

# Judet's quadricepsplasty after total hip arthroplasty and Thompson's quadricepsplasty: A case report

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## Informed Consent

The authors stated that the written consent was obtained from the patient presented with images in the study.

## Conflict of Interest

No conflict of interest was declared by the authors.

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## Abstract

Judet quadricepsplasty provides a gradual release of knee extension contracture occurring due to intrinsic and extrinsic reasons. We herein present a 68-year-old male patient with a fragmented right femur AO (arbeitsgemeinschaft für osteosynthesefragen) Type A3 fracture, which occurred because of an in-vehicle traffic accident 30 years ago. The fracture was fixed with an anterior plate-screw with open reduction, and knee extension contracture had developed after the operation. The distinctive features of this case include a previous, unsuccessful, ipsilateral V-Y quadricepsplasty, an ipsilateral total hip arthroplasty with anterior approach six months ago and a persistent extension contracture for over 30 years. Gradual releasing techniques, as described by Judet, were performed under general anesthesia and sterile conditions with the patient in supine position. Intraoperatively, two displaced screws were detected on the anterior femur, which had adhered to the vastus medialis muscle, and fibrosed. Adhesions were dissected and screws were removed. Before the release of the proximal adhesion of the rectus muscle, a forced external rotation of hip joint was performed to assure that adequate fibrotic tissue had formed on the anterior facet of the joint capsule to prevent anterior instability. Five recurrent knee joint effusions developed after surgery, which were aspirated by needle. Joint fluids were clear and there were no reproductions of any microorganisms. By the end of an uneventful, two-year follow-up period, final knee range of motion was 0-90 degrees. Loss of extension and extensor muscle power had entirely improved by 6 months. In a patient with hip prosthesis, provided that adequate fibrosis has formed on the anterior facet of the joint capsule, rectus release may not cause instability. In cases resistant to rehabilitation, if there is implant, fibrosis or hypertrophic callus which may cause irritation at any level of the knee extensor mechanism, we suggest their resection for a more even anterior cortex contour.

**Keywords:** Contracture, Hip joint, Hip prosthesis, Knee joint

## Introduction

Judet quadricepsplasty provides a gradual release of knee extension contracture occurring due to intrinsic and extrinsic reasons. It carries decreased risks of iatrogenic quadriceps rupture and extension lag compared to V-Y or Thompson methods [1-3]. The distinctive features of this case include a previous, unsuccessful, ipsilateral V-Y quadricepsplasty, an ipsilateral total hip arthroplasty with anterior approach six months ago and a persistent extension contracture for over 30 years. To the best of our knowledge, there are no reports of Judet quadricepsplasty after unsuccessful V-Y quadricepsplasty, or of contractures of more than 20 years in the English literature. Anterior approach to the ipsilateral hip for arthroplasty may cause an instability due to rectus femoris muscle release.

## Case presentation

This research was approved by the IRB of the author's affiliated institution and the patient's informed consent was obtained for publication. The study was performed following the ethical standards of the Declaration of Helsinki. A 68-year-old male was admitted with preoperative fixed extension contracture of the right knee lasting for over 30 years. The patient's medical history revealed that he had been admitted to hospital for a traffic accident and right femur AO (arbeitsgemeinschaft für osteosynthesefragen) Type A3 fracture. The fracture was fixed with open reduction and internal fixation with plate and screws. He revealed that postoperative knee ROM (range of motion) exercises were painful. Despite serious rehabilitation and removal of the plate and some screws, right knee ROM was decreased to 0-10 degrees in 6 months. Four years ago, another center tried to release the contracture with Thompson quadricepsplasty. However, all gains were lost within the first year of the operation. Six months ago, he was admitted to a local hospital because of ipsilateral severe hip pain. THA (total hip arthroplasty) with anterior capsulotomy was performed for severe hip joint arthrosis. On his first visit, he presented with severe right knee extension contracture with 0-10 degrees active ROM. He was able to walk, hip and ankle movements and lower extremity muscle functions were regular. Quadriceps femoris muscle contraction was satisfactory. Two screw heads were protruding on the anterior femoral cortex on plain radiography (Figure 1).

Figure 1: Lateral thigh x-ray shows anteriorly protruding screw heads



Knee cartilage quality was satisfactory in knee MRI (magnetic resonance imaging). Under general anesthesia and with the patient in supine position, a release was performed gradually following classic Judet's technique. The first incision was made mid anteriorly, in accordance with the previous incision scar. With this single incision, MCL (medial collateral ligament), medial capsule, and adhesions in the joint and lateral side were released (Figure 2).

Two displaced screws were detected on the anterior femur cortex during the release. There were excessive fibrosis and adhesions around the screw heads. Fibrotic tissues were resected, adhesions were released, and screws were removed. The second stage was rectus femoris muscle release from a 3 cm-long oblique bikini incision (Figure 3,4). The anterior capsule of the hip prosthesis was palpated with fingers, and simultaneously, the hip was extended, and externally rotated. The capsule was thick enough.

Figure 2: Collet shows intraarticular hypertrophic fat and fibrosis

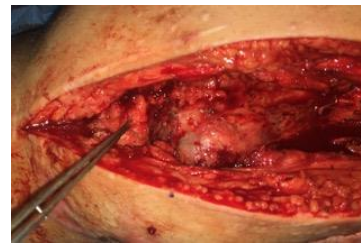
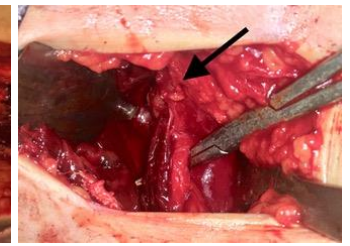


Figure 3: Clamp elevates the rectus femoris muscle.

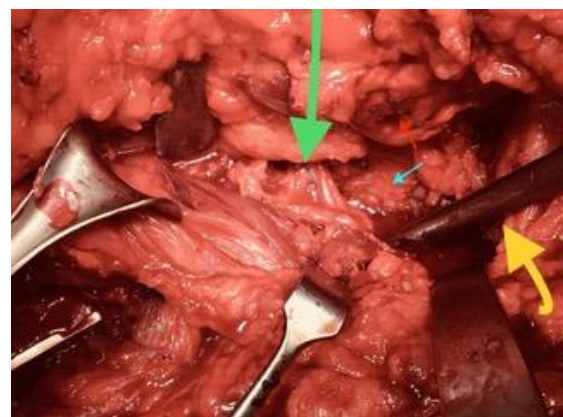


Without rectus femoris muscle support in the anterior, the joint did not destabilize (Figure 5). The rectus femoris muscle origin was then released from the Spina Iliaca Anterior Inferior.

Figure 4: Rectus muscle cut from the anterior inferior iliac spine. The broad origin was more extensive than previously thought.



Figure 5: Vastus lateralis muscle is shown (Green arrow: The still intact transverse branch of lateral femoral circumflex artery, Blue arrow: Fibrosis over anterior capsule, Yellow arrow: Bennett elevator is on the superior side of collum femoris, Red arrow: Rectus muscle was cut)



Forty-five degrees flexion was obtained at this stage. The third stage was the proximal release of the vastus complex from the anterior femur neck, and the last stage was the release of tensor fascia lata. A longitudinal lateral incision was made across the thigh, and tensor fascia lata was lengthened with multiple transverse incisions. Distally, this lateral incision was slightly curved medially and combined with an anterior midline incision. Epidural analgesia was given for postoperative pain control. Knee active-assisted exercises were started immediately. No brace or CPM (continuous passive motion) machine was used. On the second postoperative day, the wound was redressed, and the drains were removed. Lower extremity strengthening and ROM exercises, walking, and weight-bearing exercises were included in the rehabilitation program. A total of five recurrent knee joint effusions developed after surgery, which were aspirated by needle. Joint fluids were clear and there was no

growth of any microorganisms. Apart from this, no complications developed.

The final ROM was 0-130 degrees perioperatively. Wound healing was eventless, and the extension lag was improved totally at the end of 6 months. By the second year of follow-up, final knee ROM was 0-90 degrees, there were no extension lag, and no other complications (Figure 6). The result was "Good" according to Judet's criteria [1].

Figure 6: Postoperative 2 years knee flexion



## Discussion

Patellar adhesions, arthrofibrosis, fracture callus on the anterior femoral cortex, skin adhesions to extensor muscles, external fixator pins and scar tissue are some of the reasons of knee extension contracture [2, 4]. Judet's quadricepsplasty is an effective procedure that increases flexion range with lower extension lag risk. Extension lag, from which our patient suffered for six months, is more prominent with the Thompson technique [5]. This may be due to proximal release. To prevent extensor lag, V-Y plasty should be avoided, and postoperative active quadriceps exercises should be started immediately [6]. Post-operative patient compliance to rehabilitation is essential for quadricepsplasty [7].

To the best of our knowledge, no study investigates proximal rectus femoris muscle release based on ipsilateral total hip arthroplasty. If the surgeon expects to have enough fibrosis around the hip or use a posterior approach for total hip arthroplasty procedure, loss of rectus femoris muscle support may be accepted. In this case, the examination of the hip joint before the surgery revealed preoperative periarticular fibrosis, and limited external rotation, which did not cause any pain or instability. Thus, we planned the release six months after the hip prosthesis surgery.

Whether to perform total knee arthroplasty along with Judet procedure should be decided before surgery with x-rays and MRI (magnetic resonance imaging). In this case, there was no chondrolysis, knee cartilage quality was good and knee arthroplasty was not considered. If extension contracture has occurred due to an extra-articular fracture, the cartilage will be similar to one buried in the sand because of the lack of movement. Thus, preoperative evaluation of knee joint with MRI may avoid performing unnecessary knee prosthesis. In our opinion, the reason for contracture despite the previous V-Y Quadricepsplasty was two screw heads protruding on the anterior femoral cortex, which were irritating the extensor apparatus.

## Conclusion

Ipsilateral hip prosthesis may not be a restraint for Judet Quadricepsplasty if the periarticular fibrosis is thick enough. Also, all implants and callus formations which contact the

extensor apparatus should be resected; otherwise, contracture will recur because of postoperative pain during rehabilitation.

## References

1. Judet R. Mobilization of the stiff knee. *J Bone Joint Surg Br.* 1959;41(B):856-7.
2. Nicoll EA. Quadricepsplasty. *J Bone Joint Surg Br.* 1963;45:483-90.
3. Bari MM, Islam S, Shetu NH, Rahman W, Rahman M, Munshi MH et al. Judet's Quadricepsplasty for Extension Contracture of the Knee (Stiff Knee). *MOJ Orthop Rheumatol.* 2015;2(6):00071.
4. Ali AM, Villafuerte J, Hashmi M, Saleh M. Judet's quadricepsplasty, surgical technique, and results in limb reconstruction. *Clin Orthop Relat Res.* 2003;415:214-20.
5. Thompson TC. Quadricepsplasty to improve knee function. *J Bone Joint Surg Am.* 1944;26(2):366-79.
6. Kundu Z, Sangwan S, Guliani G, Siwach R, Kamboj P, Singh R. Thompson's quadricepsplasty for stiff knee. *Indian J Orthop.* 2007;41(4):390-4.
7. Alici T, Buluc L, Tosun B, Sarlak AY. Modified Judet's quadricepsplasty for loss of knee flexion. *The Knee.* 2006;13(4):280-3.

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