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Reinventing the floppy lateral position for dual approaches in COVID-19 times

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Abstract
Dual approaches are often used in complex lower limb fracture surgery. A well-accepted strategy is to definitively reduce and fix one part of the fracture (commonly the posterior articular surface in a pilon or tibial plateau fracture) with the patient in one position, and then reposition the patient to access the other side of the fracture. The change of position prolongs the anaesthetic and surgical time. In the context of the coronavirus 2019 (COVID-19) pandemic, it also causes concern with donning and doffing. We describe a mobile floppy lateral position that enables dual approaches to the ankle, distal tibia, tibial plateau, and the acetabulum without having to change the patient positioning. The patient is positioned lateral on a radiolucent table, usually with the affected side on top. No supports are placed around the pelvis, allowing the patient’s pelvis to flop forwards or backwards. Two supports are placed around the chest and a strap is placed to secure the patient to the table if deemed necessary. The initial surgical procedure can be performed by flopping the patient’s pelvis forwards, allowing access to the posterior leg, knee or hip. Once satisfactory fixation is achieved, the pelvis is rolled backwards to allow access to the anterior aspect of the fracture.

Keywords COVID; dual approach; floppy lateral; position

Introduction
Orthopaedic trauma surgery requires a variety of strategies to reconstruct fractured bones. A clear and precise surgical plan is vital to achieve osteosynthesis in complex peri-articular fractures. A critical element of surgical planning is patient positioning. For the majority of fractures, a single patient position is usually sufficient to achieve the surgeon’s goals. However, there are specific scenarios where dual approaches are necessary to achieve satisfactory fracture reduction and fixation.

Intraoperative change in patient positioning for lower limb fractures is usually from prone to supine or the reverse. Commonly the fracture is reduced and fixed using one approach. The patient is then turned onto another table and repositioned for fixation of the other part of the fracture. Intra-operative change of position does carry anaesthetic risks, risk of desterilization and a risk of the patient falling. Furthermore, by completing one side of the fracture fixation, turning the patient, and then addressing the other side restricts access to both sides of the fracture at any one time. It is advantageous to have simultaneous access to both the anterior and posterior aspects of the fracture fragments in overly complex fracture patterns, so that if the fracture reduction is not satisfactory, it can be easily rectified. This is simply not possible if there if both stages are done sequentially with a change of position.

Changing patient position halfway through an operation also takes up valuable theatre time. Since the coronavirus 2019 (COVID-19) pandemic theatre efficiency has reduced in most hospitals due to necessary checks, air changes and recovery zones. During the COVID-19 pandemic, orthopaedic trauma procedures are considered aerosol-generating procedures (AGP). This means that the entire surgical and anaesthetic team have to to don and doff using a separate entrance and exit. Complex trauma does not abate in the pandemic and we have had to think of a new strategy to reduce surgical and anaesthetic time and yet effectively perform fracture fixations. We have therefore reinvented the floppy lateral position that allows access to the anterior and posterior aspects of fractures in the lower limb without having to change patient position.

Technique
After a general anaesthetic, the patient is turned to a lateral decubitus position with the injured limb on the top. The head and shoulders are maintained in this position throughout the operative period. The pelvis is tilted forwards with no supports applied directly to the pelvis. Two supports are loosely placed around the chest wall with adequate padding. The chest wall can be secured with a strap attached to the table. This position allows access to the posterior aspect of the acetabulum, knee and ankle. Depending on the fracture configuration, either a temporary or definitive fixation is carried out. The wound is not closed. The anterior aspect of the knee and ankle can be easily accessed by tilting the pelvis backwards. This might have to be assisted by pulling the sheet under the patient. The anterior fracture is then reduced and fixed. The posterior fracture can be accessed if the fixation or the reduction interferes with the reduction and fixation on the other side. The mobile floppy lateral position gives good simultaneous access to the anterior and posterior aspects of the fractures of the knee, and ankle. It allows access to the posterior aspect of the acetabulum and the anterior column via the lateral two windows of the ilioinguinal approach. However, it would not be possible to safely perform an anterior intrapelvic approach to the pelvis using this position. An example of this set-up is seen in Figure 1.

The mobile floppy lateral position can also be used with the unaffected side on the top. This position may be useful in patients with a large wound on the posterior aspect of the knee or thigh as is depicted in the Figure 2. It is slightly tedious to access the anterior aspect of the leg or knee if this type of floppy lateral position is used. An additional manoeuvre to pull the sheet under the patient is usually necessary to access the anterior aspect of the leg or the knee. Figures 3–5 demonstrate procedures carried...
out upon patients positioned in the mobile floppy lateral position with no need to de-scrub and turn the patient.

**Discussion**

Patient positioning is vitally important when planning and performing any surgery. For the majority of orthopaedic surgery, it is possible to gain adequate access using a single patient position. However, it is necessary to perform separate approaches for complex fractures. Although the floppy lateral position was used in the past to perform two approaches in the same setting, it had become less popular in the past decade. Detractors of the floppy lateral position felt that it provided inadequate access to both sides of the fracture compared to performing the approaches in two settings. Hence most trauma surgeons in the past decade performed one approach using one position, closed the wound, repositioned the patient and then performed the second approach. There are undoubtedly some advantages to this strategy. The biggest advantage is that there is no twisting of the torso or the pelvis. Hence, this strategy is especially useful in the polytrauma scenario and in patients with an unstable spine. The disadvantage of this tactic is that the reduction and fixation of one side of the fracture could impede the reduction and fixation of the other fracture. It is also time consuming and involves moving the patient on to another bed and then transferring the patient back on to the operating table.

Our modification of the floppy lateral position was to get rid of the pelvic supports. This allowed the pelvis to flop over to a much greater extent, thereby enabling access to the front and the back of the knee, leg and the ankle. The standard mobile floppy lateral position usually has the affected leg on top as it is easier to flop the pelvis back to access the front of the fracture. This does give good access to perform the posteromedial approach for tibial plateau fractures. It is also possible to perform the mobile floppy

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**Figure 1** A series of images staging the set-up of the mobile floppy lateral position with the injured leg on the top. Using this approach it is relatively straightforward accessing all surgical approaches for lower limb fracture fixation. Images a–c show the patient set up for posterior based approaches with the pelvis flopped forward. Images d and e show the patient set up for anterior based approaches with the pelvis flopped backwards. If the patient is heavy it is beneficial to use a slide sheet under the pelvis to facilitate easy turning of the patient.

**Figure 2** A patient with an open tibial plateau fracture positioned with the unaffected leg on the top, allowing for a medial gastrocnemius flap. The left side shows access to the posterior aspect of the knee and the right side shows an anterolateral approach.
lateral position with the unaffected leg on top. As mentioned earlier, flopping the pelvis back to access the front of the fracture takes more effort with the unaffected leg on the top. Figure 2 demonstrate the mobile floppy lateral position with the unaffected leg on the top. This strategy was chosen in this case at the request of our plastic surgeon due to the large soft tissue defect at the posterior aspect of the knee. With this level of mobility of the pelvis with a relatively stable upper body position, the mobile floppy lateral position is not recommended for patients with unstable spinal injuries.

The scenario of fractures requiring approaches from the front and back is typically required for acetabular fractures, tibial plateau fractures and pilon fractures. There are only a few publications describing innovative methods for dual approach fractures.5−7 Jin et al. describe the use of a floppy lateral position to fix the anterior and posterior columns of the acetabulum through a combination of Kocher–Langenbeck and ilioinguinal approaches.7 The method is described as time saving whilst providing excellent exposure for a good reduction. Similarly in a series of 260 surgically managed acetabular fractures Guerdo et al. performed simultaneous combined approaches in 10 patients with comminuted anterior and posterior column fractures.5 Harris et al. also describe a similar methodology for treating associated both column and T-type fracture patterns.6

The trend in the past few years has been to perform the posterior and anterior approaches separately after repositioning the patient. This was partly because accessing the two sides of the fracture in the same position compromised access to both sides of the fracture. By using the mobile floppy lateral position, access to both sides of the fracture is not compromised.
There are limited studies describing a floppy lateral position for performing lower limb surgery. Foot and ankle surgeons have utilized a fixed floppy position for multiple approaches. They also use it for ankle arthroscopy. This does allow access to anterior, lateral and posterior but accessing the medial aspect of the ankle can be a challenge. By fixing the pelvis securely, the technique may be limited by any patients with hips with significant reduction in hip rotation. Furthermore there is significant torque on the knee and lower limb when twisting the leg. This is necessary to apply a plate to the posterior tibia. While this is achievable, a combination of stiff hips and rotational torque could cause malreduction of fractures and difficulty siting anatomical plates. Therefore, in reality the fixed floppy lateral position is set up for any of the laterally based approaches (anterior, direct or posterior) but the position is compromised for the other approaches, especially medial based approaches. One of the great advantages of a mobile floppy lateral position is that one does not need to compromise with either the anterior or posterior and medial or lateral approaches. This is because the pelvis moves to suit the approach required, thus greatly decreasing the torque required on the lower limb compared to a fixed pelvis approach. This key benefit allows better fracture reduction and plate positioning.

Full prone positioning allows optimum access for posterior based approaches but it does cause significant cardiac compromise. Prone positioning causes reduced stroke volume, reduced cardiac index, raised central venous pressure and low blood pressure. Furthermore once the posterior aspect of fracture fixation is complete, the patient still requires turning to address the anterior displacement. The mobile floppy lateral position avoids all these risks involved in prone positioning.

**Conclusion**

The mobile floppy lateral position is an efficient and effective manoeuvre to gain access to all approaches for lower limb periarticular fractures in patients with a stable spine. It is safer than positioning fully prone for patients with cardiovascular compromise. It can be performed on any radiolucent table with rudimentary clamps. The flexibility of the position allows full access to anterior, posterior, lateral and medial approaches with no compromise allowing optimum fracture reduction and plate positioning.

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