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New Mechanism of Hip Endoprosthesis Damage Caused by High-frequency Electrocautery

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Primary total hip arthroplasty has become the most successful orthopaedic operation since introduction by the British surgeon, Sir John Charnley, in the 1960s [1,2]. Numbers of hip endoprosthesis revisions are growing worldwide. In revision surgery of joints, high-frequency electrocauterization instruments are used for homeostasis and soft tissue dissection. If there is contact of these instruments with the metal implants, flashover might occur. This can lead to thermal microstructural changes in the material and as a consequence may reduce the fatigue strength of the implant.

Four cases of hip revision surgeries were analyzed [3,4]. In all cases flashovers occurred and secondarily, the non-modular titanium hip endoprosthesis stem broke in the neck section of the prosthesis. The fractures occurred 7 to 142 months (range 135 months) after single revision surgery without revising the stem. In three of four cases an extra long head was used. After breakage during normal walking in all four cases the damaged stem was explanted and changed to a revision stem.

The explants underwent failure analysis. In all four cases no signs of material or product defects of the titanium wrought alloys (ISO 5832-3) were found. The conducted investigations showed that contact between the high-frequency instrument and the anterolateral aspect of the endoprosthesis neck had occurred. A fatigue fracture pattern started in the contact location. Electrothermal implant damage was found in the broken area.

If in hip revision surgery the stem is not to be replaced, contact and flashovers between high-frequency instruments and the metal implant should be avoided. Due to the high relevance of this topic we are going to start a controlled biomechanical laboratory study. Based on the material analysis shortly communicated here, we hypothesize that flashovers from an electrocautery knife to the lateral aspect of a titanium hip endoprosthesis neck can reduce the implant's fatigue strength.

References

1. Charnley J (1964) The bonding of prostheses to bone by cement. J Bone Joint Surg Br 46: 518-529.
2. Learmonth ID, Young C, Rorabeck C (2007) The operation of the century: total hip replacement. Lancet 370: 1508-1519.
3. Huber G, Weik T, Morlock MM (2009) Damage to a hip endoprosthesis caused by high-frequency electrocautery. Orthopade 38: 622-625.
4. Konrads C, Wente MN, Plitz W, Rudert M, Hoberg (2014) Damage to implants due to high-frequency electrocautery: analysis of four fractured hip endosprothesis shafts. Orthopade 43: 1106-1110.