

Manchester United's rising stars revolutionize heart health

January 28 2015

A unique research project to identify the effects of exercise on young hearts has been announced today [Wednesday 28 January 2015].

Manchester United's Academy players are being put through their paces having their hearts monitored by the newest imaging technology to give invaluable insights into how young people's hearts work while doing exercise.

The project, led by the Bristol Heart Institute at the University of Bristol together with partners Toshiba Medical Systems, Bristol's Clinical Research and Imaging Centre (CRICBristol), the University of Exeter's Children's Health and Exercise Research Centre and Manchester United, will identify the healthy limits and the wider benefits of [exercise](#) for young elite athletes, normal healthy children and children with [congenital heart defects](#).

The research partnership, the first of its kind, will investigate the fitness levels of 300 children whilst exercising, when the [heart](#) is working harder. Participants are made up of 100 children born with heart conditions, 100 healthy children and adolescents and 100 elite junior athletes from the Manchester United Academy.

The research, supported by the National Institute for Health Research (NIHR), will help to identify heart performance of the different groups under stress, to help with better identification of abnormalities, which sometimes do not present themselves at rest. At the moment, echocardiograms in children have traditionally been used while patients

are at rest, making it more difficult to assess heart performance and mild functional abnormalities. This study will monitor heart function at rest and during maximum exercise while simultaneously assessing exercise capacity and performance as well as lung function in a time efficient manner in a single setting.

The first stage of the research collaboration early this year will test 40 children with congenital heart disease, 40 normal healthy children and 20 elite athletes, with the 300 cross group tests and findings completed by 2016.

Testing on elite youth athletes is already underway at Manchester United. Elite athletes at Manchester United's Academy train in a professional environment for between ten and 12 hours every week and it is important to assess progress and performance but also define healthy exercise quantities to optimize each athlete's potential.

The overall aim of the project is to more precisely identify the safe levels of exercise for children with congenital heart disease, as well as to clearly define the positive benefits that regular exercise delivers to normal healthy children over time. Additionally, data from the young athletes will be used to improve screening protocols for cardiac abnormalities in young athletes. The exercise and performance data will benefit the club and the young athletes as it aims to help optimize performance and individual training programmes based on exact physiological requirements and limits.

Dr Dave Perry, Academy Doctor at Manchester United, said: "Our players at the Academy have been offered an amazing opportunity to receive a most comprehensive screening of their cardiovascular (CVS) health. The screening process offered by Toshiba Medical Services in conjunction with the Bristol Heart Institute and University of Exeter's Children's Health and Exercise Research Centre will give a novel way of

ensuring that they have no identifiable cardiac issues.

"The screening will allow examination of their hearts while under intense stress using the Toshiba Artida™ cardiac ultrasound system. This can be further followed up by the use of the Toshiba Magnetic Resonance Image scanner (MRI) to provide comprehensive assessment of CVS health and fitness. The players are enthused that their information will help to contribute to furthering knowledge about the health of the nation.

"The screening process will help to provide reassurance to the player's parents that their son is capable of withstanding the demands that training at an elite level requires. Parents frequently ask me with regard to the risks of Sudden Cardiac Death (SCD) while exercising and the current pathway will hopefully provide some reassurance.

"It is hoped that the information from the fitness assessment will help to develop and fine tune the club's Sports Science Department training programmes."

The research collaboration is being led by the Bristol Heart Institute, which hosts the NIHR Bristol Cardiovascular Biomedical Research Unit (BRU), a joint initiative between the University of Bristol and University Hospitals Bristol NHS Foundation Trust (UH Bristol), in partnership with the University of Exeter's Children's Health and Exercise Research Centre, Toshiba Medical Systems and Manchester United.

Dr Guido Pieleles, NIHR-Clinical Lecturer in Paediatric Cardiology at the University of Bristol and Bristol Congenital Heart Centre, who is leading the [research project](#), said: "This is a unique study, using the latest technology to image the heart while it's 'at work' during exercise. We hope it will enable us to improve scanning protocols and applications, lead to a more precise and earlier diagnosis of heart function abnormalities and better monitoring of treatment progress in our young

patients with congenital heart disease. Our research will also help evaluate the benefits of exercise for the heart in obesity and other conditions caused by increasing sedentary lifestyles and poor diet.

"Not only will it allow us to identify effective diagnosis and treatment pathways for children with congenital heart disease but it will also provide new insights in the search for the right screening tools for heart abnormalities in youth athletes. Significant research progress has been made over the last decade in the adult athlete population to prevent exercise related sudden cardiac death (SCD), but validated screening protocols for childhood and adolescent athletes are still missing."

Dr Graham Stuart, Senior Consultant and Sports Cardiologist at the Congenital Heart Unit in Bristol, added: "Exercise is a critically important cardiovascular function which has been neglected in recent years, we hope this research will lead to the development of innovative diagnostic and treatment strategies in young people with heart disease."

Professor Craig Williams, Head of the University of Exeter's Children's Health and Exercise Research Centre, explained: "This research will provide us with the first ever normative database for the effects of exercise on young hearts. At the moment, we still don't understand what 'normal' looks like. By combining the three groups; elite athletes, normal healthy children and children with diseased hearts, we'll be able to identify what is abnormal and what is normal.

"This research will allow us to better identify how much activity and how often exercise can be taken, as at present clinicians aren't really sure what advice for children with certain conditions should be prescribed. The findings of this research will be a significant step forward for clinicians as care providers to deliver wellbeing guides for the children with [congenital heart disease](#), their families and carers. Additionally the benefits of better understanding the effect of exercise on normal healthy

children will help the health service identify and prescribe regimes that help ease treatment burdens for young people with sedentary lifestyles."

The research will be undertaken using Toshiba's Artida™ high-end ultrasound scanner. Its revolutionary High Density Architecture provides the researchers with clinical images of exceptional resolution and detail even whilst the child is exercising. Additionally, the system is equipped with a wide range of powerful clinical tools for advanced visualization, quantification and intervention for daily routines during this clinical research project.

Mark Hitchman, Managing Director of Toshiba Medical Systems, said: "Toshiba's heritage in applied research and development means that we have developed the technical capabilities to be an important partner in research of this kind. We're excited to see the initial results from our world-class football and research partners and how the benefits can be passed on to the wider UK health system."

Dr Steve McNally, Head of Football Medicine and Science at Manchester United, added: "This research is the first practical example of the partnership between Manchester United and Toshiba Medical Systems making a significant contribution to the development of healthcare for the general population, whilst also innovating in the field of Sports Medical Screening."

Provided by University of Bristol

Citation: Manchester United's rising stars revolutionize heart health (2015, January 28) retrieved 29 April 2024 from

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