from Mark F. Bear, Barry W. Connors, and Michael A. Paradiso:
Neuroscience: Exploring the Brain (3rd ed)

Box 18.3  OF SPECIAL INTEREST

The Frontal Lobotomy

Ever since the discoveries by Klüver, Bucy, and others that brain lesions can alter emotional behavior, clinicians have attempted surgery as a means of treating severe behavioral disorders in humans. Today, it is difficult for many people to imagine that destroying a large portion of the brain was once thought to be therapeutic. Indeed, in 1949, the Nobel Prize in Medicine was awarded to Dr. Egas Moniz for his development of the frontal lobotomy technique. Even stranger is the fact that Moniz was shot in the spine and partially paralyzed by a lobotomized patient. Although lobotomies are no longer being performed, tens of thousands were performed after World War II.

Little theory supported the development of the lobotomy. In the 1930s, John Fulton and Carlyle Jacobsen of Yale University reported that frontal lobe lesions had a calming effect in chimpanzees. It has been suggested that frontal lesions have this effect because of the destruction of limbic structures and, in particular, connections with frontal and cingulate cortex. The guiding principle behind the surgery was something like this: The limbic system controls emotion; therefore, people with emotional problems might be helped by altering the system. In other words, a little emotion is a good thing but too much is debilitating, and this problem might be surgically corrected.

A frightening variety of techniques were used to produce lesions in the frontal lobes. In the technique known as transorbital lobotomy, shown in Figure A, a knife was inserted through the thin bone at the top of the eye's orbit. The handle was then swung medially and laterally to destroy cells and interconnecting pathways. Thousands of people were lobotomized with this technique, sometimes called "ice pick psychosurgery," because it was so simple it could be performed in the physician's office. Note that, although it left no outward scars, the physician could not see what was being destroyed.

Frontal lobotomy reportedly had beneficial effects on people with a number of disorders, including psychosis, depression, and various neuroses. The effect of the surgery

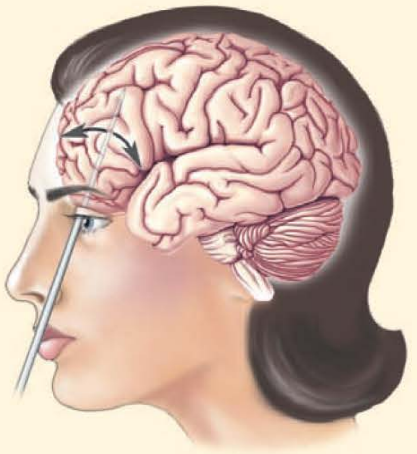

FIGURE A

was described as a relief from anxiety and escape from thoughts that were unendurable. Only later did a pattern of less pleasant side effects emerge. While frontal lobotomy can be performed with little decrease in IQ or loss of memory, it does have other profound effects. The changes that appear to be related to the limbic system are a blunting of emotional responses and a loss of the emotional component of thoughts. In addition, lobotomized patients often developed "inappropriate behavior" or an apparent lowering of moral standards. Like Phineas Gage, patients had considerable difficulty planning and working toward goals. Lobotomized patients also had trouble concentrating and were easily distracted.

Perhaps more to the point, with our modest understanding of the neural circuitry underlying emotion and other brain functions, it is hard to justify destroying a large portion of the brain. Fortunately, treatment with lobotomy decreased fairly rapidly, and today, drug therapy is primarily used instead for serious emotional disorders.