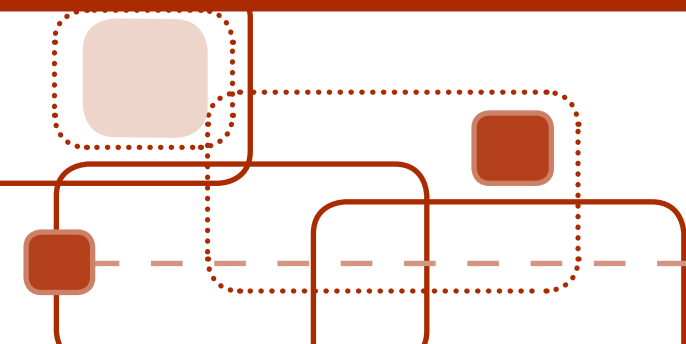


Pain in the back

Avoiding back pain
in children and teenagers



AN INVESTIGATION OF THE EFFECTS OF AN EXERCISE PROGRAMME ON
PRIMARY SCHOOL CHILDREN
PROMOTING PHYSICAL ACTIVITY



EUROPEAN REGION

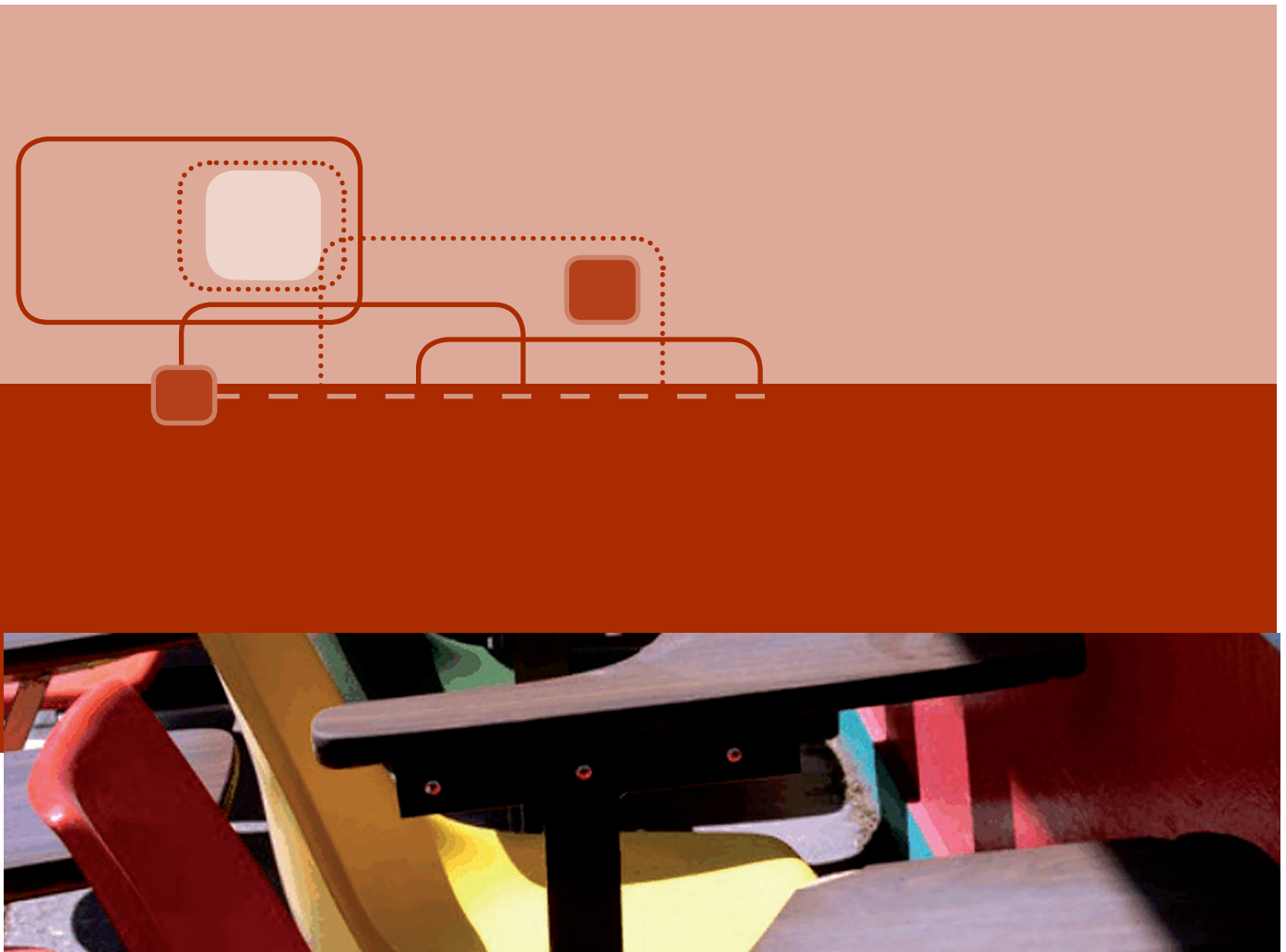
World Confederation
for Physical Therapy



This project has been co-funded by the Executive Agency for Health Consumers under the Public Health Programme 2003 - 2008

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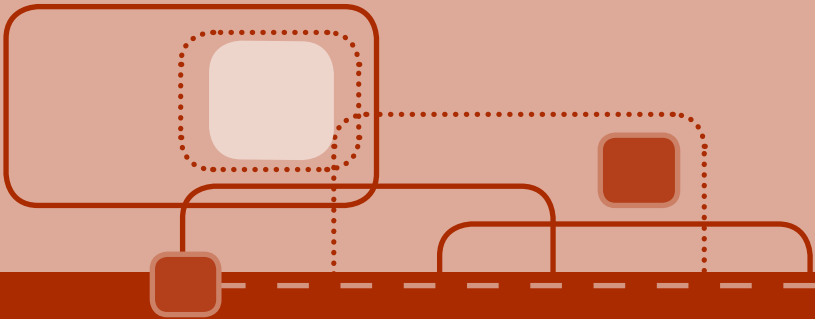
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1

Introduction



1 Introduction

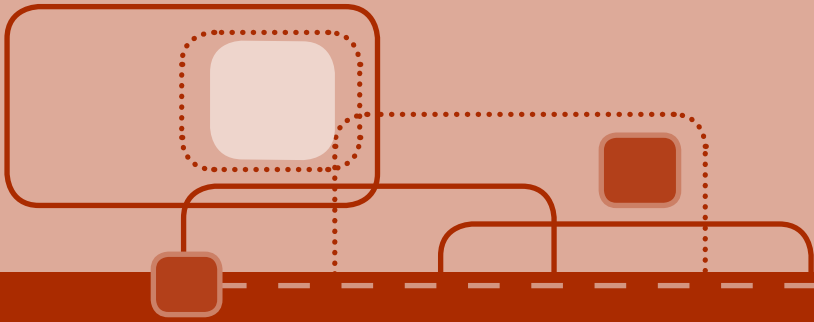
The previous review concerning back pain in schoolchildren makes it clear that there are shortcomings in the research. There are indeed studies which show that there is an increase in the prevalence of back pain as the age of the children increases, but the evidence concerning risk factors and special interventions is incomplete. There is consequently a need for high quality intervention studies.

The European Region of the World Confederation of Physical Therapy (ER-WCPT) wanted to take the opportunity to provide a better standard of evidence by means of a standardised intervention study carried out throughout Europe which could make a statement about the effectiveness of back-specific interventions for children. The European Guidelines for Prevention of Low Back Pain (COST B 13) were used as a basis for the content of this intervention. Due to the existing evidence base this was neither in favour nor against back-specific interventions in the field of education. There is however a much more promising approach which is to involve children in physical activity/exercise (Burton 2005). Because of the limited time and funding available for this project we are not able to carry out any long term observations. We are therefore concentrating on the surrogate parameter physical inactivity which we will use as an alternative measurement parameter. The risk factor physical inactivity is associated with back pain in children (Cardon and Balgué 2004; Roth-Isigkeit et al. 2005). By influencing this risk factor a modification to the risk is to be expected.

With the aim of motivating children to engage in physical activities the European physiotherapist can contribute to the prevention of back pain in children and adolescents, and in so doing prevent back pain from becoming so prevalent.

2

Research Project



2 Research Project

Several studies make it clear that children in Europe are becoming more and more inactive (Tomkinson 2003; Health Behaviour in School-aged Children, HBSC, 2001/2002). The children are consequently less physically fit and more overweight than previous generations. Physical inactivity is repeatedly mentioned as a risk factor in the increasing prevalence of back pain in children. To make the necessity for this intervention clear the following sections will discuss the physical activity of children in Europe.

2.1 Background

2.1.1 Back pain and physical activity

In back pain research aspects like physical activity and training have for years been used as part of prevention, therapy in rehabilitation. Several systematic reviews show evidence of the preventive effects of physical activity in adults (Burton 2005; van Poppel et al. 2004; Kool et al. 2004; Linton and van Tulder 2001). In these reviews the authors continually emphasised that they were not discussing the prevention of back pain itself. In cases where it was highly prevalent they did attempt to ensure that the back pain did not become chronic. However there are a lack of studies concerning a definite relationship between physical activity and both back pain and the prevention of back pain in children (Pfeifer et al. 2008).

The positive effects of physical activity (based on their mechanisms of action) are:

1. Invigoration of the back muscles and improvement of the flexibility of the trunk.
2. Improved blood flow in the intervertebral discs prevents defects, signs of wear and promotes regeneration.
3. Physical activity has an effect on the mood and the ability to withstand stress; this has a positive effect on the experience of pain (Bertelsmann Stiftung 2007).

There is not enough information about the question of what levels of physical activity have a preventive or potentially damaging effect. There is however no evidence of an increase in risk for most kinds of physical activity. Contraindications are only registered for high intensity physical activity over a prolonged period of time. Up-to-date studies by

Hartvigsen and Christensen (2007) or Hurwitz et al. (2005) point out that the preventive effect does not depend on any special kind of physical activity but on its frequency and its intensity. Two reviews and a meta-analysis by Hayden (2005a, 2005b, 2005c) concentrating on the effects of physical activity interventions in adults with chronic non-specific back pain could not ascertain that one kind of physical activity was more advantageous than any other. There is furthermore no evidence-based advice concerning the intensity, frequency and continuity of exercises for specific use on the back. Exercises for flexibility and invigoration have however shown positive effects on pain and on the state of function of patients with chronic back pain (Pfeifer et al. 2008).

Other studies focus on adolescents and young adults and repeat the advice generally given to motivate children and adolescents to become more active in order to prevent back pain (Skoffer and Foldspang 2008; Cakmak et al. 2004; Salminen et al. 1993). A study from Norway showed that children with high isometric muscle endurance reported less back pain. Furthermore this study could not find any relationship between back pain and physical fitness within the study population (Bo Andersen et al. 2006). A Danish research group (Mogensen et al. 2007) investigated the positive and negative effects of various kinds of sport on back pain but could not produce any firm evidence. Another Danish study by Wedderkopp et al. (2003) concluded that there was no obvious connection between self-reported back pain and self-reported physical activity in children and adolescents.

2.1.2 Physical activity of children in Europe

Health Behaviour in School-aged Children (HBSC), a health survey carried out by the World Health Organisation (WHO), consistently collected data concerning the health of an average of 162 000 children and adolescents (aged 11, 13 and 15) in 24 countries in Europe and North America. The extent of their physical activity was surveyed during the period of the inquiry (2001/2002). The questions concentrated on the levels of physical activity at a moderate intensity for 60 minutes on five or more days a week. That applied on average to 34% of the children and adolescents but there were significant differences between countries. The range for boys extended from 26% (Belgium) to 57% (Ireland) and for girls the range was from 12% (France) to 44% (USA) (World Health Organisation Europe 2006a).

The study furthermore showed increasing levels of sedentary behaviour (watching television and using computers) in children and adolescents. 26% of children and adolescents accordingly stated that they watched television for 4 or more hours every weekday, which increased to 45% at weekends. Comparing countries, the range extended

from 11% (Switzerland) to 46% (Israel) on weekdays and from 28% (Italy) to 70% (Ukraine) at weekends. There was widespread variation in the use of computers by boys and girls for all age groups and for all countries. Accordingly 21% of boys and 7% of girls spent up to three hours at the computer on weekdays. This increased to 35% of the boys and 15% of the girls at weekends (World Health Organisation Europe 2006a).

2.1.3 Changes taking place in children's lifestyles

Woll (2006) explained that the changes in children's lifestyles are connected with a lack of physical activity. Today physical activity is no longer a matter of course; the reasons for this trend are:

- The loss of 'street childhood':

Most parents will not let their children play in the street. On the one hand it is much more dangerous because of increasing road traffic and the decrease in public open space, especially in urban areas. On the other hand the interests of children have changed so that they have less interest in playing outside.

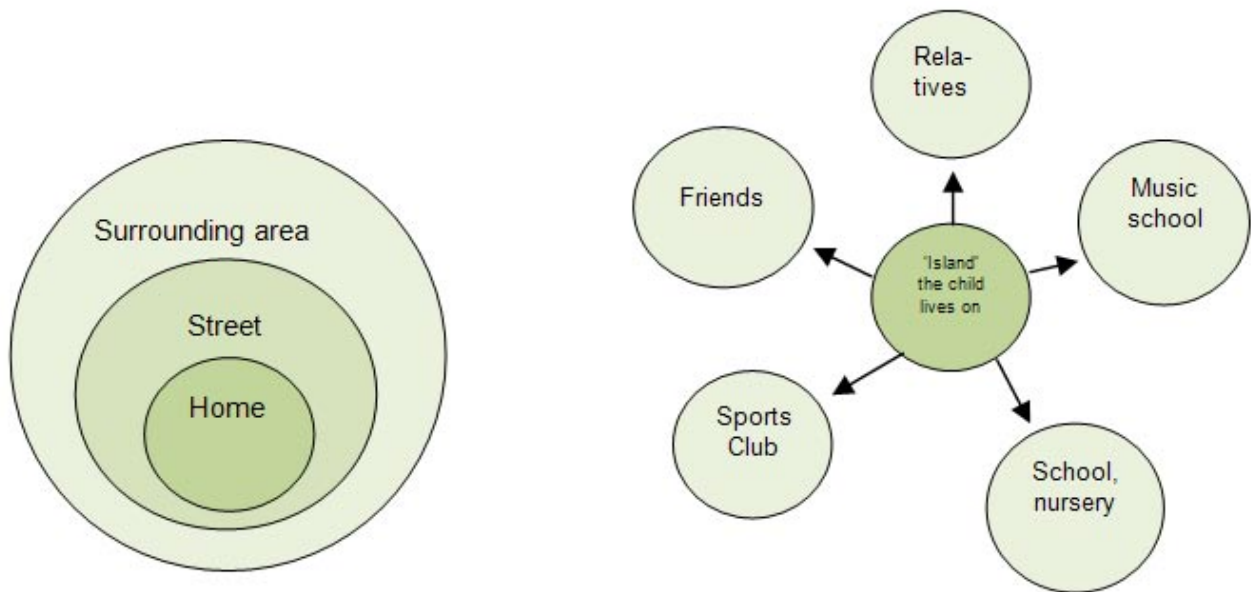
- The insular way of life:

This means children have a different way of being aware of their environment. Previously they had one manageable territory, such as the home, the street and the surrounding area which defined the child's field of experience. Today children see more and more fragments of the total environment that surrounds them because they visit fewer places on foot or on a bicycle because their parents drive them around and the distances involved have become much longer.

- Bringing the childhood indoors:

More and more children spend their time shut up indoors. A study by Bös, Opper and Woll (2002) showed that very clearly; 25% of the 1,404 children taking part in the study only played outside once a week or less.

Figure 1: Model showing the relationship between changes in the child's environment and physical activity.¹



- The effects of the media on childhood:

The disadvantage of children remaining shut up indoors is compounded by the increased use of both technology and the media during childhood. Games involving movement are less common and there is an increasing amount of interest in audiovisual media and in a range of computer programmes.

An escape into a fictional world of computer and video games arises, which reduces the real world children experience in terms of physical activity and playing in a natural environment (Woll 2006).

Following this diagnostic evaluation of the situation it is clear that there is a need for a funded interventions on a regional basis. The concepts behind these interventions have to be orientated towards the world in which the children live and have to be applied under various different conditions.

¹ Bös and Woll 2003

2.2 Purpose of the research project

The aim of this intervention study is to demonstrate the effectiveness of an intervention focussing on physical activities by children in primary schools. The central research questions are:

1. Does the intervention affect the physical activity or sport activities of the children?
2. Does the intervention affect the sporting and physical performance abilities of the children?
3. To what extent does the intervention have an effect on the children's knowledge of the relationship between physical activity and health?
4. To what extent does the intervention have an effect on the children's wellbeing?

An intervention was therefore developed involving children in a school setting. Using a standardised method of intervention in the participating member states and using a standardised method of evaluation, it is anticipated that an informed statement can be made concerning the effectiveness of the programmes to be carried out.

2.3 Prevention of disease and health promotion

This intervention is a project concerned with the prevention of disease. A definition of the terms - disease prevention and health promotion - would be useful. Both prevention and health promotion are concepts used for interventions which take corrective action when morbidity or mortality arises in a population group. Both concepts employ a different logic and are based on different theories (Hurrel-mann et al. 2007).

In the case of disease prevention, the intervention targets groups at risk from complaints or diseases which are either likely to occur, are already noticeable or are just beginning to become noticeable. Prevention can be classified as primary, secondary or tertiary depending on when it is employed – this is what is known as the pathogenetic approach (Kaba-Schönstein 2003).

Use of the key term - health promotion - was developed at the WHO's European regional office in the early 1980s with the concept being launched at the Ottawa Charter of 1986.

The concept includes the most important strategies and courses of action to be taken in the field of health promotion. Health promotion consists of the facilities and activities used to encourage the conservation of human resources and the development of the human potential for health – this is known as the salutogenetic approach. Health promotion is a process which aims to empower people to act with responsibility towards their own health. Whereas prevention targets prophylaxis or the early diagnosis of diseases and promotes immunisation, healthy eating and adequate levels of physical activity, the health promotion approach wants to strengthen people’s own individual potential for being healthy (Kaba-Schönstein 2003).

The methods employed in the prevention of disease and in health promotion are very similar. Both forms of intervention accomplish the same goal – the improvement of the health of both the individual and the general population. Whereas prevention accomplishes its goal by reducing the risk of diseases, health promotion encourages the benefits to be gained from good health.

Disease prevention therefore relates to the dynamics of disease development and health promotion relates to the dynamics of the development of good health. The aims of both approaches are admittedly the same, but they follow different intervention paths and different principles are used in carrying them out (Hurrelmann et al. 2007).

	Original	Primary	Secondary	Tertiary
Timing of the intervention	Healthy	Perceivable risk factors	In the early stages of disease	After an acute disease
Target group	Total population	Risk group	Patients	Patient in rehabilitation
Purpose	Interaction with people’s circumstances and lifestyles	Interaction with people’s circumstances and risk factors	Interaction with the cause of the disease	Avoidance of subsequent diseases
Orientation of the intervention	Ecological approach	Preventive approach	Corrective approach	Compensative approach
Description	Health promotion	Primary prevention	Secondary prevention, early treatment	Tertiary prevention, rehabilitation

2.4 Promoting physical activity in primary school children

The concept of the intervention Promoting Physical Activity in Primary School Children is to strengthen the children's physical and psychosocial health resources by motivating them to perform physical activity. Health resources refer to the potential of humans to resist against stress and be able to create their own physiological, psychological and social well-being for themselves (Sygusch et al. 2006). Physical activities including play and sport support the children's health in various ways. The physical resources provided by good health improve the cardiovascular system, invigorate the muscles, strengthen the immune system, improve energy metabolism, and strengthen the posture and the musculoskeletal system. Mental and social health resources mainly consist of providing self-confidence even when carrying out difficult tasks, coping with success and failure, and the feeling of social support and being accepted into a group. These aspects play their part in providing an understanding of how to handle pressure, how to develop resilience and how to solve conflicts more effectively (Zimmer 2004). There is a consensus within the scientific community that psychosocial health resources are useful for improving the state of people's health, but there is less agreement on the contribution made by each of the various aspects. When putting psychosocial health resources into practice they are often grouped under umbrella terms like 'mental health'. This covers topics such as fear, vitality, social support, depression and the person's frame of mind and his or her emotional state, etc. (both the positive and the negative effects). With regard to psychosocial health resources Brehm (1998) listed the following points in his model for determining the quality of healthy sports:

- mood, basic temper (emotional health resources)
- body perception, (emotional health resources)
- knowledge of cause and effect (cognitive resources)
- sensory-motor coordination, outcome-consequence-expectancy and competence-expectancy (cognitive resources)
- social integration and social support (social situation)

2.5 Concept of the intervention

A 10 hour physical activity programme was chosen as an intervention to promote physical activity. The basis for the intervention is to take the relevant local infrastructure into account and include facilities that promote physical activity (physiotherapists, schools, sports fields and sports clubs). The intervention is concerned with a sustainable concept to promote the physical activity of children according to their individual abilities and preferences, whether the activities are organised or not.

2.5.1 Purpose of the intervention

The main purpose of the intervention Promoting Physical Activity in Primary School Children is to provide support in an attempt to adequately promote the development of behaviours involving physical activity in children. With help of the intervention the following aims should be achieved:

- To motivate children to perform physical activities, to play and to take part in sports:

Co-operation with local physiotherapists, schools and sports clubs and the guidance of the children in the creative use of public spaces for playing and sports with the aim of bringing the fun back into sports and physical activities.

- To promote the physical fitness of the children:

The children should gain experience of how regular physical activity and training have a positive effect on their physical and mental health.

- To impart knowledge about the relationship of health and physical activity:

The children should be clearly taught how physical activity is important for a healthy body.

- To promote children's well-being:

The children shall gain an increased feeling of well-being through physical activity.

2.5.2 Content of the intervention

Before starting the intervention, a detailed analysis of the local facilities in terms of physiotherapists, schools and sports clubs, public playgrounds and sports facilities is to take place so that the intervention can be adapted to the local conditions.

Only when all possible sites and facilities have been located in the area can the actual classes finally be organised. This framework is used to prepare the detailed modules given in the appendix; these could then be put into effect depending on the availability of existing facilities. In addition the children in the group being used for the intervention are also taught for an additional hour of physical activity as part of the project (in addition to their physical education classes).

The intervention Promoting Physical Activity in Primary School Children includes three stages:

- The first stage concentrates on motivating the children to perform more physical activity, to play and to take part in sports.
- The second stage is the improvement of their physical fitness
- The third stage is imparting knowledge.

2.5.2.1 Motivation during physical activity, in play and in sport

The motivation of the children to take part in physical activity, to play and to do sport has two aspects: organised and non-organised forms:

1. Co-operation with local physiotherapists, schools and sports clubs (organised forms of physical activity)
2. Practical classes on the local public playgrounds, sports facilities and at home (non-organised forms of physical activity)

In co-operating with local sports clubs the main idea is to introduce a range of different sports to the children. It therefore opens up the possibility for the children to come in contact with several sports that they did not know about or had not tried before. This allows them to determine their own individual preferences and to discover their own talents. It also allows them to discover new incentives for taking part in physical activities. Do I

enjoy team games like badminton, football, basketball etc.? Do I prefer more individual sports like track and field, skating, swimming, cycling, etc. or are my favourites the more creative and expressive sports like gymnastics, dance, gymnastics using apparatus, etc.? What opportunities for organised physical activities does the local area provide for the children? The answers should be provided from within the intervention when the children have tried out a variety of different sports.

The second point should make it clear that there are other possibilities to be physically active without taking part in courses or being involved with organised sports clubs. There are therefore new possibilities for using the existing playgrounds and sports facilities. In addition to obvious locations like swimming pools, skateboard parks and the grounds used by sports teams, new possibilities could be opened up by promoting new ideas using second hand sports equipment like skipping ropes (Double Dutch and rope skipping) and elastics (jumpsies or Chinese twist). Other games can be played on the street and marked out using chalk (e.g. hopscotch could be encouraged by painting permanent lines on the ground). All these games challenge the children in many ways. In addition to aspects like communication and cooperation, the development of the motor skills is also supported. In addition many muscle groups are used, and skills and abilities like flexibility, speed, coordination and endurance are used when the children play together. There are definitely strong variations within Europe with regard to the games played and to the sports equipment used so these practical classes have to be designed to take the different regions into account.

2.5.2.2 Promoting physical fitness

The children experience how much fun sport can be by means of the forms of physical activity previously described. Furthermore the development of motor skills lies within the focus of the intervention. Motor skills tests used in sport will be conducted before and after the intervention to see whether or not there has been any success in improving endurance, strength, coordination, speed and flexibility (see 4.2.2).

2.5.2.3 Imparting knowledge

The focus of imparting knowledge during the intervention is on child-oriented teaching about the human anatomy and physiology, and how they are involved in physical activity. Subjects which could be dealt with are:

- The cardiovascular system
- The anatomy of the skeleton
- The jobs of the different muscles (see the teaching units which have been prepared in the appendix)

The teaching of the theoretical content will be adapted to take the age of the children into account. It will make use of play and will be both activity oriented and descriptive. Wherever possible, the children will research the content of the teaching material by practising it on their own bodies. This will give them a personal involvement in the subject and will make the content clearer and more comprehensible.

2.5.3 Teaching materials

One of the problems in teaching behaviour to children is that children do not see any reason to change their everyday behaviour because they have not had any negative experiences with their current behaviour patterns. Visualising the pictures of the cartoon characters in the workbooks will make them more memorable. Various concepts and stimuli need to be used as part of the teaching methodology to increase the motivation of the children. Some of these concepts and stimuli will be used in this present intervention

1. During the whole intervention cartoon characters are used which are appropriate to the age of the children. The characters will accompany the children through the entire course and will reinforce the knowledge and behaviours that they have learned. Two characters will be used as part of the intervention:
 - A girl, Franziska, who will be the presenter and who appears when key points are explained.
 - Sporty, the active character who always sets a good example and who does things in the right way.
2. The creation of a diary for the children's physical activities (see appendix). This will show the children how much physical activity they have done. Together with the knowledge imparted by the teaching this could be a suitable stimulus for behaviour modification.
3. A workbook in which the children will collect all the worksheets from the lessons,

their diary containing details of their physical activities and the outcomes of their own personal motor skills tests.

2.5.4 The school setting

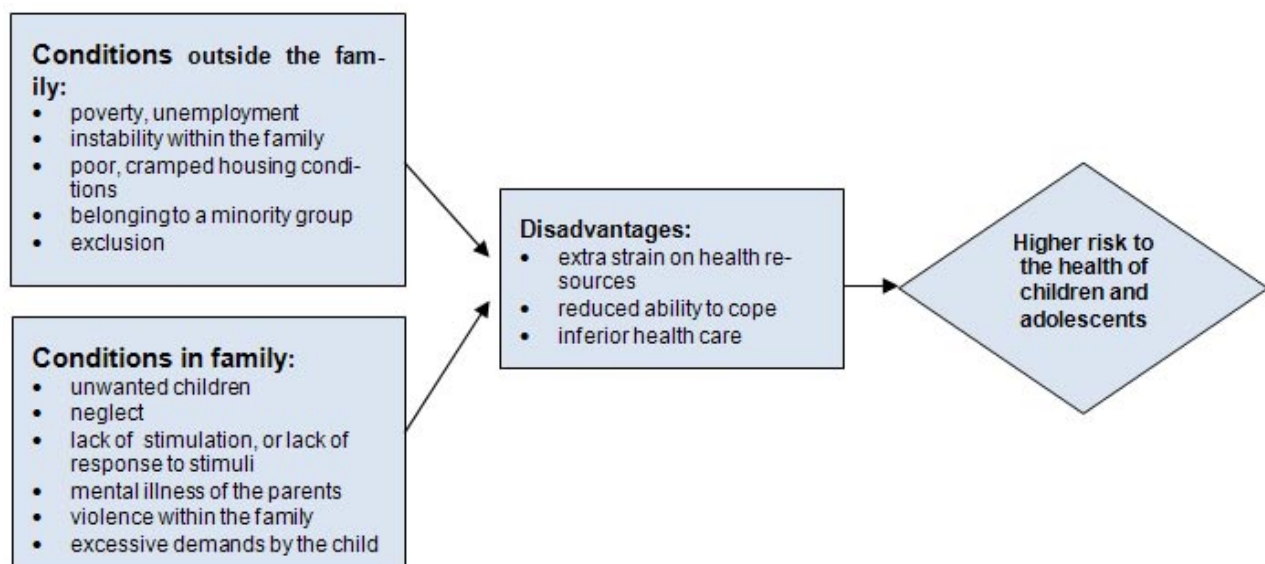
An interest in the school setting in the context of health education is not entirely new. Ever since the 1950s various programmes have been started with the focus on imparting knowledge to the children. The importance of allowing the children to develop the skills necessary to resist unhealthy lifestyles has already been made clear (World Health Organisation Europe 2006b). Since the beginning of the 1980s the term 'health promotion' has increasingly supplemented 'health education' until it has finally replaced it.

On the one hand the characteristics of the setting approach are the systematic interconnection of the different arrangements being made for health promotion. These range from organisational developments such as making physical and social rearrangements to traditional methods of intervention such as primary methods of prevention and health education. The setting approach is a core strategy used in both primary prevention and in health promotion. It concentrates on particular groups of people and places where they spend a large proportion of their lives which have an effect on each individual person's health. These include frameworks and organisations like cities, communities, schools, places of work, circles of friends and the family. Only when everything is considered in terms of health promotion and prevention can the individual's behaviour be understood or changed. An assessment must be made in terms of health promotion and the prevention of disease in order to understand the background to the health-damaging behaviour of the individuals concerned. This is because the origins of health-supporting or health-damaging behaviours often lie in group dynamics (Kaba-Schönstein 2003).

The school is one of the most important settings for primary preventative measures and for health promotion, because a large proportion of the population can be reached over a period of several years. The school is especially important because it is known that attitudes and behaviours concerning health matters are established in early childhood. Great importance is therefore attached to ensuring that young people gain a better understanding about health matters, and are made aware of decisions that affect their own behaviour which impact upon health issues. The school setting is really suitable for reaching particularly young pupils and for carrying out an intervention to promote physical activity. This target group promises a better chance of success than with adults, who have had a longterm experience using inappropriate behaviours with regard to health matters (Kaba-Schönstein 2003).

Another argument for using the school setting is the fact that children from socially-deprived families also get the chance to take part in this kind of intervention. Social disadvantage or socio-economic status is normally described in terms of parameters like education, vocational status and income. Deprived backgrounds are also reflected in health inequalities, because financial deprivation has negative effects on children and adolescents in several ways. Emphasising the fact that social disadvantage has an effect on the quality of health care (e.g. in case of purchasing dentures or in communications between doctors and patients) most of the affected children and adolescents live in small flats with poor facilities; the immediate environment does not provide many opportunities for play or for other spare time activities; they have fewer holidays, get less pocket money and therefore they are not able to spend as much money on expensive clothing or on hobbies. Furthermore because of the lack of money children and adolescents battle against conflicts within the family and fight against social exclusion by their peers at school, or in clubs and societies. When children grow up in poverty they often have less self-confidence and they are restricted in their range of social competence. This is combined with a limited ability to deal with stressful situations or to manage conflicts. In addition these children and adolescents experience greater risks to their health because of poor nutrition, smoking, unwillingness to follow guidelines, etc. These factors are mirrored in the explanatory model produced by Mielk (2000) which was modified for use with children and adolescents by Ellsaeßer et al. (2002):

FIGURE 2: THE RELATIONSHIP BETWEEN THE SOCIAL SITUATION AND THE HEALTH OF CHILDREN AND ADOLESCENTS³



3 Ellsaeßer et al. (2002): p.4

For this intervention the school setting is not limited to particular teaching groups, but is rather a physical activity programme which should be used with different groups of young people; the school itself should be used as a space in which the physical activity can take place.

2.5.5 Target group children in the primary school

Even though children have an incredible amount of energy this is being increasingly constrained by technological innovations, media consumption and by urbanisation. It is also influenced by role models within the family and by peer groups (Graf et al.2006). The intervention presented here does not address all the children in primary schools in the same way. The intervention targets girls and boys between 6 and 11 years old who go to primary school and who differ from other children in the amount of physical activity they perform. This includes children who have a lack of exercise, who are not in a sports club or who do not regularly practise any other kind of sport. In this way a group of like-minded children can come together and get the chance to develop patterns of behaviour involving physical activity without being affected by their more sporty classmates.

2.5.6 Other participants involved in the intervention

In addition to the children, who are as key members the centre of interest for the intervention, there are several other participants involved in the intervention. These include parents, teachers and of course the group leaders who all play a part in the success of the intervention.

2.5.6.1 Involvement of parents and teachers

In addition an information session is to be held for the parents at the start of the intervention to provide motivation. The parents will be informed here about current knowledge concerning children who carry out insufficient physical activity. The parents will also be informed about the development of the intervention and about its content. They will also be asked for their support. In order to make them more receptive to the study the parents are also informed about the different methods used to evaluate the project.

Part of the process of enlisting schools to take part in the project involves making teachers

receptive to the idea of the study when schools subscribe to the project. As soon as the governing body of the school is convinced of the value of the intervention, teachers need to be informed about the intervention and about how it will be evaluated. It is very important for the teachers to be familiar with the content of the intervention, because they are the key carers for the children and they have the role of imparting the principles of the intervention both inside and outside the class room.

2.5.6.2 Group leaders

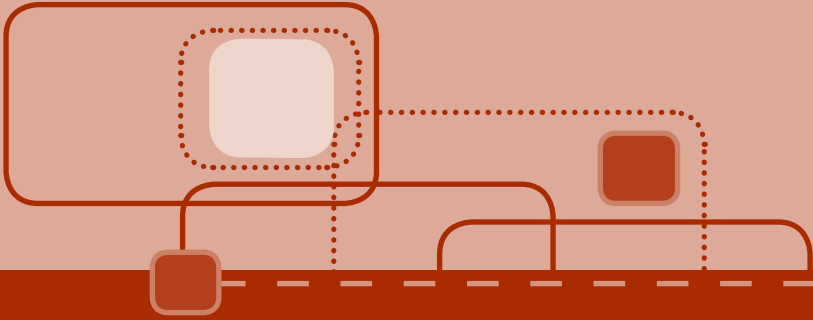
The group leaders for the intervention Promoting Physical Activity in Primary School Children need to be locally-based physiotherapists. The group leaders receive additional training about the intervention. Here the content of the intervention is described and the evaluation of the intervention is examined more closely. It is also necessary at this stage to make the physiotherapists receptive to the idea of the study and to make them familiar with the tools used for the evaluation. Only if the group leaders can identify with the ideas behind the study can the collection of data take place.

2.5.6.3 Ethical Approval

All parents whose children are involved in the intervention gave their informed consent for the children to take part. As an additional safeguard the various European member states have certain rules concerning ethical approval. Approval for the study must be granted by an authorised ethics committee in accordance with the various local rules and regulations.

3

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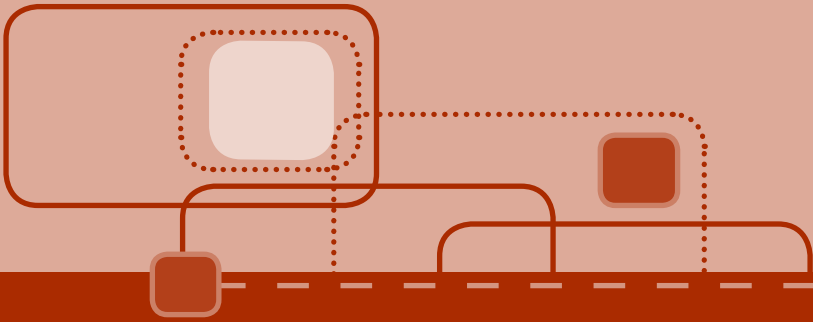
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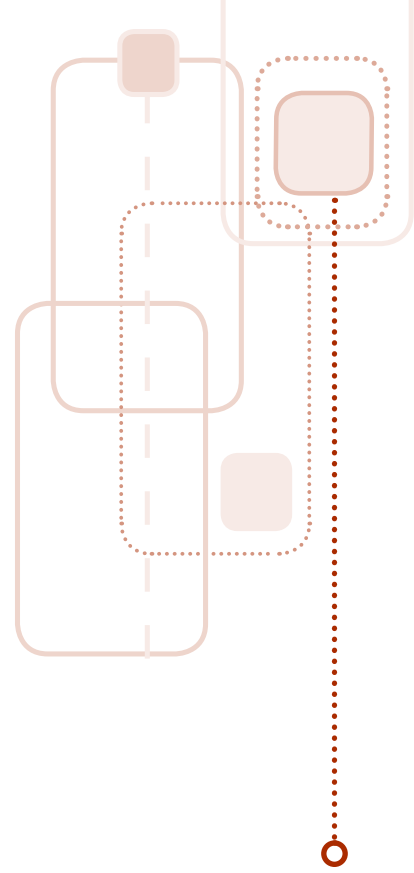
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Appendix



4 Appendix

1. Module details
2. Worksheets
3. Physical activity diary



4. MODULE DETAILS: ENDURANCE

Module Title	Aerobic endurance: 'Never out of puff!'	
Module description	<p>This module enables children to develop a basic theoretical background concerning aerobic endurance and its importance in relation to a healthy lifestyle. Successful participation in this module will enable children to:</p> <p>Experience a range of physical activities suitable for improving aerobic endurance, adequate both for use in a group as well as individually in organised and non-organised settings.</p> <p>Gather knowledge about the physiology of the cardiovascular system and its adaptation in response to challenges, when resting and when inactive.</p> <p>Apply the knowledge gained to aerobic endurance training appropriate for children with the objective of physically improving their aerobic endurance.</p> <p>Learning activities include two sessions. Session one combines non-organised physical activity with the underlying theoretical knowledge about the cardiovascular system. Session two focuses on experiencing an organised form of physical activity.</p> <p>Assessment will be by means of a worksheet requiring answers to 4 basic questions concerning the theory content of the module. Results will only be used to evaluate the effectiveness of the module.</p>	
Structure	Lecturer	Group leader
Session 1	Physical activity	Non-organised (i.e. not based in a club, society, association or similar), but instead practical in everyday settings such as public parks, playgrounds or pools using either no equipment or equipment that is readily available such as balls or skipping ropes and which ultimately will not need to be guided by an adult. Examples include running, swimming, skating, cycling, soccer, basketball etc. In order to improve co-operation, agreement should be reached within the group concerning the activities to be carried out.
	Knowledge to be gained and its application	<ul style="list-style-type: none"> • What is aerobic endurance and what do we need it for? • How does aerobic endurance relate to the cardiovascular system and what constitutes this system? • How does the cardiovascular system respond to activity and inactivity? • How much aerobic endurance should children my age have and how can I tell the state of my cardiovascular system?

Structure		
Session 2	Physical activity	Organised in contexts such as schools, clubs, societies, associations or similar, and ultimately guided by professionals such as coaches, physiotherapists, teachers etc. To achieve better long term outcomes for the intervention, co-operation with local providers of suitable endurance activities should be achieved. Joint use of organised physical activities for different modules may be carried out to suit the organisational needs.
Assessment	<p>The worksheet should consist of the following questions (sample answers given in brackets):</p> <ol style="list-style-type: none"> 1. What is aerobic endurance? (The ability to be active for a long time without having to stop to catch my breath.) 2. What is the main advantage of a strong cardiovascular system? (It helps the body to fight illnesses and injuries.) 3. How can you tell that your cardiovascular system is being challenged? (I breathe more heavily, my heart beats faster and it feels harder to continue being active without taking a break.) 4. Give three different activities that require aerobic endurance. Which of these is your favourite? (Jogging, cycling and soccer. My favourite is soccer. (Liverpool are the best!)) 	

5. MODULE DETAILS: COORDINATION

Module Title	Coordination: ‘Move like an acrobat’	
Module description	<p>This module enables the children to develop a basic theoretical background concerning coordinative abilities and its importance in relation to a healthy lifestyle. Successful participation in this module will enable children to:</p> <ul style="list-style-type: none"> • Experience a range of physical activities suitable for improving coordination, adequate both for use in a group as well as individually in organised and non-organised settings. • Gather knowledge about how joints, muscles and nerves work together in dealing with challenges involving coordination, and how their coordination skills respond to challenges, when resting, and when inactive. • Apply the knowledge gained to coordination exercises appropriate for children with the objective of improving their coordination skills. <p>Learning activities include two sessions. Session one combines non-organised physical activity with the underlying theoretical knowledge about coordination skills. Session two focuses on experiencing an organised form of physical activity.</p> <p>Assessment will be by means of a worksheet requiring answers to 4 basic questions concerning the theory content of the module. Results will only be used to evaluate the effectiveness of the module.</p>	
Structure	Lecturer	Group leader
Session 1	Physical activity	Non-organised (i.e. not based in a club, society, association or similar), but instead practical in everyday settings such as public parks, playgrounds or pools using either no equipment or equipment that is readily available such as balls or skipping ropes and which ultimately will not need to be guided by an adult. Examples include different kinds of skipping using ropes, general balance exercises (e.g. on fallen trees), running games focussing on agility, ball games requiring accuracy, gymnastic exercises, etc. In order to improve co-operation, agreement should be reached within the group concerning the activities to be carried out.
	Knowledge to be gained and its application	<ul style="list-style-type: none"> • What is coordination and what do we need it for? • Who are the players in the ‘coordination team’, and how do they respond to activity and inactivity? • How do my sense of balance, muscle control and reactions contribute to my agility? • How can I test my own personal ‘coordination team’? • How can I learn to move like an acrobat?

Structure Session 2	Physical activity	Organised in contexts such as schools, clubs, societies, associations or similar, and ultimately guided by professionals such as coaches, physiotherapists, teachers etc. To achieve better long term outcomes for the intervention, co-operation with local providers of suitable activities involving coordination should be achieved. Joint use of organised physical activities for different modules may be carried out to suit the organisational needs.
Evaluatio	The worksheet should consist of the following questions (sample answers given in brackets): <ol style="list-style-type: none"> 1. What is coordination? (The ability to perform difficult movements more easily). 2. What is the main advantage of ‘moving like an acrobat’? (It is easier not to get hurt when you fall or have an accident). 3. How can you test your coordination yourself? (I try to stand on one leg with my eyes closed for as long as I can. My friend can count how many seconds I manage). 4. Give three activities you can do on your own to improve your coordination. (Skip-ping using a rope, handstands and skateboarding). 	

6. MODULE DETAILS: SPEED

Module Title	Speed: 'Faster than light!'	
Module description	<p>This module enables children to develop a basic theoretical background concerning speed and its importance in relation to a healthy lifestyle. Successful participation in this module will enable children to:</p> <ul style="list-style-type: none"> • Experience a range of physical activities suitable for improving their speed, adequate both for use in a group as well as individually in organised and non-organised settings. • Gather knowledge about how joints, muscles and nerves work together in fast movements of the human body and the response of speed to challenges, when resting and when inactive. • Apply the knowledge gained to exercises involving speed appropriate for children with the objective of improving their speed. <p>Learning activities include two sessions. Session one combines non-organised physical activity with the underlying theoretical knowledge concerning speed. Session two focuses on experiencing an organised form of physical activity.</p> <p>Assessment will be by means of a work sheet requiring answers to 4 basic questions concerning the theory content of the module.</p> <p>Results will only be used to evaluate the effectiveness of the module.</p>	
Structure Session 1	<p>Lecturer</p> <p>Physical activity</p> <p>Knowledge to be gained and its application</p>	<p>Group leader</p> <p>Non-organised (i.e. not based in a club, society, association or similar), but instead practical in everyday settings such as public parks, playgrounds or pools using either no equipment or equipment that is readily available such as balls and stop watches and which ultimately will not need to be guided by an adult. Examples include different kinds of races including relay races, and various task such as catching a ball in time, physically responding to a given signal as quickly as possible, etc. In order to improve co-operation, agreement should be reached within the group concerning the activities to be carried out.</p> <ul style="list-style-type: none"> • Why to we need to move fast sometimes, and what happens if we cannot? • Which body components make us fast, and how do they respond to activity and inactivity? • Why does speed with a lack of control not help us very much? • How can I test my own personal speed? • How do I become super fast?

Structure		
Session 2	Physical activity	Organised in contexts such as schools, clubs, societies, associations or similar, and ultimately guided by professionals such as coaches, physiotherapists, teachers etc. To achieve better long term outcomes for the intervention, co-operation with local providers of suitable activities involving improving speed should be achieved. Joint use of organised physical activities for different modules may be carried out to suit the organisational needs.
Evaluation	<p>The worksheet should consist of the following questions (sample answers given in brackets):</p> <ol style="list-style-type: none"> 1. Which body components need to work together to make us move fast? (My brain, my muscles, my joints and my nerves). 2. What is the main advantage of being fast? (It is easier to avoid accidents and injuries). 3. What is more important: being faster than some somebody else, or being faster than you were yourself a month ago? (Being faster than I was before). 4. Give three games that help you to become faster. (Relay races, baseball and playing tag). 	

7. MODULE DETAILS: STRENGTH

Module Title	Strength: ‘Strong as King Kong’
Module description	<p>This module enables children to develop a basic theoretical background concerning strength and strength training and the benefit of a well-trained muscle system in relation to a healthy lifestyle.</p> <p>Children learn to assess their own ability as well as finding their limits concerning muscular strength. They assess their tolerance to physical exertions and explore training as a means of increasing their muscular performance.</p> <p>The module also lets the participating children experience a wide range of physical activities involving play designed to increase their anaerobic endurance, velocity strength and maximum strength. It also motivates the children to be physically active in their play.</p> <p>Knowledge to be gained involves learning:</p> <ul style="list-style-type: none">• How muscles can be strengthened and why one should exercise one’s muscles• The basics of muscle physiology and training physiology• About types of strength training (anaerobic endurance, maximum strength, velocity strength)• About the assessment of exertion (Borg Scales for children) <p>Practical examples of strength training involving play include ‘camouflaged’ circuit training sessions demanding the execution of a range of exercises designed to stimulate muscular strength in all the major muscle groups.</p> <p>Learning activities include two sessions. Session one combines non-organised physical activity with the underlying theoretical knowledge concerning speed. Session two focuses on experiencing an organised form of physical activity.</p> <p>Assessment will be by means of a work sheet requiring answers to 4 basic questions concerning the theory content of the module. Results will only be used to evaluate the effectiveness of the module.</p>

Structure Session 1	Lecturer	Group leader
	Physical activity	<p>Non-organised (i.e. not based in a club, society, association or similar), but instead practical in everyday settings such as public parks, playgrounds using equipment that is readily accessible or easily transportable such as rope ladders, step ladders, the branches of trees and park benches.</p> <p>The strengthening exercises can be in the form of ‘camouflaged’ circuit training which features the children as heroes undertaking difficult tasks (e.g. rescuing people, pioneering difficult wild terrain, climbing mountains...). This requires a gym prepared for the activities, or suitable outdoor facilities.</p>
	Knowledge to be gained and its application	<p>The knowledge to be gained involves dealing with the following questions</p> <ul style="list-style-type: none"> • What is strength? • Why is it good to train to gain strength (orthopaedic considerations)? • Everyone has their own strength training potential • Why everybody can train to gain strength • How do muscles work (basic biomechanics and physiology)? • How do muscles get stronger (stimulus, overcompensation)? • Types of ‘strength’ anaerobic endurance, maximums strength, velocity strength • When should I stop exercising? • Sore muscles’: hurt or harm?
Structure Session 2	Physical activity	<p>Organised in contexts such as schools, clubs, societies, associations or similar, and ultimately guided by professionals such as coaches, physiotherapists, teachers etc. To achieve better long term outcomes for the intervention, co-operation with local providers of suitable activities involving improving speed should be achieved. Joint use of organised physical activities for different modules may be carried out to suit the organisational needs.</p>
Assessment	Assessment is carried out by a quiz covering the theoretical aspects of strength training	

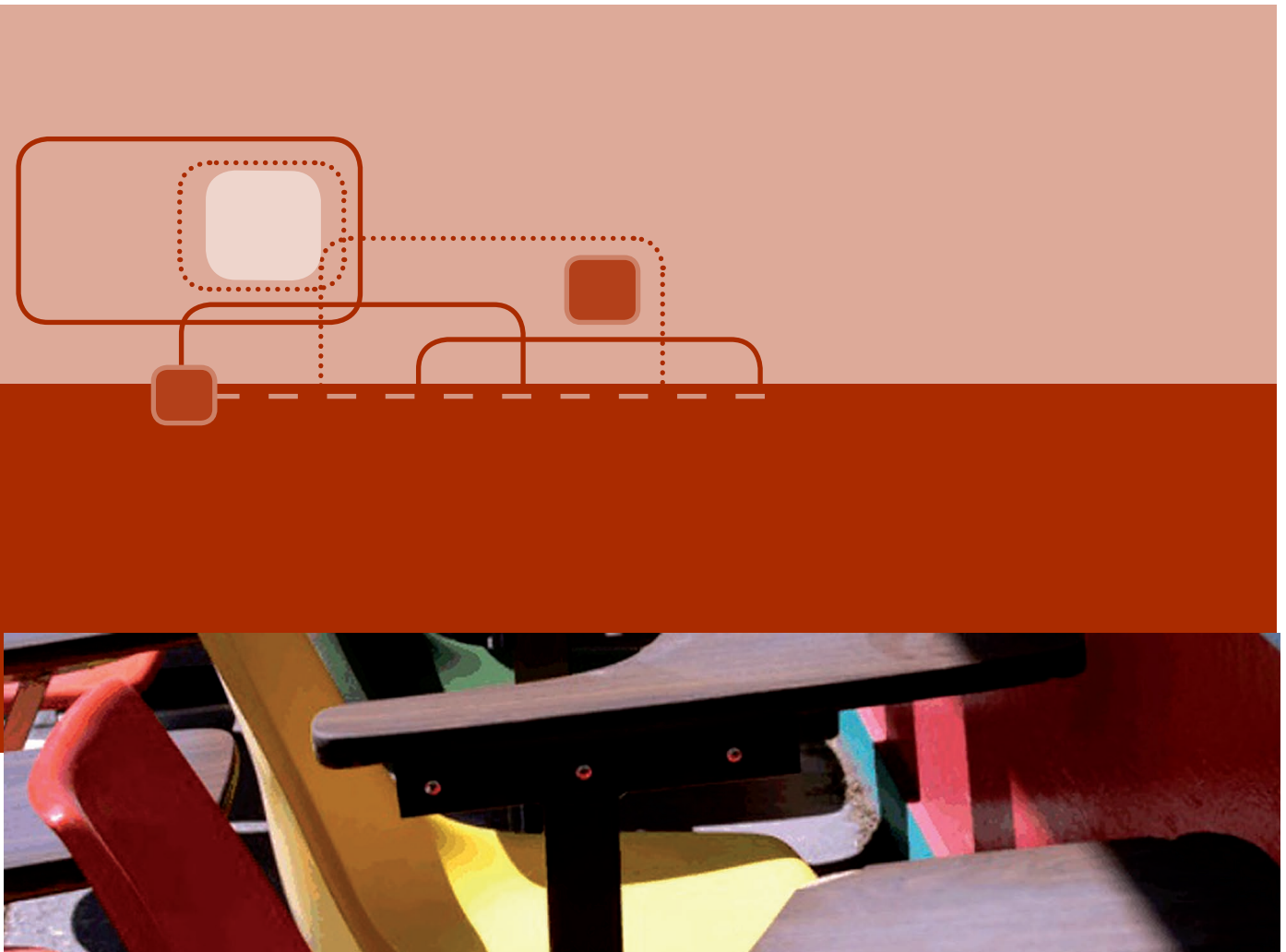
8. MODULE DETAILS: AGILITY

Module Title	Mobility/Agility: ‘Move like a snake’	
Module description	<p>This module enables children to develop a basic theoretical understanding of the concept of mobility. It enables them to understand consequences of a lack of mobility or agility in relation to a healthy life style.</p> <p>Children learn to appreciate the benefits of mobility/agility in their everyday lives.</p> <p>Participating children experience a wide range of physical activities involving play which are designed to increase their mobility/agility. This motivates the children to be physically active in their play in order to maintain or improve their mobility.</p> <p>Practical examples of agility training involving play are circuit training sessions demanding the execution of a range of exercises designed to improve mobility.</p> <p>Learning activities include two sessions. Session one combines non-organised physical activity with the underlying theoretical knowledge concerning speed. Session two focuses on experiencing an organised form of physical activity.</p> <p>Assessment will be by means of a work sheet requiring answers to basic questions concerning the theory content of the module. Results will only be used to evaluate the effectiveness of the module.</p>	
Structure	Lecturer	Group leader
Session 1	Physical activity	<p>Non-organised (i.e. not based in a club, society, association or similar), but instead practical in everyday settings such as public parks, playgrounds using equipment that is readily accessible or easily transportable such as chairs (agility tunnel) broom handles, buckets ladders and garden hoses.</p> <p>The mobility exercises can be in the form of ‘camouflaged’ circuit training which stimulates the children’s imaginations and features the children as heroes undertaking difficult tasks (e.g. exploring a cave, fighting a fire...)</p> <p>This requires a gym or suitable outdoor facilities.</p>
	Knowledge build up and transfer	<p>The knowledge to be imparted (theoretical understanding) includes:</p> <ul style="list-style-type: none"> • How joints work • How the body tends to lose capacity for mobility if it is not used (particularly the spine) • How training can improve mobility. • How the children can assess their own mobility through simple tests

Structure		
Session 2	Physical activity	Organised in contexts such as schools, clubs, societies, associations or similar, and ultimately guided by professionals such as coaches, physiotherapists, teachers etc. To achieve better long term outcomes for the intervention, co-operation with local providers of suitable activities involving improving speed should be achieved. Joint use of organised physical activities for different modules may be carried out to suit the organisational needs.
Assessment	Assessment is carried out by a quiz covering the theoretical aspects of mobility/agility training.	

5

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This project has been co-funded by the Executive Agency for Health Consumers under the Public Health Programme 2003 - 2008