References

When the surgeon opens the surgical wound he abruptly exposes the tissues to a totally new environment, ambient air, which is characterized by:

**Lower temperature**

Even a mild hypothermia increases the risk of wound infection\(^1\) partly due to a decreased tissue blood flow and tissue oxygenation.

*and, probably even more important,*

**Far lower humidity**

Perioperative desiccation of superficial tissue in the surgical cavity is recognized as one of the most important adhesiogenic factors\(^7,8\). The desiccation of mesothelial cells activates an inflammatory process which in the end leads to adhesion formation\(^7,8\).

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**Climatic change during operation and adhesion formation**

<table>
<thead>
<tr>
<th>During operation</th>
<th>12 h postoperatively</th>
<th>Post surgery</th>
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</thead>
<tbody>
<tr>
<td>Evaporation from mesothelial cells(^{12})</td>
<td>Cells desiccate and an inflammatory reaction ensues(^{12,16})</td>
<td>Formation of fibrin mesh that should normally be dissolved by fibrinolytic activity(^{12})</td>
</tr>
<tr>
<td>Failure of fibrin mesh dissolution can result in infiltration of fibroblasts, angiogenesis and innervation, resulting in tissue organisation into adhesions(^{1,16})</td>
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</tbody>
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Intraoperative field flooding with warm humidified CO\(_2\) can decrease the occurrence of adhesions after open surgery.

Flooding the surgical cavity with warm CO\(_2\) will not only prevent airborne bacteria from reaching the exposed tissue\(^{5}\) but also suffocate those already there\(^{6}\). Moreover, the use of heated humidified CO\(_2\) will also keep the surgical wound tissue warm\(^{4}\), which in its turn optimizes the immune system against infection\(^{1-3}\). Thus, decreasing the risk of surgical site infection and its toxic effects should also imply a reduced risk of adhesion formation.

**Potential application areas for the CarbonVITA™ tissue protector**

All open surgeries, including

- Abdominal surgery
- Cardio thoracic surgery
- Orthopedic surgery

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Postoperative adhesion formation is claimed to be the most frequent complication in abdominal surgery\(^{16,17}\) where as much as one third of the patients have to be readmitted for conditions related to adhesions\(^{17}\). The economical impact of adhesions is therefore also huge. In the United States alone the annual adhesion-related expenditures in healthcare exceed one billion dollars\(^{18}\).