

## Revolutionising Breast Health Monitoring with Robotic Devices



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A device for conducting Clinical Breast Examinations (CBE) has been developed. The manipulator, designed by a team at the University of Bristol and based at the Bristol Robotics Laboratory, can apply precise forces similar to those used by human examiners and is equipped with sensor technology that allows it to detect lumps.

Safe electronic CBEs could change how women monitor their breast health, as the device and sensor will have the ability to detect lumps more accurately and deeper than the human touch alone.

The devices will be located in accessible places including pharmacies and health centres.

The research team explained that if the device performing CBEs is executed effectively, there is a high likelihood that it becomes a valuable and low risk diagnostic technique.

There have been numerous past attempts to better the quality of Clinical Breast Examinations performed by healthcare professionals using technology, involving robots or electronic devices for palpating breast tissue. However, the significant technological advancements in manipulation and sensor technology over the last decade have placed researchers in a better position to achieve this goal.

The primary question the team aim to address is whether a specialised manipulator can exhibit the necessary dexterity to palpate a realistic breast size and shape effectively.

The team constructed their manipulator using 3D printing and other Computer Numerical Control (CNC) techniques. They conducted a combination of laboratory experiments and simulated experiments using both a silicone model of a breast and its digital twin.

The simulations enabled the team to conduct thousands of palpations and explore various hypothetical scenarios. In the laboratory, they experimented on the silicone breast to confirm the accuracy of the simulations and to discover the forces required for the actual equipment.

Overall, the goal of this research is to contribute to and complement the array of techniques used for diagnosing breast cancer.

One advantage, mentioned anecdotally by several doctors, is that this technology could offer a low-risk method to objectively record health data. For instance, it could make it easier to compare successive breast examinations or become part of the information shared with a specialist when a patient is referred for further evaluation.

Lead author George Jenkinson concluded, “our robotic system has the dexterity necessary to carry out a clinical breast examination – we hope that in the future this could be a real help in diagnosing cancers early”.

Source: [Bristol University](#)

Image Credit: George Jenkinson

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