McCraw and Arnold's Atlas of Muscle and Musculocutaneous Flaps

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VASTUS MEDIALIS

ANATOMICAL CONSIDERATIONS

Surface Markings

The well developed vastus medialis muscle can be palpated at the medial border of the rectus femoris muscle. It can be visually demonstrated by muscular contraction in the space between the medial femoral condyle and patellar tendon distally.

Origin and Insertion

The vastus medialis muscle has a broad origin from the distal half of the intertrochanteric line, the medial lip of the linea aspera, and a portion of the medial femoral condyle. It inserts into the medial border of the patella and the tendon of the quadriceps femoris. As a part of the quadriceps femoris mechanism, the vastus medialis muscle assists in knee extension and plays a significant role in medial knee stability as a medial "check rein" of the patella.

Adjacent Muscles

In the distal thigh the vastus medialis muscle has a broad tendinous attachment to the rectus femoris muscle, which is best seen in the area just above the patellar tendon. The sartorius muscle crosses the vastus medialis muscle obliquely above the knee. Both muscles participate in the formation of Hunter's canal. Proximally the vastus medialis muscle is partially fused with the underlying adductor longus and adductor magnus muscles.

Vascular Pattern

The proximal half of the vastus medialis muscle is supplied by branches of the profunda femoris artery. The majority of the distal muscle is supplied by four to five segmental branches of the superficial femoral artery which enter the deep surface of the muscle. The superficial femoral artery also provides a segmental blood supply to the adductor longus, the adductor magnus, and the sartorius muscles in the same area of the thigh.

Motor Nerve

Femoral nerve.

Sensory Nerve

Femoral nerve.

USES

The vastus medialis is usually employed as a muscle flap for defects of the distal anterior thigh, but it can reach the level of the midpatella by simple transposition. This transposition of the muscle can be used to close the superior aspect of the knee joint and simultaneously reconstruct the extensor mechanism of the knee. Tobin has also defined a vastus medialis myocutaneous territory which can be advanced distally over the patella for a distance of some twelve centimeters. This V-Y advancement myocutaneous flap can be moved from the upper border of the patella to the tibial tubercle without harming the motor innervation of the vastus medialis muscle. It is particularly advantageous that this myocutaneous flap will carry a long segment of vascularized medial quadriceps tendon which is strategically located for the interposition reconstruction of missing patellar or quadriceps femoris tendon segments.

REGIONAL FLAP COMPARISONS

The vastus medialis muscle flap can be transposed into small suprapatellar defects more easily than either head of the gastrocnemius muscle. The vastus medialis myocutaneous flap offers an even broader area of prepatellar coverage. The vastus medialis and vastus lateralis muscles can also be rotated into central thigh defects by simple elevation and approximation in the midline. This central approximation of the two vastus muscles can completely reconstitute the extensor mechanism of the knee in the absence of the rectus femoris muscle. Like the vastus lateralis muscle, the vastus medialis muscle can be transposed in a "reversed" fashion based on the distal perforators of the superficial femoral artery.

DISADVANTAGES

Although some loss of medial knee stability would be expected from the relocation of the vastus medialis muscle, this has not been encountered in our limited experience.

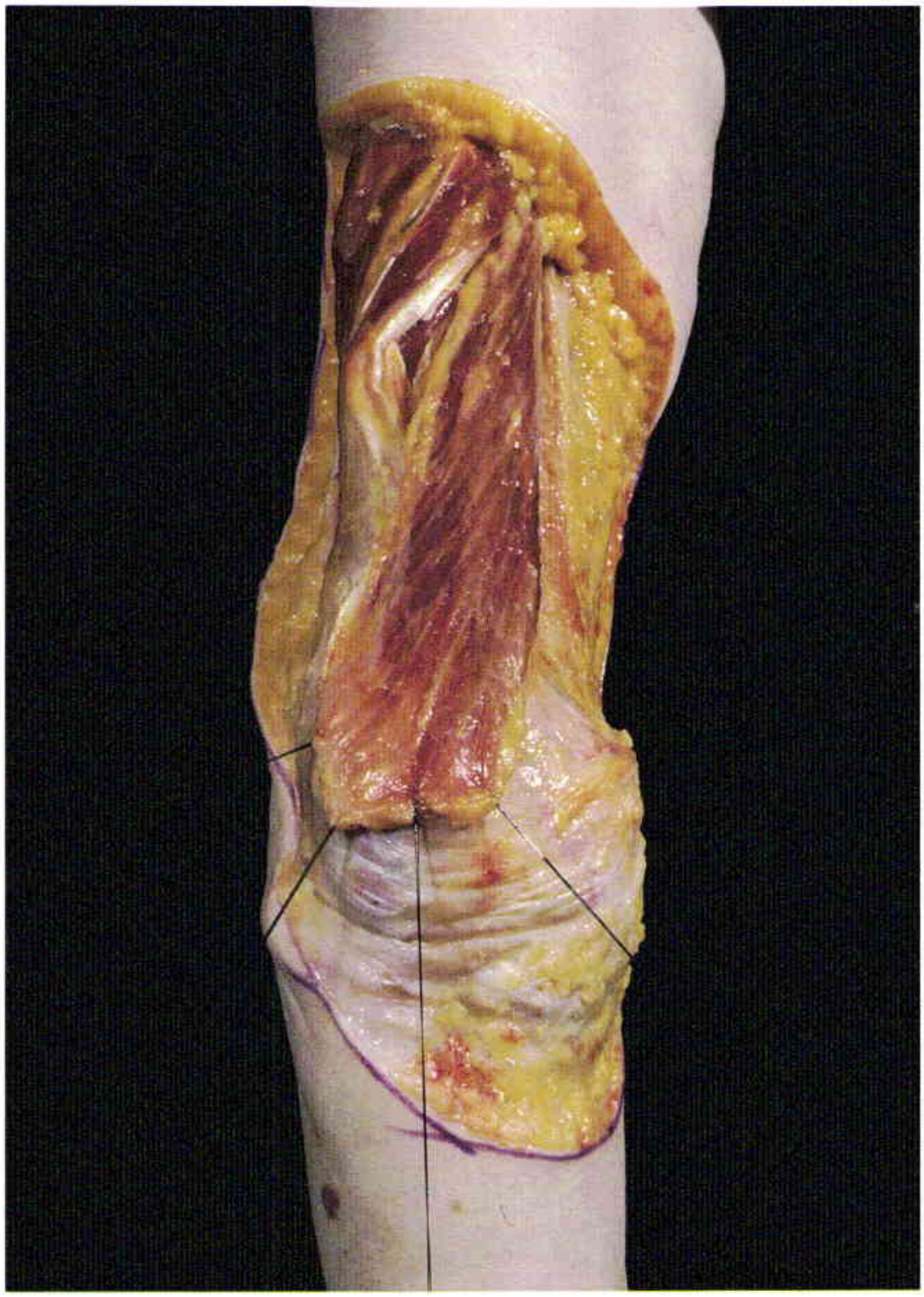
ADVANTAGES

The distinct advantage of the vastus medialis muscle is that it can provide both muscular closure of the superior aspect of the knee joint as well as simultaneous reconstruction of the extensor function of the knee — two very difficult reconstructive problems.

COMPLICATIONS, PITFALLS, AND DONOR SITE

The tendinous margin of the vastus medialis muscle should be included with the muscle flap to provide a solid structure for the purposes of suture retention. Care should be taken to protect the saphenous vein and the saphenous nerve in the retrieval of the muscle. If these structures are preserved, the donor site is usually inconsequential.

1
The extensive fascial attachments of the vastus medialis muscle to the rectus femoris muscle and the patellar tendon are demonstrated in the fresh cadaver. The vastus medialis muscle primarily inserts into the medial aspect of the knee near the midpoint of the patella.



2
The vastus medialis muscle is separated from its tendinous attachments and transposed over the patella. Note that a fascial margin has been left on three sides of the distal muscle to provide a strong layer for suturing.

3
Twenty-two-year-old man who sustained a high voltage electrical injury. The electrical arc entered in the area of the scapula and exited in the right suprapatellar area. The exit wound destroyed the distal quadriceps mechanism and exposed the knee joint. (Case of P.G. Arnold)

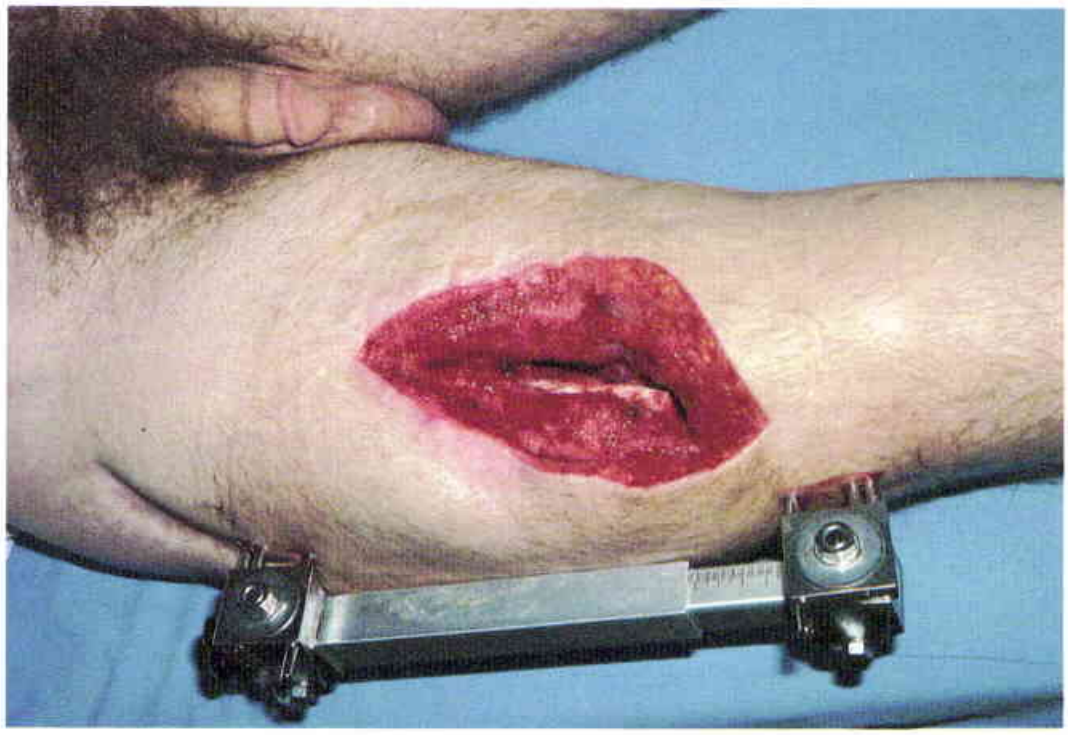
4
Appearance of the suprapatellar wound and the exposed knee joint following multiple debridements. The rectus femoris muscle and the vastus lateralis muscle were both sacrificed.

5
Elevated vastus medialis muscle flap. The remnant of the vastus lateralis muscle is retracted laterally.

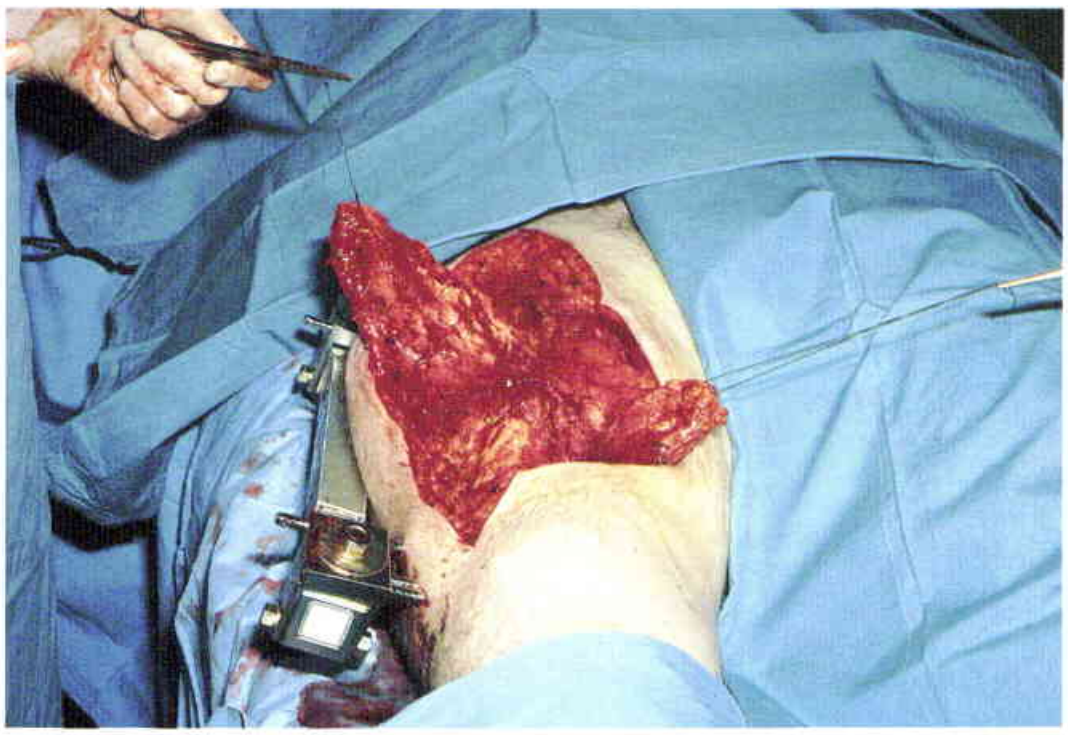
6
Vastus medialis muscle flap transposed into the suprapatellar area.

7
Appearance of the skin-grafted vastus medialis muscle flap at six months. Since the rectus femoris and vastus lateralis muscles were lost, the vastus medialis muscle was used both to cover the knee joint and to reestablish knee extension.

8
Double-exposed photographic demonstration of active knee extension following the functional vastus medialis muscle flap transfer. The patient is able to walk with a normal gait despite the devastating injury.



9
Twenty-five-year-old male with an open fracture of the femur complicated by clostridial myositis. The fracture of the femur was grossly infected, and the rectus femoris muscle had been totally excised. (Case of P.G. Arnold)



10
The vastus medialis and lateralis muscles were transposed over the infected femur and sutured together into a midline closure. The approximated muscles were then reattached to the patellar tendon to reestablish active knee extension.

11
Appearance of the skin-grafted vastus medialis and lateralis muscle flaps at six months. The muscular reconstitution of the quadriceps mechanism allowed the complex femoral fracture to heal. Full active knee extension was maintained in the absence of the rectus femoris muscle.

VASTUS MEDIALIS

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