Stanford University Reports Findings in Thrombectomy (Clot Treatment Via Spinning-induced Fibrin Microstructure Densification and Clot Volume Reduction): Surgery - Thrombectomy

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Summary: 2025 SEP 22-- By a News Reporter-Staff News Editor at Genomics& Genetics Daily-- Investigators publish new report on Surgery- Thrombectomy. According to news originating from Stanford, California, by NewsRx correspondents, research stated,“ Blood clots, composed of red blood cells embedded within a fibrin network, can cause life-threatening conditions such as...

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2025 SEP 22 (NewsRx) -- By a News Reporter-Staff News Editor at Genomics & Genetics Daily -- Investigators publish new report on Surgery - Thrombectomy. According to news originating from Stanford, California, by NewsRx correspondents, research stated, “Blood clots, composed of red blood cells (RBCs) embedded within a fibrin network, can cause life-threatening conditions such as strokes and heart attacks. However, conventional thrombectomy techniques, such as aspiration or stent retrievers, often struggle with large or tough clots, limiting their clinical efficacy.”

Financial support for this research came from Terman Faculty Fellow-ship and Gabilan Faculty Fellowship.

Our news journalists obtained a quote from the research from Stanford University, “The recently developed milli-spinner thrombectomy offers a breakthrough approach that fundamentally departs from these traditional methods. Instead of extracting the clot intact, the milli-spinner mechanically shrinks the clot by densifying its microstructure through the combined action of compression and shear forces, achieving up to 95 % volume reduction. This novel clot debulking strategy enables more effective clot removal and holds strong potential for significantly improved clinical outcomes in thrombectomy procedures. To uncover the underlying mechanisms and optimize performance, we combine in vitro experiments with dissipative particle dynamics (DPD) simulations for multiscale analysis of clot volume reduction and microstructural densification under integrated compression and shear. Experiments quantify macroscopic clot volume reduction under controlled loading, while simulations reveal microscale fibrin network densification and RBC release. This systematic study provides a quantitative understanding of how different loading modes alter clot microstructure across clot types.”

According to the news editors, the research concluded: “These findings lay the foundation for the rational design of next-generation thrombectomy systems, capable of mechanically reconfiguring clot microstructure in situ, offering enhanced efficacy and broader clinical applicability."

This research has been peer-reviewed.

For more information on this research see: Clot Treatment Via Spinning-induced Fibrin Microstructure Densification and Clot Volume Reduction. *Extreme Mechanics Letters*, 2025;79. *Extreme Mechanics Letters* can be contacted at: Elsevier, Radarweg 29, 1043 Nx Amsterdam, Netherlands.

The news correspondents report that additional information may be obtained from Ruike Renee Zhao, Stanford University, Dept. of Mechanical Engineering, Stanford, CA 94305, United States. Additional authors for this research include Yilong Chang, Jay Sim, Guansheng Li and George Em Karniadakis.

The direct object identifier (DOI) for that additional information is: https://doi.org/10.1016/j.eml.2025.102391. This DOI is a link to an online electronic document that is either free or for purchase, and can be your direct source for a journal article and its citation.

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