Uncemented Application of Cemented LCS Knee Prosthesis Leading to Knee Pain

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The LCS or New Jersey Knee (DePuy Orthopaedics Inc, Warsaw, Ind) prosthesis is a total condylar, low contact stress, mobile bearing prosthesis, which allows retention or excision of the posterior cruciate ligament. The cemented version has a sandblasted finish on cobalt-chrome-molybdenum metallic surface for cement fixation, whereas the cementless version uses Porocoat sintered beads (DePuy) for bone ingrowth (Figure 1).

This article highlights a previously unreported cause of knee pain after arthroplasty, and emphasizes the importance of a surgeon’s familiarity with implant components. This is particularly relevant to the low-volume arthroplasty surgeon who is more susceptible to complications.1

CASE STUDY
A 58-year-old man presented with an LCS knee replacement performed 1 year prior to presentation. He reported continuous knee pain on weight bearing, which was initially noted 5 weeks postoperatively. The postoperative regimen allowed partial weight bearing with crutches for 6 weeks with no wound healing problems. A stable knee with a good range of movement (0°-105°) was achieved. The patient reported diffuse knee pain, but tenderness was elicited on palpating the proximal tibial rim. Radiographs obtained 5 months after the index procedure showed the tibial component had subsided 3-4 mm posteriorly in a slightly varus position (Figure 2). Blood indices including white blood cell differential count, erythrocyte sedimentation rate, and C-reactive protein were normal.

Technetium bone scan performed 6 months postoperatively showed increased uptake at the tibial interface compared to the femoral interface. A diagnostic intra-articular injection of 2% lidocaine provided temporary pain relief. Because component loosening was suspected, the knee was explored.

The operative findings revealed a loose tibial component. The femoral and patellar components were retained more firmly but still removed easily. All components had textured surfaces and had not been cemented in place. A thin fibrous membrane had formed at the bone-implant interface and bony integration was not present. Intraoperative cultures were negative and histology of the membrane showed an absence of neutrophils, ruling out infection as a cause. Long stem revision components were cemented in situ. The patient made an uneventful recovery and remains pain-free.

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The complication of wrongful insertion of a component as described in this case has not been reported in the literature. The cemented and uncemented LCS prostheses have shown favorable long-term results with success rates of 97%-98%. The porous coated surface has been successful in facilitating bone ingrowth in post-mortem retrieval studies although fibrous attachment to bone has also been described. A minimum pore size of 40 μm and a maximum bone implant gap of 50 μm appears sufficient to allow bony ingrowth. As in this case, an excessive gap or movement at the implant bone surface leads to formation of a fibrous membrane at the interface.

It is not uncommon for a surgeon to use cement in a planned cementless knee when an interference fit is not possible due to poor bone cuts or significant osteoporosis. If the cemented components are not available or the surgeon is not aware they exist, the cementless porous coated components may be mistakenly cemented in situ. This is not ideal, but is unlikely to cause a problem in terms of component loosening. However, when textured surface components designed to be cemented are inserted without cement, the likelihood of postoperative loosening is much greater.

In diagnosing the cause of post arthroplasty knee pain, the surgeon should be aware of the subtle radiographic differences between the cemented and cementless components, particularly when, as in this case, the operative notes are not available and the patient is referred from another center.

The radiographic appearances of the cemented and uncemented components of the LCS knee are identical except for the slight irregular interface noted on the tibial component on the anteroposterior and lateral radiographs and a slight bevel to the undersurface periphery, which reduces contact stresses and bead loss at the edges (Figure 3). These differences can be easily missed or overlooked.

REFERENCES

Figure 3: Porous coated cementless LCS prosthesis (A). Magnified view of the tibial component interface showing irregular surface (B).