Content

The Effects of Different Mental Imagery Skills on Sprint Performance

Wen Yang[1], *Cindy Hui-ping Sit*[1], *Jane Jie Yu*[1]
[1]Department of Sports Science and Physical Education, Chinese University of Hong Kong

Objectives: As one of the most popular psychological skills training in sports, mental imagery refers to image the movement in the mind without any physical movements [1]. It has been found that mental imagery could improve training efficacy and performance outcomes [2]. This study aimed to compare the effectiveness of three mental imagery skills on sprint performance: i: visual imagery (VI) represents self-visualization of action stages based on visual cues [3], ii: kinesthetic imagery (KI) means perceiving the movement through proprioceptive information [4], iii: visual imagery combined with kinesthetic imagery (VI+KI) utilizes visual imagery and kinesthetic imagery simultaneously on the specific movement.
Methods: Fourteen Chinese students from track and field club (aged 16.7±1.14 years) were randomly assigned into three different imagery groups: five participants in VI group, four participants in KI group, five participants in VI+KI group. They were asked to listen to the audiotaped imagery 3 times a day for 7 days consecutively and half an hour before the training. Besides, there was a daily 30-minute sprint physical training in the 7 intervention days in order to help participants combine imagery training with physical training. At the pretest and post-test, the participants completed two sprint tests (10 and 20 meters) with three attempts for each test. One-way ANOVA was applied to analyze the difference of imagery abilities and sprint performance in three imagery groups at the pretest. Change scores of sprint performance were calculated by using non-parametric tests to compare the difference between three imagery groups at the pretest and post-test.
Results: There were no significant differences in visual imagery ability ($P>0.05$), kinesthetic imagery ability ($P>0.05$), 10-meter sprint performance ($P>0.05$) and 20-meter sprint performance ($P>0.05$) in three imagery groups at the pretest. After 7-day training, there was a significant group difference in 20-meter sprint ($P<0.05$), and improvements were found in three imagery groups on 20-meter sprint performance with VI+KI group having the greatest improvement followed by KI group and VI group.
Conclusion: Three mental imagery skills have promoted 20-meter sprint performance in the intervention. VI+KI has the greatest effect on improving 20-meter sprint performance compared to VI or KI. Future research should increase sample size and intervention duration, and non-intervention control group is also suggested.

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The Role of Perceived Social Influence on Children's Sport Experience and Performance

Linyi Su[1], *Derwin K. C. Chan*[1]
[1]Department of Early Childhood Education, The Education University of Hong Kong;

Background: Significant others are playing crucial roles on many aspects of children. Social support has shown to be an importance factor of children's sports experience and sports performance (Connaughton, Wadey, Hanton, & Jones, 2008; Rees & Freeman, 2010). However, it is unclear to what extent perceived social influences could influence and change the players' sports experience and performance.

Objects: The aim of this longitudinal study is to apply the 2x2 model of perceived social influence (Chan et al., 2019) to understand how significant others (coaches and teammates) social influences (i.e., positive influence, punishment, and dysfunction) are related to children's sport experience (competence, enjoyment, anxiety, mental toughness) and performance (base running speed; hitting distance; throwing distance).

Methods: Ninety-two young baseball athletes between 6 to 12 year-old participated in a two-wave longitudinal study with two-week interval between baseline and follow-up assessments. At each assessment, participants completed a survey comprising measures of perceived social influences from coaches and teammates, and other assessments, including the Physical Self-Perception Profile, Sport Anxiety Scale-2, Sports Mental Toughness Questionnaire of sport experience and performance. Multiple linear regression examined if the standardised residual change scores (Goode, Haley, Roth, & Ford, 1998) of the perceived social influences were associated with that of the outcome measures.

Results: The longitudinal study results revealed a number of statistically significant associations between the standardised change scores of perceived social influences and that of the outcomes variables. In particular, positive influence from coaches was negatively related to the control dimension of mental toughness (β= -.23, p <.05). Dysfunction from coaches was positively linked to competence (β= .47, p <.05) and the throwing distance (β = .61, p <.01). Punishment from coaches negatively correlated with the confidence dimension of mental toughness (β = - .86, p <.01). Positive influence from teammates positively predicted enjoyment (β= .50, p <.01) and throwing distance (β = - .36, p <.01). Dysfunction from teammates negatively linked to the control dimension of mental toughness (β = - .59, p <.01) and throwing distance (β= - .82, p<.01). Punishment from teammates positively related to the confidence (β = .82, p <.05) and control (β= .83, p<.01) dimensions of mental toughness.

Conclusions: The findings support the temporal relationships between perceived social influence and young athletes' experience and performance in sport. Coaches and teammates are encouraged to provide more positive and constructive feedback and minimise negative communication style to optimise a positive sporting environment for young athletes.

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The Effectiveness of Novel Internal Fixation Device Versus Kirschner Wire for Proximal Interphalangeal Joint Fusion in Hammer Toe: A Systematic Review

Xiaoyu Wei[1], *Samuel Ling*[1], *Patrick Yung*[1]
1 Department of Orthopaedics & Traumatology, The Chinese University of Hong Kong, Sha Tin, Hong Kong

Objective

Hammer toe deformity is a common forefoot complain, characterized by flexible or rigid plantar flexion deformity in the proximal interphalangeal (PIP) joint with or without dorsiflexion in metatarsal phalangeal (MTP) joint. PIP fusion is the most common procedure among surgical intervention. K-wire is widely chosen in PIP fusion procedure for maintaining temporary stability, for its clinical effectiveness in joint stability and relatively low cost. The diverse complications of using K-wire in joint fixation, however, is always a problem in post-operative management. Diverse intramedullary fixation has been developed recently, aiming to reduce the complication risks in K-wire. This review systematically compared the clinical effectiveness between the intramedullary implant versus Kirschner Wire, in order to provide more evidence to assist surgeons in operation design.

Methods

The database searched were PubMed, Scopus, Cochrane, Embase with keywords “claw toe OR hammer toe” AND “proximal interphalangeal OR PIP” AND “fusion OR arthrodesis”. Clinical trials with evidence level I, II and III published from the onset of databases to now were included. The studies which were not published in English or looking at the surgical outcomes in children or adolescents were excluded. The methodology equality of included studies was assessed by Critical Appraisal Skills Program (CASP).

Results

92 articles were returned by using the searching strategy above, of which one randomized controlled trial (1) and four case-controlled studies (2-5) were identified to meet the inclusion criteria (Fig 1).

Four of five included studies investigated post-operative pain level with no statistical significance. Three studies investigated patient satisfaction level and no consensus was achieved. Two studies indicated higher proportion of patients who were satisfied with the intramedullary implants, while the other one found no difference in patient satisfaction.

For the result of foot-related function, one studies adopted Foot Function Index (FFI) and SF-36 and found no statistical significance across different types of fixation. Another study records the results of FFI and Bristol Foot Score (BFS), clinically significantly difference (>10%) was found at 3 months after surgical intervention without statistical significance.

All studies reported the complication rates and union in PIP joint. In one study, no cases of possible adverse events were observed in both groups. Two studies found no statistical difference in overall complication rates. One study observed adverse events in K-wire studies but not in the intramedullry group. In the other study, the rate of wound-related complication was higher in K-wire group with

statistical significance, but no difference was found in revision or recurrence incidence. Besides, four studies across all indicated a significantly better union using novel internal fixation devices.

Conclusion

It seems that the novel device was not superior than traditional K-wire in pain control and foot-related function improvement. The intramedullary device may facilitate the union in PIP joint after fusion and reduce complications rate, especially those resulting from the external part in K-wire.

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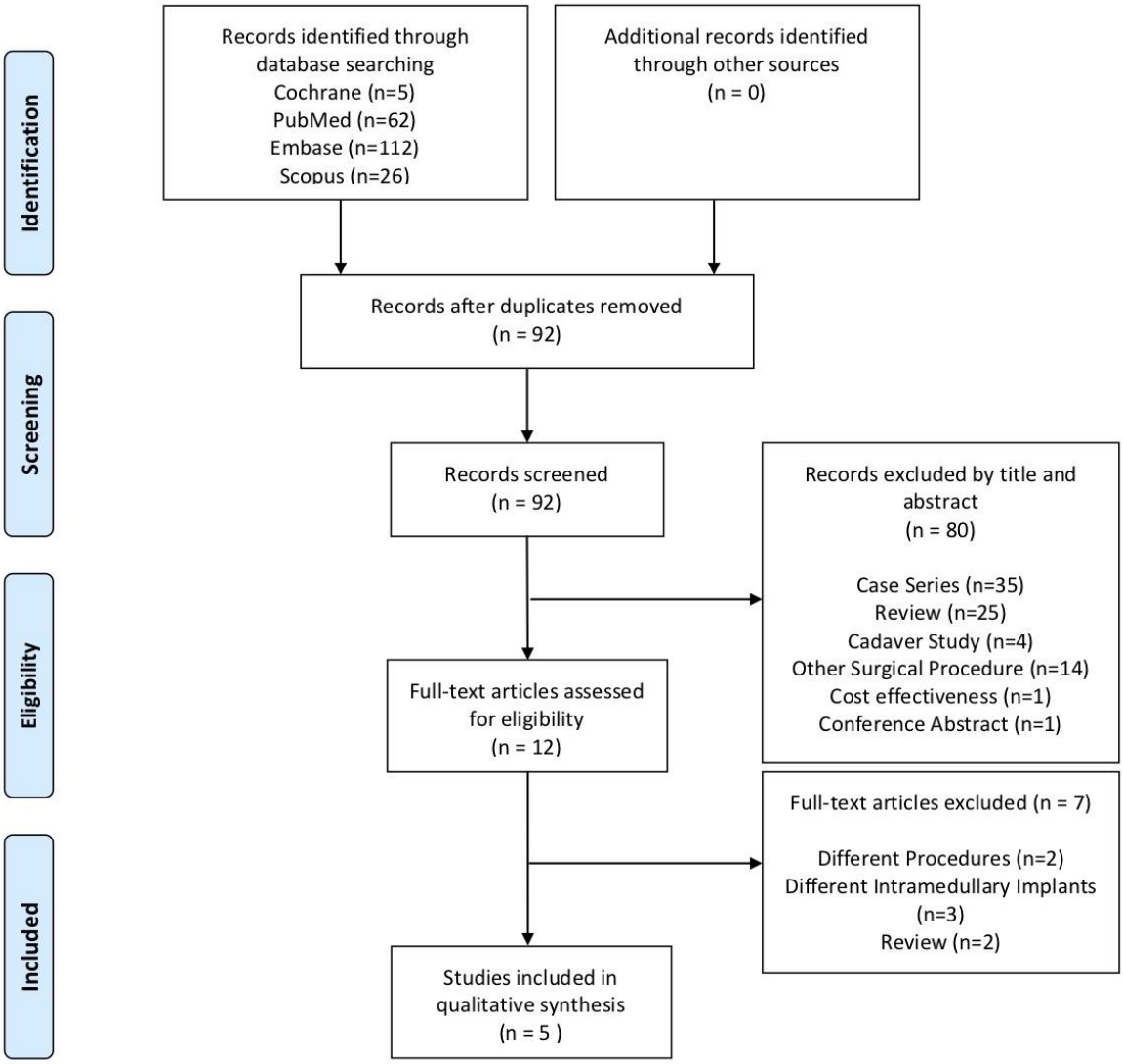
Figure 1. The flow diagram



Effect of a 2-Week Cardio-Related HIIT Program on 3-Minute Step Test Performance of Secondary School Students in Hong Kong

Hau Ying Leung
Department of Sport and Physical Education, Hong Kong Baptist University

The objective of this study was to test whether the 2-week HIIT training program could improve the cardiorespiratory functions (heart rate after low-intensity exercise) of students.

Review of Literature

Students in Hong Kong put all the time onto their studies, rather than doing exercise (SCMP, 2017). Research team of CUHK carried out a study with 37 foreign countries. Hong Kong performed the worst with a D grade in overall physical activity levels. They failed to meet the international recommendations, which is 60 minutes per day. Time is always a barrier of doing physical exercise, which contributed to the popularity of High-Intensity Interval Training (HIIT) due to its efficiency (Garcia et al., 2016).

Methods of Study

Sample of Selection

121 students who studied in STFA Lee Shau Kee College were recruited in total for the study. Among the subjects, 59 students, including both male and female, were invited to participate in the 2-week cardio-related HIIT program and the 3-minute step test. At the same time, the remaining 62 students were recruited as a control group of this study. Subjects were aged 12 years old.

Procedures

After the paperwork was done, a standardized 10-minute dynamic warm-up would be done. Then, the 3-minute step test was performed by each group of participants on four separate days (two for the pretest, two for the posttest). YMCA 3-minute Bench Step Test was used in this study. Subjects would continue stepping up and down until a total of 3 minutes were due. When the time was up, immediately stop the subjects from stepping. Ask them to sit down and let them count their radial pulse. Subjects were required to check the pulses for one complete minute.

Then, the subjects were divided into control and experimental groups. Both groups would do the 3-minute step test twice, but for the control group, NO HIIT program was required. The experimental group would do the HIIT program on the next day of the first step test. The second step test would be done 2 weeks after, which was right after the program ended. The program would be cardiorespiratory related exercise, with a 10-minute dynamic warm up, 10-15 minutes HIIT workout, followed by a 10-minute cool down. Data were collected.

Statistical Data Analysis

Data were calculated by the Statistic Package of Social Science. Significant level of 0.05 ($p<0.05$) was used in the analysis. Paired t-Test was applied to compare the means of heart rate of both groups, to see if there was any difference in the values of means. A one-way ANCOVA test was used to evaluate the efficacy of the treatment in improving the cardiorespiratory fitness compared to the control.

From the result, it can be concluded that there were significant differences in the mean score of the heart rate (bpm) between two tests of the experimental group, so as that between the control group and the experimental group. Also, it could improve the cardiorespiratory strength on the experimental

group. The reason is, a lot of cardio-exercise in the program required subjects to perform under a high intensity within a very short period of time. It pushed their limits because resuming workout required extra energy from body. Also, after-effect was brought by the HIIT program (Garcia et al., 2016). Therefore, doing the training once every other day for 2 weeks was enough for inducing a comparatively positive result.

Conclusion

The program was useful for improving the cardiorespiratory strength. Doing HIIT was an effective method in encouraging students in Hong Kong to do more exercise and improve the cardiorespiratory fitness without using too much time.

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Objectively Measured Physical Activity Levels in Children and Adolescents with Autism Spectrum Disorders: A Systematic Review

Xiao Liang[1], *Ru Li*[2], *Cindy Sit*[1]
[1]Department of Sports Science and Physical Education, The Chinese University of Hong Kong;
[2]Department of Physical Education, Shenzhen University

Background: The associations with physical activity (PA) and health benefits are well documented. Evidence indicated that children and adolescents with autism spectrum disorder (ASD) are less physically active than their typically developing (TD) peers (Bandini et al., 2013; Pan et al., 2016). The purpose of this systematic review was to provide a comprehensive summary of the PA levels and factors related to PA participation of children and adolescents with ASD by applying the socio-ecological model (SEM) (McLeory et al., 1988).

Methods: Seven databases were searched: PubMed, CINAHL, SPORTDiscus with Full Text, MEDLINE, EMBASE, ERIC, and PsychINFO in June 2019 to identify studies examining the PA levels and factors related to PA participation of children and adolescents with ASD aged 6–17 years. Two researchers independently screened studies, assessed methodological quality, and summarized relevant data.

Results: Twenty-one studies were included in the detailed review. Only 42% of the participants met the minimum *WHO Global on Physical Activity for Health* guideline (WHO, 2010) which children and adolescents aged 5–17 years should do at least 60 min of moderate to vigorous PA daily. PA levels were objectively measured by accelerometers.

Discussion: SEM provides a framework to understand multi-level factors that influence PA levels in children and adolescents with ASD. At the individual level, age was identified as a contributing factor to the PA levels, with the older ASD populations engaging in less PA. Sedentary pursuits including long screen time with technology-based activities caused low PA levels. Higher physical fitness level, better motor skills performance and sleep habits were positively related to PA levels in children and adolescents with ASD. At the interpersonal level, playing with TD peers, encouraged by teachers and support from family were important to increase PA levels for children and adolescents with ASD. At the organizational level, unprepared PE content, lacking of PE equipment and PA opportunities at school decreased their PA during school time. At the community level, children and adolescents with ASD had low PA due to lack of community-based PA opportunities during leisure time. At the societal level, very few studies included examined PA-related policies or laws in children and adolescents with ASD.

Conclusion: This review indicates that children and adolescents with ASD achieve low PA levels and that multi-level factors affect their PA levels. We recommend that there is an urgent need for future PA studies to design tailor-made community-based PA interventions which promote PA participation of children and adolescents with ASD.

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