

# **The Challenge of Pain**

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**Pain without injury**

Lesch-Nyhan disease is a rare congenital disorder which seems to be the opposite of congenital insensitivity to pain. The children appear normal at birth but they fail to thrive, both mentally and physically. They begin to exhibit self-mutilation, which is the major characteristic of the disease. With cries and appearances of great anguish, the child suddenly and viciously attacks some part of himself, acting as though it was the source of intolerable pain. It is necessary to restrain these children for their own protection. They do not attack others. Postmortem examination of their brains shows no anatomical abnormalities. The disease is tentatively explained as due to a failure to develop one of the essential enzymes which regulate metabolism (enzymeopathy). These children are particularly affected by a class of chemicals – the xanthines – which includes caffeine. In experiments designed to test the chronic effects of extremely large doses of caffeine in rats, it was found that the animals would start to bite viciously at their feet and limbs as though they felt that they were injured.

**Pain disproportionate to severity of injury**

Those who have experienced the passing of a kidney stone describe it as painful beyond any expectation that pain can reach such an intensity. The kidney may, under certain conditions, concentrate some components in the urine so that these compounds precipitate out and form small kidney stones (renal calculi). Small pieces of these stones break off and pass into the ureter that leads from the kidney to the bladder. In size, they are often not more than twice the size of the normal diameter of the ureter. Pressure of urine builds up behind the plug formed by the stone, tending to drive it into the ureter. As a result, the muscle in the ureter wall goes into localized strong contraction. This band of contraction moves down the ureter to produce peristaltic waves to drive the stone down. During this process, agonizing spasms of pain sweep over the patient so that the toughest and most stoical of characters usually collapses. The patient is pale, with a racing pulse, knees drawn up with a rigid abdominal wall and

motionless. Even crying out is restrained because all movement exaggerates the pain. As the stone passes into the bladder, there is immediate and complete relief, leaving a dazed and exhausted patient. The reason for describing this condition here is that in mechanical terms it is a rather trivial event. Furthermore it occurs in a structure which is poorly innervated when compared to any equal volume of skin. In spite of the minor nature of the actual event and the relatively small number of nerve impulses which are sent to the spinal cord, the effect in terms of pain is gigantic.

**Pain after healing of an injury**

Nerve injury of the shoulder is becoming increasingly common because motorcycles are widely accessible and all too often their power is far greater than the skill of their riders. On hitting an obstruction, the rider is catapulted forwards and hits the road at about the speed the bike was travelling. The wearing of crash helmets has effectively decreased head injuries; but the next vulnerable point to hit the road is often the shoulder, which is violently wrenched down and back. The arm is supplied by a network of nerves – the brachial plexus – which leaves the spinal cord at the level of the lower neck and upper chest, and funnels into the arms.

In the most severe of these injuries, the spinal roots are avulsed – that is, ripped out of the spinal cord – and no repair is possible. In 1979, well over a hundred brachial plexus avulsions occurred in England alone. C.A., aged twenty-five, an air-force pilot, suffered such an accident. After eight months he had completely recovered from the cuts, bruises and fractures of his accident. There had been no head injury and he was alert, intelligent and busy as a student shaping a new career for himself. His right arm was completely paralysed from the shoulder down and the muscles of the arm were thin. In addition, the limp arm was totally anaesthetic, so that he had no sensation of any stimuli applied to it. On being questioned, he stated that he could sense very clearly an entire arm, but it had no relationship to his real arm. This 'phantom' arm seemed to him to be placed across his