

When does trismus 'start'?, What are the risk factors?

Not every person who receives radiation to the head and neck will develop trismus. While there are few published studies, the range of prevalence of the condition is between 10 and 40 percent. The severity of the condition also varies widely, with some patients reporting no limitation to opening, while others are restricted to four or five millimeters. In rare cases, persons with trismus must be intubated due to severe limitation to opening. The severity of the condition varies with the placement of the radiation, the amount of radiation received, and the patient's own ability to tolerate the treatment. In some cases, there is anecdotal evidence that certain chemotherapy agents may exacerbate the condition.

Radiation that affects the temporomandibular joint, the pterygoid muscles, or the masseter muscle, is most likely to result in trismus. The tumors related to this type of radiation include nasopharyngeal, base of tongue, salivary gland, and cancers of the maxilla or mandible. Radiation in excess of 60 Gr. is more likely to cause trismus, than is radiation at levels below that amount. Patients who have been previously irradiated, and who are being treated for a recurrence, appear to be at higher risk of trismus than those who are receiving their first treatment. This would seem to indicate the effects of radiation are cumulative, even over many years.

Radiation induced trismus may begin toward the end of radiation treatment, or at any time during the subsequent 12 months. Most often, we observe tightening that increases slowly over several weeks or months. On occasion, however, we see cases where the condition suddenly worsens with no apparent instigating factor. The condition may worsen over time, remain the same, or the symptoms may reduce over time, even in the absence of treatment. However, the condition is most likely to worsen if not treated.

Some patients who have not received radiation treatment may develop trismus secondary to scarring and edema after surgery. In spite of the difference in the cause of the condition, it appears that diagnosis and treatment is similar for both types of patients. Experience suggests the combination of surgery and radiation to treat cancers of the head and neck places patients at an increased risk to develop trismus.

What's happening to cause this?

The primary factor in limiting jaw motion in the irradiated patient or surgery patient is the rapid formation of collagen secondary to radiation damage or surgery. In planning treatment, it is important to recall that immobile joints also suffer degenerative changes. Thus, while the initial cause of limited motion lies with the connective tissue, degradation of the joint can compound the problem. Joints which are immobilized show very rapid degenerative changes which can make remobilization difficult. Treatment that incorporates motion to the joint in addition to simple stretching has been shown to be more efficacious than treatment that simply stretches connective tissue.

It should be noted that trismus is frequently overlooked. Patients may assume that the reduction in jaw mobility is 'normal', or that it will resolve on its own. It is also easy for radiation oncologists, surgeons and their nurses to overlook the condition. Patients receiving radiation therapy or combined radiation and chemotherapy often require feeding tubes or limit their intake to mostly liquids during treatment. Thus they may not realize the slow progressive onset of trismus, until they attempt to resume intake of soft or solid foods. In its mild form, it is not life threatening and easy to ignore. If left untreated, however it has the potential of making recovery more difficult, as well as increasing problems associated with speech, oral hygiene and swallowing.

A simple test for trismus

Trismus tends to develop slowly. In some patients, it progresses so slowly that they may not notice it until they can only open their mouth to 20mm or less. Treatment that begins early in the progression of the condition is likely to be more effective, and easier on the patient. Because of this, it is important to be proactive in looking for early signs of trismus. One simple test is the 'three finger test'. Ask the patient to insert three fingers into the mouth. If all three fingers fit between the central incisors, mouth opening is considered functional. If less than three fingers can be inserted, restriction is likely.

Treatment options

If the examination reveals the presence of limited mouth opening, and diagnosis determines the condition to be trismus, treatment should begin as soon as is practical. As restriction becomes more severe, the need for treatment becomes more urgent. If treatment is delayed, the difficulty in reversing the condition increases.

Over the years, there have been a wide array of apparatus that have attempted to treat limited movement of the jaw. These devices range from a variety of cages that fit over the head, to heavy springs that fit between the teeth, screws that are placed between the central incisors, and hydraulic bulbs placed between the teeth. The most commonly used treatment appears to be tongue depressors. These are stacked, forced and held between the teeth in an attempt to push the mouth open over time.

Devices range widely in cost. Many devices must be custom made for each patient, thus increasing the cost of treatment. Others, such as continuous passive motion devices are rented on a daily or weekly basis, at rates of up to several hundred dollars per week. The least expensive option is the use of tongue depressors. This low-cost alternative has been used for many years to attempt to mobilize the jaw. However, low cost should not be confused with cost effective. In order to be cost effective, a treatment must be effective. A search of the literature failed to reveal any studies that could demonstrate significant improvement in treating trismus with tongue depressors.

A number of studies have demonstrated the efficacy of one particular product; the Therabite Jaw Motion (<http://www.atosmedical.com>) Rehabilitation System. Buchbinder ([results](#)) studied a population of patients with radiation-induced trismus. Over a ten-week

period, the researchers compared the effectiveness of three different protocols to improve mandibular mobility. At the end of ten weeks, the group using the Therabite System had improved an average of more than 13mm, while the group using tongue depressors improved less than 5mm. A third group, using their fingers to force their mouth open, showed even less improvement.

In another study, researchers at NYU found significant improvement in persons suffering from trismus. This study, which lasted 16 weeks, also found that the use of tongue depressors was not helpful in improving the condition.

One of the benefits of the Therabite System is that it not only stretches the connective tissue that causes trismus, but also allows for proper mobilization of the temporomandibular joint, thus addressing a secondary cause of pain and tightness. This device is generally covered by medical insurance and Medicare, and is well tolerated by the patients. We have found that early use of this device helps to improve mobility of the mandible and also to improve speech and swallowing in a patient population that is at risk of having difficulties with these functions.