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Sport injuries prevention strategy in active children. The Giocampus Barilla experience

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Dear Editor,

In children regular physical activity plays a key role in order to develop motor skills and to build relationships with peers. It's commonly accepted that daily exercise leads to several health benefits. Updated recommendations suggest that children and adolescents should have 60 minutes or more of physical activity every day (1).

The progressive involvement of the children in sport and physical recreation leads to an increased risk of injuries that may result in lifelong health problems.

Most common sports injuries involve the soft tissues of the body such as sprains (injuries to ligaments) and strains (injuries to muscles). Only about 5% of sports injuries involve bones but children are at more risk of bones injury because of the rapid growth that occurs especially during puberty.

Even if acute trauma is the most sustained injury, in children and adolescents overuse damage is dramatically growing.

These injuries may limit involvement in regular exercise, and may have a negative impact on their future social health (2, 3). Many adolescents drop out of a sport just as a result of an injury, and knee, ankle and foot injuries during childhood or adolescence may increase the risk of osteoarthritis in adulthood (4, 5).

No evidence exists about the possibility to reduce the risk for these undesired sport-related injuries through a specific prevention program. The aim of this communication is to report the positive results obtained with a trainers-centred prevention program set in a large cohort of children participating in two consecutive Barilla Summer Sport School (Giocampus Barilla).

In 2008 and 2009 Giocampus Barilla editions 2825 and 2540 children, aged 6 to 14 years, were respectively admitted to participate in the Sport School. These organised sport activities took place in the Campus sport area of the University of Parma, from June to September, in collaboration with Barilla Group, Postgraduate Medical School of Paediatrics and the Graduate School of Sport and Exercise Sciences of the University of Parma.

On average four hundred children at every turn are admitted for a period of time lasting 15 days, spending 8 hours a day (9 a.m. to 5 p.m., Monday to Friday) in physical activities (i.e. soccer, volleyball, basketball, artistic dance, tennis, fencing and athletics) under the supervision of about 30 professional instructors.

Medical assistance was always provided by the presence in the Infirmary of a Resident of the Postgraduate School of Paediatrics of the University of Parma.

During the Giocampus Barilla every medical intervention was filed on an electronic database. Causes, types and treatment of injuries were collected. In "Giocampus Barilla 2008", no injury prevention program was promoted. On the contrary, during "Giocampus Barilla 2009" a specific prevention program for the instructors was arranged.

Throughout the course of "Giocampus Barilla 2008", 22% of the children required medical assistance because of upper or lower extremity injuries (including

fractures, contusions, muscle strains and sprains: 18%), skin wounds (20%), heatstroke (including sun rush and nose bleeding: 20%), minor cranial traumas (9%), insect stings (9%) and gastrointestinal symptoms (12%). Others reasons of access to Infirmary included asthma, sore throat, headache and earache (12%).

Before the beginning of "Giocampus Barilla 2009", a four-hour educational program designed for the trainers was developed, in the attempt to decrease the injury rate observed in the previous edition. Medical staff educated trainers how to prevent, to recognise and to manage the most common injuries in children participating in physical activity. Placards displaying the first aid actions to be taken in case of simple injuries were installed in the potential injury hotspots of the Campus area (Figures 1 and 2).

The prevention strategy concerned: 1) slow and gentle stretching before any exercises in order to increase flexibility of muscles and tendons used in play; 2) rest periods during practice and games to reduce the risk of overuse injuries; 3) interruption of physical activity whether the child feels tiredness or pain; 4) strict rules, for example against spearing in soccer, to play safe and prevent serious injuries; 5) removal of obstacles and repair of holes and uneven surfaces to play on safe fields; 6) check on children equipment before beginning any sports: proper clothes, properly fitting footwear, pads, helmets and goggles in the swimming pool; 7) appropriate fluids intake before, during

Figures 1, 2. Original placards placed all around the Campus displaying recommendations and the first aid actions

and after exercise (each 20 minutes) to prevent heat injury.

As protection against heat injury we also suggested: 1) dressing the kids in cool and comfortable clothing that covered the body like lightweight cotton pants, T-shirts and hats with brim; 2) limiting sun exposure between 12 a.m. and 3 p.m. when UV rays are strongest; 3) finding shade whenever possible; 4) using sunscreen regularly.

Special attention was focused on heat injury because children sweat less than adults, acclimatize slower to warm environments and may be more at risk for heat-related injuries in hot and humid conditions (6).

In the course of "Giocampus Barilla 2009" the total number of acute injuries decreased by 6% ($p < 0.001$). A significant decrease was found in heat strokes (12.5% vs 20%; $p < 0.05$), skin wounds (7.5% vs 20%; $p < 0.001$), and insect stings (5% vs 9%; $p < 0.05$). No reduction was observed in upper or lower extremity traumas and minor head injuries.

The results revealed that 37% of the injuries happened during unstructured "free play". In literature there are no study reporting injury rates for unorganised sports (7).

No difference was found in injury rate between boys and girls; age had no influence.

Drug administration (Acetaminophen, anti-histamines, topical non steroidal anti-inflammatory and topical glucocorticoids) or ice pack application were required for 33% of the children. The others injuries solved with conservative treatment or rest. No one needed to be admitted to the hospital.

In summary, appropriate stretching, proper protective equipment, safety measures such as moderation of intensity during physical activity, have the key roles to prevent injuries in children participating in physical activity.

More effort is needed to decrease the incidence of sports-related head injuries and upper or lower extremity traumas. These kinds of injuries may be due to unstructured activities that facilitate accidental falls, collision and body contacts contributing to the phenomenon of unintentional injury. Organised sports, children education, and constant supervision of the instructors are crucial to minimize this injury rate. In addition safety rules and the fair-play concept may be applied to the contact sports to reduce rule infractions.

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