

Achilles Tendinopathy and the 100-Pound Punching Bag

Mark R Collen*

Fair Oaks Blvd., #334, Sacramento, CA 95825, United States

*Corresponding author: Mark R Collen, 2443 Fair Oaks Blvd., #334, Sacramento, CA 95825, United States, E-mail: mrc0823@gmail.com

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Abstract

This article recounts the experience of a 50 year-old man attempting to treat his refractory mid-portion Achilles tendinopathy (AT) pain and discovered by accident that training on a heavy bag after running eliminates the pain within one hour. There are currently no known exercise interventions which rapidly relieve mid-portion AT pain. Details are discussed.

Keywords: Mid-portion achilles tendinopathy; Chronic pain; Chronic illness; Depression; Anxiety; Running

Introduction

A 50 year-old man (IP) with chronic back and sciatic pain, coupled with chronic depression, insomnia and anxiety uses exercise as his primary treatment modality to manage his chronic illness. IP also experiences episodes of acute depression and anxiety and reports that running in nature is the only thing that relieves the extreme mental suffering.

Chronic pain, which is also considered chronic illness, affects an estimated 100 million Americans at an annual cost of \$600 billion [1]; and according to the World Health Organization, depression is the leading cause of disability worldwide [2]. Moreover, depression, insomnia and anxiety are comorbid to chronic pain [3,4].

Exercise is an appropriate intervention for people with a variety of chronic illnesses, both physical and mental [5-8], and it can be more effective than medical treatment [5,7]. Low back and neuropathic pain respond well to exercise and that includes training on a treadmill and running [8-12]. In addition, studies demonstrate the efficacy of exercise to treat depression and anxiety [13-15] and running is known to cause euphoria [16] the antithesis of depression. Exercise also induces analgesia and both the endogenous opioid and non-opioid systems are implicated [17]. Furthermore, exercising in nature has proven psychological benefits [18,19].

Approximately 7 years ago, IP developed mid-portion Achilles tendinopathy (AT) on the left side, and 3 years later on the right. Tendinopathy may be defined as the, "...clinical syndrome of pain and dysfunction in a tendon..." [20] and AT is likely an overuse injury [21,22]. The main symptom is pain upon palpation and loading, but the etiology of AT pain remains elusive [20,22,23]. Studies have shown the development of bilateral Achilles changes in unilateral tendinopathy [24,25] and improvements on the contralateral side with unilateral Achilles surgery for those with bilateral AT [26]. This suggests that the development and healing of Achilles tendinopathy may involve the central nervous system [24,25] and mid-portion Achilles pain may involve altered central pain processing [20,23].

IP had several appointments with a physician specializing in disorders of the foot and ankle, and was treated by two different

physical therapists. The clinician recommended eccentric stretching but it was ineffective, and the physical therapy, which did not involve eccentric stretches, worsened the symptoms. However, there is evidence to the efficacy of eccentric stretching [26-28] but Achilles tendinopathy is known to be refractory to treatment and become chronic [20,29].

In the first year of the injury, IP tried to be cautious and as the pain increased, the running decreased and eventually stopped. He avoided running for about 8 months but continued other exercises such as walking and biking. Achilles tendons require proper loading to heal and too much rest can be counterproductive to tendon health [30]. Furthermore, tendons recover slower than muscle and it may take up to three days for recovery after heavy loading workouts [30]. After the running break, IP began to gradually train and worked up to a 50 min run, twice weekly without mid-portion pain, but within 3 months of running the pain returned.

Unfortunately, IP's drive to manage mental illness through running did not depart when the Achilles pain arrived. Out of desperation to run and attempts to avoid potential injury, he began to experiment and tested a walk/sprint rotation which reduced the Achilles pain but created hip pain and thus it was stopped. Changing one's gait may help to prevent and reduce symptoms from Achilles tendinopathy [22,31] and it is possible the walk/sprint altered IP's gait to the point of decreasing mid-portion pain.

Nothing was working but IP continued to run whenever possible in an effort to mitigate the impact of depression and anxiety. In 2015, he purchased a 100-pound punching bag in hopes of relieving stress and trying a different type of exercise. Kickboxing fitness workouts have increased in popularity [32,33] and the use of a punching bag has been used with individuals who have chronic illness, including multiple sclerosis and Parkinson disease [33,34]. Training on the heavy bag did not exacerbate IP's Achilles tendinopathy symptoms. The bag workout includes a variety of punches, kicks, knees and elbows.

One day after a short, painful run, IP began to work the heavy bag out of frustration. He stopped after about 10 min due to fatigue and noticed the mid-portion Achilles pain was gone. He began to train on the punching bag after each run for about 8 to 12 min and found that both the pain upon palpation and loading disappeared, if not immediately after the bag training, then within 1 h. He also experimented by working the bag prior to a run in hopes of it delaying

or eliminating the pain during or after the workout. However, IP reported that he has not been able to make a determination on this since it is not as obvious as the pain elimination after the post-run, bag beating.

Although the etiology of Achilles tendinopathy pain remains uncertain, there are numerous theories including peripheral pain being caused by neovascularization [35] an ingrowth of nerves from the paratenon [36], or interference by the plantaris tendon [37]. As previously mentioned, there are indications that AT pain is a unique type of chronic pain involving central sensitization [20,23]. It is unique in that it is generally not constant, unlike chronic pain, but instead is experienced upon loading and palpation [23].

Working out on a punching bag involves ballistic movements of high intensity [38] and it is both anaerobically [38,39] and aerobically demanding [38,40]. One's feet positions are in constant flux along with one's weight distribution. The force to punch a bag starts at the ground, the ground reaction force, with leg drive being in both vertical and horizontal directions [41,42]. Turner elaborates, "Each punch involves triple extension whereby the ankle, knee, and hip extend to generate force from the ground"[43]. He adds further, "Triple extensions movements are also required for kicking, kneeing, and elbowing" [43]. In addition, there are also constant lateral movements while working the bag which increases the sheer forces on the Achilles.

There is currently no known exercise intervention which rapidly eliminates mid-portion Achilles tendinopathy pain. However, one study found that a single intervention of isometric contractions of the quadriceps reduced patellar tendinopathy pain immediately afterwards for at least 45 min [44]. The authors explain, "Release of intracortical inhibition was associated with pain reduction and may be implicated as an underlying mechanism for the changes in pain" [44].

Unfortunately, the literature lacks biomechanical analyses of the Achilles tendon during punching, kicking, kneeing and elbowing; and mechanobiological studies are essential in order to gain a better understanding of how bag training impacts mid-portion pain. The punching bag workout also raises some important questions. Will post-run, heavy bag training eliminate AT pain for individuals other than IP? What are the possible mechanisms for pain relief? Would other post-run exercises may eliminate or reduce refractory Achilles tendinopathy pain?

As a result of working the punching bag after running, IP is able to run on average for 50 min twice weekly, which is about double the amount he would have run without the use of the heavy bag. The difference comes down to his belief that if the pain is eliminated after each run, then there is a decreased chance that physical damage is occurring during the run, even if the Achilles hurts. There is support in the literature for training with Achilles tendon pain [28,30]. Also, IP's mental pain may demand a run regardless of the Achilles health, and the use of the heavy bag post-run may function as a harm reduction tool to prevent or reduce the risk of further injury.

IP has been training on the heavy bag after runs for over 12 months and the Achilles tendinopathy pain has improved, continues to disappear after bag training, and the amount of time running remains stable. A post-run, heavy bag workout should be investigated as an exercise intervention for runners with refractory Achilles tendinopathy.

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Declaration of Interest

The author reports no conflicts of interest.

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