

# Increasing clarity for medics in suspected physical abuse cases

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Researchers at the University of Sheffield and The Children's Hospital, Sheffield, are developing techniques which will help clinicians more accurately identify whether injuries sustained by young children are as a result of accident or abuse.

Currently [medical professionals](#) base their decisions on their prior knowledge and experience. This can be subjective – and the ramifications of making the wrong decision can be huge, for both child and parent.

Dr Amaka Offiah, Consultant at Sheffield Children's NHS Foundation Trust, and senior lecturer at Sheffield University's Department of Human Metabolism along with a team of researchers from the Faculty of Engineering, are working together to create a system aimed at providing robust scientific evidence to support clinicians faced with having to assess how an injury may have been sustained.

"There needs to be a more scientific way of determining how an injury might have been caused," says Dr Offiah "Most physically abused children are too young to say how their injuries came about and we, as medics, are reliant on our own experience to make a decision about whether what the parent is saying is realistic or not."

This research is in its early stages and the multidisciplinary team, including engineers and medics, are currently working on creating computerised models which show how children's bones react to different

forces. To do this, Dr Offiah, along with Dr Matt Carré and Nick Emerson, from the University's Department of Mechanical Engineering, have been examining the effects of different types of force on pig bones, which are regularly used as a substitute for human bones in laboratory testing.

"This was the first stage of the work," says Nick Emerson. "To see whether we could use readily available animal bone samples for our laboratory testing, and accurately recreate various fractures using predictive software."

The researchers found they were able to predict the force necessary to create a fracture and where the fracture would occur with as much as 90 per cent accuracy. "We've proven that we can adapt the modelling process to match different bones," says Emerson. "To date we've only had a limited number of test scenarios and test samples. With further refinement and more expansive testing, we believe our results will show an even higher level of accuracy."

The next stage of the work is to gather more data to develop the technique and increase its accuracy. Additionally, the researchers need to conduct experiments on bones from younger animals, to assess the effects of age.

"There has been extensive research in locating fracture sites in adult human bones, but limited attempts to determine what causes those fractures," says Emerson. "We want to gain a much clearer understanding of fracture patterns in young bones and apply this to scan data from children. We hope this will provide more certainty in cases where a clinician suspects a child hasn't sustained his or her injuries in the way the carer says."

For medics, this support is vital. "It's sometimes very difficult to

determine how an injury has been caused, even for extremely experienced clinicians," says Dr Offiah. "Obviously we don't want to remove a child from a loving, nurturing home, but equally, no-one wants a child to return to a situation where they are being physically abused.

"The most important impact of this research will be to improve the confidence in judgements made when abuse is suspected and ultimately to improve the safety and wellbeing of vulnerable children."

The research project has been funded by The Children's Hospital Charity, who support and enhance the services of Sheffield Children's NHS Foundation Trust, including £250,000 of research each year into the prevention and cure of childhood illnesses. The charity also funded the country's first paediatric Clinical Research Facility which opened at the hospital in 2008.

Provided by University of Sheffield

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