How to protect or repair the Schneiderian membrane perforations during sinus-lift treatments

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The treatment of membrane perforations can be managed with resorbable collagen fleece because it can be assume that there is a correlation between implant failure and sinus membrane perforation.

The sinus elevation can be a relatively invasive procedure and it has been reported of some surgical and postsurgical complications. (Cho et al 2001; Schwartz-Arad et al. 2004). In the focus there is the perforation of the Schneiderian membrane (Bergh van den et al. 2000a, 2000b; Cho et al. 2001; Levin et al. 2004; Proussaefs et al. 2004; Schwartz-Arad et al. 2004; Shlomi et al. 2004; Sorn? et al. 2005). That treatment problem appears in 7-10% to 35% of sinus floor elevation procedures (Khoury 1999; Nkenke et al. 2002; Stricker et al. 2003; Schwartz-Arad et al. 2004; Shlomi et al. 2004). That means that this membrane perforations are able to result in post-operative complications as acute or chronic sinus infection, bacterial invasion, swelling, bleeding, wound dehiscence, loss of the graft material and a disruption of normal sinus physiologic function (Chanavaz 1990; Bergh van den et al. 2000a, 2000b; Aimetti et al. 2001; Cho et al. 2001; Cordioli et al. 2001; Nkenke et al. 2002; Levin et al. 2004; Proussaefs et al. 2004; Schwartz-Arad et al. 2004; Shlomi et al. 2004). Some of the clinician have been supposed that there is a correlation between implant failure and sinus membrane perforation Khoury (1999) and Proussaefs et al. (2004).

The membrane perforations have been involved in anatomical as well as technical factors (Ulm et al. 1995; Vlassis & Fugazzotto 1999; Bergh van den et al 2000a, 2000b; Shlomi et al. 2004). The most common factors: Sinus floor convolutions, sinus septum (Underwood septa) (Chanavaz 1990; Betts & Miloro 1994; Ulm et al. 1995; Vlassis & Fugazzotto 1999; Bergh van den et al. 2000a, 2000b; Schwartz-Arad et al. 2004; Shlomi et al. 2004), transient mucosa swelling, osteotomy design (Vlassis & Fugazzotto 1999; Bergh van den et al. 2000a, 2000b) and narrow sinus can complicate membrane elevation and increase the risk of perforation during the procedure (Bergh van den et al. 2000a, 2000b; Cho et al. 2001; Shlomi et al. 2004). Various surgical techniques exist to overcome these perforations. The treatment of membrane perforations can be managed with resorbable collagen products because it can be assume that there is a correlation between implant failure and sinus membrane perforation.

Fig. 1: Medicipio C Fleece
The use of collagen materials (e.g. Medicipio C Fleece) intended to act as a barrier between the sinus cavity and the site of graft placement.

Membrane perforation

The outcome of some studies indicates that the extent of sinus membrane perforation can result in reduced bone formation and a compromised implant survival rate. To explain this fact, it can be hypothesized that displacement of a biomaterial through the sinus membrane can lead to transient or chronic sinusitis from 10% to 20% of sinus elevation cases, prompting the need for further treatment (Nkenke et al. 2002), and impairing the prognosis of the placed implants.

There is one important fact: For the surgeon it is difficult to determine the adequate and safe placement of the bone graft material which is able to hurt the Schneiderian membrane with sharp particles. In addition, a strong pressure can lead to extensive perforations. Therefore it is recommend by experienced clinicians the use of resorbable collagen products (e.g. Medicipio C Fleece) as a protective shield for the Schneiderian membrane. That kind of products models e.g. a pouch around the sinus graft material.

The following table 1 demonstrates the outcome of a study which shows the relation between the size of the membrane perforations and the prognosis of the implants survival rate. In that table it correlates the size of the perforation with implant failure.

Table 1: Comparison of the survival rate of the implants

<table>
<thead>
<tr>
<th>Statistical Analysis</th>
<th>Group 1 N=140</th>
<th>Group 2 N=74</th>
<th>Group 3 N=58</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>97.14</td>
<td>91.98</td>
<td>74.14</td>
</tr>
<tr>
<td>80</td>
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</tbody>
</table>

Former studies have shown that larger perforations represent an absolute contraindication to the continuation of surgery (Aimetti et al. 2001). It is recommended to integrate special protocol (e.g. the use of Medicipio C Fleece) into the treatment plan in order to reduce the perforation of the Schneiderian membrane and the risks of further surgical and postsurgical complications.

Different kinds of bone graft material exist and are able to hurt the Schneiderian membrane cause of their sharp particles. Some of the bone graft materials are composed as round particles which should be able to reduce these kinds of problems additionally.

Conclusion

The most prevalent intra-operative complication is the perforation of the Schneiderian membrane associated with the lifting of the sinus membrane. The use of collagen products (e.g. Medicipio C Fleece) and adequate bone graft material are able to reduce/avoid these kinds of treatment problems.