Objective: To evaluate the incidence and features of preoperative paravertebral ossification (PO) in patients who got artificial disc replacement (ADR), in order to explore the most effective and objective evaluation criteria of heterotopic ossification (HO).

Methods: We reviewed the images of 103 patients (62 men and 41 women) who underwent Bryan ADR in our institute during the last 27 months. The average age of the patients was 46.3 years (range from 22.0 to 71.0). The diagnosis were 57 cases of degenerative cervical canal stenosis (DCCS), and 23 cases of cervical disc herniation (CDH). Coronal reconstruction CT scan was applied to evaluate the preoperative incidence of PO.

Results and discussion: The presence of preoperative PO was found in 50 cases (48.5%). Logistic regression revealed that preoperative diagnosis contributed the greatest amount of variance. The chance of PO in DCCS patients was 3.95 times of the CDH patients ($P < 0.01$). The occurrence of PO has nothing to do with sex or age ($P > 0.05$). Occurrence rate of HO were reported with varied range as the Bryan disc from 0 to 76.2%. Imprecise of assessment methods may play a role in such a huge variance. Most authors found out that HO was typically observed lateral to the vertebral bodies, thus coronal CT scan is the better way to evaluate the PO. As shown in figure 1, sagittal reconstruction CT and demonstrate no HO at the 37.5 months follow up, but grade 3 HO was shown at coronal CT scan.

Even if the application of coronal CT to assess of HO can improve the accuracy, there are still other two issues should be mentioned. First, HO and osteophytes have the same predilection sites and can not be distinguished with each other radiographically, but both of them can affect range of motion after ADR, as a result, in this article HO and osteophytes were generally designated as PO rather than being given a specific distinction. The second problem is that, it can not identify the occurrence time of PO. Whether it exist preoperatively or develops after operation. As shown in figure 2, the cephalad adjacent segment haven't got operation, but it has the same grade of PO.
Our study indicate that PO have existed before surgery, so the preoperative data should be compared to make an objective assessment.

**Conclusion:** The existence of preoperative PO need to be heeded. A large component of HO maybe were natural development of preoperative osteophytes. HO should be evaluated by combining flexion-extension radiographs with coronal CT scan, and compared with the preoperative data, to achieve an objective assessment.