Is the Achilles Diseased in Patients with Painful Retrocalcaneal Exostosis: Pathology Results and Outcomes in Secondary Repair of the Achilles Tendon with Retrocalcaneal Exostectomy

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STATEMENT OF PURPOSE

Surgeons commonly refer to retrocalcaneal exostectomy as an Achilles "detach / reattach," as if the tendon is normal and simply in the way of accessing the bone spur. The Achilles tendon is commonly thickened on clinical, radiographic, and intraoperative exam demonstrating the classic "codfish" appearance **(Figure 1-2).** Our routine is to resect this anterior portion of the tendon thereby preserving the normal appearing posterior 60-80% of the tendon. This affords reattachment of a tendon with normal thickness. The intent of this study was to determine if the resected tendon tissue was found to be abnormal on pathologic exam and if this surgical approach increased the risk of harm.

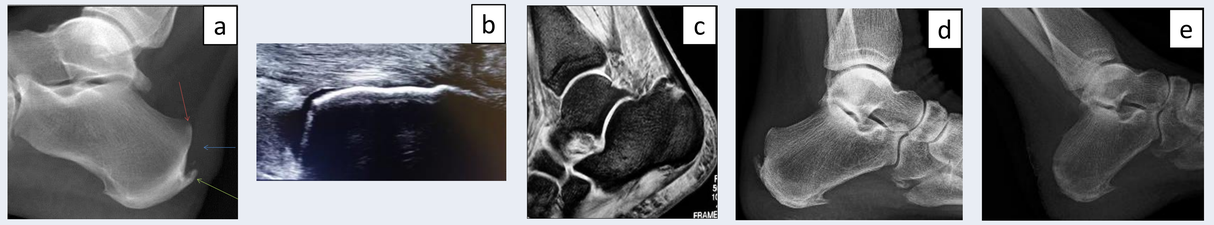
LITERATURE REVIEW

Several studies in recent literature have documented histopathologic findings in diseased Achilles tendons. de Mos, et al. in 2007 compared biopsy specimens from patients undergoing surgery for Achilles tendinopathy with macroscopically healthy tendon samples from asymptomatic patients (1). Authors concluded that healthy appearing tendon tissue adjacent to diseased tendon segments showed changes in biochemical composition and collagen turnover rate. A more recent study in 2018 (2) compared tendon composition of specimens with chronic tendinopathy, chronic rupture, acute rupture, and normal intact tendons. Polymerase chain reaction (PCR) showed altered expression of collagen genes and matrix metalloproteinases while histological evaluation showed disrupted tendon architecture in tendinopathy and chronic rupture groups. Prior investigations support this study's hypothesis that tendon pathology is highly probable in association with symptomatic retrocalcaneal exostosis.

METHODOLOGY

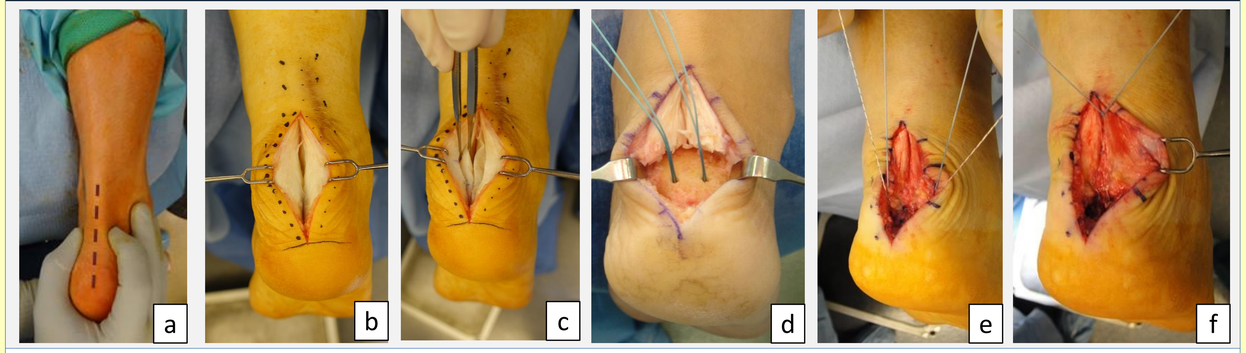
A retrospective review was conducted in consecutive cases with a pathology specimen. Patient demographics (age, gender, laterality, and BMI) were recorded. Other surgical implications included whether the procedure was an initial repair or a revision surgery, whether or not the patient required further revision or surgical intervention within the follow-up period, and whether the patient experienced a re-rupture during the follow-up period. Pathology reports were created by a certified pathologist or pathologists' assistant and were reviewed by the primary investigator. Pathology reports were considered positive for tendinopathy if the report contained either of the following: degeneration / degenerative changes or chronic inflammatory changes. Complications including incidence of re-rupture, infection, wound-healing delay, and chronic pain were recorded.

Figure 1. Preoperative and Postoperative Imaging in Retrocalcaneal Exostosis with Haglund's Deformity and Achilles Tendinopathy



(a) Common preoperative x-ray findings included Haglund's deformity (red), retrocalcaneal spur (green), and thickened Achilles tendon at the insertion (blue). (b) Achilles tendon thickening and Haglund's prominence evidenced by ultrasound imaging. (c) Chronic insertional Achilles tendon degeneration is commonly seen on MRI. (d) Lateral preoperative radiograph with classic findings. (e) Lateral postoperative radiograph with complete resection of spur and Haglund's deformity.

Figure 2. Various Patients Demonstrating Typical Intraoperative Findings and Surgical Technique



(a) Prone positioning and posterior midline incision over the Achilles tendon was used in all cases. Having the foot hanging off the end of the table allows for assessment of dorsiflexion with the knee extended as well as proper tension after repair. (b) The tendon was incised midline to expose the thick and degenerative Achilles. The anterior 20-40% of the Achilles tendon commonly involved the classic "codfish" appearance which contributed to a thick, painful tendon. (c) Resection allowed preservation of the normal posterior tendon fibers and generated a specimen that was submitted for pathologic evaluation. (d-f) Bone resection was followed by soft tissue reattachment of the Achilles including side to side repair. The tendon was reattached with the ankle at 90 degrees to avoid creating equinus deformity.

PROCEDURES

Surgery was performed prone with midline posterior incision **(Figure 2a).** The Achilles was split midline and the anterior aspect of the tendon was resected under 2.5 loupe magnification to remove the abnormal appearing portion of the tendon and restore normal thickness **(Figure 2b-c)**. The pathology specimen was sent in formalin. Resection of the spur and osseous remodeling of the Haglund's bump was performed using a combination of osteotome and power rasp. Fluoroscopic imaging was utilized to confirm the appropriate level of resection and desired shape of the calcaneus. The tendon was then reattached with soft tissue anchors under normal tension **(Figure 2d-f).** Layered closure was provided. Skin was closed with non-absorbable suture. Patients were placed in a plantarflexed plaster splint or CAM boot for 6 weeks. Progression to full weightbearing was begun after 6 weeks postoperatively. Physical therapy was ordered as necessary. Non-weightbearing and weightbearing lateral radiographs were taken at 2 weeks and 6 weeks, respectively.

RESULTS

Patient demographics and results are depicted in **Table 1** with complications listed in **Table 2.** 26 surgeries were performed on 26 patients (7 male, 19 female). The average patient age at the time of surgery was 51.0 ± 11.6 years. 3/26 (11.5%) cases were revision surgeries. Pathology specimens were procured in 26/26 (100.0%) and tendon degeneration was revealed in 21/26 specimens (80.7%). Flexor hallucis longus (FHL) tendon transfer was performed in 2/26 (7.69%). The average length of follow-up was 13.2 ± 23.3 months (range 5.5 weeks – 8.6 years). During the follow-up period, 2 patients required revision; 1 due to traumatic re-rupture and the other due to ongoing pain. There were few identified complications; 1 wound healing delay and 0 post-operative infections.

Table 1. Patient Demographics and Results

Gender	7 males, 19 females
Age	51.0 ± 11.6 years
BMI	36.4 ± 7.55
Laterality	13 right, 13 left
Haglund's with retrocalcaneal spur	20/26 (76.9%)
Retrocalcaneal spur without Haglund's	6/26 (23.1%)
Gastroc lengthening	0 (0.00%)
FHL transfer	2/26 (7.69%)
Pathology report positive for tendinopathy	21/26 (80.7%)

Table 2. Complications

Revision surgeries	2/26 (7.69%)
Postoperative rupture	1/26 (3.84%)
Infection	0/26 (0.00%)
Wound healing delay	1/26 (3.84%)

ANALYSIS AND DISCUSSION

Is the Achilles pathologic in retrocalcaneal exostectomy?

- 82.1% of pathology specimens definitively showed tendon degeneration or chronic inflammation. At a minimum, the anterior "codfish" appearing portion of the tendon should be resected, especially if the tendon is clinically thickened at the insertion.

Which patients with Achilles tendinopathy need FHL transfer?

- 2/26 patients received FHL transfer. This is largely reserved for revision surgery.

How often was gastrocnemius lengthening necessary?

- 0/28 surgeries involved concomitant gastrocnemius lengthening procedure in addition to Achilles tendon repair.

Is the posterior incision safe?

- The present study identified only 1/28 with wound healing delay (pressure-induced) and 0/28 with infection.
- Similarly, Rigby et al. had 2/43 patients with superficial wound dehiscence postoperatively (3).

How often is Haglund's deformity involved?

- 20/26 (76.9%) surgeries involved resection of a Haglund's bump and posterior calcaneal spur. The remaining 6/26 (23.1%) involved resection of a posterior calcaneal spur without Haglund's deformity.

Is it safe to thin a diseased Achilles tendon?

- The results of this study demonstrate only 1 re-rupture to date and this was related to an early mechanical fall.
- There were 2 revision surgeries performed involving the 1 traumatic rupture and another with chronic scar tissue formation.
- There were no documented strength deficiencies postoperatively.

REFERENCES

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