Manual or exercise therapy for long-standing adductor-related groin pain: Mid-term follow-up of a randomised controlled clinical trial

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Objectives: To assess the effect of exercise therapy (ET) versus multi-modal treatment programme (MMT) for adductor-related groin pain at mid-term follow-up.

Materials & Methods: Athletes (n=48) with adductor-related groin pain who were previously compared in a single blind prospective randomised controlled trial were recalled for mid-term follow-up (29 months, SD 10). A home based ET was compared to MMT, including heat and manual therapy. The main outcome measure of objective treatment success was scored in 4 categories: excellent, good, fair or poor. The secondary outcome was the recurrence rate.

Results: From the original study 39 /48 athletes (81%; 22 MMT, 17 ET) were followed-up. There was no difference in the number who were able to participate in their sport symptom free (Total 23/39 (59%); MMT 68%, ET 47%, p=0.184). Of the 20 athletes who were symptom free at short-term follow-up six (30%) had a recurrence (2 MMT 22%; 4 ET 36%, p=0.47).

Conclusions: Neither treatment had a superior outcome and there was no significant difference in recurrence rate at mid-term follow-up.
INTRODUCTION

Adductor-related groin pain (ARGP) is common in athletes. It occurs in sports involving repeated sprinting or kicking such as football and Australian rules football. In football groin injuries account for about 10% of all injuries. ARGP has been reported to account for 69% of groin injuries in footballers. Most of these injuries will recover quickly and in one study only 3 of 22 groin injured athletes still had complaints after three weeks. When groin pain does go on to be long-standing, it can be hard to treat.

A recent systematic review identified only one prospective study that had recorded recurrence frequency up to two years after treatment. In this study of athletes with pubic bone stress injury 100% of the athletes had returned to play after two years. After the first year 41% were symptom free and 67% after two years. A recent 8-12 years follow-up (FU) of Hölmich’s landmark study showed continued long-term (LT) effectiveness after exercise therapy (ET).

In our prior randomised controlled trial (RCT) the effect of ET versus multi-modal treatment programme (MMT) for ARGP in athletes was compared in a single blind prospective study. The FU of that trial was four months and showed that the MMT group had a quicker return to sports.

In this study the group of athletes that had participated in the RCT were re-evaluated. The aims were to measure effectiveness of treatment and the recurrence frequency at mid-term follow-up (MTFU). The third aim was to identify prognostic factors.

MATERIALS & METHODS

Design

The original study was a single blinded RCT. The regional medical ethics committee approved the study and all athletes gave their written informed consent. After inclusion the athletes were randomised by an independent third party using sealed envelopes.

Participants

Forty eight athletes who had previously completed a RCT for ARGP, were sent a structured questionnaire in which they were asked about the course of their injury and invited for a physical examination. Long-standing ARGP (LSARGP) was diagnosed when there was pain at the proximal insertion of the adductor muscles on palpation and pain on resisted adduction testing. The pain was defined as being long-standing if it had persisted for more than eight weeks.

Interventions

Exercise therapy

Athletes were seen on three occasions by sports physical therapists in the hospital. No treatment other than the ET was given. The ET is described in detail in the original study and the exercises are the same as in the study of Hölmich et al. Athletes performed different exercises focusing on the hip, back and abdominal muscles for around 75 minutes, three times a week. At six weeks the return to running programme was started. Athletes were instructed to stop exercising if they felt groin pain. The exercises were continued for a minimum of eight weeks and were stopped when there was no pain during or after exercises or running.

Multi-modal treatment programme

The MMT programme comprised heat, followed by Van den Akker manual maneuver, after which...
daily stretches were performed for two weeks and then the return to running programme was started. The manual therapy treatment, where the maximal tolerable stretch is applied to the adductor muscle group 3 to 5 times in a single treatment session, was performed by one of three sports medicine physicians. After the manual therapy the athletes performed 14 days of stretching and then if no pain or discomfort was felt then the same return to running programme as in ET group was started. If athletes did not improve after one treatment with MMT then the treatment was repeated once more. The programme has been described in detail elsewhere 10,12.

Questionnaire and appointment
After returning the questionnaire, athletes were contacted by phone to make an appointment and attend for a physical examination. The current intensity of sports participation, current adductor-related complaints during or after sport, recurrence of original groin injury, new groin injury, location, new treatment after completion of study, presence of pain on resisted adduction testing (Inter-oberserver agreement K=0.92 11) were recorded by an independent examiner who was trained in the techniques by a sports physician experienced in groin injuries. The examiner was blinded to the treatment the athlete had received in the trial.

Outcome measures
The primary outcome measure was the objective treatment success. This measure was also used in the original study and that of Hölmich et al. 9 and examines three measures: no pain during resisted adduction (if not present for examination this was asked about during phone interview); no groin pain during or after sporting activities performed at the same level as prior to the injury; return to the same sport at the same level without groin pain. If all three measures were achieved the objective outcome was considered excellent, if two measures were achieved the outcome was good, if one measure was achieved the outcome was fair and if none were achieved the outcome was poor. The physical examination that was used to assess for the presence of adductor pain has been shown to be reliable 11.

The secondary outcome measures were the visual analogue pain scores (VAS) for maximum pain during sports were recorded on a scale from 0 (no pain) -100 (maximal pain), the Tegner activity score and recurrence of groin injury.

Statistical analysis
All data analysis was performed using SPSS 17.0 (SPSS inc, Chicago, USA). The data in the two groups was parametric and results are thus presented as means and standard deviations. The chi-squared test was used to detect a difference in outcome between the MMT and ET group for categorical data. The Fisher’s exact test was used to analyse data concerning recurrence of injury, because of the small group. For numeric data the independent t-test was used.

RESULTS
Flow of athletes in the study
All 48 athletes who completed the RCT were sent a letter and questionnaire for the MTFU study. Thirty-nine athletes returned a completed questionnaire. After two weeks all athletes, including the ones who had not responded, were contacted by phone for an appointment. Nine athletes could not be tracked down for FU, despite repeated attempts and contacting their general practitioners for new address information. Seven athletes did not consent to a MTFU physical
examination due to time constraints. In total there were 39 completed questionnaires and 32 data sets for questionnaires plus physical examination for the analysis. Of the total group of 39 athletes, 22 had received MMT and 17 had received exercise ET. Of the 32 athletes who had a physical examination, 19 had received MMT and 13 had received ET. The flow of athletes in the study is shown in Figure 1.

FIGURE 1. The flow of athletes in the study. The outcome is dichotomised (excellent and good = good, moderate and poor = poor).
Athlete characteristics

The average age of the 39 athletes was 27.5 (SD 7.6). The group was composed of 38 men and 1 woman. Their sports were 24 football, 3 cyclists, 2 tennis, 2 running, 2 squash, 1 hockey, 1 basketball and 1 handball. Three athletes had ceased all sporting activities. The mean Tegner score at MTFU was 7.0 (SD 2.0). Six athletes performed sports 5 or more times weekly, 19 athletes 3 to 4 times weekly and 11 athletes 1 to 2 times a week. There were no significant differences between the two groups at baseline. The mean FU duration was 28.8 months (SD 10.3).

Primary outcome

At STFU 13 out of 26 (50%) of the athletes in the MMT group and 12 out of 22 (55%) of the ET group had a good or excellent objective outcome and had fully returned to sports. At MTFU 23 of the 39 athletes (59%) were able to do their sport symptom free. In the MMT group the percentage of patients who were able to perform sports symptom free had increased to 68% and in the ET group 47% were still able to perform sports symptom free. The difference between the two groups was not significant (p 0.184). (See Table 1).

Secondary outcome

Recurrence

In the MMT group the mean VAS score for pain during sports had decreased from 32 (SD 28) at ST to 25 (SD 30) at MTFU. In the ET group the mean VAS score at both ST and MT was 19 (SD 23). There was no significant difference in VAS score between MMT and ET (p=0.31). Nine patients in the MMT group and 11 in the ET group were completely symptom free at STFU. In total 6 (30%) of these 20 athletes had a recurrence. There were two recurrences (22%) in the MMT group and four (36%) in the ET group. This difference was not significant (p=0.47).

At STFU 22 of the 39 athletes included had a poor or fair outcome. At MTFU 5 of these athletes had recovered and were able to return to their sport. In four of these athletes a long period of rest was beneficial to recovery from their injury. In one athlete the use of compression shorts that he wore during sports had had an immediate subjective positive effect.

Fourteen athletes who had a poor outcome at STFU still had not recovered and two athletes who had a good outcome at STFU now had a poor outcome.

Twelve athletes had switched to less intensive sport and three athletes had ceased all sporting activities because of their ARGP. There were no complications reported.

<table>
<thead>
<tr>
<th>Objective outcome</th>
<th>Short-term</th>
<th>Mid-term</th>
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<tbody>
<tr>
<td></td>
<td>MMT</td>
<td>ET</td>
</tr>
<tr>
<td>Poor</td>
<td>11 (42%)</td>
<td>6 (27%)</td>
</tr>
<tr>
<td>Fair</td>
<td>1 (4%)</td>
<td>4 (18%)</td>
</tr>
<tr>
<td>Good</td>
<td>7 (27%)</td>
<td>7 (32%)</td>
</tr>
<tr>
<td>Excellent</td>
<td>7 (27%)</td>
<td>5 (23%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>n=26</strong></td>
<td><strong>n=22</strong></td>
</tr>
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</table>
Predictors of outcome

No significant relationship could be found between manner of onset of injury (acute/gradual) and final outcome of treatment (p=0.48). Nor between VAS score at baseline and final outcome (p=0.45). No significant relationship between manner of onset and recurrence frequency was found (p=0.77). No significant relationship was found between unilateral or bilateral groin injury at baseline and treatment outcome (p=0.81). Eight out of 26 athletes (31%) who had had a groin injury for less than 1 year at baseline still had a groin injury at MTFU. Of the 13 athletes who had had a groin injury for more than 1 year at baseline, 8 (62%) still had a groin injury at MTFU. This difference was not significant (p=0.066).

DISCUSSION

This is the first prospective RCT describing the effectiveness of treatment and recurrence frequencies at MTFU (29 months). No significant differences for the primary and secondary outcomes were detected between the ET and MMT groups. There was a relatively high percentage of recurrences in both groups; respectively 36% ET and 22% in the MMT.

The outcome results of ET are less positive than those previously published by Hölmich et al.6,9. That study used the same objective outcome measures and was of similar design. At four months FU 79% of the athletes in that study who completed the ET returned to full sporting activities without groin pain. In the present study this was only 55% at ST and this percentage has decreased to 47% at MTFU. In the MMT group this percentage increased from 50% at ST to 65% at MTFU. This difference was not significant.

The difference in ET outcome results between Hölmich et al.6 and this study may be due to the effect of supervision. In the study by Hölmich et al. the ET was supervised by a physical therapist while in this study the athletes were only instructed by a physical therapist on three occasions. The athletes were not supervised while performing the ET. A recent study comparing the effects of a home exercise programme and a supervised ET for the management of lateral elbow tendinopathy showed a significantly better outcome of treatment in the supervised group13.

The results of the MMT programme were not as promising as those published in a previous retrospective case series examining the effectiveness of this treatment 12. This may well to be due to the differences in study design (prospective RCT vs. case series) as the treating physicians and the work setting, are the same in both studies. This is an important point in the field of groin injuries and in sports medicine in general. In the field of groin injury there have only been two RCTs to date. All other treatments reported, and often with very high success rates, are case series. Readers of these case series need to be acutely aware of this fact when interpreting the literature to guide their clinical practice.

In total 6 out of 20 athletes (30%) who had a good outcome at STFU had a recurrence. Two out of 9 (22%) in the MMT group and 4 out of 11 patients (36%) in the ET group. A large prospective epidemiological study in Australian football, following 600 players for 4 seasons, reported a recurrence rate of groin injuries of 21% 1. The results are comparable to the results in the present study.

This relatively small sample size may contribute to the fact that none of the differences in outcome between the MMT and ET group were significant. This FU study was subject to the willingness of the patients to participate. Thirty nine out of 48 athletes (81%) responded, which may have led to response bias. If the 9 missing athletes, 4 in the MMT group and 5 in the ET group, are added in a best case, worst case scenario analysis, then MMT has a possible outcome of treatment range of 58% - 73% and ET a possible outcome of treatment range of 36% - 59%. If all missing athletes in the MMT group would have had a good outcome and all missing athletes
in the ET group a poor outcome (73% vs 36%), then there would be a statistically significant difference in outcome between the groups (p=0.01). If all the missing athletes in the MMT group would have had a poor outcome and all missing athletes in the ET group a good outcome (59% vs 58%) then there would not be a significant difference in outcome (p=0.92). This shows the possible influence on the difference in outcome caused by the absence of the nine athletes. Future studies can use the attrition rate from this study to adjust power calculations in the planning phase.

The fact that there are no between group differences makes it hard to give advice for clinical practice. It is suggested that the decision as to which treatment to choose be based on local availability of the treatment options and experience with them and athlete preference.

Another weakness in this study was the difference in duration of FU between the different athletes. The mean duration of FU was 28.8 months (SD 10.3). This is due to fact that no MTFU appointments were planned in the design of the original RCT. All athletes were evaluated for MTFU in a two month period. The fact that for some athletes there was a four year interval between ST and MTFU might have caused recall bias. There is also no official definition of the duration of FU. The choice to name the 29 month period in this study mid-term is arbitrary. Future studies should include scheduled longer term follow-up to avoid this problem.

Time also plays a role in the healing process of injuries. Four out of five athletes that had a poor outcome at ST and a good outcome at MTFU had a long period of rest before they were able to return to sports. After a longer FU period the use of long rest periods may cause a treatment bias and it is unclear what part of recovery can be attributed to therapy and what part to the natural healing process.

In this study no standard questionnaire for the assessment of groin injury could be used. There is a general consensus that Patient-Reported Outcome (PRO) questionnaires should serve as a gold standard in the assessment of musculoskeletal conditions. Today the Hip and Groin Outcome score exists which has been validated for athletic groin injuries but at the time this study was performed this score was not yet available.

The relatively big difference in ET outcome between this study and Hölmich et al. (47% vs 79%) calls for future research of the effect of supervision on ET and on the combination of MMT and ET. As the outcome of the present study might be influenced by the small sample size, in future studies a larger sample size would be preferable. Standardised FU at mid-term in future studies will contribute to better understanding of treatment effects beyond ST. Further research on factors predicting outcome and recurrence is needed.

In conclusion, there is no significant difference in outcome and recurrence rate between the MMT programme and ET at mid-term follow-up for long-standing ARGP (mean 29 months).

REFERENCES


