



## Oral care and cancer treatment

### ***Cancer becoming more common....***

Sadly cancer has become a significant community problem affecting larger and larger numbers of patients worldwide. Many cancer sufferers are receiving their cancer therapy as outpatients and as a result, more dentists are likely to see patients suffering from cancer in their practices. Managing oral conditions that relate to cancer or to cancer therapy is becoming more and more important.

### ***Importance of oral and dental health....***

This short article aims to address the subject in a fairly broad way to help make people aware of the importance of their dental team and the well-being of their mouth during this period when they are facing cancer treatment. It addresses the importance of good oral care when undergoing either chemotherapy (using drugs aimed at eliminating the cancer cells in their body) or radiation therapy (using ionising radiation to damage the cancer cells). This article also addresses the importance of thorough oral assessment before patients undergo either chemotherapy or radiation therapy of the head and neck regions.

### ***What are “cytotoxic” drugs....***

Chemotherapy uses drugs that damage cells in various ways. The damaging effect is greatest in those cells that are dividing most quickly hence they attack the cancer cells more than the body's own normal cells. Unfortunately, there are some adverse effects that occur even in the body's normal cells when cytotoxic drugs are used. Adverse reactions include damage to bone marrow and a number of other organs of the body resulting in reduced efficiency. Salivary glands may stop producing adequate saliva, lacrimal glands may produce inadequate tears to protect the eyes, and bone marrow may stop producing sufficient white blood cells and platelets. The specific side effects vary from one cytotoxic drug to another. Your oncologist can give you specific information and can tell you the name of the drug used for your treatment.

### ***How does radiation therapy affect the body....***

Exposure of body tissues to ionising radiation results in damage to the cells exposed. Those cells dividing fastest suffer the greatest damage hence the cancer cells are damaged more than normal body cells. However, there is always some damage to the normal tissues that have been exposed to the radiation. The result may be varying degrees of inflammation or cell damage, fibrosis or cell death. Often the blood vessel walls become thickened by fibrous tissue and blood supply to the tissues can be reduced leading to less efficient cellular activity.

### ***Oral effects of cancer treatment....***

The toxic effects of cellular damage may affect the mouth leading to several different abnormalities. Such conditions include the following:

- o **Oral mucositis:** inflammation and/or ulceration of the soft tissues in the mouth resulting in pain or a burning sensation. Different cytotoxic drugs affect the oral tissues to varying degrees.
- o **Oral infection:** infection can arise due to suppressed immune function resulting from depletion in white blood cells. Infection may be bacterial, viral or fungal and is often made worse if the mouth is dry.
- o **Salivary gland dysfunction:** if the salivary glands are exposed to cytotoxic drugs (*drugs that damage or destroy the fastest dividing cells, such as cancer cells but may damage other cells too*), the salivary glands may be adversely affected so that they stop producing an adequate volume of saliva to maintain the oral tissues in a healthy state. Depleted saliva may also leave the soft tissues of the mouth prone to infection, and there may be difficulty experienced speaking, chewing and swallowing. The protective functions of saliva may be inadequate to maintain antibacterial effects with resulting extensive dental decay and increased gum disease activity. A number of other drugs, other than cytotoxic drugs, may reduce salivary production including some blood pressure medications, antidepressants and anti-anxiety medications.
- o **Changed taste sensation:** taste can be impaired in persons with a dry mouth and in people taking cytotoxic drugs.
- o **Secondary nutritional deficiency:** due to difficulty eating certain foods, patients with a dry mouth (xerostomia) may suffer from a deficiency in certain nutritional requirements that may lead to a form of anaemia.



- o **Craniofacial and skeletal development disturbance:** cytotoxic drugs in high doses and radiation therapy may adversely affect cell division and cell differentiation in the region of the head and neck. This may occur if such cytotoxic high dose therapy or radiation therapy is provided before the age of 9 years when much of the cell differentiation for facial development has taken place.
- o **Neurotoxicity:** deep burning pain with no detectable dental or soft tissue cause.
- o **Unexpected bleeding:** due to depletion in platelet numbers, the first stage of clot formation may be adversely affected. As a result clotting can be impaired resulting in spontaneous bleeding into the tissues causing bruising.
- o **Radiation caries:** radiation therapy results in damage to the fastest growing cells and the cells performing most cellular activity. As a result the exposure of the head and neck region to radiation can result in damage to salivary gland tissues with a reduction in the production of saliva. With a reduced salivary flow there is less protection of the teeth and oral soft tissues against bacterial activity and hence the oral bacteria are able to reproduce more quickly. Without the washing effect of saliva, sugar residues from the diet remain in the mouth for far longer providing suitable food substrate for these bacteria to ferment leading to the production of acid to attack the teeth. The result is extensive decay, known as “radiation caries”.
- o **Trismus and fibrosis:** Radiation damage to the tissues results in fibrosis or scarring of the tissues in the area exposed to the radiation. In the area of the head and neck this can result in limited opening of the mouth, known as trismus, and fibrosis around the facial muscles can result in limitation of muscular movements and restriction of movement of the jaw with resulting difficulty eating. In some cases where radiation therapy is localised to the anterior part of the mouth fibrosis and scarring around the lips and cheeks can lead to strictures and narrowing of the mouth.
- o **Osteoradionecrosis:** as a result of radiation damage, fibrosis occurs in the bone in the area irradiated. This scarring often leads to fibrous compression of the small blood vessels in the bone reducing the supply of blood to the bone. Relatively minor trauma or damage to the bone of the jaws that results from tooth extraction or other oral surgery procedures can lead to death of localised areas of bone called osteonecrosis. If a patient has experienced head and neck radiation therapy a suitably qualified dental surgeon should discuss the areas of tissue exposed to the radiation with the radiation oncologist and then a determination of risk can be made prior to treatment planning. If tooth extraction is required from bone that has been in the field of radiation exposure, then it may be necessary to arrange for the patient to receive hyperbaric oxygen therapy. This is the exposure of the patient to oxygen under pressurisation in a recompression chamber as used for the treatment of divers who suffer from the bends. This exposure of the body to high-pressure oxygen leads to the growth of new blood vessels called angiogenesis in the bones, and throughout the body. It is performed many times before oral surgery and many times after oral surgery to ensure the re-establishment of an adequate blood supply to the bone likely to be affected by the surgery.

### ***Dental evaluation prior to cancer treatment***

A detailed oral clinical and radiological examination of the cancer patient is necessary before cancer treatment begins. This examination must include a thorough examination of the teeth, jaws, oral soft tissues, and jaw joints both by clinical examination and digital palpation and should be further supported by full radiological examination. Only X-rays will identify root fractures, root infections and other lesions within the jaw bones that have not yet resulted in symptoms such as pain, tenderness, pus drainage, inflammation or halitosis.

### ***Sometimes tooth removal may be the best option....***

It is often best to remove teeth that have associated infections before cancer therapy as the alternative treatment using root canal therapy (endodontics) may delay cancer treatment and such treatment is not guaranteed to successfully eliminate infection. Return of the infection may lead to a serious systemic infection.

Teeth affected by gum disease with associated bone loss and resulting mobility may also be better removed rather than try to preserve them by advanced periodontal treatment (gum disease treatment) that may not be successful and may take considerable time to achieve an acceptable level of gum health and eliminate infection.

The aim of dental evaluation is to identify any dental or oral infections before chemotherapy or radiation therapy is initiated. Teeth that will be in the field of radiation with a doubtful future should be removed because their removal later could result in osteoradionecrosis, as described above.

### ***Denture patients....***



Patients with missing teeth wearing dentures should have their dentures checked for cleanliness and to ensure they fit well. They should be encouraged to remove the dentures during treatment and never wear them at night, thereby giving the soft tissues a chance to recover from bearing the denture loads during function during the day.

***Clean teeth means less infection....***

Cleaning of the teeth (and possibly dentures) should be offered to minimise the chance of any infection developing during chemotherapy. Any oral infection that arises during chemotherapy has the potential to become a serious systemic infection. Therefore, prevention is of the highest priority.

***Dental preparation for patients about to receive cancer treatment....***

It is an advantage if cancer patients understand the possible oral problems they may suffer from, and the relationship between the oral health and their forthcoming cancer treatment, whether the treatment be chemotherapy, radiation therapy or both. Education plays a very important part in enabling patients to avoid many of the complications that may arise. Areas of education that may be of greatest assistance should concern:

- o oral cleaning,
- o the regular use of a neutral fluoride gel in a custom tray
- o a healthy and nutritionally complete diet
- o avoidance of tobacco smoking (cigarettes, cigars or pipes)
- o avoidance of chewing tobacco or betel nut products
- o avoidance of alcohol
- o explanation of the rationale for the removal of infected teeth or teeth with a doubtful prognosis
- o adequate water intake to assist in fluid balance and support saliva production

***Good advice for patients receiving cancer treatment....***

We routinely advise patients, who are going to undergo cancer treatment:

- to brush teeth and gum margins thoroughly but gently, avoiding a hard toothbrush, after all eating occasions and before going to bed
- to use a fluoride toothpaste when brushing
- to use a neutral fluoride gel 1.1% sodium fluoride for 10 minutes, in a custom gel applicator tray (this may have to be continued after cancer treatment if the production of saliva is permanently impaired)
- to use floss carefully to remove any plaque from between teeth
- to use mouth wash is acceptable as long as alcohol-containing mouthwashes are avoided
- to avoid eating candy or sweets and avoid fizzy/carbonated drinks, many of which contain sugar and are acidic
- to maintain review appointments and regular checks in the future to ensure any oral problems arising after cancer treatment can be detected at the earliest time keeping treatment to a minimum.
- to return for a check and advice if the mouth appears to become dry (for additional measures to prevent dental and oral problems)
- to chew sugar-free chewing gum to encourage the production of saliva regularly

***The timing of dental care and integrating it into cancer therapy....***

If a patient has any oral surgery performed, a period of 10 days healing should take place before chemotherapy should be provided. Surgery should always be avoided during a course of radiation therapy.

Generally a blood screen is arranged for patients who are *currently* on chemotherapy, around 24 hours before dental treatment to ensure there are adequate platelets in the blood (to allow any bleeding to stop if the treatment planned involves surgery), adequate clotting factors (to ensure blood clots well), and an adequate count of neutrophils (to ensure the patient can fight against any infection) before dental treatment can be recommended.

***Integration of combined dental and cancer care....***

Where the dentist feels there is any reason for concern over providing dental or oral surgical care to a cancer patient, the patient's oncologist or radiation oncologist will be contacted and a discussion held to ensure that the treatment



offered is carefully planned and appropriately integrated into the cancer therapy. Every attempt is made to avoid any complications.