Playground designs to increase physical activity levels during school recess: a systematic review

Escalante Y, Garcia-Hermoso A, Backx K, Saavedra JM

CRD summary
The authors concluded that playground markings plus physical structures can increase the physical activity of schoolchildren during school playtime in the short to medium term. Other interventions studied in the review did not have a clear beneficial effect. Potential for bias in review process and the unclear quality of included studies mean that the review findings may not be reliable.

Authors' objectives
To compare interventions aimed at increasing children's physical activity during school playtime.

Searching
CINAHL, Cochrane Central Register of Controlled Trials (CENTRAL), EMBASE, MEDLINE, PsycINFO and Science Citation Index were searched for articles from 1937 to 2012 written in English. Some search terms were reported. Reference lists of retrieved articles were searched for further studies.

Study selection
Eligible studies were randomised controlled trials (RCTs) or clinical controlled trials (CCTs) that compared provision of playground markings, games equipment and/or physical structures with no intervention in preschoolers (two to five years old) and schoolchildren (five to 12 years old). The school was required not to have any structured activities in place during school playtime. Outcomes of interest were vigorous and/or moderate-to-vigorous physical activity measured objectively with heart rate monitors, pedometers and/or accelerometers.

Examples of included intervention components were: themed, shaped or colour-coded floor markings (playground markings); skipping ropes, flying discs, racquets (games equipment); and football goal posts, basketball hoops (physical structures). Most participants were schoolchildren aged between four and 11. There were similar numbers of boys and girls. Where reported, school playtime ranged between 16 minutes and 42 minutes. Heart rate monitors and accelerometers were the included outcome measures.

It appeared that more than one reviewer was involved in a study selection process based on reading the abstracts of papers. Disagreements were resolved by consensus.

Assessment of study quality
There was no reported assessment of study quality.

Data extraction
Data were extracted by one reviewer on percentage changes in physical activity levels.

Methods of synthesis
A narrative synthesis grouped according to intervention content.

Results of the review
Eight studies were included in the review (2,383 participants comprised 599 preschoolers and 1,784 schoolchildren). There were three RCTs (926 participants) and five CCTs (1,457 participants).

Results were mixed for studies that focused on provision of playground markings (three studies) and games equipment (three studies). Provision of playground markings plus games equipment (one study) was not associated with any increase in physical activity. This suggested that none of these intervention types were sufficient to increase levels of physical activity levels in children during school playtime. Playground markings plus physical structures successfully increased moderate physical activity (by 5.9%) and vigorous physical activity (by 1.7%) for up to six weeks (one study).
These increases were carried forward up to 24 weeks (4.5% for moderate and 2.3% for vigorous physical activity) but the effect diminished by 52 weeks (one study).

None of the interventions successfully increased physical activity in preschoolers (one study).

Further results on differences between boys and girls were reported in the paper.

**Authors’ conclusions**

Interventions based on playground markings plus physical structures can increase the physical activity of schoolchildren during school playtime in the short to medium term. Interventions based on playground markings, games equipment (or combination) do not appear to have a beneficial effect on preschoolers or schoolchildren.

**CRD commentary**

The review question and supporting inclusion criteria were clear and potentially reproducible. The search strategy covered several relevant sources. There was no reported search for unpublished material and a language restriction was applied so relevant studies might have been overlooked. The review process was lacking in attempts to minimise error and bias. The inability to judge the quality of included studies was disappointing given that the selected study designs had potential to be higher quality. Study details were presented but the results lacked detail in terms of physiological measurements of physical activity behaviour. Most studies had reasonable sample sizes.

The authors’ conclusion reflects the evidence presented. Some potential for bias in the review process and unclear quality of the included studies mean that the review findings may not be reliable.

**Implications of the review for practice and research**

**Practice:** The authors stated that activities, games and sports appropriate to boys and girls in different age groups needed to be identified so that relevant action plans can be drawn up for school playtime activities.

**Research:** The authors stated that more analysis was needed on the modifiable aspects of school playtime to ensure greater physical activity levels in preschoolers and schoolchildren. Randomised controlled trials (using appropriate comparators) with medium- and long-term follow-up and measuring daily physical activity were needed to explore the effects of providing playground markings plus physical structures. Trials should evaluate more closely the impact on girls and the influence of teacher involvement and focus on devising strategies based on disease burden to reduce childhood obesity.

**Funding**

European Social Fund. Gobierno de Extremadura, Spain.

**Bibliographic details**

Escalante Y, Garcia-Hermoso A, Backx K, Saavedra JM. Playground designs to increase physical activity levels during school recess: a systematic review. Health Education and Behavior 2014; 41(2): 138-144

**PubMedID**

23836828

**DOI**

10.1177/1090198113490725

**Original Paper URL**

http://heb.sagepub.com/content/early/2013/07/05/1090198113490725.abstract

**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Child; Child, Preschool; Databases, Bibliographic; Environment Design /standards; Female; Humans; Male; Motor
Activity; Physical Education and Training /standards; Play and Playthings; Schools; Time Factors

**AccessionNumber**
12013038891

**Date bibliographic record published**
21/08/2013

**Date abstract record published**
25/10/2013

**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.