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SPORTS INJURIES and ACUPUNCTURE

The evidence for effectiveness

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The Evidence Series of Briefing Papers aims to provide a review of the key papers in the literature which provide evidence of the effectiveness of acupuncture in the treatment of specific conditions. The sources of evidence will be clearly identified ranging from clinical trials, outcome studies and case studies. In particular this series of briefing papers will seek to present, discuss and critically evaluate the evidence.

SPORTS INJURIES AND ACUPUNCTURE: THE EVIDENCE FOR EFFECTIVENESS

Summary

This briefing paper summarises the evidence for the effectiveness of acupuncture in the treatment of sports injuries. With the exception of tennis elbow, which is to be covered in a separate paper, none of the different injuries are covered by more than one or two published studies. Some of these are controlled trials and others uncontrolled and the quality is very variable. Nevertheless, all of the available evidence supports the effectiveness of acupuncture for treating sports injuries.

Introduction

Interest in sports and fitness has never been higher, with increased participation in recreational and organised sports by all ages and both sexes. A growing number of injuries have accompanied this. Most of these are minor sprains, strains and bruises, and many are due to overuse rather than external force (Allman & Griffith: 1986). Conventional treatment for sports and musclo-skeletal injuries has been via the use of electrical medical machines, such as ultrasound or Interferential and Transcutaneous Electrical Nerve Stimulation (TENS), which is supplemented with manual therapies such as massage, manipulation, exercise and muscle stretch rehabilitation techniques (Peterson & Renstrom: 1986).

The use of acupuncture in the treatment of sports injuries (SI) is not new, but its clinical effectiveness and potential has never been fully established (Mitchell: 1986). Stacey (1999) carried out a study with the Premiership Football League to ascertain how many teams were already using acupuncture. He received 13 replies (65%) from the 20 premiership clubs, of which 7 (54%) were using some form of acupuncture. Stacey then recorded that 2 teams used western acupuncture, 2 used Chinese acupuncture and 3 used both methods. In 4 teams the club physiotherapists administer acupuncture, in 1 the club doctor, and in 2 an external acupuncturist. The numbers in this study are small, but the data are a clear indication that acupuncture is being used at the one of the highest sport levels in the UK.

Traditional Chinese Medicine diagnosis and treatment principles for SI are similar to those for other conditions, but it is particularly important to ascertain exactly how the injury occurred and trace the mechanical and physiological consequences. Peilin (2002) records the TCM theory of injury due to excessive exercise. Exercise may

deplete energy generally, including the qi, blood, yin and yang, leading to weakening of the defensive qi. This allows the body to become more vulnerable to external pathogenic factors, which in turn can lead to dysfunction of the zang-fu organs. In addition, overuse due to repetitive movements in certain sports – eg, tennis – may cause weakness to local area muscles, tendons and ligaments, causing qi and blood deficiency and/or stagnation.

Acupuncturists specialising in SI treatment often combine the therapy with other interventions, whether in China or the West. For an example of the latter see the article by Mitchell (1985), which is summarised in Appendix 1.

As well as treating injuries acupuncture is also used for performance enhancement in sport– an area of some controversy (for example, female Chinese athletes), but one underpinned by valuable research. This was not considered to be a mainstream activity amongst sports medicine therapists (in the West) so this aspect has been confined here to listing the relevant articles: see Appendix 2.

Literature search

A literature search was carried out using ARRCBASE, the Acupuncture Research Resource Centre's database of articles drawn mainly from AMED and MEDLINE, using the primary terms 'sport' or 'athlete' and secondarily 'injury', 'therapy' or 'medicine'. 44 references were identified. The following criteria were used for the exclusion of papers: no English translation was available; the paper was unobtainable from the British Library; the paper involved therapies other than acupuncture; the paper was not the original description of a clinical study on humans, or described only a single case; the focus was on performance enhancement rather than injury (see above); the type of injury was not generally accepted as sports related or was experimentally induced. Three further relevant articles were found in the references of van Klaveren's MSc thesis (van Klaveren, 2002), bringing the total to nine to be reviewed.

Tennis elbow (lateral epicondylitis) was excluded partly because so much of the material relates to general over-use/repetitive injuries rather than specifically to sports medicine and partly because, unlike any of the other injuries, there has been a substantial number of studies. Thus tennis elbow will be the subject for a Briefing Paper of its own. The distinction between sports and non-sports related injuries is not clear-cut. To varying degrees all of the conditions covered in this review could be sustained in the course of ordinary day to day activities but we chose to exclude studies with no overt sports context. Hence there may be other reports on plantar fasciitis, rotator cuff tendinitis etc than those presented here (see, for example, Meleger and Borg-Stein, 1999/2000).

Femoral adductors syndrome (FAS)

Background

Femoral adductors syndrome is an injury that tends to affect many athletes/sports (wo)men, particularly in football, rugby or whenever there is a sudden change of direction whilst running (Brukner & Khan 2002). Excessive strain is put through the adductors, a strong stabilising group of muscles on the medial aspect of upper leg. The muscles tend to get overstretched, resulting in spasm, contraction or muscle-fibre tears. Conventional treatment may be a period of rest from sport and exercise, ultrasound to encourage blood flow and breakdown inflammation to the affected area, followed by exercise and muscle-stretch rehabilitation. The use of massage can be very beneficial to encourage the muscle fibres to become more pliable. (Peterson & Renstrom, 1986)

Yang (1998) carried out a study on the treatment of FAS caused by sports injury. Of the 40 subjects 32 were randomly selected to receive electroacupuncture and moxibustion while 8 comprised the control. The main group of points was Sp-9, Ren-2, Liv-11 and Ah-Shi points with electro-acupuncture for 15 minutes, plus one or two of the "auxiliary points", Bl-32, Bl-36, GB-31 and Liv-10. This was followed by moxa cones on the main points for a further 15 minutes. The control group was given the anti-inflammatory drugs Fenbid or Chlorzoxazone. In addition, local "irradiation with frequency spectrum" for 10 minutes was performed once every other day. Both groups received 10 treatments. The principle of treatment was to relax the muscles and tendons, activating the flow of qi and blood in the channels and collaterals, promoting blood circulation to remove blood stasis and warming the channels to stop pain (Yang, 1998).

The group receiving acupuncture performed better than the group receiving drugs and irradiation. Of the treatment group (n=32), 20 cases (62.5%) were considered cured, and 8 cases (25%) were considered effective, a total effective rate of 87.5%. In the control group (8), 2 cases (25%) were cured and 4 cases (50%) were effective, giving a total effective rate of 75%. The promising findings are rather undermined by the imbalance in numbers in the two groups being compared.

The paper also recorded a case history and discussed the Chinese medicine principles for treating this particular injury.

Ankle sprains

Background

When treating ankle sprains from sports it is very important to ascertain where the injury has originated. Sprains tend to be some form of aggravation to the main ligaments, lateral or medial and have a history of overuse (Bruckner & Khan 2002). Within sports medicine therapy acute ankle sprains would be treated by applying ice to the area to slow down the metabolism and restrict the blood flow, hence reducing the inflammation and swelling. Tape/strapping is used to restrict the movement of the

joint to avoid further damage to the area. Ultrasound and exercises would be prescribed to help repair damaged tissues and encourage blood flow to the area after an initial 48-hour period (or when any internal bleeding has finished). The exercises would incorporate strengthening as well as flexibility to enable the athlete to resume training/exercise (Peterson & Renstrom, 1986).

(a) Mou Zhixion (1987) described 31 cases with acute ankle sprain. The method was to needle the single point SJ-4, with deqi, and retain the needle for 30 minutes. In addition, the patient was to administer self-massage to the area of injury to improve circulation, resolve blood stasis and alleviate pain.
The results showed a 100% success rate from as few as two, up to 6-12, treatments. However, there is no description of what outcomes measurements defined this success rate.

Mou also discussed the case history of a 10-year-old boy who had jumped from 3-metre height and sprained his ankle. Ten sessions of conventional physiotherapy had given little relief. Five acupuncture treatments of SJ-4 with massage and self-massage cured the patient, with no subsequent discomfort.

Treatments that use more than one modality may well offer the most effective approach for the patient, but leave it open to question whether either approach alone would have had the same results. This was the only one of the studies reviewed to use the traditional principle of needling corresponding upper body points (wrist) to treat lower body (ankle) injuries.

(b) Huan et al (1999) carried out a study on the treatment of ankle sprains with floating acupuncture, a new treatment approach developed by co-author Fu Zhong-hua, in use since 1995.

The group was taken from an outpatients department of new students in the field of military training. Of 77 cases diagnosed with ankle sprains, 58 were acute and 19 chronic, with an average age of 30. The injuries had been sustained predominantly by inversion (some by eversion) of the joint. Diagnosis was made from histories, signs and syndromes of patients. X-rays were used to eliminate fractures, dislocations and ruptures of ligaments.

This study is of particular interest for the novel technique. The method is firstly to find the most tender/painful local point, then to needle horizontally 40 mm towards it from an insertion site 50-80 mm away. If a larger area of pain is present then 2 or 3 needles can be used simultaneously. The needle(s) lies subcutaneously but should be removed and reinserted if there are sensations of pain, numbness or distension. A piece of plaster holds the needle(s) in place for one day. It is then removed and a new needle inserted for the second treatment.

Results showed that of the 58 acute cases, 21 patients recovered after one treatment, 22 after two treatments, 10 after three and the last 5 after four treatments. In the chronic group of 19, five were considered cured after their first treatment; the remainder after 7 treatments. These results show that chronic injuries took longer to treat. Again there is apparently a 100% success rate.

The floating acupuncture technique derives from the Ankle and Wrist Joint system but differs from it, and from standard (Traditional Chinese Medicine) acupuncture in several important respects. Its mode of action is unknown.

Practitioners in the West may have some concerns about the technique. There is the possibility that general movement of the ankle joint with needles left fixed could cause further tissue damage or micro-tears, although a counter-argument might be that this continuous manipulation may activate the body's inflammatory response, with positive results for the injured area. Additionally there is the possibility of infection with an open wound.

Soft-tissue adhesions

Background

Adhesions tend to be a result of tearing of muscle or inflammation to an area of injury and (or) scar tissue and are often the by-product of muscle tears and strains in sports injuries. Sports medicine therapy uses ultrasound and deep friction massage to break down the adhesions/scar tissue. Once this change has begun intensive muscle stretch is applied to the area to allow the muscles to return to original length and texture and the scar tissue to become more pliable. Rehabilitation and strengthening exercises are used to build up the muscle and make the scar tissue area stronger, to stop further injury.

Xiao (1992) conducted research into the treatment of soft-tissue adhesions due to athletic damage. The paper reviews the classical needling techniques and different types of needles used in treating such conditions. Much of the paper consists of an in-depth study of these techniques.

Xiao's techniques were based on very strong manipulation of the needles. His method consisted of "multiple up-and-down" and "cross-shaking" needling at Ahshi or tender points to the bony surface, where scars or calcified nodules had been formed from musclo-tendinous tissue. He used various lengths of needle (40mm to 120mm) and depths of penetration. He had designed and made gold needles for the treatments.

The report summarised 150 cases, using the treatment outlined above, of which 117 (78%) cases were deemed to be cured, 25 (16.7%) basically cured, and 8 (5.3%) improved. These categories are not defined but it is implied that a cure means that full athletic training was resumed soon after treatment. All but 5 of the 150 patients required only one to three treatments.

The paper then discusses various case histories and detailed diagrams of needle insertions.

Plantar fasciitis pain (PFP)

Background

This is an overuse injury to the plantar fascia attachments of the arch of the foot (Bruckner & Khan 2002). It is common in athletes where running, bounding or jumping are frequent activities, and signs and symptoms are very painful heels, radiating pain over the instep of the foot, and a sensation of heat and soreness with shooting pains into the arch of the foot. Planter fasciitis pain (PFP) tends to prevent athletes from walking, running or jumping because of the severe pain that ensues. Treatment would include conventional electrotherapy and the use of orthotics to control the movement of the arch and to help reduce inflammation in the fascia and surrounding soft tissue. These would only be used as rehabilitation tools and the need to strengthen the area is imperative in preventing the recurrence of the injury. Another priority is to address any problems in relation to gait, for which orthotics may be required. (Peterson & Renstrom, 1986)

Vrchota *et al* (1991) carried out a controlled double blind trial of true acupuncture v sham acupuncture and conventional sports medicine therapy in the treatment of PFP. Ninety respondents to a newspaper advert were screened, of whom 43, with a confirmed diagnosis of PFP, were recruited.

The patients were randomly assigned to one of three treatment approaches and given four treatments on a weekly basis. Group 1 received electro-acupuncture to points Kid-1, Kid-3 and a local tender point and were instructed to exercise as much as they could tolerate. Group 2 received sham acupuncture: very superficial needling close to the base of the 1^{st}/ 2^{nd} and 4^{th}/5^{th} toes with electrical stimulation of minimal intensity. This group also was told to exercise as tolerated. Group 3 had standard sports medicine therapy, were told to decrease training frequencies and given muscle-stretch exercises. They were instructed to apply ice after exercise and take salsalate (Disalcid). All groups were given stretching exercises and their training shoes inspected and alterations recommended if necessary.

Patients kept a daily pain log while doctors recorded weekly scores for pain and for tenderness on palpation. Patients receiving true acupuncture recorded a substantial reduction in pain through the four weeks of treatment and three weeks follow-up. The sham group also responded positively but made little more than half as much progress and the sports medicine group barely a quarter as much. The doctors' pain ratings showed the same ranking but the differences were not as large. Tenderness scores were not significantly different. Overall, Vrchota et al considered that true acupuncture had been shown to be significantly more effective than both sports medicine therapy and sham acupuncture in the relief of PFP, allowing a more rapid return to sports activity (when combined with conventional approaches, such as stretching, prescribing proper shoe wear and correcting leg length differences).

Patella tendon terminal disease (PTTD)

Background

PTTD is a degenerative disorder in the region where the tendons and ligaments are attached to the bone (Wang et el 1986). This is not an injury often seen in sports clinics. It does, however, share characteristics with others which are, such as Osgood-Schlatters disease (commonly referred to as growing pains), in which the bones undergo growth spurts and the muscle cannot keep up with rate of growth, resulting in inflammation of the tibial attachment of the patellar tendon. In more serious cases, the muscle tears away from bone and can cause bone deformation from the pressure. This type of injury is very common in the adolescent age group (normally boys between 10 to 14). Rest is the standard prescription, with stretching exercises to try to strengthen/build-up the slower-growing muscles (Peterson & Renstrom 1986). PTTD in athletes is a degenerative disorder to tendons and ligaments on insertion to the bone.

Wang *et al* (1985) suggested that most cases of PTTD in athletes are due to improper training methods in which excessive running and jumping exertion pulls on the patella tendons, exceeding the tissue structure tolerance and causing graded damage. Treatment for such injuries includes physiotherapy, massage and medical injections, but the results have not been satisfactory.

The study group of 156 athletes (61 males/95 females) had an average age of 24.6 years and were drawn from a variety of sports (since no distinctions were made between the sports, this leaves potential for further single-sports studies of the treatment). They were randomly divided into three groups. Group 1 (n=85) received regular acupuncture with moxa rolls on the needle; group 2 (n=38) received microwaves from an antenna attached to the needles and group 3 (n=33) laser stimulation of acupuncture points. Points treated were the tender spot of the affected knee along with Xiyan (extra point) and St-32. Deqi sensation was obtained in each case. Details of the stimulation parameters are given in the paper. All the patients were treated 2-3 times a week. The maximum number of treatments received by one patient was 13 and the minimum was twice, averaging 6.2 times.

The results recorded were positive, with signs and symptoms having completely disappeared in 86 of the total 156 patients (55.1%), “markedly improved” in 26 cases (16.7%) and “improved” in 32 cases (21.1%). The grading of the response was based on the degree of improvement in the symptoms (primarily pain), the signs (palpatory tenderness and granular feel; knee joint movement tests) and the extent of resumption of athletic training. Only 11 cases (7.1%) failed to respond to treatment and showed no change in clinical signs and symptoms. Group 1 (acupuncture and moxibustion) showed the best response rate, 80% cured or markedly improved, while Group 2 (microwave acupuncture) and Group 3 (laser) achieved 58% and 67% respectively. All but 2% of the acupuncture/moxibustion patients showed some improvement. Better results were achieved in patients with shorter disease duration and those who had at least six treatments.

The authors consider PTTD to be fixed bi syndrome, the result of cold invasion, hence the use of moxa to warm the channels and tendons.

Rotator cuff (shoulder) tendinitis

Background

The rotator cuff is the structure surrounding the shoulder joint capsule consisting of intermingled muscle and tendon fibres that provides strength and stability to the joint. The fibres most involved are those of the supraspinatus, infraspinatus, teres minor and subscapularis (Peterson & Restrom 1986). The inflammation can affect any of these tendons and is normally caused by overuse or impact injury in contact sports. Treatment would normally involve some combination of rest, ice, compression and elevation (R.I.C.E.), with some mobility to be retained and rehabilitation encouraged after the inflammation has subsided (Brukner & Khan 2002).

Kleinhenz et al (1999), from the University of Heidelberg, chose this particular condition as a vehicle for the first trial of a retractable 'placebo' needle, which has since featured in a number of other, randomised controlled trials. Fifty-two athletes (mostly in sports involving direct shoulder stress) with rotator cuff tendinitis were randomly assigned to the acupuncture group (n=25) or the control group (n=27). The same points were used in each group but the needling differed: either a standard needle inserted through the skin into deeper tissues or the sham needle, with the point touching but not penetrating the skin. Needles were retained for 20 minutes with no stimulation. Up to 12 points were chosen from a list of 20 effective ones described in the literature. They comprised 11 local (Ah-shi), 5 distal, 1 symptomatic (St-38) and 3 based on eight principles diagnosis. A different combination was selected after four treatments if the original one proved to be ineffective. Altogether there were eight treatments in four weeks.

The main outcome measure was the change in an assessment measure used by orthopaedists for shoulder function. The acupuncture group improved from 60.4 points up to 79.6 over the four-week trial, an increase of 19.2. The control changed by only 8.4 points (the difference is significant). There was a four-month follow-up but this is hard to interpret since some members of both groups had had other treatments in the meantime.

Compared with most other studies reviewed here this was methodologically a carefully constructed and sophisticated one, though the lack of credible long-term follow-up data is a drawback. It demonstrated that sharp needles inserted through the skin worked better than blunt needles left resting on the surface, for rotator cuff tendinitis - a proposition that most acupuncturists would consider self-evident. It is hard to compare the results with those of the Chinese studies because the outcomes were measured in such a different way.

Patellofemoral pain syndrome (PFPS)

Background

PFPS is a term to describe pain in and around the patella and has many names including chondromalacia, patellofemoral joint syndrome, anterior knee pain and extensor mechanism disorder (Brukner & Khan 2002). These are all characterised by pain in front of the knee and under the kneecap, especially with activities such as stair climbing, running, and deep squatting and standing for prolonged periods. It tends to affect the alignment of the patella in relation to the femur and its tracking movement over the knee joint, with dysfunction to the muscles and ligaments. Treatment normally consists of manual therapies to realign the patella in its tracking, reduction of inflammation and pain, strengthening of muscles, stretching and massage (Bruckner & Khan 2002).

Jensen et al (1999). Seventy-five patients were randomly assigned to receive either acupuncture or no treatment. The acupuncture was semi-individualised: St-34 and Sp-10 for all, plus another two local points, plus a possible selection from Bl-17, 18, 20, 23, LI-4 and St-36. Deqi was obtained. There were eight treatments over four weeks.

The primary outcome measure was the self-administered Cincinnati Rating System (CRS) which evaluates function (walking, climbing, running, jumping) together with symptoms of pain, swelling and giving-way. Various other physical assessments were made by a blinded independent examiner.

CRS scores were better at five months in both groups. The acupuncture group, but not the control, continued to improve over the next seven months. Over the 12-month course of the trial and follow-up the acupuncture group went from 58.0 to 75.2, the control from 56.1 to 61.7 points on the overall CRS assessment – a significant superiority (p=0.005).

The results were further analysed for their clinical, rather than just statistical, significance. Thus the numbers free of pain during strenuous sport at the start were 2/36 and 1/34 in the acupuncture and control groups respectively. At 12 months the corresponding figures were 14/32 and 3/29 (a few in each group dropped out, for various reasons), an enormous difference. For functional ability the answers were similar though not so pronounced.

The authors, from physical therapy and general practice in Norway, concluded that acupuncture showed a clear and long-lasting effect in reducing pain and improving function. It is interesting to try to compare this study with that of Wang et al (1985) on Patellar Tendon Terminal Disease. In the latter, 55% of the acupuncture group were ‘cured’ (symptoms gone) compared with 49% here (average for pain and function). The numbers and frequencies of treatment were similar; the Chinese study used fewer points but added moxa.

Tibial Stress Syndrome (Shin Splints)

Background

Shin Splints is an inflammatory shin pain that that affects many people in running sports and which can be can caused by over-use, e.g. pre-season training, change of footwear, change of training surfaces, excessive road running and bounding (jumping) type exercises. Small tears develop at the muscle insertions onto the tibia or fibula, leading to inflammation of the periosteum. It is characterised by pain and tenderness over the medial margin of the lower half of the tibia on training and pressure. Treatment may consist of change of training techniques, surfaces and footwear, followed by rest, ice and use of electrotherapy or ultrasound with rehabilitative exercises.

Callison (2002). 40 athletes (18-45 years) diagnosed with Shin Splints were divided between three different treatment groups. The Sports medicine group (n=17) received standard treatments such as ice, ultrasound and exercises. For the Acupuncture group (n=12) the area along the edge of the tibia where muscle tearing was taking place. 10-15 needles were threaded subcutaneously between the soft tissue and bone. Other locations were chosen on the basis of: a) sites where motor nerves entered the local area muscles, b) ahshi points, c) leg channel clearing/balancing points (at the practitioners' discretion). The Combined group (n=11) used elements of both the above approaches. Each participant received a minimum of 2 treatments per week for the 3 week study period. Purpose-built questionnaires based on Likert pain scales were used pre-trial and at the start of weeks 2 and 3.

The acupuncture and combined groups recorded significantly lower pain levels after treatment than the sports medicine group – both during sports and non-sporting activities, and at rest afterwards. For example, for the overall effectiveness of the treatment on pain, 72.5% of the acupuncture group reported an improvement as against 54.5% of the combined group and 46.5% of the sports group. Self-medication with anti-inflammatories was also significantly lower in the acupuncture and combined groups.

The results are encouraging but very much at a preliminary level, from a trial with:

- small numbers of participants
- unknown group allocation method – unlikely to be randomised
- non-validated outcome measures
- assessors undefined, but probably not blinded nor independent
- no follow-up subsequent to the measurement in the third week

Discussion

We have concentrated on conditions that have specifically been brought about by playing sports and which would be characteristic of those seen at specialist sports medicine clinics. There are many other conditions commonly seen in such clinics but not covered here, because we found no published acupuncture trials. Also, we have excluded the performance enhancement work (Appendix 2). Hence we were left with nine papers, covering eight different conditions, and the review became more of a qualitative than a quantitative exercise.

Taken at face value these nine trials demonstrate that acupuncture is an effective treatment for a variety of sports injuries. Five of the nine are Chinese, where negative results are unlikely to be published in English language journals. Also, the brevity of the Chinese articles, particularly regarding the research methods employed, left many details unclear. Sometimes there was no description of what was actually measured, just the percentage considered cured/effective/successful/improved. Where comparisons were made (Yang, 1998; Wang et al. 1985) there was inadequate information about how the patients were allocated to the different groups. However, the four Western controlled studies, three of which, with methodology and reporting that are more acceptable to a Western audience, have also produced very positive results. Where like can be compared with like the outcomes may actually be similar in the Chinese and Western studies (e.g. Wang et al, 1985 v. Jensen et al, 1999). It is unlikely that Western trials will ever demonstrate the 100% success rates reported by Mou (1987), Huan et al (1999) or Xiao (1992) but the conditions treated in those cases, and the strength of the interventions used, probably contributed greatly.

So, these studies present us with particular approaches to treating different sports injuries plus some evidence that these can be spectacularly successful in certain circumstances. They are not assessments of acupuncture in general: different practitioners may favour other approaches. Although some of the papers discuss the rationale for their treatment approach, with mention of bi syndrome, clearing pathogenic factors and nourishing qi and blood, the main focus appears to be on local and Ahshi points, and particularly on the methods used to stimulate them and the surrounding areas – massage, moxa on the needles, electro-acupuncture, vigorous needling into scars and nodules, and the floating needle technique. In the West, specialist sports injury clinics that use acupuncture tend to do so in conjunction with the various other modalities at their disposal (as described in Mitchell's paper – Appendix 1) – and hence may not require such forceful acupuncture techniques. Also, studies run by university and medical researchers, i.e. most Western ones, tend to opt for a 'safe', consensus choice of points and needling methods. Many Chinese ones are not focused on general effectiveness but on specialised techniques developed by the individual researchers themselves.

The studies reviewed here should be seen as an invitation both to make use of some of the techniques and to assess clinical results with acupuncture throughout sports medicine.

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Table 1. Summary of sports injury papers reviewed
A) Chinese studies

Study	Condition	Methods and interventions	No. of patients	No. of treatments	Specific points used	Results/Conclusion
Yang (1998)	Femoral Adductors Syndrome	Non-randomised control: electro-acup + moxa v. drugs + irradiation	40 (32:8)	10	BL32, Bl36, GB31, AhShi Liv10,Liv11, Sp9, Ren2,	Acupuncture (62% cured, 87% effective) significantly better than control (25%, 75%)
Mou (1987)	Acute ankle sprain	Uncontrolled: acup. + self-massage	31	2-12	SJ4	100% cured by course of treatment (81% cured after 1 treatment)
Huan et al (1999)	Ankle sprain	Uncontrolled: acup with retained needle	77	Up to 7	AhShi points on ankle	100% cured by course of treatment (36% after 1 treatment, 74% after 2)
Xiao (1992)	Soft tissue adhesions	Uncontrolled: acup with strong action	150	Unknown	AhShi points on ankle	100% success rate: 94.7% cured and 5.3% significant improvement
Wang et al (1985)	Patella tendon disease	3 groups compared (randomisation unknown): acup + moxa v. laser v. microwave acupuncture	156 (85:38:33)	Unknown (2-3 per week)	St32, Xiyan, AhShi points	Overall: 55% cured, 93% effective. Cured+markedly effective: Acup/moxa: 80% Laser: 67% Microwave acup: 58%

Table 1. Summary of sports injury papers reviewed
B) Western studies

Study	Condition	Methods and interventions	No. of patients	No. of treatments	Specific points used	Results/Conclusion
Vrchota et al (1991)	Plantar fasciitis	Double-blind RCT: electroacupuncture v. sham acup (shallow) v. sports therapy	43 (randomly assigned)	4 (4 weeks; + 3 weeks follow-up)	Kid1, Kid3, Local AhShi v. 2 sham points near toe bases	Acupuncture gave significantly greater pain relief than sports medicine therapy or sham acupuncture.
Kleinhenz et al (1999)	Rotator cuff tendinitis	Acupuncture v. sham acup (retractable needle)	52 (25:27)	8 (4 weeks; + 4 months follow-up)	Up to 12 from 20 listed: local, distal, empirical, 8-principle	Constant-Murley measure for shoulder function, at 4 weeks: acup group +19.2 points sham +8.4 [follow-up: data inadequate]
Jensen et al (1999)	Patellofemoral pain syndrome	Acupuncture v. no treatment	70 (36:34)	8 (4 weeks; + 48 weeks follow-up)	St34, Sp10 + 2 more local + selection of back-shu, LI4, St36	Cincinnati Rating System (1 yr): acup +17.2 pts, control +5.6. Nos. free of pain (1 year): acup 14 out of 32, control 3/29
Callison (2002)	Tibial stress syndrome	Acupuncture v. sports medicine v. acup + sports med	40 (12:17:11)	6 (minimum, in 3 weeks; no follow-up)	Along tibial border; muscle innervation points; ahshi points; leg channel points (various)	Acup and acup/sports groups recorded signif. more pain relief & effectiveness after the course; sports alone group did not

Appendix 1

Mitchell (1985). Acupuncture and sports medicine

Ian Mitchell is a physiotherapist with first-line experience of acupuncture treatment of sports injuries. He appears to employ a pragmatic, biophysical approach to acupuncture in conjunction with conventional Western treatments. He uses auricular acupuncture with all sports injuries for analgesia and as a counter to inflammation in the area affected. This allows him to start muscle and joint activity much earlier and more vigorously, leading to faster recovery and avoiding muscle atrophy. (The reviewer has instated this practice within his own sports injury practice and has found similarly encouraging results.) Mitchell tests auricular points, such as knee or lumbar spine, with an electrical voltage meter: a high reading indicates that the corresponding area on the patient's body tends to be inflamed. Low-voltage auricular readings are more indicative of chronic injuries.

He uses ear acupuncture for both acute and chronic injuries, mixing it with both conventional sports medicine therapy (e.g. ice and strapping for acute situations) and local meridian acupuncture as appropriate. He is a strong advocate for electroacupuncture.

The paper concludes with some case histories and discussion of the specific treatment prescriptions and principles.

Appendix 2

Acupuncture for sports performance enhancement: References

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