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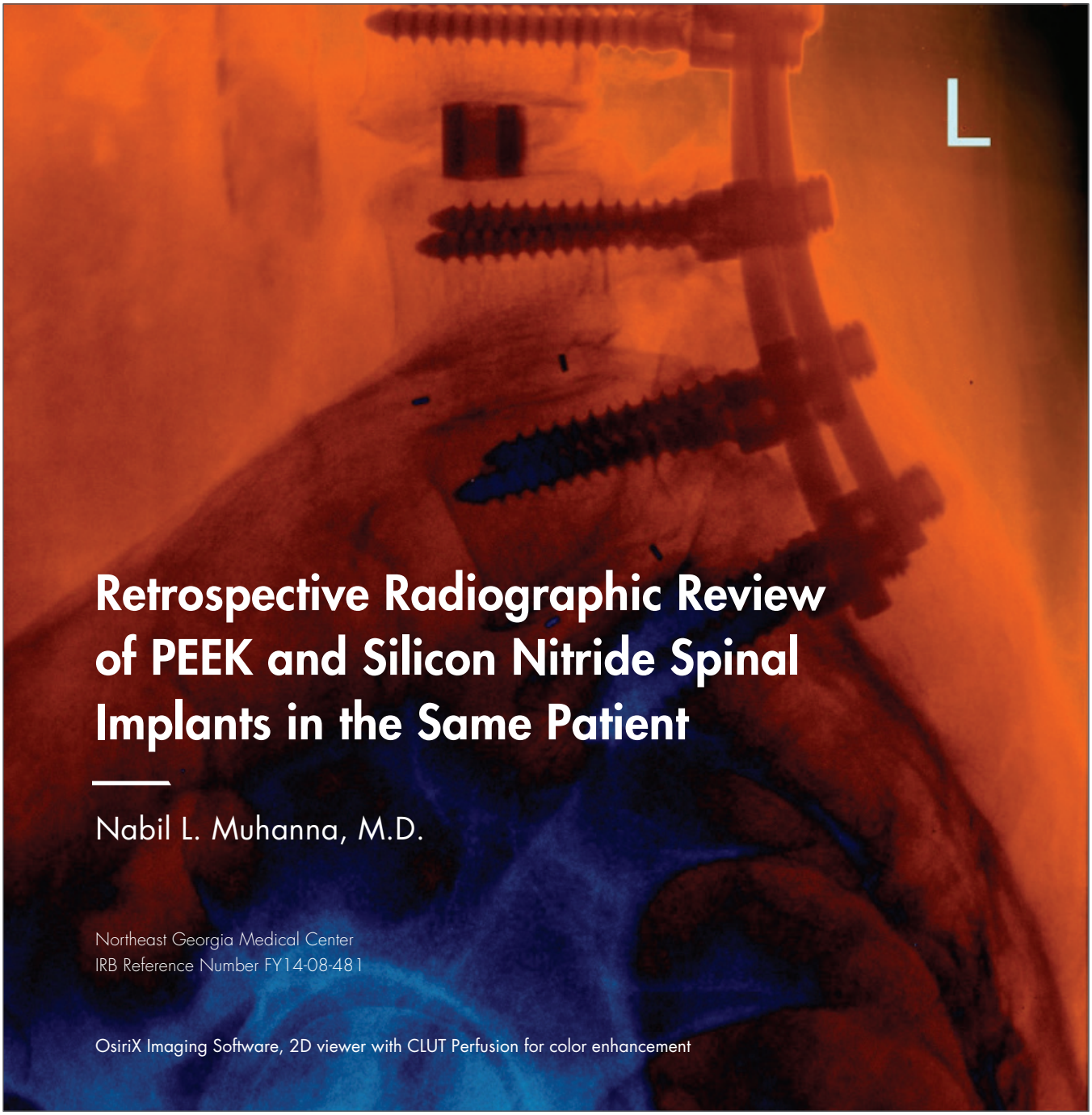

Retrospective Radiographic Review of PEEK and Silicon Nitride Spinal Implants in the Same Patient

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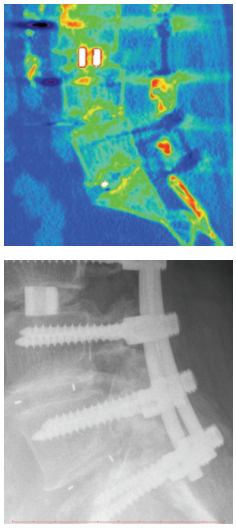
OsiriX Imaging Software, 2D viewer with CLUT Perfusion for color enhancement

SUMMARY

A 66 year old female patient underwent two separate spinal surgeries, the first using two PEEK spinal implants and the second, three years later, using a ceramic silicon nitride implant. This review compares the two materials post-operatively.

PEEK DIAGNOSIS & PROCEDURE

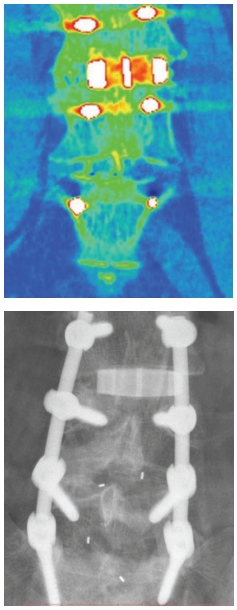
Patient had a 30 year history of chronic back pain. She reported two ruptured discs, which had been treated conservatively after an episode that left her unable to walk and on bedrest for two months. For five weeks she had experienced bilateral pain of a 10 on a 10 point scale in her lower back, which radiated to both hips and down the posterior quadriceps, being most intense in her buttocks. There was tingling across her lower back, legs gave out intermittently, left leg pain was greater, and she could not stand for longer than 30-40 minutes. No bowel or bladder incontinence. Patient had Von Willebrand Disease, hypercholesterolemia, hypertension, and diabetes mellitus that was under diet control. She was a social drinker and smoked 1 ½ packs per day. Radiologic examination revealed; severe facet disease bilateral at L5-S1, moderate facet disease at L4-L5 with left foraminal narrowing, and mild facet disease at L3-L4. After a course of therapy and treatment with little marked improvement, surgical intervention was performed with a laminotomy and decompression of the L4, L5, and S1 nerve roots and a discectomy of L4-L5-S1. Ten millimeter PEEK implants were placed obliquely across the midline with autologous posterior element bone packed in and around the spacer.



SILICON NITRIDE DIAGNOSIS & PROCEDURE

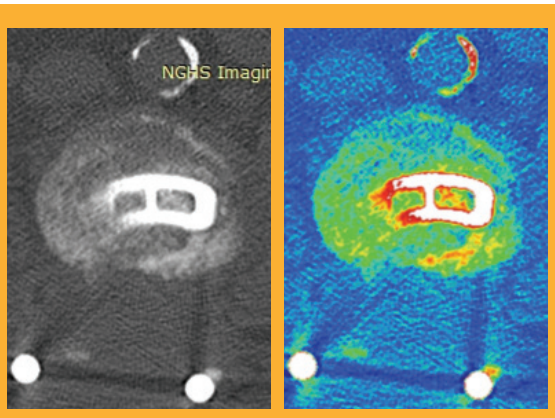
Three years later, the patient returned with intractable back pain which had lasted for 8 weeks. Radiographs indicated no evidence of bony incorporation of the PEEK devices. A broad based protruding herniation of the L3-L4 intervertebral disc existed, with moderate spinal stenosis and narrowing of the right intervertebral neural foramen, causing compression of the right L3 nerve root as it exited. Additionally, there was compression of the left L4 nerve root as it passed through the lateral recess, a result of the bulging disc, osteophytes and left facet arthropathy.

After conservative treatment a laminectomy of L3-L4 was performed, along with a discectomy from the right side where patient experienced pain. An 11mm ceramic silicon nitride TL device was positioned midline. The Valeo™ TL device and space were packed with autologous posterior element bone graft.



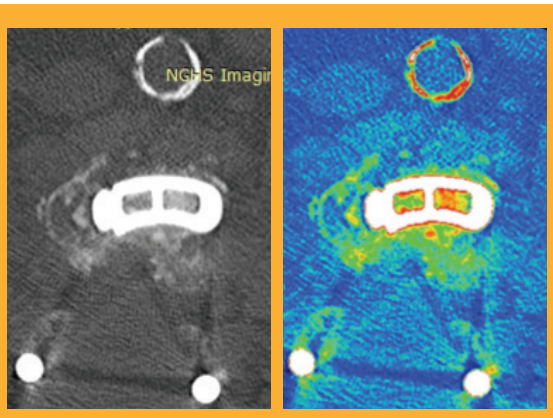
LIGHT **DENSITY** HEAVY

MOST AMOUNT OF FUSION MASS

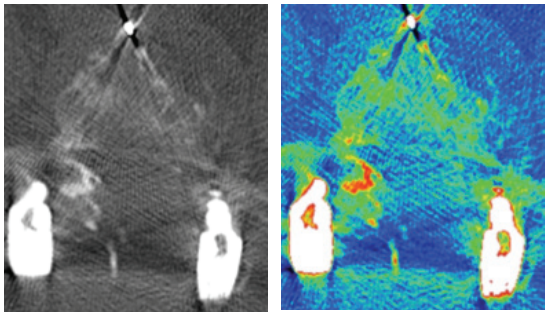


L3-L4 Silicon Nitride

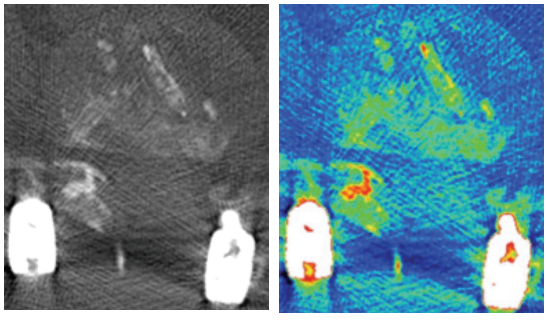
LEAST AMOUNT OF FUSION MASS



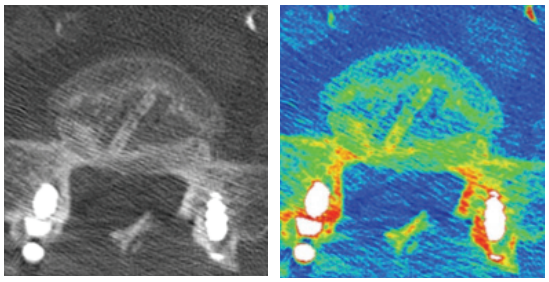
L3-L4 Silicon Nitride



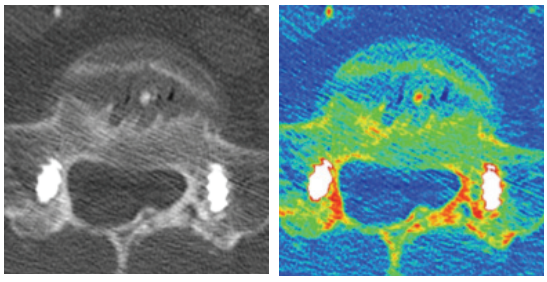
L4-L5 PEEK



L4-L5 PEEK



L5-S1 PEEK



L5-S1 PEEK

Light Density

Heavy Density

CONCLUSION

Comparing PEEK to silicon nitride in these 7.4 year (PEEK) and 4.4 year (silicon nitride) postoperative radiographs - it is apparent that silicon nitride fosters superior bone growth and bone density, despite having been implanted three years later. Given the patient's comorbidities and these results, this material should provide a clinician with significant outcome advantages over PEEK.

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