




## **MASTEROPPGAVE**

# **Oral complications to head and neck cancer therapy**

**Kristin Bergh**

**Veileder: Maud Bergdahl**



**UNIVERSITETET I TROMSØ**  
**Det helsevitenskapelige fakultet**  
Institutt for Klinisk Odontologi

Juni 2011

## Abstract

Patients with head and neck cancer may experience a broad spectre of debilitating oral complications the after radiotherapy and chemotherapy. The aim of this master thesis was to create information pamphlets in order to inform the patients with head and neck cancer about the possible complications of the cancer treatment and measurers to maintain or establish a good oral hygiene.

Material and methods was divided in to two parts. Part one was a collection of relevant literature, with Pub Med search and using the text books in my dental curriculum. In addition several information pamphlets used at different hospitals and institutions was collected. Part two was the creation of information pamphlets trying by using the most updated and evidence based measures.

During the work with the pamphlet I was introduced to the health literacy term. According to studies one third of the adult population had problems understanding written health information. As a result the pamphlet was created in plain Norwegian language and the most important information was written first.

The pamphlet will be distributed to the patients by the hospital dentist at the special clinic in Tromsø (TkNN). The collaboration between the dental teams and the general health services is in an early phase in Tromsø. Hopefully the multidisciplinary collaboration will be further developed since this is beneficial to the especially vulnerable patients, such as patients with head and neck cancer.

# Table of content

- 1 Introduction ..... 4
- 2 Hypothesis..... 4
- 3 Aim ..... 4
- 4 Background ..... 5
  - 4.1 Head and neck cancer..... 5
    - 4.1.1 Risk factors for head and neck cancer ..... 5
    - 4.1.2 Different therapy regimes for head and neck cancer ..... 6
  - 4.2 Radiation..... 6
    - 4.2.1 Biological effects of radiation..... 6
    - 4.2.2 Oral complications to radiation..... 7
    - 4.2.3 Hyperbaric oxygen therapy ..... 10
  - 4.3 Optimal dental management for patients receiving radiotherapy ..... 10
  - 4.4 Chemotherapy ..... 11
    - 4.4.1 Different treatment regimes ..... 11
    - 4.4.2 Oral complications to chemotherapy..... 11
  - 4.5 Surgery..... 13
- 5 Materials and methods..... 13
- 6 Results..... 15
  - 6.1 Summary of information material created: ..... 15
- 7 Discussion..... 16
- 8 Conclusion..... 17
- 9 Acknowledgements..... 17
- 10 References..... 18
- Appendix 1..... 20
- Appendix 2..... 22
- Appendix 3..... 24
- Appendix 4..... 25

# 1 Introduction

Many patients report problems and pain in the mouth after cancer treatment. Almost all of the patients who receive radiation to head and neck experience oral complications and for those who receive chemotherapy is the oral complications reported to about 40 % [1-3].

The most frequent oral complications of head and neck cancer treatment are:

- Oral mucositis
- Pain
- Hyposalivation
- Infections (bacterial, viral and fungal)
- Caries
- Periodontal disease
- Changes in taste
- Trismus
- Osteoradionecrosis

The oral cavity has a special role in many of the essential functions of everyday life; chewing, talking, smiling, eating, swallowing, kissing, all of them closely related to physical, psychosocial and social functions. Studies have shown that the oral complications of cancer therapy influence the patients' health-related quality of life during and after cancer treatment. These studies emphasize the importance of oral care and oral hygiene [3].

In Norway the general health care is provided and organized by the state, but the dental health care to certain groups is provided and organized by the county, and this may have contributed to the artificial division between the mouth and the rest of the body [4]. Most hospitals in Norway do not have dentists employed [5] and this and other factors may lead to problems when organizing the dental care for the patients with severe diseases, such as cancer. It has been emphasized that close collaboration between the oncological hospital team and the dental team is important [4, 6].

Some hospitals in Norway have created different systems for oral health care to cancer patients. In Tromsø the oral health care and information given to the patients concerning oral health during and after cancer treatment seemed to be insufficient and in need for more organization [7].

## 2 Hypothesis

Therefore I hypothesize that the information given about oral health to the patients with head and neck cancer in Tromsø is not optimal.

## 3 Aim

The aim of this master thesis is to improve the information about oral health and cancer treatment complications to the patient who receive irradiation to head and neck and

chemotherapy in Tromsø. Thus severe oral complications after cancer treatment may be reduced.

## 4 Background

### 4.1 Head and neck cancer

In this paper head and neck cancer is defined as done in Oncolex – the Norwegian internet based oncological encyclopaedia.

The heterogenic group of head and neck cancer consists of 70 % squamous cell carcinoma; the rest is mainly adenocarcinomas and sarcomas.

The region relevant for head and neck cancer consist of:

- Nose
- Sinuses
- Larynx
- Pharynx
- Oral cavity
- Salivary glands

Head and neck cancer accounts for approximately 4 % of all newly detected cancers in Norway [1].

In addition to the head and neck cancers other malignant diseases may lead to head and neck radiation, such as lymphomas, skin cancer, tumours of the central nervous system, metastases and bone marrow transplantation. Oral complications after secondary radiation to the head and neck from irradiation to mammal and thyroid can also occur.

#### 4.1.1 Risk factors for head and neck cancer

Predisposing causes of head and neck cancers are obscure, but in many cases related to [1, 8]:

- Age
- Male gender
- Tobacco; smoking and chewing
- Alcohol
- Sun exposure
- Ionizing radiation
- Betel (areca) chewing
- Immunosuppression and graft versus host disease
- Infections with Human Papilloma Virus (HPV)
- Low socioeconomic status

- Diet, certain occupations and poor oral hygiene appear to increase the risk for oral cancer, but more studies are required.

#### **4.1.2 Different therapy regimes for head and neck cancer**

Established head and neck cancers are treated with different methods according to spread of the tumour, diagnosis and individual aspects [1, 6, 8].

- Radiotherapy
- Chemotherapy
- Surgery
- Combinations of the above-mentioned

In addition the treatment depends on the prognosis of the disease. Curative care aims to cure the cancer. Palliative care concentrates on reducing the symptoms of the disease and slows down the process rather than curing the disease. Supportive care is given to control, prevent and relieve complications to improve the patient health-related quality of life [8, 9].

## **4.2 Radiation**

Patients with established head and neck cancers are often treated with radiation therapy and the biological effects of radiation are described below.

### **4.2.1 Biological effects of radiation**

Radiation therapy works by damaging the DNA in cancer cells. The damage to DNA occurs through direct or indirect effects. The direct effect is when the energy of a photon or a secondary electron ionizes biological macromolecules. Alternatively the indirect effect is when the photon is absorbed by water molecules in an organism, and some of the water is ionized, and the free radicals that are formed in water indirectly can change biological molecules. Since the radiation cannot distinguish between cancer cells and the normal cells the radiation therapy causes side effects [10].

Different cells and organs have different radiosensitivity, this means diverse response to radiation. The most radiosensitive cells have special characteristics; a high mitotic rate and therefore will undergo many future mitoses and are primitive in differentiation (e.g.: basal cells of the oral mucosal membrane and spermatogenic and erythroblastic stem cells). Low radiosensitive cells are highly differentiated and the mature cells will not undergo division (e.g.: neurons and striated muscle cells) [10].

The short-term effects of radiation on a tissue are determined primarily by the sensitivity of the parenchymal cells. These effects are seen in the first days and weeks after radiation therapy because of the reduction of mature cells in continuously proliferating tissues.

The long-term deterministic effects of radiation are seen months and years after exposure. These changes are caused by death of reproductive cells and by damage to the fine vasculature, which leads to death of the cells that depend on oxygen, nutrients and

elimination of waste products from the vascular supply. The effects are loss of parenchymal cells and replacement with fibrous connective tissue, also called a progressive fibroatrophy of the irradiated tissue.

The dose (Gy), dose rate (Gy/min) and oxygen availability are modifying factors that the tumour-, cell-, tissue- and organ response depend on [10]. Because hypoxic condition is less radiosensitive it is important that smoking is avoided at least two hours before radiotherapy sessions, since smoking reduces the blood flow [1, 8, 10]

#### **4.2.2 Oral complications to radiation**

Oral complications to radiation are time specific and presented according to acute and chronic complications [1, 2, 4, 8]:

##### *Acute complications:*

- Oral mucositis
- Infections
- Salivary dysfunction – hyposalivation
- Taste dysfunction
- Pain

##### *Chronic complications:*

- Mucosal fibrosis and atrophy
- Xerostomia and hyposalivation
- Caries
- Pain
- Periodontal problems
- Infections
- Taste dysfunction
  - Dysgeusia (distortion of taste)
  - Ageusia (loss of taste)
- Muscular/cutaneous fibrosis
- Mineralization disturbance
- Soft tissue necrosis
- Osteoradionecrosis

Unlike chemotherapy the radiation therapy is anatomically site-specific, and the risk of oral complications tends to be permanent, because of the inevitable damage to the tissue.

##### **4.2.2.1 Oral mucositis**

The inflammation of the oral mucosa after radiation (or chemotherapeutic agents) is referred to as oral mucositis. The clinical manifestation is erythema and ulceration of the oral mucosa. This is the most common complication of cancer therapy. Mucositis may impair communication, nutritional intake, sleep and increase the risk for sepsis. Thus the mucositis may be debilitating for the patients [2, 4, 8].

#### 4.2.2.2 Infections

The rich bacterial flora normally found in the mouth is altered after radiation therapy, the natural defence mechanisms in the mouth is reduced by the decreased barrier function and delayed wound healing. This in turn leads to proliferation of microbial bio film on the mucosa, invasion of microorganisms and an increased risk of systemic infections, which can be life-threatening [2, 4, 8].

#### 4.2.2.3 Salivary dysfunction

When tumours of the oral cavity, nasopharynx and oropharynx are treated with radiotherapy the salivary gland is likely to be irradiated. The radiation damages the glands blood supply and the salivary glandular tissue. This decreases the salivary secretion and the result is often less saliva with higher viscosity but lower pH. Radiation doses over 30 Gy generally lead to persistently if not permanent dry mouth. Some salivary function may return a few months after the radiation ceased [4, 11].

It is important to distinguish between different terms for dry mouth:

Hyposalivation: the objective reduction of salivary flow.

Xerostomia: the subjective complaint for dry mouth.

Salivary dysfunction can cause dry mouth, dry and cracked lips, burning sensation in mucous membranes, angular cheilitis, problems with dentures, taste disturbances, difficulty in chewing, swallowing and speaking, dental caries, rapid progression of periodontal disease and infections, especially candidiasis. Salivary dysfunction can exacerbate and prolong the process of oral mucositis and reduce the buffer capacity, which in turn increases the risk of progression of caries and periodontal disease. Lack of antimicrobial proteins that are normally found in saliva, will also lead to further risk of developing caries [2, 4, 8, 11].

#### 4.2.2.4 Taste dysfunctions

Taste changes are mainly because of the damage to taste buds, but less saliva is also contributing. Taste may recover after 2-6 months, but is in some cases lost on a permanent basis [8].

#### 4.2.2.5 Pain

Pain is a pronounced symptom of both mucositis and candidiasis. Pain may complicate swallowing resulting in an inadequate nutritional intake [3]. Pain and taste alterations may worsen the weight loss often seen under cancer treatment [11].

#### 4.2.2.6 Caries

Reduction of saliva flow, decreased pH, reduced buffer capacity, increased viscosity and increased colonization with *Lactobacillus spp.* and *Streptococcus mutans* increase the risk for caries. Change to a more cariogenic diet also may contribute. Note that the radiation itself does not influence the course of radiation caries.



The caries manifestations are often atypical and have rapid progression. The most common radiation caries attacks are superficial lesions attacking the enamel surfaces, but it is common to see a circumferential caries attack of the root cementum and dentin, resulting in a breakage of the whole crown [2-4, 10, 11].

The importance of good oral hygiene and frequent visits to the dentist or dental hygienist is of pivotal importance after radiation [2, 4, 8, 11].

#### ***4.2.2.7 Periodontal problems***

Salivary gland dysfunction may contribute to increase the progression of periodontal disease with pocket formation, gingival recession and bone loss [4].

The infected and inflamed periodontium can act as a focus for systemic infection [2].

#### ***4.2.2.8 Muscular / cutaneous fibrosis***

When the arteries are irradiated the inner lining of the arteries become inflamed, this can lead to a reduction of blood supply to the muscles. This often leads to a transformation from muscular tissue to a less elastic fibrous tissue, resulting in problems with swallowing and trismus. This may also contribute to an increased weight loss and a decreased health-related quality of life [8, 11].

#### ***4.2.2.9 Mineralization disturbances***

Children receiving radiotherapy to the jaws often show defects in the permanent dentition, manifested as incomplete root development, small clinical crowns or failure to form one or more teeth [10].

#### ***4.2.2.10 Soft tissue necrosis***

Soft tissue necrosis can involve any mucosal surface in the mouth. Trauma and injury is often associated with non-healing soft tissue necrotic lesions, but spontaneous lesions can also appear. Soft tissue necrosis begins as an ulcerative break of the mucosal surface and can spread in diameter and depth. It is associated with pain and when the soft tissue necrosis becomes worse the pain increases. Secondary infection is a risk [2, 10].

#### ***4.2.2.11 Osteoradionecrosis***

Osteoradionecrosis is one of the most severe complications of radiation, because of the lack of curative treatment and the debilitating effect on oral functions, appearance and psychosocial problems associated with the disease [12]. Different definitions of osteoradionecrosis varied to include soft tissue, duration and extent. One of the definitions of osteoradionecrosis is: Radiological evidence of bone necrosis within the radiation field, where tumour recurrence has been excluded [12]. Osteoradionecrosis can occur in all bones, but the mandible is especially prone to osteoradionecrosis, most likely because of the vascular patterns. In osteoradionecrotic area the cellular activity and collagen formation in bone is weakened, leading to hypoxic, hypocellular and hypovascular tissue [13].

### 4.2.3 Hyperbaric oxygen therapy

When oxygen is used in medicine at a higher level than atmospheric pressure it is called hyperbaric oxygen therapy, and is used as treatment for decompression sickness and irradiated tissue injury among others. The positive effect on radiated tissue comes as a result of the ability to improve blood supply. The Cochrane Collaboration Review on hyperbaric treatment for late radiation tissue injury concluded that there is evidence for the use of hyperbaric treatment following a tooth extraction in an irradiated field [14]. In Norway hyperbaric oxygen therapy is only given at Haukeland University hospital, Bergen. Because of tobacco smoking negative effects on the blood supply it is important that the patients stop smoking during the hyperbaric oxygen therapy.

## 4.3 Optimal dental management for patients receiving radiotherapy

The patients who receive radiotherapy to head and neck are in need for particularly supervision from dental team before during and after radiotherapy.

### *Before radiotherapy:*

A full examination of the oral cavity is performed and all teeth should be carefully examined. Panoramic and full mouth x-ray series should be taken. Good oral hygiene should be implemented. Preventive and restorative dental care should be done. Neglected and unsalvageable teeth in the radiation path should be extracted, this means teeth with

- periradicular infections, both acute and chronic
- partially erupted teeth
- teeth with extensive bone loss, furcation involvement and deep periodontal pockets

The extractions should be carried out as atraumatic as possible and at least two weeks before radiotherapy begins. There are indications for antibiotic prophylaxis and no bone should be left exposed in the mouth when the radiotherapy begins since the blood supply is damaged and the wound healing is jeopardized [8, 11].

### *During radiotherapy:*

Daily or at least weekly visit to a dental hygienist who is experienced in cancer care. The patients often need help with cleaning the teeth and the mucosa properly because of the pain from the mucositis. In addition it is emphasized that the patients are motivated to perform as proper as possible oral hygiene daily on their own. Fluoride in high concentrations should be administered frequently.

If the patients experience severe mucositis and secondary infections this should be treated

individually and controlled.

To prevent and improve trismus, a jaw opening exercise should be performed three times daily.

Smoking and alcohol should be avoided [8, 11].

#### *After radiotherapy:*

Proper oral hygiene and preventive measures should be carried out. Patients should be encouraged and motivated to maintain a frequent fluoride administration because of the rapid progression of caries. A close follow-up by dentist and dental hygienist is desirable.

If dentures are required they should be fitted about 4-6 weeks after radiotherapy.

The patient should be informed that teeth should not be extracted later in life, because of the risk for osteoradionecrosis [8, 11].

## **4.4 Chemotherapy**

Chemotherapy is rarely used alone in head and neck cancer therapy [1, 2, 8, 9]. Oral complications to chemotherapy are less common than radiation therapy complications [6, 9].

### **4.4.1 Different treatment regimes**

Chemotherapy are in many cases used together with surgery and radiation according to different regimes [9]:

- Neoadjuvant – before radiation
- Concomitant – almost at the same time as radiation
- Adjuvant – after radiation

Studies have shown that for instance squamous cell carcinomas of the mouth are responsive to some chemotherapy agents, such as Methotrexate, Cisplatin, Carboplatin, Flurouracil, Paklitaxel and Docetaxel [9].

### **4.4.2 Oral complications to chemotherapy**

Chemotherapy used to treat head and neck cancer can cause many of the same complications as radiation particularly if the treatment is prolonged and in high dosage [4, 8, 9]:

- Oral mucositis
- Infections
- Xerostomia and hyposalivation
- Caries
- Mineralization disturbances
- Taste disturbances
  - Dysgeusia (distortion of taste)

- Ageusia (loss of taste)

The oral complications after chemotherapy are often not sustained and as side-specific, in contrast to radiotherapy. Note that patient treated for other cancers than head and neck cancer, may also experience these oral complications.

#### **4.4.2.1 Oral mucositis**

The inflammation of the oral mucosa due to chemotherapeutic agents is referred to as oral mucositis. Mucositis is caused by the alteration in the epithelial proliferation. The clinical manifestation is erythema and ulceration of the oral mucosa. This is the most common complication of chemotherapy. Patients receiving high dosage chemotherapeutic agents have described the pain from oral mucositis as the worst side effect of the treatment. The increased risk for sepsis and difficulties eating, swallowing, talking is often debilitating for the patients.

Mucositis may impair communication, nutritional intake and sleep [3, 4, 6, 8].

#### **4.4.2.2 Infections**

Change in oral micro flora in cancer may cause local and systemic infections.

Chemotherapeutic agents have immunosuppressive and cytotoxic effect and will reduce the oral mucosa defence

mechanisms by inducing epithelial atrophy, ulcerations, reduced saliva secretion and decrease the number of white blood cells. This can lead to increased risk of systemic infections [4, 6, 8].

#### **4.4.2.3 Xerostomia and hyposalivation**

Xerostomia can be the result of some chemotherapeutic agents, but the incidence is not as high as with radiation [8].

#### **4.4.2.4 Caries**

An increased risk for caries can be the result of a possible xerostomia but a more cariogenic diet may also contribute [6, 8].

#### **4.4.2.5 Mineralization disturbances**

Chemotherapeutic agents cause alterations in the cell cycle and intracellular metabolism, this contributes to alterations in ameloblast activity in children receiving chemotherapy which can lead to enamel defects and peg shaped short roots [6].

#### **4.4.2.6 Taste disturbances**

Taste alterations can be related to the toxic effect on taste receptors and xerostomia [6].

## 4.5 Surgery

In general small and non metastatic tumours is removed surgically without additional radiation, but if there is doubt that the cancer cells have been totally removed an additional re-excision is performed or postoperative irradiation is given [1].

If the tumours are more extensive the surgery may include bone resection and extensive soft tissue resection. Skin / muscle patches and free grafts enable the surgeons to do extensive surgery and be able to close the wounds afterwards.

If lymph nodes are involved a neck glandular recession is often performed [1].

Because of the differences in the procedures and the anatomically differences I will not go more in detail about different interventions.

## 5 Materials and methods

The present study is divided in two parts.

Part one: Collection of relevant information

Part two: Creating patient and dentist information pamphlets.

### *Part one*

Information collection:

- Pub Med search with search terms: head, neck, cancer, prevention, chemotherapy, radiation, oral, hygiene and complications.
- Relevant literature used in my curriculum.
- Health care and oral rehabilitating program for cancer patients made by Oncologisk Centrum at Karolinska University Hospital, Stockholm [11].
- Patient and dentist written information already in use at different institutions in Norway:
  - Haukeland University Hospital, Bergen [15].
  - St. Olavs Hospital, Trondheim [16].  
This information is unpublished and I have acquired this by personal correspondence with dentists at the hospitals.
  - Radiumhospitalet, Oslo. Obtained information from oncolex.no.
- Discussion with experienced hospital dentists:
  - Maud Bergdahl, professor and former hospital dentist in Umeå.
  - Øyvind Skjeldal, hospital dentist in Tromsø.
  - Sara Bergstrand, hospital dentist in Trondheim.
- Witness the treatment of patients with manifest osteoradionecrosis at the dental specialist clinic in Tromsø, TkNN.
- Meeting with Den Norske Kreftforening and reading their information pamphlets.

### *Part two*

Create different information material which can be handed out to the patient with manifest head and neck cancers at the dental specialist clinic in Tromsø (TkNN).

## 6 Results

It was difficult to find good evidence for the agents and procedures used as patient information at the different departments. Furthermore only a few systematic reviews regarding agents used to minimize oral complications after cancer therapy, and many of the agents that were mentioned are not available or used in Norway.

When reading the different patient information pamphlets I found some of them easier to read than other. Eventually I was introduced to the health literacy field. The World Health Organization (WHO) has defined as health literacy as: “Health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use the information in ways which promote and maintain good health.” [17].

Key elements for written products to improve the usability of oral health information are [17]:

- Plain language
- The most important points organized and presented first
- Complex information broken down into understandable segments
- Simple language to define technical terms
- Complex dental terms should be explained

Since xerostomia and hyposalivation is a common problem, I saw the need for a pamphlet with a main focus on preventing dental problems with xerostomia. Therefore I created a more versatile pamphlet for everyone with xerostomia and hyposalivation, not only cancer patients.

### 6.1 Summary of information material created:

**Appendix 1:** [PASIENTINFORMASJON OM MUNNSTELL OG TANNHELSE](#) - Til deg som skal få eller har fått strålebehandling mot hode / hals

**Appendix 2:** [PASIENTINFORMASJON OM MUNNSTELL OG TANNHELSE](#) - Til deg som skal få cellegiftbehandling

**Appendix 3:** [TANNLEGEINFORMASJON](#) – Til behandlende tannlege for pasient som har fått strålebehandling mot hode / hals

**Appendix 4:** [MUNNPLEIEGUIDE](#) til munntørre pasienter

## 7 Discussion

After having read the different dentist and patient information from Karolinska [11], Haukeland [15] and St. Olavs Hospital [16] I identified many similarities, but some differences in the guidelines for cancer patients.

Therefore I discussed the different guidelines with clinically experienced dentists on which of the different products and agents I should recommend in my pamphlets. Easily available agents and measures were chosen, since they may be easier to implement for the patients.

According to the ALL survey [18] conducted in Norway 2003 one third of the Norwegian adult population had difficulties understanding written information. Individuals at highest risk for low literacy include individuals older than 65 years, those who have less than high school education and those belonging to ethnic minority groups [17].

Thus, many of the low literacy risk factors coincides with some of the risk factors for head and neck cancer (see chapter 4.1.1) and this supports the importance of keeping the information simple and reasons following the rules for usability according to oral health literacy [17].

It is also important to emphasize that a cancer diagnosis is associated with great emotional stress, and in this setting the importance of tooth brushing is not central for the patient.

After having been introduced to literacy I had to rephrase and reorganize parts of the pamphlets. Hopefully this has made the pamphlets easier to read also for those with low literacy. To ensure that the pamphlets are easy to understand I got several people with different backgrounds to read them and asked questions afterwards to ensure that they had understood them completely. And by this I realized that I had to put additional emphasis on the key points.

Cancer therapy may be seen as a period when “everything goes wrong” seen from the dentist point of view. Hyposalivation, impaired wound healing, nausea, pain, mucositis and sometimes a more cariogenic diet may lead to an accelerated decay of the mouth. Oral complications may compromise the cancer treatment and provide impaired quality of life, lead to social dysfunction and lead to socio-economic problems. Hence the remission of the disease and the survival may be affected.

Emphasis may be put on that information given is not the same as performed, but may be one step in the right direction and may help the affected patients.

The focus in this master thesis is head and neck cancer, but cancer in other regions also may give oral complications. In addition haematological diseases and bone marrow transplantation have many similarities in treatment and oral complications.

To decrease and prevent the oral complication after cancer therapy the dental team should be part of the oncological team [4, 6]. A multidisciplinary collaboration is beneficial for the



cancer patients, especially since many doctors and nurses show less interest for the oral cavity than for the rest of the body [3]. The collaboration between the dental team and the oncological team is in an early phase in Tromsø. Hopefully the establishment of a specialist clinic (TkNN) in 2003 and a specialist education in Clinical Odontology in 2011 in Tromsø may contribute to a closer collaboration between the hospital and the dental teams.

The patient information pamphlets that I have created will not be distributed at the hospital in Tromsø, but by the hospital dentist. This means that not all of the patients who receive radiation therapy at the hospital in Tromsø will get the newly produced information, but only those who are referred to the hospital dentist.

It would have been beneficial if the hospital and the specialist clinic in Tromsø (TkNN) together could have made procedures regarding the oral health of the head and neck cancer patients, as they have done in Stockholm [11]. However, shortage of personnel and fundings makes this difficult at the moment. Hopefully procedures will establish in the future.

In September 2011 a conference is scheduled in Tromsø regarding hospital dentistry in Norway. This is collaboration between UNN and TkNN and hopefully this is an important step in the multidisciplinary collaboration in Tromsø.

The hypothesis in this thesis was that the information about oral complications to head and neck cancer patients in Tromsø is not optimal, but it is difficult to confirm the hypothesis without a closer collaboration with the hospital in Tromsø. To relieve the hospital dentist work I have created pamphlets when encountering the head and neck cancer patients, and hopefully this contributes to a reduction of oral complications for patients suffering from treatment complications after head and neck cancer.

## **8 Conclusion**

Head and neck cancer has severe physical complications for those affected by the wide range of serious diseases, in addition the great mental stress associated to the uncertainties of long-term survival, daily living and life quality. Some of the oral complications can be avoided or reduced by simple measures. The organisation of the health system, which increases the artificial division between the mouth and the rest of the body, is maintained by the not optimal cooperation between dental health services and general health services. Hopefully the multidisciplinary collaboration will become closer over time, and the dental team should be part of the oncological team also in Tromsø.

## **9 Acknowledgements**

Maud Bergdahl, my supervisor for all the help and guidance with the master thesis.

Linda Molund, for introducing me to literacy and the constructive feedback on the patient information pamphlets.

Øyvind Skjeldal, for information and providing relevant patients to observe.

Kåre Bergh, for always being there and for guidance.

Erland Lundby, for computer help and all the patience.

## 10 References

1. Oncolex, Norwegian Online Cancer Encyclopedia. Available from: <http://oncolex.no/en/Hodehals.aspx> (read 06.01.2011).
2. National Cancer Institute, Oral Complications of Chemotherapy and Head/Neck Radiation. Available from: <http://www.cancer.gov/cancertopics/pdq/supportivecare/oralcomplications/HealthProfessional> (read 06.01.2011).
3. Öhrn K, Oral health and experience of oral care among cancer patients during radio- or chemotherapy. [Doctoral dissertation]. Uppsala Universitet; 2001.
4. Herlofson, BB, K Løken. Hvordan påvirkes munnhulen av kreftbehandling? Tidsskr Nor Lægeforen 2006; 126: 1349 - 52.
5. Widström E, Bergdahl M, and Nordengen R. A survey of the availability of specialist dental and oral medicine services at hospitals in Norway. OHDMBSC 2009; VIII: 22-27.
6. Skår R, Løes IM, Thorsen L, Afnan S, Løes S. Cytostatika og oral helse. Nor Tannlegeforen Tid 2010; 120: 968-73.
7. Aspås AS, Birkeland HH, En oversikt over tannbehandlingstilbudet til pasienter med kreft i hode- hals regionen. [Bachelor thesis]. University of Bergen; 2010.
8. Scully C, Medical Problems in Dentistry. Churchill Livingstone, 6th ed; 2010, p. 517-38.
9. Dahl O, Lehne G, Baksaas I, Kvaløy S, Christoffersen T. Cytostatikaboken, Available from: <http://cytostatikaboken.moses.no/> University in Oslo, 2009.
10. White SC, Pharoah MJ. Oral Radiology- Principles and interpretation. Mosby Elsevier, 6th ed; 2009, p. 17-30.
11. Oncologiskt Centrum Stockholm, Vårdprogram 2007 MUNVÅRD. Karolinska Universitetssjukhuset Stockholm- Gotland, 2007.
12. Støre G, Mandibular Osteoradionecrosis, [doctoral dissertation] University of Oslo; 2001.

13. Marx RE, Osteoradionecrosis. A new concept of its pathophysiology. J Oral Maxillofac Surg. 1983; p. 283-288.
14. Bennett MH, Feldmeier J, Hampson N, Smee R, Milross C. Hyperbaric oxygen therapy for late radiation tissue injury. Cochrane Database of Systematic Reviews 2005, Issue 3.
15. \*Informasjon til behandlende tannlege vedrørende pasienter som har fått strålebehandling mot hode/halsregionen  
\*Informasjon til deg som får strålebehandling mot hode/halsområdet, Haukeland Universitetssykehus, Tannklinikken ved Kjevekirurgisk avdeling- Helse Bergen; 2010.
16. \*Informasjonsskriv til behandlende tannlege angående pasienter som er strålebehandlet i hode-halsregionen  
\*Pasientinformasjon til pasienter som skal ha strålebehandling mot hode/ halsområdet  
\*Pasientinformasjon etter strålebehandlingen er avsluttet  
\*Pasientinformasjon om munnpleie ved cytostatikabehandling, St. Olavs Hospital, TannTeam, Trondheim; 2010.
17. Horowitz A, Kleinman D, Oral Health Literacy: The new Imperative to Better Oral Health. Dent Clin N Am, 2008: p. 333-344.
18. Lesesenteret, University of Stavanger, Available from: <http://lesesenteret.uis.no/forskning/leseundersokelser/all/> (read 06.01.2011).

## Appendix 1

# PASIENTINFORMASJON OM MUNNSTELL OG TANNHELSE

---

### *Til deg som skal få eller har fått strålebehandling mot hode/hals*

Strålebehandling mot hode/hals kan gi bivirkninger i munnhulen, og her vil vi gi noen råd om hva du kan gjøre for å forbygge og lindre eventuelle problemer.

#### **FØR STRÅLEBEHANDLINGEN:**

Undersøkelse av tenner og kjever bør gjøres hos tannlege. Det er viktig at eventuelle infeksjoner i munnhulen og dårlige tenner blir fjernet, slik at sårene får noe tid til å gro før strålebehandlingen startes.

#### **MULIGE BIVIRKNINGER UNDER OG ETTER STRÅLING**

Noen bivirkninger kan være forbigående.

- såre slimhinner
- munntørrehet
- økt fare for hull i tennene
- endret smak
- tannkjøttssykdom
- infeksjoner med bakterier, virus eller sopp
- vanskeligheter med å spise og svelge
- smerter

#### **UNDER OG ETTER STRÅLEBEHANDLINGEN**

God munnhygiene er viktig slik at du kan forbygge skader og lindre plager.

#### **GRUNDIG RENHOLD AV TENNER OG SLIMHINNER:**

- Børst tennene 2 ganger om dagen. Bruk gjerne en liten og myk tannbørste med en fluortannkrem uten såpestoff, for eksempel Zendium® Biotene® eller Salutem®.
- Husk å børste tungen.
- Etter måltider bør munnen skylles, gjerne med fysiologisk saltvann.
- Dersom det er vanskelig å pusse tennene på grunn av såre slimhinner er det spesielt viktig at du skyller munnen godt. 1 % Hydrogenperoksidløsning kan gjerne brukes.
- Det finnes bedøvende midler om du har behov for smertelindring i munnen, for eksempel ved måltider. Spør legen din om dette.
- Om du har proteser i munnen bør disse også børstes to ganger om dagen med en protesebørste. Hvis protesene sitter dårlig eller det er veldig ømt, er det lurt å bruke protesene minst mulig. Proteser bør helst ligge i et glass med vann om natten.

#### **FOREBYGGING AV HULL I TENNENE:**

Anbefales på grunn av økt risiko for hull i tennene hovedsakelig på grunn av nedsatt spyttsekresjon.

- Fluortabletter: 0,25mg fluor- finnes i ulike smakstyper. Flux® eller Nycodent®.
- Spyttstimulerende pastiller: Kan tas for å hjelpe til om man kan produsere spytt. Xerodent® sugetabletter inneholder 0,25 mg fluor i tillegg til eplesyre som øker spyttsekresjonen.
  - Personer over 12 år kan ta inntil 12 tabletter med 0,25mg fluor om dagen.
- Fluorskyllevæske: bør ikke inneholde for mye alkohol, da dette ofte irriterer slimhinnene. Skyllvæsken bør ha en fluorkonsentrasjon på 0,2% Fluor. Eksempelvis; Natriumfluorid® eller Flux®.
- Fluortyggegummi: Fluorette®
- Man kan gjerne variere fluorbruken med fluortabletter, fluortyggegummi og fluorskyllevæske.

#### **MUNNTØRRHET:**

Stråling mot spyttkjertler kan gi nedsatt spyttsekresjon. Spyttets rensende og smørende effekt kan bli dårlig. Her er noen tiltak som kan hjelpe:

- Drikke vann eller **SUKKERFRITT** mineralvann, slik som Farris
- Stimulere spyttsekresjon ved hjelp av sukkerfri tyggegummi eller sukkerfrie pastiller. For eksempel Xerodent®, Dekadin Saliva® eller Salivin®.
- Smøre slimhinnene kan man gjøre med:
  - Proxident® spray eller Saliva orthana® spray, som smører og fukter slimhinnene.
  - Man kan selv lage en blanding med nøytral matolje blandet halvt om halvt med vann og helle den i en liten sprayflaske. Eventuelt en dråpe Vademecum® for litt smak.
  - Zendium Saliva Gel® og Biotene® er geler som man kan smøre slimhinne med for å lette plager fra tørre slimhinner.
- Smøre lepper. God leppepomade smøres på leppene ved behov for å hindre sprekker i leppene. Slik som Blistex® eller Vaseline®.

#### **TRYGDERETTIGHETER**

Snakk med din tannlege om mulighet for dekning av tannlegeutgifter. Folketrygdens forskrifter og rundskriv har bestemmelser om dekning av utgifter til tannbehandling for pasienter med kreft og etter kreftbehandling. Merk at trygdens full dekning ikke betyr at hele regningen dekkes, da tannlegene har andre takster enn offentlig honorartakster.

#### **FRAMTIDIG TANNBEHANDLING**

På grunn av at bestrålt vev har dårligere blodgjennomstrømning er det **VIKTIG** at du opplyser din tannlege og tannpleier at du har fått strålebehandling mot hode/ hals.

Det anbefales at du går til hyppige kontroller hos tannlege eller tannpleier, helst hver tredje måned det første året etter strålebehandling.

**SOM EN GENERELL REGEL GJELDER DET AT MAN ALDRI SKAL TREKKE TENNER I OMRÅDER SOM HAR BLITT BESTRÅLT.**

*Dersom du har problemer i munnhulen bør du opplyse din tannlege, tannpleier, lege eller sykepleier om dette.*

## Appendix 2

# PASIENTINFORMASJON OM MUNNSTELL OG TANNHELSE

---

### *Til deg som skal få cellegiftbehandling*

Noen cellegiftbehandlinger kan gi deg bivirkninger i munnhulen, og her vil vi gi noen råd om hva du kan gjøre for å forbygge og lindre eventuelle problemer.

### **MULIGE BIVIRKNINGER I MUNNHULEN UNDER OG ETTER CELLEGIFTBEHANDLING**

De fleste av bivirkningene er forbigående.

- såre slimhinner
- munntørrhet
- økt fare for hull i tennene
- endret smak
- infeksjoner med bakterier, virus eller sopp
- smerter

### **UNDER OG ETTER CELLEGIFTBEHANDLINGEN**

God munnhygiene er viktig slik at du kan forbygge skader og lindre plager.

### **GRUNDIG RENHOLD AV TENNER OG SLIMHINNER:**

- Børst tennene 2 ganger om dagen. Bruk gjerne en liten og myk tannbørste med en fluortannkrem uten såpestoff, for eksempel Zendium® Biotene® eller Salutem®.
- Husk å børste tungen.
- Etter måltider bør munnen skylles, gjerne med fysiologisk saltvann.
- Dersom det er vanskelig å pusse tennene på grunn av såre slimhinner er det spesielt viktig at du skyller munnen godt. 1 % Hydrogenperoksidløsning kan gjerne brukes.
- Det finnes bedøvende midler om du har behov for smertelindring i munnen, for eksempel ved måltider. Spør legen din om dette.
- Om du har proteser i munnen bør disse også børstes to ganger om dagen med en protesebørste. Hvis protesene sitter dårlig eller det er veldig ømt, er det lurt å bruke protesene minst mulig. Proteser bør helst ligge i et glass med vann om natten.
- Dersom blodplateverdiene dine er under 20 bør du utøve stor forsiktighet ved tannpuss. Tanntråd/tannpirker/mellomromsbørster frarådes. Dette på grunn av blødningsfaren. I slike situasjoner kan munnpensel eller munnsvamp med saltvann brukes.

#### FOREBYGGING AV HULL I TENNENE:

Anbefales på grunn av økt risiko for hull i tennene hovedsakelig på grunn av nedsatt spyttsekresjon.

- Fluortabletter: 0,25mg fluor- finnes i ulike smakstyper. Flux® eller Nycodent®.
- Spyttstimulerende pastiller: Kan tas for å hjelpe til om man kan produsere spytt. Xerodent® sugetabletter inneholder 0,25 mg fluor i tillegg til eplesyre som øker spyttsekresjonen.
  - Personer over 12 år kan ta inntil 12 tabletter med 0,25mg fluor om dagen.
- Fluorskyllevæske: bør ikke inneholde for mye alkohol, da dette ofte irriterer slimhinnene. Skyllevæsken bør ha en fluorkonsentrasjon på 0,2% Fluor. Eksempelvis; Natriumfluorid® eller Flux®.
- Fluortyggegummi: Fluorette®
- Man kan gjerne variere fluorbruken med fluortabletter, fluortyggegummi og fluorskyllevæske.

#### MUNNTØRRHET:

Spyttets innhold og mengde kan bli endret under cellegiftkurer. Spyttets rensende og smørende effekt kan bli dårlig og her er noen tiltak som kan hjelpe:

- Drikke vann eller **SUKKERFRITT** mineralvann, slik som Farris
- Stimulere spyttsekresjon ved hjelp av sukkerfri tyggegummi eller sukkerfrie pastiller. For eksempel Xerodent®, Dekadin Saliva® eller Salivin®.
- Smøre slimhinnene kan man gjøre med:
  - Proxident® spray eller Saliva orthana® spray, som smører og fukter slimhinnene.
  - Man kan selv lage en blanding med nøytral matolje blandet halvt om halvt med vann og helle den i en liten sprayflaske. Eventuelt en dråpe Vademecum® for litt smak.
  - Zendum Saliva Gel® og Biotene® er geler som man kan smøre slimhinne med for å lette plager fra tørre slimhinner.
- Smøre lepper. God leppepomade smøres på leppene ved behov for å hindre sprekker i leppene. Slik som Blistex® eller Vaseline®.

#### PROTESER

Dersom du har proteser i munnen kan det i perioder bli vanskelig å bruke protesene. Ved munntørrhet vil protesene sitte dårlig. Vekttap kan også gi dårlig passform på protesene. Ved spesielt skjøre og tynne slimhinner kan protesene lage sår dersom du opplever dette bør du bruke protesene minst mulig. Dersom du er plaget med soppinfeksjoner vil soppen gro også på protesene, derfor er det viktig at også protesene lir behandlet med soppmiddel.

#### TRYGDERETTIGHETER

Snakk med din tannlege om mulighet for dekning av tannlegeutgifter. Folketrygdens forskrifter og rundskriv har bestemmelser om dekning av utgifter til tannbehandling for pasienter med kreft og etter kreftbehandling. Merk at trygdens full dekning ikke betyr at hele regningen dekkes, da tannlegene har andre takster enn offentlig honorartakster.

*Dersom du har problemer i munnhulen bør du opplyse din tannlege, tannpleier, lege eller sykepleier om dette.*

## Appendix 3

### TANNLEGEINFORMASJON

---

*Til behandlende tannlege for pasient som har mottatt stråleterapi mot hode/hals*

Pasientens navn:	
Fødselsdato:	
Diagnose:	
ICD-10 kode:	
Terapi:	
Strålefelt og dose:	
Stråleperiode:	
Tannbehandling utført:	

Strålebehandling mot hode/hals gir ofte en del bivirkninger slik som munntørrehet, mukositt, smerter, infeksjoner, smaskforstyrrelser, redusert gapeevne, fibrose, atrofi av muskler, periodontale problemer og spesielt rask kariesutvikling.

Derfor er det ønskelig at disse pasientene får en spesielt tett oppfølging av egen tannlege/tannpleier, eksempelvis 2-4 ganger årlig de første årene.

**På grunn av mulighet for utvikling av osteoradionekrose etter ekstraksjoner anbefales det generelt at man ALDRI trekker tenner dersom kjevene er bestrålt.**

Det er indikasjon på antibiotikaproylaks dersom man må ekstrahere i lavbestrålt område, utføre endodontisk behandling eller subgingival scaling.

Folketrygdens § 5-6 med tilhørende forskrifter og rundskriv har bestemmelser om dekning av utgifter til tannbehandling.

Vedlagt finner du også pasientinformasjon om munnstell og tannhelse.

Ta gjerne kontakt med TkNN hvis du lurer på noe. Telefon: 77 78 90 00.

Utført av	Sted	Dato



# MUNNPLEIEGUIDE TIL MUNNTØRRE PASIENTER



## RÅD FOR Å FOREBYGGE OG LINDRE PLAGENE VED MUNNTØRRHET

- Grundig renhold av tennene to ganger om dagen. Det er spesielt viktig å pusse tennene før man går og legger seg på kvelden - ikke glem å pusse tunga
- Drikk vann og fukt munnen med vann
- Bruk fluortilskudd
- Stimuler spyttproduksjonen mellom måltider med **sukkerfri** tyggegummi eller **sukkerfrie** pastiller
- Begrense inntaket av sukkerholdige drikker og søtsaker
- Unngå munnskyllevæsker med alkohol da de ofte virker irriterende på såre slimhinner
- Dersom du har proteser er det ekstra viktig at disse rengjøres godt. Ta de helst ut av munnen om natten

## ULIKE PRODUKTER SOM ER EGNET VED MUNNTØRRHET

- Myk eller ekstra myk tannbørste, gjerne med lite børstehode
- Tannkrem som ikke inneholder skummiddel er mer skånsom for slimhinnene: Zendium<sup>®</sup>, Biotene<sup>®</sup> eller Salutem<sup>®</sup>
- Fluortilskudd - Flux<sup>®</sup> sugetabletter og tyggegummi
- Fluorskyllevæske med 0,2 % Natriumfluorid - NAF<sup>®</sup>, Flux<sup>®</sup>
- Preparater som stimulerer spyttsekresjonen - Xerodent<sup>®</sup>, Dekadin saliva<sup>®</sup>, Salivin<sup>®</sup>
- Sprayflasker
  - med kunstig spytt - Saliva Orthana<sup>®</sup>
  - med smørende munnspray - Proxident<sup>®</sup>, Biotene munnspray<sup>®</sup>
  - man kan selv blande vann og nøytral matolje/glyserol(85 %) halvt om halvt. Hvis du ønsker ekstra smak kan du tilsette et par dråper Vademecum<sup>®</sup>
- Smørende gel kan smøres i kinnslimhinnene, gjerne før man legger seg for natten - Zendium Saliva gel<sup>®</sup>, Biotene oralbalance gel<sup>®</sup>
- Hydrogenperoxid 1 % renser slimhinnene og løser slim. Kan brukes som munnskylling, gurglevann eller slimløser.
  - I tillegg finnes det en tyggegummi med hydrogenperoxid - Caroxin<sup>®</sup>
- Har du proteser som sitter dårlig kan det hjelpe med festemiddel - Corega<sup>®</sup>
  - Det er spesielt viktig at protesene blir grundig rengjort
- Fuktgivende leppepomader mot såre lepper - Blistex<sup>®</sup>, Vaseline<sup>®</sup>
- Du kan med fordel variere fluorbruken med ulike smaker og preparater.

### **MULIGE FØLGER AV MUNNTØRRHET:**

- Hull i tennene
- Såre slimhinner
- Sviende følelse i munnen
- Infeksjoner i munnen, spesielt sopp
- Vanskeligheter med å spise
- Smaksforandringer
- Vanskeligheter med å snakke
- Dårlig ånde
- Tørre og sprukne lepper
- Søvnvansker

### **SPYTTETS FUNKSJONER:**

- Beskytter tenner og slimhinner
- Beskytter mot infeksjoner
- Regulerer pH-verdien og beskytter derfor mot hull i tennene
- Hjelper til med svelging
- Løser opp smaksstoffer i munnen
- Hjelper til slik at vi får pratet
- Hjelper til slik at tannproteser sitter på plass og ikke er ubehagelige å bruke

### **ÅRSAKER TIL MUNNTØRRHET:**

- Bivirkning av medikamenter
- Bindevevssykdommer, for eksempel: Sjøgrens syndrom
- Stråleterapi mot hode og hals
- Stoffskiftesykdommer
- Diabetes
- Psykologiske faktorer, for eksempel: stress, angst eller depresjon
- Munnpusting
- Underernæring eller faste
- Infeksjoner

### **TRYGDERETTIGHETER:**

Snakk med din tannlege om mulighet for dekning av tannlegeutgifter.

Folketrygdens forskrifter og rundskriv har bestemmelser om dekning av utgifter til tannbehandling for pasienter med munntørrhet.

Merk at trygdens full dekning ikke betyr at hele regningen dekkes, da tannlegene har andre takster enn de offentlige honorartakstene.

### **Har du spørsmål?**

Ta kontakt med:



- **TKNN**  
Tannlegeforeningens Kompetansesenter for Kirk-Norge  
Telefon: 77 78 90 00
- Universitetsklinikken:      Telefon: 77 78 90 30
- Din egen tannlege eller tannpleier.

Ulike apotek kan også være behjelpelige med å gi råd om produkter.

***Dersom du har problemer i munnhulen bør du opplyse din tannlege, tannpleier eller lege om dette.***