Total Elbow Arthroplasty

Elbow replacement surgery was first described in the 1950s. These early designs were used sparingly due to the complexity of the elbow anatomy, technical difficulty of the surgery and high rates of subsequent prosthetic failure. Over the subsequent two to three decades, advances in understanding of the elbow anatomy, biomechanics, and implant design led to the current elbow replacement prothesis. The most common current total elbow arthroplasty (TEA) design consists of two metal components with long stems that are cemented into the bone canals of the humerus and ulna. These components are then secured (linked) together to remove the painful arthritic joint surface and provide stability to the implants.

The most common indication for TEA is arthritis: osteoarthritis, posttraumatic arthritis, or rheumatoid arthritis. In these conditions, the joint surface that allows for smooth joint motion becomes irregular and painful as it loses its protective cartilage surface. With time, which may be over a number of years, patients will complain of pain, cracking or grinding with use, as well as progressive loss of motion. When this arthritis becomes severe, these symptoms can become functionally debilitating and may lead to a loss in quality of life.

For these patients, TEA can result in dramatic reduction of pain and improved joint function. This surgery is performed through a long incision on the back of the arm that extends over the point of the elbow (olecranon). The ulnar nerve which lies along the inside of the elbow is identified and moved to the front of the elbow for protection (this is called an ulnar nerve transposition). The triceps tendon attachment is protected and the elbow is dislocated which allows the surgeon to visualize the diseased joint surface. Using a saw, these arthritic surfaces are removed and replaced with metal components that mimic anatomic joint surfaces. These implants are secured within the canal of the humerus and ulna with bone cement. Once the components are secured, they are linked together, providing joint stability. A drain is placed and the skin is closed with staples. Typically, the patient remains in the hospital for 1-2 nights and then discharged home. After the skin heals, the patient works to regain motion and may not require any formal physical therapy.

Despite advancements in TEA design, prosthesis longevity is still dependant on the fixation of the cement with the bone and prosthesis (bone-cement interface). Therefore, the TEA is at risk of loosening and failure with over use and weight bearing, and ahs a

reported rate of need for revision surgery between 5-15%. Patients who undergo this surgery therefore will have a life-long weight bearing restriction of 5-10 lbs with any one lifting activity and 2 lbs with any repetitive lifting in order to protect implant fixation. These restrictions narrow which patients may be candidates for TEA, as younger and more active patients that are unable or unwilling to adhere to these strict restrictions should not undergo this procedure.

Ultimately, for the patient who is complaining of life-altering pain and limited function as a result of advanced arthritis in the elbow, and who is also willing to adhere to strict life-long restrictions, TEA can be a very successful surgery. Future investigations into elbow biomechanics, component design and component fixation should continue to improve outcomes following TEA.