Introduction
Lumbar spinal interbody fusion is performed to restore the intervertebral disc height (IVDH) and realign and stabilize the spinal column at one or more levels. To achieve these objectives mainly non-resorbable (titanium, carbon, PEEK) interbody fusion cages are used. To elucidate the influence of bioresorbable cage material on segment stability, IVDH maintenance and fusion, an in vivo radiostereometric analysis (RSA) study comparing 70/30 (L-lactide-co-D,L-lactide) PLDLLA cages with titanium cages of similar design was performed.

Materials and Methods
In 28 goats randomly a bioresorbable (n=21) or a titanium control (n=7) cage was implanted at L3-L4. (Fig. 1) Motion analysis of the L2-L3 (control) and L3-L4 goat spinal segment was performed using RSA before and after implantation of a PLDLLA cage and at follow up (3, 6, 12 months). Range of motion (ROM) for flexion/extension and IVDH were measured with RSA. Fusion was scored at follow up time intervals with a validated radiographic score.

Results
Surgery caused a non significant increase of ROM and a significant decrease of IVDH direct postoperatively in both groups (p < 0.0001). ROM of the PLDLLA segments gradually decreased in time and was similar to the titanium control group at twelve months. IVDH of the PLDLLA segments decreased significantly up to six months (p < 0.001), no further decrease was observed at twelve months.(Fig.2) Like the ROM, similar values were found for the decrease of IVDH for both the PLDLLA (1.4 +/- 0.8 mm) and titanium specimens (1.3 +/- 1.0 mm). (Fig.3) However, radiographic analysis showed a higher fusion rate in the titanium control group compared to the PLDLLA cages.

Conclusions
PLDLLA cages showed results equivalent to titanium cages with respect to maintaining IVDH and decreasing ROM. Therefore PLDLLA cages present a promising alternative to titanium cages, the standard in spinal interbody surgery.

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