Cancer Association of South Africa (CANSA)

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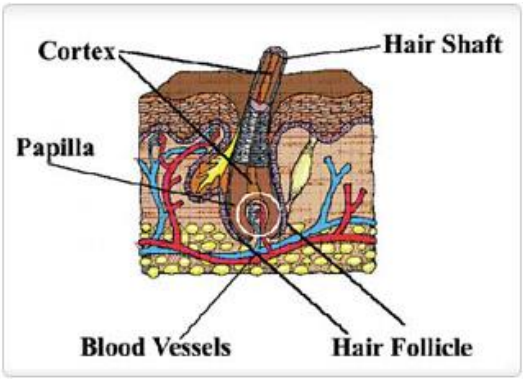
Fact Sheet
on
Scalp Cooling to Help Minimise Hair Loss

Introduction

Hair grows from a single follicle - an indentation in the skin. Each hair follicle has its own blood, nerve and muscle supply. Every individual is born with a specific number of follicles, which cannot be changed, and the size of one's hair follicle determines the thickness of one's hairs.



[Picture Credit: Hair Follicle]

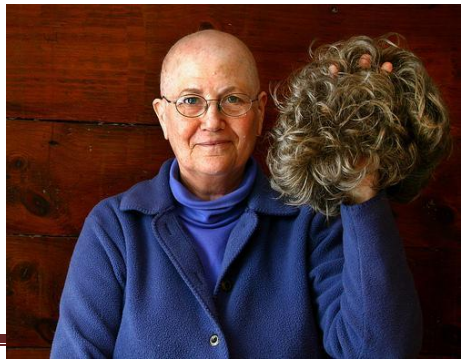
At the base of each follicle, lying on the dermis (the deeper layer of the skin), is the papilla – the bud of hair where most growth takes place.

The blood vessels that surround follicles carry the nourishment one's hair needs to grow. This is one of the reasons why diet is so important for healthy hair growth and strength.

When blood vessels in the scalp are cooled, they become narrower, and so less blood flows through them. Cooling the scalp during chemotherapy means that less of the chemotherapy drug reaches the hair follicles. This means the hair is less likely to fall out.
(MacMillan Cancer Support).

Loosing Hair Following Chemotherapy

Chemotherapy drugs are powerful medications that attack rapidly growing cancer cells. Unfortunately, these drugs also attack other rapidly growing cells in the body - including those in the hair roots.



[Picture Credit: Hair Loss]

Chemotherapy may cause hair loss all over the body - not just on the scalp. Sometimes even the eyelashes, eyebrows, armpits, pubic and other body hair also fall

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out. Some chemotherapy drugs are more likely than others to cause hair loss, and different doses of chemotherapy drugs can cause anything from a mere thinning of hair to complete baldness.

Fortunately, most of the time hair loss from chemotherapy is temporary. One can expect one's hair to regrow three to ten months after chemotherapy treatment ends, though the hair may temporarily be a different shade or texture.

The loss of hair that comes as a side effect of many chemotherapy agents can be a devastating part of cancer treatment. Some patients see it as not just a blow to their vanity, but as a constant, visual reminder of their illness.
(SFGate; Mayo Clinic).

Hair loss is one of the most well-known side effects of cancer treatment. Some cancer drugs may cause:

- Mild thinning of hair
- Partial hair loss, or loss of patches of hair
- Complete hair loss (alopecia)

Generally, chemotherapy is the type of cancer treatment most likely to cause hair loss. Complete hair loss is very unlikely with any other type of cancer treatment. But some other cancer drugs can cause hair thinning. One cannot tell beforehand who will be affected or how badly someone may be affected by chemotherapy drugs. Some drugs are more likely to cause hair loss than others.

Hair loss also depends on other factors such as:

- The type of drug or combination of drugs the patient is taking
- The dose of the drug(s) that are given
- One's individual sensitivity to the drug(s)
- One's drug treatment in the past

Most people think that chemotherapy drugs always cause hair loss. But some do not cause any hair loss at all, or only slight thinning. Other types of chemotherapy may cause complete hair loss, including eyelashes, eyebrows, underarm, leg and sometimes pubic hair.

If a person's hair is going to fall out, it usually begins within two to three weeks after chemotherapy treatment starts. It is usually a gradual loss of hair rather than a sudden one. The good news is that the hair will start to grow back once chemotherapy treatment has finished. In very rare cases the hair does not grow back but usually this only happens with very high doses of particular drugs. Ask the treating physician or specialist nurse whether the prescribed drugs are likely to cause hair loss.

Some hormone therapies or biological therapies can cause hair thinning. Usually this is quite mild and may not even be noticeable. With hormone therapies, the thinning usually slows down or stops within the first year of starting treatment.
(Cancer Research UK).

Chemotherapy Drugs that Usually Cause Hair Loss
Of the chemotherapy drugs commonly used to treat cancer, several are known to cause hair loss. It is important to keep in mind, however, that many factors such as the dose, route of administration, combination of drugs, and other individual characteristics will all impact on whether or not hair loss occurs as well as the degree of hair loss experienced.

The chemotherapy drugs most often associated with hair loss are:

Adriamycin (doxorubicin) - often causes hair loss. When administered as an injection every three to four weeks, hair loss is usually total including eyebrows, eyelashes and pubic hair. Weekly injections of lower doses are associated with minimal or no hair loss

Carboplatin - when used alone rarely causes hair loss. When used in combination with Cytoxan (cyclophosphamide), hair loss occurs about half of the time

Cisplatin - may cause hair loss; however, this side effect is uncommon

Cytoxan (cyclophosphamide) - commonly causes hair loss

Dactinomycin - may cause hair loss which is not limited to the scalp

Etoposide - may cause mild hair loss in some patients, although some patients develop total baldness

Hexamethamelamine (HMM, altretamine) - may cause hair loss; however, this side effect is uncommon

Ifosfamide - commonly causes hair loss

Taxol - causes hair loss in almost 100% of patients. Hair loss usually occurs 14 to 21 days after treatment and often affects all body hair including eyebrows, eyelashes, and pubic hair

Vincristine - causes hair loss in less than half of patients.

Other chemotherapy drugs which are less frequently associated with hair loss, either because the frequency of hair loss or degree of hair loss is less, include: bleomycin, 5-fluorouracil (5-FU), and methotrexate.
(Oncolink).

Coping with hair loss
If worried about hair loss or thinning of hair from cancer treatment, the tips below might help. Ask the treating physician or nurse if the cancer drugs prescribed for you will cause hair loss.

If complete hair loss is a possibility:

- Ask about a wig before treatment commences, in order to match the colour and texture with one's real hair
- If feeling adventurous, choose a wig for a whole new look – why not the colour and style you have always wanted!
- Think about having hair cut short before treatment starts

- Some people shave their hair off completely to avoid the distress of seeing the hair fall out
- Wear a hair net at night not to wake up with hair all over the pillow, as this can be upsetting

For hair loss or thinning:

- Use gentle hair products such as baby shampoos
- Do not use perms or hair colours on thinning hair - colours may not take well and perms can damage the hair
- Use a soft baby brush and comb the thinning hair gently
- Try not to brush or comb thinning hair too hard – a soft baby brush may help
- Avoid using hair dryers, curling tongs and curlers on thinning hair
- Pat the hair dry
- If the scalp flakes or itches this means it is dry – use oil or moisturiser, not dandruff shampoo

(Cancer Research UK).

The Cool Cap

A cool cap (also known as a 'hypothermia cap', 'cold cap' or 'cooling cap') is a therapeutic device used to cool the human scalp. The most prominent medical applications of this device are said to be in preventing or reducing alopecia (hair loss) as a result of chemotherapy, and for preventing cerebral palsy in babies born with neonatal encephalopathy caused by hypoxic-ischaemic encephalopathy (HIE). It can also be used to provide neuro-protection after cardiac arrest, to inhibit stroke paralysis, and as cryotherapy (cold therapy) for migraine headaches.

[Picture Credit: Baby with Cool Cap]

Worn tight on the head, hypothermia caps are typically made of a synthetic such as neoprene, silicone or polyurethane, and filled with a coolant agent such as ice or gel which is either frozen to a very cold temperature (usually -25°C to -30°C) before application or continuously cooled by an auxiliary attached control unit.

[Picture Credit: The Cool Cap]

It is said that a cool cap can prevent hair loss in up to 80% of patients and that it is particularly effective against the drugs used in treating breast cancer.
(Adelaide Cancer Center; Wikipedia).

Concerns Over the Use of Scalp Cooling

Some doctors worry about using scalp cooling with treatment that aims to cure the cancer. There are concerns that cancer cells that may have spread to the scalp may be more likely

to survive chemotherapy if scalp cooling is used. However, cancer spreading to the scalp is very uncommon.

Clinical trials have shown that the risk of this occurring as a result of scalp cooling is very small, except in haematological cancers. Some people may prefer not to have scalp cooling because of this, but others are happy to try it. If interested in scalp cooling, talk about it with a doctor.

Scalp cooling is not effective with all chemotherapy drugs. It is most likely to be effective with:

- Cyclophosphamide
- Daunorubicin
- Docetaxel (Taxotere ®)
- Doxorubicin
- Paclitaxel (Taxol (paclitaxel ®).

(MacMillan Cancer Support).

Good Candidates for Scalp Cooling

Scalp cooling is not suitable for everyone. It is not suitable if the following applies:

- Patients who have a haematological cancer such as myeloma, leukaemia or lymphoma. This is because there is a high risk of cancer cells surviving in the blood vessels of the scalp, causing the cancer to come back after treatment

- Patients who need very high doses of chemotherapy, as this makes scalp cooling less likely to work

- Patients having continuous chemotherapy through a pump for several days, as this makes it impractical to have scalp cooling

- Patients whose liver are not working as well as it should be. This may lead to the chemotherapy drugs circulating in the body for longer than usual, and it may not be possible to keep the scalp cold for long enough

- Patients who have severe migraines.

- Patients who have already had a first course of chemotherapy and did not have scalp cooling for it

(MacMillan Cancer Support).

How to Use a Cool Cap

Before embarking or making use of a cool cap, this should be discussed with the treating physician.

If approved by the treating physician the cap is worn during each chemotherapy session for:

- 20 to 50 minutes before

- during
- after each chemotherapy session (the amount of time the cap is to be worn after the chemotherapy session depends on the type of chemotherapy the patient receives)

If the patient uses a cool cap that needs to be filled with ice or where the cooled gel needs to be replaced may have to change the cap several times during the chemotherapy treatment. Each cap is usually worn for about 30 minutes; then it warms up and is replaced with a new cap. In the case of caps that are chilled by an external control unit, the cap does not have to be changed during treatment.

Because the caps are so cold, some patients get a headache while wearing the cap. Most patients also get very cold, so it makes sense to dress warmly and bring warm blankets with if it is decided to try the cold cap regime.

Patients who use cold caps during chemotherapy are advised to baby their hair during treatment. The following applies:

- no blow drying, hot rollers, or straightening irons to be used
- shampoo hair only every third day with cool water and a gentle shampoo
- no colouring of hair until 3 months after chemotherapy is done
- gentle combing and brushing of hair at all times

The cost of using a cool cap varies depending on the make of cool cap, the number of chemotherapy sessions the patient will be having, and the number of months that the patient will be using a cool cap. Some users have said the cost of a cool cap is comparable to the cost of a having a wig made.

It is important to know that some doctors are concerned that cool caps may prevent the chemotherapy medicine from reaching cancer cells that may be in the scalp. Several US studies are underway to look at the safety and effectiveness of cool caps. At this time, none of the caps have been approved by the US Food and Drug Administration.

It is also important to know that cool caps do not work for everyone. In two small European studies, cool caps were considered effective in about 50% of the women that used them. (Breast Cancer.Org).

Recent Trials in the Use of Scalp Cooling

One of the trials used the Orbis Paxman Hair Loss Prevention System (Paxman Coolers Ltd), which is awaiting approval in the United States. The Paxman device is a two-cap system consisting of an inner silicon cap in which refrigerated fluid is circulated and an outer neoprene cap that insulates the scalp. The cap is fitted snugly to the head and is held in place with a chin strap

[Picture Credit: Courtesy of Paxman]

Treatment was deemed to be a success if clinicians blinded to randomization judged patients to have experienced no hair loss or only grade 1 hair loss (<50% hair loss not requiring a wig), as defined by

the Common Terminology Criteria for Adverse Events version 4.0 (CTCAEv4.0) alopecia scale.

At the time of the planned interim analysis, 95 women had been treated with the scalp cooling device and 47 others had received no specific treatment for alopecia.

Results showed that after the fourth cycle of chemotherapy, 50.5% of the cooling group retained their hair, achieving a grade 0 or 1 on the CTCAEv4.0 scale — meaning no wig or scarf was needed — vs 0% of controls.

The second published study used a different scalp cooling device, the *DigniCap*, developed by Dignitana AB). This device was approved for use in the United States in 2015, and initial results from this study were reported at the time by *Medscape Medical News*.

[Picture Credit: Courtesy of Dignicap]

In this study, 106 women with early-stage breast cancer used the DigniCap device, and another 16 women served as controls.

Importantly, almost all women in this study received some form of taxane-based chemotherapy, and no women in the scalp cooling group received an anthracycline-based regimen. The mean duration of chemotherapy in this particular study was 2.3 months.

Scalp cooling was initiated 30 minutes prior to each chemotherapy cycle, with scalp temperature maintained at 3°C (37°F) throughout chemotherapy and for 90 minutes to 120 minutes afterward.

Of 101 evaluable patients assigned to the scalp cooling group, 66.3% experienced hair loss of 50% or less from baseline, meaning they had a score of 0 to 2 at study endpoint. This compared to 0% of women in the control group
(Medscape).

Medical Disclaimer

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