Polyetheretherketone (PEEK)

Is a synthetic material that was used initially in spine and hip surgery. It has the properties of being biocompatible, resistant to thermal and ionizing radiation, and resembles cortical bone biomechanically.

Indications

A survey of the NASS section of Spinal Oncology found a lack of consensus with regards to the imaging and radiation benefits and several ongoing concerns about currently available options. Therefore, routine utilization of these implants for anterior and posterior spinal reconstructions remains low. Future investigations are warranted to practically validate these devices' theoretical risks and benefits [1].

Cervical PEEK Cage

see Cervical PEEK Cage.

Polyetheretherketone rod

see Polyetheretherketone rod.

CFR-PEEK

CFR-PEEK.

Cranioplasty

Polyetheretherketone (PEEK) implants are preoperatively tailored to the exact size of the defect and exhibit an excellent combination of strength, durability, and environmental resistance. It is associated with low morbidity, with additional advantages including strength, stiffness, durability, and inertness. It would be beneficial to assess the longer-term outcomes; however, it appears at first glance that PEEK implants show great promise in calvarial reconstruction [2].

Patient-specific PEEK implants are a reasonable option for repair of large cranial defects but should not replace the use of autologous bone when it is available. Rates of complications are comparable to those reported with other implants, and overall aesthetic results are good. Temporal wasting is the main aesthetic concern after cranioplasty [3].

Case series

2017

Fusion Rates of Intervertebral Polyetheretherketone and Titanium Cages without Bone Grafting in Posterior Interbody Lumbar Fusion Surgery for Degenerative Lumbar Instability [4].

2016

Between 2006 and 2013, a total of 211 patients suffering from spondylodiscitis underwent surgical debridement and instrumentation. There were 52 cases where PEEK cages were used. Laboratory and physical examinations were assessed at a 3-month follow-up. Last follow-up was performed with at a minimum of 12 months after surgery via a telephone interview.

Mean age at presentation was 67 years, with 19 (37 %) male patients and 33 (63 %) female. Distribution of the infection was lumbar in 29 (56), thoracic in 3 (6 %) and cervical in 11 (21 %) cases. Nine patients (17 %) had concomitant non-contiguous spondylodiscitis. Epidural abscess was found in 17 patients (33 %); 48 (92) had pain; neurological deficits were found in 20 patients (38 %). All patients in this series underwent surgical debridement with instrumentation of the spine. Postoperative intravenous antibiotics were administered for 15.4 ± 6.8 days followed by 2.9 ± 0.5 months of oral antibiotics. Complete resolution of the infection was achieved in all cases. Of the 28 patients with neurological deficits, 6 had full recovery and 10 had improved incompletely after surgery. One patient suffered from a pulmonary embolism postoperatively. There were no mortalities.

Use of PEEK cages for interbody fusion is feasible and safe in patients suffering from a pyogenic spinal infection [5].

2014

Twelve consecutive patients (75% males; mean age = 43, range 16-67) underwent PEEK cranioplasty between January 2011 and December 2012 after a mean time interval of 10 months (range 3-40) following initial craniectomy. The mean defect size was 11 × 8 cm (range 7 × 6 to 14 × 8 cm) and no additional contouring of PEEK implants was necessary intraoperatively. The scalp was closed primarily in all patients, and no complications of implant breakdown, wound infection, or Cerebrospinal fluid fistula were appreciated during follow-up. Computer-designed, patient-specific PEEK implants for cranioplasties are a viable alternative when autologous bone grafts are unavailable or unsuitable. Such prefabrication reduces operative times through minimal to no intraoperative adjustments. Although initial results are promising, longer-term follow-up and further comparative studies including randomized control trials to evaluate outcomes between different alloplastic materials for cranioplasty are necessary [6].

1)

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