MANAGING PROBLEMS IN YOUR JAW JOINT AND RELATED MUSCLES

The public is very familiar with the term “TMJ”. This term has become understood to mean pain in the jaw joint and facial area, or oral-facial pain. The actual term “TMJ” refers to the temporomandibular joint of which each of us has two, a right and a left. The proper terminology for this problem area should be TMD or temporomandibular disorders. This terminology is a broad heading which has numerous sub-categories and an abundance of distinctly different maladies included.

The TMJ is a unique joint. Most joints have a single type of function. Knees, elbows, fingers and toes are hinge joints. Shoulders and hips are rotating joints {ball and socket}. Wrists and ankles are flexing joints. Backs are more complex with two distinctly different functions. The backbones rotate and flex and thus are more complex in function. A general rule of mechanics states the more complex things are made, the more problems with malfunction. This seems to be true with back joints which account for the leading cause for disability in the U.S. The TMJ is the one exception to this rule. The TMJ has three types of movement. The first 20mm {3/4 of an inch} the jaw acts as a hinge. To open beyond that amount would impinge the angle of the lower jaw against the large blood vessels carrying blood to and from the brain. Therefore, the lower jaw does something unique, it comes out of the socket. The lower jaw translates downward and forward down a slope of bone allowing the jaw to open widely. Chewing involves the third type of movement. When you chew, the joint opposite the side on which you are chewing comes out of the socket. The joint on the chewing side rotates like a ball and socket. The TMJ is the exception to the rule of “the more complex, the more problems”. The TMJ is one of the most adaptable and forgiving of all joints.

If asked to name the heaviest weight-bearing joint in the body, most would guess the knees or back. However, that answer is wrong by a factor of hundreds. The TMJ is the heaviest weight-bearing joint in our bodies. Years ago, basic research was carried out to determine just how hard people could bite in order to determine the strength requirements for materials used in the mouth for fillings and crowns. Dental students were used as test subjects being given devices which would measure the force of the bite. These studies determined that men could bite harder than women, back teeth were capable of biting much harder than front teeth and that back teeth could carry as much as 20,000 to 40,000 pounds per square inch. That is one to two hundred times the weight that knees have to carry. This is enough power to crush rock, something teeth do easily when chewing ice. The joints in normal conditions do not bear the brunt of the force. The back teeth are exceedingly important in taking the heavy force and shielding the joints. Loss of back teeth can be a factor in causing increased stress on the TMJ’s.

The functions of the lower jaw are most highly coordinated by the brain using the muscles which open and close the jaw. The lower jaw literally floats in position during normal use dictated by the teeth and what we are eating. In this scenario, the joint actually is of little consequence in eating. This truth is validated by the fact that in trauma to the jaw, when joints are often fractured and dislocated, a person can learn to chew and eat without one or sometimes both.
The younger the patient is when they fracture and dislocate a joint, the more the likelihood that a new joint will grow back in its place. Young toddlers frequently sustain severe falls, have a laceration under their chin, and are taken to the emergency room. Toddlers have faces that are naturally round and plump able to hide the swelling of injury. Toddlers can't talk to express what is wrong, and no teeth for occlusion to be a problem. Therefore, attending emergency room physicians don't routinely order lower jaw x-rays on children and miss the fact they have a broken joint. Evidence of a previous joint fracture may be seen years later in adulthood as a small bony ball to the inside a perfectly normal in appearance replacement joint which has regenerated. Even in adults, some sort of functional joint, although abnormal in appearance on x-ray, will form after complete dislocation of a joint fracture. In the United Kingdom (Great Britain) as a part of their National Health System, one of the ways they manage Chronic TMD is to surgically remove the joint entirely. The focus of treatment after such a fracture or surgery is to teach the muscles and brain to maintain a normal bite. If this can be accomplished, there is usually no need to replace the joint.

TMD is eleven times more prevalent in women than men. The cartilage between the lower jaw and the base of the skull socket normally rides in a stirrup fashion between the bones during movement. In general anatomy classes, in reference to the TMJ, we were taught that the joint cartilage in 60% of women is forward or anteriorly displaced. This was so often the case that it was called “a normal anatomical variant in females”. This cartilage displacement is the cause of clicking or popping which occurs with opening and closing the mouth. Most joints in the body have hyaline cartilage between bones to cushion movement and protect the bone ends. Hyaline cartilage is soft, spongy and easily penetrated or broken. The back bones have between them a different type of material comprising the “disk”. It is made of fibrocartilage, the “steel-belted-radial” of cartilage and the strongest material of its type our bodies have. The cartilage of the TMJ is fibrocartilage, the only appendage joint to contain such a material. We are indeed strangely and wonderfully made to withstand the heaviest abuse in the TMJ.

The most difficult question has always been the reason for such a high incidence of cartilage displacement in women. Men seldom have this problem unless they have a history of trauma to the jaw. Out of breast cancer research has come a possible clue or answer as to the reason for female TMJ problems. Basic research in breast cancer may have given us a clue or answer to this question. It has been noted that a varying percentage of breast cancer cells require estrogen to grow. These cancer cells have estrogen sites on the cell itself to which estrogen attaches in a “lock-and-key” fashion. There are chemotherapy drugs which are pseudoestrogen. They are the keys which fit into the lock but won’t work and won’t come out again. Giving these drugs cause only menopause symptoms and avoid hair loss or other more severe side effects. Without active estrogen, cancer cells can’t reproduce and eventually die of old age. These drugs can eliminate a high percentage of cancer cells which have already gone throughout the body. As a part of this research, a study was attempted to determine if tumors could be tracked using radioactive estrogen scanning. Before using this method, it had to be known where the normal estrogen binding sites were located which might give false markings suggesting a tumor. Women participants in the study didn’t have cancer and men were used as a control. Both were given radioactive estrogen and had follow-up scans. The study indicated the usual sites which would differentiate between women and men. However, there were some unusual differences which had not been anticipated. Women had a high concentration of estrogen binding sites in
the TMJ and the valve controlling tendons in the heart while men had none. Estrogen binding sites in connective tissues are thought to be the reason for increased flexibility in women throughout their lives. Young girls are able to bend backwards and place their head between their knees. Women over 90 can often bend at the waist and place their palms on the floor. These are feats exclusively female. The assumption was made that perhaps this might account for the increased incidence of mitral valve prolapse and TMD in females. The theory that has been proposed is that the cause of the increased incidence of TMJ cartilage displacement is these estrogen sites which account for the increased flexibility leading to disk displacement. This is an important concept. If this is true, and it most probably is, treatment of TMJ disk displacement should be toward management than surgical correction. This is the most likely reason for reoccurrence of disk displacement following surgery to reposition the disk.

Another facet of TMD management which is confusing to the public is the diversity of treatments used to manage the problem. It is difficult to understand that grinding on teeth, wearing a plastic night guard, surgery on the joint, stress management, and physical therapy have any connection. This is because there is not a single cause for TMD. There are three overlapping causes for TMD. The first is joint disease which includes arthritis, cartilage problems, systemic diseases affecting joints and post-traumatic joint problems. The second is bite related issues such as the loss of the joint protecting back teeth, malocclusion and interferences in occlusion. The third cause is bruxism or grinding and clinching the teeth. Not infrequently patients may exhibit severe joint deterioration on x-ray and experience no TMD symptoms at all. The same can be said for patients who have lost all back tooth support or who have horrible malocclusion. In fact, we often see patients with perfect occlusion of all 28 teeth and perfectly normal joints who hurt continuously. How then can anyone make sense of any of these findings. Simply stated underlying problems in bite and joints may be predisposing factors but bruxism is often the trigger.

Effective management of TMD involves coordinate therapy to deal with all 3 facets of causes. Medications are primarily used to manage joint disease. Mechanical problems and joint pain not responsive to medication and other modalities can be managed by surgery. Splint therapy, occlusal adjustments, restorative dentistry, orthodontic therapy, and surgery to realign the jaws are methods to remedy bite related causes. Stress management, sleep alteration therapy, splint therapy and patient awareness are methods of bruxism management. Physical therapy falls into the category of supportive therapy. Studies of different treatment methods have shown almost identical success patterns including the use of placebo(sugar pills). In most cases, TMD is self-limiting and will resolve if treatment doesn’t make it worse. The goal of therapy is to do the least to get the patient “over the hump”. There is no “cookie-cutter” approach to TMD management. Each case is different, often complex, and requires more time to manage. For this reason, initial TMD consultation is limited to our Birmingham office. All follow-up appointments can be made in either office.