Review Article

Acute Achilles Tendon Ruptures: An Update on Treatment

Anish R. Kadakia, MD
Robert G. Dekker II, MD
Bryant S. Ho, MD

Abstract

Acute rupture of the Achilles tendon is common and seen most frequently in people who participate in recreational athletics into their thirties and forties. Although goals of treatment have not changed in the past 15 years, recent studies of nonsurgical management, specifically functional bracing with early range of motion, demonstrate rerupture rates similar to those of tendon repair and result in fewer wound and soft-tissue complications. Satisfactory outcomes may be obtained with nonsurgical or surgical treatment. Newer surgical techniques, including limited open and percutaneous repair, show rerupture rates similar to those of open repair but lower overall complication rates. Early research demonstrates no improvement in functional outcomes or tendon properties with the use of platelet-rich plasma, but promising results with the use of bone marrow–derived stem cells have been seen in animal models. Further investigation is necessary to warrant routine use of biologic adjuncts in the management of acute Achilles tendon ruptures.

From the Department of Orthopaedic Surgery, Feinberg School of Medicine, Northwestern University, Chicago, IL (Dr. Kadakia and Dr. Dekker) and Hinsdale Orthopaedics, Hinsdale, IL (Dr. Ho).

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Acute rupture of the Achilles tendon is common, especially in recreational athletes aged 30 to 49 years.[1] A 2014 population-based study reported an increasing incidence of acute rupture, particularly in the 49- to 60-year age group, but a decrease in the proportion of patients undergoing surgical treatment.[2] With the emergence of functional bracing and early motion protocols, nonsurgical management of ruptures has resulted in rerupture rates and functional outcomes similar to those of surgical management, but with less risk of complications.[3] As evidence in support of nonsurgical treatment grows, the incidence of surgical repair has declined by up to 55% in some countries in recent years.[4]

The risk of rerupture, skin complications, and nerve complications, as well as strength and return to work, must be considered in the selection of a treatment strategy. Recent nonsurgical protocols involve a short period of immobilization in a boot with early motion and progressive weight bearing. If surgical treatment is chosen, options include open, minimally invasive, and percutaneous repair techniques. Treatment goals emphasize restoration of physiologic tendon length and tension, which is believed to ultimately maximize strength and function. Although biologic adjuncts, such as platelet-rich plasma (PRP) and bone marrow–derived stem cells, have been used in efforts to optimize postoperative tendon healing, they have yet to show substantial differences in outcome.

Nonsurgical Management

The optimal management of an acutely ruptured Achilles tendon has been the subject of debate for decades.

Figure 1

Photograph showing a commercial functional brace that permits varying degrees of static or dynamic ankle plantar flexion and limited ankle dorsiflexion. (Courtesy of OPED, Oberlaindern, Germany.)

The choice of management strategy has been influenced by earlier studies showing a lower risk of rerupture with surgical treatment, but at the expense of a higher risk of wound complications, including infection and impaired wound healing.[5]

Historically, nonsurgical management consisted of immobilization in a cast for 6 to 8 weeks. A study of this treatment strategy demonstrated a higher rate of rerupture compared with the results of surgical treatment (12.6% versus 3.5%).[5] Recent studies of nonsurgical treatment with early functional rehabilitation have shown rerupture rates lower than those of cast immobilization and comparable to those of surgical intervention.[6,7] Nevertheless, one recent investigation reported rerupture rates as low as 3% to 5% with casting.[8] The authors of the study suggested that the decreased rates stemmed from exclusion of patients who sought treatment >72 hours after the injury because a delay in initiation and maintenance of plantar flexion could result in development of a hematoma that blocks tendon apposition. However, time to presentation has previously not been shown to correlate with rerupture rates.[9]

Functional Rehabilitation

In some countries or regions, acute Achilles tendon ruptures are predominantly managed nonsurgically. For instance, functional rehabilitation is preferred by more than half of surgeons in Finland.[10] The exact definition of functional (dynamic) rehabilitation varies. The term may refer to early controlled motion, protected weight bearing, or a combination of both. Furthermore, the means by which protected motion is achieved differ. Protocols range from the use of a rigid boot that is removed by the patient to perform range-of-motion (ROM) exercises to the use of adjustable, nonremovable short-leg orthoses that allow progressive, restricted ankle motion[11] (Figure 1).

The beneficial effects of early motion on tendon healing have been well described and have been extensively studied in rat models. Eliasson et al[12] showed improved tendon strength in rats with early motion at 8 and 14 days after rupture. Hammerman et al[13] showed that mechanical loading in a healing Achilles tendon induces local microtrauma, which eventually produces a stronger tendon callus. Clinically, Schepull and Aspenberg[14] demonstrated a better elastic modulus of the tendon with early motion than with immobilization in a randomized controlled trial of 35 patients. However, this finding did not translate to substantial differences in functional outcome, measured by the heel-raise index at 1-year follow-up.

The functional rehabilitation protocol for patients with a ruptured Achilles tendon varies widely but typically consists of initial immobilization for approximately 1 to 2 weeks. The patient is then transitioned to a controlled ankle motion (CAM) walker with initiation of gentle stretching and resistance exercises that are progressed over time. Weight bearing in the CAM walker is generally allowed. Randomized controlled trials have demonstrated that weight bearing reduces ankle stiffness and results in better health-related quality of life; however, no studies have shown an effect on the rerupture rate, functional outcomes, or biomechanical tendon properties.[8,15]

In one blinded, randomized controlled trial, no difference in heel-rise work, a measure of plantar flexion strength, or in the rate of rerupture was seen at 1 year after injury in 60 patients randomized to weight-bearing or non–weight-bearing functional rehabilitation.[15] However, patients in the weight-bearing group had higher health-related quality of life scores at 1-year follow-up. Similarly, in a randomized controlled trial of 74 patients by Young et al,[8] weight bearing had no statistically significant effect on rerupture rates. Both of these studies, however, are relatively small and may not be sufficiently powered to detect true differences in rerupture rates.

The extent to which weight bearing results in tension on the Achilles tendon while the patient uses a brace for support is unknown. Importantly, weight bearing has not been shown to affect rerupture rates and is a safe and appealing option for select patients who are able to comply with the activity restrictions of their functional rehabilitation protocol.[8] Table 1 summarizes an example of a functional rehabilitation protocol for the management of an acute Achilles tendon rupture.[6]

Outcomes

Few randomized controlled trials have directly compared functional rehabilitation with standard immobilization. Saleh et al[16] showed that functional rehabilitation with early motion and the use of a removable CAM walker resulted in faster return to mobility and return to work compared with casting for 8 weeks.[16] Multiple studies have demonstrated rerupture rates with functional rehabilitation that were lower than previously reported rates of rerupture with standard immobilization or surgical management. Importantly, some,[6,7] but not all,[17] recent randomized controlled trials comparing functional rehabilitation and surgical repair have demonstrated no difference in rerupture rates. Soroceanu et al[3] performed a meta-analysis of 10 randomized controlled trials consisting of 418 patients treated surgically and 408 patients treated nonsurgically. They reported no statistically significant difference in the risk of rerupture between surgical treatment and nonsurgical treatment consisting of functional bracing and early motion (absolute risk difference, 1.7%; P = 0.45). However, compared with nonsurgical treatment consisting of prolonged immobilization, such as casting, surgical treatment reduced the absolute risk of rerupture by 8.8% (P = 0.010).

No clinically important long-term differences in ankle ROM, strength, calf circumference, or functional outcome scores between functional rehabilitation and surgical repair have been identified.[3,6] Schepull et al[18] compared the mechanical properties of ruptured Achilles tendons after surgical repair with those after functional rehabilitation by implanting tantalum markers into the ends of the ruptured tendons. They found no differences in strain per force, cross-sectional area, tendon elongation, or heel-raise index after 18 months.

Nilsson-Helander et al[7] showed improved function at 6 months after surgical treatment but little difference at 1 year postoperatively in a randomized controlled trial of 97 patients. The surgical group had

Table 1

Sample Functional Rehabilitation Protocol for Use After Surgical or Nonsurgical Management of Acute Achilles Tendon Ruptures

Postoperative Week	Protocol
0–2	Posterior slab/splint Non–weight bearing with crutches immediately postoperatively in patients who undergo surgical treatment or immediately after injury in nonsurgically treated patients
2–4	Controlled ankle motion walking boot with 2-cm heel lift[a,b] Protected weight bearing with crutches Active plantar flexion and dorsiflexion to neutral, inversion/eversion below neutral Modalities to control swelling Incision mobilization if indicated[c] Knee/hip exercises with no ankle involvement (eg, leg lifts from sitting, prone, or side-lying position) Non–weight-bearing fitness/cardiovascular exercises (eg, bicycling with one leg) Hydrotherapy (within motion and weight-bearing limitations)
4–6	Weight bearing as tolerated[a,b] Continue protocol of wk 2-4
6–8	Remove heel lift Weight bearing as tolerated[a,b] Slow dorsiflexion stretching Graduated resistance exercises (open and closed kinetic chain exercises and functional activities) Proprioceptive and gait training Ice, heat, and ultrasound therapy, as indicated Incision mobilization if indicated[c] Fitness/cardiovascular exercises (eg, bicycling, elliptical machine, walking and/or running on treadmill) with weight bearing as tolerated Hydrotherapy
8–12	Wean out of boot Return to crutches and/or cane as necessary; gradually wean off use of crutches and/or cane Continue to progress range of motion, strength, and proprioception
>12	Continue to progress range of motion, strength, and proprioception Retrain strength, power, and endurance Increase dynamic weight-bearing exercises, including plyometric training Sport-specific retraining

[a] Patients are required to wear the boot while sleeping.
[b] Patients are allowed to remove the boot for bathing and dressing but should adhere to the weight-bearing restrictions.
[c] If, in the opinion of the physical therapist, scar mobilization is indicated (ie, the scar is tight), the physical therapist can attempt to mobilize the scar with the use of friction or ultrasound therapy instead of stretching.
Adapted with permission from Willits K, Amendola A, Bryant D, et al: Operative versus nonsurgical treatment of acute Achilles tendon ruptures: A multicenter randomized trial using accelerated functional rehabilitation. *J Bone Joint Surg Am* 2010;92(17):2767-2775.

Table 2

Clinical Pearls for Successful Nonsurgical Management of Midsubstance Achilles Tendon Ruptures

Nonsurgical treatment is not synonymous with no treatment. A proven functional rehabilitation protocol must be administered and supervised closely.[6]
Patients who are treated nonsurgically must take added caution because suture fixation makes surgical repair more robust than nonsurgical treatment.
It is important to avoid dorsiflexing the Achilles tendon beyond neutral in the first 6 weeks of treatment, after which the patient may begin controlled, progressive stretching.[6]
The clinician must ensure that the patient understands that the healing tendon is vulnerable and that care must be taken to avoid sudden loading of the Achilles tendon during activities of daily living (eg, ascending stairs) because it can result in rerupture.
Gradual return to low-impact activities may commence at 6 months after injury. High-impact activities (eg, soccer, football, rugby) may be considered after 9 months if the patient demonstrates the ability to perform a single-limb heel rise.
Achilles tendon avulsions (ie, distal tears at the calcaneus with or without bone fragment) require surgical management.

greater improvement in concentric strength, heel-rise height and work, and hopping tests at 6 months postoperatively, but at 1-year follow-up, only the heel-rise work was greater. However, the clinical relevance of this difference in heel-rise work is unclear because no difference was found in patient opinions regarding function or physical activity levels at 1-year follow-up.

Existing randomized controlled trials comparing surgical and nonsurgical treatment may not be adequately powered to detect differences in physical function or the rate of rerupture. In a randomized study of 100 patients, Olsson et al[17] reported better performance on all functional tests after surgical repair with accelerated postoperative functional rehabilitation compared with treatment consisting of functional rehabilitation alone. However, only the differences in hopping and drop countermovement jump testing were statistically significant. No reruptures occurred in patients treated surgically, whereas five patients who were treated nonsurgically had reruptures; however, this difference was not statistically significant ($P = 0.057$). Larger studies in which patients are stratified on the basis of age and activity demands are needed to better assess differences in function and the rate of rerupture between surgical and nonsurgical treatment.

The only differences between surgical treatment and functional rehabilitation that have been reported are in terms of time to return to work and plantar flexion strength. In the meta-analysis by Soroceanu et al,[3] surgical treatment was associated with return to work up to 19 days earlier. However, specific criteria for return to work were not defined and likely varied among the studies included in the meta-analysis. In a study of 144 patients, Willits et al[6] found a small, yet statistically significant increase in plantar flexion strength at 1 and 2 years after surgical repair. They used a dynamometer to compare peak plantar flexion torque of the affected extremity with that of the normal contralateral extremity at different velocities and found a mean difference of 14.15% (95% confidence interval, 1.12% to 27.19%) between surgical treatment and functional rehabilitation. Although the clinical relevance of this difference is unclear, this factor is important to consider in the treatment of athletes.

The risk of complications other than rerupture is lower after nonsurgical treatment than after surgical treatment.[3] This finding is consistent with those of earlier meta-analyses comparing surgical management with immobilization.[5] Soroceanu et al[3] reported a 15.8% lower risk of complications other than rerupture with nonsurgical treatment. Willits et al[6] reported no soft-tissue complications in patients treated with a removable orthosis, early motion, and early weight bearing; in surgically treated patients, the authors found a 12.5% rate of complications, including superficial and deep infection, hypertrophic scar, tendon tethering to skin, and wound dehiscence. In a series of 945 consecutive patients (949 tendons) treated with nonsurgical functional management, Wallace et al[9] reported low rates of complications other than rerupture, including heel pain (2.2%), numbness (0.7%), ulcers (0.5%), deep vein thrombosis (1.1%), pulmonary embolism (0.2%), and orthosis-related discomfort (0.4%).

Although complication rates are lower with nonsurgical treatment than with surgical treatment, orthosis-related complications can occur. In one randomized controlled trial of 83 patients, the rate of skin-related complications after nonsurgical treatment with a nonremovable dynamic orthosis was 31.7% compared with 4.7% after minimally invasive repair.[19] Orthosis-related complications included fungal infection, pressure sores, blisters, and superficial wound infection.

Appropriate counseling and regular patient follow-up are fundamental to successful outcomes of functional rehabilitation (Table 2). Rerupture of the healing Achilles tendon during functional rehabilitation usually occurs in conjunction with poor patient compliance. In a prospective, nonrandomized study of 57 patients treated nonsurgically with the use of a dynamic ankle brace, Neumayer et al[11] reported seven reruptures at a mean 5-year follow-up. Five of the seven patients who experienced rerupture were reported to have demonstrated poor compliance before the rerupture. All reruptures occurred within the first 5 months of treatment. In their consecutive series of 945 patients, Wallace et al[9] retrospectively investigated the long-term rate of rerupture after functional nonsurgical treatment. The authors found a low rate of rerupture (2.8%, or 27 reruptures) at a follow up of ≥2 years. Five patients prematurely removed their brace, and two of those patients subsequently experienced rerupture within the first 3 months of treatment. They were successfully treated with a repeat functional protocol and returned to full activities without complication.

Surgical Management

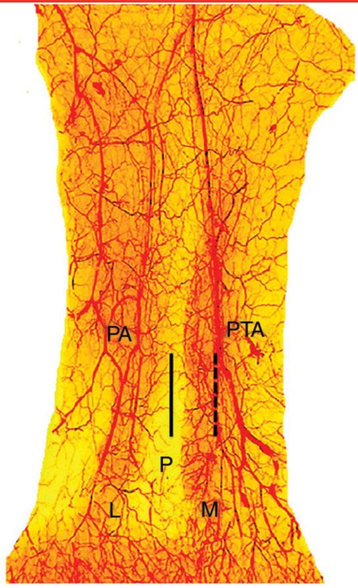
Surgical management of acute Achilles tendon ruptures historically was performed through a posterior midline approach with the patient in a prone position. Taylor and Palmer[20] showed that this approach is at the junction between the posterior tibial and peroneal arterial supply and suggested that an incision at this location would cause the least amount of vascular insult. However, vascular mapping in cadavers performed by Yepes et al[21] demonstrated the least amount of vascularization of the skin and subcutaneous tissue directly posteriorly and the greatest amount of vascularization between the axis of the medial malleolus and the medial border of the Achilles tendon (Figure 2). A posteromedial approach to the Achilles tendon takes advantage of this zone of increased vascularity and soft tissue. Additionally, this approach can be used reliably with the patient placed in a supine position and the surgical extremity externally rotated with the assistance of a beanbag.[22] This approach avoids the risks and challenges of prone positioning.

Clinically, the choice of approach does not appear to be associated with differences in wound complication rates. A systemic review by Highlander and Greenhagen[23] demonstrated wound complication rates of 7% and 8.3% in the midline incision group and the posteromedial incision group, respectively. Risk factors that were associated with wound complications in a retrospective review of 167 patients by Bruggeman et al[24] included smoking, steroid use, and female sex. Interestingly, the authors of the study did not find statistically significant associations of diabetes mellitus, age, or body mass index with wound complications.

Percutaneous Repair

The desire to decrease wound complications in Achilles tendon repairs has led to the development of new repair techniques that decrease the incision size and minimize devitalization of surrounding soft tissue. Ma and Griffith[25] first reported on a percutaneous technique for suture repair of the Achilles tendon in 1977. They used medial and lateral stab incisions to pass and tie a suture between the proximal and distal ends of the tendon. Although earlier studies of percutaneous repair techniques included reports of sural nerve injury, the absence or lower rate of these complications in recent studies is likely a reflection of improved surgical technique, with care taken to identify and protect the sural nerve through the proximal lateral stab incisions.[26,27] Nevertheless, in a study by Maes et al,[28] eight sural nerve injuries were reported in

Figure 2



Angiogram demonstrating the integument of the posterior ankle and calf. The Achilles tendon and paratenon have been removed. The solid line over the hypovascular zone (P) represents the standard posterior midline incision. The dotted line represents the posteromedial incision through the zone of greatest vascularity. L = lateral, M = medial, PA = peroneal artery, PTA = posterior tibial artery. (Reproduced with permission from Yepes H, Tang M, Geddes C, Glazebrook M, Morris SF, Stanish WD: Digital vascular mapping of the integument about the Achilles tendon. *J Bone Joint Surg Am* 2010;92[5]:1215-1220.)

a series of 124 patients after percutaneous repair, thus demonstrating that sural nerve entrapment remains a concern despite advances in surgical technique.

The results of percutaneous techniques have been shown to be similar to those of open repairs in terms of decreased wound complications without increased rerupture rates. In a prospective randomized controlled trial of 33 patients, Lim et al[26] reported no postoperative wound infections in the percutaneous repair group and a 21% infection rate in the open repair group (P = 0.01).

Rerupture rates were 3% and 6%, respectively, but the difference was not statistically significant. Complications in the percutaneous repair group included wound puckering in 9% of patients and adhesions in 6% of patients. Karabinas et al[27] found no substantial difference in return to work, return to activities, American Orthopaedic Foot and Ankle Society (AOFAS) score, or satisfaction between open repair and percutaneous repair in a prospective randomized controlled trial of 34 patients. In a retrospective review of 32 patients, Henríquez et al[29] reported no differences in plantar flexion strength, ROM, calf or ankle diameter, or single heel-raise testing. The authors reported only two wound complications and one rerupture, both in the open repair group. However, 42% of patients in the study were lost to follow-up.

The use of endoscopy has been proposed as an adjunct to percutaneous techniques to allow visualization of the tendon apposition and avoid damage to the sural nerve. Although Chiu et al[30] reported a 10% rate of sural nerve numbness that resolved in 1 month in a series of 19 patients treated with endoscopically assisted percutaneous repair, they noted that this complication occurred in the first two patients and did not occur after they moved the location of the percutaneous incisions to directly over the lateral border of the Achilles tendon.

Limited Open Repair

Percutaneous Achilles tendon repair does not provide access that would allow the surgeon to visualize the final tendon apposition or judge the quality of the repair. To ensure that the length of the tendon is adequately restored with a tendon repair that maximizes contact of the edges of the ruptured tendon, Kakiuchi[31] devised a technique that combined open and percutaneous techniques. This limited open technique involves a small incision over the site of the Achilles tendon rupture and a percutaneous suture repair accomplished by passing suture within the paratenon (Figure 3). This technique has been improved with modern instrumentation, such as modified ring forceps,[32] that simplifies percutaneous passage of the suture through the Achilles tendon within the paratenon.

Assal[33] reported excellent results and no wound complications or sural nerve injuries in a prospective multicenter study of 187 consecutive patients treated with a limited open technique with the Achillon Achilles Tendon suture system (Integra LifeSciences). Three patients experienced rerupture, one resulting from an acute fall and two resulting from noncompliance with postoperative bracing. In a prospective randomized study of 40 patients comparing open repair with mini-open repair in which the Achillon suture system was used, Aktas and Kocaoglu[34] found no statistically significant difference in AOFAS scores and decreased local tenderness, skin adhesions, and scar or tendon thickness in the mini-open repair group. They reported no complications in either group. Despite successful limited open Achilles tendon repairs in 36 professional athletes, Vadalà et al[35] showed a decrease in endurance of 6.78% at 28-month follow-up.

Our preferred method of repair is a limited open technique with the use of a vertical posteromedial incision that can be extended proximally or distally if greater tendon visualization is required (Figure 2). Sutures are placed deep to the paratenon to decrease the risk of sural nerve injury. We think that this method reduces the risk of wound complications while allowing visualization of the repair and maximizing the quality of the tendon repair and the length of the tendon.

Postoperative Protocol

Historically, postoperative care after surgical repair of the Achilles tendon consisted of immobilization in a cast for 6 weeks without weight bearing. Costa et al[36] compared this regimen with early weight bearing in a carbon-fiber above-ankle orthosis in a randomized prospective study of 48 patients and found improved time to normal walking and stair climbing in the early weight-bearing group. Two patients in the early weight-bearing group who were noncompliant with activity restrictions sustained reruptures in acute falls, demonstrating the importance of careful patient selection for early weight-bearing protocols.

Suchak et al[37] compared weight bearing with non–weight bearing in patients placed in an ankle-foot orthosis at 2 weeks postoperatively, with early motion exercises initiated at that time. They reported no reruptures in 110 patients, with improved quality of life and decreased activity limitations in the weight-bearing group at 6 weeks but no statistically significant differences between the groups at 6 months postoperatively.

Similar results have been reported in patients who underwent percutaneous Achilles tendon repairs and were allowed immediate weight bearing with ROM exercises at 2 weeks postoperatively. In a study of 52 patients, Patel et al[38] reported no reruptures. Patients demonstrated a mean AOFAS score of 96 with a 3.8% rate of wound dehiscence that did not require secondary surgery. In a study of limited open Achilles tendon repairs, Groetelaers et al[39] reported no difference in strength, quality of life, or return to work or sports with immobilization with non–weight bearing versus full weight-bearing in a protective brace at 2 weeks

Figure 3

Intraoperative photographs showing a mini-open repair technique. **A,** The mini-open incision is marked on the patient's skin. **B,** Edges of the tendon are grasped. **C,** A jig is inserted. **D,** The suture is passed percutaneously through the proximal end of the Achilles tendon. **E,** The sutures are shuttled through the mini-open incision. **F,** Knotless suture anchors are placed in the calcaneus through a distal percutaneous incision. **G,** The proximal sutures are passed through the distal tendon stump and out the distal incision with the use of a suture passer (arrowhead). **H,** The knotless suture anchor is inserted into the calcaneus while the proper length and tension of the tendon are maintained.

postoperatively. No statistically significant differences in the rates of rerupture or wound infection were found.

We prefer a 2-week period of non–weight bearing to allow for skin and soft-tissue healing after surgical repair. At the first postoperative evaluation, the patient is transitioned to a removable CAM walking boot and is allowed to perform toe-touch weight bearing with crutches. The patient is transitioned to full weight bearing by 3 weeks postoperatively. Daily unloaded ankle motion exercises and supervised physical therapy are started at 2 weeks postoperatively. Patients may return to sports at 9 months postoperatively if they demonstrate the ability to perform a single-limb heel rise (Table 1).

Augmentation and Biologic Adjuncts

The role of repair augmentation and biologic adjuncts in the surgical management of ruptured Achilles tendons has continued to evolve as surgeons look for ways to decrease rerupture rates and improve clinical outcomes. Pajala et al[40] examined augmentation of open Achilles tendon repair with a down-turned gastrocnemius fascia flap in a prospective randomized study of 60 patients. They found no statistically significant differences between rerupture rates with augmentation (10%) and without augmentation (10%). No statistically significant differences were noted in calf strength, pain, ROM, or return to work between the two groups.

The drive to improve the results of acute Achilles tendon repairs has led to consideration of augmentation with biologics, such as PRP or bone marrow–derived stem cells. Although PRP has shown limited effectiveness in the management of specific pathologies of the shoulder and elbow, little evidence has suggested its efficacy in the management of acute Achilles tendon ruptures. In a study of 12 athletes, Sánchez et al[41] compared open repair with and without PRP and found faster recovery of ROM and return to sports in the PRP group. However, all athletes in both groups were able to return to sport with satisfaction at 1-year follow-up. In a randomized, single-blind study of 30 patients, Schepull et al[42] reported no difference in functional outcome or mechanical tendon properties at 1-year follow-up between the PRP group and the control group.

Bone marrow–derived stem cells have shown promise in animal models, but clinical data have yet to be reported. Okamoto et al[43] used a rat model to compare Achilles tendon repair with and without the addition of bone marrow cells or mesenchymal stem cells. They found increased ultimate strength to tendon failure in the bone marrow cell group at 7, 14, and 28 days postoperatively. In contrast, the mesenchymal stem cell group showed improved strength to failure at 7 and 14 days, but no difference at 28 days. Similarly, Adams et al[44] demonstrated no difference in ultimate strength to failure at 28 days in a rat model with injected mesenchymal cells. However, they found increased ultimate strength to failure at 28 days in tendon repairs using suture loaded with mesenchymal cells. Although these rat models show promise, the clinical translation of these findings is currently unknown.

Summary

Nonsurgical management of acute Achilles tendon ruptures should consist of functional rehabilitation; the reported rerupture rates with functional rehabilitation are lower than those with standard immobilization.[5,9] Nonsurgical functional rehabilitation offers rerupture rates and outcomes similar to those of surgical management while avoiding postoperative complications. Although surgical treatment is associated with increased risk of complications, including wound infections, newer, less invasive techniques have decreased the risk of complications without increasing rerupture rates and should be strongly considered if surgical treatment is selected. Surgical treatment has been shown to provide earlier return to work and slightly stronger plantar flexion strength, and should be considered in athletes. Biologic adjuncts, such as PRP and bone marrow–derived stem cells, currently have no proven role in the surgical management of Achilles tendon ruptures.

References

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