The patient was treated conservatively initially in a brace in extension for a couple of weeks with controlled weight-bearing followed by graduated knee flexion. From 5th weeks onwards, range of motion exercises, stretching and proprioception exercise programs were commenced under supervision of physiotherapist.

**Discussion**

Quadriceps tendon ruptures are more common after the 4th decade usually in the presence of risk factors such as systemic or local steroids, statins and fluoroquinolones. Younger patients usually present after trauma. Eccentric overloading of the extensor mechanism when the knee is flexed with plantar flexion of the foot is the most common mechanism of injury [3].

The quadriceps femoris inserts into the patella as a common tendon with a tri-laminar arrangement. The most superficial fibres originate from the rectus femoris, the deepest layer from the vastus intermedius and the intermediate layer from the vastus lateralis and vastus medialis [4] (Figure 3).

The vastus intermedius arises from the proximal two thirds of the anterolateral surface of the femur, the lower half of the line as per a, the upper part of the lateral supra condylar line and the lateral intermuscular septum. It converges towards the patella and divides into lateral and medial parts. The vastus intermedius contributes first to the deep layer of the quadriceps tendon through its lateral part and second to the two-layered intermediate layer of the quadriceps tendon by its superficial and deep medial aponeurosis [4]. Its nerve supply is from the femoral nerve and its arterial supply is from the lateral femoral circumflex artery [5].

Clinical presentation of quadriceps rupture varies depending on the severity of the injury. The patient may present with difficulty walking, swelling, a mobile patella with loss of extensor mechanism, and a palpable defect. An extensor lag may be an indication of a partial tear [5].

Ultrasound is usually the first line investigation as it is readily available. The sensitivity and specificity of ultrasound in identifying partial tears is not established [5]. One advantage of ultrasound is the ability to perform real time dynamic scanning, which optimises the evaluation of tendon tears. Knee flexion and extension confirms the continuity of an intact tendon and helps differentiate from scar tissue [6]. Real-time dynamic scanning is a feature unique to sonography and is a capability that should be used to optimize evaluation of tendon tears. With knee flexion and extension, the fibrillar echo texture of an intact tendon may be more obvious, allowing further differentiation from scar tissue

Partial tears are seen on MRI as focal discontinuities of some layers of the quadriceps whilst other layers are still intact. MRI is the imaging modality of choice for optimally visualizing partial tears and treatment planning [7].

An isolated vastus intermedius tendon rupture is difficult to detect clinically and peri-operatively since the rectus femoris is intact, which makes this injury easy to miss. Early diagnosis and treatment is essential to decrease morbidity. Ultrasound and MRI play an essential role in the diagnosis of quadriceps rupture as they delineate the exact nature of the injury. There is no definitive treatment for the isolated vastus intermedius injury documented in the literature [5].

**Teaching point**

- Isolated tears of the vastus intermedius are rare
- They should be assessed by dynamic ultrasound scanning
• MR is the gold standard
• Early treatment is paramount as delays may result in retraction of the tendon and poor surgical outcome

References