

RESUMO N° 336

EXPERIMENTAL AND NUMERICAL PROCEDURE TO DETERMINE THE FAILURE PROPERTIES DUE TO DEEP PENETRATION OF VENA CAVA TISSUE

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Inferior vena cava filters have been found to be safe and effective for the prevention and treatment of pulmonary embolism when anticoagulation is not possible or has failed. A complications such as cava perforation or filter migration are possible. However, [1] reported the penetration of struts and hooks of two inferior vena cava (IVC) filters (Günther tulip retrievable filter [GTF] and Celect filter) through the vena cava wall and to assess local or systemic complications resulting from this penetration.

Within this work we use an in-vitro mechanical test to explore the resistance of biaxially stretched vena cava tissue against deep perforation and a methodology that integrating experimental and numerical modeling to identify constitutive fracture properties of the vena cava.

Six sheep vena cava were harvested just after sacrifice and cyclic uniaxial tension tests in longitudinal and circumferential directions [2], and biaxially deep penetration testes were performed [3]. After that, we use a nonlinear Finite Element (FE) model to simulate in vitro penetration of the cava tissue in order to fit the fracture properties under penetration of the vena cava by defining a cohesive fracture zone. An iterative process were developed in order to fit the fracture properties of the vena cava using the previously obtained experimental results.

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