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A Case Of Defect With Loss Of Entire Patella Bone And Patella Tendon - Reconstructed With Turn Down Flap From Quadriceps Aponeurosis.

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ABSTRACT

A case of loss of the patella and patellar ligament was reconstructed with a turn down flap of quadriceps tendon. A seven year follow-up showed acceptable result.

Keywords: patella, tendon, quadriceps apneurosis.

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Case report

A 35 year old gentleman, a milk vendor had a head on collision with a car seven years back and had an open patellar fracture with soft tissue loss. He had initial treatment in the form of debridement when the lacerated and damaged patellar ligament was removed along with comminuted fracture fragments of patella in another hospital. When he presented to me three months after this treatment he did complain of difficulty in walking and sitting on floor for taking meal. On examination of his right knee there was a transverse scar of the patellectomy. Below this scar, normal patellar contour was absent, as shown by the absence of the normal bony resistance. Instead a depression in felt at that site (figure 1).

On pressing below the scar region, there was pus discharge from the lateral part of the wound as pointed in figure 2. He also had a stiff knee with extensor lag of 30 degrees. To address his problems of extensor lag and defect in the patella region a turn down flap of the quadriceps was planned. Under spinal anesthesia, he was taken up for surgery, a vertical skin incision crossing the previous scar was made and the sinus which drained pus was debrided well. In the wound the defect of the patella and the patellar ligament were identified (figure 3).The distance from the tibial tuberosity to the quadriceps tendon was measured crossing the patellar defect to be 12 cms. A rectangular flap with distal base was developed from the quadriceps of length 12 cms. (figure 4).

This flap was lifted off the quadriceps and turned 180 degree distally and anteriorly. (figures 5-8). The resultant defect in the quadriceps tendon was repaired with 1-0 Vicryl ® (figure 9). The free end of the turn-down flap was sutured to the distal part of the remnant of patellar tendon and tibia (figure 10).On completion of the turn down reconstruction the flap looked exactly like the patella in appearance (figure 11). The sub cutaneous tissue and the skin were closed (figure 12). The knee joint was immobilized in tube slab for 6 weeks and later plaster was discarded and graded mobilization of the knee was started under close watch of a physiotherapist. He had returned to his daily activity of a milkman at 6 months post operatively. At the latest follow-up of seven years he was able to flex to 110 degrees , and fully and actively extend(figures 13,14,15). The cosmetic appearance of the knee was like that it had a patella but actually there is no patella(figures 16,17,18).

Figure 1:There was a transverse scar. Below this scar the defect in the patellar area is shown by the depression while palpation using the thumb.

Figure 2: On pressing the region below the scar of the previous wound there was pus discharge from the lateral part of the scar being pointed.

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Figure 3: The separate vertical skin incision and the defect of the patella and the patellar ligament is palpated

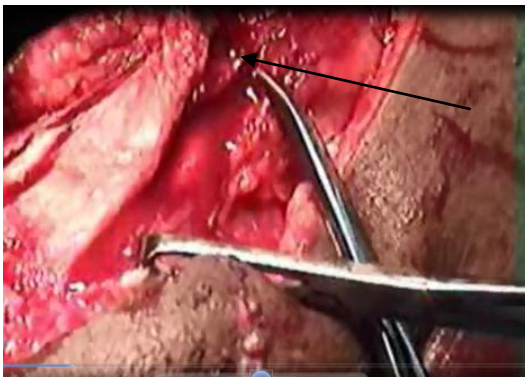

Figure 4: An inferiorly based rectangular flap being developed from the quadriceps

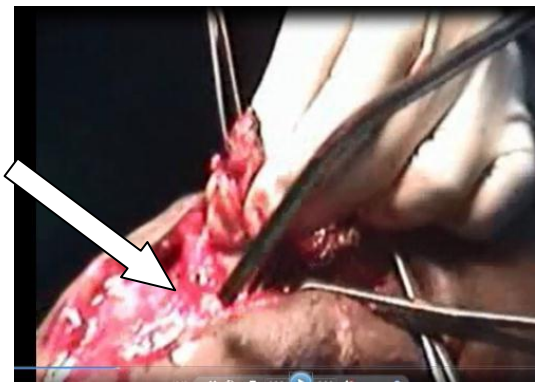

Figure 5:The defect being pointed

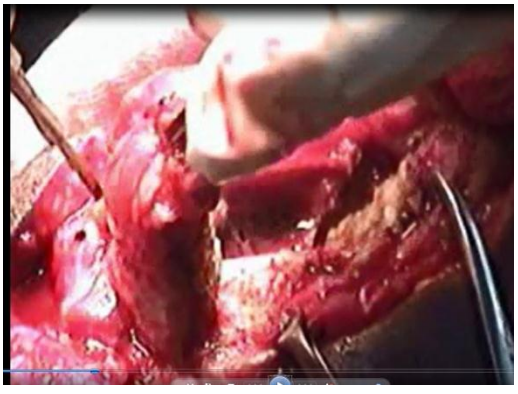

Figure 6: The view of the quadriceps flap showing its thickness.

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Figure 7: Flap being lifted off the quadriceps.

Figure 8: Flap being turned down 180 degree distally and forwards.

Figure 9: The donor-defect in the quadriceps aponeurosis being repaired

Figure 10: The turned down flap is sutured to the distal part of the patellar tendon and tibia

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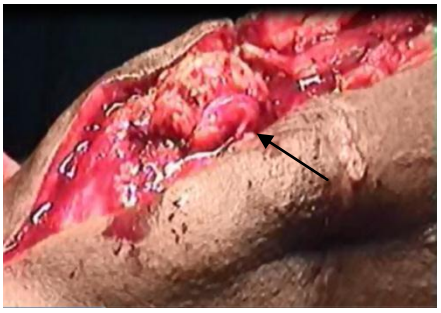

Figure 11: On completion of the turn down reconstruction the flap looks exactly like the patella.

Figure 12: The sub cutaneous tissue layer being closed.

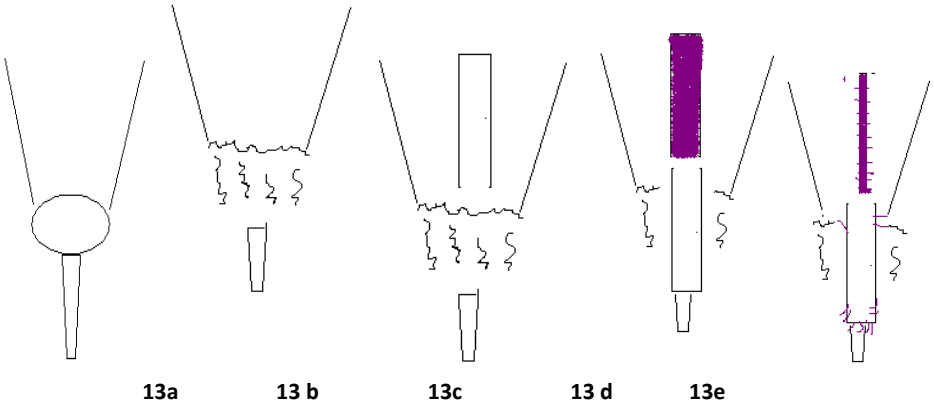

Figure 13: a b c d e The steps of the surgery.13 a. Schematic diagram showing normal anatomy, 13 b gap in the extensor apparatus,13 c Planning of the quadriceps tendon, 13 d The turn down flap of the quadriceps tendon bridging the gap, 13 e The completed reconstruction

Figure 14: Patient squatting with available flexion at right knee at a follow up 7 years after the surgery

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Figure 15: Patient standing at a follow up 7 years after the surgery

Figure 16: Two views of the patient with maximum extension at right knee at a follow up 7 years after the surgery

Figure 17: Patient doing flexion 110 degree of the right knee at a follow up 7 years after the surgery

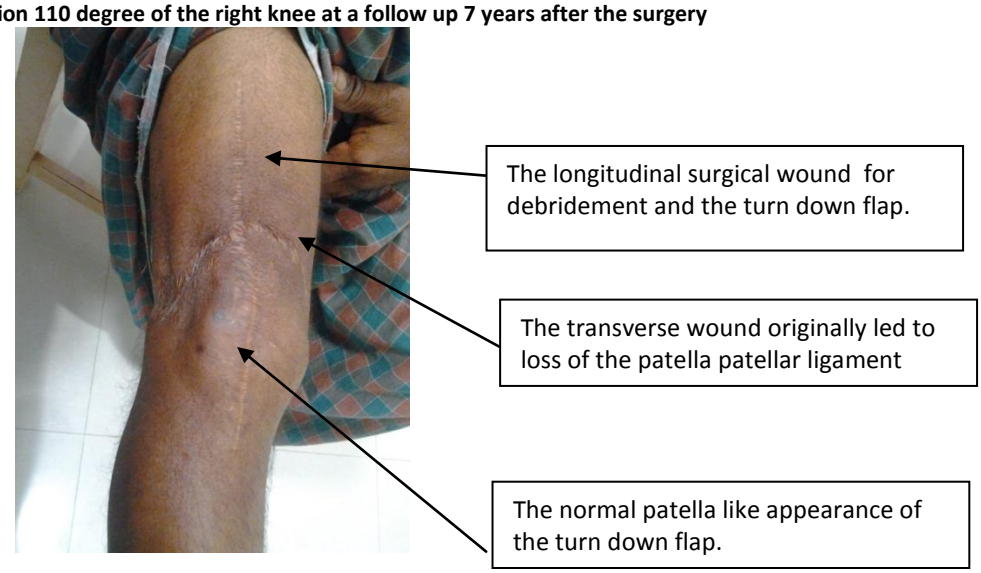

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Figure 18: The post operative status of the patient's right knee at a follow up 7 years after the surgery.

Figure 19:The post operative radiograph of the patient's right knee 7 years after the surgery.

DISCUSSION

The outcome of a quadriceps tendon turn down flap is presented here after seven years. The patellectomy and loss of tissue in the site after the initial debridement involving the patella and the infra patellar soft tissue were the problems in this case. Adequate length of the turn down flap of quadriceps flap is planned and executed. Since there was no patella in this case, there is no way a tension relieving wires could be applied. This case needed an immobilization for 6 weeks, with regular dressings for the wound. The presence of infection also had an effect in slowing the initiation of mobilization in this case. We found that cosmetically the base of the flap formed a patella like appearance. In literature, a case of turn down flap of quadriceps flap is reported for a post total knee arthroplasty, patellar tendon rupture. Two years and 6 months later the patient had no extension lag of the knee and knee flexion to 110 degrees. [1]

In injuries of knee's extensor apparatus for example, chronic quadriceps rupture, acute patellar ligament and quadriceps tendon injures, primary repair with a full-thickness V-Y turndown flap is done bridging the tendon gap and sutured to the distal part of the remnant tendon is done . Various materials like patients own semitendinosus tendon or allograft tendon or synthetic augmenting sutures made up of Dacron are used [2]

As there needs to be a stage of immobilization for the transferred tissue to gain strength, the joint mobilization and resisted exercises are delayed. Rehabilitation is only gradually started with a slow step by step increase in the degree of movement, first with gentle active flexion and passive extension and from the third month onwards introducing progressive resisted exercises to the quadriceps. The ultimate aim of such therapy is to get at least 90% of range of movement and at least quadriceps strength of 80% of uninjured side. [2] There has been reports on treatment of patellar ligament ruptures [3-5] or quadriceps ruptures [6] had slightly less power compared to the uninjured side but acceptable levels. In certain studies both the patellar ligament and quadriceps ruptures were studied. [7,8] Results in patellar tendon ruptures group is slightly better as the age of the quadriceps group patients are more and there are co-morbid conditions. [7,8]

When it comes to reconstructing old quadriceps or patellar tendon ruptures, there are only case reports. [7] Since they are infrequent, large series are not there multiple suture techniques, to delayed repair with or without grafting, to reconstruction with auto grafts or allograft are recommended. Polydioxanone sulphate (PDS) cerclage had a better motion without the need for subsequent implant exit. [2] as already told our patient did not have a patella hence we were not able to provide a tension relieving wire.

In isolated patellar ligament loss or rupture, to distinguish original tendon from scar tissue filling the tendon gap, a Z-shortening of the tendon is done with the contra lateral (normal) knee to guide the fitting length of the repaired tendon.[2] In our case the entire patella with patellar ligament was missing hence this was not applicable. Sometimes in post total knee arthroplasty, quadriceps and patellar ligament ruptures happen. In such cases, good results are obtained in delayed repair of existing tissue with soft tissue graft for

increased strength. If the patella is present, its normal relationship with femur is must. In surgeries involving the knee, especially those involving cutting power instruments to be used near the patellar ligament also, alertness is needed to look for patellar tendon rupture and intervene with an early repair.

Instead of local tissue of the patient like what we have done in this case, latest materials like high strength sutures, tissue engineered soft tissue products like Collagen constructs can be used in reinforcing the repair or bridge gaps in tendon-to-bone repair. This will allow early and aggressive rehabilitation. [2] Also the added advantage of less morbidity to the patient and less chance of disease transmission or immune response as in a tissue allograft are there. [2] Sub mucosa of swine intestine, purified collagen or human dermis are tried in soft tissue bridging , with gradual tissue incorporation and strengthening. These have deficiencies like high cost and more chance of infection. More important is that in all the above cases a compulsory wait for an initial period of intrinsic strengthening and wound healing, is required to allow gradual increase in strength with increase in range of flexion and extension. [2]

This case report substantiates the effectiveness of biological reconstruction using local tissue especially in a long follow up.

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