The Prevention and Treatment of Femoral Trial Head Loss in Total Hip Arthroplasty

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Take-Home Points

- Femoral head trial loss is a complication that can occur during THA.
- This event can be a source of avoidable morbidity.
- Preventative measures can be taken to avoid this complication.
- If preventative measures fail, retrieval of the femoral trial head can be performed.
- A thorough understanding of preventative and retrieval methods is essential for surgeons that perform THA.

Total hip arthroplasty (THA) is becoming an increasingly common procedure. Although this procedure is frequently performed, intraoperative complications still arise; therefore, methods of preventing and ameliorating these complications must be devised. One such complication is the loss of the femoral trial head component within the patient.

Loss of the trial head has been documented in THA cases that have used a number of different surgical approaches. Although it is uncommon to lose the trial within the pelvis, it is not an entirely unlikely phenomenon. The possibility of such an event makes prevention important, especially given the associated morbidity that loss of the component could cause. Fortunately, there are preventative measures that can be taken to minimize the probability of losing the femoral trial head, in addition to techniques that can be utilized if prevention fails.
Surgical Technique

Prevention

Firstly, it is important to avoid the use of worn-out femoral trial components. It is thought that the incidence of femoral trial head loss is increased when the trunnion is older and has been used repeatedly.\textsuperscript{2,3} Therefore, it is advised that the use of worn femoral trial stems and other older trial components be avoided.

When the femoral trial head disengages anteriorly, it has the potential to enter the pelvis/retroperitoneal space.\textsuperscript{2,4} The femoral trial head may move more freely in the absence of resistance offered by the anterior capsule.\textsuperscript{4} Therefore, when extensive anterior capsular dissection has taken place, such as during extensive capsulectomy, caution should be exercised when manipulating the hip. This emphasizes the necessity to closely monitor the head during any manipulation, particularly in the presence of significant anterior capsule disruption.

Modular hip arthroplasty prosthetics allow for various intraoperative changes to be made to the femoral component, providing greater specificity to the prosthesis.\textsuperscript{5} However, the modularity of the femoral component has been described as a factor contributing to loss of the femoral trial head.\textsuperscript{4} This also has been discussed with respect to the implantable prosthetic femoral head itself because of disengagement from the femoral stem during reduction and dislocation.\textsuperscript{4}

Case reports have cited the tension of the soft tissues as a definitive factor in trial head loss.\textsuperscript{1,4,6} These reports discuss the notion that more tension within the soft tissue can increase the likelihood that the trial head will dislodge during reduction or dislocation. Surgeons should therefore consider taking special care when manipulating the trial joint when the soft tissues are particularly tight and offer significant resistance. It has been suggested that the incision be packed with gauze during reductions when the soft tissue is under significant tension in order to keep the femoral trial head from entering the pelvis.\textsuperscript{6}

A simple technique that can be utilized in the prevention of femoral trial head loss is the placement of a suture through the apical hole in the trial head to aid in the retrieval of the implant if it is lost.\textsuperscript{1} Madsen and colleagues\textsuperscript{1} suggest the placement of a No.1 (or thicker) suture through this hole. Although this takes some time to perform, it could prove useful in the prevention of complicated implant loss.

Lastly, and perhaps most importantly, it is essential that there is communication and understanding between the surgeon and any assistants. This has been noted to be particularly important during posterior or lateral surgical approaches when the trial head can be lost during attempts at reduction with traction and internal rotation.\textsuperscript{2} Given the possibility of losing the trial head during this reduction maneuver, communication between the team during the reduction is instrumental.

Retrieval

If the femoral trial head dissociates from the trunnion of the femoral trial manipulation, there are some techniques that can be used to aid in retrieval. It has been described that when the trial head is lost within the surgical wound, it can travel underneath the rectus femoris muscle and cross the pelvic brim, subsequently entering the pelvis along the psoas tendon, as the psoas bursa offers little resistance to the smooth femoral trial head.\textsuperscript{1} The trial head has been found to follow this path along the psoas tendon until it is located in the posterior pelvis within the retroperitoneal space.\textsuperscript{1,7} What follows is a compilation of techniques for approaching loss of the femoral trial
head when it occurs.

The femoral trial head is round and smooth, which complicates its retrieval. If the surgeon tries to simply grab the component with fingers, it may slip away into the pelvis. When trialing the hip to assess for anterior stability, if the femoral trial head is lost, the leg should not be moved. At this point, a manual attempt to recover the trial head before it moves into the pelvis along the psoas tendon should be made. It is possible that the femoral trial head may spin when trying to retrieve it, however this should still be attempted before a formal additional surgical approach is employed. It has also been noted that one can manually simultaneously press down on the hypogastrium toward the iliac fossa in order to inhibit the movement of the disarticulated trial head from advancing proximally. After performing this maneuver, the femoral trial head can be retrieved through the inguinal canal.

Additional surgical approaches can also be utilized for retrieval of the femoral trial head if other measures fail. Callaghan and colleagues describe a separate surgical approach that can be used to retrieve the trial component after losing the trial head during a posterolateral approach for THA. This technique is commenced by making a 6-cm to 7-cm incision along the iliac crest to the anteromedial aspect of the anterior superior iliac spine. The interval between the iliacus and the inner table of the iliac wing is developed, and an attempt is made to locate the femoral trial head and guide it distally along the pelvis toward the hip. Fingers or napkin forceps can be used to accomplish this advancement of the trial head distally toward the hip, and once reaching surgical site, the trial can then be retrieved. Further extension of the incision can be made distally if this limited approach is unsuccessful. In the event the femoral trial head is still unable to be retrieved, the authors suggest considering a dedicated retroperitoneal approach for trial retrieval after the arthroplasty procedure has been completed.

Another method for retrieval of the femoral trial head has been described specifically in the setting of a direct lateral approach. Kalra and colleagues describe a case in which the trial femoral head dislocated anteriorly, and although it was unable to be visualized, the component was able to be palpated posterior to the superior pubic ramus. With the trial head still disassociated within the pelvis, the final implants were implanted. Although the trial was unable to be viewed, using the same incision for the direct lateral approach, the trial femoral head was guided posteriorly toward the sciatic notch. A posterior approach to the hip was then performed using the same initial direct lateral incision used. Subsequent exposure and release of the external rotators and posterior capsule was performed, as was release of the insertion of the gluteus maximus in order to facilitate better visualization and to prevent excessive tension on the sciatic nerve. Blunt finger dissection of the soft tissues was then performed, and the trial head was retrieved from the sciatic notch with a Kocher clamp.

Madsen and colleagues highlight two different cases in which the trial head was lost into the pelvis when using an anterolateral (modified Watson-Jones) approach to the hip to perform THA. As previously alluded to, the trial heads traveled along the patients’ psoas muscle and stopped directly anterior to their sacroiliac joint. In both cases, the trial head was retrieved using a large Satinsky aortic clamp, which enabled the surgeons to drag the trial head to the pelvic brim where it could be removed with a hemostat.

Multiple authors have discussed the decision to leave the component within the pelvis if the femoral trial head cannot be retrieved. Batouk and colleagues noted that in a case of loss of the femoral trial head, the component would be unlikely to disrupt any of the structures within the pelvis, and in the absence of compression of any vital structures, leaving the implant in the patient could be considered. Although the short-term follow-up of 3 months noted in this particular case did not yield any obvious detriment to the patient in regard to symptomatology, the authors note that the long-term effects of such a practice is unclear. In another case, in which the decision was made to leave the femoral trial head, the patient at postoperative week 6 began to hear clicking in the hip with an associated loss of range of motion. This subsequently prompted removal of the trial.
component.

**Discussion**

Although not a particularly common complication, loss of the femoral trial head can occur; therefore, a plan of action should be in place to prevent its loss or to retrieve it if prevention is ineffective. Given the modularity of various arthroplasty systems in regard to the different trial components or even the final implantable prosthetic devices, component loss is a possibility. An understanding of this complication and the appropriate steps to approaching it could aid in preventing patient morbidity. Because of this, it is imperative that surgeons who perform THA be aware of the potential complications and the measures that can be taken to address them.

**Conclusion**

The femoral trial head often can be quickly and easily recovered; however, trial component recovery can sometimes be more complicated. Loss of the trial femoral head could potentially occur during dislocation, reduction, or any of the trial positions. An example of a more complicated recovery is when the femoral trial head is lost into the retroperitoneal space, which could occur when trialing the hip in extension to assess the anterior stability of the hip. Loss of the femoral trial head is an avoidable occurrence, and it has the potential to cause a number of complications as well as the need for additional incisions/surgery to retrieve the femoral trial head. The subsequent issues that could arise after loss occurs can not only lead to extensive surgical complications, but can also foster patient dissatisfaction regarding surgical outcomes. Therefore, consistent attempts to utilize preventative techniques are essential. As discussed, simple measures such as placement of a suture through the apical hole of the trial component and adequate communication between those involved in reduction and trialing maneuvers, can serve to avert femoral trial head loss.

**Key Info**

**Figures/Tables**

**References**


### Multimedia

### Product Guide

**Product Guide**

- Med4 Elite®
- GRPro 2.1®
- Shoulder Wrap
- Knee Wrap

### Citation

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