Reviewer's report

**Title:** Evaluation of Implant Loosening Following Segmental Pedicle Screw Fixation in Adolescent Idiopathic Scoliosis: A 2 Year Follow-up with Low-Dose CT

**Version:** 2

**Date:** 30 April 2014

**Reviewer:** Ian Stokes

**Reviewer's report:**

This paper reports a retrospective study of CT images and plain radiographs of patients operated for AIS, mean age 16 years with two years follow-up. In all cases, pedicle screws were used exclusively. They aimed to determine the rate of pedicle screw loosening, and to identify factors associated with radiological evidence of loosening.

They found that 32% of patients had evidence of loosening by CT (2.8% of screws), and the rate was higher in males.

Since they used both CT and plain radiography to identify loosening, and the rate observed by CT was substantially higher, this raises the question which method was most accurate. They do not have any independent ('gold standard') so specificity is not known. However, loosening signs on CT were associated with reported pain, but with 28% false positive (Table 2). This suggests that the CT method is overly sensitive. It is suggested that the authors include more information and analysis of the radiological vs. CT observations, otherwise the significance of the observations by CT remains rather obscure.

The radiological observations were made at one time by one radiologist, therefore there is no information about inter- or intra-observer variability. This should be identified as a limitation of the study.

**Specific revisions and suggestions:**

Abstract, Methods, line 1: Correct text to state age 18 was at follow-up, not at surgery.

Abstract, Results: The final three sentences of this section should state that the 26 patients were those with signs of loosening.

Introduction: Suggest that the statement of aims at the end of this section include the comparison of CT vs. plain xray.

Methods, page 3, final line: spell out CTDI and DLP.

Methods, page 4, 1st line: Explain 'effective dose' - is this skin entry dose, or averaged tissue dose, or organ dose?
Throughout the manuscript: employ et al. as the abbreviation of et alia.

Page 5, para 1, line 2: "Data is' -> 'Data are'.

Page 5, para 1, penultimate line ‘according to one' -> 'according to criteria'.

line 10: Page 5, 2nd paragraph: define 'correction rate'

Page 6: 'This result in kappa value of 0 i.e. poor agreement 001'. Explain the apparent contradiction between the 0 and the 001 values.

Page 8, Conclusion: 'CT is more accurate than plain radiography' -> 'CT is more *sensitive* than plain radiography'.

Table 1 legend 'continues' -> 'continuous'.

Figures 2 and 3 legends: 'sex' -> 'six'.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

'I declare that I have no competing interests'