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LUMBAR INTERVERTEBRAL DISC ALLOGRAFTING IN A GOAT MODEL

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Preliminary study in humans indicated that whole fresh-frozen intervertebral disc (IVD) transplantation may be an effective treatment for disc degenerative diseases, but signs of degenerative change in the allograft were noted after the transplantation. The underlying mechanisms are not fully understood and remain a series of ongoing research in large animal model. Because of the ethically and economically accessible issues as well as anatomical similarity with human disc, the goats were used to develop reliable surgical approaches for lumbar spine exposure and disc allograft transplantation. Out of 14 male goats, 3 goats were used in a pilot study of different surgical approaches for lumbar spine exposure and as IVD donors; the remaining 11 goats were used as allograft recipients. Radiographs were used to monitor the stability and healing of the grafts on day 0 and one month post transplantation, respectively. Compared with the retroperitoneal 'trans-psoas muscle' approach and the 'post-psoas muscle' approach with longitudinal skin incision, the 'post-psoas muscle' approach with transverse skin incision is the superior choice for the transplantation because of broader surgical view and integrity of the psoas muscle. Preservation of the anterior longitudinal ligament and appropriate portion of the annulus fibrosus at the recipient site was crucial for satisfactory transplantation. Furthermore, a slightly reduced height of the disc allografts compared to that of the recipient slot may largely facilitate the transplantation owing to decreased incidents of dislodgement and endplate fracture. With the optimized approach, the IVD allograft can be steadily transplanted and matched well in goats.