Interventions for preoperative smoking cessation (Review)

Møller AM, Villebro N

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[Intervention Review]

Interventions for preoperative smoking cessation

Ann Merete Møller[1], Nete Villebro[2]

[1]Department of Anaesthesiology, Herlev University Hospital, Herlev, Denmark. [2]Department of Quality and Education, H:S Bispebjerg University Hospital, Copenhagen NV, Denmark

Contact address: Ann Merete Møller, Department of Anaesthesiology, Herlev University Hospital, Herlev Ringvej, Herlev, 2730, Denmark. annmo@heh.regionh.dk. docamm@yahoo.com.

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ABSTRACT

Background

Smokers have a substantially increased risk of intra- and postoperative complications. Preoperative smoking intervention may be effective in decreasing this incidence. The preoperative period may be a well chosen time to offer smoking cessation interventions due to increased patient motivation.

Objectives

The objective of this review was to assess the effect of preoperative smoking intervention on smoking cessation in the postoperative period and longer term. We also set out to determine the effect of smoking cessation on the incidence of postoperative complications.

Search strategy

The specialized register of the Cochrane Tobacco Addiction Group was searched using the free text and keywords (surgery) OR (operation) OR (anaesthesia) or (anesthesia). MEDLINE, EMBASE and CINAHL were also searched, combining tobacco- and surgery-related terms. Most recent search February 2005.

Selection criteria

We considered randomized trials which recruited smokers prior to surgery, offered a smoking cessation intervention, and measured abstinence from smoking in the preoperative and postoperative periods. We also considered randomized trials of the effect of smoking cessation on the incidence of intra- and postoperative complications.

Data collection and analysis

The authors independently assessed studies to determine eligibility. The results were discussed between the authors.

Main results

Four trials met the inclusion criteria. All trials significantly reduced preoperative smoking but the effect sizes were heterogeneous so a pooled effect was not estimated. Only two trials reported the effect of the smoking intervention on wound complications, and the results were heterogenous, with a significant reduction in wound-related complications, cardiopulmonary complications and the overall risk of any complication in one trial, and no evidence of a difference in complications in the other. The effect on longer term smoking cessation was not significant in either of the two trials with follow up beyond the perioperative period.

Authors' conclusions

Preoperative smoking interventions are effective for changing smoking behaviour perioperatively. Direct evidence that reducing or stopping smoking reduces the risk of complications is based on two small trials with differing results. The impact on complications may depend on how long before surgery the smoking behaviour is changed, whether smoking is reduced or stopped completely, and the type of surgery.

PLAIN LANGUAGE SUMMARY

Are there interventions to help people to stop smoking before they have surgery

Smoking is a well-known risk factor for complications after surgery. Studies of interventions to encourage smokers to stop before their operation show that short-term quitting and reduction can be achieved. The effect of intervention on complication rates is unclear, and may depend on how long before surgery the smoking behaviour changes.

BACKGROUND

Complications related to anaesthesia and surgery are important to patients and expensive for the healthcare system. Intra- and postoperative complications result in increased morbidity and mortality, and extended hospital stay and convalescence.

Five to ten per cent of a population may annually undergo surgery and anaesthesia. Pulmonary or cardiovascular complications occur in up to 10% of the cases (Pedersen 1994), with people who smoke having a considerably increased risk of intra- and postoperative complications (Bluman 1998). In a retrospective study smokers were found to have three- to six-fold increased risk of intra-operative pulmonary complications (Akrawi 1997; Schwilk 1997). Patients with chronic heart or lung disease have a two- to five-fold increased risk of perioperative complications.

Smoking has many effects on heart function and circulation, both in the short and long term. Short-term effects may be due to increased amounts of carbon monoxide and nicotine in the blood. The harmful effects of these substances disappear 24 to 48 hours after smoking cessation (Kambam 1986; Pearce 1984). The long-term effects include the development of generalized atherosclerotic changes in the vasculature. Short-term effects are more significant in those who suffer from generalized atherosclerosis (Klein 1984; Nicod 1984; Sheps 1990). The harmful effects of carbon monoxide (CO) are primarily caused by the effect of CO on oxygen metabolism, because CO binds to the haemoglobin molecules instead of oxygen. This reduces the availability of oxygen to the tissues by 3 to12 % (Pearce 1984). Furthermore, CO changes the structure of the haemoglobin molecules, shifting the oxygen-haemoglobin curve to the left, further reducing the oxygen availability, and also increases the risk of cardiac arrhythmias (Sheps 1990). Nicotine stimulates the surgical stress response and increases blood pressure, pulse rate and systemic vascular resistance, increasing the work of the heart. In summary, the effects of nicotine and CO in common tend to create an imbalance between the oxygen consumption and the oxygen availability in smokers (Kaijser 1985; Roth 1960). The effect of nicotine replacement therapy (NRT) on oxygen consumption is unclear (Benowitz 1997; Keeley 1996), and the effect on perioperative outcome remains to be evaluated. Still it must be considered a better alternative than smoking.

As anaesthesia and surgery cause an increased strain on cardiac and circulatory functions, an existing oxygen imbalance can be worsened in smoking patients, potentially resulting in hypoxemia in vital organs.

Smoking also impairs pulmonary function. Smokers have increased mucus production, with damage to the tracheal cilia, which impedes the clearance of the mucus. This is the explanation for the accumulation of mucus in the airways, which eventually may lead to pulmonary infections (Lourenco 1971). These effects may be exaggerated by reductions in immune function associated with smoking (Cohen 1993; Pearce 1984). Immobilization during surgery and anaesthesia and in the immediate postoperative period worsens the reduced pulmonary function and the mucus accumulation. Pulmonary function generally improves after approximately eight weeks smoking cessation (Bode 1975; Buist 1976;

Camner 1973; McCarthy 1972, Mitchell 1982). In a retrospective study in patients undergoing pulmonary surgery, Nakagawa 2001 found that the risk of postoperative pulmonary complications was significantly higher compared to never-smokers for both current smokers and for recent smokers who had been smoke-free for two to four weeks before their operation. Warner 1989 found, in a prospective, descriptive and uncontrolled study, that patients who stopped smoking about eight weeks prior to operation reduced their risk of postoperative pulmonary complications.

Smoking impairs wound healing after surgery (Haverstock 1998; Jorgensen 1998, Silverstein 1992; Sorensen 2002), and has been shown to increase the risk of anastomotic leakage after colorectal surgery (Sorensen 1999).

Shannon-Cain 2002 found that patients were not routinely informed of the risk of tobacco use or the potential of benefit of abstinence before surgery, and concluded that the preoperative period might be a window for smoking intervention.

The potential reduction of complications would be related to the success rate of a preoperative smoking cessation intervention. The motivation might be increased, if a potential reduction of complications is possible. On the other hand, some patients tend to be nervous prior to surgery and might feel that they need to smoke until after the procedure, in order to deal with the stress of impending surgery. Brief smoking intervention delivered within routine daily care may not be powerful enough to influence highly dependent smokers (Hajek 2002). More intensive interventions may be required (Lancaster 2005; Rice 2004; Stead 2005).

A successful pre-operative smoking intervention could potentially reduce perioperative complications and lead to long-term health gains if cessation were sustained.

OBJECTIVES

The objectives of this review were to assess the evidence for an effect of preoperative smoking intervention on smoking cessation in the postoperative period and longer term, and on the incidence of postoperative complications.

METHODS

Criteria for considering studies for this review

Types of studies

randomized controlled trials.

Types of participants

Smokers of any age, who are scheduled for elective surgery.

Types of interventions

Any preoperative intervention to help patients awaiting surgery to stop smoking. We considered any intervention, whether brief or more intensive, including both behavioural and pharmacological strategies, with or without face-to-face contact, provided at least 48 hours before the operation. Trials of intra-operative and post-operative smoking interventions were not considered.

Types of outcome measures

Smoking cessation:
Prevalence of smoking cessation two months prior to surgery. Prevalence of smoking cessation prior to surgery, in the immediate postoperative period, and in the short and long term.
Morbidity and mortality:
Wound-related complications
Secondary surgery
Cardiopulmonary complications
Admission to intensive care
Intra- or postoperative mortality.
Length of stay

Search methods for identification of studies

The specialized register of the Cochrane Tobacco Addiction Group was searched using the free text and keywords (surgery) OR (operation) OR (anaesthesia) or (anesthesia). We conducted additional searches of MEDLINE, EMBASE and CINAHL. Most recent search was performed in February 2005
MEDLINE strategy:
1 randomi?ed controlled trial in PT
2 controlled clinical trial in PT
3 random allocation
4 allocation concealment
5 #1 OR #2 OR #3 OR #4
6 smoking intervention
7 smoking cessation
8 #6 OR #7
9 surgery
10 operation
11 operativ*
12 an?esthesia
13 #9 OR #10 OR #11 OR #12
14 #5 AND #8 AND #13
15 Explode (Postoperative complication*)
16 Eplode (Preoperative care)
17 Explode (Patient education)
18 #15 AND (#16 OR #17)

19 #14 OR #18
EMBASE strategy:
1 "smoking-cessation"/ all subheadings
2 ("smoking"/ all subheadings) and ((smok* or tobacco or cigar*) near (stop* or quit* or giv* or refrain* or reduc*))
3 #1 or #2
4 (surgery or surgical or operation or operativ* or preoperativ* or an?esthesia) in ab or de or ti
5 #3 and #4
CINAHL strategy:
1 "Smoking-Cessation" OR "Smoking-Cessation-Programs" OR "Smoking"/ prevention-and-control OR (smoking cessation) OR((smok* or tobacco or cigar*) near (stop* or quit*))
2 surgery or operation or operativ* or an?esthesia
3 #1 AND #2

Data collection and analysis

Two authors (AAM and NV) evaluated all references retrieved through electronic searches. Both authors retrieved in full and appraised all relevant studies identified from abstracts. We resolved disagreement by discussion.
We extracted the following information about each study:

- Country; Site; Method of randomization;
- Number and characteristics of study participants
- Description of intervention and timing and duration in relation to operation;
- Outcomes: definition of smoking abstinence at each follow-up point.
- Data on perioperative complications.

We evaluated studies on the basis of the quality of the randomization and allocation concealment procedure used, as described in the Cochrane Collaboration Handbook.
We have reported relevant outcomes in the text as percentages. For graphical display and pooling we have expressed the outcomes as an odds ratio (OR). For beneficial outcomes a value greater than 1 indicates that the intervention is better than the control, that is, the odds of quitting are higher in the intervention than in the control group. For unfavourable outcomes such as wound infection, a value less than 1 indicates that the intervention is better, that is, odds of an unfavourable outcome are lower in the intervention group.
We considered pooling study results if the interventions and outcomes measured were judged to be sufficiently similar, and in the absence of statistical heterogeneity. Two tests for heterogeneity were used: the chi squared test for heterogeneity, with $P < 0.1$ considered significant, and the I^2 statistic, with values above 75% interpreted as as high heterogeneity. The I^2 statistic (Higgins 2003) can be interpreted as the proportion of total variation observed between the studies attributable to differences between studies rather than to sampling error (chance). Where it was appropriate to pool studies, we used the Mantel-Haenszel fixed-effect method for pooling ORs, with 95% confidence intervals.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.
The search identified 14 possibly eligible controlled studies. Four of these studies could be included in the review.

Trial participants

Moller 2002 enrolled 120 patients six to eight weeks before scheduled elective hip or knee joint replacement. Sorensen 2003 enrolled 60 patients two to three weeks before colorectal surgery involving an enteric anastomosis. Ratner 2004 enrolled 237 patients attending a presurgical assessment clinic one to three weeks prior to surgery. Wolfenden 2005 enrolled 210 patients attending a preoperative clinic one to two weeks prior to surgery.

Interventions

All four studies offered face-to-face advice and counselling before surgery. This was supplemented by telphone calls, written materials and other aids in some cases (see included study table for further details). Nicotine replacement therapy was provided to some or all participants in all studies.

Outcomes

Smoking cessation

Smoking status was assessed shortly before surgery in all studies. One study did not distinguish between cessation and reduction, so we have used the combined outcome (Sorensen 2003). The same study also assessed smoking at the time of suture removal, but this outcome is not used in the meta-analysis. Two studies also assessed longer term cessation; three months (Wolfenden 2005), six and twelve months (Ratner 2004)

Perioperative/postoperative complications

Two studies assessed complications of surgery (Moller 2002; Sorensen 2003).

Excluded studies

Of the possibly eligible studies three were excluded because they involved preoperative smoking cessation interventions but did not use random allocation to intervention and control groups (Basler 1981; Haddock 1997; Munday 1993). Three were excluded because the intervention was delivered in the postoperative period (Griebel 1998; Simon 1997; Wewers 1994). One study evaluated a training intervention for surgical residents and did not have patient-based outcomes (Steinemann 2005). One study evaluated a multicomponent intervention including drinking, obesity and physical activity in addition to smoking, and recruited both smokers and nonsmokers. Perioperative outcomes were not evaluated (McHugh 2001).

One study (Myles 2004) comparing bupropion to placebo for preoperative cessation was excluded because there were high levels of drop-out in each group, and only a small number of those who remained in the study were admitted for surgery within the six-month study period. Data on perioperative cessation and complications were available for only 20 of the 47 people originally randomized. Cessation rates and wound infection rates were low and similar in each group.

Risk of bias in included studies

All four studies reported that allocation to groups was random. Three gave sufficient detail about the method of allocation concealment to classify it as adequate. One did not describe the method of allocation and concealment. Outcome assessment was reported to be by blinded assessors in three studies (Moller 2002; Ratner 2004; Wolfenden 2005). Two studies used biochemical validation of self-reported abstinence (Ratner 2004; Sorensen 2003).

Effects of interventions

Effect on smoking cessation

In all studies the intervention achieved a significant increase in the odds of smoking cessation in the perioperative period, but there was a high level of heterogeneity between the studies so that it was not appropriate to calculate a pooled estimate. Odds ratios (ORs) are displayed in graph 01.01.

Moller 2002 found that 64% stopped smoking completely in the intervention group compared to 7.7% in the control group. In this study the perioperative period was defined as six to eight weeks before surgery until 10 days after.

Sorensen 2003 found a cessation or reduction rate of 89% in the intervention group compared to 13% in the control group in the preoperative (two to three weeks before surgery) period ($P < 0.05$). Eleven days after surgery the control group had reduced smoking levels further, giving a cessation/reduction rate of 93% in the intervention group and 50% in the control group ($P < 0.05$).

Wolfenden 2005 provided an intervention one to two weeks before surgery based on a computerised smoking intervention programme. The cessation rates were high in both the intervention (78%) and usual care (65%) group.

Ratner 2004 found 73% of the intervention group abstinent for at least 24 hours before surgery compared to 53% of controls.

Two studies reported longer term postoperative cessation. Quit rates fell in both studies and significant differences between intervention and control groups were not maintained at three months (Wolfenden 2005) or at 12 months (Ratner 2004) (graph 01.02).

Effect on perioperative morbidity and mortality

Only two studies reported these outcomes. Wound complications and any complications are displayed as ORs in graphs 02.01 and 02.02. Due to statistical heterogeneity between the studies we have not calculated a pooled estimate of effect.

Wound complications

Moller 2002 found a significantly reduced incidence of wound-related complications in the intervention group (5% versus 31%, $P = 0.001$). Wound complications was divided into infections (positive culture and antibiotics prescribed), wound haematoma, and wound complication with subfascial involvement.

Sorensen 2003 found non-significant differences in wound-related complications in 33% of the intervention group and 27% of the control group. In this study wound-related complications were divided into the following subgroups: anastomotic leakage, fascial dehiscence, wound infection, necrotic stoma, haematoma.

Secondary surgery was performed in 4% of the intervention group and in 15% of the control group patients in Moller 2002. In the intervention group, one patient had reposition of the prosthesis, and one patient had wound-related secondary surgery. In the control group seven patients (13%) had wound-related secondary surgery, and one patient had vascular-related secondary surgery. Although it is evident that some patients in Sorensen 2003 had secondary surgery, no data on this are given in the paper.

Cardiopulmonary complications

Moller 2002 found 2% in the intervention group and 12 % in the control group ($P = 0.039$) suffering from cardiopulmonary complications, needing either ventilatory support or cardiological treatment. Sorensen 2003 found 11% with pulmonary complications in the intervention group versus 16% in the control group ($P = 0.38$). No cardiac complications were recorded in this study.

Any complication

Moller 2002 found a total complication rate of 18% in the intervention group, compared to 52% in the control group ($P = 0.0003$). Sorensen 2003 found 41% complication rate in the intervention group compared to 43% in the control group (non-significant).

Intensive care admittance

Moller 2002 states the number of days spent in intensive care in the two groups as two days in the intervention group versus 32 days in the control group. The number of patients was not stated.

Length of stay

Neither study detected significant differences in duration of hospital admission. Duration of hospital admission was 11 days (range 7 to 55) in the intervention group and 13 (range 8 to 65) in the control group in Moller 2002. Sorensen 2003 found that the median duration of hospital admission was 11 days in both groups (range 8 to14).

Mortality

There were two deaths in the control group during the perioperative period in Sorensen 2003.

DISCUSSION

Two questions need to be answered in order to investigate the possible prevention of smoking-related postoperative complications.The first is whether preoperative smoking intervention reduces smoking by patients before surgery. The second is whether successful preoperative smoking cessation/reduction reduces the incidence of postoperative complications. This review includes four studies addressing the first question but only two of them address the second. Of these two, the first (Moller 2002) which was conducted by the authors of this review, achieved a large change in smoking behaviour in the intervention group, and a lower incidence of complications. The second trial also reduced smoking in the intervention group before surgery, but the complication rates were similar. Some differences between the studies might explain this. The smoking cessation intervention began six to eight weeks before scheduled surgery in Moller 2002 but only two to three weeks before in Sorensen 2003. It is possible that a longer period of abstinence is required to achieve a reduction in some, or all, types of complication. This would have implications for the short-term benefit that could be achieved from interventions that are provided at preadmission clinics, the model tested in the other two trials. In both these trials the clinic visit was only one to two weeks before scheduled surgery. Smoking-induced reduction in lung function may be significantly improved by six to eight weeks smoking abstinence (Buist 1976). The smoking-related impairment of immune function may likewise be reversed by six to eight weeks of abstinence (Beckers 1991). These studies suggest that smoking cessation interventions are likely to be more beneficial when offered at least six weeks before surgery than in the immediate preoperative period, if possible. Such interventions may be difficult to achieve unless there is a partnership between surgical services and other branches of the health service, particularly primary care.

Another difference between the two studies of complication rates was that the smoking behaviour outcome measured by Sorensen 2003 combined smoking abstinence and reduction. If few of the intervention group quit completely, the effect on complication rates might be limited. A further difference between Moller 2002 and Sorensen 2003 was the type of surgery: hip and knee replacement versus colerectal surgery. This might have influenced the type of complications likely to occur.

Neither of the trials with longer-term assessment of smoking behaviour detected a significant difference between the intervention and control groups.

However, there is no a priori reason to believe that interventions that help people to stop smoking in other settings will not also work in perioperative patients. These include measures to increase motivation and treat nicotine dependence, including brief advice (Lancaster 2004), more intensive behavioural support (Lancaster 2005; Stead 2005), nicotine replacement therapy (Silagy 2004), and antidepressants (Hughes 2004).

Whether the perioperative period is a particularly suitable time for smoking interventions remains unknown. Schwartz 1987 demonstrated that patients may be more likely to comply with smoking cessation advice during the time of an acute illness. The possibility of reducing perceived vulnerability to postoperative complications could promote patient motivation to quit or reduce smoking prior to operation. On the other hand, people who smoke might find it more difficult to quit when facing the stress of an operation.

Whether preoperative smoking cessation intervention may have adverse effects is unknown. It has been claimed that recent quitters may suffer from pulmonary symptoms such as cough and sputum production, but we could find no evidence about the relevance of this to surgical patients.

AUTHORS' CONCLUSIONS

Implications for practice

The results of observational data and one study in this review suggest the preoperative smoking intervention is beneficial for changing smoking behaviour perioperatively and for reducing the incidence of complications, but results of a second study with a shorter preoperative cessation period suggest that the timing of the intervention may be important.

We suggest that smokers awaiting surgery should, like all smokers, be advised to quit and offered effective interventions, including behavioural support and pharmacotherapy.

Implications for research

We need to establish the effect of shorter preoperative intervention periods on complication rate. We also need to know how preoperative smoking intervention affects long-term smoking abstinence rates. In addition we need to describe different methods of smoking intervention in order to find the most effective way.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Moller 2002

Methods	Country: Denmark Method of randomization: sealed envelopes
Participants	120 patients awaiting hip or knee alloplasty. 108 completed.
Interventions	Initiatied 6-8 weeks before surgery. Weekly meetings from a nurse, NRT available. Control group: usual care
Outcomes	Smoking cessation in perioperative period (before, just after, 10 days after, 4 weeks after. Intraoperative/postoperative complications until 4 weeks after surgery. Outcome assessor blinded
Notes	Randomized participants who did not have surgery are not included in denominators

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Ratner 2004

Methods	Country: Canada Method of randomization: sealed envelope, computer-generated assignment
Participants	237 patients awaiting surgery. 228 assessed postoperatively, 202 at 6 months, 169 at 12 months
Interventions	Initiated 1-3 weeks before surgery: 15 min face-to-face counselling from trained nurse, materials, nicotine gum, quit kit, hotline number. Post -op counselling in hospital and via telephone. Control group: usual care
Outcomes	Smoking cessation (abstinence for at least 24 hours before surgery, 6 months, 12 months) Validated by CO (face-to-face) or urine cotinine Post-op complications not assessed
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Sorensen 2003

Methods	Country: Denmark Method of randomization: not stated
Participants	60 patients awaiting colorectal surgery. 57 completed, 3 withdrew from intervention group
Interventions	Initiated 15 days (inter quartile range 8-24) before surgery from a nurse. Home visit + telephone support. NRT available up to 24 hours before surgery. Control group: told to continue smoking
Outcomes	Smoking cessation on day before surgery, at suture removal, validated by CO and cotinine Post-op complications up to 30 days requiring medical or surgical intervention
Notes	Drops outs not accounted for

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Wolfenden 2005

Methods	Country: Australia Method of randomization: by computer, 3:2 ratio. Concealed until allocation. Only assessor blinded post allocation
Participants	210 patients awaiting surgery, 197 included in preoperative assessment
Interventions	1-2 weeks preoperative smoking intervention. NRT in the dependent group (>10 cpd). Tailored self-help materials, telephone counselling. Control group: staff could provide advice and NRT at their discretion
Outcomes	Smoking cessation, for >24 hr before admission, at 3 month follow up. No validation. Outcomes reported to a blinded assessor at 3 months Post-op complications not assessed
Notes	13 randomized participants who did not have surgery are not included in denominators for perioperative abstinence.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

CO: carbon monoxide
cpd: cigarettes per day

NRT: nicotine replacement therapy

Characteristics of excluded studies *[ordered by study ID]*

Basler 1981	Patient allocation not randomized.
Griebel 1998	Intervention takes place during the course of postoperative recovery.
Haddock 1997	Quasi-experimental design.
McHugh 2001	Not all patients allocated to treatment and control group were smokers. The intervention was directed not only at smoking habits, but also drinking habits, obesity, physical activity etc.
Munday 1993	Patient allocation not randomized.
Myles 2004	Outcome assessment not immediately prior to surgery. Change of protocol within the study.
Rissel 2000	Historical controls.
Simon 1997	Intervention postoperative, not preoperative.
Sorensen 2003b	Not a clinical trial - experimental test of surgical procedures on volunteers.
Steinemann 2005	Intervention was training of surgical residents. No patient-related outcomes assessed.
Wewers 1994	Intervention postoperative, not preoperative.
Yang 2003	Commentary on Sorensen 2003b

DATA AND ANALYSES

Comparison 1. Effect of intervention on smoking behaviour

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Smoking cessation at time of surgery	4		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected
2 Smoking cessation longer term	2		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 Three month follow-up	1		Odds Ratio (M-H, Fixed, 95% CI)	Not estimable
2.2 Twelve month follow-up	1		Odds Ratio (M-H, Fixed, 95% CI)	Not estimable

Comparison 2. Effect of intervention on perioperative morbidity

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Wound complications	2		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected
2 Any complication	2	165	Odds Ratio (M-H, Fixed, 95% CI)	0.37 [0.19, 0.71]

Analysis 1.1. Comparison 1 Effect of intervention on smoking behaviour, Outcome 1 Smoking cessation at time of surgery.

Review: Interventions for preoperative smoking cessation

Comparison: 1 Effect of intervention on smoking behaviour

Outcome: 1 Smoking cessation at time of surgery

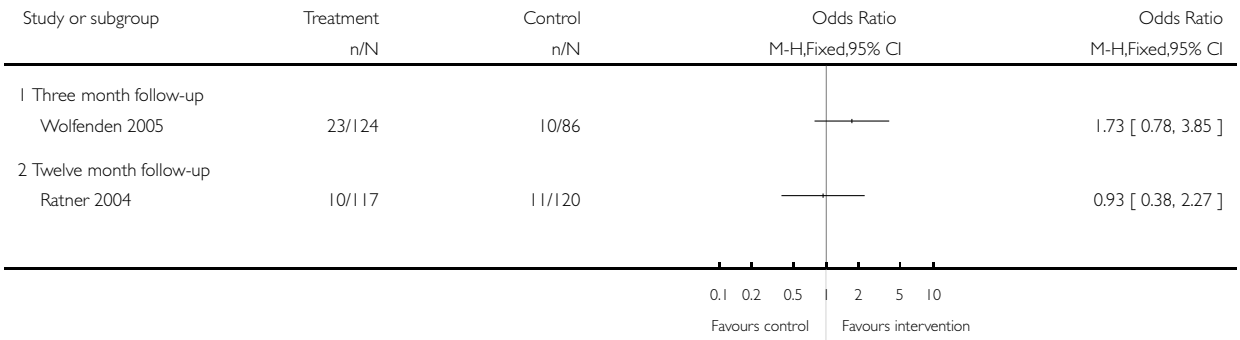
Study or subgroup	Intervention n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Odds Ratio M-H,Fixed,95% CI
Moller 2002	36/56	4/52		21.60 [6.79, 68.71]
Ratner 2004	81/117	62/120		2.10 [1.24, 3.58]
Sorensen 2003	24/27	4/30		52.00 [10.54, 256.65]
Wolfenden 2005	92/118	51/79		1.94 [1.03, 3.66]

Analysis 1.2. Comparison 1 Effect of intervention on smoking behaviour, Outcome 2 Smoking cessation longer term.

Review: Interventions for preoperative smoking cessation

Comparison: 1 Effect of intervention on smoking behaviour

Outcome: 2 Smoking cessation longer term

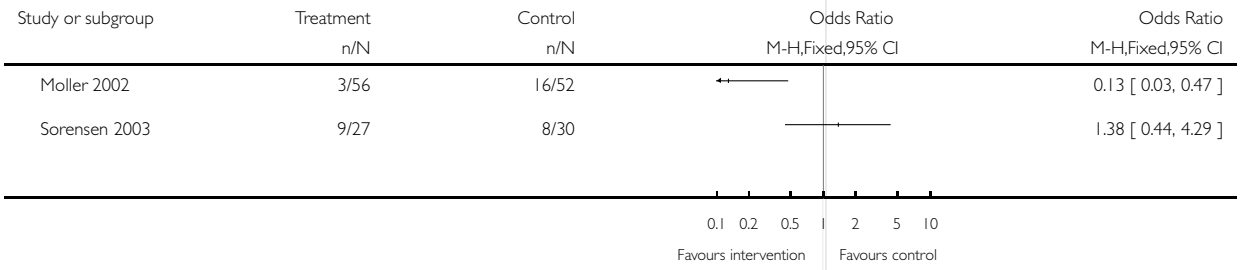


Analysis 2.1. Comparison 2 Effect of intervention on perioperative morbidity, Outcome 1 Wound complications.

Review: Interventions for preoperative smoking cessation

Comparison: 2 Effect of intervention on perioperative morbidity

Outcome: 1 Wound complications



Analysis 2.2. Comparison 2 Effect of intervention on perioperative morbidity, Outcome 2 Any complication.

Review: Interventions for preoperative smoking cessation

Comparison: 2 Effect of intervention on perioperative morbidity

Outcome: 2 Any complication

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
Moller 2002	10/56	27/52		75.9 %	0.20 [0.08, 0.48]
Sorensen 2003	11/27	13/30		24.1 %	0.90 [0.31, 2.58]
Total (95% CI)	**83**	**82**		**100.0 %**	**0.37 [0.19, 0.71]**
Total events: 21 (Treatment), 40 (Control)					
Heterogeneity: Chi^2 = 4.59, df = 1 (P = 0.03); I^2 =78%					
Test for overall effect: Z = 3.00 (P = 0.0027)					

WHAT'S NEW

Last assessed as up-to-date: 16 May 2005.

3 September 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 3, 2000

Review first published: Issue 2, 2001

17 May 2005	New citation required and minor changes	Updated for issue 3, 2005, four new trials included

CONTRIBUTIONS OF AUTHORS

In the updated version NV and AMM did searches, scanned the retrival for relevant studies and evaluated the studies found.

AMM and NV did data extraction and wrote the review.

Tom Pederson was an author of the first version.

DECLARATIONS OF INTEREST

The authors of the review are also authors of one of the included trials (Moller 2002).

INDEX TERMS

Medical Subject Headings (MeSH)

*Smoking Cessation; Intraoperative Complications [*prevention & control]; Postoperative Complications [*prevention & control]; Preoperative Care; Randomized Controlled Trials as Topic; Smoking [adverse effects]

MeSH check words

Humans