Open air children playgrounds: the importance of microbial control of floor

DE INVESTIGAÇÃO INTERDISCIPLINAR EGAS MONIZ



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Introduction

Playgrounds are places of entertainment integrated in society, they serve the child population, and they are generally regarded as safe areas. However, dogs, birds and other animals share the environment and children could be exposed to a variety of microorganisms, some of them potentially pathogenic carrying antibiotic resistance.









Open air playgrouns

Materials and Methods

During nine months, 30 playgrounds, located in grand area of Lisboa, were examined twice per month.

The samples have been collected near the surface of playground toys and trees and consisted of pebble stone (5mm), synthetic floor and sand. The washing solutions of sand and pebble stone, and the solution where the swabs were immersed from synthetic floor were used to inoculate different culture media. Biochemical tests and antimicrobial susceptibility were determined among selected bacteria.

Results

- → The total amount of microorganisms were variable among the 30 playgrounds. Low contamination is directly related to the cleaning conditions, animal control of the facilities and social status of population.
- Climatic changes have a major impact on microbial flora: the increase on temperature and the reduction of rainfall resulted in a significant decrease in the quantity of microorganisms.
- → The type of floor influenced the results: synthetic floor showed the higher number of isolates with antibiotic resistance.
- Staphylococcus aureus coagulase-positive was isolated with major incidence during winter time.
- Resistance to antibiotics used in clinical practice was detected in bacteria isolated from different playgrounds.

Bacteria	
Acinetobacter baumannii/ calcoaceticus	Lactococcus lactis app
Aerococcus viridans	Micrococcus m
Aeromonas hydrophila/caviae	Pontea
Butiauxella agrestis	Pseudomonas
Brevandimonas vezicularis	Pseudomonas aeruginosa
Citrobacter braukii	Pseudomonas patida
Citrobacter freundi	Salmonella
Citrobacter Koseri/amalonaticus	Salmonella choleraesuis ssp arizonae
Chryseobacterium indologenes	Serratia Ficaria
Citrobacter youngae	Serratia odorifera
Enterobacter	Staphylococcus aureus
Enterobacter annigenus	Staphylococcus lentus
Enterobacter cloacae	Staphylococcus xylonas
Enterobacter intermedias	Klebriella pneumoniae spp
Enterococcus durans	Klebniella oxytoca
Enterococcus faecium	Klayvena app
E. coli	Vibrio parahaemolyticus
Escherichia hermannii	Vibrio valnifican
Escherichia vulneris	
Hafria alvei	
Fungus	
Alternaria	-
Aspergillas ap	
Aspergillus niger	
Candida albicans	
Fanariam	
Geotrichum	

→ The microorganisms found are part of commensal flor from humans and animals, however normal flora bacteria can act as opportunistic pathogens at times of lowered immunity.

- It was worrisome the identification of Staphylococcus aureus meticilline resistant (MRSA). The mecA gene was confirmed by PCR amplification.
- The cephalosporinase AmpC-type was identified among Escherichia coli and Citrobacter species. This β-lactamase conferred resistance to cephalosporins and was inhibited by cloxacillin





At the end of the study, we analised samples collected after the hygiene and cleanliness of the playgrounds. The number of microorganisms lowered significantly, showing that this control is essencial, when repeated periodically, and performed by playground cleaning specialists.

Conclusions

The importance of microbiological control was demonstrated in our work, emphasizing the need for cleaning of playgrounds that could serve as the vehicle transmission of pathogenic microorganisms