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John Hunter: learning from natural experiments, 'placebos', and the state of mind of a patient in the 18th century

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Introduction

Maverick, Scottish-born 18th-century surgeon John Hunter was Georgian London's most popular surgeon in the late 18th century.^{1,2} He made exceptional contributions to advancing the understanding and practice of medicine through observation and experiment. John Hunter studied anatomy for 12 years alongside his brother William, at their school in Covent Garden. After a few short spells of hands-on surgical practice in London hospitals, he signed up in 1760 as a surgeon in the British army.

Learning from natural experiments

In March 1761, aged 33, John Hunter set sail from Portsmouth as part of an undercover expedition to capture the island of Belle-Île, off the coast of Brittany, in a reckless effort to determine the outcome of the Seven Years War. After the troops succeeded in conquering the island, Hunter and his fellow surgeons were kept busy treating hundreds of wounded British and French soldiers in filthy conditions, without the benefit of either anaesthesia or antiseptic methods. Operating in dirty field hospitals, probing patients' wounds with knives, forceps and fingers encrusted with blood and pus, the army surgeons frequently introduced fatal infection.

Despite the death toll from infection following surgery to remove musket balls and debris, Hunter's colleagues believed that infection was not only a necessary but also a beneficial result of treatment. Hunter believed differently. A passionate advocate of the healing powers of nature, he did not view infection as inevitable and always urged a conservative approach to surgery. In the same way that Ambroise Paré's views about treating battle wounds with hot oil had been changed by observations following a chance, natural ex-

periment two centuries earlier,^{3,4} John Hunter's conservative views about treatment were confirmed in a natural experiment.

On the day the British landed on Belle-Île, five French soldiers had been shot in the exchange of fire but hid in an empty farmhouse with their wounds untreated until they were discovered four days later. One had been hit in the thigh by two musket balls, one of which was still lodged in his thigh bone; a second had been shot in the chest and was spitting blood; the third had been hit in the knee; the fourth had been hit in the arm; and the fifth was only slightly wounded. Despite having no surgery to remove the missiles, or indeed any treatment at all, all of them recovered better than their British opponents who had been subjected to the surgeon's knife. 'These four men had not anything done to their wounds for four days after receiving them ... and they all got well,' Hunter later wrote.⁵

Further evidence for Hunter's argument against removing bullets came in the form of a British grenadier who had been shot in the arm and taken prisoner by the French. He, too, had received only superficial treatment yet when he escaped a fortnight later the surgeons were surprised to find his injuries healed. 'About a fortnight after the accident he made his escape, and came to our hospital; but by that time the swelling had quite subsided, and the wounds healed; there only remained a stiffness in the joint of the elbow, which went off by moving it.'⁵

While Hunter's colleagues dismissed these discoveries as anomalies, Hunter applied the findings to his practice, only operating to remove a musket ball when this had shattered bone or taken in obvious debris but otherwise leaving the wound to heal untouched. He wrote home to tell his brother William that 'my practice in Gunshot wounds has

been in a great Measure different from all the others, both on account of my suppos'd knowledge, and method of treatment'.⁶

While modern practice would now normally entail removing a foreign object, in the circumstances in which Hunter operated – the unhygienic conditions of 18th-century army surgery and ignorance of cross-infection – his approach, based on evidence rather than tradition, was plainly preferable. It was many more years, however, before the results of his observations were published posthumously in *A Treatise on the Blood, Inflammation and Gun-shot Wounds*.⁵

Learning from 'placebos'

Returning to London in 1763, Hunter set up in private practice as a surgeon and specialized in treating venereal disease. As always he applied his scientific approach to his work. Experience had taught him that mercury – the standard treatment for syphilis and sometimes used for gonorrhoea – was ineffectual for the latter, since gonorrhoea almost always cleared up on its own. He observed: 'I am inclined to believe it [mercury] is very seldom of any kind of use, perhaps not once in ten cases: but even this would be of some consequence, if we could distinguish the cases where it is of service from those where it is not'.⁷

With this objective in mind, Hunter devised a test, secretly treating some patients with mercury and others with bread pills. He recorded: 'The patients always got well; but some I believe, not so soon as they would have done, had the artificial methods of cure been employed'.

Although most of his experiments on sexually transmitted diseases – including a probable self-experiment – were conducted in the 1760s, the year that he used bread pills is not recorded, and Hunter only described his approach many years later in his *A Treatise on the Venereal Disease*.⁷ Whether he used the term 'placebo' to describe this approach to treatment evaluation is not known – William Cullen used that term at least as early as 1772^{8,9} – but bread pills were used in other comparative experiments in the early 19th century.^{10–12}

Learning from the state of mind of a patient

Whether or not Hunter used the word 'placebo', he was well aware of what we now refer to as 'placebo

effects' – both in orthodox medicine and folklore alternatives. Having noted that certain ailments could be induced through psychological means, he speculated that they might be cured through the same power of mind, writing: 'But as the state of the mind is thus capable of producing a disease, another state of it may effect a cure'. The same phenomenon was described a few decades later by John Haygarth in his pamphlet entitled '*Of the imagination, as a cause and as a cure of disorders of the body*'.¹³

In a posthumously published report of his lectures,¹⁴ Hunter observed: 'I am apt to suppose that a spider's web, when taken for an ague, cures in the same way, at least in one case; for on giving it without the patient's knowledge, it had not the slightest effect; but by persuading the patient that it was a spider, the effect was produced, at least the disease did not return'. Hunter added wryly: 'Even tumours have yielded to the stroke of a dead man's hand'.

Hunter had no particular bias against folk or 'quack' medicine – he was well aware of the defects of conventional practice – but was keen to test all methods of treatment. It was what worked – whether orthodox or alternative – that mattered.

John Hunter's teaching

John Hunter was one of a number of 18th-century pioneers of an approach to surgery and to medicine which stressed the importance of making observations and experiments¹⁵ but probably the most influential. He urged his students – who totalled roughly 1000 – to question accepted practices, formulate new hypotheses, test these through observation and experiment, and – crucially – apply the lessons they learned to their practice. Describing his lectures, which he first advertised in 1772, he said: 'I do not intend to give my lectures as a regular course, but rather to explain what appear to me to be the principles of the art, so as thereby to fit my pupils to act as occasion may require, from comparing and reasoning on known principles'.¹⁶

When students arrived for the start of lectures, Hunter told them not to take notes, or if they did, to burn them afterwards. He was aware that his continuous programme of research meant his views were always changing, so that whatever he told the students would be out of date before long.

Indeed, when one pupil accused him of having altered his opinion on a particular topic from one year to the next, Hunter retorted: 'Very likely I did. I hope I grow wiser every year'.¹⁷

He encouraged the pupils to learn from their mistakes – freely admitting his own – and to apply the results of their research to practice: 'I think we may set it down as an axiom, that experiments should not be often repeated which tend merely to establish a principle already known and admitted; but that the next step should be, the application of that principle to useful purposes'.¹⁸ Famously, when his first and favourite pupil, Edward Jenner, asked his advice on treating a certain patient, Hunter replied: 'I think your solution is just. But why think, why not try the experiment?'.¹⁹

His teaching had a profound effect, heralding a more scientific approach to surgery both in Britain and in America. As one of his pupils, Henry Cline, remarked: 'When I heard this Man, I said to myself, This is all day-light. I felt that I was now enabled to judge of what my experience and observation had taught me; and thought I might, like Mr Hunter, venture to Think for myself'.²⁰

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