Is autogenous bone graft really structurally inferior to a cage in instrumented lumbar interbody fusions?

A Durst, AJ Cook, S Bhagat,

AS Rai, RJ Crawford

Norfolk and Norwich University Hospital

Introduction

- Posterior Lumbar Interbody Fusion
  - First described in 1950's by Cloward[1]
    - Use of iliac crest graft, fusion rates of 85%
  - Artificial constructs first introduced in 1984
  - Rapidly followed by pedicle screw augmentation[2]
- Use of a Cage now widespread
  - Improve fusion rates, maintenance of fusion height
  - Costly
    - 58,000 cages used in 1998
    - Cost $182 million
    - 20% of spinal implant market
- Local graft can maintain the lordotic angle
  - Comparable outcome scores[3,4]
- Cages do subside[5]
- Bone graft contact area within a cage is <50%[6]

1. **Cloward RB.** *J Neurosurg. 1953*
2. **Brantigan et al.** *Spine 2000*
3. **Raman AS et al.** *J Bone Joint Surg (Br) 2006*
4. **Hu MW et al.** *J Bone Joint Surg (Br) 2012*
5. **Tokuhashi Y et al.** *Orthopedics 2009*
6. **Lee JH et al.** *Spine 2010*

Aim

- Compare post-op interbody height loss between:
  - Group 1 – *PEEK* Cage (*Travios, Synthes Ltd*)

    \+ autologous graft

  - Group 2 – Local Autologous Bone Graft

    Disc space cleared
    Local bone graft impacted

- Pedicle fixation in both groups

Methods

- Retrospective radiological review of all patients undergoing a PLIF between 2007 and 2012
  - >2 level fusions excluded

- Interbody height loss between immediate post-op and minimum 6 month follow-up

- Average of anterior and posterior intervertebral height

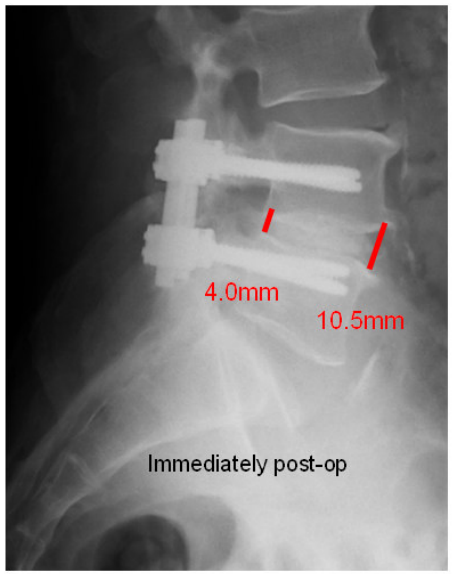
- Student's *t*-test significant at $p < 0.05$

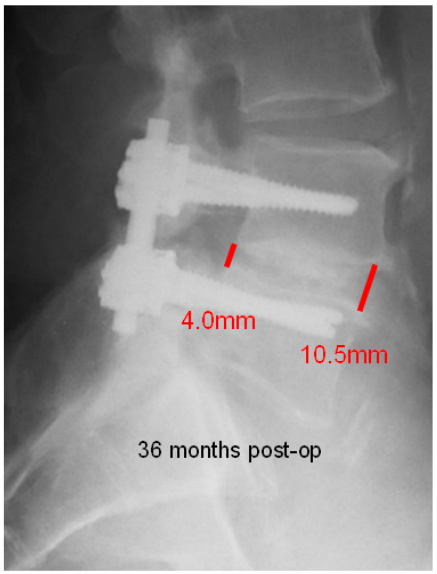
Patients & Methods

	Local Graft	Cage	Total
Mean Age	63	50	54.4
Male	12	19	31
Female	24	44	68
Total	36	63	99

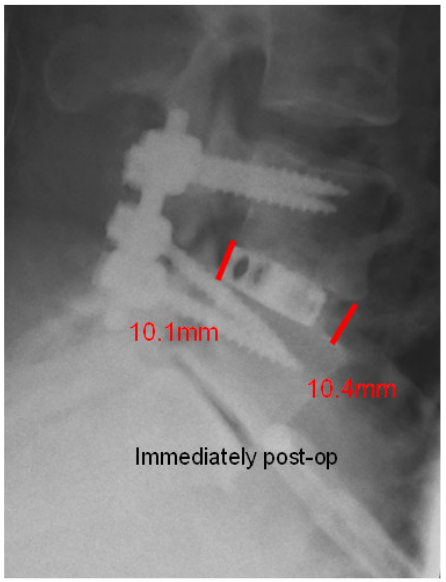
Results: Case Examples

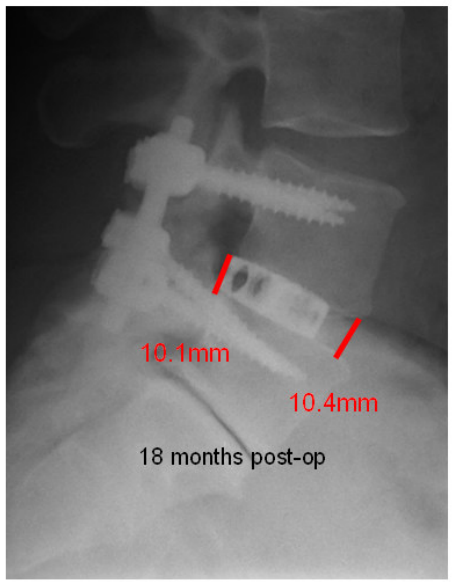
Autograft



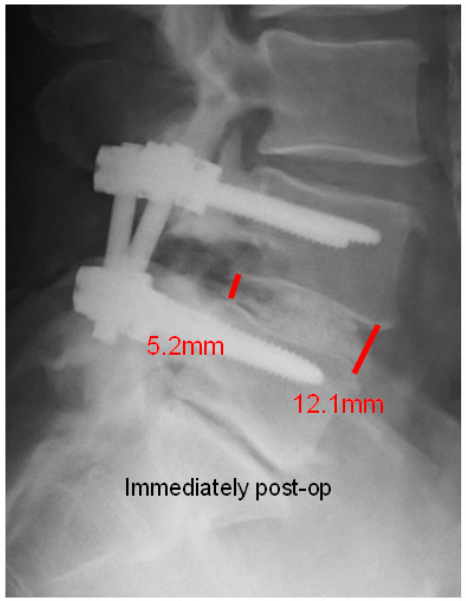


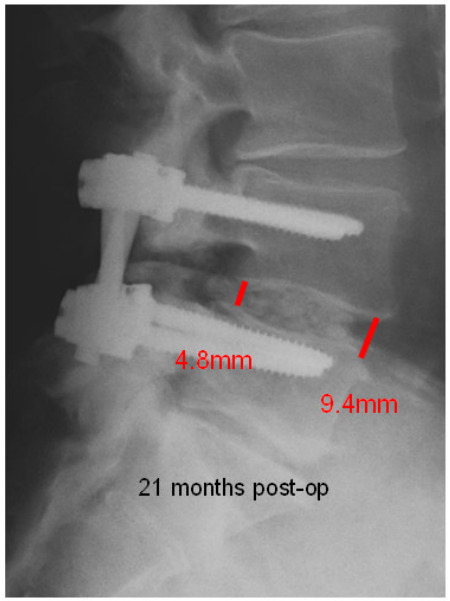
Cage



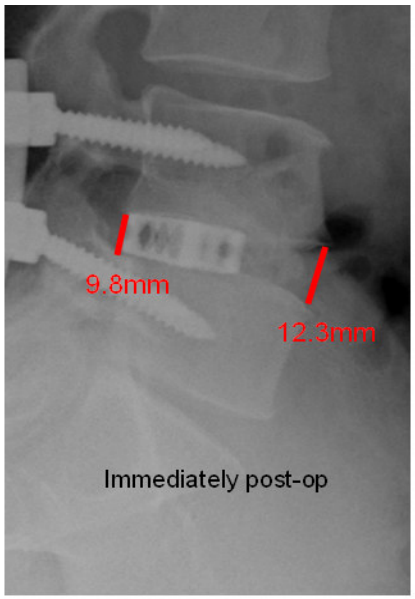


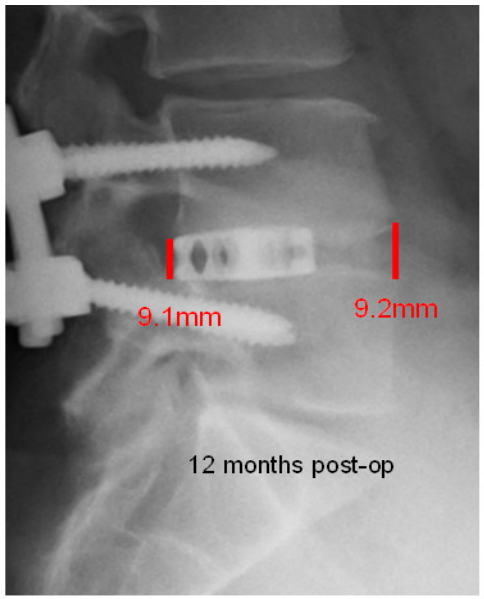
Autograft





Cage





Results: Graft alone vs Cage

	Mean Loss of height	Mean follow-up duration
Local Graft	2.7mm (95% CI 1.8-3.5)	14.7 months
Cage	2.5mm (95% CI 1.9-3.1)	18.2 months

p = 0.798

Results: Male vs Female

	Mean Loss of height	Mean follow-up duration
Male	3.3mm (95% CI 2.1-4.5)	16.9 months
Female	2.2mm (95% CI 1.8-2.7)	18.4 months

p = 0.044

Conclusions

- No benefit from use of interbody cage in preservation of interbody height in PLIF
- Men lose more intervetebral height than women after PLIF
  - Incidental finding (? Reason)
- Economic implications
  - Up to £2000 per cage

Limitations

Retrospective study

No co-morbidities/bone density/BMI included

Purely radiological study

- Not assessing fusion rates
- No outcome scoring

Disclosure Information

The authors have no conflict of interest to report