

**Received:** 2011.06.06  
**Accepted:** 2011.11.03  
**Published:** 2012.01.10

## Rectus abdominis overuse injury in a tennis athlete treated with traumeel

**Konstantinos Natsis, Christos Lyrtzis, Efthymia Papathanasiou, Nikos Anastasopoulos**

Department of Anatomy, Medical School, Aristotle University of Thessaloniki, Thessaloniki, Greece

### Summary

**Background:**

Rectus abdominis injuries are common in tennis players at all levels of competition. Traumeel® injection can be used for treatment of muscle strains and hematomas.

**Case Report:**

A 21-year-old female tennis athlete was injured on the non-dominant rectus abdominis during the cocking phase of the service motion. She suffered from pain and tenderness. One week later, during a serve, she experienced severe pain on the contralateral side of her abdomen. Conservative treatment was performed by the team physician with rest, ice therapy and analgesics for 20 days, but she had recurrent injuries. The ultrasonography and MRI showed hematoma of the rectus abdominis muscle. She was treated with 2 injections of Traumeel® on the 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup> post-traumatic day and received 1 injection on the 10<sup>th</sup> post-traumatic day. She also modified her serve technique. On the fourth post-treatment week the athlete had pain-free function and both the MRI appearance and the size of rectus abdominal muscle were normal. She returned to her sport activities. There is no recurrence of her injury 2 years later.

**Conclusions:**

Rectus abdominis hematoma must be diagnosed early. Traumeel® injections are effective, safe and well-tolerated for the treatment of overuse injury of the rectus abdominis following strain.

**key words:**

**rectus abdominis • overuse injury • Traumeel® injection**

**Full-text PDF:**

<http://www.amjcaserep.com/fulltxt.php?ICID=882235>

**Word count:**

1500

**Tables:**

–

**Figures:**

4

**References:**

21

**Author's address:**

Christos Lyrtzis, Department of Anatomy, Medical School, Aristotle University of Thessaloniki, Greece, e-mail: lyrtzichristos@yahoo.gr

## BACKGROUND

Traumatic musculoskeletal pathology is frequent in athletes. Muscle injuries account for more than 30% of sport injuries. One of the more common injuries is a muscle strain [1]. A strain causes microscopic tears within the muscle, but occasionally, in severe injuries, the muscle can be ruptured [2]. The most frequent cause of partial or complete rupture of muscle is the eccentric overload of the muscle or muscle overstretching [3]. Severe muscle strains can lead to hematoma formation.

The abdominal muscles are active during sports activities [4]. There are high torsion movements during a service or attack in tennis, volleyball, baseball and other sports. During this movement there is hyperextension of the lumbar spine, stretching of the abdominal musculature and eccentric contraction followed by a concentric phase. The torso is flexed and rotated towards the injured side during the attack or service movement. Rectus abdominis muscle strain and hematoma formation are a relatively rare condition.

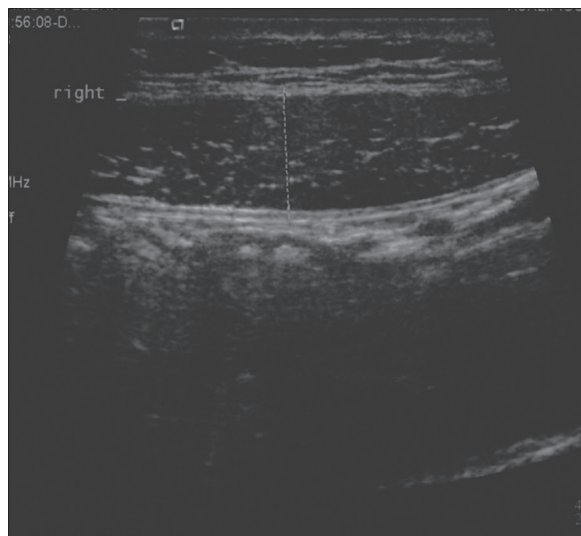
The modified RICE (Rest, Ice, Compression, Elevation) protocol is the treatment of choice. It includes rest, ice and compression to minimize the formation of a large hematoma that affects the scar tissue at the end of the repair process. Additionally, the treatment includes Non-Steroid Anti-Inflammatory Drugs (NSAIDs), ultrasound, hyperbaric oxygen and operative treatment [5].

We report a case of an overuse injury of the rectus abdominis muscle following overstretching during a tennis service in an athlete treated with injection of a homeopathic preparation containing anti-inflammatory, analgesic, anti-edematous, anti-exudative components and modification of the serve technique.

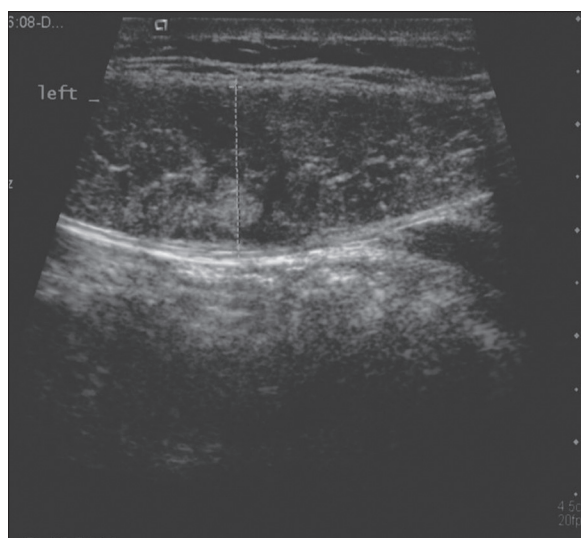
## CASE REPORT

A 21-year-old female tennis champion was injured on her abdominal wall during a service in competition play. Specifically, she felt pain on her contralateral of service abdomen after a service but did not stop playing. She continued to suffer from pain in her abdomen and tenderness with any attempt of movement. Her trainer observed a tender mass after the trauma and he tried to control the pain with ice packs in the field. She was not initially restricted from athletic competition. One week later, again during a service, she experienced severe pain in her abdomen. Conservative treatment was performed by a team physician with rest, ice therapy and analgesics for 20 days. There was an improvement and she decided to participate in training. During the first day of training she felt the same pain during service. Conservative treatment was performed for 20 days with rest, ice application, anti-inflammatory medication, muscle relaxant drugs, ultrasound and iontophoresis, followed by active stretching of the muscle within the athlete's pain limits and isometric exercises. She was instructed to perform active, pain-free rectus abdominis stretching 15 times a day and to perform pain-free isometric rectus abdominis strengthening exercises. She started training and after 2 days she felt the same pain during the service.

Three months after the initial injury and following a new injury, she came to our clinic. On clinical examination, the



**Figure 1.** Ultrasound of normal right rectus abdominis.

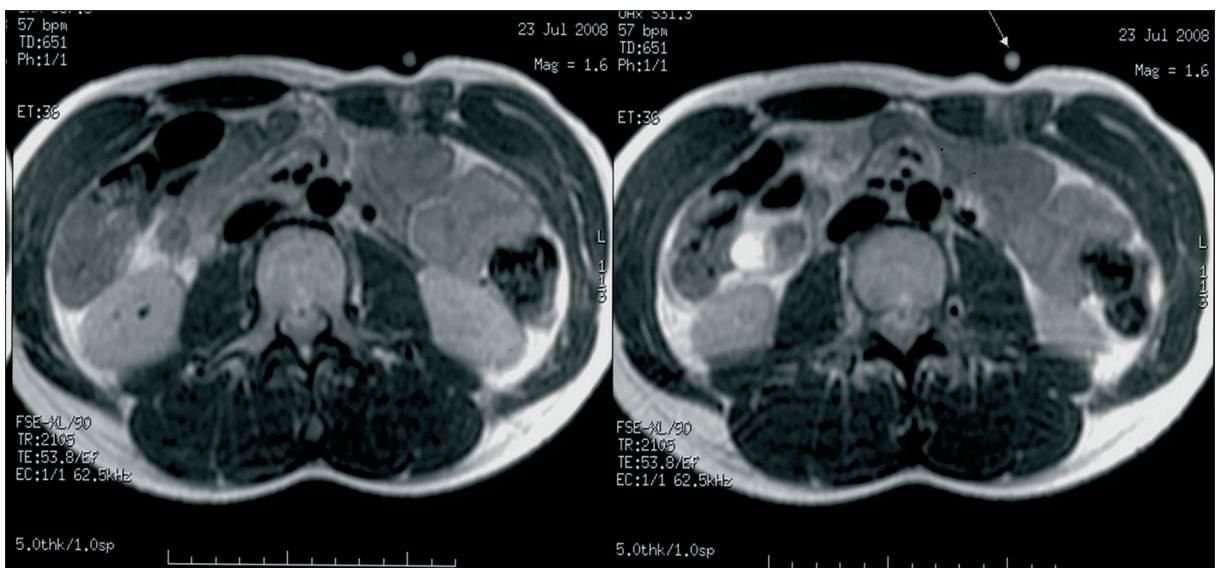


**Figure 2.** Ultrasound of left rectus abdominis before treatment.

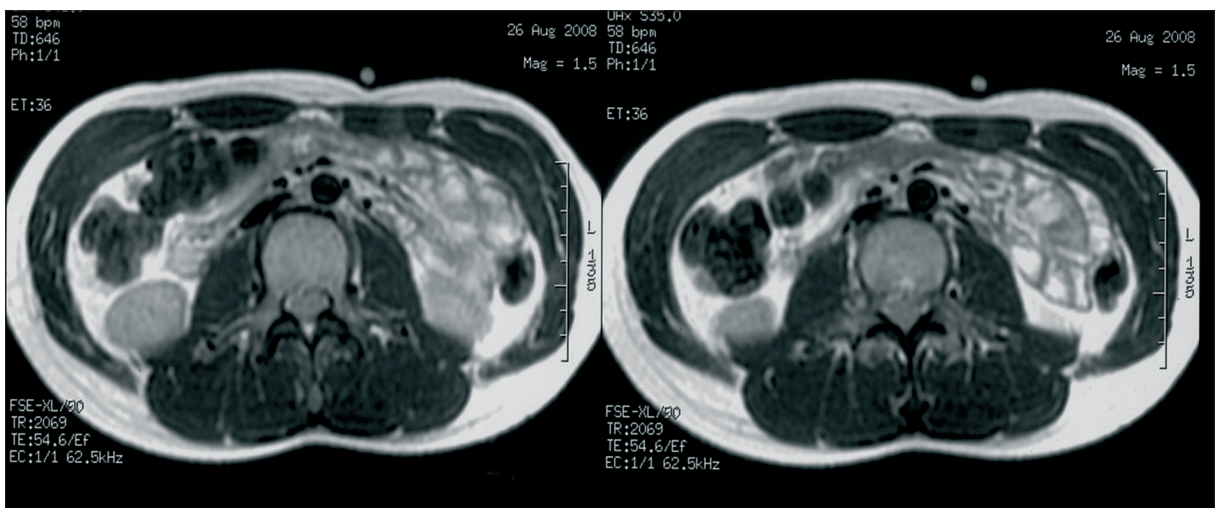
patient complaint of pain during exercise, which was more intense on palpation of the rectus abdominis muscle. The pain was localized on the left inferior rectus abdominis. Flexion and muscle stretching were painful. There was edema on the left rectus abdominis. She was not able to perform an isometric rectus abdominis contraction.

Laboratory data, including leukocyte and platelet count, hemoglobin, blood chemistry tests, blood coagulation and urine analysis, were normal. Only creatine kinase level was increased. Ultrasound was done to check the soft tissues of the abdominal wall. It revealed a hematoma in the left rectus abdominis muscle in comparison with the right rectus abdominis (Figures 1 and 2). The next day an MRI examination confirmed the hematoma formation, and its size was 7×2×3 cm (Figure 3). The patient was not on any medication and had no known blood disorders.

Due to the recurrence of symptoms and failure of conventional treatment, we decided to modify the standardized



**Figure 3.** Abdomen MRI before treatment: Note the different size of the two rectus abdominis and the edema (sign).



**Figure 4.** Abdomen MRI 4 weeks after treatment: Note that both rectus abdominis muscles had almost the same size and the edema was significant reduced.

treatment protocol and to use a homeopathic preparation. The patient was treated under aseptic conditions, with injection of Traumeel<sup>®</sup>, a homeopathic anti-inflammatory drug. The hematoma was palpated and we injected 2 ampoules of Traumeel 2 ml with a needle. We did not aspirate the hematoma before injection. The treatment was administered on the 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup> post-traumatic days and 1 injection on the 10<sup>th</sup> post-traumatic day. The goals of treatment included pain-free rectus abdominis flexion and extension and unrestricted return to full athletic activities as soon as possible.

After 3 weeks of trauma the athlete started training and a rehabilitation program including controlled warm-up and muscle stretching. To visualize the results of treatment, a second MRI was implemented after 4 weeks (Figure 4). MRI revealed a nearly complete recovery and she had pain-free function. The patient was instructed to modify the service technique in cooperation with her trainer and returned to her former sport activities and competitions. Two years later

there is no recurrence of her injury and she participates under competition conditions in her sport.

## DISCUSSION

Abdominal muscles are active during sports activities [4]. There are high torsion movements during the service or attack in tennis, volleyball, baseball, handball and other sports. Rectus abdominis contusions are relatively rare in athletes. Fatigue, inflexibility, poor coordination and intrinsic tightness are factors that contribute to muscle overloads [2]. They are more common during sports like volleyball, tennis and baseball [4,6].

Factors such as anticoagulation therapy, abdominal surgery, old age, asthma, coughing, pregnancy, trauma and medication injection in the abdomen predispose to spontaneous rectus abdominis hematoma [7–9]. The pain after a rectus abdominis hematoma must be differentiated of other

conditions such as appendicitis, intestinal obstruction, hernia or perforation, ovarian cysts, ectopic pregnancy and many other abdominal diseases.

Medical imaging can diagnose the precise location and severity of muscle traumas and detect critical elements that will delay complete repair. Ultrasonography is a useful and inexpensive imaging technique for analyzing muscular trauma [10]. It provides a good imaging of muscle fibers, tendons and aponeurosis, but there is a limitation on visualization of deep structures. MRI is the imaging modality of choice for diagnosis of soft-tissue injuries in cases in which swelling or other soft-tissue abnormalities obscure examination or preclude the use of more routine diagnostic modalities, and is the most sensitive imaging technique for analyzing muscular trauma [10,11]. The MRI appearance of hematomas is variable and depends on the age of the hematoma [12]. It is a good method for estimating recovery following muscle strain injury.

Treatment of muscle strains consists of rest and ice application for the reduction of swelling. Temperature changes after the application of ice packs are depth-dependent. Temperatures do not fall as much after trauma; this is attributed to an increase in blood flow through tissues [13]. Passive stretching and massage should be avoided until the patient has restored painless range of motion [14]. For hematoma treatment, local administration of autologous conditioned serum is also used [15]. Older athletes require prolonged abstinence from playing [16]. The goal of treatment is to reduce recovery time and thus allow a rapid return to previous activities.

Initial treatment was performed according to the modified RICE protocol, but there was recurrence of the injury. We treated the hematoma with injection of Traumeel® following the modified RICE protocol. Traumeel® Injection Solution is officially classified as a homeopathic combination drug and is not approved by the FDA. It is a homeopathic anti-inflammatory, analgesic, anti-edematous, anti-exudative combination formulation of 12 botanical substances and 2 mineral substances including arnica, calendula, chamomile and others. It is indicated for repetitive or overuse sports injuries, as well as muscle injuries like contusions, ankle sprains, hemarthrosis, inflammation, wounds and neuralgia [17–21]. Traumeel® Injection Solution does not inhibit the arachidonic acid pathway of prostaglandin synthesis, but modulates the release of oxygen radicals from activated neutrophils and inhibits the release of inflammatory mediators and neuropeptides [19]. It can be used in the form of tablets, drops, injection solution or ointment [19].

A recent study reported that local administration of autologous conditioned serum shortens the time to recovery after strain injury of professional athletes much more than injection of Traumeel® in different strained muscles, but there was not a comparison for rectus abdominis hematoma [15]. The local administration of autologous conditioned serum was also used in animal experiments by the same authors and resulted in an increased proliferation rate of satellite cells [20].

The high risk of recurrence of soft tissue injuries in athletes is due to early return to training and sport activities before complete healing of injury. The athlete should not be allowed to return to sport activities until able to demonstrate

muscle flexibility and strength [2]. Infrequently, severe muscle tears require open repair, especially in young people or laborers [2]. After the repair of a ruptured muscle, dense connective tissue is the predominant tissue at this side [1].

## CONCLUSIONS

In our case Traumeel® injections and modification of service technique were effective and no recurrence of rectus abdominis muscle strain was reported at 2-year follow-up. The combination of Traumeel® injections and modification of service technique can be used for treatment of rectus abdominis overused injuries.

## REFERENCES:

- Garrett WE Jr: Muscle strains injuries. *Am Journal of Sports Med*, 1996; 24: S2–8
- Ellison A, Boland A, Snook G, Calehuff H: Athletic training and sports medicine. The hip and thigh. 1984; Chapter 20: 230–35
- Bencardino J, Rosenberg Z, Brown R et al: Traumatic musculotendinous injuries of the knee: diagnosis with MRI imaging. *Radiographics*, 2000; 20: 103–20
- Maquirriain J, Ghisi JP, Kokalj AM: Rectus abdominis muscle strains in tennis players. *Br J Sports Med*, 2007; 41: 842–48
- Jarvinen TA, Kaariainen M, Jarvinen M, Kalimo H: Muscle strain injuries. *Curr Opin Rheumatol*, 2000; 12: 155–61
- Cherry WB, Mueller PS: Rectus sheath hematoma: review of 126 cases at a single institution *Medicine (Baltimore)*, 2006; 85: 105–10
- Berná JD, Zuazu I, Madrigal M et al: Conservative treatment of large rectus sheath hematoma in patients undergoing anticoagulant therapy. *Abdom Imaging*, 2000; 25(3): 230–34
- Maharaj D, Ramdass M, Teelucksingh S et al: Rectus sheath haematoma: a new diagnosis features. *Postgrad Med J*, 2002; 78: 755–56
- Ruiz-Tovar J, Gamallo C: Spontaneous rectus sheath hematoma: a case report *Acta Chir Belg*, 2008; 108(3): 339–40
- Carrillon Y, Cohen M: Imaging findings of muscle traumas in sport medicine. *J Radiol*, 2007; 88: 129–42
- Connell D, Ali K, Javid M et al: Sonography and MRI of rectus abdominis muscle strain in elite tennis players *AJR Am J Roentgenol*, 2006; 187(6): 1457–61
- Trecek J, Sundaram M: Radiologic case study. Extensive hematoma of the vastus intermedius showing components of subacute and chronic hemorrhage with associated myositis of the vastus intermedius and medialis. *Orthopedics*, 2007; 30(10): 806, 880–81
- Walton M, Roestenburg M, Hallwright S, Sutherland JC: Effects of ice packs on tissue temperatures at various depths before and after quadriceps hematoma: studies using sheep. *J Orthop Sports Phys Ther*, 1986; 8(6): 294–300
- Chhabra A, Katolik L, Pavlovich R et al: Sport medicine In *Review of Orthopaedics*. (2004) Chapter 3, section 2, 4<sup>th</sup> edition, Edited by Saunders; 225–27
- Wright-Carpenter T, Klein P, Schaferhoff P et al: Treatment of muscle injuries by local administration of autologous conditioned serum: A pilot study of sportsmen with muscle strains. *Int J Sports Med*, 2004; 25: 588–93
- Orchard J: Management of muscle and tendon injuries in footballers. *Aust Fam Physician*, 2003; 32(7): 489–93
- Thiel W, Bohro B: Die therapie von frischen, traumatischen Blutergüssen der kniegelenke mit Traumeel. *N Injektionslosung Biologische Medizin*, 1991: 506–15 [in German]
- Bohmer D, Ambrus P: Treatment of sports injuries with Traumeel ointment: a controlled, double blind study with Traumeel ointment for Treatment of sport injuries. *Biol Ther*, 1992; 10: 290–300
- Stengele U, Traumeel S: *Biologische Medizin*, 2002; 3: 158–59
- Wright-Carpenter T, Opolon P et al: Treatment of muscle injuries by local administration of autologous conditioned serum: animal experiments using a muscle contusion model. *Int J Sports Med*, 2004; 25: 582–87
- Linklater J, Hamilton B, Carmichael J et al: Hamstring injuries: Anatomy, Imaging and Intervention. *Semin Musculoskelet Radiology*, 2010; 14(2): 131–61