a palatable diet to one of less palatability is so remote as not to merit serious consideration. This view is open to argument. But irrespective of the differences of opinion, there is need, indeed, for writers of present-day textbooks on nutrition to devote a portion of their space to the nutritonal lessons to be learnt from the past, from wartime experiences, and from present-day backward populations.

**REFERENCES**

2. Iden (1902): Ibid., I, 979.