The clinical case for smoking cessation for wound care

What is the relationship between smoking and wound/bone healing?

Compared to non-smokers, smokers are more likely to experience complications in tissue healing such as delayed healing, infections, dehiscence and hernia.[1–6] A meta-analysis of 107 studies found relative risks of 2.15 (95% confidence interval 1.87 to 2.49) for wound related complications in smokers compared with non-smokers.[7] Smoking is also associated with an increased rate of non-union and slowed healing of bone.[2,3,8] Smoking has effects on the cardiovascular and respiratory systems, which have the net effect of reducing blood flow, tissue oxygenation, aerobe metabolism, the inflammatory healing response, and impairing the proliferative response.[1,9,10]

Why intervene in secondary care?

Hospitalisation offers an opportune time to encourage patients to stop smoking for five main reasons:

- Firstly, this time is often a 'teachable moment' where patients are more receptive to intervention and are more motivated to quit.
- Secondly, abstaining from smoking at this time can lead to significant health benefits.
- Thirdly, the hospital's no smoking environment creates an external force to support abstinence.
- Fourthly, patients are ideally placed to be given information about treatment options, support through withdrawal, and signposted to specialist stop smoking services.
- Finally, stop smoking interventions are highly cost-effective and result in direct cost-savings to the NHS.

Effects of smoking on wound healing:[1–3]

- peripheral tissue hypoxia leading to necrosis
- decreased inflammatory responses
- delayed proliferative healing responses and reduced collagen synthesis
- increased oxidative stress inhibits the mechanisms of neutrophils
- impaired production of pro and anti-inflammatory cytokines responsible for regulating the immune function

Effects of smoking on bone healing:[2]

- increased tissue hypoxia, vasoconstriction
- impairment of osteoblast activity and collagen synthesis

Main acute effects of smoking on the body
(estimated time of recovery, if known)

- Increase in sympathetic tone leading to an increase in blood pressure, heart rate and peripheral vasoconstriction leading to an increased demand for oxygen and cardiac function[12] **(24 – 48 hours)**
- Formation of carboxyhaemoglobin leading to a reduction in oxygen delivery to the tissues[13] **(8 – 24 hours)**
- Formation of carboxymyoglobin leading to a reduction in oxygen storage in the muscles[14] **(8 – 24 hours)**
- Increase in red blood cell production, which leads to an increase in blood viscosity, a decrease in tissue perfusion, a decrease in oxygen delivery to the tissues and potentiation of thrombotic process[9]
- Hypersecretion of mucus, narrowing of the small airways, decrease in ciliary function and change in mucus rheology leading to a decrease in mucociliary transport[9] **(12 – 72 hours)**
- Changes in functioning of a range of immune cells (pro- and anti-inflammatory cytokines, white blood cells, immunoglobulins) which lead to decreased immunity and are associated with atherosclerosis[9] **(1 week – 2 months)**
- Induction of hepatic enzymes which increases drug metabolism through both pharmacokinetic and pharmacodynamic mechanisms[15,16] **(6 – 8 weeks)**

What are the health benefits of quitting for patients?

Successful quitting will not only benefit a patient's long-term health by reducing the risk of disease development[3,17] but there is evidence that quitting smoking may reduce wound-healing complications (see below).

A large systematic review found stopping smoking restores tissue oxygenation and metabolism fairly rapidly and the inflammatory cell response is reversed in part within 4 weeks. However the proliferative response remains impaired.[1,18] While quitting at least 4–8 weeks (or longer) is recommended for planned interventions, temporary abstinence beginning immediately around the time of admission and lasting until a patient has healed may still have worthwhile benefits.[1]

Improvements in wound healing associated with smoking cessation

- Reduced rate of wound infections[1,18,19]
- Reduced rate of impaired wound healing[1,20,21]
- Increased rate of bone healing[2,22,23]
- Permanent smoking cessation reduces the risk of heart disease, stroke, cancer and premature death[17]

Smoking cessation interventions have been proven effective for hospitalised patients in general patients[29] and for improving wound and bone healing.[1,2] Smoking cessation interventions increase the rate of long-term quitting if they include regular behavioural support and pharmacotherapy (nicotine replacement therapy (NRT), varenicline) that is continued at least 1 month after discharge.[29]

Best practices for managing tobacco withdrawal in the inpatient setting

Most regular smokers will experience tobacco withdrawal symptoms within hours of their last cigarette and can range from mild to severe.[24] Withdrawal symptoms include aggression and hostility and can affect the care of the patient. Recognising and managing tobacco withdrawal among hospitalised patients who smoke should be a priority. Providing NRT to a patient will ease withdrawal symptoms and can also support long-term quitting. A combination of the patch (NRT patch can take 20 – 40 minutes to reach therapeutic dose) with a short-acting oral NRT product (e.g. gum, inhaler, spray) is a recommended evidence-based practice.[25,26]

Tobacco withdrawal symptoms include:[24]

- Urges to smoke or cravings
- Restlessness or difficulty concentrating
- Irritability, aggression, anxiety, crying, sadness or depression
- Difficulty sleeping or sleeping disturbances
- Increased appetite and weight gain
- Coughing
- Mouth ulcers
- Constipation
- Light headedness

Vaping

E-cigarettes provide nicotine without combustion and are popular among UK smokers as an alternative to smoking. While electronic cigarettes are not risk-free, Public Health England estimates they are 95% safer than smoking cigarettes.[27] There is also evidence to indicate that e-cigarettes are effective in helping patients stop smoking.[28] Evidence on safety and the role vaping plays in supporting quitting is reviewed regularly. Policies related to the use of electronic cigarettes in inpatient settings will vary by trust and organisation.

Very Brief Advice on Smoking

How to approach smoking cessation with patients

The NHS Long Term Plan has committed that all people admitted to hospital who smoke will be offered NHS-funded tobacco treatment services by 2023/24.[30]

NICE[31,32] outlines a care pathway for supporting smoking cessation in the inpatient and other clinical settings that includes brief advise, pharmacotherapy, and referral to specialised stop smoking support. In essence, the care pathway incorporates a brief intervention using the 3As:

ASK and record smoking status

ADVISE the patient:

- the best way of quitting is with a combination of support and stop smoking medication
- support with stopping smoking and/or managing any tobacco withdrawal symptoms (temporary abstinence) is available
- of the personal health benefits of stopping smoking

ACT on the patient's response:

- prescribe NRT for patients in withdrawal
- monitor withdrawal and adjust pharmacotherapy accordingly
- refer to specialised stop smoking support (hospital-based, local stop smoking service)

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