

Simultaneous removal of retained metal hardware during primary knee Arthroplasty

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Article information	Abstract
Key words: Total Knee Arthroplasty, Hardware Removal, Simultaneous Surgery Received: 20-5-2025 Accepted: 04-06-2025 Available: 10-08-2025	Background: Retained hardware is usually removed during TKR only if no infection is present. We follow clinical and lab criteria to rule out infection and proceed in one session. Methods: In 39 cases, hardware was removed during primary TKR. Most staplers were taken out through the main incision; blade plates needed separate lateral incisions. One tibial nail was partially removed: one DCS plate through lateral dissection. Results: No infections at 6 months. Dropout rate 5%. Over 10 years, no late complications, skin necrosis, or fractures were noted. No metallosis observed. Conclusion: Simultaneous hardware removal during TKR is safe and effective when infection is excluded, and proper planning is followed.

I) Introduction

Total knee arthroplasty (TKA) in patients with retained internal fixation hardware presents unique challenges related to implant positioning, infection risk, and soft tissue handling. The conventional approach often involves staged procedures, where hardware is removed prior to TKA in a separate operation. However, this increases surgical burden, recovery time, and overall healthcare costs.

At our center, we perform simultaneous hardware removal and TKA in a single operative session when infection is confidently excluded. Using a combination of clinical signs and serological markers (ESR, CRP), we determine surgical readiness and proceed with carefully planned removal of hardware through the main or separate incisions.

This study reviews our experience in 39 such cases, outlining surgical strategies based on hardware type and location, and presenting clinical outcomes over a long-term follow-up period.

II) Methods and Study Design

39 cases came to primary total knee arthroplasty operation with nearby metal hardware needing removal. Clinical assessment of the knee including joint motion, local signs of inflammation, ESR and CRP in presence of local tenderness, swelling or active arthritis (flare up). If the serological estimations are four times the normal values or do not go down by 40% in four weeks more tests as

needle aspiration for culture and biopsy are carried out before embarking on surgery. Only in one case a stapler was left in situ in the tibia 3 cm away from the prosthesis. 14 blade plates with variable number of holes (4 - 6); each blade plate [Fig.1] was removed through a separate incision. On the other hand, staplers in (23 patients) were removed from the proximal tibia through the same midline TKR incision - one intramedullary tibial nail; a plate (of eight holes) with DCS was removed during the TKR. Operation just before the femoral TKR cutting. One to three step staplers of Coventry wedge osteotomy were removed through the same midline incision after the raising a lateral flap between deep fascia and patellar tendon over joint capsule and lateral tibial plateau till you feel the metal stapler. Care to be taken not to damage the bone cortices which may add time and blocks to ordinary primary TKR. On the other hand, the blade plates were removed through a separate incision usually through the previous scar but no overlap with the main midline incision and usually 1 cm distal and at least 6 cm laterally, in these cases the main midline incision planned not to go distal to the lower end of the patellar tendon to avoid axial overlap which may cause skin necrosis. We do pack this separate wound and proceed with the primary TKR and after a drain insertion and subcutaneous closure, we irrigate and drain this metal ware incision separately at the end of TKR operation. In one case major concern was raised on removal of ipsilateral tibial nail that a large medullary area of potential ooze and two more sites of locking screws which may increase risk of infection, however the nail was broken at proximal screw hole allowing removal of the proximal 8 cm leaving the rest of nail in situ with no breach of the surrounding medulla. A DCS implant is removed through the same skin midline incision and after lateral deep dissection over the vastus lateralis towards its femoral attachment to linea aspera where a longitudinal incision along the muscle fibers. Both drains were removed within 48 hours and first dressing usually done on the 4th postoperative day and managed not different from a usual primary TKR operation.

III) Results:

So far, no infections were observed in the first 6 months, with a low drop rate of 5% and no reports of late referral over an accumulative follow-up period of more than 10 years. No skin necrosis; no fractures. No reactive metallosis was seen, and no metallurgical analysis was done to assess the type of corrosion in retrieved implants (Cook et al)

IV) Discussion

Metal hardware could be removed in a single sitting, or it should be staged given the concern regarding infection, although there is little evidence of this in the literature either way. The use of Coventry-type staples, however, if they are small, usually does not necessitate removal as they rarely interfere with the subsequent insertion of the tibial component. In other words, one could leave nearby metal hardware in situ if they are not in contact with the prosthesis (Fig. 2 & 3). However, a 5-year follow-up of two cases done elsewhere showed no evidence of untoward symptoms. These two stainless hardware pieces were hammered out of their places with potential measured contact area, though it could be tiny, small, and growth of bone or fibrous tissue may form a biological barrier and should not be considered as a real junction contact point as seen in modular prostheses. There was not much extra time added to the average TKR operation time—an average of 15 minutes added in case of separate incisions to remove plates. The rationale is to move or remove any hardware that may potentially interfere with prosthetic components in position and future long-term survivorship. Planning is needed regarding (1) assurance of absence of active infection, (2) absence of non-union with loose hardware, (3) type and position of implants, and (4) state of skin and previous scars.

V) Conclusion

Simultaneous removal of retained metal hardware during primary TKR is a save and practical approach in appropriately selected patient with proper pre-operative assessment and intra-operative technique, complications are minimal and outcome comparable to stander TKR.

VI) References

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