Review

A systematic review on the effectiveness of slowly-absorbable versus non-absorbable sutures for abdominal fascial closure following laparotomy

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Abstract

Objective: To systematically analyse the effectiveness of delayed-absorbable (Polydioxanone; PDS) versus non-absorbable (Polypropylene; Prolene, and Nylon) for abdominal fascial closure in patients undergoing laparotomy.

Methods: Randomised trials evaluating PDS versus Prolene/Nylon for abdominal fascial closure were selected and analysed by using the statistical tool RevMan where summative data was expressed as odds ratio (OR).

Results: Eight randomised trials encompassing 4261 patients undergoing laparotomy closure with either PDS or Prolene/Nylon were retrieved. There was no statistically significant heterogeneity among trials. In the fixed effect model PDS was comparable to Prolene/Nylon in terms of risk of incisional hernia (OR, 1.10; 95% CI, 0.87, 1.37; z = 0.79; p = 0.43), wound dehiscence (OR, 1.04; 95% CI, 0.67, 1.62; z = 0.19; p = 0.85), peri-operative complications (OR, 0.94; 95% CI, 0.66, 1.33; z = 0.37; p = 0.71), suture sinus formation (OR, 0.58; 95% CI, 0.33, 1.04; z = 1.84; p = 0.07) and surgical site infection (OR, 0.98; 95% CI, 0.68, 1.39; z = 0.14; p = 0.89). Subgroup analysis separately comparing Prolene and Nylon with PDS supported same outcome.

Conclusion: PDS and Prolene/Nylon are equally effective for the closure of abdominal fascia following laparotomy. Given that there are no significant differences between two suture materials, further studies may be conducted to evaluate their cost-effectiveness and measurement of health-related quality of life instead of analysing their effectiveness in laparotomy closure.

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1. Introduction

Incisional hernia is a frequent complication of abdominal surgery, with a reported incidence of 3–13% of patients following laparotomy.1–4 In the United States of America, approximately 4–5 million laparotomies are performed annually,4 leading to at least 400,000–500,000 incisional hernias, of which approximately 200,000 repairs are performed.4,5 In the Netherlands, 100,000 laparotomies and 3900 incisional hernia repairs are performed annually.6 In the United Kingdom, more than 124,000 laparotomies and 7000 incisional hernia repairs were performed in 2005–2006 with both open and laparoscopic techniques.7 Thus about 4% of patients undergoing a laparotomy require additional surgery to repair an incisional hernia. When morbidity is added to the vast numbers and the tremendous costs associated with incisional hernia repair,8–12 it becomes quite clear that effective preventive strategies may play a vital role to save healthcare resources by reducing the incidence of incisional hernia. Development of incisional hernia following laparotomy is multifactorial. These factors may be classified into patient related, biological factors and surgical technique related.13–16 Patient related factors include age, higher body mass index, synchronous presence of abdominal aortic aneurysm and multiple co-morbidities.17–20 Biological factors include the capacity for normal collagen synthesis and organization to affect sound biological repair. Abnormal biological healing of fascial sheath results in the development of incisional hernia.21–24 Therefore, biological factors are less amenable to modifications. Operative and technical factors may be considered the weakest link in the development of incisional hernia which should form the highest priority in preventive strategies.

Several systematic reviews25–30 have examined the type of suture used for abdominal fascial closure but none have successfully recommended an agreed suture technique and suture type. The objective of this review is to systematically analyse only those randomised controlled trials which have evaluated the efficacy of the most commonly used suture material (in the United Kingdom)
for abdominal fascial closure, that is monofilamentous slowly-absorbable Polydioxanone (PDS) versus monofilamentous non-absorbable Polypropylene (Prolene) and Nylon.

2. Methods

Relevant prospective randomized controlled trials on the use of PDS versus Prolene/Nylon for abdominal fascial closure following laparotomy until April 2011 were included in this review. The Cochrane Colorectal Cancer Group (CCCG) Controlled Trial Register, the Cochrane Central Register of Controlled Trials (CENTRAL) in The Cochrane Library, Medline, Embase and Science Citation Index Expanded were searched until April 2011 using the medical subject headings (MeSH) terms “laparotomy closure”, and “fascial sheath closure”. These headings were used in combination with “slowly-absorbable suture”, “non-absorbable suture”, “polydioxanone”, “PDS”, “polypropylene”, and “prolene”. A filter for identifying relevant studies recommended by The Cochrane Collaboration was used to filter out irrelevant studies in Medline and Embase. The references of the included studies were searched to identify further trials. The software package RevMan 5.0.132 provided by The Cochrane Collaboration was used for analysis. The odds ratio (OR) with 95 per cent confidence interval (CI) was calculated for binary data variables. The random effects model33 and the fixed effect model34 were used to calculate the combined outcome in both binary and continuous variables. In case of heterogeneity, only the results of the random effects model were reported. Heterogeneity was explored using the $\chi^2$ test, with significance set at $p < 0.05$, and quantified35 using $I^2$ with a maximum value of 30% identifying low heterogeneity.31 The Mantel-Haenszel method was used for the calculation of OR under the fixed effect model, and the DerSimonian/Laird method was used for the calculation of OR under the random effect model.36 In a sensitivity analysis, 0.5 was added to each cell frequency for trials in which no event occurred in either the treatment or control group, according to the method recommended by Deeks et al.37 The estimate of the difference between both techniques was pooled depending upon the effect weights in results determined by each trial estimate variance. A forest plot (Figs. 3–17) was used for the graphical display of results from the meta-analysis. The square around the estimate stands for the accuracy of the estimation (sample size) and the horizontal line represents the 95% CI. We also performed subgroup analysis on trials where comparison between PDS versus Prolene and PDS versus Nylon was made separately to evaluate the influence of individual suture material.

3. Results

Eight studies38–45 encompassing 4261 patients undergoing laparotomy closure with either PDS or Prolene/Nylon were retrieved from the electronic databases (Fig. 1). There were 2195 patients in PDS group and 2066 patients in Prolene/Nylon group. The characteristics of these trials are given in Table 1. Variables used to achieve a combined outcome are given in Table 2. On subgroup analysis, combined outcome was achieved by a separate meta-analysis of 4 trials38,39,42,44 comparing the effectiveness of PDS (863 patients) versus Prolene (865 patients). Furthermore, combined outcome was also achieved after a separate meta-analysis of 4 trials40,41,43,45 comparing the effectiveness of PDS (1332 patients) versus Nylon (1201 patients) and difference between outcomes of these two groups was critically assessed to quantify bias based on these two suture materials.

Fig. 1. Quorum diagram showing trial selection methodology.
Table 1
Characteristics of included trials.

<table>
<thead>
<tr>
<th>Trial</th>
<th>Type of trial</th>
<th>Country</th>
<th>Surgical procedures</th>
<th>Suture comparison</th>
<th>Follow-up duration</th>
<th>Reported outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bloemen 2011</td>
<td>RCT</td>
<td>Netherlands</td>
<td>Both elective and emergency laparotomy</td>
<td>Polydioxanone 1/0 versus Polypropylene 1/0 Mass closure</td>
<td>14.70 months</td>
<td>Wound infection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polydioxanone: 34.5(31.6–37.3) Polypropylene: 31.3(30.5–36.0)</td>
<td></td>
<td>Peri-operative complications</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>INCISIONAL HERNIA</td>
<td></td>
<td>Wound dehiscence</td>
</tr>
<tr>
<td>Cameron 1987</td>
<td>RCT</td>
<td>UK</td>
<td>Midline laparotomy for various abdominal procedures</td>
<td>Polydioxanone 1 versus Polypropylene 1 Mass closure</td>
<td>18 months</td>
<td>Wound infection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>INCISIONAL HERNIA</td>
<td></td>
<td>Peri-operative complications</td>
</tr>
<tr>
<td>Docobo-Durantez 2006</td>
<td>RCT</td>
<td>Spain</td>
<td>Laparotomy for Hepatobiliarypancreatic diseases and liver transplantation</td>
<td>Polydioxanone 1 versus Nylon 1 Mass closure</td>
<td>12 months</td>
<td>Wound infection</td>
</tr>
<tr>
<td>Israelsson 1994</td>
<td>RCT</td>
<td>Iceland, Sweden</td>
<td>Midline laparotomy for various abdominal procedures</td>
<td>Polydioxanone 2 versus Nylon 1 Mass closure</td>
<td>12 months</td>
<td>Wound infection</td>
</tr>
<tr>
<td>Krukowski 1987</td>
<td>RCT</td>
<td>UK</td>
<td>Midline laparotomy for various abdominal procedures</td>
<td>Polydioxanone 1 versus Polypropylene 1 Mass closure</td>
<td>12 months</td>
<td>Wound infection</td>
</tr>
<tr>
<td>Leaper 1985</td>
<td>RCT</td>
<td>UK</td>
<td>Midline and transverse laparotomy for various abdominal procedures</td>
<td>Polydioxanone 1 versus Polypropylene 1 Mass closure</td>
<td>6 months</td>
<td>Wound infection</td>
</tr>
<tr>
<td>Mirza 2003</td>
<td>RCT</td>
<td>UAE</td>
<td>Midline and transverse laparotomy for various abdominal procedures</td>
<td>Polydioxanone 1 versus Polypropylene 1 Mass closure</td>
<td>12 months</td>
<td>Wound infection</td>
</tr>
<tr>
<td>Wissing 1987</td>
<td>RCT</td>
<td>Netherlands</td>
<td>All midline laparotomies: emergency and elective</td>
<td>Polydioxanone 1 versus Nylon 1 Mass closure</td>
<td>12 months</td>
<td>Wound infection</td>
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</table>

Table 2
Outcome variables.

<table>
<thead>
<tr>
<th>Trial</th>
<th>Number of patients</th>
<th>Incisional hernia</th>
<th>Surgical site infection</th>
<th>Suture sinus</th>
<th>Peri-operative complications</th>
<th>30-day wound dehiscence</th>
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</thead>
<tbody>
<tr>
<td>Bloemen 2011</td>
<td>267</td>
<td>58/267</td>
<td>18/267</td>
<td>5/267</td>
<td>41/267</td>
<td>18/267</td>
</tr>
<tr>
<td></td>
<td>256</td>
<td>45/256</td>
<td>14/256</td>
<td>3/256</td>
<td>26/256</td>
<td>9/256</td>
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<tr>
<td>Cameron 1987</td>
<td>143</td>
<td>10/143</td>
<td>12/143</td>
<td>0/143</td>
<td>44/143</td>
<td>1/143</td>
</tr>
<tr>
<td>Israelsson 1994</td>
<td>319</td>
<td>2/42</td>
<td>20/319</td>
<td>reported</td>
<td>23/319</td>
<td>2/319</td>
</tr>
<tr>
<td>Mirza 2003</td>
<td>405</td>
<td>49/325</td>
<td>38/405</td>
<td>1/405</td>
<td>8/405</td>
<td>3/405</td>
</tr>
</tbody>
</table>
3.1. Methodological quality of included studies

The methodological quality of included trials was initially assessed by the published guideline of SIGN (Scottish Intercollegiate Guidelines Network) and Rangel et al.\textsuperscript{46,47} All trials scored from 11 to 15 a maximum of 19 moderates to good strength of each randomised controlled trial. Based on the quality of included randomised controlled trials,\textsuperscript{38–44} the strength and summary of evidence was further evaluated by GradePro\textsuperscript{45}, a statistical tool provided by Cochrane Collaboration (Fig. 2). The Mantel-Haenszel fixed effect model was used to compute robustness and susceptibility to an outlier among these trials. The allocation concealment and blinding of investigator or assessor were not clearly reported as is often the case in trial evaluating surgical procedures. Qualitatively the results of this review may be considered relatively weaker. There was no statistically significant heterogeneity (clinical or methodological diversity) amongst trials except in case of peri-operative complications including surgical site infection.

3.2. Incidence of incisional hernia (PDS versus Prolene/Nylon)

There was no heterogeneity \( \chi^2 = 4.31, \text{df} = 7, p = 0.74; I^2 = 0\% \) among trials. Therefore, in the fixed effects model (OR, 1.11; 95% CI, 0.89, 1.39; \( z = 0.92; p = 0.36; \) Fig. 3), there was no statistical

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**Table:**

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Illustrative comparative risks* (95% CI)</th>
<th>Relative effect (95% CI)</th>
<th>No of Participants (studies)</th>
<th>Quality of the evidence (GRADE)</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td><strong>Incisional hernia incidence</strong></td>
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<tr>
<td>Odds ratio</td>
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<tr>
<td>Follow-up: mean 35 months</td>
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<tr>
<td>PDS</td>
<td>0.89 (99 to 147)</td>
<td>OR 1.1 (0.89 to 1.39)</td>
<td>3154 (8 studies)</td>
<td>++++ moderate\textsuperscript{1,2,3}</td>
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<tr>
<td>Prolene/Nylon</td>
<td>0.89 (78 to 117)</td>
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<td><strong>Surgical site infection rate</strong></td>
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<td>Odds ratio</td>
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<tr>
<td>Follow-up: mean 35 months</td>
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<tr>
<td>PDS</td>
<td>0.88 (55 to 107)</td>
<td>OR 0.97 (0.68 to 1.39)</td>
<td>4261 (8 studies)</td>
<td>++++ high</td>
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<tr>
<td>Prolene/Nylon</td>
<td>0.88 (55 to 107)</td>
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<td><strong>Suture sinus rate</strong></td>
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<td>Odds ratio</td>
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<tr>
<td>Follow-up: mean 35 months</td>
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<tr>
<td>PDS</td>
<td>0.29 (7 to 29)</td>
<td>OR 0.49 (0.29 to 0.85)</td>
<td>3425 (8 studies)</td>
<td>++++ moderate</td>
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<tr>
<td>Prolene/Nylon</td>
<td>0.29 (7 to 29)</td>
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<td><strong>Perioperative complications</strong></td>
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<td>Odds ratio</td>
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<td>Follow-up: mean 35 months</td>
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<tr>
<td>PDS</td>
<td>0.61 (76 to 149)</td>
<td>OR 0.89 (0.61 to 1.3)</td>
<td>4096 (8 studies)</td>
<td>++++ moderate\textsuperscript{4}</td>
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<tr>
<td>Prolene/Nylon</td>
<td>0.61 (76 to 149)</td>
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<tr>
<td><strong>Perioperative wound dehiscence</strong></td>
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<tr>
<td>Odds ratio</td>
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<tr>
<td>Follow-up: mean 35 months</td>
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<tr>
<td>PDS</td>
<td>0.68 (14 to 32)</td>
<td>OR 1.05 (0.68 to 1.62)</td>
<td>4209 (8 studies)</td>
<td>++++ high\textsuperscript{4}</td>
<td></td>
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<tr>
<td>Prolene/Nylon</td>
<td>0.68 (14 to 32)</td>
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</table>

*The basis for the assumed risk (e.g. the median control group risk across studies) is provided in footnotes. The corresponding risk (and its 95% confidence interval) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI).

CI: Confidence interval; OR: Odds ratio;
GRADE: Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

1 Lack of power calculations, blinding, and intention-to-treat analysis
2 Lack of power calculations, blinding, and intention-to-treat analysis
3 This conclusion is based on study of more than 4000 patients
4 No explanation was provided

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**Fig. 2.** Summary and strength of the evidence from trials analysed on GradePro\textsuperscript{8}.
difference in the incidence of incisional hernia following the use of both types of sutures for abdominal fascial closure.

3.3. Surgical site infection rate (PDS versus Prolene/Nylon)

There was a significant heterogeneity [\(\tau^2 = 0.14, \chi^2 = 15.92, df = 7, (p < 0.03); I^2 = 56\%\)] among trials. Therefore, in the random effects model (OR, 0.97; 95% CI, 0.68, 1.39; \(z = 0.16; p = 0.88;\) Fig. 4), there was no statistical difference in surgical site infection rate following the use of both types of sutures.

3.4. Suture sinus development rate (PDS versus Prolene/Nylon)

There was no heterogeneity [\(\chi^2 = 4.70, df = 5, (p = 0.45); I^2 = 0\%\)] among trials. Therefore, in the fixed effects model (OR, 0.49; 95% CI, 0.29, 0.85; \(z = 2.54; p = 0.01;\) Fig. 5), there was statistically significant higher risk of suture sinus development following the use of Prolene/Nylon compared to PDS.

3.5. Peri-operative complications (PDS versus Prolene/Nylon)

There was a significant heterogeneity [\(\tau^2 = 0.19, \chi^2 = 21.66, df = 7, (p < 0.003); I^2 = 68\%\)] among trials. Therefore, in the random effects model (OR, 0.69; 95% CI, 0.48, 1.00; \(z = 1.94; p = 0.05;\) Fig. 9), there was no statistical difference in surgical site infection rate following the use of both types of sutures.

3.6. Peri-operative wound dehiscence (PDS versus Prolene/Nylon)

There was no heterogeneity [\(\chi^2 = 10.70, df = 7, (p = 0.15); I^2 = 35\%\)] among trials. Therefore, in the fixed effects model (OR, 1.05; 95% CI, 0.68, 1.62; \(z = 0.20; p = 0.84;\) Fig. 7), there was no statistical difference in the incidence of peri-operative wound dehiscence following the use of both types of sutures.

3.7. Incidence of incisional hernia (PDS versus Prolene)

There was no heterogeneity [\(\chi^2 = 2.05, df = 3, (p = 0.56); I^2 = 0\%\)] among trials. Therefore, in the fixed effects model (OR, 1.08; 95% CI, 0.79, 1.48; \(z = 0.47; p = 0.64;\) Fig. 8), there was no statistical difference in the incidence of incisional hernia the use of both types of sutures for abdominal fascial closure.

3.8. Surgical site infection rate (PDS versus Prolene)

There was no heterogeneity [\(\chi^2 = 4.46, df = 3, (p = 0.22); I^2 = 33\%\)] among trials. Therefore, in the fixed effects model (OR, 0.69; 95% CI, 0.48, 1.00; \(z = 1.94; p = 0.05;\) Fig. 9), there was no statistical difference in surgical site infection rate following the use of both types of sutures.
**Fig. 5.** Suture sinus formation (PDS versus Prolene/Nylon).

**Fig. 6.** Peri-operative complications (PDS versus Prolene/Nylon).

**Fig. 7.** Wound dehiscence (PDS versus Prolene/Nylon).
3.9. Suture sinus development rate (PDS versus Prolene)

There was no heterogeneity \( \chi^2 = 4.48, \text{df} = 3, (p = 0.21); I^2 = 33\% \) among trials. Therefore, in the fixed effects model (OR, 0.47; 95% CI, 0.20, 1.10; \( z = 1.74; p = 0.08 \); Fig. 10), there was no statistical difference in the incidence of suture sinus development following the use of both types of sutures materials.

3.10. Peri-operative complications (PDS versus Prolene)

There was a significant heterogeneity \( \tau^2 = 1.40, \chi^2 = 9.87, \text{df} = 3, (p < 0.02); I^2 = 70\% \) among trials. Therefore, in the random effects model (OR, 0.83; 95% CI, 0.47, 1.46; \( z = 0.65; p = 0.51 \); Fig. 8), there was no statistical difference in the incidence of peri-operative complications following the use of both types of sutures.

3.11. Peri-operative wound dehiscence (PDS versus Prolene)

There was a significant heterogeneity \( \tau^2 = 0.29, \chi^2 = 12.69, \text{df} = 3, (p < 0.005); I^2 = 76\% \) among trials. Therefore, in the random effects model (OR, 0.49; 95% CI, 0.12, 2.09; \( z = 0.96; p = 0.34 \); Fig. 12), there was no statistical difference in the incidence of peri-operative wound dehiscence following the use of both types of sutures.

3.12. Incidence of incisional hernia (PDS versus nylon)

There was no heterogeneity \( \chi^2 = 1.44, \text{df} = 3, (p = 0.70); I^2 = 0\% \) among trials. Therefore, in the fixed effects model (OR, 1.12; 95% CI, 0.81, 1.54; \( z = 0.68; p = 0.49 \); Fig. 13), there was no statistical difference in the incidence of incisional hernia following the use of both types of sutures.

![Fig. 8. Incisional hernia (PDS versus Prolene).](image1)

![Fig. 9. Surgical site infection (PDS versus Prolene).](image2)

![Fig. 10. Suture sinus formation (PDS versus Prolene).](image3)
3.13. Surgical site infection rate (PDS versus nylon)

There was no heterogeneity \([\chi^2 = 5.68, \text{df} = 3, (p = 0.13); I^2 = 47\%]\) among trials. Therefore, in the fixed effects model (OR, 1.25; 95% CI, 0.94, 1.67; \(z = 1.56; p = 0.12\); Fig. 14), there was no statistical difference in the incidence of developing surgical site infection following the use of both types of sutures.

3.14. Suture sinus development rate (PDS versus Nylon)

There was no heterogeneity \([\chi^2 = 0.24, \text{df} = 1, (p = 0.62); I^2 = 0\%]\) among trials. Therefore, in the fixed effects model (OR, 0.51; 95% CI, 0.25, 1.04; \(z = 1.85; p = 0.06\); Fig. 15), there was no statistical difference in the incidence of suture sinus development following the use of both types of sutures for abdominal fascial closure in laparotomy.

3.15. Peri-operative complications (PDS versus Nylon)

There was no heterogeneity \([\chi^2 = 5.28, \text{df} = 3, (p = 0.15); I^2 = 43\%]\) among trials. Therefore, in the fixed effects model (OR, 1.14; 95% CI, 0.86, 1.52; \(z = 0.91; p = 0.37\); Fig. 16), there was no statistical difference in the incidence of peri-operative complications following the use of both types of sutures for abdominal fascial closure.

3.16. Peri-operative wound dehiscence (PDS versus Nylon)

There was no heterogeneity \([\chi^2 = 1.73, \text{df} = 3, (p = 0.63); I^2 = 0\%]\) among trials. Therefore, in the fixed effects model (OR, 1.35; 95% CI, 0.68, 2.67; \(z = 0.87; p = 0.38\); Fig. 17), there was no statistical difference in the incidence of peri-operative wound dehiscence following the use of both types of sutures.

![Fig. 12. Wound dehiscence (PDS versus Prolene).](image)

![Fig. 13. Incisional hernia (PDS versus Nylon).](image)
3.17. Subgroup analysis

A subgroup analysis was performed on trials with follow-up of more than 1 year because a number of incisional hernias develop later than one year after laparotomy. There was no heterogeneity \[\chi^2 = 4, \text{df} = 6, (p = 0.68); I^2 = 0\%\] among trials. Therefore, in the fixed effects model (OR, 1.10; 95% CI, 0.88–1.38; \[z = 0.87; p = 0.38\]), there was no statistical difference in the incidence of incisional hernia following the use of both types of sutures for abdominal fascial closure.

3.18. Other relevant variables

Although the authors of this review intended to analyse data of other relevant and important variables such as cost-effectiveness, health-related quality of life measurement, length of hospital stay, operative time, long-term follow-up and re-admission rate due to intra-abdominal adhesions. These calculations were virtually impossible to perform because of insufficient data reporting.

4. Discussion

This meta-analysis has demonstrated that PDS, Prolene and Nylon are equally effective for abdominal fascial closure. Risk of incisional hernia, wound dehiscence, peri-operative complications, suture sinus formation, and surgical site infection do not differ significantly for different suture materials. Subgroup analysis comparing PDS with both Prolene and Nylon also suggest equivalence. There is a lack of agreement within the surgical fraternity about the ideal abdominal fascial closure technique. Several meta-analyses of variable quality have reported confusing and conflicting recommendations. Studies have compared the use of

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**Fig. 14.** Surgical site infection (PDS versus Nylon).

**Fig. 15.** Suture sinus formation (PDS versus Nylon).

**Fig. 16.** Peri-operative complications (PDS versus Nylon).
absorbable versus non-absorbable, delayed-absorbable versus non-absorbable, monofilament versus multifilament and the use of steel wires for laparotomy closure but without any solid conclusion. The findings of our review correlate well with one meta-analysis published in 2002 supporting the use of slowly-absorbable suture material. This is further supported by Diener et al favouring the use of delayed-absorbable suture material like PDS. In contrast, Hodgson et al favour the use of non-absorbable Prolene and NyloN. We consider this meta-analysis a valuable guide in current surgical practice for the surgical community because the most commonly used suture materials were compared and a conclusive outcome could be reached to attain valid recommendations. A recently published high quality randomised controlled trial favours our conclusion considerably but the incidence of incisional hernia was reported higher between both groups because of difference in baseline characteristics referring towards higher number of recruited patients with chronic obstructive pulmonary disease.

No further trials are required for the evaluation of suture material in abdominal fascial closure according to the results of summative outcomes of this review. Future randomised trials may be aimed to evaluate variables like cost-effectiveness, health-related quality of life measurement, length of hospital stay, operative time, long-term follow-up and re-admission rate due to intra-abdominal adhesions. Furthermore, research may be directed towards closure strategy in emergency versus elective laparotomy closure, new suture material, and the use of prophylactic biosynthetic meshes in a group of high risk population like patients with obesity, chronic obstructive pulmonary disease.

**Conflict of interest**

None.

**Funding**

None.

**Ethical approval**

Not applicable.

**Trial**

Not applicable.

**Author contribution**

Study idea: Sajid
Study design: Sajid, Parampalli, McFall
Data collections: Sajid, Parampalli

**Data confirmation:** Baig
**Data analysis:** Sajid, Parampalli
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**Critical review of the article:** Baig
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**References**


**Fig. 17.** Wound dehiscence (PDS versus Nylon).