Introduction: Postoperative adhesions and scar tissue are a significant problem in anterior spine surgery. Involvement of overlying structures can create pain and neurovascular complications. Adhesions also create a difficult surgical environment at revision surgery.

Purpose: To evaluate the safety and efficacy of a permanent polyvinyl alcohol (PVA) hydrogel barrier in reducing the risk of potential postoperative vessel damage during anterior lumbar revision surgery and creating a plane of dissection at revision surgery.

Methods: The PVA devices were implanted onto the ventral surface of exposed lumbar intervertebral discs in sheep using an anterolateral approach. Discs at two levels adjacent to the study site were also exposed in each sheep to serve as controls. Periodic sampling was undertaken to evaluate gross anatomic, micropathological and biochemical environments and physical properties of the shields at necropsy at up to 120 days.

Results: The properties and visual appearance of the device remained intact. The material remained flexible, hydrophilic, and soft. The material showed no resorption or decomposition at necropsy. The material was well tolerated by the animal, with histological studies showing minimal sign of acute or chronic inflammation or rejection. Tissue planes were easily able to be localized, presenting a “landing zone” to the surgeon attempting to locate the prior surgical site.

Discussion and conclusion: The PVA vessel shield effectively protected the structures overlying the sheep spine after initial surgery, and provided a clear dissection plane for resection at repeat surgery. The device allowed for easy separation of the overlying structures with no adhesion.