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Bran yesterday . . . bran tomorrow?

Dietary fibre rose to prominence in the late 1960s. For a decade it held the enthusiastic attention of many doctors, nutritionists, and the public at a time of increasing awareness of the part played by diet in health. Dietary fibre had been considered previously to be an inert component of plant foods; because it was not digestible by human intestinal enzymes it was thought to have no important effects on nutrition. Only when Cleave, Burkitt, Trowell, Painter, and others propounded what became known as the fibre hypothesis did its possible part in the prevention and treatment of disease receive much attention.[1-4] The fibre hypothesis took the epidemiological observation that many diseases of the civilised world are rare in less developed countries, where an unrefined diet rich in fibre is eaten, and postulated that deficiency of dietary fibre contributed to the development of these diseases in the West. The list is considerable, ranging from dental caries through ischaemic heart disease, diabetes, obesity, and gall stones to diverticular disease and colonic cancer.

Fifteen years later is the hypothesis proved, or still relevant? What is the real value of dietary fibre now that the dust has settled? Dietary fibre comprises an enormous range of substances of widely different chemical composition and physical properties. All are structural or storage components of plant cells, though some authors also like to include indigestible components of animal foods.[5] Their different physical properties of bulking, water holding, gel formation, and viscosity determine their effects on gastrointestinal function. The great diversity of forms of fibre makes it nonsensical to equate the unrefined, high fibre diet of the rural African in the epidemiological study with a Western diet with added bran. Fibre content may be similar, but the type of fibre and its properties and effects are almost certainly not. The protein and fat contents of these diets are also not comparable, and this may be equally important.

Experimental confirmation of the epidemiologically observed association between many diseases and a diet deficient in fibre is still lacking. Long term controlled experiments are difficult or impossible, and short term studies do not answer the crucial questions. The many published experimental reports require critical scrutiny and cautious interpretation.[6] Three major reviews in the past four years have helped to restore perspective.[7-9]

The gastrointestinal conditions in which some proved benefits come from treatment with dietary fibre are constipation,[10] irritable bowel syndrome in which constipation predominates,[11] diverticular disease (indirectly),[12] and anal conditions such as haemorrhoids[13] and fissure. Even so, some of the extensive evidence is conflicting. Nevertheless, bran, particularly wheat bran, seems to be the most effective for these conditions[14]; large particles are more effective than small,[15,16] and raw bran is better than prepared or cooked.[10,12] Bran gives softer, bulkier stools,[14,16] normalises the transit time,[17] and relieves symptoms.

Dietary fibre may be protective against the development of colonic cancer, but the case is still unproved, and many other factors probably contribute.[18] Two linked studies have suggested that patients who develop Crohn's disease have earlier eaten little fibre from fruit and vegetables[19] and have fewer hospital admissions and operations when put on a high fibre diet.[20] There is no similar evidence in ulcerative colitis, though an increase in the intake of fibre may relieve constipation in the ascending colon associated with distal colitis. Dietary fibre may protect against appendicitis in Johannesburg[21] but appears not to in Nottingham.[22] Deficiency of fibre may be a factor in the development of dental caries and hiatus hernia and remission in duodenal ulceration, but evidence is incomplete, conflicting, or unconvincing. Viscous fibres slow small intestinal transit and may benefit patients with the short bowel and dumping syndromes.

More substantial evidence has emerged for the benefits of dietary fibre, especially the viscous forms, in modifying intestinal absorption[23] and indirectly improving metabolic control in diabetes, hyperlipidaemia,[24] and possibly liver disease. Secondary metabolic changes may improve the outlook in ischaemic heart disease and gall stone disease, but the evidence is sparse. Obesity generally responds to reduced dietary intake, which may be helped by the satiety of a high fibre intake, but fibre does not cause weight loss directly.

How should fibre be taken? There are now many "pharmacological" preparations of fibre in the form of tablets, granules, and powders for those who cannot take a high fibre diet. Bran and some other fibres are available to add to the usual diet. The food industry responded to the fibre boom by producing a range of refined products "enriched" with fibre, mainly cereal fibre. In practice, however, the most logical, but not always acceptable, approach is to take a less refined, mixed diet including reasonable quantities of fruit, vegetables, legumes, and cereals.[25] In this

way an adequate fibre intake is achieved in a variety of forms without difficulty.

Fifteen years on, the fibre hypothesis has survived. In the short term, colonic function may be modified and symptoms, particularly constipation, relieved. Gastrointestinal absorption may be controlled and some metabolic disorders stabilised. Yet the long term benefits from prophylactic use of high fibre diets are not proved and may never be so: too many extrinsic factors play a part both in the diet and in the environment generally. Epidemiological and circumstantial pointers suggest that there may be some advantages in taking a mixed, high fibre diet, but its prophylactic use still remains a matter of philosophy.

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The spleen preserved

The surgical removal of a normal spleen has been—and still is—performed too often. External trauma may shatter a spleen, but it may also merely lacerate it or tear the capsule, leaving the organ largely intact. I have memories of a consultant whose desire to divide all the short gastric vessels in doing a gastrectomy for peptic ulcer often led to "Damn it, sister, the spleen" and to the rapid excision of a spleen denuded of its capsule at its upper pole. This was assumed to do no harm, though clinical observations suggested that the patients concerned had a more complicated convalescence. In reality we should never have accepted that removal of a quarter of the body's lymphoid tissue would be harmless.

Cooper and Williamson recently reviewed the operation of splenectomy and collected comprehensive evidence of its harmful effects.[1] These are predictable from the nature and functions of the spleen; they first became evident in children, who developed fulminant infections with a variety of organisms, death occurring especially in younger children. The risks are greater when a diseased spleen is removed, and current advice is that children who have their spleen removed, for whatever reason, should be given polyvalent vaccines and prophylactic penicillin for at least two years.

There is less evidence of the effects of splenectomy in adults. In 1967 a 48 year old man enjoyed a holiday in the west of Ireland and shortly afterwards developed a fulminant, febrile illness from which he died.[2] This proved to be babesiosis, a disease of cattle transmitted by ticks and due to a protozoal parasite resembling that of malaria. He had had a splenectomy (in the course of a gastroenterostomy) that year. Seven similar cases have been reported in Europe; all the patients had had splenectomies, and five died.[3] This can hardly be regarded as a common risk; the mechanism is clearly an immunological deficiency. Robinette and Fraumeni followed up veterans of the 1939-45 war and showed an apparent excess of mortality from ischaemic heart disease and infections among those who had had splenectomies,[4] but the evidence is not as convincing as that in children. Furthermore, Okiye and his colleagues found no increase in infections in patients who had their spleens removed before renal transplantation—a group that might be expected to be particularly at risk.[5]

Nevertheless, the evidence shows that splenectomy is harmful in children and probably so in adults, and the potential harm is likely to be greater in tropical countries. Clearly there are some diseased states or some severe traumatic injuries in which the benefits of splenectomy will outweigh the disadvantages. But what of the rest? In what ways can the spleen be preserved?

If the spleen is uniformly diseased—for example, by lymphoma—it must be excised. A cyst, however, might be excised or enucleated with preservation of at least part of the spleen. If the spleen is normal but damaged partial splenectomy is possible. For lesser degrees of damage a laceration may be sutured, and bleeding from a capsular tear may usually be controlled by the application of a haemostatic agent such as gelatin foam. Prudently chosen, these methods are safe and effective. If the spleen must be excised a portion of it can often be inserted into the omentum as a free graft, where it will survive, but whether full splenic function is regained is less certain.

Surgeons depend on assumptions, and one such used to be that if the spleen is believed to be damaged a laparotomy is essential. Isotope scanning now enables us to image the spleen, and the technique has shown that patients with damaged spleens may be treated without operation. A teenager I saw recently two days after injury with minimal signs of peritoneal bleeding had a scan showing a fragmented spleen. He was observed in hospital for two weeks and then discharged. Two months later he was well—and another scan showed a damaged but functioning spleen. Joseph and colleagues reported on 39 children with traumatic injuries to the spleen, of whom 24 were successfully managed without laparotomy,[6] and there have been many other reports. The surgeon still needs to be alert for secondary haemorrhage from a damaged spleen in which the initial bleeding has been naturally arrested by keeping patients under observation, but this is probably an unusual event, and recovery of the damaged spleen is more likely.

Dogma has again been discredited by the exercise of judgment. The spleen should and often can be preserved by conservative management, provided that careful observa-