Introduction
In addition to the general health risks associated with smoking, research has shown that smokers are also more likely to suffer complications during and following surgery. The Royal College of Anaesthetists (RCoA) advises smokers undergoing surgery to quit for several weeks before their surgery in order to reduce the risk of breathing problems. Smokers who are unable to quit smoking are advised to refrain from smoking on the day of the operation. Smokers undergoing cosmetic surgery are advised to refrain from smoking for at least two weeks before and after the operation to improve post-operative recovery.

Risks associated with smoking and surgery
Some surgeons will not perform surgery on patients who smoke and the RCoA considers quitting smoking to be essential before undergoing heart surgery. There is some research which suggests that smokers who have been smoking for longer than ten years should not undergo breast reconstructive surgery as the risk of complications is so high.

There is strong evidence that smokers who undergo surgery:
- have a higher risk of lung and heart complications
- have higher risk of post-operative infection
- have impaired wound healing
- are more likely to be admitted to an intensive care unit
- have an increased risk of dying in hospital
- are at higher risk of readmission
- remain in hospital longer

A prospective cohort study from the United States found that smoking was associated with an almost sixfold increased risk for post-operative pulmonary complications. Smoking is the single most important risk factor for the development of serious post-operative complications in patients undergoing elective hip and knee replacement as well as the single most important factor for the development of post-operative cardiopulmonary and wound-related complications in elective orthopaedic surgery. Smoking has pronounced effects in foot and ankle surgery, resulting in higher rates of complications, particularly non-union. Smoking is also an important predictive factor for anastomotic leakage after colonic and rectal resection and smokers are at significantly higher risk of complications during reconstructive breast surgery and breast cancer surgery.

A function of anaesthesia is to reduce coughing and spasms during surgery but because smokers are more prone to coughing during surgery they need a higher dose of anaesthesia than non-smokers. Also, smokers have decreased blood oxygenation, leading to decreased oxygen delivery to their tissues and are consequently more likely to need oxygen therapy. Depriving vital organs of oxygen for even a short period of time can lead to serious complications.
Benefits of quitting before surgery

There is evidence to suggest that quitting smoking before having surgery:

- reduces the risk of post-operative complications\(^{32}\)
- reduces lung, heart and wound-related complications\(^{33,34}\)
- decreases wound healing time\(^{35}\)
- reduces bone fusion time after fracture repair\(^{36}\)
- reduces length of stay in hospital.\(^{23}\)

This is in addition to the long-term benefits of quitting smoking such as reduced risk of lung cancer and heart disease.

Evidence about the optimum time to quit smoking prior to surgery varies, with most research finding that two months prior to surgery provides the most benefit.\(^{37,38,39,40}\) For smokers who are unable to quit, the Royal College of Anaesthetists advises that they should at least refrain from smoking on the day of surgery to help avoid breathing problems during the procedure.\(^{4}\)

There is some older evidence which suggests that stopping smoking shortly before surgery may increase complications.\(^{41}\) However, independent research investigating this question found no increased risk in pulmonary complications amongst smokers who quit just before surgery\(^{42}\) and a 2011 review found no increase in complications amongst smokers who quit within two months of surgery.\(^{43}\)

Smokers who are concerned should seek advice from their surgeon, or preferably the anaesthetist who will be with them during surgery.

Quitting smoking after surgery also brings significant benefits. A 20 year follow-up study of smokers who underwent coronary artery bypass graft surgery found that smoking cessation after surgery was an important independent predictor of a lower risk of death and repeat coronary procedures compared with patients who continued smoking.\(^{44}\)

Costs to the NHS

The health problems associated with smoking have been estimated to cost the NHS around £2.7 billion every year\(^{45}\) while other estimates have put the cost as high as £5.2 billion.\(^{46}\) This does not include the cost of work days lost, sickness benefits and other indirect costs.

It has been estimated that, in London alone, savings of around £2,650,000 a year could be made if between 8% and 17% of smokers quit before having surgery.\(^{47}\) The Welsh government has estimated that supporting smokers to quit before having surgery smokers could save as much as £2.3 million more every year.\(^{48}\) These savings are derived from “bed days” saved and the reduced cost of treating post-operative complications.

Stop Smoking Advice for smokers undergoing elective surgery

Research in the USA found that many surgeons and most anaesthetists do not routinely counsel prospective patients to quit smoking prior to surgery, (42% and 70% respectively).\(^{49}\) In the UK, the National Institute for Health and Care Excellence (NICE) recommends that “patients referred for elective surgery should be encouraged to stop smoking before an operation” and that services should be developed to assist them.\(^{50,51}\)

Evidence suggests that smoking cessation programmes aimed at assisting smokers undergoing surgery to quit are effective at reducing post-operative complications\(^{52,53}\) and intensive interventions which begin during the hospital admission are especially effective.\(^{54}\) A hospital admission may boost a person’s receptivity to smoking cessation interventions and increase
their motivation to stop smoking.\textsuperscript{55}

Provision of Stop Smoking Services for prospective surgical patients in the UK has increased in recent years. Some hospitals offer brief intervention counselling for smokers or provide information during surgical pre-admission checks\textsuperscript{56,57} while others write to all prospective surgical candidates about the risks associated with smoking and surgery with contact details for local stop smoking services and a number have produced leaflets for patients\textsuperscript{58,59} or provide information on their websites.\textsuperscript{60}
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